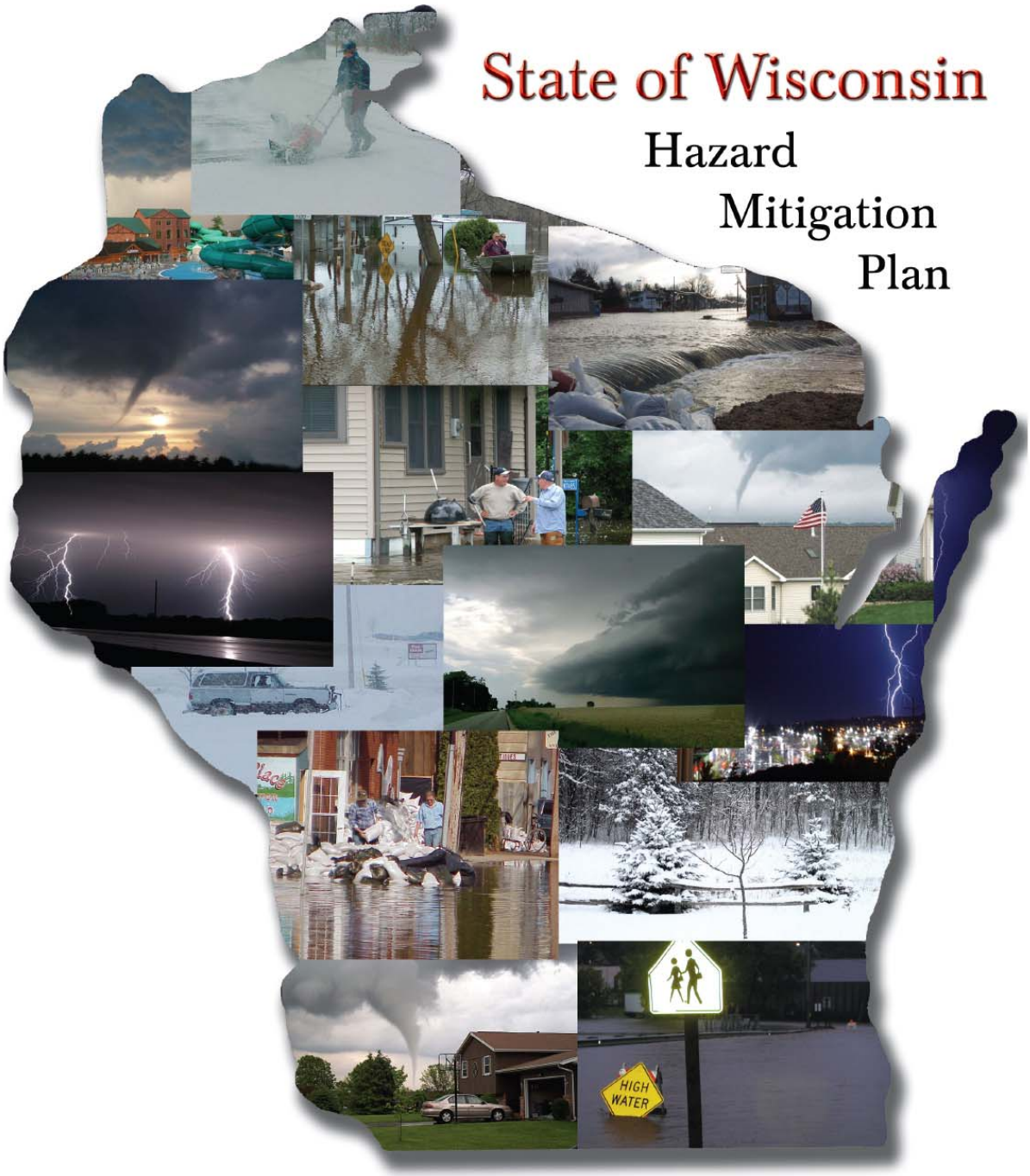
State of Wisconsin

Hazard Mitigation Plan



Wisconsin Emergency Management

Department of Military Affairs

October 2011

EXECUTIVE SUMMARY

Millions of dollars are spent each year on disaster response and recovery. By undertaking hazard mitigation – activities which will reduce the impact of future disasters – state and local governments and tribal organizations can reduce these costs and minimize the impacts of potentially disastrous events. Hazard mitigation can also be considered disaster prevention and encourages the development of disaster resistant communities. Wisconsin Emergency Management (WEM) is the lead agency for the hazard mitigation program in Wisconsin, a key component of which is the State of Wisconsin Hazard Mitigation Plan. The purpose of the original Plan was to identify Wisconsin's major hazards, assess the risk and vulnerability of the state to those hazards, and recommend actions to reduce vulnerability using the technical and programmatic resources of Wisconsin state agencies. Ultimately, the Plan strives to help protect the health, safety, property, environment, and economy of Wisconsin from the effects of natural hazards. In this three-year Plan update, all sections of the plan were reviewed and revised, and include updated data and demographics (where applicable), risk assessments, mitigation goals, strategies, action items, and other pertinent information.

This version of the State of Wisconsin Hazard Mitigation Plan is a natural hazard mitigation plan. The Plan has evolved over time. This Plan update builds upon the Risk Assessment and Mitigation Strategy that were developed in 2005 and updated in 2008. In addition, other plan elements were updated as needed to incorporate new information about hazards that threaten Wisconsin as well as changes to agency programs that address hazards. It is the hope of the Wisconsin Hazard Mitigation Team that technological hazards will be addressed in a future plan update.

The following State Mitigation Goals were updated by the Wisconsin Hazard Mitigation Team and serve as the foundation for updated State Mitigation Strategy:

1. Minimize human, economic and environmental disruption and reduce the potential for injury and loss of life from natural hazards.
2. Enhance public education about disaster preparedness and resilience, and expand public awareness of natural hazards.
3. Encourage and promote continued comprehensive hazard mitigation planning and implementation of the plan.
4. Support coordination and collaboration among federal, state, and local authorities, and non-governmental organizations regarding hazard mitigation activities.
5. Improve the disaster resistance of buildings, structures, and infrastructure whether new construction, expansion or renovation.

The State of Wisconsin Hazard Mitigation Plan is organized to closely follow the planning requirements found in 44 CFR Parts 201.4 and 201.5.

Section 1 serves as an introduction to the Plan. It includes the purpose and scope of the plan and identifies the regulations and assurances [201.4(c)(6) and 201.4(c)(7)]. It further acknowledges and thanks the members of the Wisconsin Hazard Mitigation Team for their efforts in this ongoing process. Finally, included in the introduction is background information on the State of Wisconsin. Every effort has been made to use the best available data for the update.

Section 2 describes and details the planning process used in update of the Plan including how it was prepared, who was involved, and how other agencies participated in the process. It describes the coordination among the state, federal, and other agencies and how the plan will be integrated with other state and federal planning efforts [201.4(b) and 201.4(c)(1)].

Section 3, the Wisconsin Risk Assessment [201.4(c)(2)] provides the following:

- An overview of the type and location of natural hazards that affect the state including updated information on previous occurrences of hazard events as well as the probability of future events;
- An overview and analysis of the state's vulnerability to the top natural hazards of flooding, tornadoes/high winds, coastal erosion, and wildfires;
- Describes jurisdictions most threatened by and vulnerable to the above identified hazards;
- An updated overview and analysis of potential losses to vulnerable structures including state-owned or -operated buildings, critical facilities, and infrastructure;
- An integration of the local hazard mitigation plan risk assessments into the State Hazard Mitigation Plan; and
- A discussion of the state's lifelines.

Section 4, the Mitigation Strategy, identifies the State's strategy for reducing the losses identified in the Wisconsin Risk Assessment [201.4(c)(3)]. The section identifies the State's mitigation goals to guide the selection of activities to mitigate and reduce losses. These goals were reviewed and revised during the 2011 Plan update process. Included is a State Capability Assessment that provides a summary of state policies, laws, regulations, programs, and capabilities that exist and support mitigation. The State Capability Assessment was updated by meeting with individual members of the Wisconsin Hazard Mitigation Team. A major component of the Mitigation Strategy is the specific mitigation actions that state agencies will implement. The mitigation actions were reviewed by the WHMT and each action's status (i.e. deleted, completed, ongoing, etc.) is discussed. New actions were also included. In the previous plan update, the action items were listed according to which goal they satisfied. This update lists them according to lead agency. The section ends with an updated discussion regarding hazard mitigation funding and information regarding potential funding sources for implementing mitigation measures at the state and local levels.

Section 5 describes the State's process for supporting, through funding and technical assistance, the development of local hazard mitigation plans [201.4(c)(4)]. It highlights the progress Wisconsin has made over the last three years in local mitigation planning. It also describes how the State coordinates with local jurisdictions to encourage and support all-hazards mitigation planning. In addition, the section highlights some of the recent trends and best practices in Wisconsin for local mitigation planning.

Section 6 describes the Plan Maintenance Process and includes the method and schedule for monitoring, evaluating, and updating the plan. It identifies how the State monitors project implementation closeouts, and reviews progress on achieving the goals of the Plan as well as the activities and projects in the Mitigation Strategy [201.4(c)(5)].

Section 7 describes and details the State's Comprehensive Hazard Mitigation Program [201.5(b)].

The conclusion of the Plan, Section 8, acknowledges the adequacy of state hazard mitigation programs, which were tested and matured during a succession of disasters since the 1990's. Mitigation programs have reduced the number of flood-damaged and repetitive loss properties. At the same time, many challenges remain. Basement and stormwater flooding remain common, and flood insurance is widely misunderstood and underutilized. A very important task will be to effectively promote local mitigation planning (and local plan updates) as disaster prevention. Community planning and development professionals should continue to evaluate local hazards in their plans and embrace the goal of making disaster resistance a Wisconsin way of life.

This plan update includes a new Rural Electric Cooperative Annex. This annex ensures that participating Rural Electric Cooperatives will be eligible to apply for hazard mitigation funds to prevent loss of function and damages in rural areas of the state.

Appendix M contains the signature pages for agency concurrence with the Plan. Other Plan appendices contain documentation regarding a history of the State's federal disaster declarations, hazard mitigation projects completed in the State, the Wisconsin Repetitive Loss Report, the State Administrative Plan for the Hazard Mitigation Grant Program, state and federal authorities for the Plan and other reference materials.

Extensive organizational changes were made in the 2011 Plan update. Several sections included duplicate information. This update has attempted to eliminate some of that duplication. Section 3, Mitigation in Wisconsin, has now been incorporated into Section 7, State's Comprehensive Hazard Mitigation Program. Several previous appendices were deleted (C: Capability Assessment Form; H: Managing State MOU; I: Household Survey; and O: 44 CFR Parts 201 and 206) and several added (G: Rural Electric Cooperative Annex; H: State-Owned and Operated Building Vulnerability Assessment Questionnaire; I: Loss Avoidance Study; and J: Evaluating Losses Avoided.) The matrix on the following pages briefly summarizes the changes made in the 2011 Plan update to each section and appendix in Wisconsin's Hazard Mitigation Plan.

2011 STATE PLAN UPDATE SUMMARY	
Plan Section	**Description of Update**
Section 1: Introduction	Updated planning process participants and demographic data; reorganized and truncated state background information
Section 2: Planning Process	Updated planning process including information about the WHMT, facts, figures, and statistics; discussion of the Wisconsin Recovery Task Force moved to Section 7
Section 3: Risk Assessment	Updated all hazard profiles, occurrences, and probabilities, and all risk assessments; integrated local risk assessments and risk summary; included state-owned facility inventory and risk assessment
Section 4: Mitigation Strategy	Revised goals, state and local hazard mitigation goal alignment, and strategy; updated State Capability Assessment and the Mitigation Action Plan; reorganized action items by lead agency
Section 5: Coordination of Local Mitigation Planning	Updated programs, local mitigation plan progress, planning costs, planning guidance, and planning maps; highlighted best practices
Section 6: Plan Maintenance	Updated plan maintenance process and future plan update schedule
Section 7: Comprehensive State Hazard Mitigation Program	Updated comprehensive mitigation programs, regional and other planning initiatives, assessment of mitigation actions, and integration with FEMA mitigation programs and initiatives; incorporated the former Section 3, Mitigation in Wisconsin, into this section
Section 8: Conclusion	Updated of data, statistics, and programs
Appendix A: Annual Natural Disaster Report	Updated to include disasters 2008-2011
Appendix B: Federal Declarations	Updated to include declarations 1933, 1944, and 1966
Appendix C: Mitigation Projects	Updated to include grants funded since 2008
Appendix D: Repetitive Loss Report	Updated repetitive loss report
Appendix E: WI Hazard Mitigation Team (WHMT)	Updated to include current members
Appendix F: HMGP Administrative Plan	Included May 2011 Administrative Plan
Appendix G: Rural Electric Cooperative Annex	New
Appendix H: State Structure Inventory Form	New
Appendix I: Loss Avoidance Study: Wisconsin Property Acquisition and Structure Demolition	September 2009 loss avoidance study for Jefferson, Kenosha and Crawford County
Appendix J: Evaluating Losses through Acquisition Projects	Loss avoidance study for Milwaukee County
Appendix K: Authorities	No changes
Appendix L: Acronyms	No changes

Plan Section	Description of Update
Appendix M: State Agency Concurrences	Updated with current state agency concurrences
Appendix N: Standard Plan Crosswalk	Crosswalk based on 2011 update
Appendix O: Enhanced Plan Crosswalk	Crosswalk based on 2011 update

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SECTION 1: INTRODUCTION

Natural disasters threaten communities and citizens throughout the United States. Over the last 31 years, disaster damages and costs in the US have exceeded $725 billion (adjusted for inflation, National Climatic Data Center, 2011). Non-tropical floods accounted for over 10% of the total (NCDC, 2011). Nationwide, an increase in the number of tornadoes, hurricanes, blizzards, earthquakes, droughts, and, above all, flood events, has occurred over the last 20 years, resulting in an increase in property damage, and more frequent interruptions of business and government services. Natural disasters have a tremendous economic impact on governments, businesses, and individuals.

In the 1980s, Wisconsin was granted six Presidential Disaster Declarations. In the 1990s, it was twice that number, and in the 2000s, the State was granted ten Presidential Disaster Declarations. Since 1990, Wisconsin has incurred over $2.75 billion in disaster-related damages. In that time, the State has only received about $.86 billion in federal disaster relief. The remaining $1.89 billion was paid by local governments, businesses, and individuals, or simply accepted as losses.

To reduce vulnerability to natural hazards and decrease the staggering costs the government and insurance industry pay in their wake, the State must find ways to minimize disaster losses through the implementation of mitigation projects and activities. Hazard mitigation activities are actions taken to eliminate or reduce the long-term risk to human life and property from natural hazards. Along with preparedness, response, and recovery, hazard mitigation is one of the four phases of emergency management. Mitigation can occur during any phase of emergency management – before, during, or after a disaster. However, hazard mitigation is the only phase of emergency management that can break the cycle of damage and repair. A report released by the Multihazard Mitigation Council in 2005 indicated that for every dollar spent on mitigation, $4 or more can be saved in future damage costs.

1.1 PURPOSE AND SCOPE

The purpose of the State of Wisconsin Hazard Mitigation Plan is to identify the state's major natural hazards, assess the vulnerability to those hazards, and take steps to reduce that vulnerability using the technical and programmatic resources of State of Wisconsin agencies. The Plan includes a mitigation strategy that identifies goals and recommended actions and initiatives that will reduce or prevent injury and damage from natural hazards.

The State of Wisconsin Hazard Mitigation Plan is a natural hazard mitigation plan. Technological hazards are not addressed at this time. The Plan assesses natural hazard risk, reviews current state and local hazard mitigation capabilities, develops mitigation strategies, and identifies state agency actions to address mitigation needs. The Plan does not attempt to develop local mitigation projects. As a home rule state, the State of Wisconsin respects the rights of communities to implement specific mitigation actions that best serve them. The Plan identifies existing resources and develops tools to assist communities in

their mitigation efforts. This is accomplished by establishing statewide mitigation policies, and providing technical resources, financial guidance, and training and education opportunities. To this end, the State of Wisconsin Hazard Mitigation Plan is the foundation for a viable statewide mitigation program.

1.2 REGULATIONS

In 1988, the Disaster Relief Act of 1974, PL 93-288, was amended by PL 100-707, the Robert T. Stafford Disaster Relief and Emergency Assistance Act. Section 404 of the Stafford Act allows the President to contribute up to 75% of the cost of hazard mitigation measures not to exceed 15% of the estimated federal assistance provided as a result of a Presidential Disaster Declaration. Section 404 funds can be used anywhere in the state and are not limited to the counties in the declared area.

Section 322 of the Disaster Mitigation Act of 2000 requires the development of a State Hazard Mitigation Plan for a state to be eligible for federal mitigation funds and certain other disaster assistance. States must develop and submit for approval to the Federal Emergency Management Agency (FEMA) a Standard Hazard Mitigation Plan that includes details of the planning process, identification of the state's natural hazards, a risk assessment for the identified natural hazards, a mitigation strategy, and a plan maintenance process. Section 322 of the Act also allows the President to increase the mitigation contributions to 20% of the federal assistance provided for the Presidential Disaster Declaration if the approved State Hazard Mitigation Plan contains enhanced mitigation program management information.

This Plan meets the requirements for a Standard State and Enhanced Plan under Interim Final Rule 44 CFR 201.4 and 201.5, published by the Federal Emergency Management Agency on February 26, 2002. Completed Standard and Enhanced State Hazard Mitigation Plan Review Crosswalks can be found in Appendices N and O.

Meeting the planning requirements of these regulations maintains the State of Wisconsin's eligibility for obtaining the maximum federal disaster assistance available including the hazard mitigation grants available through the Stafford Act.

1.3 ASSURANCES

The State of Wisconsin will comply with all applicable federal statutes and regulations in effect with respect to the periods in which it receives grant funding, in compliance with 44 CFR 13.11(c). The State of Wisconsin Hazard Mitigation Plan will be amended according to the process described in the Plan Maintenance Section whenever necessary to reflect changes in state and federal statutes as required in 44 CFR 13.11 (d). The Plan complies with state and federal regulations, as cited in the Authorities Appendix and other portions of the Plan.

1.4 WISCONSIN HAZARD MITIGATION TEAM

The Wisconsin Hazard Mitigation Team (WHMT) is comprised of representatives from the following state and federal agencies:

- Cooperative Network
- Federal Emergency Management Agency
- Mississippi River Regional Planning Commission
- National Weather Service
- Public Service Commission of Wisconsin*
- University of Wisconsin-Cooperative Extension*
- US Army Corps of Engineers
- US Department of Agriculture, Natural Resources Conservation Service
- US Department of Agriculture, Rural Development
- US Department of Housing and Urban Development
- US Economic Development Administration
- US Geological Survey
- Voluntary Organizations Active in Disaster
- Wisconsin Association of Floodplain, Stormwater, and Coastal Management
- Wisconsin Department of Administration,* Division of Housing; Division of Intergovernmental Relations: Wisconsin Coastal Management Program, Comprehensive Planning; Division of State Facilities
- Wisconsin Department of Agriculture, Trade and Consumer Protection*
- Wisconsin Department of Health Services*
- Wisconsin Department of Natural Resources,* Division of Enforcement and Science
- Wisconsin Department of Natural Resources,* Division of Forestry
- Wisconsin Department of Natural Resources,* Division of Water
- Wisconsin Department of Safety and Professional Services,* Division of Safety and Buildings
- Wisconsin Department of Transportation*
- Wisconsin Department of Military Affairs,* Division of Emergency Management
- Wisconsin Emergency Management Association
- Wisconsin Historical Society*
- Wisconsin Office of the Commissioner of Insurance*

The heads of the agencies listed above (indicated with an asterisk) have reviewed and concurred that the State of Wisconsin Hazard Mitigation Plan is a working document that will improve the State's ability to minimize the effects of natural hazards and resist disas-

ter, thereby protecting the health, safety, and economy of its citizens (see Appendix M). They further agree to implement the mitigation actions identified in the Mitigation Strategy and to provide support for and participate in plan updates.

1.5 STATE OF WISCONSIN BACKGROUND INFORMATION

Wisconsin is the 23rd largest state in the United States at 54,310 square miles (land only) and has the 20th greatest population (5,686,986 as of 2010). Wisconsin's natural beauty has made the state a favorite playground of the nation. Vacationers enjoy the state's clean lakes, rolling hills, quiet valleys, and deep forests. The winters are ideal for skating, skiing, snowmobiling, and tobogganing. Many communities stage curling matches during the winter and others hold snowmobile derbies.

1.5.1 State Government

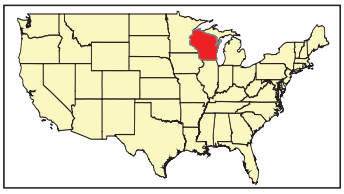
Source: Wisconsin Department of Administration: http://www.doa.state.wi.us/subcategory.asp?linksubcatid=326&locid=4.

The Wisconsin State Capitol (left), located in Madison, Wisconsin, houses both branches of the Wisconsin Legislature, the State Supreme Court, and the Office of the Governor. The state is divided into 72 counties and many smaller jurisdictions: cities, villages, and towns. Cities and villages are incorporated urban areas. Towns are minor civil divisions of counties and are unincorporated.

Wisconsin is a “home-rule” state. This means that state authority in local affairs is limited except when the State enacts legislation that applies to all local jurisdictions uniformly. The State can also prohibit cities and villages from enacting ordinances in matters of statewide concern. Cities and villages have home-rule authority, but towns do not. Counties have only administrative home rule, which means they can organize their administrative departments as they see fit. When cities or villages request action by the county on their behalf, home rule can extend to the counties.

1.5.2 Geography

Wisconsin is bordered by Lake Superior and the Upper Peninsula of Michigan to the north, Lake Michigan to the east, Illinois to the south, and Iowa and Minnesota to the west (see map at right). The state's western boundary is defined by Mississippi and St. Croix Rivers.



Source: WEM, 2011.

Geology

Thousands of years ago, most of Wisconsin was covered by glaciers which scraped the tops off tall hills, leaving rich earth deposits and beautiful lakes (15,000 of them) among rolling hills and ridges. As a result, the state can be divided into five distinct geological land areas (see map below): the Lake Superior Lowland, the Eastern Ridges and Lowlands (Great Lakes Plains), the Northern Highland (also known as the Superior Upland), the Central Plain, and the Western Upland.

Lake Superior Lowland: In northern Wisconsin, the Lake Superior Lowland slopes gradually upwards toward the south from the shores of Lake Superior. This small area of nearly flat plain extends about 5 to 20 miles inland.

Northern Highland: Most of northern Wisconsin is characterized by Northern Highland geography. This area, lying south of the Lake Superior Lowland, expands southward over about one third of the state. The Northern Highland reaches its highest elevations in the north, sloping downward to the south. The Northern Highland supports hundreds of small lakes and heavily forested hills. Timms Hill, the highest point in Wisconsin, is located in the Northern Highland.

Central Plain: South of the Northern Highland and curving across the central part of the state is the Central Plain. In the southern portion of the Central Plain, the Wisconsin River has carved the beautiful scenic gorge Wisconsin Dells. This is an area of buttes and mesas; an unexpected landscape for central Wisconsin.

Source: Wikipedia, public domain file: http://en.wikipedia.org/wiki/File:Wisconsin_geographic_provinces.svg.

Eastern Ridges and Lowlands: To the east of the Central Plain, the gently rolling hills of the Eastern Ridges and Lowlands area extend from Green Bay south to Illinois. This is the richest agricultural region of Wisconsin where ice-age glaciers deposited earth over limestone ridges.

Western Upland: To the west of the Central Plain, the Western Upland is characterized by limestone and sandstone bluffs along the Mississippi River. The Western Upland extends along the Mississippi River to the border of Illinois. The southwestern portion of the Western Upland was not touched by glaciers and is an area that contains steeply sloped ravines and winding ridges.

Weather

Wisconsin lies between 42° 30' and 47° north latitude and is located centrally between the east and west coasts of the continent. As such, the state has four distinct seasons. The waters of Lake Superior and Lake Michigan create slightly more moderate climates along their shores. Wisconsin lies in the belt of prevailing westerly winds. Table 1.5-1 below shows the average and extreme temperatures for the state.

TABLE 1.5.2-1 AVERAGE AND EXTREME TEMPERATURES	
Average Temperatures	14° F in January to 69° F in July
Highest Temperature	114° F on July 13, 1936 in Wisconsin Dells
Lowest Temperature	-55° F on February 2 & 4, 1996 in Couderay

1.5.3 Water Resources and Recreation

Wisconsin values its water resources. With over 15,000 lakes, 33,000 miles of rivers and streams, and 5.3 million acres of wetlands to enjoy, Wisconsinites work hard to protect their lakes and restore their watersheds as shoreline use intensifies. Fishing and boating are major recreational activities in the state.

Aside from water, Wisconsin has numerous other outdoor recreational assets. According to the State of Wisconsin 2009-2010 Blue Book, there are nearly 6,000 state-owned campsites, and 6 million acres of hunting land. Wisconsin currently operates 48 state parks, 13 state forests, and 5 recreation areas. Visitors to Wisconsin's state parks, forests, trails, and recreation areas number over 13 million annually.

1.5.4 Infrastructure

Transportation

As of January 1, 2008, there were 114,705 miles of roads in Wisconsin. That includes 11,769 miles of state trunk highways, 19,868 miles of county trunk highways, and 81,324 miles of local roads. Over 78% of state roads (89,888 miles) are surfaced at bituminous grade or higher, with the remaining 22% being gravel or soil-surfaced, graded and drained, or unimproved.

Wisconsin is also home to 12 railroads with 3,417 miles of railroad, 10 active lake harbors, and 726 airports of which 98 are publicly owned, 415 are privately owned, and 211 are specialized facilities.

Dams

There are currently about 3,800 dams in the State of Wisconsin. About 100 dams have been removed since 1967. 60% of Wisconsin dams are privately owned, 9% are owned by the State, 17% are owned by a municipality, and the remaining 14% have other types of ownership. About 5% of the dams in Wisconsin produce hydroelectricity and therefore fall under federal jurisdiction. The Wisconsin Department of Natural Resources regulates the remaining 95% of dams.

Nuclear Power Plants

There are two nuclear power plants in Wisconsin: Kewaunee in Kewaunee County and Point Beach in Manitowoc County. They are both on the shore of Lake Michigan. The Prairie Island nuclear power plant in Minnesota is on the shore of the Mississippi River and thus also impacts Wisconsin. These power plants are regulated by the Nuclear Regulatory Commission (NRC).

1.5.5 Population

The population of Wisconsin as of 2010 is 5,686,986, a 6.0% increase from the 2000 Census. Population growth was concentrated in the Fox River Valley, the far Western part of the state near Minnesota's Twin Cities, Dane County, and Southeastern Wisconsin.

With respect to population change in rural and urban areas, Wisconsin's demographic history largely parallels that of the rest of the country. Urban population is defined as persons living in and around cities with populations over 50,000, and those who reside in smaller cities and villages with populations of at least 2,500. The remainder of the population is considered rural. The 2000 Census found that 68% of Wisconsin's population lives in urban areas. This contrasted with 79% nationally.

The five largest cities in Wisconsin are Milwaukee, Madison, Green Bay, Kenosha, and Racine.

In 2008, the Wisconsin Demographic Services Center completed a set of long-range projections for Wisconsin including the state's fifteen coastal counties. These projections from 2000-2035, help public officials and others anticipate and plan for future growth and decline.

As a group, Wisconsin's fifteen coastal counties are projected to increase by 9.2 % in population through 2035. This change is less than the projected statewide growth of 24.1%. Numerically, the coastal counties population is projected to increase by 179,000 persons, from 1.94 million in 2000 to 2.12 million in 2035.

1.5.6 American Indians

American Indians have been a vital and significant population throughout Wisconsin's history and for hundreds of years prior to statehood. Geographically, American Indians have a strong presence not only in those counties that have reservations or tribal lands but also in a number of urban counties. In 2010, the largest populations were in Milwaukee County (6,794), Brown County (5,191) and Menominee County (3,981). When considered as a percentage of the total population, northern Wisconsin counties have the highest percentage of American Indian residents. Four counties have populations that are more than 10% American Indian: Menominee (87%), Sawyer (16%), Forest (11%), and Ashland (10%).

According to the "Tribes of Wisconsin" book prepared in July, 2011 by the Wisconsin Department of Administration, there are 11 federally-recognized Indian Tribes in Wisconsin:

- Bad River Band of Lake Superior Tribe of Chippewa Indians
- Forest County Potawatomi Community
- Ho-Chunk Nation
- Lac Courte Oreilles Band of Lake Superior Chippewa
- Lac du Flambeau Band of Lake Superior Chippewa
- Menominee Nation
- Mohican Nation, Stockbridge Munsee Band
- Oneida Tribe of Indians of Wisconsin
- Red Cliff Band of Lake Superior Chippewa
- St. Croix Band of Chippewa Indians
- Sokaogon Chippewa Community

As sovereign nations, these Tribes can apply directly to FEMA for mitigation grants or apply through the State as the subgrantee. They must meet the same mitigation planning requirements as other jurisdictions to be awarded grant funds.

SECTION 2: THE PLANNING PROCESS

2.1 OVERVIEW OF THE PLANNING PROCESS

2.1.1 Initial Plan Development

Wisconsin Emergency Management (WEM) developed the State Hazard Mitigation Plan over a period of several years. Subsequently, WEM has updated the plan over the last three years. The Plan is a multi-agency effort with WEM serving as the lead agency for the planning process. Mitigation staff from WEM led the development effort and conducted the bulk of the research and writing of plan drafts, worked with state and federal agencies, reviewed local plans for information to include in the State Plan, convened meetings of the Wisconsin Hazard Mitigation Team (WHMT), managed the plan review process, and facilitated adoption by the State agency heads.

In response to the 1993 Midwest Flood, WEM formed the Interagency Disaster Recovery Group (IDRG) that was an informal group with the responsibility to coordinate recovery and mitigation efforts and included both state and federal agencies. The purpose and goal of the IDRG was to assist the local governments during the disaster recovery phase by providing technical assistance when possible, prevent duplication of efforts and funding among the participating agencies, identify and prioritize mitigation projects, and identify funding options for implementing long-term mitigation projects whether through the individual agencies or by “packaging” funding among the different programs. As a result of the success of the ad-hoc group, the IDRG continued to meet in response to subsequent major disasters in the State up until late 2003.

The successes of the IDRG made it clear the need to formalize a group and designate a permanent State Hazard Mitigation Team which was an expansion of the IDRG with policy-making authority. To that end, The Adjutant General sent letters in March 2000 to ten state agencies requesting them to attend a meeting to discuss the formation of the State Hazard Mitigation Team (SHMT) and development of the State Hazard Mitigation Plan and each agency’s roles and responsibilities in these efforts. The original agencies invited to participate on the SHMT were those that were identified with responsibilities in the areas of natural resources, environmental regulation, planning and zoning, building codes, infrastructure regulation and construction, insurance, public information/education, economic development, and historic preservation.

An overview of Wisconsin’s disaster history and hazard mitigation programs was provided along with an introduction to hazard mitigation planning at a meeting held on April 12, 2000. At the meeting agencies were requested to designate a representative from their agency as a member of the SHMT. The team member would act as a liaison between the Team and their respective agency and have access to technical expertise within the agency and be able to facilitate decision making and policy interpretation related to the agency in the areas of planning, regulations, programs, policies, and functions. Agency representatives were designated and the first official meeting of the SHMT was held on

May 17, 2000. Several agencies that had multiple facets that needed to be included in the plan had more than one representative on the SHMT. Many of the members of the IDRG were also members of the SHMT. Agencies represented on the SHMT included:

- Department of Administration
- Office of Land Information Services
- Department of Health and Family Services
- Wisconsin State Historical Society
- Department of Transportation
- Division of Transportation Infrastructure Development
- Bureau of Highway Operations
- Department of Commerce
- Division of Safety and Buildings
- Bureau of Field Operations
- Wisconsin Emergency Management
- Department of Administration
- Division of Housing and Inter-Governmental Relations
- Bureau of Program Development and Management
- University of Wisconsin-Extension
- Local Government Center
- Office of the Commissioner of Insurance
- Public Service Commission
- Division of Administrative Services
- Department of Agriculture, Trade and Consumer Protection
- Division of Agricultural Resource Management
- Department of Natural Resources

The SHMT team met frequently during the development of the State Hazard Mitigation Plan. Meeting agendas, attendance sheets, meeting summaries and handout materials are all on file at WEM. A summary was prepared after each meeting and distributed to Team members with any items that needed follow-up or action noted. SHMT meetings were held: May 17, 2000, July 10, 2000, August 15, 2000, September 11, 2000, October 4, 2000, and December 7, 2000.

The Plan was finalized in July 2001, and was submitted to the State agency heads in August for agency concurrence. The head of each agency represented on the SHMT signed a State Agency Concurrence acknowledging that they had reviewed and concurred with the State Hazard Mitigation Plan. By signing the concurrence they agreed to continue to support and participate in the plan updates, and implement the actions identified in the

plan. The Plan was placed on WEM's website. The State of Wisconsin Hazard Mitigation Plan was formally submitted to FEMA Region V on October 26, 2001. A letter dated January 21, 2002, from FEMA advised that the plan met Section 409 of the Robert T. Stafford Disaster Relief and Emergency Assistance Act and the requirements of 44 CFR Part 206.405. The letter also included recommendations for the next update of the plan.

2.1.2 2004 Plan Update

On February 26, 2002, 44 CFR Part 201 established criteria for state and local hazard mitigation planning as authorized by Section 322 of the Stafford Act, as amended by Section 104 of the Disaster Mitigation Act of 2000. Beginning November 1, 2004, states are required to have an approved Standard State mitigation plan in order to be eligible to receive FEMA mitigation funds through the Hazard Mitigation Grant (HMGP) and the Pre-Disaster Mitigation (PDM) Programs as well as other disaster assistance. The regulations also included criteria for an Enhanced State mitigation plan. With the approval of an Enhanced Plan, the amount of assistance provided through the HMGP would increase from 7.5% (now 15%) to 20%. Failing to meet this requirement will have a significant financial impact on both the state and local governments following a disaster.

The regulations and planning requirements were discussed extensively at the next regularly scheduled SHMT quarterly meeting held on May 10, 2002. It was obvious that changes would be required to the State Plan in order to meet the new requirements, and that WEM would need the assistance of the Team members in meeting the requirements.

In July 2002 WEM requested FEMA Region V to review the State Hazard Mitigation Plan for compliance with the new planning requirements. FEMA provided specific comments in a letter dated November 4, 2002. Based on those comments, mitigation staff developed a strategy and timeline for completing the major components of the plan. The review comments were discussed with the SHMT at a quarterly meeting held on March 5, 2003.

In April 2003, WEM forwarded a letter to FEMA Region V requesting HMTAP (Hazard Mitigation Technical Assistance Program) assistance in completing the State Risk Assessment in meeting the planning criteria 44 CFR 201.4(c)(2). The request was approved in August 2003 and FEMA hired a contractor to update the State Hazard Analysis and complete a State Risk Assessment. WEM, FEMA and the contractor met in January 2004 to finalize the work plan for the contract. Based on the meeting and the work plan, the Risk Assessment was to be completed by April 30th with final report May 28, 2004. The final State Risk Assessment was not completed and finalized until December 8, 2004.

In December 2003, the Interagency Disaster Recovery Group and the State Hazard Mitigation Team, which up to this point were functioning as two separate groups yet some members were on both teams, merged to form the Wisconsin Hazard Mitigation Team (WHMT). Two additional members from state agencies were added to the team; the Department of Administration, Intergovernmental Relations, Comprehensive Planning Program; and Department of Commerce, Division of Safety and Buildings. In addition, the

Chairman of the Wisconsin Association of Floodplain, Stormwater, and Coastal Managers (WAFSCM) joined the Team. This member also works for the Milwaukee Metropolitan Sewage District (MMSD), the largest district in the state. The MMSD has been implementing flood mitigation measures throughout the Milwaukee urban area. Earlier in the year the Executive Director from the Mississippi River Regional Planning Commission representing the Council of Regional Planning Organizations joined the WHMT. In January of 2005, three additional members were added to team that included a representative from the Great Lakes Tribal Council, Wisconsin Emergency Management Association, and the National Weather Service. Later that year, individuals representing the Department of Administration, Division of State Facilities and the Volunteer Organizations Active in Disasters joined the Team. Since 2005 a representative from the Cooperative Network joined the WHMT. This brings the total to 41 members representing 11 state agencies and 7 federal agencies along with the WAFSCM, Council of Regional Planning Organizations, WEMA, Cooperative Network, and VOAD. Team members provide a variety of expertise and perspective to the planning process, including emergency management, natural hazards, land-use planning, agriculture, building codes, transportation, and infrastructure (see Appendix F for a full list.) Agencies and their area of expertise are listed in Table 2.1.2-1 below.

TABLE 2.1.2-1 WISCONSIN HAZARD MITIGATION TEAM

Expertise	Organization(s)
State Comprehensive Planning	Department of Administration/ Intergovernmental Relations/Comprehensive Planning Program Council of Regional Planning Organizations
Coastal Management	Department of Administration, Intergovernmental Relations/Coastal Management Program Wisconsin Association for Floodplain, Stormwater, and Coastal Managers
State-Owned Buildings	Department of Administration, Division of State Facilities
Public Health	Department of Health Services
Historic Preservation	Wisconsin State Historical Society
Transportation Infrastructure	Department of Transportation, Division of Transportation Infrastructure Development, Bureau of Highway Operations
Building Codes	Department of Safety and Professional Services
Hazard Mitigation	Wisconsin Emergency Management Federal Emergency Management Agency Wisconsin Emergency Management Association Council of Regional Planning Commissions
Disaster Response	Wisconsin Emergency Management Federal Emergency Management Agency Wisconsin Emergency Management Association Volunteer Organizations Active in Disasters
Community Development Block Grants/Housing and Public Facilities	Department of Administration

TABLE 2.1.2-1 CONTINUED	
Expertise	**Organization**
Education/Planning/Local Government Resources	University of Wisconsin Extension Council of Regional Planning Organizations
Insurance	Office of the Commissioner of Insurance
Lifelines	Public Service Commission, Division of Administrative Services Cooperative Network
Agriculture	Department of Agriculture, Trade and Consumer Protection, Division of Agricultural Resource Management, Bureau of Land & Water Resources, Conservation Management Section US Department of Agriculture, Natural Resources Conservation Service
Floodplain Management, Stormwater, Dam Safety	Department of Natural Resources Wisconsin Association for Floodplain, Stormwater and Coastal Managers US Army Corps of Engineers
Forestry	Department of Natural Resources
Housing	Department of Administration US Department of Housing and Urban Development Us Department of Agriculture, Rural Development Department of Health Services
Conservation	US Department of Agriculture, Natural Resources Conservation Service Department of Natural Resources
Business Recovery	Department of Administration Economic Development Administration Council of Regional Planning Organizations
Climate and Weather Information, Storm Data Information Center.	National Weather Service
Volunteer Organizations - Red Cross, Salvation Army, etc.	Wisconsin Volunteer Organizations Active in Disasters

Source: WEM, 2011.

The purpose of the WHMT includes the following:

- Assist with the revision and update of the Wisconsin State Hazard Mitigation Plan
  - Review previous hazard mitigation planning, and identify progress made on actions recommended in the 2001, 2005, and 2008 Plans
  - Develop updated goals, objectives and strategies for the update of the Plan
  - Assist with development of plan maintenance process
- Provide ongoing monitoring of state hazard mitigation efforts after adoption and FEMA approval of the State Plan
- Assist in the review of the State Plan, and in revising the plan every three years

The 2004 Wisconsin All-Hazard Mitigation Plan was submitted to FEMA for review and comment on October 19, 2004. After completion of the Risk Assessment by a contractor, FEMA completed their review and on December 9, 2004, WEM received a letter advising

that the state plan met the required criteria for a Standard State mitigation plan. The Plan would be approved upon formal adoption by the State. The head of each state agency represented on the WHMT signed a State Agency Concurrence acknowledging that they had reviewed and concurred with the State of Wisconsin Hazard Mitigation Plan. By signing the concurrence they agreed to continue to support and participate in the plan updates, and implement the actions identified in the plan. The concurrence signed by each agency represented on the Team including the WEM Administrator represents formal adoption of the plan. The Enhanced Hazard Mitigation Plan was approved December 14, 2005. The State of Wisconsin Hazard Mitigation Plan is published on WEM's website.

2.1.3 2008 Plan Update

On February 16, 2006, the WHMT met and discussed the strategy for the three year update. WEM reported that the Enhanced Hazard Mitigation Plan for Wisconsin was approved December 14, 2005. This increased the HMGP to 20% from 7.5% (now 15%) in future declarations.

For the 2008 plan update, numerous meetings were held with the WHMT and documentation of the planning process includes meeting agendas, meeting summaries, handout packets, follow-up letters and e-mails. Copies of the documentation are on file at WEM and can be provided upon request. WHMT meetings were held as follows: April 3, 2007, February 21, 2008, September 12, 2008, and October 17, 2008.

The State of Wisconsin Hazard Mitigation Plan 2008 update was developed by Wisconsin Emergency Management with the assistance and use of information provided by other state and federal agencies. The 2008 Wisconsin Hazard Mitigation Plan was approved on December 9, 2008 with the Enhanced Hazard Mitigation Plan approved on June 15, 2009.

2.1.4 2011 Plan Update

The 2011 update of the State of Wisconsin Hazard Mitigation Plan involved only two meetings of the WHMT as a whole. A new approach was used that involved WEM staff meeting with individual agencies to review past contributions and gather new information. The approach worked much better than the large-group-meeting and questionnaire formats that have been used in the past. This approach led to more well thought-out mitigation action items.

December 9, 2010: The meeting started with a discussion of DR-1768, DR-1933, and DR-1944 flood recovery efforts. Next, the Hazard Mitigation Assistance Program for FFY11 was discussed. Then the WHMT discussed the Plan update. The importance of participation from WHMT members was stressed. The five state hazard mitigation goals from the 2008 Plan update were revised. The revisions emphasized resilience over recovery and the participation of governmental and non-governmental partners. WEM addressed the need for other state agencies to revise their State Capability Assessment and Action

Item contributions from the 2008 Plan update and to offer new Action Items that can be included in the 2011 Plan.

July 20, 2011: Recovery effort status updates from DR-1719, DR-1768, DR-1933, DR-1944, and DR-1966 were given. WEM spoke about RiskMAP initiatives in several counties throughout the state. DNR gave an update on the Dam Grant Program. The Department of Commerce was abolished due to the creation of the Wisconsin Economic Development Corporation, so representatives from the divisions that participate on the WHMT discussed where in the organizational structure of the state government they were now located. The Division of Housing is now in the Department of Administration. The Division of Safety and Buildings is now in the Department of Safety and Professional Services.

Table 2.1.4-1, below, lists the meetings held between WEM and some of the other agencies represented on the WHMT. Other agencies that were not met with individually, but contributed to the 2011 Plan update through written correspondence include the Department of Agriculture, Trade, and Consumer Protection; the Wisconsin Association for Floodplain, Stormwater, and Coastal Management; and the Milwaukee Metropolitan Sewerage District. A few agencies that were contacted to update their past contributions to the plan did not respond, so their contributions were updated using information from other, related agencies and from their websites.

TABLE 2.1.4-1

Date	Time	Agency
April 4, 2011	1:00 PM	DOT
April 4, 2011	2:00 PM	DNR Fire Operations
April 4, 2011	3:00 PM	DOA Coastal Management Program; Intergovernmental Relations
April 13, 2011	1:00 PM	NWS
April 18, 2011	1:00 PM	USGS
April 18, 2011	2:00 PM	DOA Division of Housing (formerly in Commerce)
April 18, 2011	3:00 PM	OCI
May 2, 2011	2:00 PM	DSPS Division of Safety and Buildings (formerly in Commerce)
June 3, 2011	1:30 PM	DNR Water Resources

Source: WEM, 2011.

For this Plan update, the Risk Assessment underwent a complete overhaul. The methodologies were updated, new information was gathered on hazard events (including hail as a new hazard), and the first phase of the State Structure Inventory was included.

Additionally, the Plan has been rearranged. The 2008 Plan update contained information that was duplicated sometimes in two or three sections. In this update we have tried to reduce the amount of duplication. The former Section 3, a History of Mitigation in Wisconsin, was combined with former Section 8, the Enhanced Plan Section, into what will now

be Section 7. Section 5, previously Section 6, is devoted to local planning efforts and now includes sections on local planning trends and best practices. Finally, Section 4 (previously Section 5), the Mitigation Strategy, has been reorganized such that the Action Items are organized by Lead Agency instead of by goal. This was done for two reasons: first, it will be easier for each agency to find their contribution; second, many of the Action Items meet more than one of the State Hazard Mitigation Goals, so organizing them by goal was somewhat misleading. The Risk Assessment will now be Section 3 where previously it was Section 4 and Section 6 is now the Plan Maintenance Process. Several previous appendices were deleted (C: Capability Assessment Form; H: Managing State MOU; I: Household Survey; and O: 44 CFR Parts 201 and 206) and several added, including a brand new Rural Electric Cooperative Annex (G: Rural Electric Cooperative Annex; H: Wisconsin Risk Assessment Data Collection Worksheet; I: Loss Avoidance Study; and J: Evaluating Losses Avoided).

As hazard mitigation planning continuously involves multiple government agencies and other organizations, it is assumed the role of other entities will increase in the future. The Plan will be adjusted accordingly during the three-year update cycle.

2.2 COORDINATION AMONG AGENCIES

As the lead agency in the development of the State of Wisconsin Hazard Mitigation Plan, WEM works with other state, federal and local agencies to develop and implement the strategies outlined in this document and obtain interagency feedback on the success or failures of those strategies and use that information in updating the Plan. The State of Wisconsin Hazard Mitigation Plan was developed with the support and assistance of WHMT as described previously in this section.

In addition to working with the agencies on the WHMT, for the past several years WEM staff provided information on hazard mitigation programs and the planning process to groups and individuals through a variety of means. This included making presentations to certain groups such as the Wisconsin Emergency Management Association, Wisconsin Manufactured Housing Association, Wisconsin Land Information Association, American Planners Association, Wisconsin Utilities Association, Council of Regional Planning Organizations, UW Student Planning Association, Great Lakes Inter-Tribal Council, State Bar of Wisconsin, Wisconsin Claims Council, Wisconsin Association for Floodplain, Stormwater, and Coastal Managers, the Association of State Floodplain Managers, Wisconsin Chapter of the Public Risk Managers Association, LaFollette School of Public Affairs, and Southwest Building Inspectors Group. In addition, information was provided to communities receiving Community Development Block Grants and how they can incorporate mitigation into rehabilitation of housing stock. Presentations on hazard mitigation planning and its link to comprehensive planning and smart growth were made to the State Agency Resource Working Group of the Wisconsin Land Council, at a workshop for local officials on Complying with Comprehensive Planning and State Agency Resources, and to a Department of Administration and several members of the Wisconsin Land Council.

Hazard mitigation and mitigation planning are included in WEM's training curriculum and are addressed in the New Directors Series, Introduction to Emergency Management, Disaster Response and Recovery Operations, Local Damage Assessment, Municipal Planning, in addition to the Hazard Mitigation Planning Workshop. The one-day planning workshops have been held December 3, 2002; December 10, 2002; December 12, 2002; September 30, 2003; July 27, 2004; April 20, 2005; April 26, 2006; April 25, 2007, April 30, 2008, April 23, 2009, April 22, August 18, 2010, and April 12, 2011. In addition, a planning workshop was held for the Great Lakes Tribal Council which consists of the Wisconsin tribes on November 18, 2004. Workshop attendees receive a binder with all information presented and referenced at the workshop along with a CD. Over 400 people have attended the workshops. WEM hosted a four-day HAZUS class in 2006 and Benefit-Cost Analysis Training in 2007, 2009 and 2011. Also in 2007, WEM hazard mitigation staff presented a 1.5 hour topical seminar at the 2007 Governor's Conference on Homeland Security and Emergency Management on how to prepare a successful mitigation application. This was followed up with a half-day training on mitigation planning and project development at the 2008 Governor's Conference. Again a binder and CD with all referenced material were provided to attendees. Workshop materials are also available on WEM's website. Mitigation is also discussed at the Public Officials Briefings and Substantial Damage Workshops following federal declarations. As a result of the 2008 floods, acquisition and demolition of flood-damaged properties was a high priority. Due to this priority WEM developed and conducted a one-day buyout workshop for local governments.

In fall of 2004, the UW-Green Bay launched a certificate program in Emergency Management Planning and Administration. Mitigation planning is included in the curriculum.

Other avenues of providing information to other agencies, organizations and the public were through articles printed in the WEM Digest, the Department of Natural Resources' newsletter Floodplain and Shoreland Management Notes, and "Water Matters", the newsletter of the Wisconsin Association of Floodplain, Stormwater and Coastal Managers. An extensive article on Mitigation Planning for Natural Hazards was published in the spring 2008 Center of Land Use Education's newsletter, "The Land Use Tracker." To provide public exposure to the State Hazard Mitigation Plan, the Plan is available on WEM's website along with other information regarding the State's mitigation program.

Success Stories and Best Practices have been developed and published for several communities that have implemented mitigation measures and had subsequent events testing those measures. The stories are published on both FEMA's and WEM's websites. Table 7.5.2-1 in Section 7 identifies the Best Practices published to date.

Loss avoidance studies are one type of activity that WEM and FEMA undertake to document their successes and quantify the economic benefits of mitigation measures implemented through mitigation programs. These studies use a methodology developed by FEMA to quantitatively evaluate the effectiveness of mitigation projects using actual post-mitigation hazard events in the calculation. Two loss avoidance studies have been completed for Wisconsin mitigation projects and can be found on the WEM website at http://

emergencymanagement.wi.gov/mitigation/stories.asp. Section 7.5.1 discusses in more detail the studies and the methodology for loss avoidance reports.

In the development of the first Wisconsin Hazard Mitigation Plan and the subsequent three-year update, mitigation staff utilized a Household Natural Hazards Preparedness Questionnaire. The questionnaire was developed from a survey created by the Oregon Natural Hazards Workgroup at the University of Oregon's Community Service Center. The questionnaire included the State Plan's mitigation goals and asked the individual completing the questionnaire to provide their opinion of the goals and their importance. The questionnaire had general questions designed to help gauge household preparedness and the individual's knowledge of mitigation tools that may be available. The questionnaire was interactive and could be completed on WEM's website. In addition, the survey was distributed at various WEM training sessions, speaking engagements, and at the Annual Governor's Conference on Emergency Management. Results of the survey regarding the state goals are shown below in Table 2.2-1.

TABLE 2.2-1 SURVEY RESULTS: OPINION OF STATE GOALS

Goal	Percent of "Somewhat Important" and "Very Important" Responses	
	2005	2008
Minimize human, economic, and environmental disruption from natural hazards by encouraging agencies and citizens to use programs that strengthen disaster resistance.	100%	95%
Expand public awareness of natural hazards and conduct public education.	97%	94%
Encourage hazard mitigation planning by funding the development of local plans.	89%	80%
Support intergovernmental cooperation among federal, state, and local authorities by working closely with them on hazard mitigation activities.	97%	89%
Improve disaster resistance by promoting mitigation techniques for buildings and structures.	95%	88%

Source: WEM, 2008.

Since qualitative questions were not asked in the online survey, reason for the slight decrease in favorable goal responses is not known.

Another question asked that they provide their opinion of strategies to reduce risk and losses associated with natural disasters. The results are shown in Table 2.2-2 on the following page.

It is interesting to note the increase in the percentage of "agreement" responses with regard to making homes more disaster resistant. The flooding in Wisconsin during 2007 and 2008 may have contributed to the increase in support for mitigation; however, this is purely speculative.

TABLE 2.2-2 SURVEY RESULTS: OPINION OF RISK REDUCTION STRATEGIES

Strategy	Percent "Agreement"	
	2005	2008
Regulatory approach	61%	57%
Non-regulatory approach	67%	69%
Mixture of regulatory and non-regulatory	72%	72%
Prohibit development in areas subject to natural hazards	84%	79%
Use tax dollars to reduce risk and losses from natural hazards	62%	64%
Protect historical and cultural structures	61%	64%
Willing to make home more resistant	85%	90%
Safeguard local economy after a disaster	90%	84%
Support improving disaster preparedness of local schools	95%	94%
Support local inventory of at-risk buildings and infrastructure	82%	85%

Source: WEM, 2008.

Wisconsin Association of Floodplain, Stormwater, and Coastal Managers (WAFSCM)

On March 16, 2001, a planning meeting was held at WEM's office by a group of concerned professionals who felt it was time for the state to have a local organization that deals with issues involving floodplains, stormwater and coastal management. Many more meetings followed this initial planning meeting with persons from both the public and private sector attending and providing support. Goals and objectives as well as by-laws were developed and WAFSCM was born in January 2002. In January 2004 WAFSCM became a chapter of the Association of State Floodplain Managers, a national organization that promotes the common interest in flood damage abatement, enhancing cooperation among agencies, and encouraging new and innovative approaches to the nation's floodplains. WAFSCM's mission is dedicated to promoting sound floodplain, stormwater, and coastal management in the interest of the citizens of Wisconsin. The first "Water Matters" was published and distributed in March 2002 and the first annual WAFSCM conference was held in November that same year. The newsletter includes articles on issues relating to floodplains, stormwater and coastal as well as articles relating to hazard mitigation. WEM provided support to WAFSCM by developing the newsletter from 2002 through 2007, with DNR producing and mailing it. In addition, WEM staff members have served on the board as Secretary and Treasurer and are involved in the membership, awards, and scholarship committees. WAFSCM holds an annual conference in which WEM and DNR staff members participate. WAFSCM was also a sponsor for the ASFPM annual conference held in Madison, WI in June 2005. Staff from WEM and DNR assisted with the conference.

Coastal Hazards Work Group

WEM participates on the Coastal Hazards Work Group. This group was formed to provide technical assistance and coordinate state resources addressing coastal hazards. The Work Group meets bimonthly or as needed. The group also meets with representatives of the three coastal regional planning commissions and representatives of local governments as needed. A multi-year strategy is being implemented to assist in developing the

coastal hazards policy. The overarching goal of the strategy is to develop and implement shoreline and bluff erosion policies. Elements of the coastal hazards strategy include:

- Expansion of technical tools and technology transfer
- Education and outreach
- Coordination with municipalities and agencies

The agencies represented on the group include University of Wisconsin – Sea Grant Institute, State Department of Natural Resources, Wisconsin Coastal Management Program as well as WEM. The representative from the Wisconsin Coastal Management Program is also on the Wisconsin Hazard Mitigation Team. Section 7.7.9 contains additional information regarding the Coastal Hazards Workgroup.

State Agency Resource Working Group (SARWG)

SARWG was a statutorily funded group of the Wisconsin Land Council and is administered through the Department of Administration, Division of Intergovernmental Relations. The Division is responsible for administering the Comprehensive Planning Grant Program for the State. Representatives are from various state agencies and analyze and address land use issues and related policy issues. As a mitigation action, WEM participated on the group to promote mitigation planning as part of the comprehensive planning process. WEM had made formal presentations to the group on mitigation planning as well as to a SARWG sponsored workshop for local officials and planners. The DOA representative on the SARWG also participates on the WHMT. With the sunset of the Wisconsin Land Council there is no statutory requirement or funding for the group. However, members continue to communicate and share information via e-mail to promote comprehensive and mitigation planning.

Homeland Security Council

In March 2003, Governor Doyle created the Homeland Security Council to help coordinate the state's terrorism preparedness efforts. The Governor has named Major General Donald Dunbar, Adjutant General of the Wisconsin National Guard, as the Governor's Homeland Security Advisor. Other agencies on the Council are Wisconsin Emergency Management; the Division of Criminal Investigation of the Wisconsin Department of Justice; the Division of Health Services; Department of Administration, Division of Enterprise Technology; Wisconsin Chiefs of Police Association; Badger State Sheriffs Association; Department of Natural Resources; Department of Agriculture, Trade and Consumer Protection; Department of Administration, Division of Capitol Police; Office of Justice Assistance; and the Wisconsin State Patrol.

Specifically, the Council is charged with the following responsibilities:

- Coordinate the efforts of state and local agencies that have responsibility over homeland security efforts
- Coordinate state efforts with the US Department of Homeland Security, FEMA, FBI, and other local and federal agencies

- Coordinate law enforcement and intelligence gathering efforts of local and state agencies
- Advise local governments as the Council becomes aware of heightened threat assessments, and assist the public in understanding what these often complex security designations mean
- Serve as a resource to assist local governments in developing plans to identify and protect critical assets in their communities
- Make recommendations to the Governor and to local governments on what additional steps are necessary to further enhance Wisconsin's homeland security

The Council meets regularly and in response to elevated threat levels.

Interagency Working Group

The Interagency Working Group is chaired by Wisconsin Emergency Management and comprised of representatives of the Departments of Administration; Agriculture, Trade and Consumer Protection; Health Services; Justice; Corrections; Children and Family Services; Office of Energy Independence; Natural Resources; and Transportation, as well as the Office of Justice Assistance, National Guard and University of Wisconsin Police. The Group was formed in the late 90's with its original focus on terrorism preparedness. Since that time, its mission has evolved to cover all hazards and all phases of emergency management. The Group meets monthly or more often if dictated by current events and acts as a support group to the Governor's Homeland Security Council.

Wisconsin Recovery Task Force (WRTF)

It was obvious early on in the administration of the 2008 flood declaration that additional outside resources would be required to assist the State and its communities in the recovery. Upon direction of Governor Doyle, WEM created the WRTF to assist individuals, businesses, and communities to recover quickly, safely, and in a manner that builds resistance to future disasters. Six subcommittees were formed with a focus on mitigation, agriculture, business, housing, human needs, and infrastructure. The WRTF is comprised of many state and federal agencies. Its primary goal is to identify the unmet needs of the communities and citizens of Wisconsin following disasters. The WRTF met bi-weekly. One of the outcomes from the report submitted to the Governor was that the WRTF be a standing task force and meet semi-annually to ensure preparedness and facilitate effective operational readiness following a disaster.

The Wisconsin Hazard Mitigation Team (WHMT) played an integral part in identifying the key players that comprise the WRTF. Many of the WHMT members are actively participating and leading WRTF subgroups. Without the Wisconsin Hazard Mitigation Team, it is very likely that the WRTF would not have been created and activated as quickly as it was.

The State Hazard Mitigation Officer was assigned to be Chair of the Mitigation Committee. The Committee consisted of 11 state agencies (all which are members of the WHMT); 7

federal agencies (5 of which are members of the WHMT); and 5 other organizations (4 of which are members of the WHMT). The mission of the committee is to "[a]ssist communities during the recovery process to make their communities more disaster resistant." The Committee identified challenges, issues and roadblocks that the State and communities face during the recovery process.

The Committee worked together to identify needs and match the needs with the appropriate agency and funding source(s). In addition, it worked together to try and package funding where possible. As a result of this Committee and the WHMT, the Department of Commerce committed Community Development Block Grant funds to cover the 12.5% local match required for the Hazard Mitigation Grant Program grants. This measure provided 100% funding to those communities implementing buyout and elevation projects. Section 7.7.6 contains additional information regarding the WRTF.

Economic Development Administration (EDA)

After the 2008 flood disaster, the EDA provided grants to the Regional Planning Commissions in the disaster area for the development of Flood Recovery Strategies. To accomplish the tasks assigned, the Department of Commerce coordinated the effort that was referred to as the EDA Disaster Recovery Collaboration. The group met monthly up through August 2011. WEM mitigation staff participated in the collaboration by attending the meetings and providing input. Potential projects were brought forward and discussed to maximize funding opportunities. In addition, a collaboration website was established where members shared information. One of the outcomes of the group, was the development of a Community Economic Recovery Guidebook to assist economic development organizations, businesses, and community leaders prepare for economic recovery from a disaster. A link to the guidebook was placed on WEM's website and can be downloaded at http://emergencymanagement.wi.gov/recovery/business.asp.

Regional Planning Commissions (RPCs)

The RPCs are one of WEM's strongest partners in mitigation planning. The RPCs have provided planning services to many of the counties in the development and update of all-hazards mitigation plans. In addition, the RPCs prepare grant applications for local governments to obtain federal and state assistance for many types of activities including mitigation grant applications for both planning and projects. After the 2008 floods, RPCs located in the southern part of the state worked with their respective local jurisdictions to assist in the completion of grant applications for recovery assistance. Because of their involvement in the state and local planning process, the RPCs are knowledgeable on both state and local mitigation priorities and program requirements. Therefore, they are able to develop comprehensive project grant applications.

HAZUS

In 2008, WEM partnered with the University of Wisconsin Land Information and Computer Graphics Facility, and the Polis Center at Indiana-Purdue University at Indianapolis on a joint effort to create at statewide HAZUS flood risk assessment for all 72 Wisconsin counties. This statewide HAZUS flood risk assessment is included in this Plan. In addition,

the individual county HAZUS flood risk assessments were distributed to all counties and each respective RPC. WEM's website includes an interactive map where the county HAZUS risk assessment can be viewed and downloaded.

WEM Staff also joined the Central HAZUS Users Group. Staff from the East Central and Bay Lakes Regional Planning Commissions joined the group and worked with state mitigation staff in the use of HAZUS to assist in the development of hazard mitigation plans.

Rural Electric Cooperatives

Rural Electric Cooperatives are integral to the State of Wisconsin and its communities. Today, there are 25 electric cooperatives in Wisconsin that generate, transmit and distribute electric power. Initial discussions of the development of a rural electric cooperative annex to the State of Wisconsin's Hazard Mitigation Plan began in late 2007. Several electric cooperatives in the state had been recipients of hazard mitigation funding. WEM approached the Cooperative Network (at that time Wisconsin Federation of Cooperatives) to gauge the interest of the state's electric cooperatives in developing an electric cooperative annex to the State of Wisconsin Hazard Mitigation Plan. As a result, 13 of the electric cooperatives entered into a Memorandum of Understanding with Wisconsin Emergency Management in the development of a Rural Electric Annex to the State Plan. This annex ensures that participating Rural Electric Cooperatives will be eligible to apply for hazard mitigation funds to prevent loss of function and damage in rural Wisconsin. The Rural Electric Cooperative Annex is Appendix G of the State Plan.

RiskMAP

During 2009 FEMA began to develop a robust multi-year plan called RiskMAP (Risk Mapping, Assessment, and Planning) to address the full scope of the remaining mapping needs. RiskMAP is the successor to FEMA's Map Modernization program and expands the focus to include risk assessment, mitigation planning, and traditional hazard identification (flood mapping) activities. DNR's priorities for watershed selection were based on flood risk, recent flood events, and the availability of digital floodplain and high-quality elevation data.

The primary area of focus in FFY 2011 was the Upper and Lower Rock River watersheds along with one study in the Lower Wisconsin watershed and a few others in the Upper and Lower Chippewa and Eau Claire watersheds. The Upper and Lower Rock River watersheds as well as Chippewa and Eau Claire counties are still in the discovery phase in which the areas in greatest need of new engineered floodplain maps are determined. Discovery meetings for Chippewa and Eau Claire counties were held in January 2011 and for the Upper and Lower Rock River watershed in February 2011. Community officials had the opportunity to share their local knowledge and concerns on which streams warranted new floodplain maps and pointed out their areas of concerns. In addition, the State Hazard Mitigation Officer attended the discovery meetings for the Upper and Lower Rock River watershed and discussed the status of the communities' hazard mitigation plans; how RiskMAP products might assist in making the plans more comprehensive; previous mitigation projects in the area; and hazard mitigation funding opportunities. Miti-

gation will be part of future discovery meetings as they are held in the Lower Wisconsin River watershed.

Wetlands, Wildlife Habitat, and Flood Hazards in the Rock River Basin

WEM and DNR staff was contacted in early 2011 by the Environmental Law Institute (ELI) and the University of North Carolina (UNC) at Chapel Hill regarding collaborating together on a workshop on Wetlands, Wildlife Habitat, and Flood Hazards in the Rock River Basin. The workshop was held May 13, 2011, and was designed to facilitate a greater collaboration between emergency managers and wetland and wildlife conservation managers to strengthen protection of vital wetlands and floodplains. Wisconsin Wetlands Association was a sponsor in addition to the ELI and UNC. The workshop explored how different agencies and organization can work together to meet multiple goals and identify the information needed and funding sources available for joint projects. Both WEM and DNR made presentations at the workshop. Based on the workshop results the ELI, UNC, and Wisconsin Wetlands Association are working on developing a guidebook for the region on the obstacles to and opportunities for collaboration.

Public Assistance

Mitigation staff works very closely with the Public Assistance staff during federal declared disasters to ensure that hazard mitigation measures are implemented to the fullest extent possible through the Section 406 program. Through the Public Assistance Program, cost-effective hazard mitigation measures can be included on damaged facilities and funded as part of a community's grant. Mitigation opportunities that are identified through the Preliminary Damage Assessment process or other means are documented and provided to Public Assistance staff at the Joint Field Office. Mitigation staff attends and participates in the Public Assistance Applicants briefings where the mitigation staff discusses the hazard mitigation program, mitigation planning requirements and 406 mitigation opportunities. 406 Mitigation is a high priority with the State in every federal disaster declaration and staff continue look for ways to promote and implement 406 Mitigation.

Wisconsin Voluntary Organizations Active in Disasters (WI VOAD)

WI VOAD is a humanitarian association of independent voluntary organizations who may be active in all phases of disaster. Its mission is to foster efficient, streamlined service delivery to people affected by disaster, while eliminating unnecessary duplication of effort, through cooperation in the four phases of disaster: preparation, response, recovery, and mitigation. Staff from WEM provides coordination and assistance to WI VOAD members. WI VOAD has taken a lead role in long-term recovery and sponsors Long Term Recovery Committees. These committees, using WI VOAD's 501(c)(3) tax exempt status, focus on fundraising, reaching out to individual/families with unmet disaster needs and providing services to them through a uniform case management process.

Through the above activities and mechanisms, WEM was able to help educate multiple stakeholders about Wisconsin's hazards, assist them in developing plans, and obtain mitigation ideas and suggestions for the state plan. In this manner, WEM received input

from different levels of government, local officials, business representatives, private organizations and other interested parties including the public.

State mitigation staff provides input and participates in panels, workgroups, committees, etc. as requested by FEMA regional or headquarters offices. Staff has served in FEMA's HMA national evaluation every year. The SHMO participated on the National Review Panel for the states of Maryland, Washington, and Florida to review their enhanced plans. In addition, another mitigation staff member sat on the panel that reviewed the second update of the State of Washington's enhanced plan. The SHMO participated on the Enhanced Plan Review Procedures Workgroup and the External Stakeholder Workgroup for Mitigation Plan Review Process. Wisconsin is committed to working with FEMA in the future to improve and streamline programs, policies and procedures.

2.3 PROGRAM INTEGRATION

Implementation of the State of Wisconsin Hazard Mitigation Plan will be most effective if it is integrated with other planning efforts of other state planning programs and initiatives. The State has made efforts at integration by identifying opportunities where mitigation can be integrated into existing plans, reports, programs and/or initiatives.

The State of Wisconsin Hazard Mitigation Plan is a stand-alone plan; however, because of the importance that the State places on mitigation initiatives and activities, it is also included as an appendix to the Wisconsin Emergency Response Plan. This enables state agencies to reference the document when seeking information and guidance on the State's mitigation goals and actions.

The State's Long-Term Recovery strategy is outlined in ESF 14 which is a part of the State Emergency Response Plan. ESF 14 was updated to include lessons learned in the recovery process for DR-1768. A key element of the ESF and long-term recovery is the Wisconsin Recovery Task Force, which is comprised of more than 20 state and federal agencies with recovery responsibilities. The WRTF is a standing task force which will be active on a year-round basis and gear up when a disaster occurs. The WRTF is chaired by the WEM Administrator and consists of six subcommittees; agriculture, business, housing, human needs, infrastructure and mitigation. The State Hazard Mitigation Officer serves as the Chairman of the mitigation subcommittee. The subcommittees identify disaster impacts, challenges associated with those impacts and resources available to meet the challenges. Collectively, the agencies package funding for local housing, infrastructure, business repair and mitigation projects. ESF 14 also describes the roles and responsibilities of Wisconsin VOAD and the regional Long Term Recovery Committees (LTRC) which they sponsor. The LTRCs are the primary mechanism for meeting the unmet needs of individuals. (See Figure 7.1.4-2 for a map of the LTRCs.)

Wisconsin Emergency Management's Strategic Plan 2004-2006, identified 7 goals. One of the goals is to develop and evaluate emergency management plans and processes to ensure that they reflect our hazards, risks, capabilities, resources, and mitigation op-

portunities. Along with the goal are 5 objectives. The strategic plan remained in effect during the rapid turnover of 5 administrators. The plan is scheduled to be updated in FFY 2012. The goals and mitigation actions in the State of Wisconsin Hazard Mitigation Plan will assist WEM in achieving the goals of the Strategic Plan.

Wisconsin's Comprehensive Planning Legislation was signed into law by the Governor in 1999 and amended in 2000-2001. The Law requires communities to develop a comprehensive plan by January 1, 2010, if it engages in zoning, shoreland/wetland zoning, subdivision regulation, or official mapping. This statutory requirement is known as "the 2010 consistency requirement." The comprehensive plan will guide those development and land use decisions. The local plan must address nine minimum planning elements and be created in a public forum (More information about Wisconsin's Comprehensive Planning is available in Section 7.1.1 and at http://www.doa.state.wi.us/section.asp?linkid=128&locid=9.) Wisconsin Emergency Management (WEM) was not part of the discussion when the original legislation was developed. However, since the law was passed WEM has made efforts to find ways to integrate local comprehensive plans and local mitigation plans. These efforts include the following:

WEM mitigation staff attended the first Smart Growth presentation and public forum at the Monona Terrace Convention Center in Madison, WI in 2000, and publicly asked the question, "Why is there not a natural hazard element in the comprehensive plan requirements, given the nearly $1 billion of disaster related damages in Wisconsin since 1971?" Staff also had private conversations with program presenters and attendees about the need for hazard mapping and local hazard mitigation planning.

During 2001, WEM staff served on the advisory panel for the creation of the Guide for Preparing an Intergovernmental Cooperation Element for a Local Comprehensive Plan. Staff used this opportunity to suggest in which local communities might cooperate regionally to share emergency management resources, participate in watershed planning for resource preservation and flood prevention, and to cooperatively plan emergency response for hazardous materials.

WEM staff continued to attend meetings of the Wisconsin Land Information Council to learn more about the Smart Growth initiatives and to look for ways to integrate local hazard mitigation planning with local comprehensive planning.

The State Hazard Mitigation Officer made two presentations in March and December of 2001 to the Wisconsin Land Information Association regarding hazard mitigation planning and how hazards need to be addressed as part of any communities development and land use decisions, therefore, an integral part of a the comprehensive plan. A similar presentation was made to the American Planners Association Conference in Chicago in 2001.

In 2002 the State Hazard Mitigation Officer staff made a presentation on Wisconsin's disaster history and hazard mitigation programs to the Wisconsin Land Information Council during the group's brown bag lunch meeting. The presentation convinced the council's director to try to integrate hazard mitigation into the state comprehen-

sive planning initiative. In addition, WEM mitigation staff recommended the addition of a hazard planning goal to the state comprehensive planning goals. However, no substantive hazard mitigation element has been added to comprehensive planning requirements at this time.

As a result of the above activities and additional discussions, a staff person from the Department of Administration's comprehensive planning section joined the Wisconsin Hazard Mitigation Team in 2003. In addition, the State Hazard Mitigation Officer participated on the State Agency Resources Working Group (SARWG) as described previously in section 2.3.

WEM staff used local comprehensive planning as one of the criteria for awarding points to PDM planning grant applicants in 2002 recognizing that there would be benefits from developing a comprehensive plan that would assist communities in developing all hazard mitigation plans. WEM reviewed the planning elements for similar or duplicate requirements of the all-hazards mitigation plan so that communities preparing a comprehensive plan and a mitigation plan could minimize the duplication of effort and better integrate the two plans. A list of the nine planning elements and some ideas on how to integrate all hazards mitigation planning concepts into them are included in the Resource Guide to All Hazards Mitigation Planning in Wisconsin. In addition, where to integrate the comprehensive planning elements into the all hazards mitigation plan are also described in the guidance and are discussed at the Hazard Mitigation Planning Workshops held at least once a year.

The Council of Regional Planning Organizations represents the nine Regional Planning Commissions in Wisconsin (see Figure 7.1.4-1). For most communities in Wisconsin, Regional Planning Commissions serve as the only affordable local planning body available and are a source of planning expertise. The Commissions provide the mechanism by which multiple jurisdictions within a region may coordinate their plans. Most of Wisconsin's Commissions are engaged in assisting communities in developing their comprehensive plans as required by State Law. Recognizing the close relationship that the Commissions have with local governments and the resources that they can provide, and the link between comprehensive and hazard mitigation planning, a representative from the Council of Regional Planning Organizations joined the Wisconsin Hazard Mitigation Team in 2003. This member serves as a conduit between the Commissions and the Team. Having the Council participate on the Team will help the state share resources, combine planning requirements, avoid duplication, and provide additional local and regional assistance to communities that choose to plan. The Commissions have developed many of the local hazard mitigations plans either approved or presently underway as well as assisting the counties with the five-year update requirement.

As part of the State's mitigation planning efforts, 69 of the 72 counties in Wisconsin have completed or are developing an all hazards mitigation plan as of June 30, 2011. A countywide planning effort including both incorporated and unincorporated areas of the county receives priority for funding. This will ensure that as many jurisdictions as

possible remain involved in the mitigation planning process. The county all hazard mitigation plan will normally be a separate stand-alone document, but it can be an annex to the County's Emergency Operations Plan as well as part of a comprehensive plan. Any jurisdiction within a county may prepare a mitigation plan specific to that jurisdiction; separate from the county all hazards mitigation plan. See Section 5, Local Hazard Mitigation Planning, and Section 7.7.1.

Local governments and Regional Planning Commissions as well as consultants are using information contained in the State of Wisconsin Hazard Mitigation Plan to develop local all-hazards mitigation plans. As the local plans are developed, the information provided through those planning efforts will be available to WEM mitigation staff to incorporate into the State Plan. There will be continuous improvement of all the plans as they are reviewed and updated every three years for the State and five years for the local plans. For more information on the local hazard mitigation process, see Section 5.

In FFY05, WEM received a PDM state planning grant for a Risk Assessment of State-Owned and -Operated Buildings, Critical Facilities, and Infrastructure. WEM hired a staff member who started this huge endeavor. There are approximately 6,500 state facilities (not counting infrastructure) in the State of Wisconsin. It would take one person working full-time nearly 28 years to visit every facility. Therefore, a strategy was developed to obtain needed site-specific information on those facilities and infrastructure that are most critical and may be at most risk from future disasters. WEM along with the Department of Administration created a Wisconsin Risk Assessment Data Collection Worksheet that to collect information on structures. The collection worksheet covers everything from general information, such as location, to more detailed information involving such topics as construction materials. All of this data is needed to create an accurate risk assessment. Appendix H contains the Wisconsin Risk Assessment Data Collection Worksheet and Section 3.17 discusses the process and results to date. Future updates of the State of Wisconsin Hazard Mitigation Plan will include assessment of additional structures.

WEM applied for and received a 2007 PDM-C grant for updating the State Hazard Mitigation Plan. A larger portion of the grant was for the development of a statewide HAZUS flood risk assessment. With support from the University of Indiana Purdue-POLIS Center, the University of Wisconsin-Land Information and Computer Graphics Facility (LICGF) completed a statewide HAZUS flood risk assessment. The results can be found in Section 3.7.4. The statewide HAZUS flood risk assessment was included in the 2008 update of the State of Wisconsin Hazard Mitigation Plan. In addition, the individual county HAZUS flood risk assessments were distributed to all counties and to each respective Regional Planning Commission. WEM's website includes an interactive map where the county HAZUS risk assessments can be viewed and downloaded. FEMA highlighted Wisconsin's Statewide Flood Risk Assessment efforts in a Best Practices story that can be found at http://www.fema.gov/mitigationbp/brief.do?mitssId=4453. With the 2011 update of the State Plan, a HAZUS risk assessment was completed for the counties that had digitized FIRM maps completed since the 2008 update. This included new assessments for 13 counties. The statewide summary was updated to reflect these changes.

Over the years, WEM has worked to identify partners interested in participating in the State's mitigation efforts. Integration of other federal, state, and local agencies, business and industry, and private non-profit organizations into the State mitigation program has been an ongoing process that also has helped to educate WEM's partners concerning the importance of mitigation. Another relationship that developed during the planning process was WEM working with Wisconsin's Rural (Electric) Cooperatives to develop the Rural Cooperative Hazard Mitigation Plan annex for the State of Wisconsin Hazard Mitigation Plan.

This educational process also has resulted in WEM's partners using mitigation in their programs and plans over time. These discussions and/or meetings have involved reviews of current programs and policies that promote or could potentially promote mitigation initiatives. Many of the mitigation successes since the 1993 floods have been as a direct result of these meetings and discussions. The lessons learned through these programs and activities have contributed to the development of the State Plan and have been integrated into their own plans, programs and procedures. The State Capability Assessment in Section 4, Mitigation Strategy, includes a detailed description of where and how mitigation is integrated into specific agency plans, policy, programs and initiatives.

SECTION 3: WISCONSIN RISK ASSESSMENT

Risk assessments provide the factual basis for activities proposed in the strategy portion of the mitigation plan. Statewide risk assessments must characterize and analyze natural hazards and risks to provide a statewide overview of the greatest threats. This overview will allow the State to compare costs associated with potential losses and to determine their priorities for implementing mitigation measures under the strategy. Furthermore, it helps the State prioritize jurisdictions that receive technical and financial support in the development of more detailed local risk and vulnerability assessments.

3.1 INTERIM FINAL RULE REQUIREMENT

The Interim Final Rule found in 44 CFR Section 201.4 [c][2] states that "to be effective, the State Hazard Mitigation Plan must include the following elements:

i. An overview of the type and location of all natural hazards that can affect the State, including information on previous occurrences of hazard events, as well as the probability of future hazard events, using maps where appropriate.

ii. An overview and analysis of the State's vulnerability to the hazards described in paragraph [c] [2], based on estimates provided in local risk assessments as well as the State risk assessment. The State shall describe vulnerability in terms of jurisdictions most threatened by the identified hazards, and most vulnerable to damage and loss associated with hazard events. State owned critical or operated facilities located in the identified hazard areas shall also be addressed.

iii. An overview and analysis of potential losses to the identified vulnerable structures, based on estimates provided in local risk assessments as well as the State risk assessment. The State shall estimate the potential dollar losses to State owned or operated buildings, infrastructure and critical facilities located in the identified hazard areas."

3.2 OVERVIEW OF VULNERABILITY AND RISK ASSESSMENT

The State of Wisconsin has experienced thousands of hazard events, resulting in millions of dollars in losses and casualties, 29 Presidential Disaster Declarations, and six Emergency Declarations since 1971. As part of an overall effort to reduce future exposure to damages, the State of Wisconsin, in cooperation with FEMA, has developed the Wisconsin Risk Assessment. The Wisconsin Risk Assessment presents research on the potential impact of natural hazards throughout the state and its jurisdictions. The document was developed to comply with the Disaster Mitigation Act of 2000 (DMA2K). This report provides a foundation for Wisconsin's effort to develop strategies to mitigate future damages from hazards.

The Wisconsin Risk Assessment examines natural disasters on a statewide basis and for individual counties. Natural hazards include those caused by climatological, geological, hydrologic, or seismic events. The Risk Assessment relies upon information about

past hazard events from published sources such as the US National Oceanographic and Atmospheric Administration (NOAA), National Weather Service (NWS), US Geological Survey (USGS), US Army Corps of Engineers (USACE), Wisconsin Department of Natural Resources (DNR), and Wisconsin Emergency Management (WEM), among others.

According to the DMA2K and supporting requirements in the Interim Final Rule (IFR), states must take actions to identify hazards and assess threats, as outlined in Section 4.1 of the State Hazard Mitigation Plan. The initial hazard identification catalogued potential hazards in Wisconsin and determined which hazards have the most chance of significantly affecting the state and its citizens. The hazards include those that have occurred in the past, as well as those that may occur in the future.

After the most significant statewide hazards were identified, a detailed Risk Assessment was developed. The process used to identify the most significant hazards was reviewed and approved by the Wisconsin Hazard Mitigation Team (WHMT). This qualitative rating is included at the end of each hazard discussed in the Risk Assessment, as a way to address the issue of probability without undertaking detailed studies for all the hazards.

Because it forms the basis of the State Hazard Mitigation Plan, the state-level Risk Assessment should be as comprehensive as possible. As discussed elsewhere in this section, the initial list of thirteen natural hazards was reduced to five, for a more detailed analysis of hazards posing the greatest threat and mitigation potential in Wisconsin: flooding, tornadoes, high winds, coastal erosion, and wildfire.

The DMA2K criteria require states first to identify hazards that may affect them and then to perform a comprehensive multi-hazard assessment, including a review of detailed information concerning hazard characteristics, past occurrences, and probability.

3.2.1 Hazard Identification: Methodology

The hazards profiled in the Wisconsin Risk Assessment were selected from the comprehensive list of natural hazards FEMA identified in the 1997 “Multi-Hazard Identification and Risk Assessment: A Cornerstone of the National Mitigation Strategy (MHIRA)” and the “Hazard Analysis for the State of Wisconsin” (Department of Military Affairs, Wisconsin Emergency Management, November 2002).

Although the IFR requires that all natural hazards affecting the state must be included in a detailed overview, it is not practical or desirable to perform in-depth risk assessments on all these hazards since many of them have a low probability of occurring and/or it is difficult to mitigate their effects. Because of this, the WHMT and WEM determined that it would be desirable to reduce the initial list of 13 hazards to those that:

1. Have the highest probability of occurring within the state; and
2. Have the greatest potential for mitigation.

To accomplish this, the WHMT and WEM used a qualitative system that ranked each of the thirteen hazards by both probability and mitigation potential. The ranking systems for are shown in Tables 4.2.1-1 and 4.2.1-2 below. This ranking is not intended to supersede the detailed risk assessment of each potential hazard type, but rather to allow time and technical resources to be focused on the most significant hazards.

TABLE 3.2.1-1 PROBABILITY RANKING AND CRITERIA

Ranking	Criteria
High	• The hazard has impacted the state annually, or more frequently • The hazard is widespread, generally affecting regions or multiple counties in each event • There is a reliable methodology for identifying events and locations
Medium	• The hazard impacts the state occasionally, but not annually • The hazard is somewhat localized, affecting only relatively small or isolated areas when it occurs • The methodology for identifying events is not well-established, or is not applied across the entire state
Low	• The hazard occurs only very infrequently, generally less than every five years on a large scale, although localized events may be more frequent • The hazard is generally very localized and on a small scale (i.e. sub-county level) • A methodology for identifying event occurrences and/or severities is poorly established in the state, or is available only on a local basis

TABLE 3.2.1-2 MITIGATION POTENTIAL RANKING AND CRITERIA

Ranking	Criteria
High	• Methods for reducing risk from the hazard are technically reliable • The State or counties have experience in implementing mitigation measures • Mitigation measures are eligible under federal grant programs • There are multiple possible mitigation measures for the hazard • The mitigation measures are known to be cost-effective • The mitigation measures protect lives and property for a long period of time, or are permanent risk reduction solutions
Medium	• Mitigation methods are established • The State or counties have limited experience with the kinds of measures that may be appropriate to mitigate the hazard • Some mitigation measures are eligible for federal grants • There is a limited range of effective mitigation measures for the hazard • Mitigation measures are cost-effective only in limited circumstances • Mitigation measures are effective for a reasonably long period of time
Low	• Methods for reducing risk from the hazard are not well-established, are not proven reliable, or are experimental • The State or counties have little or no experience in implementing mitigation measures, and/or no technical knowledge of them • Mitigation measures are ineligible under federal grant programs • There is a very limited range of mitigation measures for the hazard, usually only one feasible alternative • The mitigation measures have not been proven cost-effective and are likely to be expensive compared to the magnitude of the damages caused by the hazard • The long-term effectiveness of the measure is not known, or is known to be relatively poor

Table 3.2.1-3 below highlights important information considered for each of the initial hazards. The data sources used for assessment and the relative rankings for probability and mitigation potential are shown. The table also indicates the "disposition" of the hazard, which describes how the hazard was addressed, either by performing a basic profile as required by the IFR, or through a more comprehensive risk assessment that provides projections of future losses from the selected hazards.

TABLE 3.2.1-3 NATURAL HAZARD IDENTIFICATION AND DISPOSITION

Hazard	Data Sources	Probability	Mitigation Potential	Disposition
Hail	• NOAA: NWS • FEMA • WEM	High	Low	• General profile • Risk assessment at county level
Lightning	• FEMA • Centers for Disease Control and Prevention • NOAA: NWS • University Corporation for Atmospheric Research	High	Low	• General profile
Tornadoes and High Winds	• NOAA: NWS • FEMA • WEM	High	High	• General profile • Risk assessment at county level • Risk assessment for State-owned and –operated facilities • Separate assessments for tornadoes and high winds
Flooding	• FEMA • WEM • NOAA: NWS • DNR	High	High	• General profile • Risk assessment at county level • Risk assessment for State-owned and –operated facilities
Wildfires	• FEMA • WEM • DNR	Medium	Medium	• General profile • Risk assessment at county level
Drought	• FEMA • WEM • NOAA: NWS	Medium	Low	• General profile
Extreme Heat	• FEMA • WEM • NOAA: NWS	High	Low	• General profile
Winter Storms	• FEMA • Centers for Disease Control and Prevention • NOAA: NWS	High	Low	• General profile

TABLE 3.2.1-3 CONTINUED				
Hazard	**Data Sources**	**Probability**	**Mitigation Potential**	**Disposition**
Coastal Erosion	• USGS • USACE • FEMA • WEM • DOA: WCMP	High	High	• General profile • Risk Assessment at County level • Risk Assessment for State-owned and –operated facilities
Earthquakes	• FEMA • University of Wisconsin-Extension, Geological and Natural History Survey • University of Memphis Center for Earthquake Information • WEM	Low	Low	• General profile
Landslides and Land Subsidence	• FEMA • USGS • WEM	Medium	Low	• General profile
Dam Failure	• FEMA • WEM • DNR	High	Medium	• General profile
Climate Change		???	???	

The classification process provided a stratification of the hazards based on these criteria. The WHMT identified floods, tornadoes, high winds, wildfires, and coastal erosion, because these hazards present highest risk to the state and have the most potential for mitigation based on this assessment. In the following sections, these hazards are afforded detailed risk assessments to identify the areas of the state that are most at risk, and this information is in turn used as the basis for determining appropriate actions to reduce the risks.

Since the State re-evaluates and updates this plan every three years, it may be appropriate to revisit this ranking methodology and perform full risk assessments for additional hazards in future plan updates. In 2008, a more detailed assessment of wildfires was included than in the previous version of the Plan, as a result of analysis done by the US Forest Service and DNR. The final report is included in the 2011 update. Furthermore, a more detailed assessment for hail is included in the 2011 update, based on data provided by the NWS and analyzed by WEM.

Population growth and development also increase the risk and vulnerability of counties. Since most natural hazards, with the exception of floods, coastal hazards, and dam failure, are so wide-spread, it is difficult to project future risk based solely on population and

growth. Increasing residential property value will also increase future risk from tornado damage, in general.

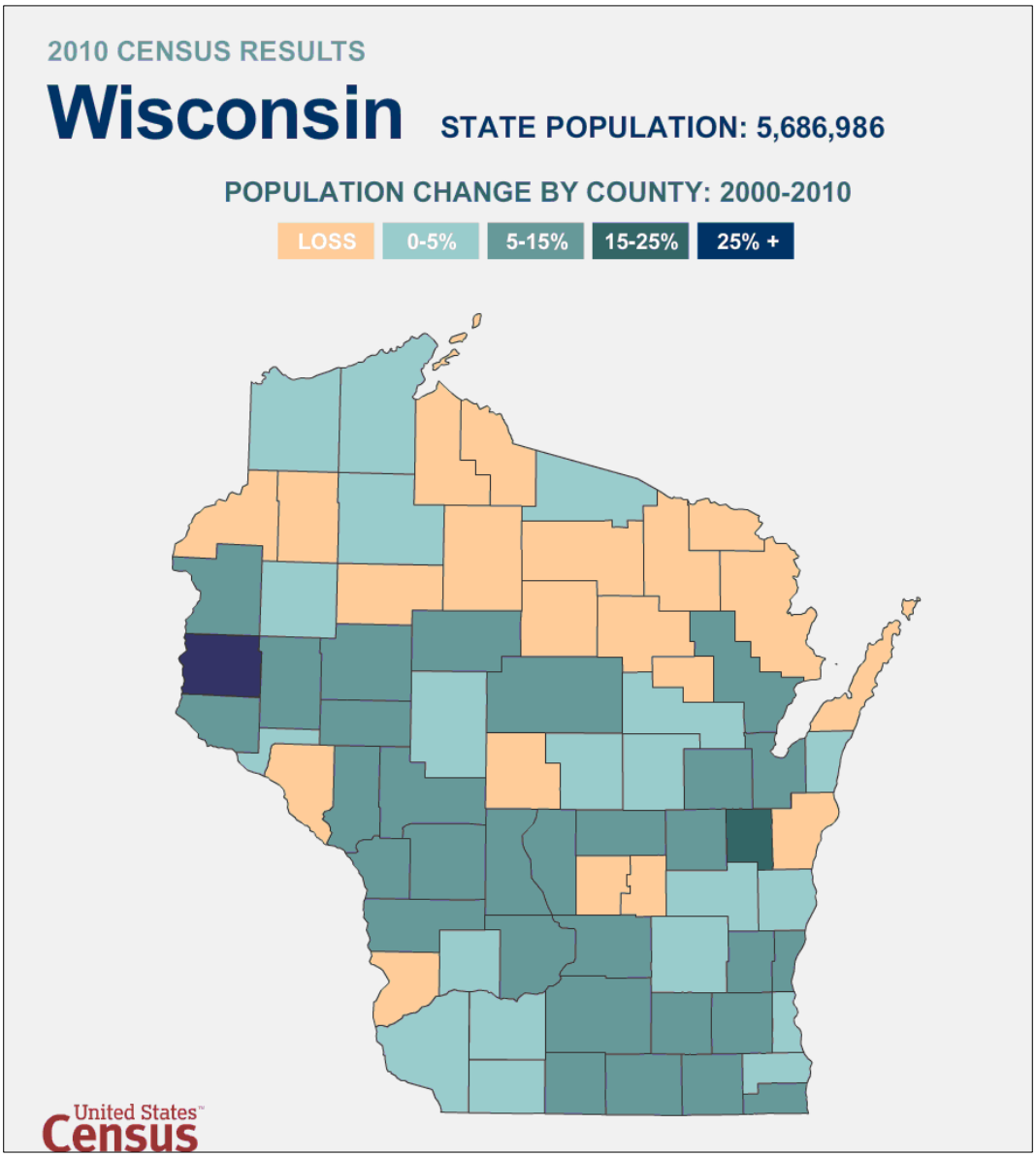


Figure 3.2.1-1 Wisconsin Population Change by County, 2000-2010
Source: US Census Bureau, 2011.

According to population projections calculated by the Demographic Services Center, the state is expected to increase in population to nearly 6.65 million by 2035, which is a growth of 24.1% (http://www.doa.state.wi.us/docview.asp?locid=9&docid=2108). The counties projected to grow fastest over the 35 year study period (2000 to 2035) are Calumet, Dane, Oconto, Kenosha, Pierce, Polk, St. Croix, Sauk, Walworth, and Washington, accounting for 45% of the state's overall increase. Of the 33 counties projected to grow over 24.1% in that time, the largest growth is projected to occur in St. Croix County, increasing its population to 227,000 residents, which is over 150% expected population growth.

Based on the University of Wisconsin's Applied Population Laboratory's analysis of Census 2010 data, Wisconsin's overall population increased 6% between 2000 and 2010 to include 5,686,986 residents. Numerically, this is an increase of 323,271 residents (http://www.apl.wisc.edu/newsletters/Population_Notes_Summer2011.pdf).

TABLE 3.2.1-4 WISCONSIN COUNTIES WITH THE HIGHEST POPULATION CHANGE

County	2000 Census	2010 Census	Numeric Change	% Change
Dane	426,526	488,073	61,547	14.4%
Waukesha	360,767	389,891	29,124	8.1%
Brown	226,658	248,007	21,349	9.4%
Saint Croix	63,155	84,345	21,190	33.6%
Kenosha	149,577	166,426	16,849	11.3%
Outagamie	161,091	176,695	15,604	9.7%
Washington	117,496	131,887	14,391	12.2%
Winnebago	156,763	166,994	10,231	6.5%
Walworth	92,013	102,228	10,215	11.1%
State of Wisconsin	**5,363,715**	**5,686,986**	**323,271**	**6.0%**

Source: US Census Bureau, 2011.

Twenty rural counties, concentrated in northern Wisconsin, lost population between 2000 and 2010. Most of the population growth occurred near the Minneapolis-Saint Paul, Milwaukee, and Chicago metropolitan areas, with the fastest growing counties shown in table 3.2.1-4, above. The counties estimated to gain the largest number of residents were Dane, Brown, Outagamie, and Milwaukee.

Many of Wisconsin's most populous cities, as listed in Table 3.2.1-5 are located near Lake Michigan or along the Mississippi River. As such, these high population centers are particularly vulnerable to coastal hazards, riverine flooding, and flash flooding (as a result of storm water runoff).

Generally population growth and development increase the risk and vulnerability of counties. Since most natural hazards, with the exception of floods, coastal hazards,

TABLE 3.2.1-5 MOST POPULOUS WISCONSIN CITIES

City	Census 2010 Population
Milwaukee	594,833
Madison	233,209
Green Bay	104,057
Kenosha	99,218
Racine	78,860
Appleton	72,623
Waukesha	70,718
Oshkosh	66,083
Eau Claire	65,883
Janesville	63,575
West Allis	60,411
La Crosse	51,320
Sheboygan	49,288
Wauwatosa	46,396
Fond du Lac	43,021

Source: US Census Bureau, 2011.

and dam failure, are so wide-spread, it is difficult to project future risk based solely on population and growth. Increasing residential property value will also increase future risk from tornado damage, in general.

Data included in these projections for the 2011 State Hazard Mitigation Plan utilize Census 2000 and 2010 data, for more accurate growth rate and population projections. The only expected change for the 2014 update is the verification of accuracy in these projections, as no new Census data will be available until 2020.

3.2.2 Terminology

FEMA defines **risk** as "the likelihood that a threat will harm an asset with some severity of consequences" (http://www.fema.gov/pdf/plan/prevent/rms/155/e155_unit_v.pdf). Risk examines not only the **probability**, or likelihood, of event occurrence, but also the consequences of this event's occurrence. Since all hazards do not occur in each locality with the same frequency, it is important to note that probability changes over time. The likelihood of an event occurring is greater as the time horizon increases.

By understanding the probability of occurrence and consequences of an event, the State can better manage the risk with mitigation measures that reduce threats, vulnerabilities, and risks to assets.

Vulnerability speaks to susceptibility of people, property, ecosystems, or resources to a hazard event. Note that vulnerability can be considered any of the following:

- Social (i.e. displacement of people, loss of a critical facility providing services to people)
- Political (i.e. loss of jobs, stability of local government, or political power)
- Environmental (i.e. loss of animal habitat, contamination of a lake)
- Economic (i.e. loss of productivity in a local economy, monetary loss, opportunity cost of re-building)

Understanding the consequences of an event is often dependent upon understanding the **severity** of the event. In other words, by knowing "how bad" a hazard event is, the destructiveness of a natural hazard in Wisconsin can be better understood.

Throughout the Risk Assessment, risk is defined as the dollar value of future expected losses, and is annualized whenever possible. Dollar value is used to express risk simply so different types of losses (i.e. deaths, injuries, loss of property, etc.) can be compared and examined. Methods used for evaluating risk are defined or described in each section devoted a specific hazard.

Furthermore, the investigations of each of Wisconsin's natural hazards are methodically examined on three main criteria:

1. **Nature:** basic information about the natural hazard that distinguishes it from other hazards; used to understand the subsequent vulnerability assessment and loss estimates
   - Information drawn mainly from FEMA, the NWS, and other national agencies
2. **History:** background information about previous occurrences of the natural hazard; focuses on hazard events in Wisconsin and on major occurrences elsewhere in the United States where information for the state is lacking
   - Information drawn mainly from the database of natural historical hazard events in Wisconsin
3. **Probability and Magnitude:** information about the likelihood of occurrence and severity of events in Wisconsin
   - Information drawn from a combination of FEMA and other national sources, Wisconsin expertise, and the Wisconsin natural hazard event database

In the 2008 version of the State Hazard Mitigation Plan, detailed county-level analyses were included for flooding, tornadoes, coastal erosion, and wildfires. In 2011, a county-level analysis was also included for hail, since it leads to millions of dollars of damages each year. Additionally, an assessment of critical State-owned and -operated facilities was performed for floods,[1] tornadoes, and high winds.

3.3 SEVERE THUNDERSTORMS

In the 2011 State Hazard Mitigation Plan, severe thunderstorms are first hazard addressed because of their association with other natural hazards affecting Wisconsin. Severe storms in and of themselves pose great threats to safety in the state; however, the numerous other hazards accompanying severe thunderstorms, such as hail, lightning, tornadoes, high winds, and flooding, pose additional threats to safety affording more in-depth analyses in following sections.

3.3.1 Nature of the Hazard

Thunderstorm events are generated by instability in the atmosphere, sufficient moisture, and rising motion to form clouds and rain. They are characterized by precipitation in the form of rain, lightning, hail, downbursts, and tornadoes. Occasionally, thunderstorms occur in winter during heavy snow events. Typically, Wisconsin thunderstorms are approximately 15 miles across and last for about 30 minutes, but events of longer duration or with high rates of precipitation can lead to flooding (NWS).

The National Weather Service (NWS) classifies a thunderstorm as severe if at least one of the following conditions occurs:

1. Winds reach or exceed 58 mph
2. The storm produces a tornado

1. Coastal and riverine floods were examined for the Risk Assessment.

3. The storm produces hail at least one inch in diameter

In severe thunderstorms, strong downburst winds are created by falling rain and associated sinking air, creating winds that can reach speeds of 60 to 100 mph. Micro-bursts, concentrated versions of downbursts, can have speeds up to 150 mph. Great damages can result from downbursts and micro-bursts.

Throughout this section, the focus is specifically on the wind damages associated with severe thunderstorms, as the lightning and hail accompanying them are evaluated at greater detail in following sections.

3.3.2 Wisconsin Severe Thunderstorm Event History

Thunderstorms and the associated severe weather can occur throughout Wisconsin during any month of the year, but their highest frequency is from May through September. They also occur most often between 12:00 P.M and 10:00 P.M. The peak hour for severe thunderstorms is 6:00 to 7:00 P.M.

Wisconsin averages around 30 thunderstorm days per year over the northeastern counties to around 42 days over the southwestern counties (NWS).

July 4, 1977

On July 4, 1977, a long-lived line of severe thunderstorms produced significant wind damage across a large part of northern Wisconsin. Called a “derecho,” a widespread and long-lived, violent, convectively-induced windstorm associated with a fast-moving band of severe thunderstorms developed over west central Minnesota during the morning and moved southeast, increasing in intensity as it approached Wisconsin. A series of intense downburst winds caused major forest blown-downs, widespread severe damage to property, one casualty, and 35 injuries. This band of extreme damage, which was 10 to 20 miles wide and over 160 miles long, extended from eastern Burnett County through Washburn, Sawyer, Price, and Oneida Counties. Approximately 850,000 acres of trees were either destroyed or badly damaged. Damage estimates including buildings and vehicles totaled about $24 million. Wind gusts may have reached 135 mph at times.

May 31, 1998

During the early morning hours of Sunday, May 31, 1998, south-central and southeast Wisconsin experienced another “derecho.” Incredibly powerful, hurricane-force high winds, with peak gusts of 100 to 128 mph tore through 12 counties, while another eight counties had peak gusts of 30 to 80 mph. Although all 20 counties in south-central and southeast Wisconsin reported scattered to widespread wind damage, there were five main corridors or swaths of concentrated damage: 1) from central Sauk County through northern Dane County, northern Jefferson County, southern Dodge County, and Waukesha County into Milwaukee County; 2) from east-central Columbia County across northern Dodge County

and through southeast Fond du Lac County and southern Sheboygan County; 3) from the West Bend area of central Washington County east to the Port Washington area of Ozaukee County; 4) from southeast Iowa County into northwest Green County; and 5) from the northwest to the central part of Lafayette County.

Utility companies and Emergency Managers stated that the May 31, 1998 event was the most damaging, widespread, straight-line thunderstorm wind event to affect southern Wisconsin in the past 100 years. Estimated monetary damage for all twenty counties was $55.85 million for homes, businesses, utilities' buildings, agriculture buildings, signs, street lights, billboards, campers, and boats. An additional $1.48 million in damages occurred in crop and livestock losses. As a sign of the wind power, many concrete silos had their tops blown off and many barns were flattened. Roofs peeled off homes and other structures. Thousands of large trees were either uprooted or twisted and broken by the winds. Hundreds of power poles were snapped or pushed over by the winds or falling trees and branches. At one time, approximately 60,000 customers in south-central Wisconsin and 170,000 in southeast Wisconsin were without electricity. Some residences and businesses were without power for as long as five or six days due to the deluge of needed utility repairs and a shortage of replacement power poles.

July, 1999

Throughout July 1999, the northwestern portion of Wisconsin received an unusual amount of thunderstorm activity. The cumulative damage from these events led to a Presidential Disaster Declaration for ten counties. Most of the wind damage occurred in the forests of Douglas and Bayfield Counties. The US Forest Service stated that downbursts and wind affected an estimated 92,000-acre area of forest during this month-long period.

Approximately 12,000 acres of trees were nearly 100% down in the affected area and another 30,000 acres were moderately affected with up to 40% of trees destroyed. The downed trees created an immediate debris problem on area roads as well as a severe long-term fire hazard. Other long-term effects include the possible spread of tree diseases, which could affect the value of timber as an economic resource; lost tourism and tourism revenue; increased spending for debris clearance; and increased spending for fire-fighting activities.

May 12, 2000

On May 12, 2000, a major super-cell storm developed in west-central Wisconsin. Chilton and St. Nazianz in Manitowoc County were particularly hard-hit by hail and wet microbursts that produced winds over 100 mph and a brief EF0 to EF1 tornado.

June 11, 2001

On June 11, 2001, a line of thunderstorms with many of the same characteristics as a tropical storm ripped through east-central and west-central Wisconsin. The thunder-

storm complex produced hurricane-strength wind gusts and hail, resulting in thousands of downed trees and damage to structures. Nearly $20 million in damage was reported in central and east-central Wisconsin. Much of the wind damage was concentrated in Wood, Portage, Waushara, Waupaca, Winnebago, Outagamie, and Calumet Counties and the cities of Appleton and Oshkosh. Overall, this event affected 30 counties, which were included in Presidential Disaster Declaration 1369.

August 3, 2004

On August 3, 2004, clusters of severe thunderstorms moved southeast through south-central and southeast Wisconsin, resulting in damaging high winds that toppled large trees, very large damaging hail, and heavy rains that led to flash flooding. Columbia County suffered the most damage thanks to hurricane-force thunderstorm winds coupled with hail stones one to three inches in diameter. The wind-driven hail damaged at least 100 homes and several businesses and churches in Fall River (Columbia County). The wind-driven hail also mowed down some corn and soybean fields between Rio and Columbus. Some of the hail stones were still un-melted the next morning. Flash flooding resulted in gravel shoulder washouts and flooded buildings and basements in the Wisconsin Dells to Wyocena area of Columbia County. Rainfall amounts of 2.50 inches were measured in about one to two hours in the Portage area (Columbia County). This storm caused over $3 million in damages.

July 30, 2006

On July 30, 2006, downburst winds hit the Bayfield waterfront where an art fair was in progress at Memorial Park. Most of the ninety fair tents were demolished and art pieces were tossed into Lake Superior. A woman broke her hand and a man received a large gash on his hand. Numerous large trees were blown down in Bayfield. The local Catholic church lost a portion of its roof, resulting in damage estimated at $300,000. There was an unverified report from a private weather system clocking the wind at 99 mph before it became inoperable. At the Apostle Island Marina numerous boats were damaged. Trees were reported down all across northern Douglas County. Damages were over $1.5 million.

August 13, 2007

On August 13, 2007, a large severe thunderstorm produced winds damaging an area from just west of New Richmond to Glenwood City. This damage occurred within an approximately two to four mile swath between these two cities. Some general reports include: 109 homes were damaged or severely damaged; 48 barns were damaged or severely damaged; two barns were destroyed near Emerald; one home was rendered uninhabitable three miles east-southeast of New Richmond; one home at County G and GG was destroyed; barns, homes, and corn fields were flattened near Emerald Dairy along county Highway G; power lines and trees were toppled; and the entire village of Hammond and some outlying areas were without power for approximately 12 hours. Damage was over

$35 million to properties and $10 million to crops.

Figure 3.3.2-1 below shows the average number of thunderstorm days across the United States in 2008 (this study has not been repeated since 2008). The highest concentration of thunderstorm days is found in the Southeast, with an annual average of 60 to 100 thunderstorm days. In Wisconsin, there is an annual average between 30 and 50 thunderstorm days.

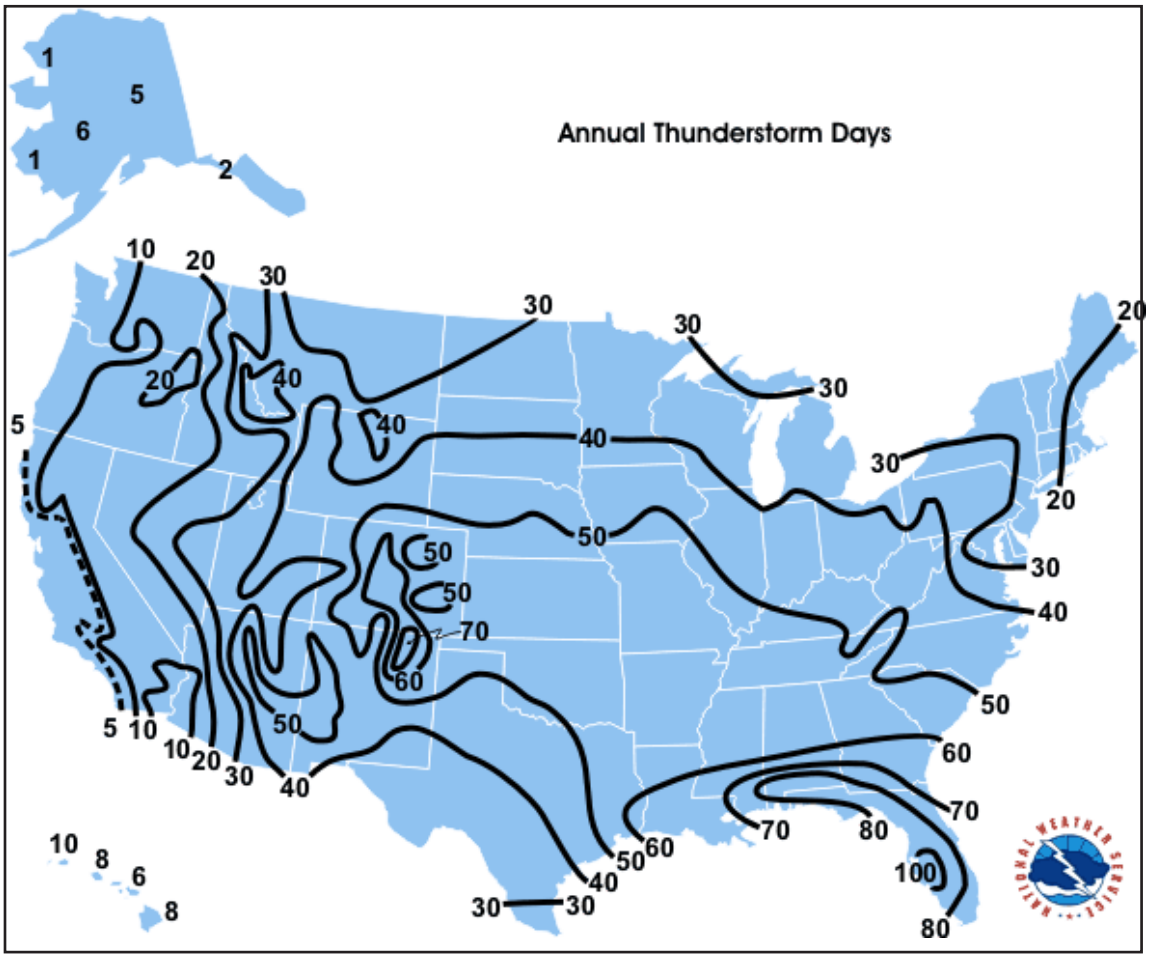


Figure 3.3.2-1 Annual Average Number of Thunderstorm Days in the US
Source: NOAA National Weather Service, Milwaukee/Sullivan, WI, 2008.

3.3.3 Probability of Occurrence

The number of days that severe thunderstorm winds, large hail, or tornadoes occur annually within 25 miles of a given point in Wisconsin ranges from about three days across the northern counties to about seven days across the southwestern counties. Figure 3.3.3-1 below depicts the annual number of days with severe thunderstorm winds that can be expected across the United States. Wisconsin experiences from two to five severe thunderstorm wind events per year, on average.

This is important to note because in some cases, thunderstorm winds can be fatal. 25 fatalities were attributed to wind from severe thunderstorms during the time period from 1982 to 2010 in the US. When a thunderstorm became severe in Wisconsin during the period of 1982 to 2010, short-fuse severe weather was in the form of:

- Damaging high wind 58% of the time,
- Large hail 30% of the time,
- Tornadoes 7% of the time, and
- Flash floods from heavy rain 5% of the time.

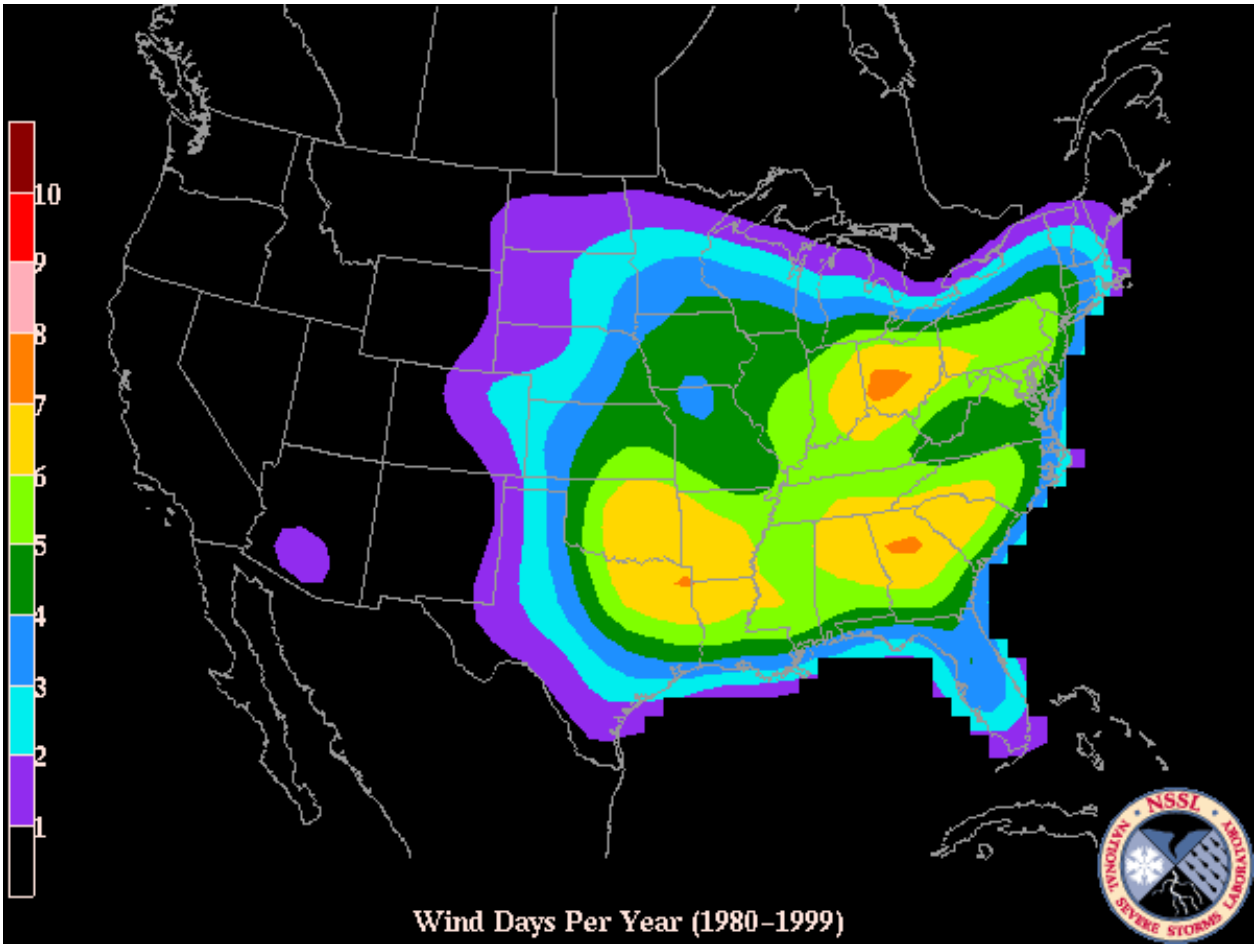


Figure 3.3.3-1 Annual Average Number Days with Severe Thunderstorm Winds in the US
Source: NOAA National Weather Service, Milwaukee/Sullivan, WI, 2008.

Figure 3.3.3-2, below, shows the number of severe thunderstorm wind events, number of directly-related fatalities, and number of directly-related injuries from 1982 to 2010 in each Wisconsin county. Southern Wisconsin has the most of severe thunderstorm wind events. Dane, Rock, Walworth, Waukesha, and Jefferson counties have the most events with 277, 244, 207, 204, and 177 events, respectively. This is particularly alarming due in part to the recent development of land in these counties and the projected population growth. Only seven counties have experienced fewer than 50 severe thunderstorm

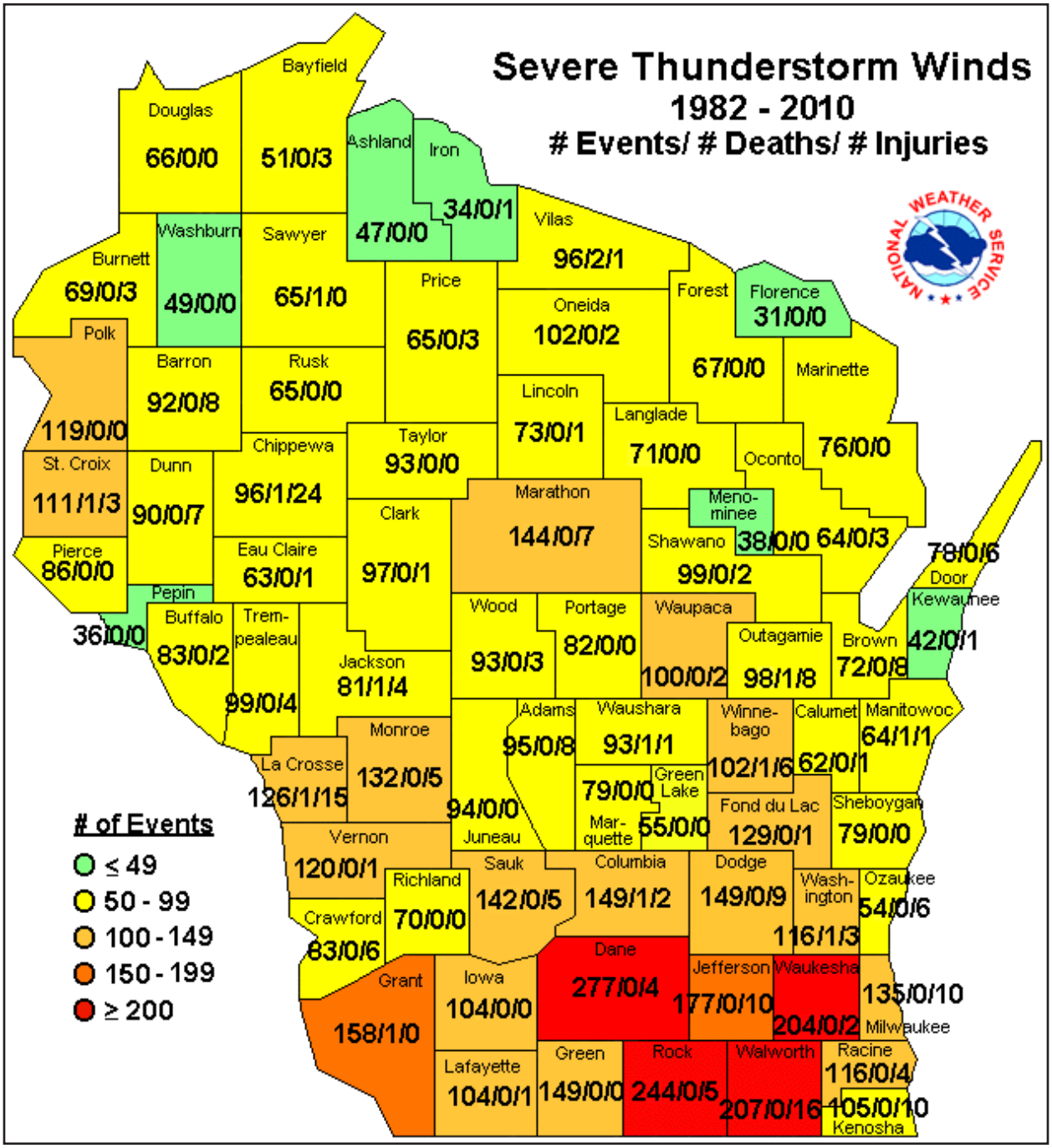


Figure 3.3.3-2 Severe Thunderstorm Wind Events by County, 1982-2010
Source: NOAA National Weather Service, Milwaukee/Sullivan, WI, 2011.

events during the time period. Florence, Iron, and Pepin counties experience many times fewer severe thunderstorm wind events than the highest southern counties.

According to the NWS, in the time period between 1970 and 2010, Wisconsin has experienced 580 hurricane-force wind events (74 mph or higher). In Figure 3.3.3-3, below, the number of severe thunderstorm wind events with hurricane-force wind gusts is shown. Again, note the concentration of events in southeastern Wisconsin. Rock, Dane, and

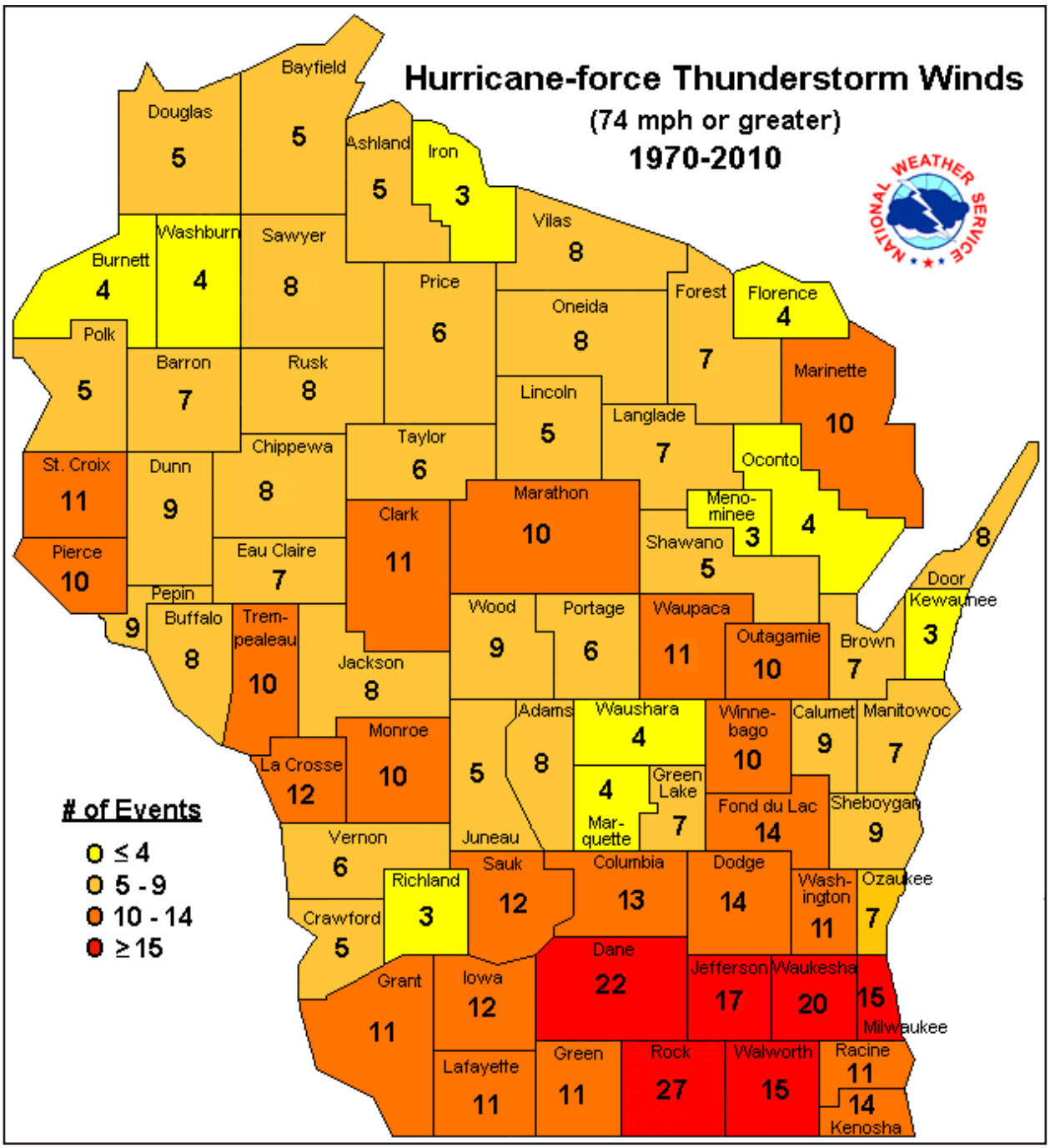


Figure 3.3.3-3 Hurricane-Force Severe Thunderstorm Wind Events by County, 1970-2010
Source: NOAA National Weather Service, Milwaukee/Sullivan, WI, 2011.

Waukesha Counties have had 27, 22, and 20 hurricane-force wind gust events since 1970, respectively. This concentration around higher population densities poses the potential for damages where land is most developed.

Within the same time period, winds at or above 100 mph have been documented during 58 events, meaning that winds similar to a Category 2 hurricane are experienced about 1.4 times every year on average in Wisconsin. Figure 3.3.3-4, below, shows the num-

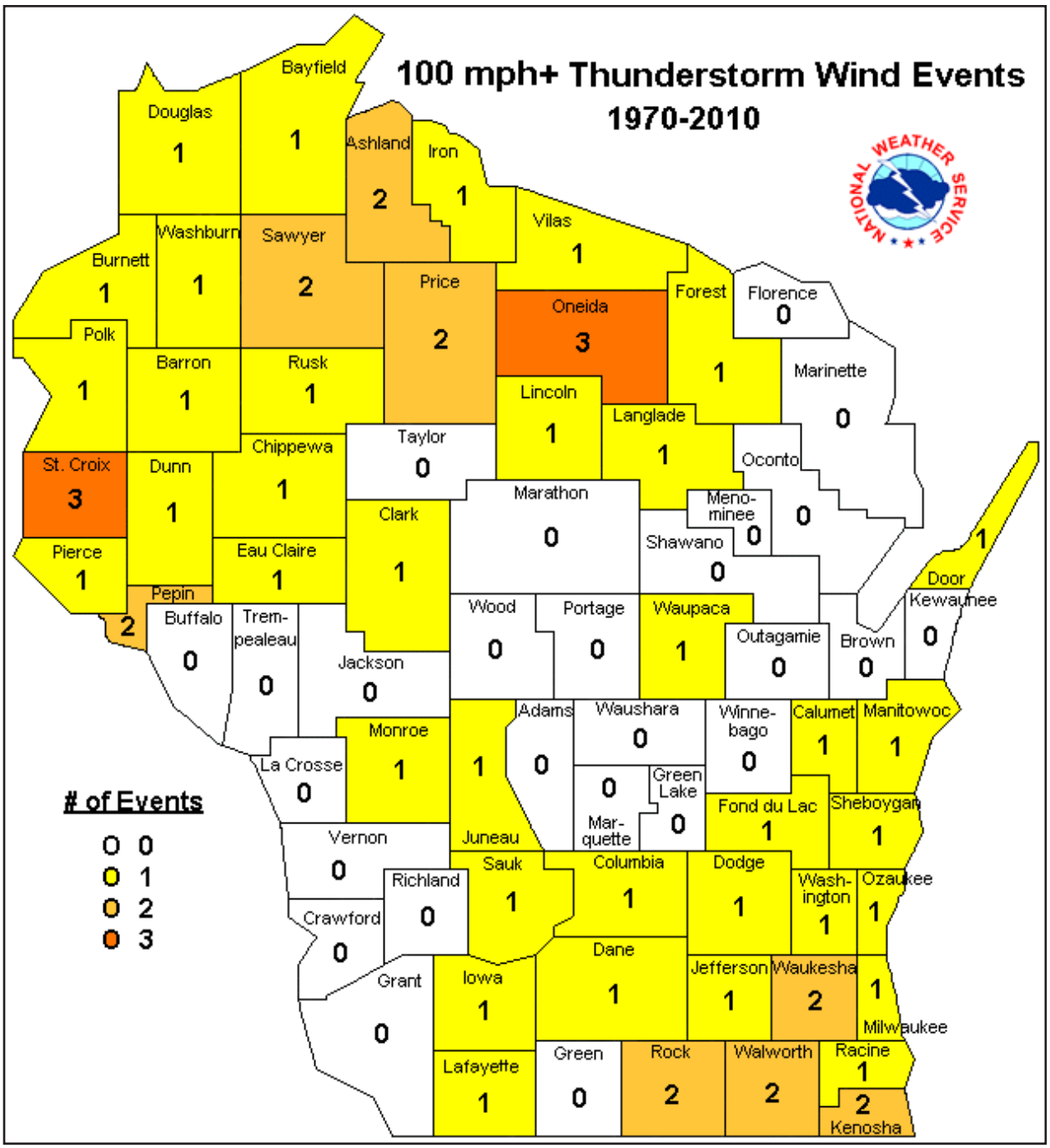


Figure 3.3.3-4 Severe Thunderstorm 100+ mph Wind Events by County, 1970-2010
Source: NOAA National Weather Service, Milwaukee/Sullivan, WI, 2011.

ber of severe thunderstorm wind events with wind gusts of 100 mph or more per county. Since these extreme wind events are not very common, the data shown does not lend itself to meaningful conclusions, though it appears that the northern parts of the state have a slightly higher risk for these extreme wind events, especially Oneida and St. Croix counties. Generally, the central part of the state has experienced very few Category 2 hurricane-force wind gusts as a result of severe thunderstorm events.

Information on large hail, tornadoes, and flood events, which often accompany severe storms, is included in the Sections 3.4, 3.5, and 3.6, which immediately follow.

3.3.4 Hazard Ranking

TABLE 3.3.4-1 HAZARD RANKING FOR SEVERE THUNDERSTORMS

Evaluation Criteria	Description	Ranking
Probability	• The hazard has impacted the state numerous times on an annual basis • The hazard is widespread, generally affecting regions or multiple counties in each event • There is a reliable methodology for identifying events and locations	High
Mitigation Potential	• Mitigation methods are established • The State or counties have limited experience with the kinds of measures that may be appropriate to mitigate the hazard • Some mitigation measures are eligible for federal grants • There is a limited range of effective mitigation measures for the hazard • Mitigation measures are cost-effective only in limited circumstances • Mitigation measures are effective for a reasonable period of time	Medium

3.3.5 Sources for Severe Thunderstorms

TABLE 3.3.5-1 SOURCES FOR SEVERE THUNDERSTORMS

Source Title	Link to Resource
FEMA's Multi-Hazard Identification and Risk Assessment, "Part 1: Atmospheric Hazards"	http://www.fema.gov/library/viewRecord.do?id=2214
FEMA: Thunderstorms and Lightning	http://www.fema.gov/hazard/thunderstorm/index.shtm
NOAA Severe Weather Information	http://www.noaawatch.gov/themes/severe.php
National Climatic Data Center Storm Event Database	http://www4.ncdc.noaa.gov/cgi-win/wwcgi.dll?wwevent~storms
NWS Storm Prediction Center	http://www.spc.noaa.gov/
Natural Hazards Center, University of Colorado Boulder	http://www.colorado.edu/hazards/
NWS Weather Forecast Office, Milwaukee/Sullivan, WI	http://www.crh.noaa.gov/mkx/
NWS Weather Forecast Office, Green Bay, WI	http://www.crh.noaa.gov/grb/
NWS Weather Forecast Office, La Crosse, WI	http://www.crh.noaa.gov/arx/

3.4 HAIL

3.4.1 Nature of the Hazard

Hail can develop within thunderstorms when strong currents of rising air, known as updrafts, carry water droplets high within the storm, exposing these droplets to cold air and freezing them. As the frozen droplets begin to fall toward the ground, rising currents within the storm lift them again. The hailstones gain an ice layer and grow increasingly larger with each ascent. Eventually the hailstones become too heavy for the updraft to support, and they fall to the ground.

Though hail typically accompanies severe thunderstorms, all strong thunderstorms have the potential to produce hailstones of small diameter (less than 0.75 inches). The size of hailstones varies and is a direct consequence of the severity and size of the thunderstorm; greater instability in the atmosphere causes stronger updrafts. Stronger updrafts can keep hailstones suspended for longer periods of time, resulting in larger hailstones at ground level. Hailstones vary widely in size, as shown in Table 3.4.1-1, below. Trained volunteer storm spotters and the National Weather Service (NWS) officially report severe hail, which are hailstones considered 0.75 inches in diameter or greater.

TABLE 3.4.1-1 ESTIMATING HAIL SIZE

Size Reference of Hailstone	Diameter of Hailstone (Inches)
Pea	0.25
Small Marble	0.50
Penny	0.75
Quarter	1.00
Ping-Pong Ball	1.50
Golf Ball	1.75
Tennis Ball	2.50
Baseball	2.75
Large Apple	3.00
Softball	4.00
Grapefruit	4.50

Source: NOAA National Weather Service, Milwaukee/Sullivan, WI, 2011.

3.4.2 Wisconsin Hail Event History

Hailstorms are relatively frequent across the US. Since 1986, nearly 3,000 individual hail events have been reported annually across the country (NWS). Although they occur in every state on the mainland US, hailstorms occur most frequently in the midwestern states, particularly in Texas, Oklahoma, Kansas, and Nebraska. Hailstorms can occur

throughout the year; however, most hail events occur between April and October. Though hail-related fatalities are rare, great amounts of crop and property damage can be traced to hail damage.

On average, hail causes $1 billion in damage to crops and property each year in the US (NWS). The costliest hailstorms in the US occurred in Dallas/Fort Worth, Texas on May 5, 1995 and in St. Louis, Missouri on April 10, 2001. Both storms had reported damages of over $2 billion (NWS). The largest hailstone ever recorded fell in Vivian, South Dakota on July 23, 2010 with a diameter of eight inches and weighing almost two pounds (NWS). Figure 3.4.2-1, below, depicts the annual number of severe hail reports (0.75 inches in diameter or larger) per 100 square miles in the United States between 2000 and 2009. Note the highest average number of severe hail events occur in the southern Midwest, with Kansas, Oklahoma, Nebraska, and Texas as the leading states. Kansas has the highest concentration of counties experiencing over eight events, while many counties in surrounding states average three to eight events.

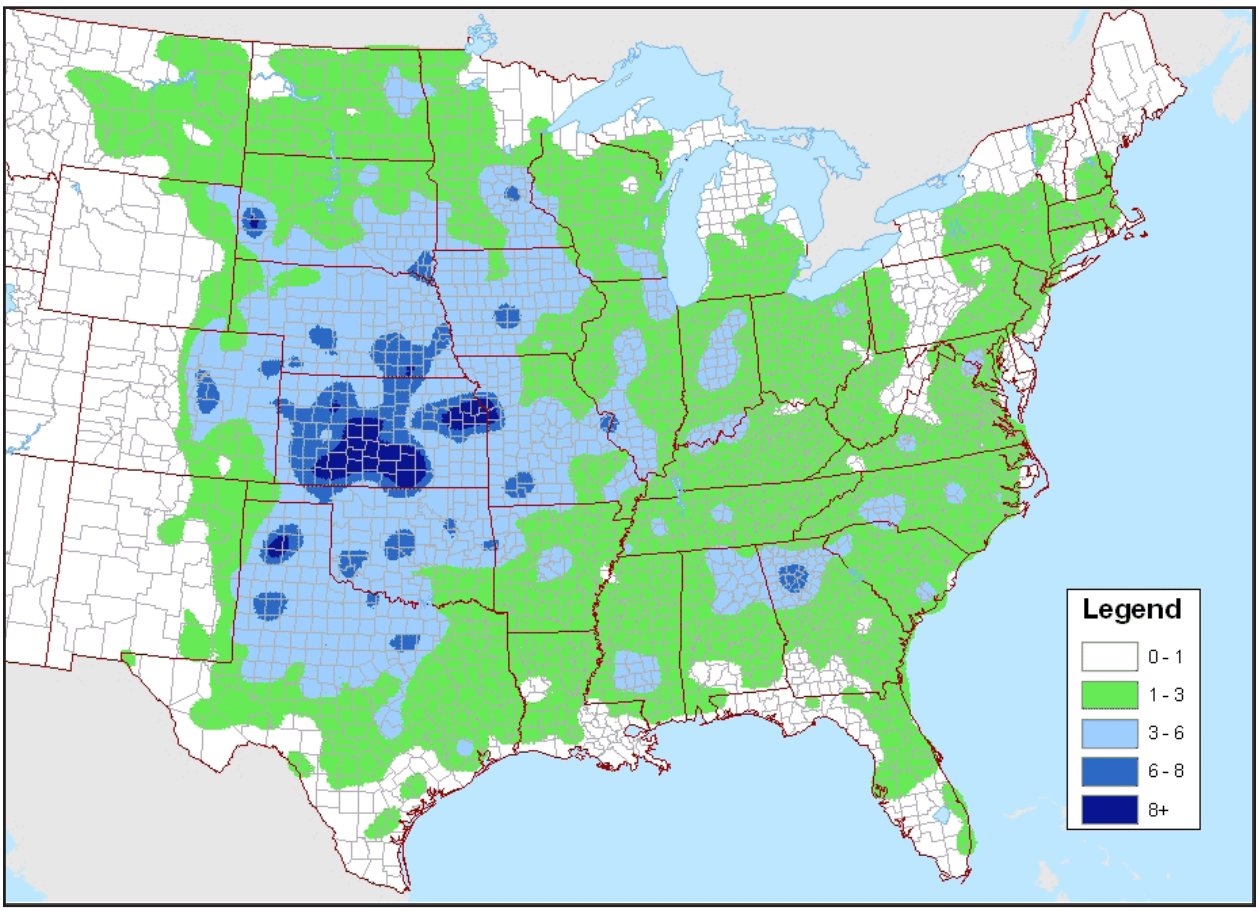


Figure 3.4.2-1 Average Number of Severe Hail Reports per 100 Square Miles, 2000-2009
Source: NOAA National Weather Service, Milwaukee/Sullivan, WI, 2011.

Comparing the southern Midwest to Wisconsin during this nine year period, Wisconsin experienced significantly fewer hail events. In fact, most of Wisconsin's counties

experienced an average of one to three severe hail events annually from 2000 to 2009, with a higher concentration of up to six events in southeastern Wisconsin.

There is an annual average of 84 hail events producing stones one inch or more in diameter from 1982 to 2010 in Wisconsin (NWS). In this time period, there were 4,657 severe hail events (stones of 0.75 inches in diameter) in the state. Although at least 42 people have reported injuries as a result of large hailstones between 1982 and 2010 in Wisconsin, the actual number of injuries may be higher since some injured people may not seek medical treatment. There have been no reported fatalities due to large hail in Wisconsin, but there have been a few fatalities nationwide.

Wisconsin's largest hailstone with a diameter of 5.7 inches, was reported on the north side of Wausau during the evening of May 22, 1921, even though most hailstones in this hailstorm were four inches in diameter or smaller. Several people were injured by the large hail stones and damage was extensive. The second largest hailstone in Wisconsin weather history fell on June 7, 2007. Hailstones up to 5.5 inches in diameter were measured in Port Edwards (Wood County), shown below in Figure 3.4.2-2. The storm resulted in $45 million in hail damage.

Figure 3.4.2-2 Port Edwards 5.5 Inch Hailstone, June 7, 2007
Source: NOAA National Weather Service, Milwaukee/Sullivan, WI, 2011.

The months of maximum hailstorm frequency are May through September, with approximately 85% of hailstorms occurring during this period. Unfortunately, hailstorms are most frequent during the four months of the growing and harvesting seasons for many of Wisconsin's crops, causing economic losses and damages for the agriculture industry.

Wisconsin's first-ever $100 million dollar hailstorm took place on May 12, 2000 when a single storm moved across the central part of the state from south of La Crosse (La Crosse County) through the Lake Winnebago area to Manitowoc (Manitowoc County) and eventually to Lake Michigan. Ten counties were pounded with hailstones one to three inches in diameter during the morning hours. Damage to property and crops was estimated at $122 million.

On April 13, 2006, three hail-producing severe thunderstorms affected southern Wisconsin. Hail, up to 4.25 inches in diameter, fell across a large swath from Mineral Point (Iowa County) to north of Milwaukee (Milwaukee County). Based on insurance claims information, the April 13, 2006, hailstorms resulted in total damage of about $420 million, making it the most costly hailstorm day in Wisconsin weather history. Over 50,000 vehicle claims, 40,000 residential claims, and about 5,400 business/farm claims were filed with various insurance companies. Additionally, the first of the three hailstorms was the single costliest thunderstorm in Wisconsin weather history, with damage estimated at $300 million.

The paths of the three hailstorms on April 13, 2006 are shown below in Figure 3.4.2-3. The storm shaded in yellow was the strongest of the three, and produced hailstones of two to 4.25 inches in diameter near Lake Mills (Jefferson County).

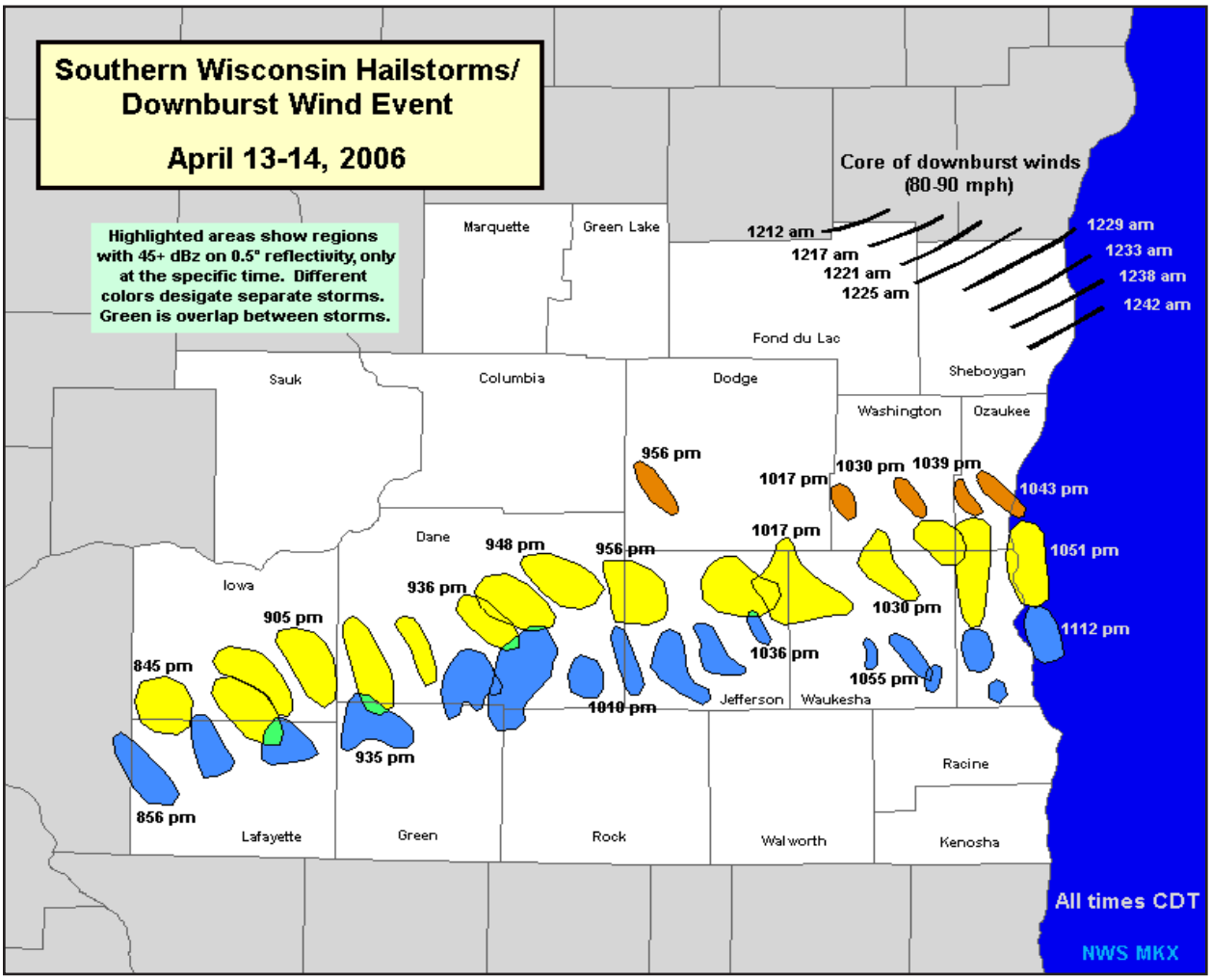


Figure 3.4.2-3 Hailstorm Paths, April 13, 2006
Source: NOAA National Weather Service, Milwaukee/Sullivan, WI, 2008.

On June 25, 2006 a 40- to 45-minute hailstorm moved from about three miles south-southeast of Dekorra (Columbia County) southeast to North Leeds (Columbia County), leaving in its wake a large amount of crop damage from hail the size of quarters. Crop,

vegetable, and fruit damage was noted, and in some cases, an entire year's crop was lost. Many homes and vehicles were also damaged. Hail depth on some roads reached eight inches and had to be plowed. A large area of southern Columbia County had considerable flood and hail damage (refer to Section 3.7 for more about the flooding accompanying the hail damage). The slow movement of the thunderstorms amplified the damage. Damage estimates were over $500 million with $1.7 million in crop damage.[1]

On June 12, 2008, a severe storm produced hail stones up to five inches in diameter just west of the City of Waukesha (Waukesha County). This would be the third largest hailstone in Wisconsin's recorded history.

Two years later, scattered severe storms with large hail struck parts of central and southern Wisconsin on April 3, April 10, May 22, and June 8, 2010. There were many reports of hailstones ranging from two inches to 4.25 inches in diameter. On April 3, 2010 alone, at least 575 insurance claims were filed with Madison-based American Family Insurance Company in Dane and Dodge Counties. Collectively, reported and unreported damage for the four days of large hail probably totaled several million dollars.

Figure 3.4.2-4 on the following page highlights the severe hailstorm events (hailstone diameter of 0.75 inch or larger) that occurred in each Wisconsin county from 1982 to 2010, including the number of deaths and injuries attributed to those events. Only three counties have experienced less than twenty hail events during the 28 year period shown. There are ten counties with over 100 severe hail events, and an additional ten counties with between 80 and 99 severe hail events. Many of these counties, such as Dane and Grant, have large amounts of lands used for agriculture. Other counties, such as Milwaukee, Waukesha, Dane, and St. Croix, have a high concentration of development and population. Shockingly, very few injuries have occurred in these more densely populated counties. Manitowoc County has seen the highest number of reported injuries from hail with 30, some of which occurred in the previously mentioned May 12, 2000 event.

3.4.3 Probability of Occurrence

According to local experts at the NOAA National Weather Service in Sullivan, Wisconsin, the average land area affected by an individual hail event is about 225 square miles, or an area equal to half of Green County. In other words, on average, an area with diameter seventeen miles surrounding the center of the storm is affected in a hail event. Hail risk at a single point or over an area is a function of the target at risk (property or crop) and the hail frequency and intensity.[2]

The annual probability of hail occurring somewhere in the state is quite high. However, the site-specific incidence of hail is lower, due to the localized nature of the hazard.

1. The crop damage estimate is based on a newspaper report which quoted a USDA report. The property damage is purely an estimate based on a variety of reports.
2. The estimate was provided by a meteorologist specializing in storm statistics at the Milwaukee/Sullivan NWS Office, 2011.

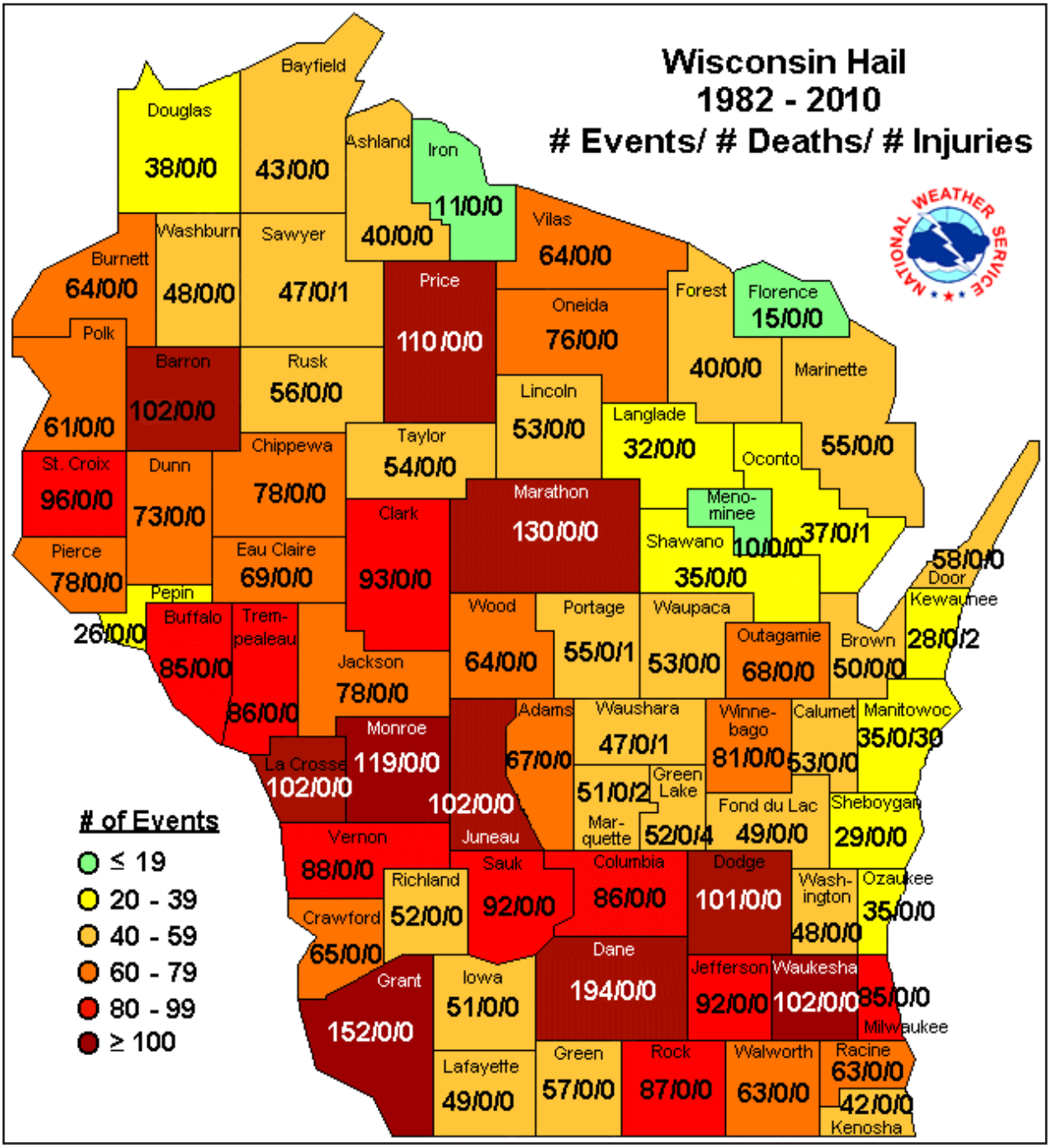


Figure 3.4.2-4 Severe Hail Events by County, 1982-2010
Source: NOAA National Weather Service, Milwaukee/Sullivan, WI, 2011.

3.4.4 Estimated Losses

The following five tables (3.4.4-1 through 3.4.4-5) were compiled using historic data from the Milwaukee/Sullivan NWS. Note that not all damages or injuries are reported to the NWS, and the only damages included in these calculations are those reported. Though this data is incomplete, it is the best available.

From January 1, 1994 to December 31, 2010, information on hail events with hailstones greater than 0.75 inches in diameter (penny size hailstones) in each county in the state was used. The NWS does not have complete historic records for severe hail events prior to 1994.

All damages were reported in nominal dollar values, and were adjusted for inflation to reflect 2008 values. 2008 was selected, because it aligns with the most recent version of FEMA Benefit-Cost Analysis software.

Damage calculations included all reported property and crop damages, as well as injuries sustained in a severe hail event. Deaths were not incorporated, since Wisconsin did not experience a death as a result of a hail event during the sixteen year study period.

1. **Injury** was assigned a value based on the May 2009 FEMA Benefit-Cost Analysis Reengineering (BCAR) Methodology Report. Using the "Willingness to Pay" (WTP) or Hedonic Pricing Methodology used by the Federal Aviation Administration (FAA), the rounded value of a minor injury in 2008 was $12,000 and the rounded value of a moderate injury in 2008 was $90,000. These are the most up-to-date values used for calculations in FEMA's Benefit-Cost Analysis software program.
2. Since the NWS does not differentiate between a major and minor injury in their data, a "**blended injury**" value was calculated by averaging the WTP to avoid a minor and a moderate injury: ($12,000+$90,000)/2 = $51,000.

Using the data provided by NWS, the following calculations were used:

- **Total Reported Injury Damages:** cumulative sum of all damages associated with reported injuries from a severe hail event (1994-2010), as reported to the NWS
- **Total Reported Property Damages:** cumulative sum of all reported property damage as a result of a severe hail event (1994-2010), as reported to the NWS
- **Total Reported Crop Damages:** cumulative sum of all reported crop damages associated with severe hail events (1994-2010), as reported to the NWS
- **Average Reported Property Damage Per Hail Event** = Total Reported Property Damages ($) divided by the Number of Severe Hail Events in a county
- **Average Reported Crop Damage Per Hail Event** = Total Reported Crop Damages ($) divided by the Number of Severe Hail Events in a county
- **Average Damage Per Hail Event** = Total Reported Damages ($) divided by the Number of Severe Hail Events in a county
- **Annual Probability of a Hail Event** = Number of Severe Hail Events divided by the number of years reported (17 years)
- **Estimated Future Annual Loss** = Annual Probability of a Hail Event x Average Damage per Hail Event

Table 3.4.4-1, below, highlights severe hail events in Wisconsin in the 17-year period from 1994 to 2010 by county. The highest value in each category is highlighted in black, while the next four highest values are highlighted in gray. As indicated, there exists a wide range of events and reported damages. Not surprisingly, counties with higher populations tend to have higher reported property damages.

TABLE 3.4.4-1 DAMAGES ASSOCIATED WITH SEVERE HAIL EVENTS IN WISCONSIN, 1994-2010

County Name	Number of Severe Hail Events	Number of Reported Injuries	Total Estimated Losses From Reported Injuries	Total Reported Property Damages	Average Reported Property Damages per Hail Event	Total Reported Crop Damages	Average Crop Damages per Hail Event	Total Reported Damages	Average Total Damage per Hail Event	Annual Probability of a Hail Event	Estimated Average Future Annual Loss
Adams	28	-	-	$503,150	$17,970	$232,710	$8,311	$735,860	$26,281	1.647	$43,286
Ashland	17	-	-	-	-	-	-	-	-	1.000	-
Barron	44	-	-	$33,072,500	$751,648	-	-	$33,072,500	$751,648	2.588	$1,945,441
Bayfield	26	-	-	$11,880	$457	-	-	$11,880	$457	1.529	$699
Brown	26	-	-	-	-	-	-	-	-	1.529	-
Buffalo	43	-	-	$119,480	$2,779	$173,160	$4,027	$292,640	$6,806	2.529	$17,214
Burnett	30	-	-	$352,500	$11,750	-	-	$352,500	$11,750	1.765	$20,735
Calumet	25	-	-	**$46,848,000**	**$1,873,920**	$21,400	$856	**$46,869,400**	**$1,874,776**	1.471	**$2,757,024**
Chippewa	30	-	-	$40,000	$1,333	$45,000	$1,500	$85,000	$2,833	1.765	$5,000
Clark	40	-	-	$225,430	$5,636	$294,540	$7,364	$519,970	$12,999	2.353	$30,586
Columbia	43	-	-	**$541,847,500**	**$12,601,105**	$3,066,000	$71,302	**$544,913,500**	**$12,672,407**	2.529	**$32,053,735**
Crawford	27	-	-	$566,710	$20,989	$1,532,690	$56,766	$2,099,400	$77,756	1.588	$123,494
Dane	**65**	-	-	**$75,686,230**	$1,164,404	$162,490	$2,500	**$75,848,720**	$1,166,903	3.824	**$4,461,689**
Dodge	48	-	-	$3,947,570	$82,241	$2,680	$56	$3,950,250	$82,297	2.824	$232,368
Door	32	-	-	-	-	-	-	-	-	1.882	-
Douglas	22	-	-	$14,100	$641	-	-	$14,100	$641	1.294	$829
Dunn	33	-	-	$122,000	$3,697	-	-	$122,000	$3,697	1.941	$7,176
Eau Claire	30	-	-	-	-	-	-	-	-	1.765	-
Florence	10	-	-	-	-	-	-	-	-	0.588	-
Fond Du Lac	25	-	-	$57,970	$2,319	-	-	$57,970	$2,319	1.471	$3,410
Forest	26	-	-	$110,000	$4,231	-	-	$110,000	$4,231	1.529	$6,471
Grant	**52**	-	-	$3,529,870	$67,882	**$16,111,560**	**$309,838**	$19,641,430	$377,720	3.059	$1,155,378
Green	27	-	-	$12,500	$463			$12,500	$463	1.588	$735

TABLE 3.4.4-1 CONTINUED

County Name	Number of Severe Hail Events	Number of Reported Injuries	Total Estimated Losses From Reported Injuries	Total Reported Property Damages	Average Reported Property Damages per Hail Event	Total Reported Crop Damages	Average Crop Damages per Hail Event	Total Reported Damages	Average Total Damage per Hail Event	Annual Probability of a Hail Event	Estimated Average Future Annual Loss
Green Lake	29	**4**	$204,000	$1,877,280	$64,734	$393,400	$13,566	$2,474,680	$85,334	1.706	$145,569
Iowa	27	-	-	$24,178,400	$895,496	$398,850	$14,772	$24,577,250	$910,269	1.588	$1,445,721
Iron	6	-	-	-	-	-	-	-	-	0.353	-
Jackson	30	-	-	$2,600,780	$86,693	$1,107,490	$36,916	$3,708,270	$123,609	1.765	$218,134
Jefferson	47	-	-	$14,578,750	$310,186	$125,000	$2,660	$14,703,750	$312,846	2.765	$864,926
Juneau	33	-	-	$673,710	$20,415	$585,450	$17,741	$1,259,160	$38,156	1.941	$74,068
Kenosha	26	-	-	$221,790	$8,530	-	-	$221,790	$8,530	1.529	$13,046
Kewaunee	15	**2**	$102,000	$1,100	$73	-	-	$103,100	$6,873	0.882	$6,065
La Crosse	25	-	-	$1,767,440	$70,698	$40,910	$1,636	$1,808,350	$72,334	1.471	$106,374
Lafayette	26	-	-	$6,203,030	$238,578	**$12,061,000**	**$463,885**	$18,264,030	$702,463	1.529	$1,074,355
Langlade	23	-	-	$1,370	$60	-	-	$1,370	$60	1.353	$81
Lincoln	28	-	-	$2,680	$96	-	-	$2,680	$96	1.647	$158
Manitowoc	24	**30**	$1,530,000	**$63,922,440**	**$2,663,435**	**$6,268,700**	**$261,196**	**$71,721,140**	**$2,988,381**	1.412	**$4,218,891**
Marathon	**54**	-	-	$12,280	$227	-	-	$12,280	$227	3.176	$722
Marinette	33	-	-	$79,750	$2,417	-	-	$79,750	$2,417	1.941	$4,691
Marquette	29	**2**	$102,000	$1,252,280	$43,182	-	-	$1,354,280	$46,699	1.706	$79,664
Menominee	8	-	-	-	-	-	-	-	-	0.471	-
Milwaukee	32	-	-	$8,629,000	$269,656	-	-	$8,629,000	$269,656	1.882	$507,588
Monroe	40	-	-	$1,257,790	$31,445	**$4,964,350**	**$124,109**	$6,222,140	$155,554	2.353	$366,008
Oconto	25	**1**	$51,000	$2,461,000	$98,440	$802,500	$32,100	$3,314,500	$132,580	1.471	$194,971
Oneida	31	-	-	$458,010	$14,775	-	-	$458,010	$14,775	1.824	$26,942
Outagamie	22	-	-	$6,138,000	$279,000	-	-	$6,138,000	$279,000	1.294	$361,059
Ozaukee	19	-	-	$6,810,500	$358,447	$17,550	$924	$6,828,050	$359,371	1.118	$401,650
Pepin	22	-	-	$244,000	$11,091	$1,605,000	$72,955	$1,849,000	$84,045	1.294	$108,765
Pierce	39	-	-	$24,400,000	$625,641	**$5,625,000**	**$144,231**	$30,025,000	$769,872	2.294	$1,766,176
Polk	33	-	-	$160,030	$4,849	-	-	$160,030	$4,849	1.941	$9,414

TABLE 3.4.4-1 CONTINUED

County Name	Number of Severe Hail Events	Number of Reported Injuries	Total Estimated Losses From Reported Injuries	Total Reported Property Damages	Average Reported Property Damages per Hail Event	Total Reported Crop Damages	Average Crop Damages per Hail Event	Total Reported Damages	Average Total Damage per Hail Event	Annual Probability of a Hail Event	Estimated Average Future Annual Loss
Portage	29	**1**	$51,000	-	-	-	-	$51,000	$1,759	1.706	$3,000
Price	36	-	-	-	-	-	-	-	-	2.118	-
Racine	32	-	-	$192,460	$6,014	$0	$0	$192,460	$6,014	1.882	$11,321
Richland	32	-	-	$61,900	$1,934	$206,980	$6,468	$268,880	$8,403	1.882	$15,816
Rock	46	-	-	$4,766,500	$103,620	$2,904,430	$63,140	$7,670,930	$166,759	2.706	$451,231
Rusk	30	-	-	-	-	-	-	-	-	1.765	-
Sauk	43	-	-	$1,071,940	$24,929	$568,370	$13,218	$1,640,310	$38,147	2.529	$96,489
Sawyer	21	-	-	-	-	-	-	-	-	1.235	-
Shawano	14	-	-	-	-	-	-	-	-	0.824	-
Sheboygan	14	-	-	-	-	$1,200	$86	$1,200	$86	0.824	$71
St. Croix	41	-	-	$3,660,000	$89,268	$39,600	$966	$3,699,600	$90,234	2.412	$217,624
Taylor	23	-	-	$243,990	$10,608	$377,560	$16,416	$621,550	$27,024	1.353	$36,562
Trempealeau	41	-	-	$83,200	$2,029	$124,830	$3,045	$208,030	$5,074	2.412	$12,237
Vernon	33	-	-	$454,070	$13,760	$483,150	$14,641	$937,220	$28,401	1.941	$55,131
Vilas	25	-	-	$895,000	$35,800	-	-	$895,000	$35,800	1.471	$52,647
Walworth	31	-	-	-	-	$2,000	$65	$2,000	$65	1.824	$118
Washburn	24	-	-	$4,230	$176	-	-	$4,230	$176	1.412	$249
Washington	30	-	-	$4,283,870	$142,796	-	-	$4,283,870	$142,796	1.765	$251,992
Waukesha	**51**	-	-	$25,198,170	$494,082	$29,250	$574	$25,227,420	$494,655	3.000	$1,483,966
Waupaca	28	-	-	$2,140,000	$76,429	-	-	$2,140,000	$76,429	1.647	$125,882
Waushara	24	**1**	$51,000	$32,500,000	**$1,354,167**	-	-	$32,551,000	**$1,356,292**	1.412	$1,914,765
Winnebago	**49**	-	-	$22,500,000	$459,184	-	-	$22,500,000	$459,184	2.882	$1,323,529
Wood	33	-	-	**$46,800,000**	**$1,418,182**	-	-	**$46,800,000**	**$1,418,182**	1.941	**$2,752,941**
STATE	**N/A**	**41**	**$2,091,000**	**$1,019,854,130**	**$462,519**	**$60,374,800**	**$27,381**	**$1,082,319,930**	**$490,848**	**N/A**	**$63,665,878**

Source: NOAA National Climatic Data Center Storm Event Database, 2011.

12 counties experienced over $10 million in total reported property damages, as shown in Table 3.4.4-2. Columbia County has had by far the most reported property damages.

TABLE 3.4.4-2 COUNTIES WITH THE HIGHEST TOTAL PROPERTY DAMAGES FROM SEVERE HAIL EVENTS IN WISCONSIN, 1994-2010

County Name	Number of Severe Hail Events	Average Reported Property Damages per Event	Total Reported Property Damages
Columbia	43	$12,601,105	$541,847,500
Dane	65	$1,164,404	$75,686,230
Manitowoc	24	$2,663,435	$63,922,440
Calumet	25	$1,873,920	$46,848,000
Wood	33	$1,418,182	$46,800,000
Barron	44	$751,648	$33,072,500
Waushara	24	$1,354,167	$32,500,000
Waukesha	51	$494,082	$25,198,170
Pierce	39	$625,641	$24,400,000
Iowa	27	$895,496	$24,178,400
Winnebago	49	$459,184	$22,500,000
Jefferson	47	$310,186	$14,578,750
STATE	**N/A**	**$462,519**	**$1,019,854,130**

Source: NOAA National Climatic Data Center Storm Event Database, 2011.

Table 3.4.4-3, below, shows that during the same 17-year period, ten counties experienced over $1 million in total reported crop damages, with two counties over $10 million.

TABLE 3.4.4-3 COUNTIES WITH THE HIGHEST REPORTED CROP DAMAGES FROM SEVERE HAIL EVENTS IN WISCONSIN, 1994-2010

County Name	Number of Severe Hail Events	Average Crop Damages per Hail Event	Total Reported Crop Damages
Grant	52	$309,838	$16,111,560
Lafayette	26	$463,885	$12,061,000
Manitowoc	24	$261,196	$6,268,700
Pierce	39	$144,231	$5,625,000
Monroe	40	$124,109	$4,964,350
Columbia	43	$71,302	$3,066,000
Rock	46	$63,140	$2,904,430
Pepin	22	$72,955	$1,605,000
Crawford	27	$56,766	$1,532,690
Jackson	30	$36,916	$1,107,490
STATE	**N/A**	**$27,381**	**$60,374,800**

Source: NOAA National Climatic Data Center Storm Event Database, 2011.

Only seven counties reported injuries during severe hail events from 1994 to 2010 as seen in Table 3.4.4-4. All of Manitowoc County's injuries were reported in one hail event, profiled in the Wisconsin Hail Event History section.

TABLE 3.4.4-4 INJURIES SUSTAINED AS A RESULT OF SEVERE HAIL EVENTS IN WISCONSIN, 1994-2010

County Name	Number of Severe Hail Events	Number of Reported Injuries	Total Estimated Losses from Reported Injuries
Manitowoc	24	30	$1,530,000
Green Lake	29	4	$204,000
Kewaunee	15	2	$102,000
Marquette	29	2	$102,000
Oconto	25	1	$51,000
Portage	29	1	$51,000
Waushara	24	1	$51,000
STATE	**N/A**	**41**	**$2,091,000**

Source: NOAA National Climatic Data Center Storm Event Database, 2011.

Table 3.4.4-5 lists the 13 Wisconsin counties with estimated average future annual losses over $1 million. Columbia County leads the category, partly due to the 2006 severe hail event which had over $500 million in reported damages. Dane County is second in the rankings, due in part the large concentration of population to report damages. Manitowoc is in third place, partly due to the May 12, 2000 event, in which 30 injuries were reported.

TABLE 3.4.4-5 HIGHEST ESTIMATED AVERAGE FUTURE ANNUAL LOSSES BY COUNTY FOR WISCONSIN HAIL EVENTS

County Name	Number of Severe Hail Events	Total Reported Damages	Average Total Damage per Hail Event	Estimated Average Future Annual Loss
Columbia	43	$544,913,500	$12,672,407	$34,057,094
Dane	65	$75,848,720	$1,166,903	$4,740,545
Manitowoc	24	$71,721,140	$2,988,381	$4,482,571
Calumet	25	$46,869,400	$1,874,776	$2,929,338
Wood	33	$46,800,000	$1,418,182	$2,925,000
Barron	44	$33,072,500	$751,648	$2,067,031
Waushara	24	$32,551,000	$1,356,292	$2,034,438
Pierce	39	$30,025,000	$769,872	$1,876,563
Waukesha	51	$25,227,420	$494,655	$1,576,714
Iowa	27	$24,577,250	$910,269	$1,536,078
Winnebago	49	$22,500,000	$459,184	$1,406,250
Grant	52	$19,641,430	$377,720	$1,227,589
Lafayette	26	$18,264,030	$702,463	$1,141,502

Source: NOAA National Climatic Data Center Storm Event Database, 2011.

3.4.5 Hazard Ranking

TABLE 3.4.5-1 HAZARD RANKING FOR HAIL		
Evaluation Criteria	**Description**	**Ranking**
Probability	• The hazard has impacted the State numerous times on an annual basis • The hazard is widespread, generally affecting regions or multiple counties in each event • There is a reliable methodology for identifying events and locations	High
Mitigation Potential	• Methods for reducing risk from the hazard are not well-established, are not proven reliable, or are experimental • The State or Counties have little or no experience in implementing mitigation measures, and/or no technical knowledge of them • Mitigation measures are ineligible under Federal grant programs • There is a very limited range of mitigation measures for the hazard, usually only one feasible alternative • The mitigation measure(s) have not been proven cost effective and are likely to be very expensive compared to the magnitude of the hazard • The long-term effectiveness of the measure is not known, or is known to be relatively poor	Low

3.4.6 Sources for Hail

TABLE 3.4.6-1 SOURCES FOR HAIL	
Source Title	Link to Resource
FEMA's Multi-Hazard Identification and Risk Assessment, "Part 1: Atmospheric Hazards"	http://www.fema.gov/library/viewRecord.do?id=2214
NOAA Severe Weather Information	http://www.noaawatch.gov/themes/severe.php
National Climatic Data Center Storm Event Database	http://www4.ncdc.noaa.gov/cgi-win/wwcgi.dll?wwevent~storms
NOAA National Severe Storms Laboratory	http://www.nssl.noaa.gov/
NWS Storm Prediction Center	http://www.spc.noaa.gov/
Natural Hazards Center, University of Colorado Boulder	http://www.colorado.edu/hazards/
NWS Weather Forecast Office, Milwaukee/Sullivan, WI	http://www.crh.noaa.gov/mkx/
NWS Weather Forecast Office, Green Bay, WI	http://www.crh.noaa.gov/grb/
NWS Weather Forecast Office, La Crosse, WI	http://www.crh.noaa.gov/arx/

3.5 LIGHTNING

3.5.1 Nature of the Hazard

Lightning typically occurs as a byproduct of a thunderstorm. The action of rising and descending air in a thunderstorm separates positive and negative charges, with lightning the result of the buildup and discharge of energy between positive and negative charge areas. Water and ice particles may also affect the distribution of the electrical charge. In only a few millionths of a second, the air near a lightning strike is heated to 50,000°F, a temperature hotter than the surface of the sun. Thunder is the result of the very rapid heating and cooling of air near the lightning that causes a shock wave.

The hazard posed by lightning is significantly underrated. High winds, rainfall, and a darkening cloud cover are the warning signs for possible cloud-to-ground lightning strikes. While many lightning casualties happen at the beginning of an approaching storm, more than half of lightning deaths occur after a thunderstorm has passed. The lightning threat diminishes after the last sound of thunder, but may persist for more than 30 minutes. When thunderstorms are in the area, but not overhead, the lightning threat can exist when skies are clear. Lightning has been known to strike more than ten miles from the storm in an area with clear sky above.

According to the National Weather Service (NWS), on average, about 25 million cloud-to-ground strikes are detected in the continental United States annually, with about half of all flashes contacting more than one ground point. In addition, there are roughly five to ten times as many cloud-to-cloud flashes as there are to cloud-to-ground flashes (NWS).

In the 69 year period between 1940 and 2009, 9,151 deaths have been reported as a result of lightning in the US (NWS). Over the past 30 years (1980 to 2010) the US has seen an annual average of 56 lightning deaths. In 2010, there were only 45 lightning deaths; however as of July 1 in 2011, there have been 55 lightning deaths nationwide.

In Wisconsin, there have been 290 lightning events between 2000 and 2010. During this ten-year period, five deaths and 56 injuries were reported in the state. These lightning incidents also resulted in about $47 million in reported property damage and $3,000 in crop damages.

These numbers are likely an underestimate of the actual number of casualties because few people report suspected lightning deaths, injuries, and damages. Cloud-to-ground lightning can kill or injure people or damage property through direct or indirect means. As such, to the general public, lightning is often perceived as a minor hazard; however, lightning-caused damage, injuries, and deaths establish lightning as a significant hazard associated with any thunderstorm in any part of the state.

Large outdoor gatherings (sporting events, concerts, campgrounds, etc.) are particularly vulnerable to lightning strikes that could result in injuries and deaths. This vulnerability

underscores the importance of developing site-specific emergency procedures for these types of events, with particular emphasis on adequate early warning. Early warning of lightning hazards, combined with prudent protective actions, can greatly reduce the likelihood of lightning-related injuries and deaths.

Researchers identified noticeable patterns in lightning fatality cases. In a 1998 study, the Center for Disease Control (CDC) states that for the period of 1959-1990, "approximately 30% of persons struck by lightning die and 74% of lightning strike survivors have permanent disabilities." The study also notes that burn victims are at higher risk for death than those struck by lightning. Sixty-three percent of lightning-associated deaths occur within 1 hour of injury, 92% occur between May and September, and 73% occur during the afternoon and early evening. Of persons who died from lightning strikes, 52% were engaged in outdoor recreational activities and 25% were engaged in work activities (CDC, 1998).

3.5.2 Wisconsin Lightning Event History

Wisconsin has a high frequency of property losses due to lightning. During the ten-year period between 2000 and 2010, there was nearly $47 million in property and crop damage reported in Wisconsin (NWS, 2011). One of the most damaging lightning events in this time period occurred during a storm in Kenosha on August 24, 2006. Lightning was responsible for at least $14 million in reported damages.

In Wisconsin from 2000 to 2010 there were five reported fatalities and 56 injuries directly caused by lightning (NWS). Figure 3.5.2-1 on the next page shows the damaging lighting events by county from 1982 to 2010. The number of reported events, deaths, and injuries are also displayed on the map. It is important to consider that these numbers are likely under-estimated, since many incidents go unreported. Note the high concentration of damaging lightning events in the southeastern part of the state. Waukesha County leads Wisconsin in number of lightning events with 75 occurring since 1982. Walworth and Rock Counties have experienced the highest number of reported injuries with 18 and 15, respectively. The high number of lightning-related injuries in southeastern Wisconsin may be related to the higher concentration of population.

3.5.3 Probability of Occurrence

Lightning occurs with most severe thunderstorms, though does not always produce damages. The probability of lightning itself occurring is quite high, due to the high number of severe thunderstorms in the state; however, the site-specific incidence of lightning is considered low because of the localized nature of the hazard.

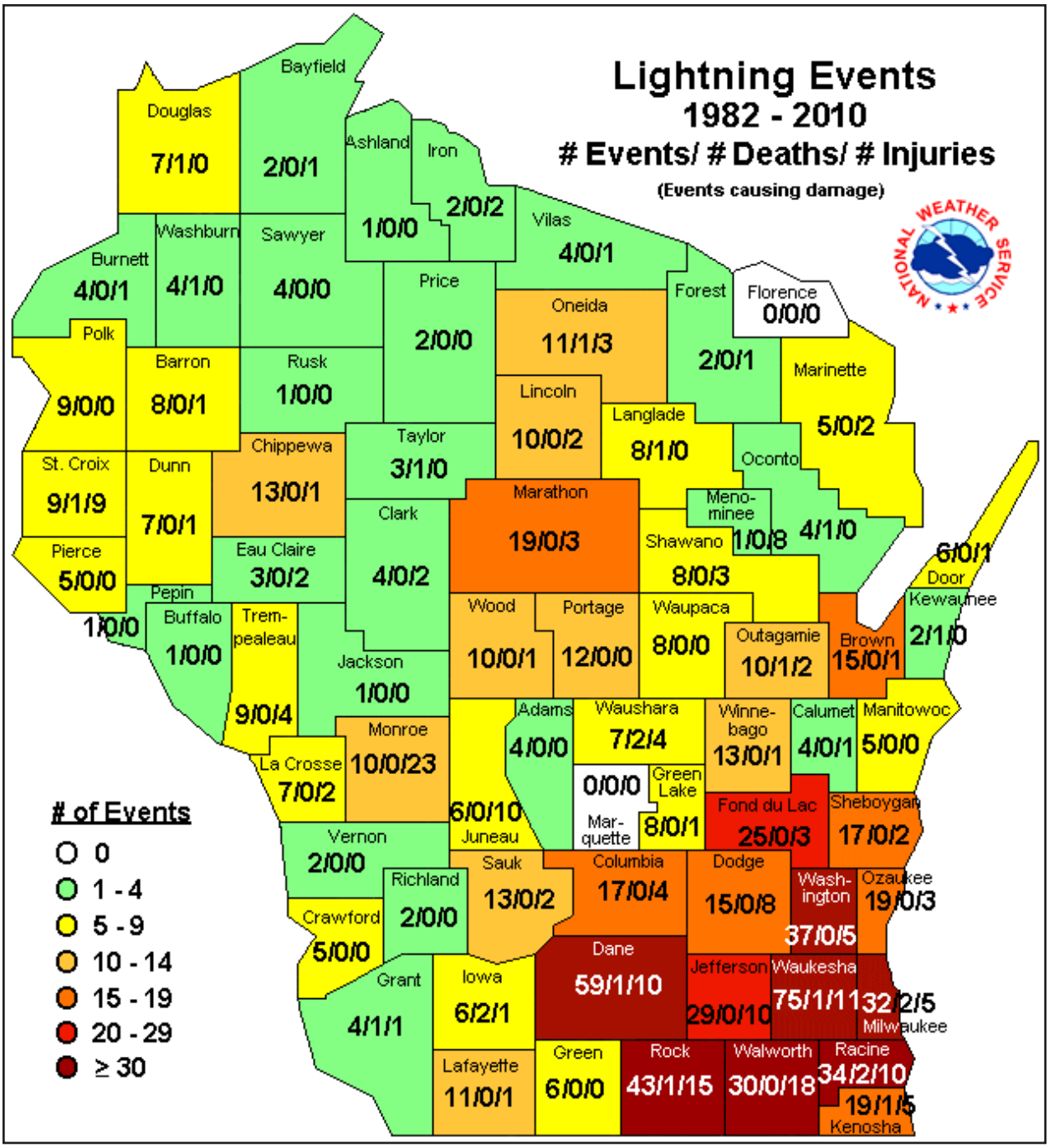


Figure 3.5.2-1 Lightning Events by County, 1982-2010
Source: NOAA National Weather Service, Milwaukee/Sullivan, WI, 2011.

3.5.4 Hazard Ranking

TABLE 3.5.4-1 HAZARD RANKING FOR LIGHTNING		
Evaluation Criteria	**Description**	**Ranking**
Probability	• The hazard has impacted the State numerous times on an annual basis • The hazard is widespread, generally affecting regions or multiple counties in each event • There is a reliable methodology for identifying events and locations	High
Mitigation Potential	• Methods for reducing risk from the hazard are not well-established, are not proven reliable, or are experimental • The State or Counties have little or no experience in implementing mitigation measures, and/or no technical knowledge of them • Mitigation measures are ineligible under Federal grant programs • There is a very limited range of mitigation measures for the hazard, usually only one feasible alternative • The mitigation measure(s) have not been proven cost effective and are likely to be very expensive compared to the magnitude of the hazard • The long-term effectiveness of the measure is not known, or is known to be relatively poor	Low

3.5.5 Sources for Lightning

TABLE 3.5.5-1 SOURCES FOR LIGHTNING	
Source Title	Link to Resource
FEMA's Multi-Hazard Identification and Risk Assessment, "Part 1: Atmospheric Hazards"	http://www.fema.gov/library/viewRecord.do?id=2214
NOAA Severe Weather Information	http://www.noaawatch.gov/themes/severe.php
National Climatic Data Center Storm Event Database	http://www4.ncdc.noaa.gov/cgi-win/wwcgi.dll?wwevent~storms
NOAA National Severe Storms Laboratory	http://www.nssl.noaa.gov/
NWS Storm Prediction Center	http://www.spc.noaa.gov/
Natural Hazards Center, University of Colorado Boulder	http://www.colorado.edu/hazards/
NWS Weather Forecast Office, Milwaukee/Sullivan, WI	http://www.crh.noaa.gov/mkx/
NWS Weather Forecast Office, Green Bay, WI	http://www.crh.noaa.gov/grb/
NWS Weather Forecast Office, La Crosse, WI	http://www.crh.noaa.gov/arx/
NWS Office of Climate, Water, and Weather Services Natural Hazard Statistics	http://www.nws.noaa.gov/om/hazstats.shtml
NWS Lightning Safety	http://www.lightningsafety.noaa.gov/

3.6 TORNADOES AND HIGH WINDS

3.6.1 Nature of the Hazard

A tornado is a violently rotating column of air (vortex) extending from the base of a convective cloud (usually cumulonimbus) to the ground. Tornadoes can form within many environments; however, three common environments include intense squall lines, supercell thunderstorms, and the right front quadrant of land-falling hurricanes within the spiral bands of thunderstorms. Though more uncommon, tornadoes may also result from earthquake induced fires, wildfires, or atomic bombs (FEMA, 1997). Additionally, severe weather spotter and research videotapes of tornadoes in the past twenty years have shown that a tornado can be in progress, but a visible "funnel cloud" may be absent at the ground level, while rotating dirt/debris at the ground and cloud-base rotation indicate that a tornado occurred (NWS).

Tornado damage severity is measured by the Enhanced Fujita Tornado Scale (EF-Scale). The EF-Scale keeps the previous numerical values of zero to five from the old Fujita Tornado Scale (F-Scale), but the wind speed values associated with the upper portions of the rating system were lowered in the EF-Scale, based on engineering studies and meteorological research. Table 3.6.1-1, at right, shows the criteria of the EF-Scale. A detailed description of the EF-Scale can be found online at the National Weather Service (NWS) Storm Prediction Center website.

TABLE 3.6.1-1 ENHANCED FUJITA (EF) TORNADO SCALE

Category	F-Scale Wind Speed (mph)	EF-Scale Wind Speed (mph)
EF0 (weak)	40-72 mph	65-85 mph
EF1 (weak)	73-112 mph	86-110 mph
EF2 (strong)	113-157 mph	111-135 mph
EF3 (strong)	158-206 mph	136-165 mph
EF4 (violent)	207-260 mph	166-200 mph
EF5 (violent)	261-318 mph	>200 mph

Source: NOAA National Weather Service, Milwaukee/Sullivan, WI, 2011.

3.6.2 Wisconsin Tornado Event History

Most tornadoes in the United States last less than 10 minutes, but can exist for more than an hour (NOAA Storm Prediction Center. The path of a tornado can range from a few hundred feet to miles, and tornado widths may range from tens of yards to a mile or two.

Wisconsin lies along the northern edge of the nation's maximum frequency belt for tornadoes, called "tornado alley" by some, which extends northeastward from Oklahoma into Iowa and then across to Illinois and southern Wisconsin. Generally, the southern portion of Wisconsin has a higher frequency of tornadoes, though every county in Wisconsin has had tornadoes and is susceptible to a tornado disaster.

Table 3.6.2-1, on the following page, shows all reported tornado ratings in Wisconsin from 1982 to 2010. This table indicates that about 85.3% of Wisconsin's tornadoes were rated as "weak" (EF0 & EF1), 13.7% were "strong" (EF2 & EF3), and about 0.9% were "violent" (EF4 & EF5).

The "average" Wisconsin tornado for the period of 1982-2007 had a life-span of 7.1 minutes, a path length of 3.7 miles, a path width of 118 yards, and an EF rating of 0.7 (mid-way between an EF0 and EF1) (NWS).

Tornadoes have occurred at all times of the day in Wisconsin. The peak hours of occurrence are between 3:00 and 10:00 p.m., when 75% of the tornadoes occur, with the busiest "spin-up hour" between 6:00 and 7:00 p.m. (NWS).

As seen in Figure 3.6.2-1, on the following page, the only month with no documented tornadoes in Wisconsin is February. June has the highest tornado frequency, followed by July, May, and August. Winter, spring, and fall tornadoes historically are more likely to occur in southern Wisconsin than in the northern parts of the state.

Figure 3.6.2-2, on the following page, is a plot of Wisconsin short- and long-track tornadoes for the period of 1950-2010. This map shows that most long-track tornadoes in the state travel southwest to northeast; however, a number of the tornadoes moved west to east as well as northwest to southeast. Data accompanying the map indicated that northwest to southeast moving tornadoes tended to occur in the later part of the warm season.

TABLE 3.6.2-1 WISCONSIN TORNADO RATINGS

Year	EF0	EF1	EF2	EF3	EF4	EF5	Total
1982	1	9	6	0	0	0	16
1983	16	10	3	1	1	0	31
1984	10	8	10	3	2	1	34
1985	3	7	6	0	0	0	16
1986	4	4	5	1	0	0	14
1987	8	8	0	0	0	0	16
1988	8	19	7	1	0	0	35
1989	9	7	1	0	0	0	17
1990	0	6	3	0	0	0	9
1991	5	3	2	0	0	0	10
1992	6	16	2	2	0	0	26
1993	27	9	1	0	0	0	37
1994	8	18	6	2	1	0	35
1995	5	2	0	0	0	0	7
1996	11	7	2	0	0	1	21
1997	6	6	2	0	0	0	14
1998	16	3	3	2	0	0	24
1999	8	2	0	0	0	0	10
2000	11	6	1	0	0	0	18
2001	7	4	0	1	0	0	12
2002	18	5	2	1	0	0	26
2003	10	4	0	0	0	0	14
2004	22	10	2	2	0	0	36
2005	43	16	2	1	0	0	62
2006	10	2	0	0	0	0	12
2007	13	3	1	1	0	0	18
2008	23	13	1	1	0	0	38
2009	11	5	0	0	0	0	16
2010	17	24	5	0	0	0	46
Total	**336**	**236**	**73**	**19**	**4**	**2**	**670**

Source: NOAA National Weather Service, Milwaukee/Sullivan, WI, 2011.

Figure 3.6.2-2, on the following page, is a plot of Wisconsin short- and long-track tornadoes for the period of 1950-2010. This map shows that most long-track tornadoes in the state travel southwest to northeast; however, a number of the tornadoes moved west to east as well as northwest to southeast. Data accompanying the map indicated that northwest to southeast moving tornadoes tended to occur in the later part of the warm season.

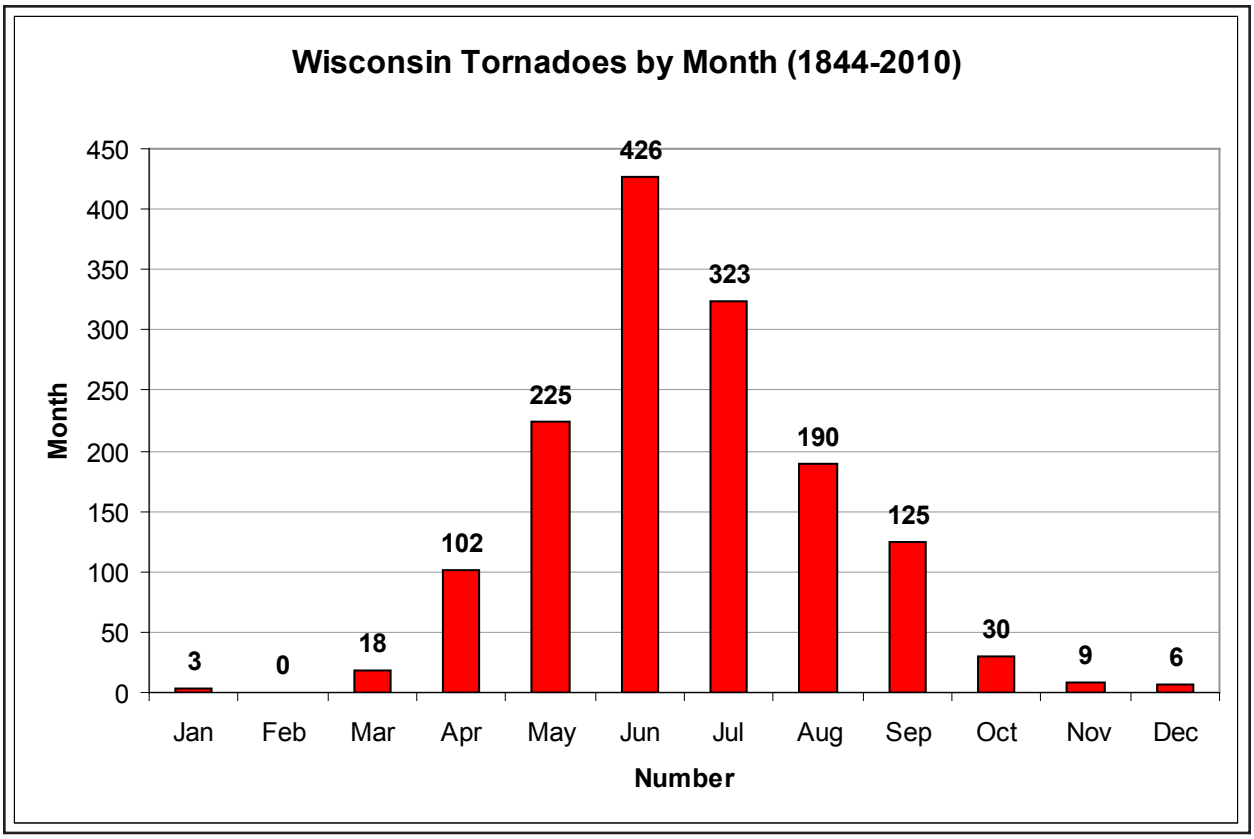


Figure 3.6.2-1 Wisconsin Tornadoes by Month, 1844-2010
Source: NOAA National Weather Service, Milwaukee/Sullivan, WI, 2011.

Figure 3.6.2-2, on the following page, is a plot of Wisconsin short- and long-track tornadoes for the period of 1950-2010. This map shows that most long-track tornadoes in the state travel southwest to northeast; however, a number of the tornadoes moved west to east as well as northwest to southeast. Data accompanying the map indicated that northwest to southeast moving tornadoes tended to occur in the later part of the warm season.

The longest-tracked tornado in Wisconsin, 170 miles, was the April 5, 1929, tornado that traveled from southwest of River Falls (Pierce County) to Van Buskirk (Iron County). It resulted in twelve fatalities and 100 injuries. As recently as June 7, 2007, a tornado in northeast Wisconsin traveled for over 40 miles through the counties of Shawano, Menominee, Langlade, and Oconto; the longest-tracked tornado in the entire United States for 2007 (NWS).

Between 1980 and 2010, Wisconsin's tornadoes displayed a strong year-to-year variation, ranging from seven in 1995 to 62 in 2005. For the period of 1971-2000, Wisconsin averaged 20.5 tornadoes and one fatality annually due to tornadoes. That was slightly higher than the average from 1950 to 2009, which was 19.6 tornadoes per year (NWS).

While all Wisconsin counties recorded at least three tornadoes between 1844 and 2010, six counties (Barron, Dane, Dodge, Fond du Lac, Grant, and Marathon) have recorded over 40 tornadoes. Dane, Dodge, Grant, and Marathon Counties have had the most with

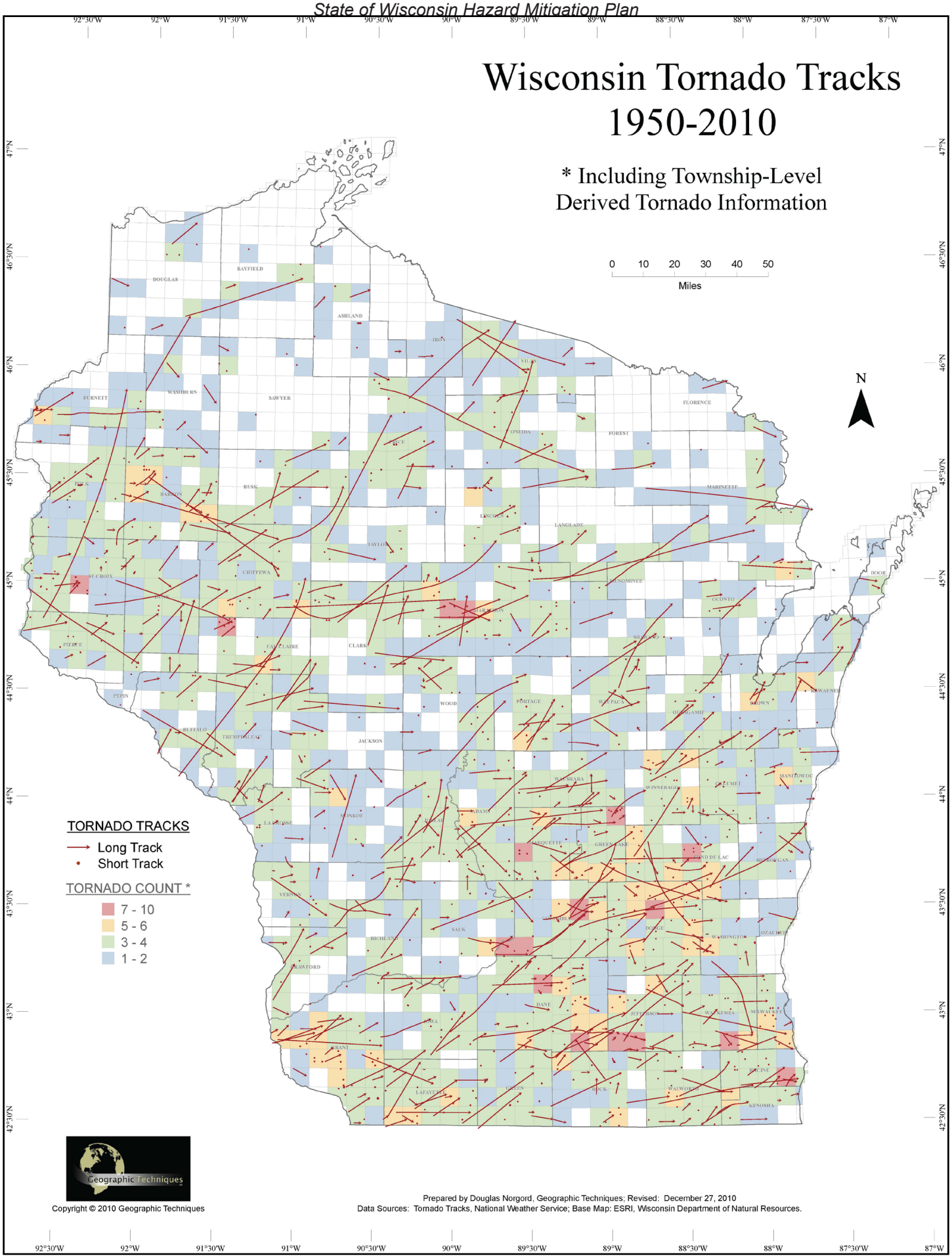


Figure 3.6.2-2 Wisconsin Tornado Tracks, 1950-2010

Source: Geographic Techniques, 2010.

74, 60, 59, and 54, respectively. Figure 3.6.2-3, below, shows the county-by-county distribution of tornadoes between 1844 and 2010. Counties in the southern part of the state have had more recorded tornadoes than the rest of the state, with a concentration of 30 or more tornadoes per county in south-central Wisconsin. Keep in mind that in the 1800s and the early 1900s, tornadoes that did not occur in populated areas during the day were rarely reported or documented.

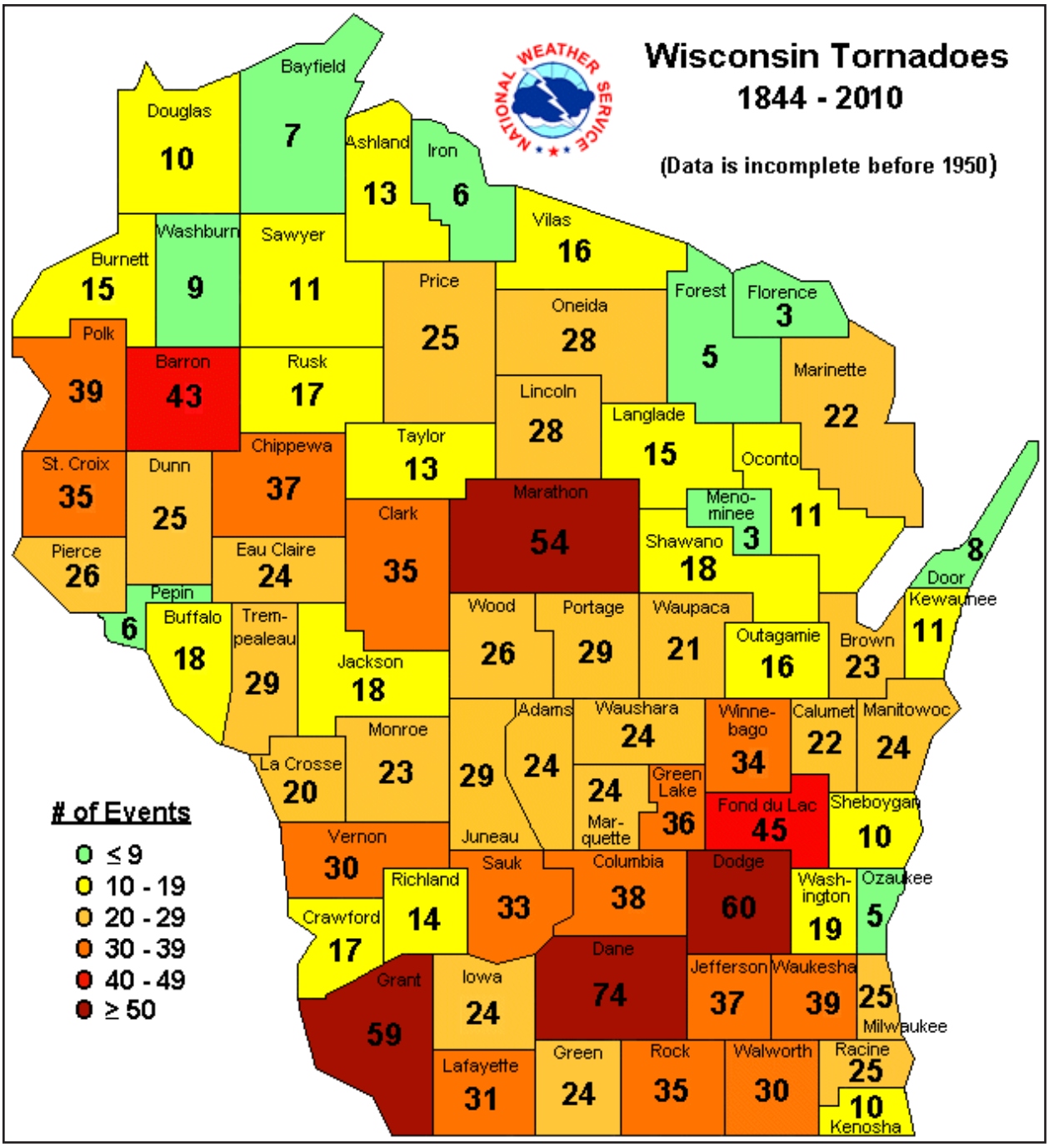


Figure 3.6.2-3 Wisconsin Tornadoes Events by County, 1844-2010
Source: NOAA National Weather Service, Milwaukee/Sullivan, WI, 2011.

June 12, 1899

Figure 3.6.2-4 New Richmond Tornado Damage, June 12, 1899
Source: NOAA National Weather Service, Milwaukee/Sullivan, WI, 2008.

Some of Wisconsin's more noteworthy tornadoes occurred more than 100 years ago. In 1899, half of the City of New Richmond (St. Croix County) was destroyed and 112 people were killed by a powerful tornado. This tornado originated on Lake St. Croix, about five miles south of Hudson. The tornado moved to the northeast, east of Hudson, in the direction of New Richmond, leveling farms near Burkhardt and Boardman. The tornado passed through New Richmond on a day in which about 1,000 people had come from surrounding villages to watch a circus, which ended at about 4:30 p.m. that day. Passing through the very center of town, the tornado leveled buildings and sent debris flying. Over 300 buildings were damaged or destroyed. The damage was estimated at $300,000. The good visibility of the tornado may have prevented an even higher death total. While not a massive tornado, the combination of time and position was unfortunate. Figure 3.6.2-4 shows some of the damage caused by the 1899 tornado.

April 3, 1956

A tornado struck the southeast sector of the City of Berlin (Green Lake County), after damaging three or more farms south and west of the city. It came within a few yards of the high school where 400 students were in class; however, the tornado changed its path, barely missing the school. Witnesses saw cars and buildings lifted and carried through the air. The tornado killed seven people and injured 50. Damage was estimated at over $1 million.

June 4, 1958

20 people died, 110 were injured, and 60 buildings were destroyed in the City of Colfax (Dunn County) by a tornado estimated to be F4 intensity. The same storm system spawned three other tornadoes in Chippewa and Clark Counties that day.

April 21, 1974

A tornado, estimated to be F4 intensity, hit the City of Oshkosh (Winnebago County). Despite a lack of advance warning no one was killed, although seventeen people were reported injured. Eleven commercial structures were damaged and property damage reached $4 million. About the time the tornado began ripping through Oshkosh, a series of tornadoes spun up in the Lomira/Brownsville area (Dodge County). The tornadoes left a trail of broken homes and barns in their wake and destroyed a large lumberyard. Two deaths and numerous injuries were attributed to the storms.

1980

Tornadoes and downbursts occurred in Chippewa, Dunn, Eau Claire, and Pierce Counties and caused more than $150 million in property damage.

June 8, 1984

A powerful F5 tornado struck the Village of Barneveld (Iowa County) and proceeded to move northeast through Dane County. It killed nine people and injured 200 with damage pegged at $40 million along its 36 mile path between 12:41 a.m. and 1:40 a.m.

July 18, 1996

In the late afternoon, a line of thunderstorms caused the NWS to issue a tornado watch for the eastern two-thirds of Wisconsin. As the line moved east, the storms became more severe in Marathon and Portage Counties. The storms were very dangerous by the time they reached Fond du Lac County. Warning sirens sounded in the Village of Oakfield (Fond du Lac County) at approximately 7:08 p.m. At 7:13 p.m., a tornado intensifying from F3 to F4 tore through the community. This violent tornado intensified to an F5 just east of Oakfield. The path of destruction was about 13.3 miles long and up to 0.25 mile wide. Only twelve people were injured, but over 150 homes and businesses were damaged or destroyed.

March 8, 2000

A tornado classified as an F1 by the NWS spun up at General Mitchell International Airport in Milwaukee (Milwaukee County). Tornadoes of this category were considered weak, with 73-112 mph winds (on the old Fujita Scale). However, in just a few minutes, the tornado caused $381,000 worth of damage to about 75 homes and $3.8 million in damage to commercial real estate.

June 18, 2001

A strong F3 tornado hit Burnett and Washburn Counties. This tornado touched down near Grantsburg and continued traveling east for over 25 miles to an area just outside

Spooner. Witnesses said the tornado split into three tornadoes in some areas. There was extensive damage and destruction along the tornado's path. Damage was most concentrated in a six-block wide area of the Village of Siren (Burnett County), where numerous homes and businesses were completely leveled, three people were killed, and sixteen were injured.

September 2, 2002

On Labor Day, the Village of Ladysmith (Rusk County) was hit by an F3 tornado, with estimated winds of 158 to 206 mph. The damage the tornado caused to a 16-by-4-block area, which included most of the downtown business district, was estimated at $20 million. The tornado damaged more than 130 structures in this community of 3,900. There were 24 injuries, none of them serious, primarily because the downtown business district was unusually empty due to the Labor Day holiday.

September 30, 2002

Tornadoes and large hail-producing thunderstorms struck north-central and northeast Wisconsin in the evening. Two tornadoes spun up within twenty minutes of each other. One hit several miles west of Tomahawk (Lincoln County), destroying a trailer home and several out-buildings on the property, throwing a pick-up truck up into a nearby tree, and pushing a 28-foot camper trailer 300 feet. Thousands of trees were knocked over in a nearby wooded area. The F2 twister spun and dissipated just west of the Tomahawk Regional Airport (Lincoln County).

June 8, 2003

During the afternoon, scattered showers and thunderstorms developed across central and east-central Wisconsin as a strong upper-level low pressure system moved across the State. At least five tornadoes developed, four of them in the NWS Green Bay forecast area. The tornado south of Marshfield (Wood County) did several thousand dollars in damage to a garage and play house. Two 50-pound metal barrels were thrown over 200 yards. None of the other tornadoes did any damage.

August 18, 2005

It was a memorable day with 27 tornadoes spinning up in Wisconsin; a new single-day state record. Figure 3.6.2-5, on the following page, shows a plot of the 27 tornadoes. The strongest tornado, which raked the Stoughton area (Dane County), was rated at the top of the EF3 category, traveled for twenty miles, and resulted in one fatality, 23 injuries, and $35 million in reported damages.

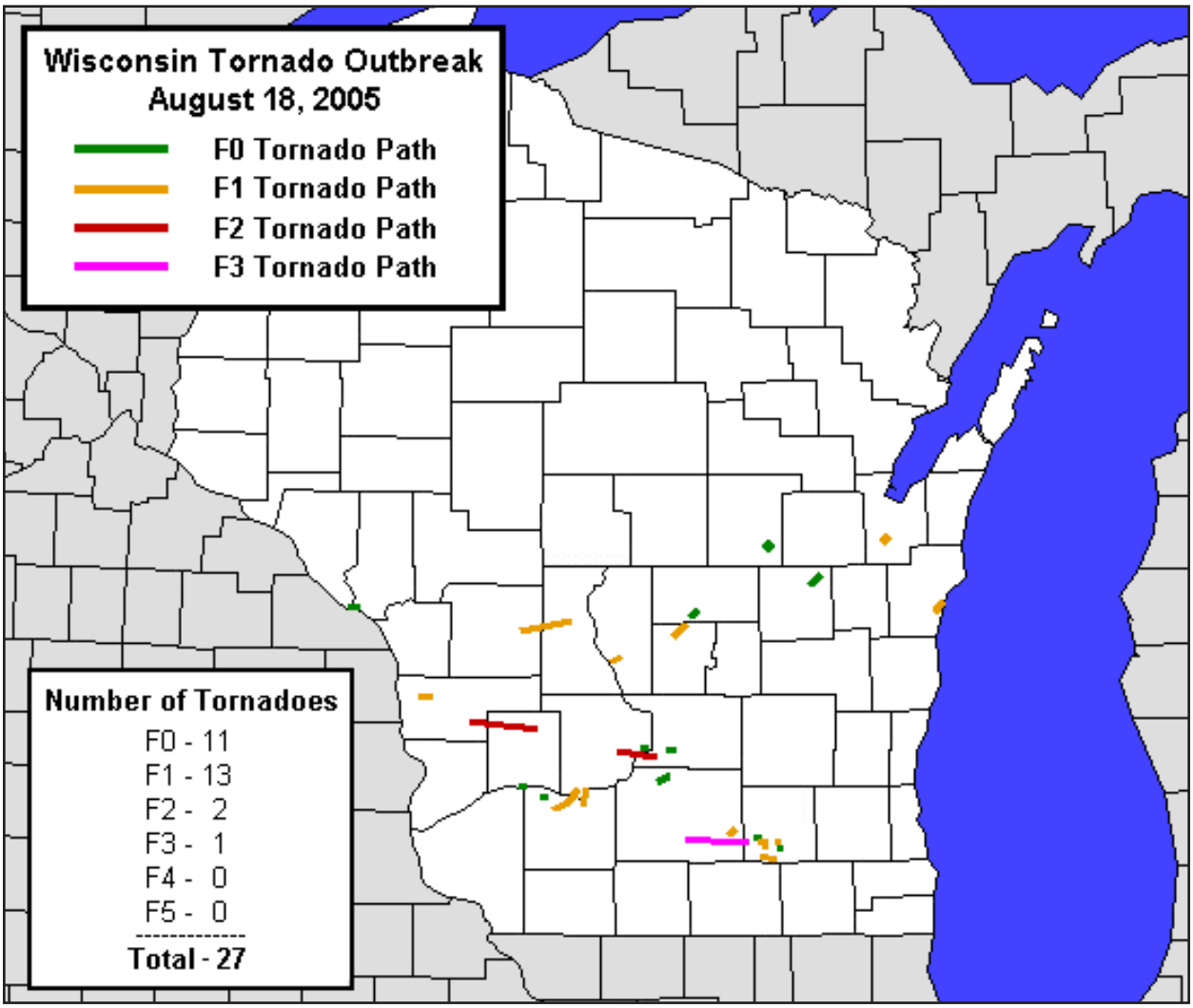


Figure 3.6.2-5 Wisconsin Single-Day State Record Tornado Outbreak, August 18, 2005
Source: NOAA National Weather Service, Milwaukee/Sullivan, WI, 2008.

January 7, 2008

A rare January weather event occurred in southeastern Wisconsin. With temperatures in the lower 60s, thunderstorms formed ahead of a stationary front and produced hail, damaging winds, and a few tornadoes. The first tornado spun up in southeast Walworth County and then tracked through the Wheatland and Brighton areas (Kenosha County). The second tornado occurred in the Town of Somers (Kenosha County) and on the north side of the City of Kenosha (Kenosha County).

In Walworth County, five structures sustained damage - three had minor damage and two had moderate damage. In Kenosha County, with both tornadoes combined, 105 homes sustained damage: 46 homes had minor damage, 32 had major damage, and 27 were destroyed. Thanks to early warnings issued by the NWS, this tornado resulted in only fifteen minor injuries and about $13.8 million in damage. This was the first EF3 tornado in Kenosha County since the rating system began in 1982, and was the first tornado in

Wisconsin in January since the January 24, 1967 tornado in Green and Rock Counties. Figure 3.6.2-6, below, shows the tornadoes' paths.

a

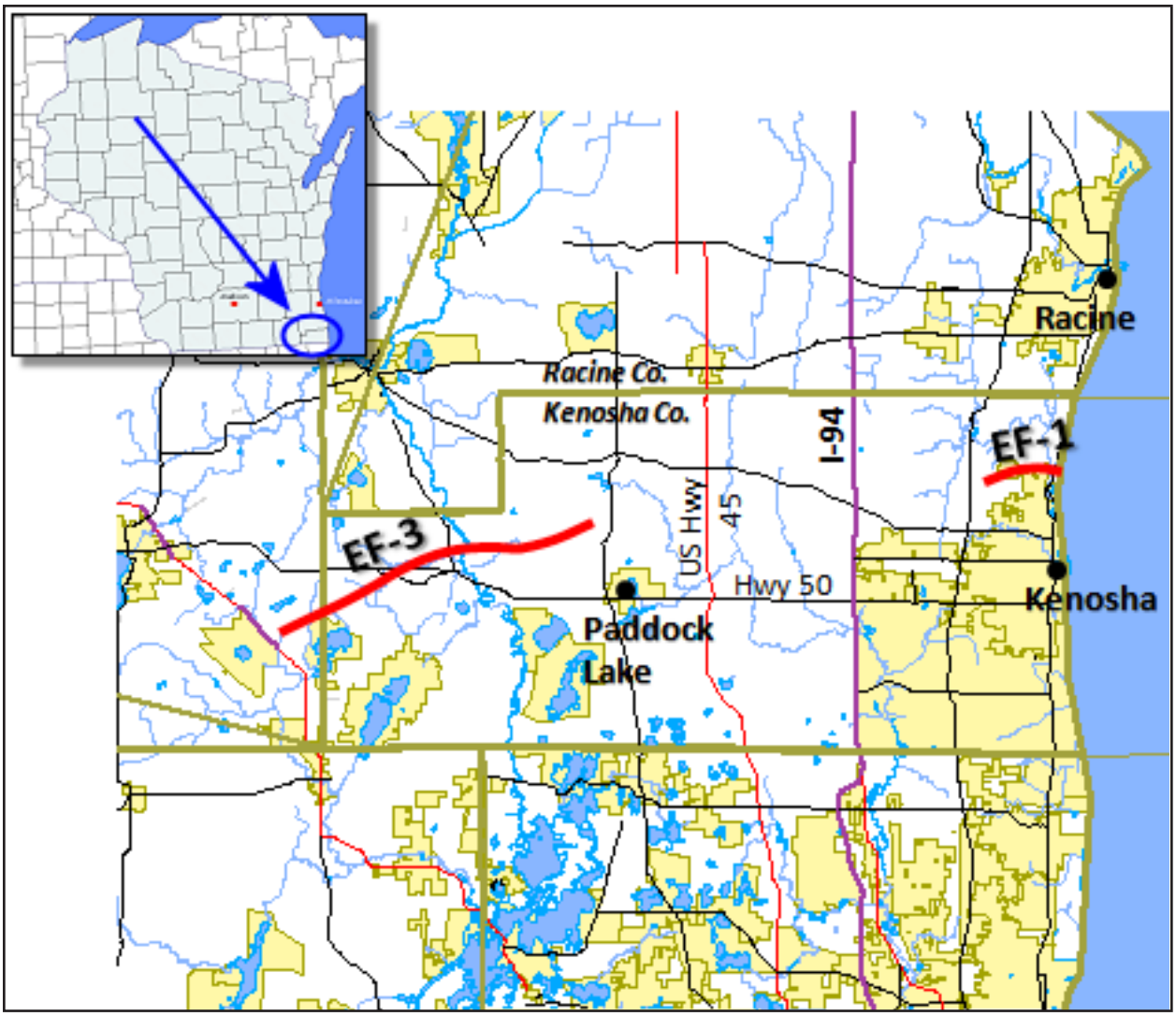


Figure 3.6.2-6 Southeastern Wisconsin Winter Tornadoes, January 7, 2008
Source: NOAA National Weather Service, Milwaukee/Sullivan, WI, 2008.

Table 3.6.2-2, on the following page, lists significant tornadoes in Wisconsin's history and the damage they caused.

TABLE 3.6.2-2 SIGNIFICANT TORNADO EVENTS IN WISCONSIN, 1865-2010				
Date	**EF Rating**	**Location (County or Counties)**	**Reported Damage**	**Fatalities**
6/29/1865		Vernon	Not Available	24
5/23/1878	EF4 (est.)	Dane, Iowa, Jefferson, Milwaukee, Waukesha (may have been 3 separate tornadoes)	Not Available	19
5/18/1898	EF5 (est.)	Clark, Eau Claire, Langlade, Lincoln, Marathon	Not Available	17
6/12/1899		St. Croix	Not Available	117
9/21/1924		Eau Claire to Oneida	Not Available	26
9/21/1924		Barron to Ashland	Not Available	10
4/5/1929	EF4 (est.)	Barron, Pierce, St. Croix	$4,000,000	7
4/3/1956	EF4 (est.)	Green Lake, Waushara, Winnebago	$1,000,000	7
6/4/1958		Chippewa, Clark, Dunn (3 tornadoes)	$27,750,000	27
4/11/1965	EF2 (est.)	Dodge, Jefferson	Not Available	3
4/21/1974	EF4 (est.)	Winnebago	$4,000,000	0
4/21/1974	EF3 (est.)	Dodge, Fond du Lac	$5,000,000	2
7/15/1980		Chippewa, Dunn, Eau Claire (9 tornadoes)	$150,000,000	0
4/27/1984	EF3	Oneida, Vilas	$52,500,000	1
4/27/1984	EF3	Menominee, Shawno, Waupaca	$2,624,000	0
4/27/1984	EF4	Outagamie, Winnebago	$3,600,000	1
4/27/1984	EF4	Waukesha	$1,300,000	1
6/8/1984	EF5	Columbia, Dane, Iowa	$40,000,000	9
8/29/1992	EF3	Waushara	$10,100,000	1
7/5/1994	EF4	Manitowoc	$2,100,000	0
8/27/1994	EF3	Adams	$4,600,000	2
7/18/1996	EF5	Fond du Lac	$40,400,000	0
8/23/1998	EF3	Door	$7,000,000	0
3/8/2000	EF1	Milwaukee	$4,181,000	0
6/18/2001	EF3	Burnett, Washburn	$10,000,000	3
9/2/2002	EF3	Rusk	$25,000,000	0
6/23/2004	EF3	Dodge, Fond du Lac, Green (2 tornadoes merged)	$20,000,000	1
8/18/2005	EF3	Dane, Jefferson	$35,052,000	1
8/18/2005	EF2	Richland, Vernon	$3,570,000	0
6/7/2006	EF3	Langlade, Menominee, Oconto, Shawno	$15,400,000	0
1/7/2008	EF3	Kenosha, Walworth	$13,810,000	0
6/21/2010	EF2	Waukesha	$206,000,000	0

Source: NOAA National Weather Service, Milwaukee/Sullivan, WI, 2011.

3.6.3 Probability of Occurrence

Wisconsin averages 22 documented tornadoes annually, based on data from 1950 through May 31, 2011 (NWS). This number has increased recently from an average of 18.7 per year for the 45-year period of 1950 through 1994, due to more highly-trained severe weather spotters and more accurate documentation by the NWS. Table 3.6.3-1, below, shows how Wisconsin ranked with other states in terms of number of tornadoes, fatalities, injuries, and nominal reported damages (i.e. not adjusted for inflation). The number of tornadoes per year varies due to fluctuations in the jet stream pattern which influences thunderstorm movement. Wisconsin ranked 4th nationally in 1980 when 43 tornadoes spun up, which was more than the normal leading state, Texas, had that year. However, during 1999, there were only eleven confirmed tornadoes in Wisconsin, a small number compared to an average year. In 2005, Wisconsin had 62 tornadoes, which was the seventh highest state total for the year.

TABLE 3.6.3-1 NATIONAL TORNADO RANKINGS BY NUMBER OF TORNADOES, FATALITIES, INJURIES, AND DAMAGES, 1950-2010

Rank	State	Tornadoes	State	Fatalities	State	Injuries	State	Damages (Millions)
1	TX	7,904	TX	537	TX	8,200	TX	$11,755.64
2	KS	3,667	MS	418	MS	6,072	OK	$7,794.64
3	OK	3,290	AL	376	AL	5,815	FL	$7,325.97
4	FL	3,052	AR	367	AR	5,014	IA	$6,063.41
5	NE	2,542	TN	304	OH	4,441	KS	$5,481.56
6	IA	2,212	OK	282	OK	4,404	MS	$5,202.19
7	IL	2,102	IN	252	IN	4,230	MO	$4,890.01
8	MO	1,942	MI	243	IL	4,124	GA	$4,559.70
9	CO	1,890	KS	232	TN	3,884	NE	$4,452.33
10	MS	1,791	MO	230	GA	3,735	AL	$4,203.08
11	AL	1,695	IL	203	MI	3,364	IL	$4,119.25
12	LA	1,689	OH	191	FL	3,292	LA	$4,013.20
13	SD	1,658	GA	178	MO	3,147	AR	$3,893.04
14	AR	1,587	FL	161	KY	2,792	IN	$3,471.40
15	MN	1,580	LA	155	KS	2,679	**WI**	**$3,326.62**
16	GA	1,380	KY	125	LA	2,650	OH	$3,268.95
17	ND	1,356	MA	102	NC	2,208	TN	$3,164.56
18	IN	1,236	NC	100	IA	2,190	MN	$2,782.75
19	**WI**	**1,224**	**WI**	**99**	MN	1,932	MI	$2,759.80
20	NC	1,116	MN	98	**WI**	**1,634**	NC	$2,550.29

Source: NOAA National Weather Service, Milwaukee/Sullivan, WI, 2011.

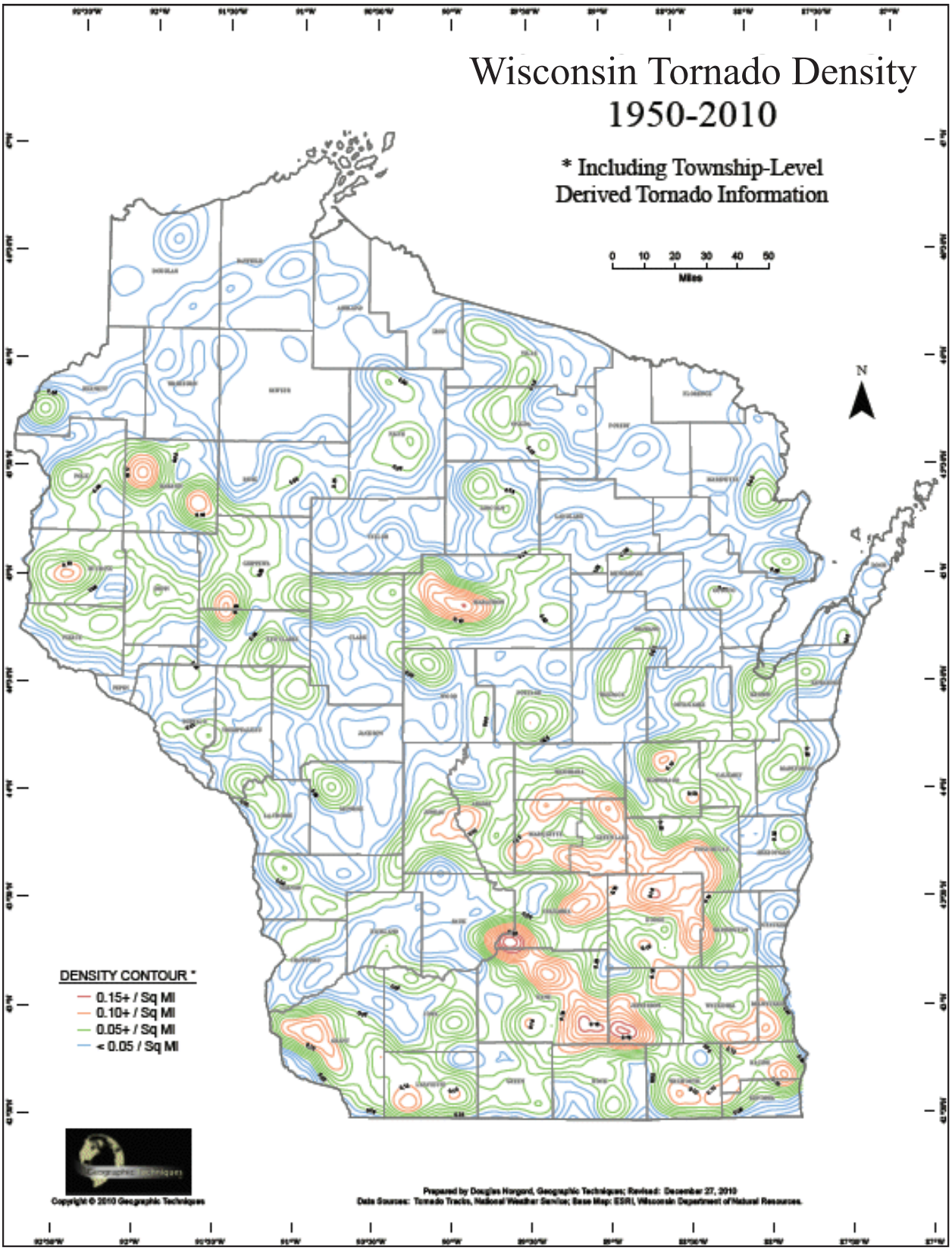


Figure 3.6.3-1 Wisconsin Tornado Density , 1950-2010
Source: Geographic Techniques, 2011.

Figure 3.6.3-1, on the previous page, shows a density plot of Wisconsin tornadoes. The number of tornadoes per township in each county was determined in order to find the number of tornadoes per square mile. This data was then projected onto 100-meter square grids. This technique allows for tornado count data to be applied on a regional level, showing trends of tornado occurrence (FEMA, 2009). Using this technique allows the untrained eye to clearly identify the local "hot spots" across the state at the township level for the 61 years of data provided. Speculation suggests that the concentration of tornadoes between Madison and Lake Winnebago may be related to the fact that the terrain in that area is flatter, as compared to the southwestern counties. Additionally, an interaction between a lake breeze front generated by Lake Winnebago and outflow boundaries (gust fronts) generated by individual thunderstorms may enhance the spin-up of the tornado circulation below the cloud base.

3.6.4 Estimated Losses

The four tables (3.6.4-1 through 3.6.4-4) that follow, were compiled using historic data from the Milwaukee/Sullivan NWS. All NWS reported property damage (including reported crop damages) was used in damage calculations.

From January 1, 1950 to December 31, 2010, information on tornadoes from each county in the state was entered into a spreadsheet that included the following information: average damage amounts per tornado, annual probability, and estimated future annual losses. The following are definitions of the terms/figures used in Tables 3.6.4-1 through 3.6.4-4:

- **Total Damages:** Cumulative sum of all reported total damages associated with all tornadoes occurring during in the 61 year period from January 1, 1950 to December 31, 2010 (reported damages provided by National Weather Service)[1]
- **Average Damage/Tornado** = Total damages (in dollars) divided by the number of tornadoes
- **Annual Probability of a Tornado** = Number of tornadoes divided by the number of years (61)
- **Estimated Future Annual Losses** = Annual probability x average damage/tornado

Damage calculations include all reported property and crop damage, as well as injuries and deaths sustained as a result of the tornado event. These figures were incorporated as follows:

1. **Injury** was assigned a value based on the May 2009 FEMA Benefit-Cost Analysis Reengineering (BCAR) Tornado Methodology Report. Using the "Willingness to Pay" (WTP) or Hedonic Pricing Methodology used by the Federal Aviation Administration (FAA), the rounded value of a minor injury in 2008 was $12,000 and the

1. Damages included in the calculations include all property and crop damages recorded by the NWS; if damages were not reported, they were not included in these calculations. For multi-county tornadoes, each county's respective damage total was provided by the NWS.

rounded value of a moderate injury in 2008 was $90,000. These are the most up-to-date values used for calculations in FEMA's Benefit-Cost Analysis software program.

2. Since the NWS does not differentiate between a major and minor injury in their data, a "**blended injury**" value was calculated by averaging the WTP to avoid a minor and a moderate injury: ($12,000+$90,000)/2 = $51,000.
3. The FAA assigned **death** a rounded WTP value of $5,800,000 in 2008, based on the BCAR Tornado Methodology Report.

Note that all reported damages were recorded in nominal values by the NWS. All values were adjusted for inflation, and reported in 2008 dollars, since FEMA's Benefit-Cost Analysis uses 2008 data, which is the best available. Using the Bureau of Labor Statistics Consumer Price Index Inflation Calculator, the prices for 2009 and 2010 were adjusted using multipliers of 1 and 0.99, respectively.

For instance, Marathon County had 47 tornadoes over the 61 year time period (1950-2010). This translates to:

- Average damage:
  $16,464,000 (total damage) / 47 tornadoes = $350,298 per tornado
- Annual probability of tornado:
  47 tornadoes / 61 years = 0.77049 annual probability
- Estimated future annual losses:
  $367,813 per tornado x 0.77049 = $283,396 in average annual damages

These calculations were done for each county to arrive at the future annual probability of a tornado and estimated annual losses from tornado events. Table 3.6.4-1, below, lists the counties in alphabetical order, and highlights the top five counties in each category, with the top county represented in black, and the next four in gray.

TABLE 3.6.4-1 TORNADO PROPERTY LOSS ESTIMATE BY COUNTY, 1950-2010

County Name	Number of Tornadoes (1950-2010)	Total Damages (1950 to 2010) (2008 Dollars)	Average Damage per Tornado (2008 Dollars)	Annual Probability of Tornado	Estimated Future Annual Loss (2008 Dollars)
Adams	15	$3,258,000	$217,333	0.24590	$53,443
Ashland	9	$300,000	$33,333	0.14754	$4,918
Barron	35	$8,603,000	$252,871	0.57377	$145,090
Bayfield	5	$775,000	$155,000	0.08197	$12,705
Brown	21	$4,043,000	$197,238	0.34426	$67,902
Buffalo	14	$8,598,000	$614,709	0.22951	$141,081
Burnett	13	$12,550,000	$966,146	0.21311	$205,900
Calumet	19	$3,850,000	$202,632	0.31148	$63,115

TABLE 3.6.4-1 CONTINUED					
County Name	Number of Tornadoes (1950-2010)	Total Damages (1950 to 2010) (2008 Dollars)	Average Damage per Tornado (2008 Dollars)	Annual Probability of Tornado	Estimated Future Annual Loss (2008 Dollars)
Chippewa	27	$36,893,000	$1,366,407	0.44262	$604,803
Clark	22	$7,783,000	$354,223	0.36066	$127,752
Columbia	35	$9,154,000	$359,428	0.57377	$206,229
Crawford	11	$553,000	$57,086	0.18033	$10,294
Dane	**56**	**$69,129,000**	$1,244,849	**0.91803**	**$1,142,812**
Dodge	**57**	$28,058,000	$497,860	**0.93443**	$465,213
Door	8	$8,018,000	$1,002,250	0.13115	$131,443
Douglas	8	$856,000	$107,000	0.13115	$14,033
Dunn	16	**$58,297,000**	**$3,643,563**	0.26230	**$955,689**
Eau Claire	14	$15,805,000	$1,128,929	0.22951	$259,098
Florence	2	$75,000	$37,500	0.03279	$1,230
Fond Du Lac	**41**	**$60,218,000**	$1,468,732	**0.67213**	**$987,180**
Forest	4	$5,300,000	$1,325,000	0.06557	$86,885
Grant	**44**	$5,298,000	$120,745	**0.72131**	$87,095
Green	18	$3,558,000	$197,667	0.29508	$58,328
Green Lake	26	$12,493,000	$492,758	0.42623	$210,028
Iowa	23	$2,198,000	$95,565	0.37705	$36,033
Iron	4	$253,000	$140,718	0.06557	$9,227
Jackson	13	$3,905,000	$300,385	0.21311	$64,016
Jefferson	33	$10,128,000	$325,815	0.54098	$176,261
Juneau	21	$4,967,000	$236,524	0.34426	$81,426
Kenosha	9	$21,925,000	**$2,447,331**	0.14754	$361,082
Kewaunee	7	$550,000	$78,571	0.11475	$9,016
La Crosse	14	$3,130,000	$230,929	0.22951	$53,000
Lafayette	26	$7,400,000	$291,725	0.42623	$124,342
Langlade	6	$4,955,000	$825,833	0.09836	$81,230
Lincoln	21	$1,825,000	$86,905	0.34426	$29,918
Manitowoc	19	$8,450,000	$444,737	0.31148	$138,525
Marathon	**47**	$16,464,000	$350,298	**0.77049**	$269,902
Marinette	18	$3,925,000	$218,056	0.29508	$64,344
Marquette	18	$1,428,000	$99,889	0.29508	$29,475
Menominee	2	$5,200,000	**$2,600,000**	0.03279	$85,246
Milwaukee	17	$7,753,000	$456,059	0.27869	$127,098
Monroe	18	$3,916,000	$217,556	0.29508	$64,197
Oconto	10	$11,354,000	$1,135,400	0.16393	$186,131

TABLE 3.6.4-1 CONTINUED					
County Name	Number of Tornadoes (1950-2010)	Total Damages (1950 to 2010) (2008 Dollars)	Average Damage per Tornado (2008 Dollars)	Annual Probability of Tornado	Estimated Future Annual Loss (2008 Dollars)
Oneida	20	**$51,181,000**	**$2,559,050**	0.32787	**$839,033**
Outagamie	14	$15,176,000	$1,084,000	0.22951	$248,787
Ozaukee	3	$2,800,000	$933,333	0.04918	$45,902
Pepin	5	$600,000	$120,000	0.08197	$9,836
Pierce	19	$3,808,000	$200,421	0.31148	$62,426
Polk	24	$8,628,000	$365,729	0.39344	$143,893
Portage	21	$2,088,000	$99,429	0.34426	$34,230
Price	18	$26,383,000	$1,465,722	0.29508	$432,508
Racine	20	$3,166,000	$468,336	0.32787	$153,553
Richland	11	$3,455,000	$314,091	0.18033	$56,639
Rock	23	$7,733,000	$336,608	0.37705	$126,918
Rusk	13	$25,850,000	$1,988,462	0.21311	$423,770
Sauk	23	$6,544,000	$284,522	0.37705	$107,279
Sawyer	8	$278,000	$34,750	0.13115	$4,557
Shawano	12	$5,856,000	$488,000	0.19672	$96,000
Sheboygan	8	$3,278,000	$454,244	0.13115	$59,573
St. Croix	31	**$37,230,000**	$1,221,129	0.50820	**$620,574**
Taylor	8	$4,206,000	$525,750	0.13115	$68,951
Trempealeau	16	$5,879,000	$367,438	0.26230	$96,377
Vernon	19	$4,658,000	$246,474	0.31148	$76,770
Vilas	13	$26,450,000	**$2,034,615**	0.21311	$433,607
Walworth	23	$4,530,000	$240,000	0.37705	$90,492
Washburn	8	$2,780,000	$347,500	0.13115	$45,574
Washington	17	$30,280,000	$1,781,176	0.27869	$496,393
Waukesha	28	$14,508,000	$1,291,510	0.45902	$592,824
Waupaca	14	$4,266,000	$304,714	0.22951	$69,934
Waushara	16	$28,830,000	$1,801,875	0.26230	$472,623
Winnebago	24	$8,279,000	$349,527	0.39344	$137,519
Wood	17	$26,510,000	$1,559,412	0.27869	$434,590
STATE		**$848,421,000**			**$14,513,866**

Source: NOAA National Weather Service, Milwaukee/Sullivan, WI, 2011.

There are 14 counties in Wisconsin (out of 72) that have experienced over $20 million in tornado damages, as reported to the NWS. They are listed in Table 3.6.4-2, on the following page. Dane County has had the second highest number of events (56) since 1950, and also has a high concentration of population, which helps explain the high amount of reported damages.

TABLE 3.6.4-2 COUNTIES WITH OVER $20 MILLION IN TOTAL REPORTED TORNADO DAMAGES, 1950-2010

County Name	Number of Events	Total Damages (2008 Dollars)
Dane	56	$69,129,000
Fond Du Lac	41	$60,218,000
Dunn	16	$58,297,000
Oneida	20	$51,181,000
St. Croix	31	$37,230,000
Chippewa	27	$36,893,000
Washington	17	$30,280,000
Waushara	16	$28,830,000
Dodge	57	$28,058,000
Wood	17	$26,510,000
Vilas	13	$26,450,000
Price	18	$26,383,000
Rusk	13	$25,850,000
Kenosha	9	$21,925,000

Source: NOAA National Weather Service, Milwaukee/Sullivan, WI, 2011.

TABLE 3.6.4-3 COUNTIES WITH THE HIGHEST AVERAGE REPORTED TORNADO DAMAGES, 1950-2010

County Name	Number of Events	Average Damages (2008 Dollars)
Dunn	16	$3,643,563
Menominee	2	$2,600,000
Oneida	20	$2,559,050
Kenosha	9	$2,447,331
Vilas	13	$2,034,615
Rusk	13	$1,988,462
Waushara	16	$1,801,875
Washington	17	$1,781,176
Wood	17	$1,559,412
Fond Du Lac	41	$1,468,732
Price	18	$1,465,722
Chippewa	27	$1,366,407
Forest	4	$1,325,000
Waukesha	28	$1,291,510
Dane	56	$1,244,849
St. Croix	31	$1,221,129
Oconto	10	$1,135,400
Eau Claire	14	$1,128,929
Outagamie	14	$1,084,000
Door	8	$1,002,250

Source: NOAA National Weather Service, Milwaukee/Sullivan, WI, 2011.

There exists a large disparity between the numbers of tornado events occurring throughout the state. Table 3.6.4-3, at right, lists the counties in Wisconsin that experience the most costly tornado events. 20 counties experience average reported damages over $1 million per tornado, some of which also have a higher number of tornado events. Though Menominee and Forest Counties have had only two and four tornadoes since 1950, respectively, these counties have experienced serious damages. The other counties with costly average damages per event have had between 13 and 41 tornado events in the 61 year period.

This data was used to project the annual probability of death and injury at the county level. Both injury and death were based on an annual probability of .01639 (1/61 = 0.01639). Table 3.6.4-4 lists the counties in alphabetical order, with supplemental tables showing the most at-risk counties for death and injury, as well as estimated annual losses.

For an example of how these losses were estimated: Take Marathon County which had 19 injuries since 1950, which equates to an annual probability of an injury 0.3115 (19

injuries/61 years) x $51,000 (FAA "rounded value of a blended injury") = $15,885. Zero deaths occurred in this county. The NWS provided data for reported crop and property damages, and they were annualized and added to the annual death and injury damages. Therefore, the expected annual total damages for Marathon County equals $285,787.

Note: in order to demonstrate loss estimates when a death occurs in a county, Burnett County will be used as an example. Burnett County had 3 deaths which equates to an annual probability of a death as .0492 (3 deaths/61 years) x $5,800,000 (FAA "rounded value of death") = $285,246. This amount would then be added to the totals for injuries and property losses.

TABLE 3.6.4-4 ESTIMATED FUTURE ANNUAL TORNADO LOSSES BY COUNTY IN WISCONSIN [1]

County Name	Deaths, 1950-2010	Annual Probability of Death	Annual Loss Due to Death, 1950-2010	Injuries, 1950-2010	Annual Probability of Injury	Annual Loss Due to Injury, 1950-2010	Annual Property Loss, 1950-2010 (From Table 3.6.4-1)	Total Estimated Future Annual Tornado Losses
Adams	0	0.00000	-	18	0.2951	$15,049	$53,443	**$68,492**
Ashland	0	0.00000	-	0	0.0000	-	$4,918	**$4,918**
Barron	0	0.00000	-	16	0.2623	$13,377	$145,090	**$158,467**
Bayfield	0	0.00000	-	4	0.0656	$3,344	$12,705	**$16,049**
Brown	0	0.00000	-	7	0.1148	$5,852	$67,902	**$73,754**
Buffalo	0	0.00000	-	7	0.1148	$5,852	$141,081	**$146,933**
Burnett	3	0.04918	$285,246	25	0.4098	$20,902	$205,900	**$512,048**
Calumet	1	0.01639	$95,082	7	0.1148	$5,852	$63,115	**$164,049**
Chippewa	5	0.08197	$475,410	90	1.4754	$75,246	$604,803	**$1,155,459**
Clark	1	0.01639	$95,082	7	0.1148	$5,852	$127,752	**$228,687**
Columbia	1	0.01639	$95,082	55	0.9016	$45,984	$206,229	**$347,295**
Crawford	0	0.00000	-	9	0.1475	$7,525	$10,294	**$17,819**
Dane	4	0.06557	$380,328	66	1.0820	$55,180	$1,142,812	**$1,578,320**
Dodge	0	0.00000	-	36	0.5902	$30,098	$465,213	**$495,311**
Door	0	0.00000	-	4	0.0656	$3,344	$131,443	**$134,787**
Douglas	0	0.00000	-	0	0.0000	-	$14,033	**$14,033**
Dunn	21	0.34426	$1,996,721	77	1.2623	$64,377	$955,689	**$3,016,787**
Eau Claire	6	0.09836	$570,492	20	0.3279	$16,721	$259,098	**$846,311**
Florence	0	0.00000	-	0	0.0000	-	$1,230	**$1,230**
Fond Du Lac	2	0.03279	$190,164	24	0.3934	$20,066	$987,180	**$1,197,410**

1. All monetary values in this table were adjusted for inflation and reported in 2008 dollars as explained earlier in this section.

TABLE 3.6.4-4 CONTINUED								
County Name	Deaths, 1950-2010	Annual Probability of Death	Annual Loss Due to Death, 1950-2010	Injuries, 1950-2010	Annual Probability of Injury	Annual Loss Due to Injury, 1950-2010	Annual Property Loss, 1950-2010 (From Table 3.6.4-1)	Total Estimated Future Annual Tornado Losses
Forest	0	0.00000	-	3	0.0492	$2,508	$86,885	**$89,393**
Grant	0	0.00000	-	7	0.1148	$5,852	$87,095	**$92,948**
Green	0	0.00000	-	45	0.7377	$37,623	$58,328	**$95,951**
Green Lake	8	0.13115	$760,656	54	0.8852	$45,148	$210,028	**$1,015,831**
Iowa	9	0.14754	$855,738	206	3.3770	$172,230	$36,033	**$1,064,000**
Iron	0	0.00000	-	3	0.0492	$2,508	$9,227	**$11,736**
Jackson	0	0.00000	-	5	0.0820	$4,180	$64,016	**$68,197**
Jefferson	3	0.04918	$285,246	36	0.5902	$30,098	$176,261	**$491,605**
Juneau	3	0.04918	$285,246	38	0.6230	$31,770	$81,426	**$398,443**
Kenosha	0	0.00000	-	15	0.2459	$12,541	$361,082	**$373,623**
Kewaunee	0	0.00000	-	1	0.0164	$836	$9,016	**$9,852**
La Crosse	0	0.00000	-	3	0.0492	$2,508	$53,000	**$55,508**
Lafayette	0	0.00000	-	12	0.1967	$10,033	$124,342	**$134,375**
Langlade	0	0.00000	-	3	0.0492	$2,508	$81,230	**$83,738**
Lincoln	0	0.00000	-	2	0.0328	$1,672	$29,918	**$31,590**
Manitowoc	0	0.00000	-	2	0.0328	$1,672	$138,525	**$140,197**
Marathon	0	0.00000	-	19	0.3115	$15,885	$269,902	**$285,787**
Marinette	2	0.03279	$190,164	8	0.1311	$6,689	$64,344	**$261,197**
Marquette	0	0.00000	-	0	0.0000	-	$29,475	**$29,475**
Menominee	0	0.00000	-	0	0.0000	-	$85,246	**$85,246**
Milwaukee	0	0.00000	-	176	2.8852	$147,148	$127,098	**$274,246**
Monroe	0	0.00000	-	4	0.0656	$3,344	$64,197	**$67,541**
Oconto	0	0.00000	-	6	0.0984	$5,016	$186,131	**$191,148**
Oneida	5	0.08197	$475,410	36	0.5902	$30,098	$839,033	**$1,344,541**
Outagamie	0	0.00000	-	10	0.1639	$8,361	$248,787	**$257,148**
Ozaukee	0	0.00000	-	30	0.4918	$25,082	$45,902	**$70,984**
Pepin	0	0.00000	-	6	0.0984	$5,016	$9,836	**$14,852**
Pierce	0	0.00000	-	6	0.0984	$5,016	$62,426	**$67,443**
Polk	4	0.06557	$380,328	18	0.2951	$15,049	$143,893	**$539,270**
Portage	2	0.03279	$190,164	4	0.0656	$3,344	$34,230	**$227,738**
Price	0	0.00000	-	26	0.4262	$21,738	$432,508	**$454,246**
Racine	0	0.00000	-	10	0.1639	$8,361	$153,553	**$161,913**

TABLE 3.6.4-4 CONTINUED								
County Name	Deaths, 1950-2010	Annual Probability of Death	Annual Loss Due to Death, 1950-2010	Injuries, 1950-2010	Annual Probability of Injury	Annual Loss Due to Injury, 1950-2010	Annual Property Loss, 1950-2010 (From Table 3.6.4-1)	Total Estimated Future Annual Tornado Losses
Richland	0	0.00000	-	9	0.1475	$7,525	$56,639	**$64,164**
Rock	0	0.00000	-	2	0.0328	$1,672	$126,918	**$128,590**
Rusk	0	0.00000	-	34	0.5574	$28,426	$423,770	**$452,197**
Sauk	0	0.00000	-	13	0.2131	$10,869	$107,279	**$118,148**
Sawyer	0	0.00000	-	0	0.0000	-	$4,557	**$4,557**
Shawano	0	0.00000	-	1	0.0164	$836	$96,000	**$96,836**
Sheboygan	1	0.01639	$95,082	8	0.1311	$6,689	$59,573	**$161,343**
St. Croix	2	0.03279	$190,164	35	0.5738	$29,262	$620,574	**$840,000**
Taylor	0	0.00000	-	3	0.0492	$2,508	$68,951	**$71,459**
Trempealeau	0	0.00000	-	3	0.0492	$2,508	$96,377	**$98,885**
Vernon	0	0.00000	-	2	0.0328	$1,672	$76,770	**$78,443**
Vilas	0	0.00000	-	4	0.0656	$3,344	$433,607	**$436,951**
Walworth	0	0.00000	-	3	0.0492	$2,508	$90,492	**$93,000**
Washburn	0	0.00000	-	0	0.0000	-	$45,574	**$45,574**
Washington	3	0.04918	$285,246	57	0.9344	$47,656	$496,393	**$829,295**
Waukesha	1	0.01639	$95,082	32	0.5246	$26,754	$592,824	**$714,660**
Waupaca	6	0.09836	$570,492	8	0.1311	$6,689	$69,934	**$647,115**
Waushara	1	0.01639	$95,082	34	0.5574	$28,426	$472,623	**$596,131**
Winnebago	1	0.01639	$95,082	52	0.8525	$43,475	$137,519	**$276,076**
Wood	0	0.00000	-	30	0.4918	$25,082	$434,590	**$459,672**
STATE	**95**	**N/A**	**$9,032,787**	**1596**	**N/A**	**$1,334,361**	**$14,513,866**	**$24,881,014**

Source: NOAA National Weather Service, Milwaukee/Sullivan, WI, 2011.

3.6.5 Hazard Ranking

TABLE 3.6.5-1 HAZARD RANKING FOR TORNADO		
Evaluation Criteria	**Description**	**Ranking**
Probability	• The hazard has impacted the State numerous times on an annual basis • The hazard is widespread, generally affecting regions or multiple counties in each event • There is a reliable methodology for identifying events and locations	High
Mitigation Potential	• Methods for reducing risk from the hazard are technically reliable • The State or Counties have experience in implementing mitigation measures • Mitigation measures are eligible under Federal grant programs • There are multiple possible mitigation measures for the hazard • The mitigation measure(s) are known to be cost-effective	High

3.6.6 Sources for Tornadoes and High Winds

TABLE 3.6.6-1 SOURCES FOR TORNADOES AND HIGH WINDS	
Source Title	**Link to Resource**
FEMA's Multi-Hazard Identification and Risk Assessment, "Part 1: Atmospheric Hazards"	http://www.fema.gov/library/viewRecord.do?id=2214
FEMA, "Understanding Your Risks: Identifying Hazards and Estimating Losses," 2001	http://www.fema.gov/library/viewRecord.do?id=1880
NOAA Severe Weather Information	http://www.noaawatch.gov/themes/severe.php
National Climatic Data Center Storm Event Database	http://www4.ncdc.noaa.gov/cgi-win/wwcgi.dll?wwevent~storms
NOAA National Severe Storms Laboratory	http://www.nssl.noaa.gov/
NWS Storm Prediction Center	http://www.spc.noaa.gov/
Natural Hazards Center, University of Colorado Boulder	http://www.colorado.edu/hazards/
NWS Weather Forecast Office, Milwaukee/Sullivan, WI	http://www.crh.noaa.gov/mkx/
NWS Weather Forecast Office, Green Bay, WI	http://www.crh.noaa.gov/grb/
NWS Weather Forecast Office, La Crosse, WI	http://www.crh.noaa.gov/arx/
NWS Office of Climate, Water, and Weather Services Natural Hazard Statistics	http://www.nws.noaa.gov/om/hazstats.shtml
NWS, "Annual U.S. Killer Tornado Statistics"	http://www.spc.noaa.gov/climo/torn/fataltorn.html
NWS, "The Enhanced Fujita (EF) Scale"	http://www.spc.noaa.gov/efscale/
Norgood, Douglas G., Geographic Techniques, Mt. Horeb, WI, 2003.	http://geotechmap.com/default.aspx

3.7 FLOODING

3.7.1 Nature of the Hazard

Flooding, as defined by the National Flood Insurance Program (NFIP), is "a general and temporary condition where two or more acres of normally dry land or two or more properties are inundated by water or mudflow" (NFIP, 2011). Floods specifically affect floodplains, or lowlands adjacent to water bodies. Floods are natural events that are considered hazards only when people and/or property are affected. Nationwide, hundreds of flood hazard events occur each year, making it one of the most common hazards in all 50 states and U.S. territories (FEMA, 2011).

There are a number of categories of floods in the U.S; however, the most common type of flooding event is riverine flooding, also known as overbank flooding. In Wisconsin, riverine floodplains range from narrow, confined channels in the steep valleys of hilly regions, to wide, flat areas in plains and coastal regions. The amount of water in the floodplain is a function of the size and topography of the contributing watershed, the regional and local climate, geological characteristics, and land use attributes.

The cause of flooding in large rivers is typically prolonged periods of rainfall from weather systems covering large areas. These systems may saturate the ground and overload the rivers and/or reservoirs in numerous smaller basins that drain into larger rivers. Localized weather systems, such as thunderstorms, may cause intense rainfall over smaller areas, leading to flooding in smaller rivers and streams. These events may also lead to flooding in larger waterways, as smaller rivers and streams feed into these larger systems. Annual spring floods, due to the melting of snowpack, may affect both large and small rivers and areas.

As such, Wisconsin is prone to experiencing flash floods, ice jam floods, local drainage floods, and high groundwater floods. In Wisconsin, the most notable are flash floods, as they occur quickest, with little or no warning, and tend to be accompanied by other problems. Flash floods are floods that occur within six hours of a causative event such as heavy rains, ice jams, or dam failures. They usually involve a rapid rise in water level, high velocity, and large amounts of debris, which can lead to significant damage including the tearing out of trees, undermining of buildings and bridges, scouring of new channels, and creation of sink holes. The intensity of flash flooding is a function of the intensity and duration of rainfall, steepness of the watershed, stream gradients, watershed vegetation, natural and artificial flood storage areas, and configuration of the streambed and floodplain. Urban areas are increasingly subject to flash flooding due to the removal of vegetation, installation of impermeable surfaces, and construction of drainage systems.

Much of Wisconsin's flooding on larger rivers occurs more than six hours after a causative event such as heavy rain, or rain combined with snowmelt. This kind of flooding can ultimately affect not only larger rivers, but also small streams and low areas outside of the

flood plains of larger rivers. It is not uncommon in Wisconsin to have flash flooding on the larger rivers transition to general river flooding that persists for days.[1]

Many urban areas that have historically been flood prone have been removed from the floodplain through the application of two construction types: 1) flood control dams, which reduce peak discharges; and, 2) levees, which redirect floods away from areas that would otherwise be inundated. It is noteworthy that as Wisconsin develops, urbanization decreases the abilities of natural systems to absorb rainfall because of the increased amount of impervious surfaces and runoff.

The aforementioned types of "natural" flooding occur nationally. FEMA and the Wisconsin Department of Natural Resources (DNR) Division of Water through the NFIP usually map flood plains and flood occurrences. Regulation of new construction in mapped flood hazard areas is a responsibility of local government.

Flooding resulting from inadequate man-made infrastructure is a type of flooding that must be addressed, but has not typically been mapped by the NFIP, since the NFIP only requires local governments to impose land use regulations in a mapped floodplain. The NFIP standard flood insurance policy, however, often pays claims for flood losses in these areas with inadequate infrastructure.

3.7.2 Wisconsin Flood Event History

The counties that border the Mississippi and Wisconsin Rivers, the largest rivers in Wisconsin, are prone to flooding in low-lying areas, including along the tributaries. Smaller rivers have periodically flooded in other places, such as the Chippewa River, Menomonee River, Kickapoo River, Pecatonica River and its tributaries, Bad River, Wolf River, and Milwaukee River.

Flooding has been a principle cause of damage in 29 of 43 Presidential Disaster Declarations and one of six Presidential Emergency Declarations in Wisconsin from 1971 through April 2011. Flood damages tend to be the most widespread of Wisconsin's disasters. For instance, during the state's second worst flooding event in the summer of 1993, extremely heavy rainfall resulted in a major Presidential Disaster Declaration for 47 counties with total associated damage exceeding $740 million. 40 of the counties were declared for both Public and Individual Assistance, while the other seven were declared for Individual Assistance only. Though Wisconsin was not affected as severely as other states in the Midwest, the 1993 floods were one of the state's most significant disasters in terms of both damages and funds received through disaster relief programs. The total amount of disaster relief funds received from all declarations prior to this was $352 million. Approximately $300 million in disaster relief was received for the 1993 Presidential Disaster Declaration alone.

1. Losses associated with local drainage are most significant when they occur with other hazards described in this document, such as widespread flooding and thunderstorms; therefore, they are not analyzed as a distinct hazard.

Understanding the risk involved with flooding in Wisconsin is important, especially as many counties develop lands that once were set aside for agricultural or preservation purposes. Throughout recent years, flooding in Wisconsin has changed in scale and scope; this is due largely to the increasing demand for housing along Wisconsin's waterfronts.

Using Table 3.7.2-1, below, to compare the major flood events in Wisconsin from 1973 onward, it can be understood that flood events in recent years have increased in magnitude and severity, based on the large number of counties affected and the monetary value of damages.

TABLE 3.7.2-1 MAJOR FLOOD EVENTS IN WISCONSIN, 1973-2010

Date	Disaster Number	Area Affected (Counties Unless Otherwise Specified)	Damages ($1,000)	Deaths
1973	376	Adams, Brown, Buffalo, Chippewa, Clark, Crawford, Door, Dunn, Eau Claire, Green Lake, Jefferson, Kenosha, Kewaunee, La Crosse, Langlade, Lincoln, Manitowoc, Marathon, Marinette, Marquette, Milwaukee, Oconto, Outagamie, Ozaukee, Pepin, Portage, Racine, Rock, Rusk, Sheboygan, Walworth, Waukesha, Waupaca, Waushara, Wood	$24,000	0
1975	482	Buffalo, Pepin, Pierce, Trempealeau	$5,200	0
1978	559	16 counties in southern and southwestern Wisconsin; the Kickapoo River Valley was the most severely affected area	$51,000	0
June, Sept. 1980	626	6 northwestern and west-central counties including Chippewa, Dunn, Eau Claire, and Pierce	$6,000	0
July 1984	3091	Vernon	$1,000	0
Sept. 1985		Ashland, Bayfield, Douglas	$3,000	0
Aug. 1986	770	Milwaukee Waukesha	$20,000	2
Sept. 1986	775	Dodge, Fond du Lac, Kenosha, Milwaukee, Ozaukee, Sheboygan, Washington, Waukesha	$6,000	0
June 1990	874	East-central and southwestern counties, including Brown (including City of Green Bay), Kewaunee, Calumet, Manitowoc, Outagamie, Winnebago, Dane, Green, Rock, Grant, Iowa, Lafayette (including City of Darlington), Crawford, Richland, Sauk, Juneau, and Vernon	$21,000	0
Aug. 1990	877	City of Tomah and surrounding areas of Monroe County	$6,200	2
Sept. 1992	964	Brown, Calumet, Crawford, Dane, Grant, Green, Iowa, Juneau, Kewaunee, Lafayette, Manitowoc, Monroe, Outagamie, Richland, Rock, Sauk, Vernon, Winnebago	$17,000	0

TABLE 3.7.2-1 CONTINUED				
Date	**Disaster Number**	**Area Affected (Counties Unless Otherwise Specified)**	**Damages ($1,000)**	**Deaths**
June-Aug. 1993	994	Adams, Brown, Buffalo, Calumet, Chippewa, Clark, Columbia, Crawford, Dane, Dodge, Dunn, Eau Claire, Fond du Lac, Grant, Greene, Green Lake, Iowa, Jackson, Jefferson, Juneau, Kenosha, La Crosse, Lafayette, Lincoln, Marathon, Marquette, Menominee, Milwaukee, Monroe, Outagamie, Pepin, Pierce, Portage, Price, Racine, Richland, Rock, Rusk, Sauk, Shawano, St. Croix, Trempealeau, Vernon, Waupaca, Waushara, Winnebago, Wood	$740,000	2
July 1996	1131	Fond du Lac, Green (including City of Monroe and the Village of Monticello)	$6,000	2
June 1997	1180	Milwaukee, Ozaukee, Washington, Waukesha	$87,700	0
Aug. 1998	1238	Milwaukee, Waukesha, Sheboygan, Racine, Rock	$55,000	2
July 1999	1284	Ashland, Bayfield, Douglas, Florence, Iron, Oneida, Price, Rusk, Sawyer, Vilas	$31,000	0
May–July 2000	1332	Columbia, Crawford, Dane, Grant, Iowa, Juneau, Kenosha, Lafayette, Milwaukee, Richland, Sauk, Vernon, Walworth, Adams, Ashland, Barron, Burnett, Forest, Green, Iron, Jackson, Monroe, Oneida, Polk, Rusk, Sawyer, Washburn, Dodge, Racine, Waukesha	$74,000	0
April 2001	1369	Adams, Ashland, Barron, Bayfield, Buffalo, Burnett, Calumet, Chippewa, Clark, Crawford, Douglas, Dunn, Grant, Iron, Jackson, Juneau, La Crosse, Outagamie, Pepin, Pierce, Polk, Portage, Rusk, St. Croix, Taylor, Trempealeau, Vernon, Washburn, Waupaca, Waushara, Winnebago, Wood	$84,200	0
June 2002	1429	Adams, Clark, Dunn, Marathon, Marinette, Portage, Waushara, Wood	$14,300	0
Sept. 2002	1432	Polk	$3,000	0
May-June, 2004	1526	Southern and central counties - widespread (most counties south of a line from Eau Claire to Wausau to Green Bay)	$268,425	1
July 2006		Waukesha County and City of Madison	$13,000	0
Aug. 2007	1719	Columbia, Crawford, Dane, Grant, Green, Iowa, Jefferson, Kenosha, La Crosse, Racine, Richland, Rock, Sauk, Vernon	$116,400	1
June 2008	1768	Adams, Calumet, Crawford, Columbia, Dane, Dodge, Fond du Lac, Grant, Green, Green Lake, Iowa, Jefferson, Juneau, Kenosha, La Crosse, Lafayette, Marquette, Manitowoc, Milwaukee, Monroe, Ozaukee, Racine, Richland, Rock,, Sauk, Sheboygan, Vernon, Walworth, Washington, Waukesha, Winnebago	$ 763,619	1

TABLE 3.7.2-1 CONTINUED				
Date	**Disaster Number**	**Area Affected (Counties Unless Otherwise Specified)**	**Damages ($1,000)**	**Deaths**
July 2010	1933	Calumet, Grant, Milwaukee	$45,000	0
Oct. 2010	1944	Buffalo, Clark, Jackson, Juneau, Marathon, Portage, Taylor, Trempealeau, Wood	Ongoing	0

Source: NOAA National Weather Service, Milwaukee/Sullivan, WI, 2011.

1997

Since 1993, several flooding events have been especially noteworthy; the first of which occurred on June 20 and 21, 1997. During this event, a rainstorm dumped more than seven inches of rain in a 30-hour period in Milwaukee and surrounding counties. The intense rainfall overwhelmed creeks and rivers, as well as storm and sanitary sewers. Hundreds of local roads and highways were filled with water, as deep as 23 feet in some areas. Thousands of homes were damaged, many of which had six to seven feet of water in their basement. The flood also damaged hundreds of businesses, many of which were forced to close temporarily or permanently. Some of the damaged businesses that provide critical services included Bayshore Clinical Labs, St. Michael's Hospital Health Center, St. Luke's South Shore Hospital, and the dialysis center in the City of Brown Deer.

Total, the initial damage losses from the 1997 floods amounted to almost $55 million for the public and private sectors, with most of the $44 million in private sector losses being uninsured. The severity of the storm and significance of the uninsured losses prompted a request for a Presidential Disaster Declaration for four Wisconsin counties. The declaration was granted for both Public and Individual Assistance. A fifth county was added later for Public Assistance only.

2001

In 2001, flooding was the principal reason Wisconsin initially received Presidential Disaster Declaration, DR-1369, although tornadoes and severe storms were also major factors as the disaster progressed. Heavy winter snowfall combined with spring rain led to spring flooding. In mid-April, rain and rapid snowmelt caused the Mississippi River and many of its tributaries to flood. Floodwaters along the Mississippi River from Alma (Buffalo County) to Prairie du Chien (Crawford County) rose to their highest levels since 1965. In addition, severe storms also struck northern Wisconsin in late April. Heavy rains mixed with freezing rain, snow, and strong winds caused widespread flooding and wind damage. The initial flooding affected 17 counties; eventually, 32 counties were declared for DR-1369 for a variety of storm-related damage, including tornadoes.

2002

Late in June 2002, a series of severe thunderstorms swept across central and northeastern Wisconsin. The storms produced up to 15 inches of rain in 24 hours in some locations with flooding on the Peshtigo, Wisconsin, and Yellow Rivers; flash flooding on smaller streams; and extensive ponding throughout many of the affected areas. There were reports of one to two feet of water in the streets of Marinette (Marinette County), and reports of one foot of water in the streets Wautoma (Waushara County). The high-velocity floodwaters destroyed or caused extensive damage to bridges, bridge approaches, culverts and road surfaces, leaving impassable gaps on county and township roads throughout the disaster area. Erosion and scouring around culverts and bridges reached depths of up to eight feet. Areas particularly hard hit were Marathon, Adams, Portage, and Marinette Counties. Nearly $4 million in damage was identified in these four counties, primarily to roads, bridges, drainage ditches, culverts, and sewer lines.

2004

In the months of May and June, 2004, a series of weather systems periodically moved east across the central and southern parts of Wisconsin and generated thunderstorms that dumped heavy rains. This resulted in widespread river, urban, and agricultural flood damage that totaled a staggering $268,425,000, with one flood-related death. Rainfall amounts in May 2004, ranged from seven inches to a maximum of 14.72 inches at Lynxville (Crawford County), or two to three times the monthly average. In May alone, the water level in Lake Michigan rose eleven inches due to rain and runoff. In June 2004, rainfall totals ranged from five to 12.72 inches at Readstown (Vernon County). Some of the larger rivers rose two to four feet above flood stage which constituted moderate to major flooding.

2007

In August, 2007, a series of thunderstorm clusters moved east-southeast through the southern third of Wisconsin, dumping record-setting rains. Many locations set new all-time daily and monthly August rainfall records. Much of the rain fell during August 19-20, 2007, when six to 12 inches were measured (150% to 300% of the August monthly average). Only one person perished in a flash flood event in southern Richland County. Alongside unofficial reports of 22 to 25 inches of water, Viroqua (Vernon County) picked up 21.74 inches of rain for the month, a new all-time monthly record for Wisconsin. Total flood damages were about $116.4 million. A record flood crest was reported at the Root River Canal near Raymond (Racine County), and major flood levels were observed at New Munster on the Fox River (Kenosha County) and at Newville on the Rock River (Rock County). Some locations along the Kickapoo River came within one to two inches of establishing a new all-time record crest.

2008

In June 2008, yet another widespread, severe flooding/flash flooding event, consisting of two rounds of heavy rains, ravaged an already saturated part of the state south of a line from La Crosse (La Crosse County) to Manitowoc (Manitowoc County). The first round of heavy rains occurred June 5 through 8, 2008 and the second round during the overnight hours of June 12 through 13, 2008. Collectively, amounts ranged from six to over 15 inches. In many locations, 24-hour and monthly rainfall records were established. Milwaukee would eventually measure 12.27 inches, which was a new record monthly rainfall. At least 38 river gauge sites set new all-time record-high crests; in some cases exceeding flood stage by six to over 11 feet. The Baraboo River in Baraboo (Sauk County) crested at 27.48 feet, where normal flood stage is 16.0 feet.

Thousands of homes, businesses, and farms were damaged or destroyed by the flood waters. In some cases, rivers remained in flood stage into late July 2008, and some low spots in farm fields still had standing water into September 2008 due to a high water table. Most of the flooding was of the “100-year” magnitude, and some was probably of the “200- or 300-year” type. Numerous roads were closed, damaged, or washed-out in river valleys and other low spots, and some bridges were significantly damaged. The worst river flooding occurred on the Baraboo, Kickapoo, Rock, Northern and Southeastern Fox, and Crawfish Rivers. A number of farm fields were never replanted by the time they dried out in late July or early August 2008. In some areas, the June 2008 flooding in Wisconsin was worse than the 1993 flooding. On June 14th, President Bush declared Disaster Declaration 1768 in the state. Eventually the declaration included 31 counties with estimated damages totaling roughly $763 million (FEMA, 2011).

Changes in precipitation patterns indicate that rainfall totals have increased in the past few years during individual rain events. For instance, heavy rain events in both 2007 and 2008 precipitated 20 to 25 inches (50-75% of the yearly average) or more in some river basins. This is important to note, since in many cases these heavy rain events occur after soils have already become saturated, leading to record-setting floods, resulting in hundreds of millions in damages. Figure 3.7.2-1, on the following page, illustrates this phenomenon as witnessed in June 2008.

The rains combined with the already saturated soils worsened the flooding conditions necessitating rescues, evacuations, road closures, and sandbagging. Thousands of homes sustained damages and many people were left homeless. Hundreds of small businesses were damaged and temporarily closed. Damage to public facilities is estimated to be in the tens of millions of dollars. Both the agriculture and tourism industries, representing the heart of state and local economies, suffered significantly. Many of the communities were still recovering from flooding that occurred ten months earlier which also resulted in a federal disaster declaration.

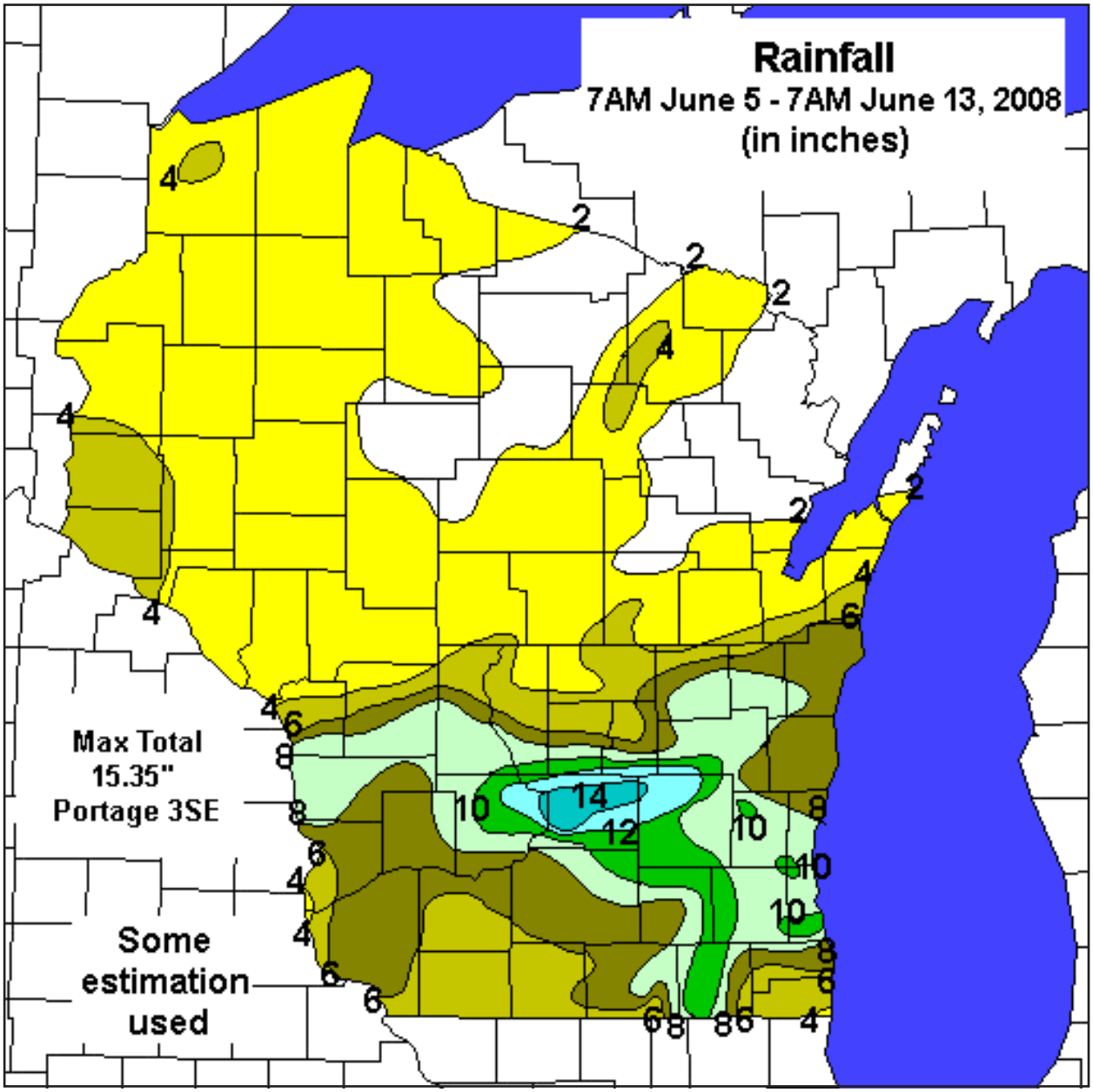


Figure 3.7.2-1 Rainfall Totals, 7 a.m. June 5 - 7 a.m June 13, 2008
Source: NOAA National Weather Service, Milwaukee/Sullivan, WI, 2011.

July 2010

Parts of south-central and southeast Wisconsin experienced several rounds of record-setting torrential heavy rains during the afternoon and evening hours of July 22, 2010 that led to flash flooding. During the afternoon, a persistent band of strong to severe thunderstorms developed and moved very slowly over the region throughout the evening hours. The individual storms were moving quite fast, at about 40 to 50 mph, but the slow southward movement of the boundary of these storms resulted in storms repeatedly moving over the same area. Widespread three to four inch rainfall amounts were reported along and on either side of the I-94 corridor, with locally higher amounts of five to eight inches.

The greatest rain amounts fell in Milwaukee County, where the most damage occurred. Mitchell Field recorded 5.61 inches for the day, breaking a record for the date. The previous record was 1.26 set in 1948.

Massive flooding shut down streets and the freeway system in parts of Milwaukee County at rush hour with up to four feet of rushing water. There was one fatality in Milwaukee. The Milwaukee Fire Department logged 50 rescues from homes and streets. The Milwaukee Metropolitan Sewerage District reported that the storm resulted in a combined sewer overflow of around two billion gallons. All Lake Michigan beaches in Milwaukee were closed through the following weekend of July 24 and 25, 2010, due to sewer contamination. The City of Milwaukee received at least 2,000 calls for sewer backups into basements of homes, with the northern half of the City hit hardest. Flooding rains created a massive 20 foot deep sink hole in the City of Milwaukee, swallowing a sport utility vehicle and a street light. The driver of the SUV was injured and treated at a hospital. Electrical power cables and other cable lines were also damaged.

General Mitchell International Airport (Milwaukee County) was closed late Thursday night, July 22, through 2 p.m. Friday, July 23, 2010 due to flooded runways. Over 4,400 homes reported water-filled basements in the City of Milwaukee alone. 11,764 homes received some sort of impact from the flooding, with six homes destroyed; 57 homes receiving major damage; 1,859 home receiving minor damage; and 9,842 homes minimally affected by the flood waters. 68 businesses were affected, with nine having major damage and 59 having minor damage. About 32,000 WE Energy utility customers lost electricity throughout southeast Wisconsin due to the flooding and lightning.

September 2010

An excessive rainfall event, with amounts of three to six inches, occurred across parts of central and northeast Wisconsin starting on the evening of September 22 and lasting through the morning hours of September 23, 2010. The heaviest rain fell over the central part of the state where many locations received more than five inches. This led to flash flooding, as well as moderate to record river flooding across parts of central Wisconsin. A new record stage of 18.41 feet was established on the Yellow River at Babcock (Wood County). This is 6.41 feet above flood stage. The Wisconsin River at Portage (Columbia County) set a new record crest of 20.66 feet on September 28, 2010, or 3.66 feet over flood stage.

Figure 3.7.2-2, on the following page, shows the county-by-county distribution of flood events across Wisconsin for the period of 1982-2010. The map shows the number of flood events, the number of directly-related fatalities, and the number of directly-related injuries. Notice that the southern part of the state has most of the flood events. Hilly terrain in the southwestern counties and the built-up urban areas in the southeast are factors that increase the chances of flooding. Noteworthy is the fact that Dane and Vernon Counties have the most flooding events during the time period, with 77 and 71, respectively. Very few injuries and deaths are recorded during the 28 year period, with the

highest number of injuries sustained in any one county equal to three (Rock and Jackson counties).

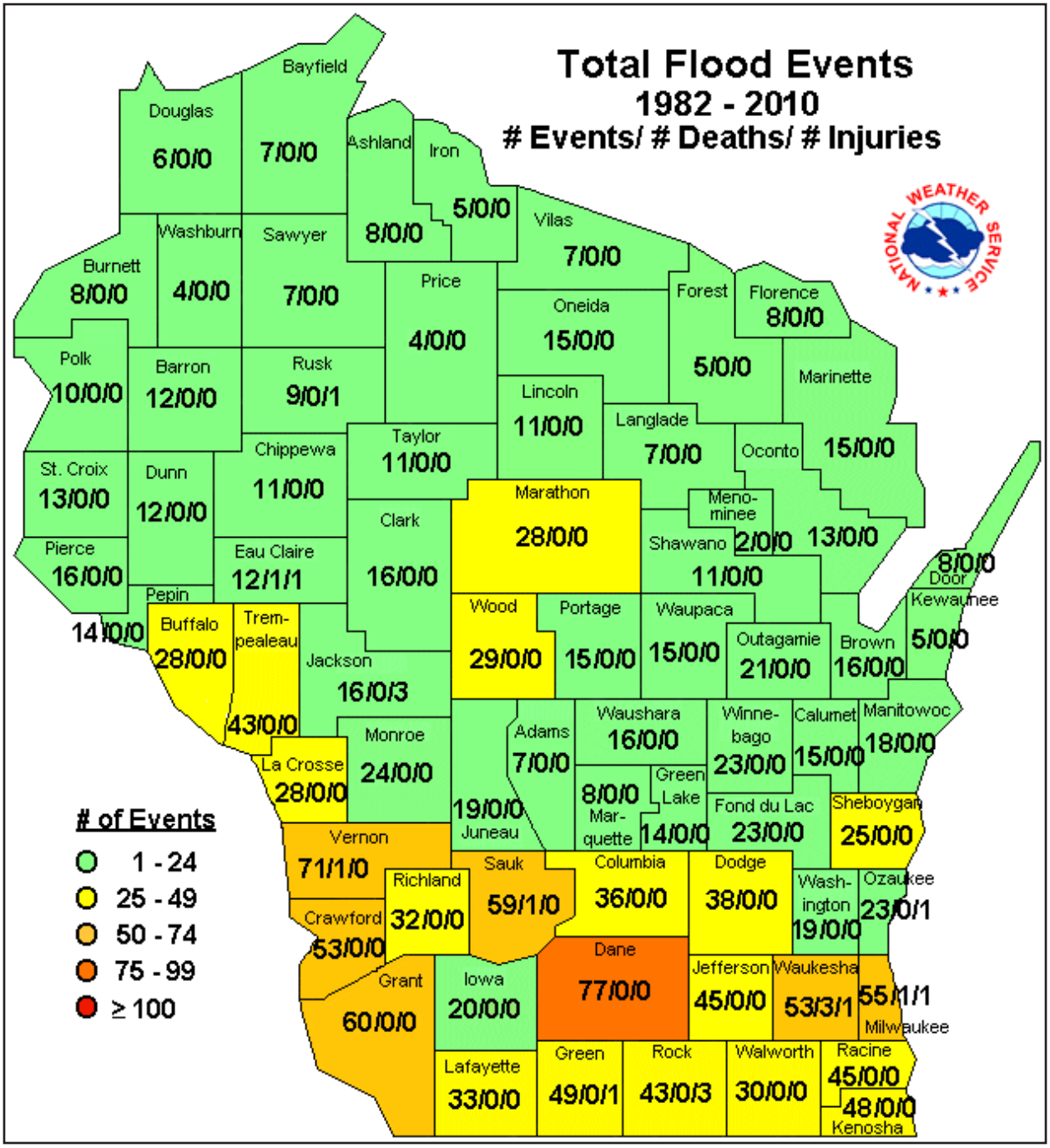


Figure 3.7.2-2 Flood Events by County, 1982-2010
Source: NOAA National Weather Service, Milwaukee/Sullivan, WI, 2011.

3.7.3 Probability of Occurrence

Floods are described in terms of their extent and the related probability of occurrence. Flood studies use historical records to determine the probability of occurrence for different extents of flooding. From these records, a probability of occurrence is determined and expressed in a percentage. The percentage describes the chance that the level of flood water exceeds a certain height, on average in any given year. The most widely adopted design and regulatory standard for floods in the US is the one-percent annual chance flood (base flood), which has been formally adopted by FEMA. The base flood, or "100-year flood," has a one-percent chance of occurring in any particular year. This measure is a simple and general way to express the statistical likelihood of a flood; actual recurrence periods vary from place to place.

Smaller floods occur more often than larger, deeper and more widespread floods. Thus, a "10-year" flood has a greater likelihood of occurring than a "100-year" flood. Table 3.7.3-1, to the right, shows a range of flood recurrence intervals and their probabilities of occurrence.

TABLE 3.7.3-1 FLOOD PROBABILITY TERMS

Flood Recurrence Intervals	Annual Percent Chance of Occurrence
10-year	10.0%
50-year	2.0%
100-year	1.0%
500-year	0.2%

Source: FEMA, 2001.

It is important to note that risk of a flood event occurring changes over time. Since natural hazards, like floods, do not affect a particular location every single year, the focus is on the overall probability of the event occurring over a selected time horizon. Assuming that most hazard events are independent outcomes, the probability of a 100-year flood occurring at any given time is 1/100 or 0.01. However, the probability of a 100-year flood occurring at least once over the next 100 years is 1-(0.99)^100=0.634.

This plan considers hazards over the entire State of Wisconsin; however, flood probability and magnitude are highly location-specific, so it is not possible to characterize these generally across the state in a meaningful way. The State Plan includes flood risk assessments that implicitly include probability and magnitude determinations on a state and county basis. However, truly accurate determinations of flood probability and magnitude require site-specific engineering studies and data-gathering that is beyond the scope of this hazard profile.

3.7.4 HAZUS Flood Risk Assessment

Hazard USA (HAZUS) is a software tool used to estimate damages from wind, floods, and earthquakes, among other natural disasters. This software was developed by FEMA under contract with the National Institute of Building Sciences (NIBS). Loss estimates produced by HAZUS are based on current scientific and engineering knowledge of the effects of hurricane winds, floods, and earthquakes. Estimating losses is essential to

decision-making at all levels of government, providing a basis for developing mitigation plans and policies, emergency preparedness, and response and recovery planning. HAZUS provides estimates of hazard-related damage before a disaster occurs and takes into account various impacts of a hazard event. The impacts include the following:

- Physical damage to residential and commercial buildings, schools, critical facilities, and infrastructure
- Economic loss, including lost jobs, business interruptions, and repair and reconstruction costs
- Social impacts and impacts to people, including requirements for shelters and medical aid

HAZUS uses Geographic Information System (GIS) software to map and display hazard data and the results of damage and economic loss estimates for buildings and infrastructure. It also allows users to estimate the impacts of hurricane winds, floods, and earthquakes on populations. HAZUS provides for three levels of analysis:

- Level 1 Analysis: rough estimate based on the nationwide database; a way to begin the risk assessment process and prioritize high-risk communities
- Level 2 Analysis: requires the input of additional or refined data; hazard maps that will produce more accurate risk and loss estimates[1]
- Level 3 Analysis: yields the most accurate estimate of loss and typically requires the involvement of technical experts (i.e. structural and geotechnical engineers); allows users to supply their own techniques to study special conditions

Wisconsin is currently running a level 1+ analysis, incorporating Digital Flood Information Rate Maps where available. In addition to the HAZUS supplied data, WEM provided updated essential facilities data. The site specific inventory (specifically schools, hospitals, fire stations, Emergency Operation Centers, and police stations) was updated using the best available statewide information.

FEMA HAZUS data were used to estimate the number of structures located within the one-percent chance, or 100-year, floodplain based upon Flood Insurance Rate Maps (FIRMs) published by FEMA. This data was supplemented by US Census housing data to estimate dates of construction.[2]

The statewide flood risk assessment is an initial step in identifying and quantifying flood risks throughout Wisconsin. The risk assessment uses existing available information, including GIS data with HAZUS.

1. Assistance from local emergency management personnel, city planners, GIS professionals, and others may be necessary for this level of analysis.
2. Under National Flood Insurance Program (NFIP) floodplain management regulations, which must be adopted by communities in order to benefit from Federal flood insurance, structures built after the date a FIRM becomes effective must be elevated at or above the base flood elevation (BFE). Thus, structures completed after the FIRM effective date are significantly less vulnerable to flood damage than pre-FIRM construction. In determining the vulnerability of housing stock, the FIRM effective date can be applied as a benchmark to separate the most vulnerable structures from the total building stock.

The initial assessment uses existing State-level information. The information is compiled in digital formats that enable the future update and enhancement of the assessment to use more detailed local data. As individual community hazard mitigation plans are updated, the statewide flood hazard mitigation risk assessment can be enhanced in future State Hazard Mitigation Plan updates.

The hazard identification and data inventory tasks, completed in 2008, were conducted by WEM with assistance from the Land Information and Computer Graphics Facility (LICGF) at the University of Wisconsin-Madison and the Polis Center at Indiana University-Purdue University Indianapolis. The LICGF and Polis teams assisted WEM in developing the flood risk assessment using HAZUS as a risk assessment tool.

Identify Hazards

The initial task involved reviewing flood information from the Wisconsin Department of Natural Resources (DNR). The DNR maintains a file of each county's and community's hydrologic/hydraulic assessments. The file includes FEMA Flood Insurance Study (FIS) reports, geo-referenced images of scanned FIRM maps, DFIRM vector maps, and Q3 vector maps. LICGF visited DNR and obtained copies of the available files.

Flood Risk Assessment Reports from local hazard mitigation plans were used to identify the local historical hazards. Approved Flood Risk Assessment Reports were provided by WEM for 46 counties and cities in Wisconsin. Eleven preliminary county reports were also made available.

Profile Hazard Events

Following the hazard identification task, staff performed HAZUS 100-year flood return interval analysis for each county using DFIRM or Q3 flood boundaries (DFIRM being preferable) whenever they were available. Prototyping prior to the commencement of the project indicated that the Enhanced Quick Look method available in HAZUS 2.0 provided loss estimates consistent with traditional methods.

For counties without DFIRM or Q3 boundaries, HAZUS was used to generate new 100-year flood boundaries and flood depth grids. Hydrologic and hydraulic analyses were performed at square mile intervals on all reaches generated from USGS 30 meter digital elevation models (DEMs).

TABLE 3.7.4-1 FLOOD RISK DATA SOURCES

Sources	Counties	Ratio
DFIRM	46	64%
Q3	3	4%
H&H + FIS Discharge Values	23	32%
Total	**72**	**100%**

Source: WEM, 2011.

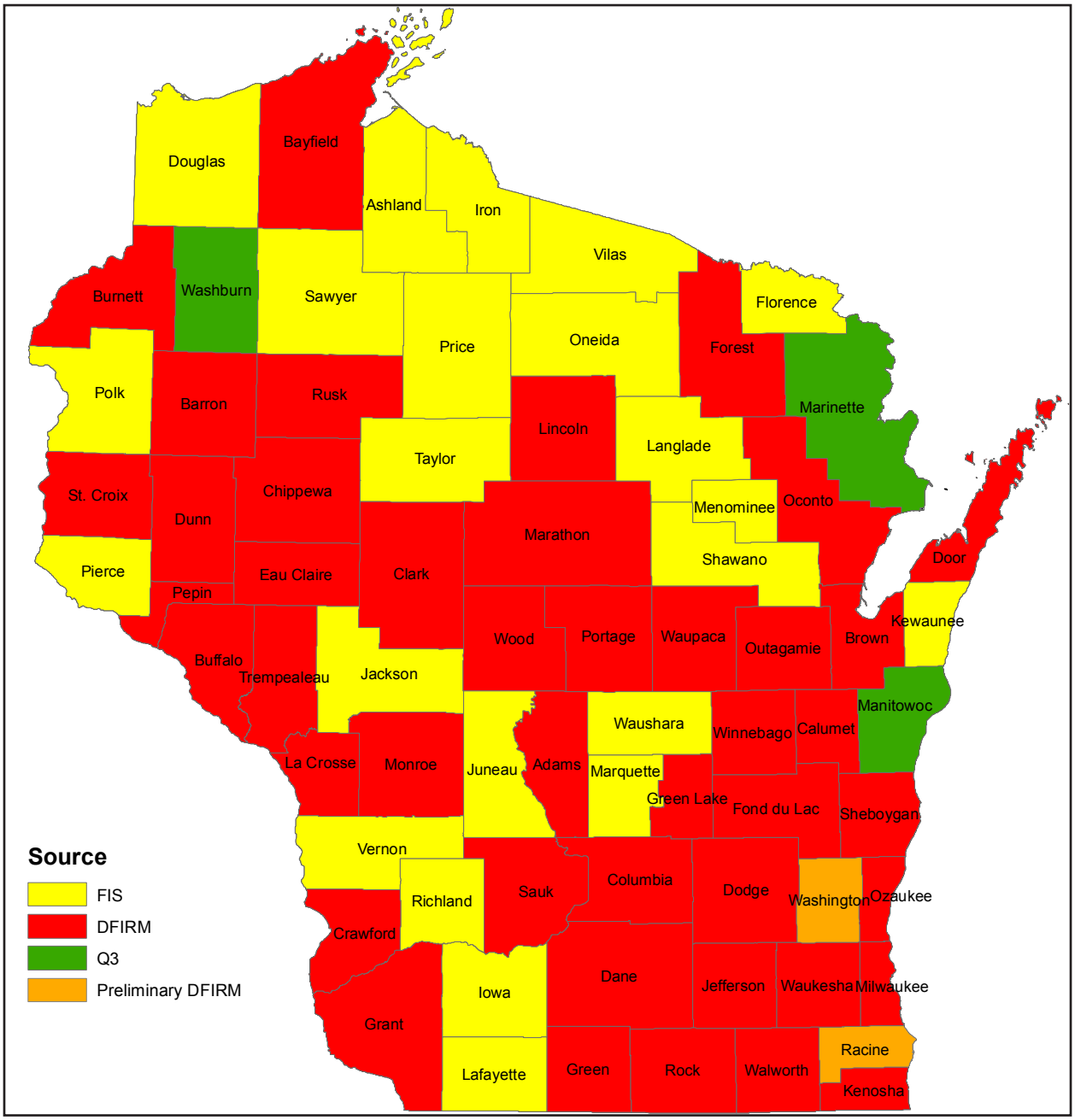


Figure 3.7.4-1 Flood Risk Data Sources by County
Source: WEM, 2011.

Figure 3.7.4-1, above, shows which data sources were used for each county. WEM has been gathering the new DFIRMs as they have become available and has been completing HAZUS runs using the new DFIRMs. Since 2009, WEM has completed 18 HAZUS runs using the new DFIRMs.

Inventory Assets

The HAZUS analysis was performed using default inventory data contained within the software. HAZUS default inventory data includes the following:

- General building stock
- Essential facilities
- Demographic information
- Transportation lifeline systems
- Utility lifeline systems
- High potential loss facilities
- Hazardous materials facilities

In addition to the HAZUS supplied data, WEM provided updated essential facilities data. The site-specific inventory (specifically schools, hospitals, fire stations, Emergency Operation Centers, and police stations) was updated using the best available statewide information.

Table 3.7.4-2 shows the differences between the default HAZUS data sets for Wisconsin and the updated data that were used for the 2008 flood assessment.

TABLE 3.7.4-2 STATEWIDE DATABASE UPDATES

Feature Class	Default Counts	Updated Counts	Default Exposure	Updated Exposure
Schools	3,093	3,299	$ 1,654,615	$ 2,046,405
Care Facilities	143	574	$ 1,258,320	$ 5,399,059
Police Stations	541	985	$ 810,418	$ 1,410,625
Fire Stations	617	900	$ 396,114	$ 727,000
EOCs	16	55	$ 17,120	$ 71,500
Communications	362	920	$ 38,734	$ 123,280
Dams*	629	3713	-	$ 1,418,000

*Dam losses are not reported in HAZUS flood models.
Source: University of Wisconsin and The Polis Center, 2008, "Wisconsin Statewide Flood Risk Assessment Report."

The State of Wisconsin has created a GIS layer for all DNR-managed properties. The risk assessment process overlaid the flood boundaries with the DNR-managed properties to identify any properties at risk.

Estimate Losses

The loss estimation was performed using HAZUS. This process reflects a Level 1+ approach to flood modeling. The Level 1+ approach uses default data while referencing additional data. As indicated above, the loss estimation process used supplementary essential facility information for the purpose of improving the accuracy of the model predictions.

HAZUS flood modeling was performed one county at a time. A stream network was delineated for every square mile within the county. The HAZUS flood model performs an area weighted assessment of flood damage. The number of grid cells at a given depth is counted and then divided by total number of cells within a census block. The result is used to "weight" damage at that flood depth for each occupancy class. Essential facilities are evaluated by their specific location by default. Buildings are considered a total loss once they reach the 50% damage threshold.

HAZUS analysis was performed within a study region created for each county. Separate case studies within each study region were frequently required:

- Coastal flood analysis was performed separately from the riverine analysis except when DFIRM or Q3 boundaries were used for the analysis.
- Streams for which FIS discharge values were available were segregated into a separate case study.
- Riverine flood analysis was performed in a separate case study whenever the number of reaches exceeded around 100. This threshold number varied depending on the problems encountered for each case study or study region.

The analysis included:

General Building Stock
- Building losses
- By occupancy and by building type
- By full replacement value and depreciated replacement value
- Shelter requirements
- Building, content, and inventory losses

Essential Facilities

Building and content losses
Restoration time to 100% functionality
Lifeline losses (for selected components)
Losses to structures and equipment

Table 3.7.4-3 provides a summary of building loss and economic loss for each county. The table also includes short term shelter requirements and population.

TABLE 3.7.4-3 FLOOD RISK ASSESSMENT RESULTS BY COUNTY							
County	Population	Estimated Total Buildings	Total Damaged Buildings	Total Building Exposure ($1,000)	Total Economic Loss ($1,000)	Building Loss ($1,000)	Short Term Shelter
Adams	18,643	13,532	156	$1,714,102	$53,424	$30,367	230
Ashland	16,866	7,767	33	$1,424,733	$18,051	$7,976	139
Barron	44,963	18,699	155	$3,790,003	$114,253	$46,428	544
Bayfield	15,013	11,111	63	$1,637,752	$54,931	$27,326	19
Brown	226,778	69,571	385	$19,961,716	$448,922	$183,041	10,818
Buffalo	13,804	5,462	45	$1,027,996	$46,272	$21,206	599
Burnett	15,674	12,110	162	$1,853,439	$65,233	$36,945	135
Calumet	40,631	13,711	54	$3,188,818	$68,200	$24,978	606
Chippewa	55,195	19,897	77	$4,096,770	$136,198	$60,010	951
Clark	33,557	12,496	26	$2,228,193	$43,852	$19,365	144
Columbia	52,468	19,485	474	$4,419,256	$242,423	$130,669	1,903
Crawford	17,243	7,696	84	$1,184,381	$47,946	$22,504	586
Dane	426,526	120,062	588	$37,942,411	$460,477	$180,345	8,107
Dodge	85,897	27,873	136	$6,819,041	$108,225	$47,375	1,699
Door	27,961	17,670	305	$3,544,600	$58,146	$30,818	354
Douglas	426,526	17,059	37	$3,567,617	$33,129	$15,281	8,107
Dunn	39,858	12,786	17	$2,765,823	$48,097	$21,633	824
Eau Claire	93,142	29,742	344	$7,849,911	$300,969	$94,818	9,855
Florence	5,088	4,065	6	$530,974	$3,736	$2,107	38
Fond du Lac	97,296	32,524	106	$7,842,669	$170,858	$65,109	5,916
Forest	10,024	7,898	9	$1,087,102	$15,365	$7,701	46
Grant	49,597	17,179	17	$3,344,675	$43,584	$20,006	309
Green	33,647	12,042	70	$2,915,843	$82,537	$33,036	899
Green Lake	19,105	10,071	28	$1,655,646	$32,742	$12,451	574
Iowa	23,000	8,595	14	$1,816,053	$23,216	$10,320	230
Iron	6,861	5,212	10	$727,042	$10,292	$4,316	26
Jackson	19,100	7,230	32	$1,298,474	$28,897	$11,141	251
Jefferson	74,021	24,973	129	$6,476,456	$150,487	$57,626	2,528
Juneau	24,316	11,351	55	$1,790,806	$50,421	$17,339	640
Kenosha	149,577	47,404	374	$12,467,944	$250,736	$93,902	3,740
Kewaunee	20,187	7,393	147	$1,517,568	$57,109	$22,520	587
La Crosse	107,120	33,301	495	$8,866,469	$294,438	$112,867	8,088
Lafayette	16,137	6,109	7	$1,214,511	$27,613	$12,736	28
Langlade	20,740	10,166	19	$1,741,110	$31,342	$10,518	402

TABLE 3.7.4-3 CONTINUED							
County	Population	Estimated Total Buildings	Total Damaged Buildings	Total Building Exposure ($1,000)	Total Economic Loss ($1,000)	Building Loss ($1,000)	Short Term Shelter
Lincoln	29,641	13,180	14	$2,413,646	$28,109	$11,752	334
Manitowoc	82,887	29,082	105	$7,463,475	$87,338	$39,738	980
Marathon	125,834	43,255	232	$10,019,212	$240,673	$101,922	3,733
Marinette	43,384	24,343	175	$3,770,304	$125,246	$59,390	1,031
Marquette	15,832	8,278	76	$1,187,213	$25,244	$9,532	223
Menominee	4,562	2,005	0	$253,325	$4,282	$1,449	33
Milwaukee	940,164	256,229	1,059	$78,904,721	$732,195	$286,370	13,038
Monroe	40,899	14,618	124	$2,808,608	$91,692	$37,601	1,869
Oconto	35,634	18,667	45	$3,024,420	$47,883	$23,102	824
Oneida	36,776	24,793	26	$4,242,933	$51,173	$16,840	274
Outagamie	160,971	51,491	72	$13,930,487	$152,435	$61,684	589
Ozaukee	82,317	26,361	396	$8,424,827	$257,259	$106,533	4,061
Pepin	7,213	2,705	28	$543,852	$27,441	$12,140	249
Pierce	36,804	11,320	38	$2,745,224	$69,889	$27,163	494
Polk	41,319	19,110	154	$3,854,074	$91,323	$39,262	1,124
Portage	67,182	22,213	59	$4,802,272	$67,398	$27,617	2,615
Price	15,822	8,898	3	$1,534,217	$13,589	$6,048	77
Racine	188,831	59,300	501	$15,693,961	$238,307	$106,819	5,924
Richland	17,924	7,221	49	$1,329,972	$47,598	$19,157	335
Rock	152,307	52,424	485	$12,746,145	$316,841	$123,674	3,831
Rusk	15,347	7,111	24	$1,068,768	$29,397	$13,356	143
Saint Croix	63,155	20,525	352	$5,369,002	$249,531	$138,451	1,386
Sauk	55,225	20,828	163	$4,709,308	$134,539	$53,249	1,696
Sawyer	16,196	13,194	31	$1,990,856	$31,915	$15,397	113
Shawano	40,664	16,584	13	$3,054,433	$21,462	$9,660	164
Sheboygan	112,646	37,082	209	$10,241,080	$187,311	$82,217	1,993
Taylor	19,680	7,857	35	$1,458,249	$92,146	$23,299	157
Trempealeau	27,010	10,011	104	$2,118,192	$85,197	$34,963	1,192
Vernon	28,056	11,406	94	$1,677,827	$46,199	$20,440	290
Vilas	21,033	21,564	11	$3,116,310	$13,696	$6,127	22
Walworth	93,759	35,741	285	$9,304,295	$232,517	$120,010	1,053
Washburn	16,036	10,233	174	$1,554,736	$78,854	$44,926	165
Washington	117,493	37,309	377	$10,613,383	$351,573	$134,719	4,692
Waukesha	360,767	114,352	1,154	$35,955,764	$739,778	$291,616	13,042

TABLE 3.7.4-3 CONTINUED							
County	Population	Estimated Total Buildings	Total Damaged Buildings	Total Building Exposure ($1,000)	Total Economic Loss ($1,000)	Building Loss ($1,000)	Short Term Shelter
Waupaca	51,731	19,655	72	$4,154,334	$134,620	$49,495	2,140
Waushara	23,154	13,102	0	$1,921,060	$10,094	$3,508	507
Winnebago	156,763	51,009	213	$12,530,045	$220,746	$73,710	7,099
Wood	75,555	27,481	73	$6,328,340	$95,649	$38,988	1,155
Totals	5,747,134	1,852,779	11,684	$461,168,774	$9,093,260	$3,766,704	148,569

Source: WEM, 2011.

County summaries of site specific losses relative to essential facilities are compiled in Table 3.7.4-4. Counts of the moderately damaged essential facility buildings for each county are provided.

TABLE 3.7.4-4 MODERATELY DAMAGED ESSENTIAL FACILITY BUILDINGS BY COUNTY					
County	Care	EOC	Fire	Police	School
Adams	0	0	0	1	1
Ashland	0	0	0	0	0
Barron	0	0	0	0	0
Bayfield	0	0	0	0	0
Brown	0	0	0	0	4
Buffalo	0	0	0	1	0
Burnett	0	0	0	0	0
Calumet	0	0	0	0	0
Chippewa	0	0	1	0	1
Clark	0	0	0	0	0
Columbia	1	0	0	0	3
Crawford	0	0	0	0	0
Dane	0	0	1	1	2
Dodge	0	0	1	0	0
Door	0	0	1	0	0
Douglas	0	0	0	0	0
Dunn	0	0	1	0	0
Eau Claire	0	0	0	0	0
Florence	0	0	0	0	0
Fond du Lac	0	0	1	1	2
Forest	0	0	0	0	0

TABLE 3.7.4-4 CONTINUED					
County	Care	EOC	Fire	Police	School
Grant	0	0	0	0	0
Green	0	0	2	2	0
Green Lake	0	0	0	0	2
Iowa	0	0	0	1	1
Iron	0	0	0	0	0
Jackson	0	0	1	1	2
Jefferson	0	0	1	0	0
Juneau	0	0	1	0	2
Kenosha	0	0	0	1	1
Kewaunee	0	0	1	1	0
La Crosse	0	0	0	0	2
Lafayette	0	0	0	0	0
Langlade	0	0	0	0	0
Lincoln	0	0	0	0	0
Manitowoc	0	0	1	1	1
Marathon	0	1	0	0	1
Marinette	1	0	1	0	1
Marquette	0	1	0	4	0
Menominee	0	0	1	0	2
Milwaukee	1	0	0	0	4
Monroe	0	0	1	1	1
Oconto	0	0	0	0	0
Oneida	0	0	0	0	1
Outagamie	0	0	0	0	0
Ozaukee	0	0	2	1	2
Pepin	0	0	0	0	0
Pierce	1	0	0	1	1
Polk	0	0	0	0	0
Portage	0	0	0	0	0
Price	1	0	1	0	2
Racine	0	0	0	0	1
Richland	0	0	0	0	2
Rock	0	0	0	0	0
Rusk	0	0	0	0	0
Saint Croix	0	0	0	0	1
Sauk	0	0	2	1	2
Sawyer	0	0	0	2	1

TABLE 3.7.4-4 CONTINUED					
County	**Care**	**EOC**	**Fire**	**Police**	**School**
Shawano	0	0	0	0	0
Sheboygan	1	0	2	0	1
Taylor	0	0	0	0	0
Trempealeau	1	0	1	1	3
Vernon	0	0	0	2	1
Vilas	0	0	0	0	0
Walworth	0	0	0	0	0
Washburn	0	0	0	0	1
Washington	0	0	1	1	4
Waukesha	4	2	3	6	0
Waupaca	0	0	2	1	4
Waushara	0	0	1	1	0
Winnebago	0	0	0	0	4
Wood	1	0	1	0	2
Totals	**12**	**4**	**32**	**33**	**66**

Source: WEM, 2011.

Figures 3.7.4-2 through 3.7.4-5 can be found on the following pages. Figures 3.7.4-2 and 3.7.4-3 show the estimated building loss per county and the total estimated loss per county calculated in the HAZUS Flood Risk Assessment. Figure 3.7.4-4 shows the ratio of total economic loss to total building exposure per county. Figure 3.7.4-5 illustrates the estimated number of displaced persons per county. HAZUS uses the total number of residential buildings and populations to calculate the estimate. As can be expected, the counties with the highest populations have the highest number of displaced persons.

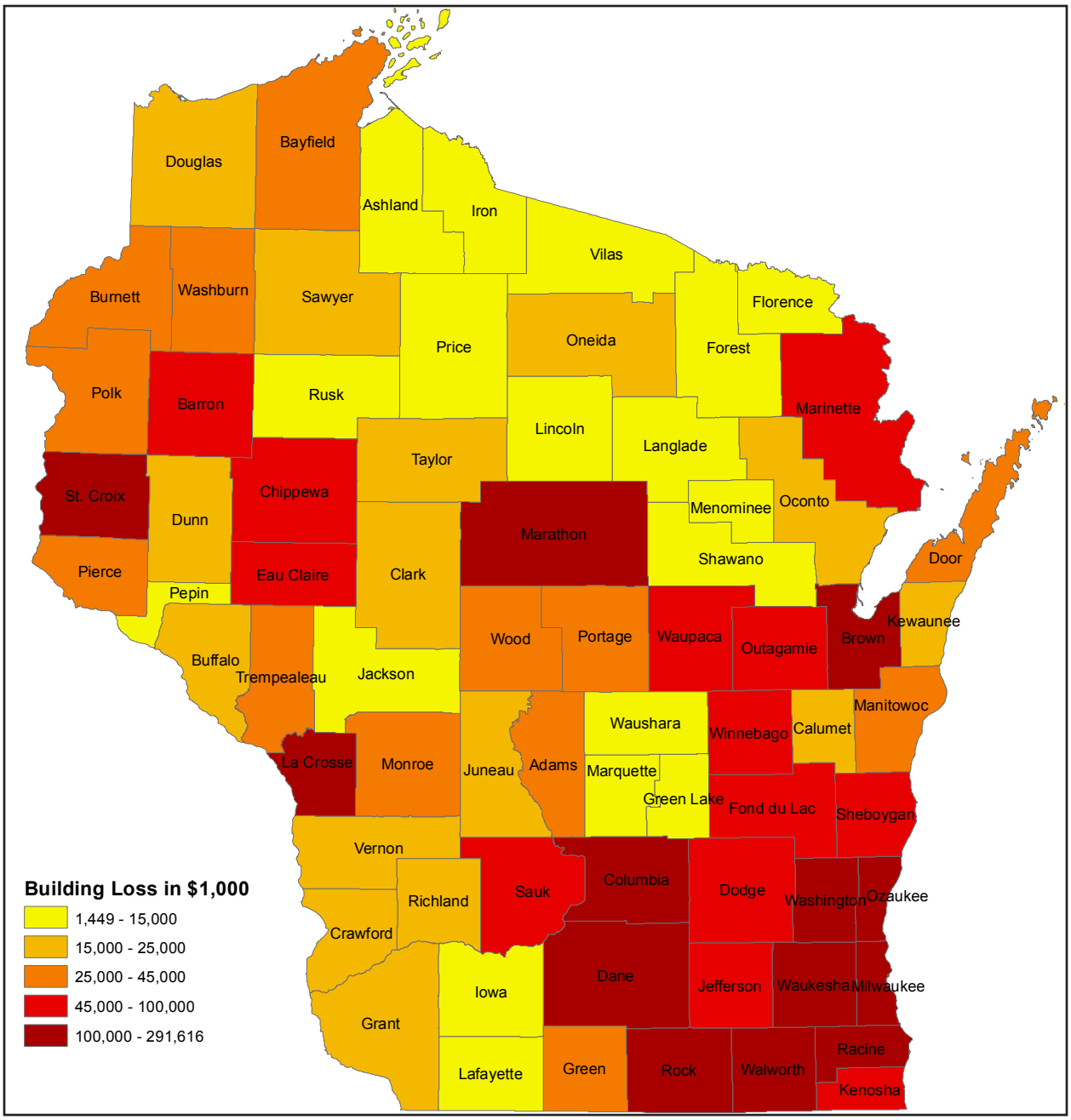


Figure 3.7.4-2 Estimated Building Flood Loss by County
Source: WEM, 2011.

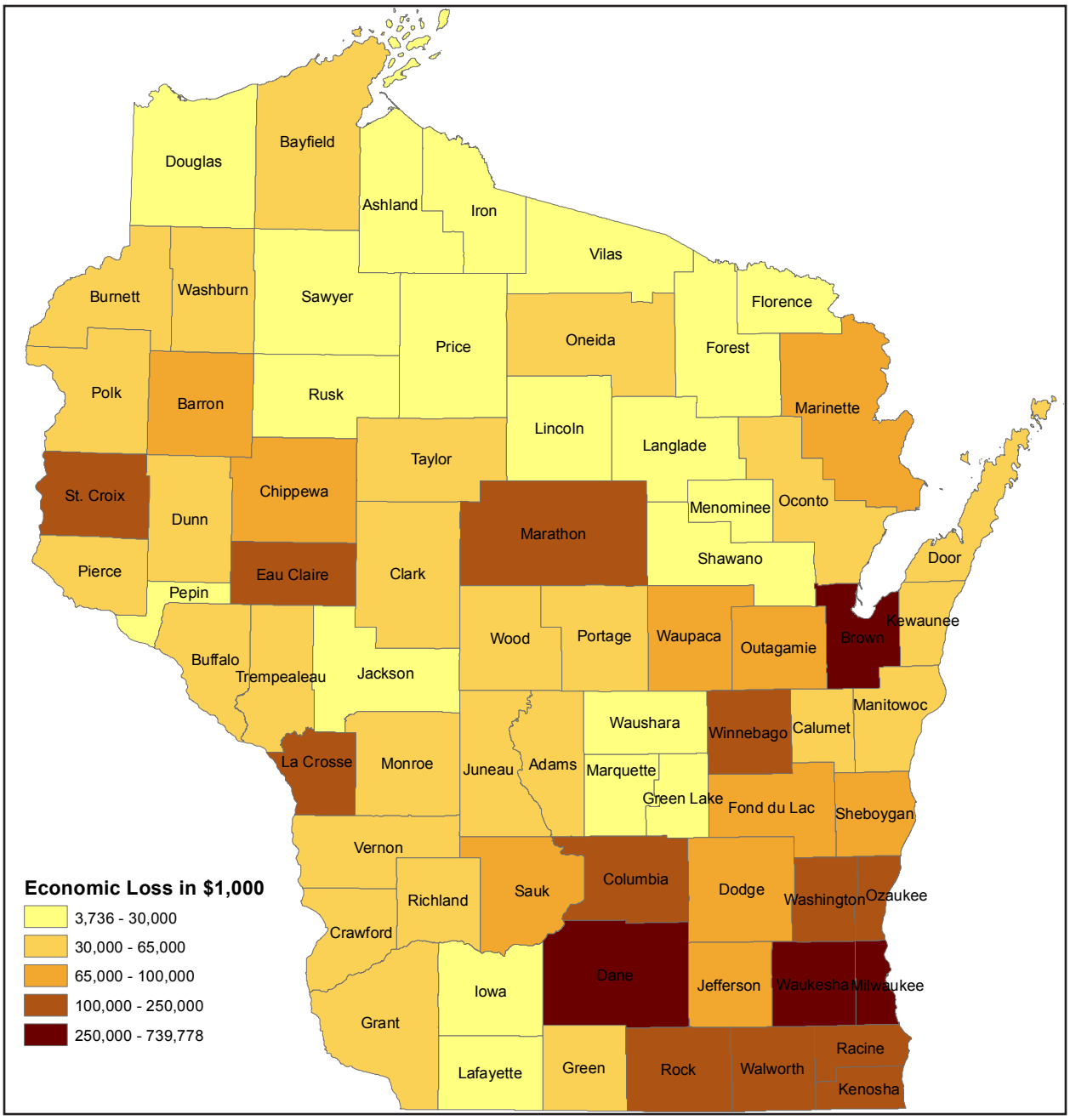


Figure 3.7.4-3 Total Estimated Flood Losses by County
Source: WEM, 2011.

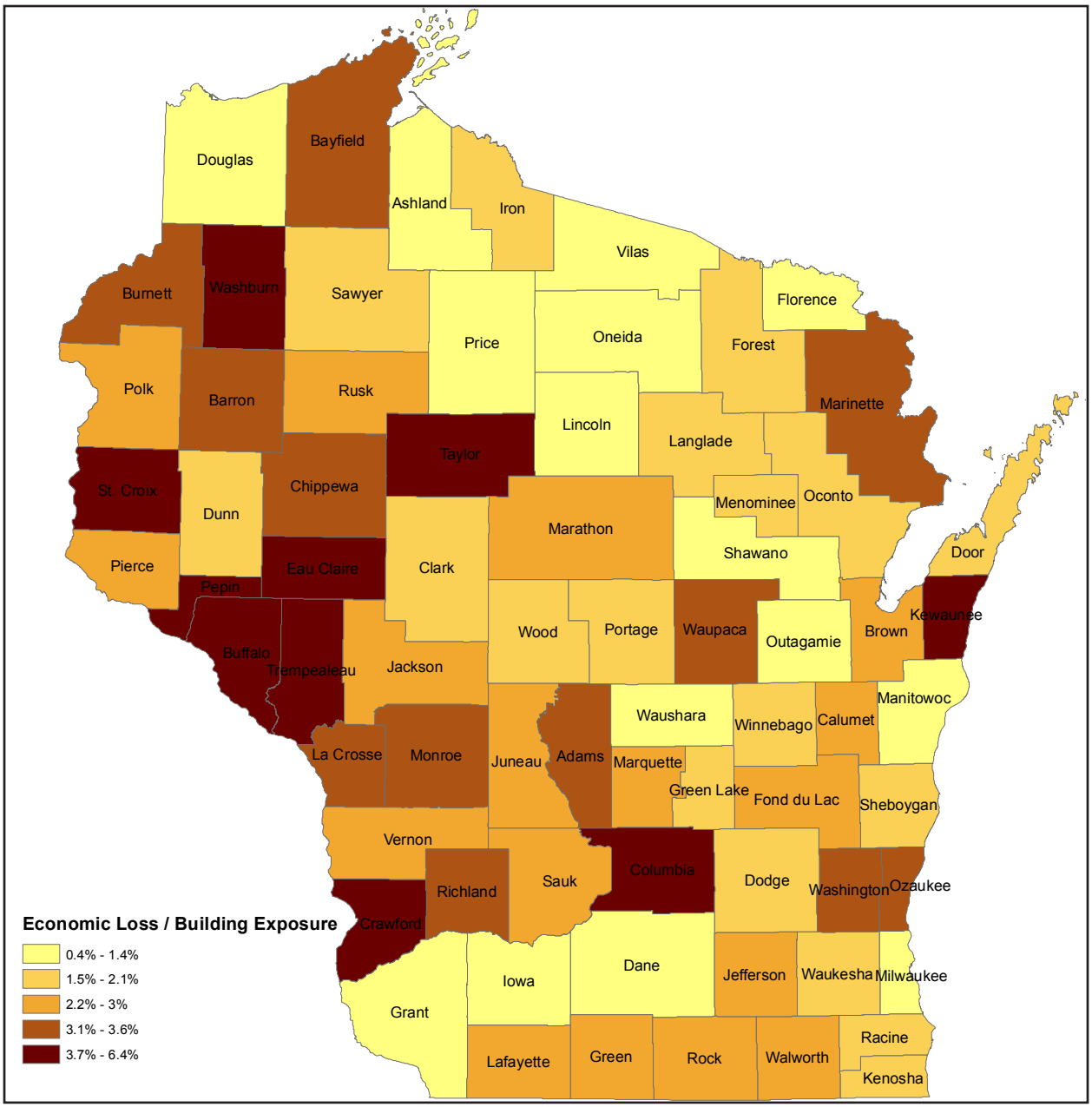


Figure 3.7.4-4 Ratio of Total Estimated Flood Losses to Total Building Exposure by County
Source: WEM, 2011.

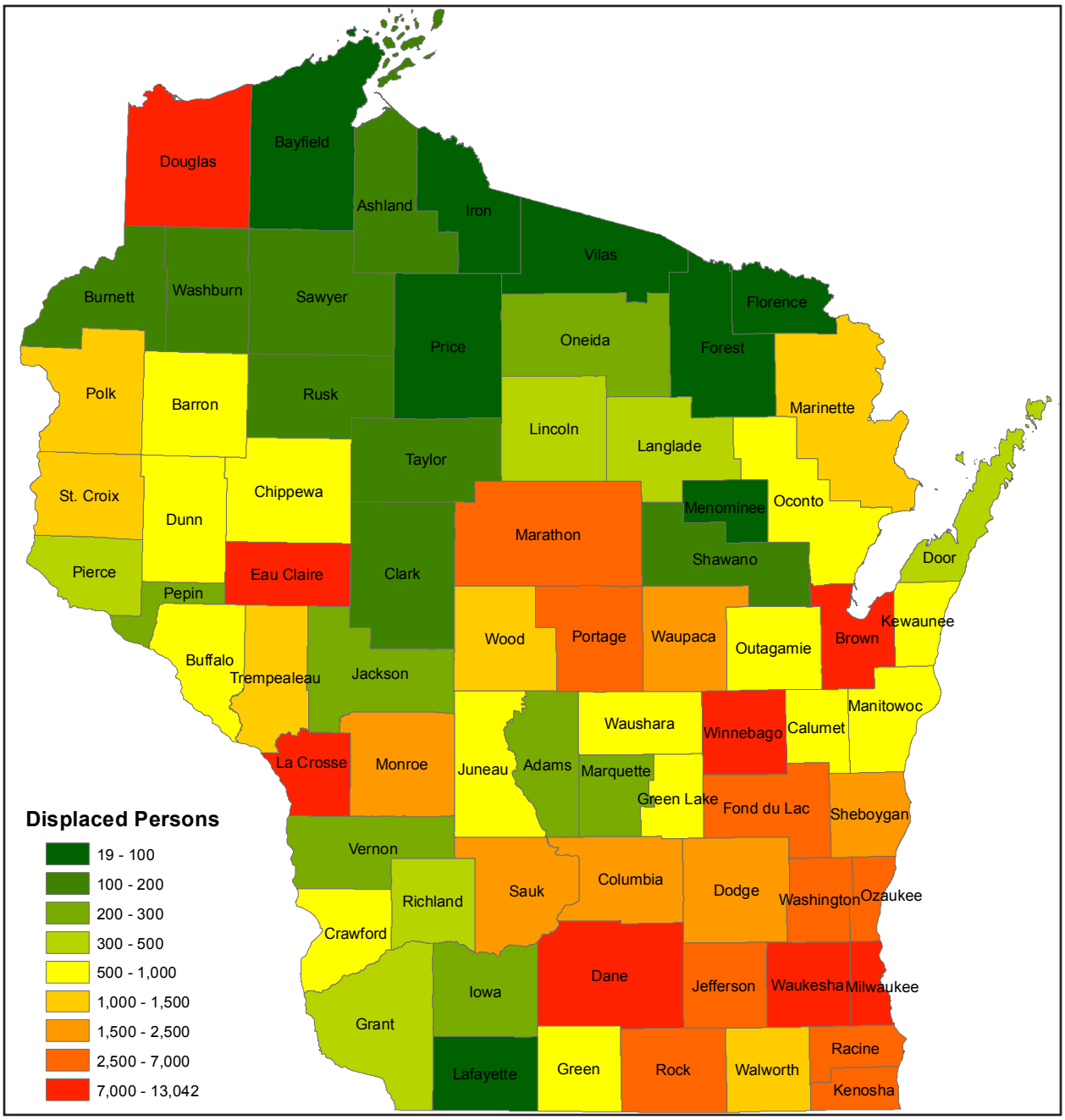


Figure 3.7.4-5 Estimated Persons Displaced by Flood per County
Source: WEM, 2011.

3.7.5 Hazard Ranking

TABLE 3.7.5-1 HAZARD RANKING FOR FLOODING		
Evaluation Criteria	**Description**	**Ranking**
Probability	• The hazard has impacted the state numerous times on an annual basis • The hazard is widespread, generally affecting regions or multiple counties in each event • There is a reliable methodology for identifying events and locations	High
Mitigation Potential	• Methods for reducing risk from the hazard are technically reliable • The state or counties have experience in implementing mitigation measures • Mitigation measures are eligible under federal grant programs • There are multiple possible mitigation measures for the hazard • The mitigation measure(s) are known to be cost-effective	High

3.7.6 Sources for Flooding

TABLE 3.7.6-1 SOURCES FOR FLOODING	
Source Title	**Link to Resource**
FEMA's Multi-Hazard Identification and Risk Assessment, "Subpart C: Hydrologic Hazards"	http://www.fema.gov/library/viewRecord.do?id=2214
NOAA Flooding Information	http://www.noaawatch.gov/themes/flooding.php
National Climatic Data Center Storm Event Database	http://www4.ncdc.noaa.gov/cgi-win/wwcgi.dll?wwevent~storms
NOAA National Severe Storms Laboratory	http://www.nssl.noaa.gov/
NWS Storm Prediction Center	http://www.spc.noaa.gov/
Natural Hazards Center, University of Colorado Boulder	http://www.colorado.edu/hazards/
NWS Weather Forecast Office, Milwaukee/Sullivan, WI	http://www.crh.noaa.gov/mkx/
NWS Weather Forecast Office, Green Bay, WI	http://www.crh.noaa.gov/grb/
NWS Weather Forecast Office, La Crosse, WI	http://www.crh.noaa.gov/arx/
NWS Office of Climate, Water, and Weather Services Natural Hazard Statistics	http://www.nws.noaa.gov/om/hazstats.shtml
National Flood Insurance Program (NFIP)	http://www.floodsmart.gov/floodsmart/
FEMA Flood Hazard Site	http://www.fema.gov/hazard/flood/index.shtm

3.8 WILDFIRE

3.8.1 Nature of the Hazard

Chapter 26.01(2) of the Wisconsin State Statutes defines forest fires as any "uncontrolled, wild, or running fires burning in forest, marsh, field, cutover, or other lands or involving farm, city, or village property and improvements incidental to the uncontrolled, wild, or running fires occurring on forest, marsh, field, cutover, or other lands." They often begin unnoticed, can spread quickly, and are usually signaled by dense smoke that may fill the area for miles around. Wildfires in Wisconsin are primarily human-caused through acts such as burning yard debris, arson, or campfires. They can also be caused by natural events such as lightning.

On average, over 1,500 wildfire events occur annually in Wisconsin, causing thousands of dollars of damage to property, and destroying natural resources (DNR, 2011). In the past five years, 2005 saw the most property burned, with 6,196 acres; over half the acreage burned came from a single wildfire in Adams County. As depicted in Table 3.8.1-1, left, and Figures 3.8.1-1 and 3.8.1-2, on the following page, dozens of structures are damaged and hundreds of structures are destroyed annually by many wildfires throughout the state. Though thousands of acres are burned annually, many structures are saved by sound fire management techniques.

TABLE 3.8.1-1 WISCONSIN WILDFIRES, 2005-2010

Year	Number of Wildfires	Number of Acres Burned	Number of Structures Saved	Number of Structures Burned
2005	1,520	6,196	832	157
2006	1,597	2,124	497	66
2007	1,486	4,713	595	62
2008	821	998	219	31
2009	1,519	3,361	682	85
2010	1,220	2,093	440	41
TOTAL	**8,163**	**19,485**	**3,265**	**442**

Source: Wisconsin Department of Natural Resources, 2011.

Types of Wildfires in Wisconsin

Interface or intermix fires (also known as wildland-urban interface or WUI fires) occur in areas where both vegetation and structures provide fuel.

Firestorms occur during extreme weather (e.g. high temperatures, low humidity, and high winds) with such intensity that fire suppression opportunities are limited. These events typically burn until the weather or fuel conditions change, reducing fire behavior.

Prescribed fires occur with the intentional application of fire to wildland natural fuels, under specific environmental conditions, to accomplish planned land management objectives. They are part of a fuel management strategy and one of the most complicated and complex operations to implement.

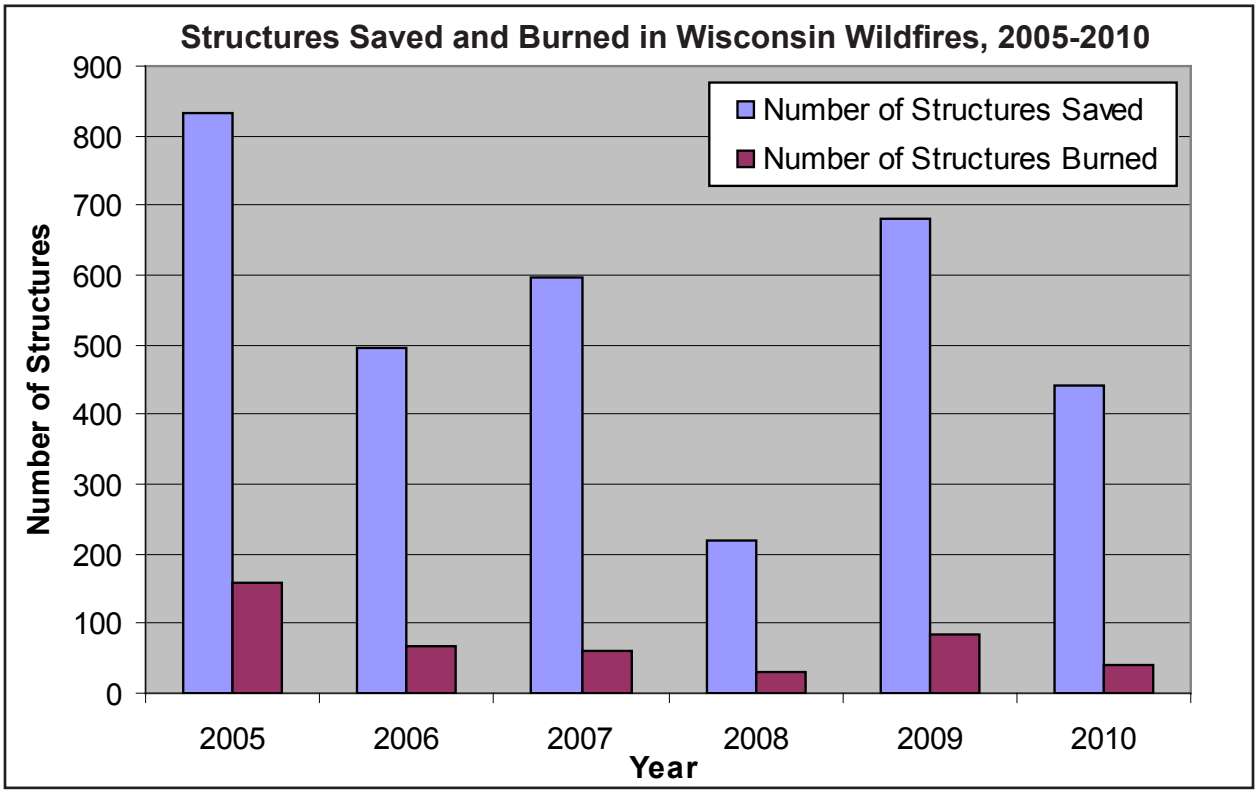


Figure 3.8.1-1 Structures Saved and Burned in Wisconsin Wildfires, 2005-2010
Source: Wisconsin Department of Natural Resources, 2011.

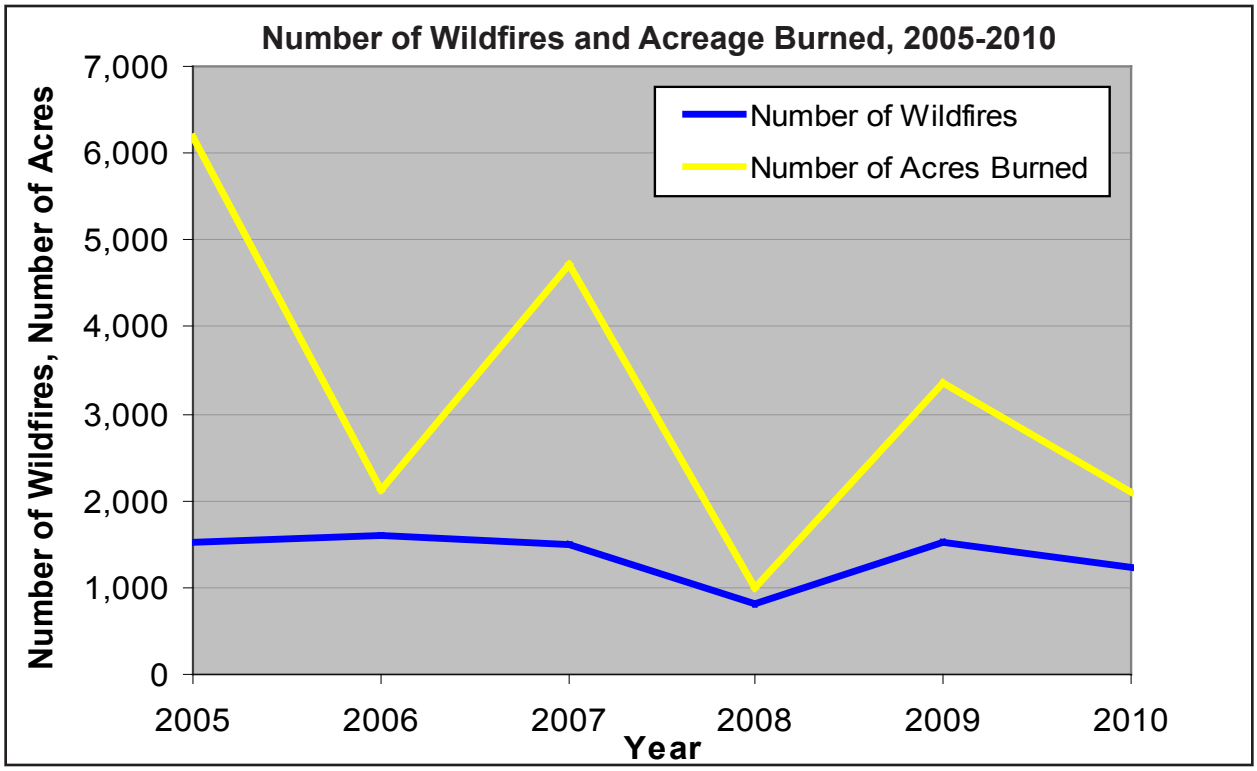


Figure 3.8.1-2 Number of Wildfires and Acreage Burned, 2005-2010
Source: Wisconsin Department of Natural Resources, 2011.

Factors Influencing Fire Behavior

Fuels

Fuel is required for any fire to burn. With regards to wildfire, fuels may consist of any of the following:

- living vegetation (grass, shrubs, and trees)
- dead plant material (dead trees, dried grass, fallen branches, pine needles, and dead leaves)
- "urban fuels" (houses, vehicles, and other man-made objects)

Fuels are arranged horizontally and vertically. Horizontal arrangement refers to the distribution of fuels over the landscape (FEMA). Vertical arrangement consists of the following:

- **Ground fuels** are combustible materials lying beneath the ground, including deep duff, roots, buried logs, and other organic matter.
  - Fires in ground fuels are usually called "peat fires."
- **Surface fuels** are materials lying on or immediately above the ground including pine needles, leaves, grass, downed logs, stumps, tree limbs, and low shrubs.
- **Aerial fuels** are green and dead materials in the upper forest canopy including tree tops and branches, snags, and tall shrubs.
  - "Crown fires" burn these aerial fuels and typically occur in conifer stands; this type of fire tends to be very intense and difficult to control.

Weather

- Temperature: Higher temperatures preheat fuels by driving off moisture, which allows fuels to burn faster.
- Relative humidity: Lower relative humidity and a lack of precipitation lowers fuel moisture; dry fuels burn more easily than fuels with higher moisture content.
- Wind speed: Wind is the most important weather factor since it dries fuel and increases the supply of oxygen. Wind has the greatest influence on the rate and direction of fire spread. In Wisconsin, wind direction almost always changes in a clockwise rotation, and winds tend to be the strongest in mid-afternoon.

Topography

- Slope: Steep slopes spread fire rapidly. Fire travels faster uphill and afternoon winds travel upslope as hot air rises, pushing fire even faster.
- Aspect (direction a slope faces): In Wisconsin, north-facing slopes tend to be more shaded with more moisture and heavier fuels, such as deciduous trees. South-facing slopes tend to be sunnier and drier, with more light fuels such as grasses.

Interaction with Other Hazards

Some natural hazards cause wildfires, others intensify them, and still other hazards are intensified by wildfire events. In Wisconsin, the following hazards often interact with wildfires, altering the conditions in the fire themselves:

- **Severe thunderstorm wind events:** increased wind speed increases the rate at which a wildfire spreads; the rate of spread varies directly with wind velocity (see Section 3.3 for more information about severe thunderstorms)
- **Lightning:** lightning may cause a wildfire as a result of a cloud-to-ground lightning strike (see Section 3.5 for more information about lightning)
- **Flooding:** wildfires remove vegetation from landscape, decreasing the soil's ability to absorb moisture, thus increasing likelihood of flooding in a fire ravaged area (see Section 3.7 for more information about flooding)
- **Landslides:** since wildfires remove vegetation and damage soils, flash runoff erosion may contribute to landslides (see Section 3.14 for more information about landslides)

Most Wisconsin wildfires occur in spring between March and June, with the highest incidence in April, although under the right conditions, they can occur at any time of the year (DNR). The season length and peak months may vary from year to year. Land use, vegetation, amount of combustible materials present, and weather conditions such as high wind, low humidity, and lack of precipitation are the chief factors in determining the number of fires and acreage burned. Generally, fires are more likely when vegetation is dry from a winter with little snow and/or a spring and summer with sparse rainfall.

Wildfire management involves the control, containment and suppression of a wild or uncontrolled fire. If not promptly controlled, a wildfire may grow into an emergency or disaster. Even small fires can threaten lives, resources, and improved property. The indirect effects of wildfires can also be detrimental. In addition to charring vegetation and destroying forest resources, large, intense fires can harm the soil, waterways, and the land itself.

Wildfires are capable of causing significant injury, death, and damage to property. A recent inventory showed that 16 million acres, or 46 percent of the State, is covered with forests. The potential for property damage from wildfires increases each year as additional properties are developed in woodland areas and higher numbers of people use these areas recreationally. Fires can extensively impact the economy of an affected area, especially the logging, recreation, and tourism industries. Major direct costs associated with forest fires or wildfires are the expenses of suppression, property loss, salvage, removal of downed timber and debris, and restoration of the burned area.

3.8.2 Wisconsin Wildfire Event History

While most of the wildfires starts in Wisconsin are quickly contained and kept to less than ten acres in size, Wisconsin has experienced catastrophic fires throughout its history.

The DNR highlights the events described below as noteworthy wildfires in the state's history.

1871: The most disastrous fire in Wisconsin's history is the Peshtigo Fire, when more than 1.5 million acres of forest burned in northeastern Wisconsin, mainly in Oconto, Marinette, Shawano, Brown, Kewaunee, Door, and Manitowoc Counties. The fire displaced an estimated 3,000 people, killed an estimated 1,152 people, and left another 350 people missing. This event represents the greatest single loss of human life by fire in American history; however, the Great Chicago Fire occurred at the same time and received much more publicity than this historic Wisconsin fire.

1891: The Comstock Fire destroyed about 64,000 acres in Barron and Washburn Counties, including the entire Village of Barronett (Washburn County) and structures in the City of Shell Lake (Washburn County).

1894: On July 27, the Phillips Fire burned over 100,000 acres in Price County, destroying 400 homes and much of the downtown area in the City of Phillips. 13 people died trying to escape by swimming across Long, Duroy, and Elk Lakes.

1930-34: In the dust bowl era, severe droughts ravaged the state. During this four-year period, about 2,950 fires burned 336,000 acres annually in Wisconsin.

1959: On May 1, a running crown fire in Burnett County burned 17,560 acres, causing $201,889 in reported damages.

1977: The entire state suffered two years of severe drought. Nearly 49,000 acres burned in 1977 alone. Over 170 structures were destroyed or damaged. Jackson, Washburn, Douglas, and Wood Counties were the worst hit. The Saratoga Fire in Wisconsin Rapids (Wood County) burned 6,159 acres and destroyed 90 buildings; the Brockway Fire in the Black River Falls area (Jackson County) burned 17,590 acres; and the Five-Mile Fire in Washburn and Douglas Counties burned 13,375 acres and destroyed 83 buildings.

1980: Over two days in April, the Ekdall Church Fire in Burnett County and the Oak Lake Fire in Washburn County together burned over 16,000 acres and destroyed more than 200 buildings.

2003: The Crystal Lake Fire in Marquette and Waushara Counties burned 572 acres. Nearly 200 buildings were threatened and several were destroyed.

2005: On May 5, the Cottonville Fire burned a swath 1.5 miles wide and seven miles long through the Towns of Big Flats, Preston, and Colburn (Adams County). It took nearly 200 personnel to suppress the wildfire in about 11 hours. Over 100 people were evacuated for several days while crews extinguished smaller fires. There were nine year-round residences, 21 seasonal homes, and at least 60 outbuildings destroyed in the 3,410 acre fire. 300 buildings were saved due to firefighting efforts.

2007: On April 29, a fire in Bayfield County burned 1,167 acres of US Forest Service land. Though this was the biggest fire in terms of acreage since the Cottonville Fire, only one structure was burned, and another 30 were saved.

3.8.3 Wildland-Urban Interface Fires

Throughout the twentieth century, housing was concentrated mainly in the larger metropolitan statistical areas, but people began moving to the outer fringe of cities and suburbs in the latter part of the 1900s. As housing development continues to occur into more rural areas, the dynamics of fire suppression and control have changed drastically (DNR, 2011).

Wildfire danger grows as homes and other man-made objects are moved into forests, grasslands, and other areas with highly flammable vegetation, creating what is known as the wildland-urban interface (WUI). According to the DNR, “the WUI can be a lone house in the middle of a forest, a subdivision on the edge of a pine plantation, or homes surrounded by grassland” (DNR, 2011). Locating man-made structures in areas that have burned naturally in the past both interrupts the natural recurrent cycle of wildfires and adds fuel to wildfires.

People continue to move to WUI areas, increasing dangers to their lives, property, and the natural resources surrounding them. Until residents adapt to the dangers around them, fire officials continue their efforts to promote and protect the safety of people and property in WUI areas with highly flammable vegetation. There is particular concern with homes located in remote areas where access roads and driveways are too narrow or sandy to allow emergency vehicles to properly service the homes. Furthermore, the addition of homes increases danger through use of power lines, liquid propane tanks, hazardous materials, and increased vehicular traffic (DNR, 2011).

Another factor increasing concern for the WUI areas is that the increase in the number of available, skilled firefighters and equipment is not keeping pace with increase in rural development. In these fire-prone WUI areas, firefighters often work as volunteers, and may be unaware of the additional challenges posed by WUI fires in their communities, such as the need for evacuation plans or the simultaneous confrontation of structure fires and wildfires. That type of demand requires a high level of training which may not always be available.

3.8.4 Probability of Occurrence

Wildfires are an ongoing threat to both rural areas and WUI communities. The number of acres burned has dropped significantly from 9,740 acres in 1988 to 988 acres in 2008, which was a 22 year low. However, the potential for wildfire persists due to the standing, constantly renewing fuel load.

There is a 100% probability that there will be at least one fire in Wisconsin every year. Wildfire managers prioritize the protection of lives, property, and resources – in that order. The challenge is to minimize the damage done by wildfire, while at the same time ensuring the safety of everyone involved.

Since fires occur annually in Wisconsin, the risk is inevitable. Preventing damages relies heavily on the education of residents and visitors to WUI areas to prevent starting wildfires, and to keep people and property safe when a wildfire does occur.

3.8.5 National Firewise Communities

The National Firewise Communities Program is a multi-agency effort between agencies, tribes, organizations, fire departments, and communities across the US to reduce loss of life, property, and resources to wildland fire by building and maintaining communities in a way that is compatible with natural surroundings. This goal is accomplished by actively involving homeowners, community leaders, planners, developers, and others in the effort to protect life, property, and resources from the risk of wildland fire before a fire starts. The Firewise Communities approach emphasizes community responsibility for planning and designing a safe community, effective emergency response, and individual responsibility for safer home design, construction, landscaping, and maintenance.

There are three main Firewise concerns in fire-prone areas:

1. **Buildings:** emphasis is on flammability of residential buildings/areas and outbuildings
2. **Surrounding vegetation:** does vegetation help spread fire or promote fire suppression?
3. **Access:** can emergency vehicles and workers service the area if a fire is burning

The Firewise Program recommendations are primarily focused on “The Home Ignition Zone (HIZ),” an area extending 100 to 200 feet beyond each side of all buildings on a property. In a well designed site, the HIZ should provide enough distance between buildings and a wildfire and modify vegetation around the structure so it acts as a fire break, rather than a spreading aid. Creating such defensible space increases the chance of buildings surviving a wildfire without outside help (DNR, 2011).

3.8.6 Communities-at-Risk

In 2003, the National Association of State Foresters produced the Field Guidance for Identifying and Prioritizing Communities-at-Risk (CARs). The purpose of the guide was

to provide states with a nationally-consistent approach for assessing and displaying the risks to communities from wildfire. The Wisconsin DNR, in cooperation with its federal and tribal partners, began working on a statewide assessment of CAR in 2004, which was finished in March 2011.

CAR is a model used to identify broad areas of the state that are at relatively high risk of resource damage from wildfire. Results of the model can then be used by local governments developing Community Wildfire Protection Plans (CWPP), and by the DNR to reduce local risks of wildland fire by prioritizing hazard mitigation and fire protection efforts.

The approach used in this risk assessment model is based on the "Methodology" section of the National Association of State Foresters Field Guidance document which recommends assessing and mapping four factors: 1) historic fire occurrence; 2) hazard; 3) values protected; and 4) protection capabilities. Modifications to this methodology were made to fit the data layers available for Wisconsin.

The DNR uses three factors to assess CAR to wildfire damage:

1. **Hazard:** the relative likelihood that an ignited wildfire will achieve sufficient intensity to threaten life or property based on land cover type, and historic fire regime.
2. **WUI (Values at Risk):** the relative vulnerability of each 2000 census block to wildfire damage based on housing density and spatial relationships with undeveloped vegetation in the WUI. Wisconsin's WUI was layered with a weighted vegetation layer to accentuate proximity to flammable vegetation.
3. **Ignition Risk:** the relative likelihood of a wildfire ignition within a given 30m pixel based on historic fire occurrence, population density, and proximity to a potential ignition source.

From these factors, models were developed in GIS to create statewide grids representing each of the three input factors. Finally, a statewide composite grid was created using a weighted overlay of hazard (40%), WUI (30%), and ignition risk (30%). This composite grid represents CAR on a zero to nine scale of threat, with zero representing little to no threat (i.e. low or high intensity urban development) and nine representing a very high threat (i.e. a jack pine or red pine forest). Statistics could then be calculated by municipal civil division (MCD). MCD was chosen since city or village boundaries change as land is annexed to plan for development. This measure provided consistency in reporting, and this is the level used in development of CWPPs (DNR, 2011).

Each of Wisconsin's 1,864 towns, villages, and cities was defined as a "community." Using a combination of natural breaks and field verification, quantitative markers were assigned for five threat levels: very low, low, moderate, high, and very high. Ultimately, those "communities" determined to have a high or very high threat of wildfire were considered to be CARs. 337 communities were determined to be "at risk."

Communities in Wisconsin vary considerably in size, particularly when comparing northern, more rural, communities to southern, more urban, communities. Because of this variation in size, the potential for missing areas of high risk was greater for larger towns. For this reason, the DNR incorporated a "Community-of-Concern" (COC) category to identify those towns with portions of their land at high risk of wildfire, but which were not otherwise included as a CAR. A COC was defined as a community that contained at least two contiguous square miles at high or very high risk; 237 communities were named as COCs.

The breakdown of communities is shown below in Table 3.8.6-1, and depicted graphically in Figures 3.8.6-1 and 3.8.6-2 on the following pages.

TABLE 3.8.6-1 WILDFIRE RISK LEVELS FOR WISCONSIN COMMUNITIES

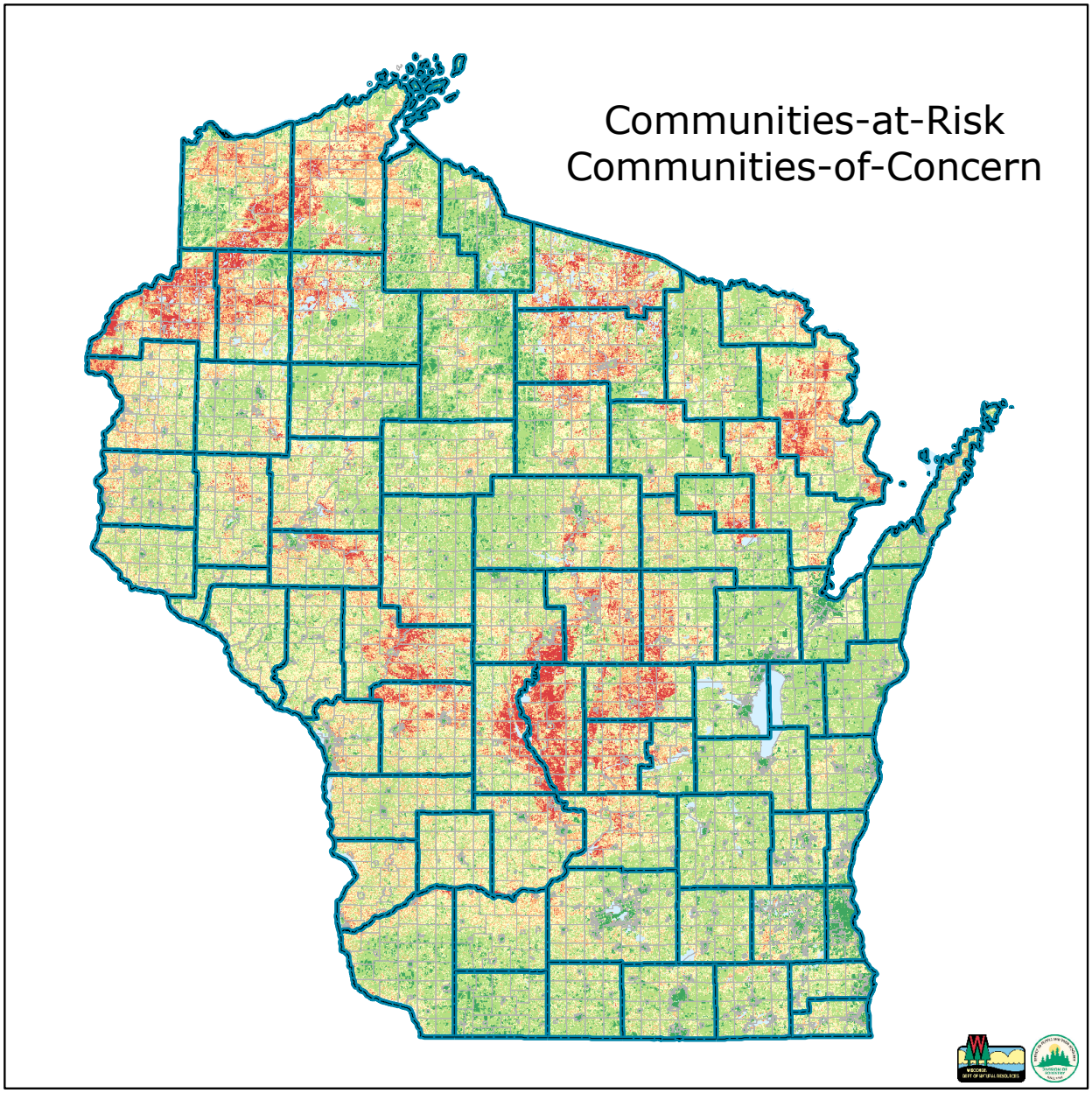
Risk Level	Number	Percent of Communities	Number of Cities	Number of Villages	Number of Towns	Percent of Land Area
Very High (CAR)	93	5	2	12	79	6
High (CAR)	244	13	10	47	187	16
Concern (COC)	237	13	8	6	223	20
Totals	**574**	**31**	**20**	**65**	**489**	**42%**

Source: Wisconsin Department of Natural Resources, 2011.

3.8.7 Hazard Ranking

TABLE 3.8.7-1 HAZARD RANKING FOR WILDFIRE

Evaluation Criteria	Description	Ranking
Probability	• The hazard impacts the state occasionally, but not annually • The hazard is somewhat localized, affecting only relatively small or isolated areas when it occurs • The methodology for identifying events is not well-established, or is not applied across the entire state	Medium
Mitigation Potential	• Mitigation methods are established • The state or counties have limited experience with the kinds of measures that may be appropriate to mitigate the hazard • Some mitigation measures are eligible for federal grants • There is a limited range of effective mitigation measures for the hazard • Mitigation measures are cost-effective only in limited circumstances • Mitigation measures are effective for a reasonable period of time	Medium



Introduction to the CAR Composite Grid

The composite grid is a model generated with Wisconsin datasets compiled from three input grids: Hazard (40%), WUI (30%), Risk (30%) (see table). Each 150-m pixel is attributed a value from 0 to 9, with 9 representing the highest risk of exposure to wildfire damage. These values are represented in the map as Very High to Very Low.

The composite grid is used to determine Communities-at-Risk. To identify a Community-at-Risk, the mean of all values within a Municipal Civil Division (MCD) must fall above CAR thresholds. Thresholds were determined using statistical methods and field verification.

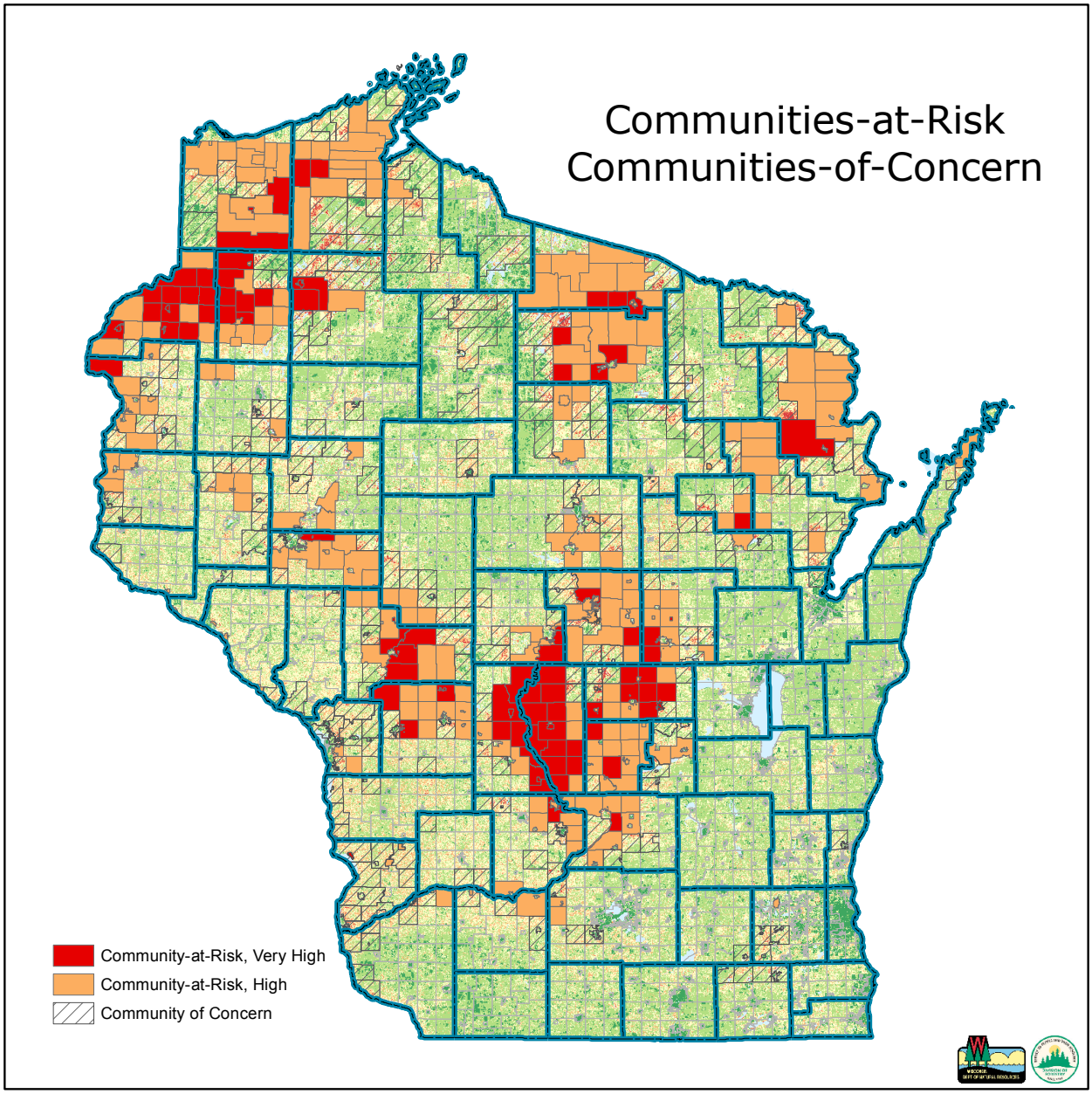
Composite Grid Inputs

For north: Surface fuel flammability (50%)	= Historic Fire Regime (50%)	HAZARD (40%)	Composite Grid
For south: Integrated Moisture Index (25%) Presettlement Veg (25%)			
	For state: Wiscland (vegetation) (50%)		
	WUI (50%)	WUI (30%)	
	Wiscland (vegetation) (50%)		
	Population Density (50%)	RISK (30%)	
	Historic Fire Occurrence (25%)		
	Distance to Rd or RR (25%)		

** Percent (%) equals weighted value into the next level of analysis.*

10/5/07

Figure 3.8.6-1 Communities-at-Risk, Communities-of-Concern Composite Map
Source: Wisconsin Department of Natural Resources, 2011.



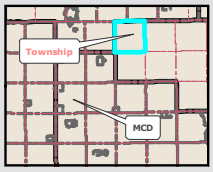
Introduction to Communities-at-Risk

The purpose of this model is to identify broad areas of the state that are at relatively high exposure to resource damage due to wildfire.

As mandated by the NASF, Wisconsin's Communities-At-Risk are divided into three categories:

1) Very High
2) High
3) Community of Concern*

Defining Community



For Wisconsin, Communities-at-Risk are reported at the MCD (municipal civil division) level*. MCD was chosen due to its identifiable legal boundaries, ease in reporting, and usage in the development of Community Wildfire Protection Plans.

** Menominee County is an exception due to its lack of MCD's (civil townships). Therefore, Menominee county is reported by legal township.*

** A Community of Concern is a Wisconsin DNR concept whereby it is demonstrated that a significant portion of the community (more than 2 adjoining square miles) are at high or very high risk, but where the community as a whole falls below the Community-at-Risk threshold.*

Figure 3.8.6-1 Communities-at-Risk, Communities-of-Concern Map
Source: Wisconsin Department of Natural Resources, 2011.

3.8.8 Sources for Wildfire

TABLE 3.8.8-1 SOURCES FOR WILDFIRE	
Source Title	**Link to Resource**
FEMA's Multi-Hazard Identification and Risk Assessment, "Subpart E: Other Natural Hazards"	http://www.fema.gov/library/viewRecord.do?id=2214
FEMA Wildfire Information Site	http://www.fema.gov/hazard/wildfire/index.shtm
National Interagency Fire Center	http://www.nifc.gov/
NOAA Wildfire Information site	http://www.noaawatch.gov/themes/fire.php
Natural Hazards Center, University of Colorado Boulder	http://www.colorado.edu/hazards/
Wisconsin DNR Division of Forestry	http://dnr.wi.gov/forestry/
Wisconsin DNR Current Fire Danger	http://dnr.wi.gov/forestry/Fire/Fire_Danger/Wis_Burn/StateCounties.asp
Wisconsin DNR Forest Fire Program	http://dnr.wi.gov/forestry/fire/
Wisconsin DNR Fire Management (PDF)	http://dnr.wi.gov/forestry/Publications/Guidelines/PDF/chapter17.pdf
Wisconsin DNR Major Wildfire Event History	http://dnr.wi.gov/wnrmag/html/supps/2005/apr05/timeline.htm
National Climatic Data Center Storm Event Database	http://www4.ncdc.noaa.gov/cgi-win/wwcgi.dll?wwevent~storms

Cardille, Jeffrey A., Stephen J. Ventura, and Monica G. Turner. 2001. Environmental and social factors influencing wildfires in the upper Midwest, United States. Ecological Applications. 11(1): 111-127.

Cleland, David T., Thomas R. Crow, Sari C. Saunders, Donald I. Dickmann, Ann L. Maclean, James K. Jordan, Richard L. Watson, Alyssa M. Sloan and Kimberly D. Brosofske. 2004. Characterizing historical and modern fire regimes in Michigan (USA): A landscape ecosystem approach. Landscape Ecology. 19: 311-325.

Finley, Robert W. Data 1976, Map 1999 (Nina Janicki). Finley's Presettlement Vegetation. publ. in: Ecological Landscapes of Wisconsin.

Haight, Robert G., David T. Cleland, Roger B. Hammer, Volker C. Radeloff, and T. Scott Rupp. 2004. Assessing Fire Risk in the Wildland-Urban Interface. Journal of Forestry. Oct/Nov: 41-48.

Radeloff, V.C., R. B. Hammer, S.I. Stewart, J.S. Fried, S.S. Holcomb, and J.F. McKee-Fry. 2005. The wildland urban interface in the United States. Ecological Applications. 15(3): 799-805.

Stewart, Susan I., Volker C. Radeloff, Roger B. Hammer, and Todd J. Hawbaker. 2007. Defining the Wildland-Urban Interface. Journal of Forestry. June: 201-207.

Sturtevant, Brian R, Patrick A Zollner, Eric J Gustafson, and David T. Cleland. 2004. Human influence on the abundance and connectivity of high-risk fuels in mixed forests of northern Wisconsin, USA. Landscape Ecology. 19: 235-253.

US Department of the Interior (USDI) and US Department of Agriculture (USDA). 2001. Urban wildland interface communities within vicinity of federal lands that are at high risk from wildfire. Federal Register. 66(3): 751-777.

3.9 DROUGHT

3.9.1 Nature of the Hazard

Drought is the result of a natural decline in the expected precipitation over an extended period of time, and occurs in virtually every climate on the planet, including areas of high and low precipitation. The severity of drought can be aggravated by other climatic factors, such as prolonged high winds and low relative humidity (FEMA). Drought is a complex natural hazard which is reflected in the following four definitions commonly used to describe it:

1. **Meteorological drought:** degree of dryness, expressed as a departure of actual precipitation from expected average or normal amount, based on monthly, seasonal, or annual time scales
2. **Hydrological drought:** effects of precipitation shortfalls on streamflows, reservoir, lake, and groundwater levels
3. **Agricultural drought:** soil moisture deficiencies relative to water demands of crop life
4. **Socioeconomic drought (or water management drought):** demand for water exceeds the water supply, resulting in a water shortage

A drought's severity depends on numerous factors:

- Duration
- Intensity
- Geographic extent
- Water supply demands, for both human use and vegetation

Due to its multi-dimensional nature, drought is difficult to define in exact terms, partly because of the ways it differs from other natural hazards:

- The onset and end of a drought are difficult to determine due to the slow accumulation and the lingering of effects after its apparent end.
- The lack of an exact and universally accepted definition adds to the confusion of existence and severity.
- The impact of drought is less obvious and may be spread over a larger geographic area.

These characteristics have hindered the preparation of drought contingency or mitigation plans by many governments and can make it difficult to perform an accurate risk assessment analysis.

Droughts may cause a shortage of water for human and industrial consumption, hydroelectric power, recreation, and navigation. Water quality may also decline and the number and severity of wildfires may increase. Severe droughts may result in the loss of

agricultural crops and forest products, undernourished wildlife and livestock, and lower land values, among other outcomes.

Wisconsin is most vulnerable to agricultural drought. The state has approximately 15.2 million acres of farmland on 78,000 farms and was ranked ninth in the country in overall farm receipts in 2010 (National Agricultural Statistics Service). Even small droughts of limited duration can significantly reduce crop growth and yields, adversely affecting farm incomes and local economies. Droughts significantly increase the risk of forest fires and wildfires. Additionally, the loss of vegetation in the absence of sufficient water can result in flooding, even from average rainfall, following drought conditions.

3.9.2 Wisconsin Drought Event History

During the 20th century, nine notable droughts have occurred in Wisconsin.

1929-34

The Drought of 1929-1934 was probably the most significant in Wisconsin history, considering its duration and severity. This drought had a 75-year recurrence interval in most of the state and over 100-year recurrence interval in certain areas. The austere economic aspects of the Great Depression compounded its effects. The drought continued with somewhat decreased effect until the early 1940s in some parts of the state.

1948-50

The 1948-1950 Drought was most significant in the northern part of the state. In the most severely affected areas, the drought had a recurrence interval of greater than 70 years.

1955-59

The 1955-1959 Drought had a recurrence interval of 30 to 70 years in all but the northwestern corner of Wisconsin.

1976-77

Estimates suggest that the 1976-1977 Drought in the Great Plains, Upper Midwest, and far Western States caused direct losses of $10 to $15 billion (FEMA). The drought of 1976-1977 was most severe in a wide band stretching from north to south across the state. Stream flow measuring stations recorded recurrence intervals from 10 to 30 years. State agricultural losses during this drought were set at $624 million. 64 counties were declared Federal Drought Areas and deemed eligible for assistance under the Disaster Relief Act. Additionally, numerous private and municipal wells went dry. Federal assistance was used to help communities drill new wells and obtain new water supplies.

1987-88

Some people believe the Drought of 1987-1988 to be most severe ever experienced in Wisconsin and much of the Midwest. It was characterized by not only below normal precipitation, but also persistent dry air and above normal temperatures. Stream flow measuring stations indicated a recurrence interval of 75 to 100 years. Its effects were most severe in north-central and northeastern Wisconsin. The drought occurred early in the growing season and resulted in a 30% to 60% crop loss, with state agricultural losses set at $1.3 billion. 52% percent of the state's 81,000 farms were estimated to have had crop losses of 50% or more, with 14% of the farms suffering estimated losses of 70% or more (FEMA). A combination of state and federal drought assistance programs helped Wisconsin farmers recover a portion of their losses. All Wisconsin counties were designated eligible for this drought assistance. In total, the drought in the Central and Eastern States during 1987-89 caused an estimated $39 billion in damages (FEMA).

The effect of this drought on municipal and private water supplies was not as severe; there were only a few reports of individual wells drying up. Several municipal water utilities experienced maximum use of their water delivery systems. Many water utilities imposed some type of water-use reduction rules or restrictions, usually involving the limitation of lawn sprinkling and yard watering.

2003

In August 2003, drought conditions returned to parts of south-central and southeast Wisconsin. The jet stream and associated low pressure systems stayed north of Wisconsin, resulting in few cold front passages. Conditions worsened from abnormally dry (D0 rating) to a moderate drought (D1 rating) as the month progressed. This drought continued into September 2003 and ultimately reached the severe category (D2). Crop and fruit tree farms without irrigation capability were especially affected. The hottest day of the summer in Milwaukee (Milwaukee County) occurred on August 21 when 96 degrees was recorded. Madison (Dane County) topped out at 94 degrees on August 26. Milwaukee experienced six days during the month with maximum temperatures of 90 degrees or higher. The three-month summer period of June through August was the driest in three decades in West Bend (Washington County), where only 5.11 inches of rain fell (7.82 inches below normal). Similar conditions were experienced throughout southern Wisconsin.

2007

Between January and July 2007, drought gradually returned to most of Wisconsin, spreading from north to south. The jet stream pattern kept low pressure systems and associated thunderstorms northwest of Wisconsin while summer temperatures averaged one to three degrees above normal. Eventually moderate (D1 rating) to extreme drought (D3 rating) covered 85% of the state. Only the southern tier of counties had normal conditions to abnormally dry conditions (D0 rating). Crop yields were reduced. Moderate to heavy

rains across central and southern Wisconsin in August broke the back of the drought in those areas, but the drought only gradually left the northern part of the state by December 2007.

3.9.3 Probability of Occurrence

The future incidence of drought is highly unpredictable, and may also be localized, making it difficult to determine probability with any accuracy; however, the NWS and National Integrated Drought Information System (NIDIS) are improving methodology to accurately forecast drought conditions. Both organizations use a combination of current and historical precipitation, streamflow, ground water, and crop data to perform short-term and long-term forecasts.

The Palmer Index determines long term drought forecasts, profiling several months at a time; however, it does not provide accurate short-term forecasts (several weeks). It uses a ranking of zero as normal, with drought shown in terms of negative numbers and excessive moisture in terms of positive numbers. The scale and conditions from July 2011 are pictured in Figure 3.9.3-1 on the following page. The NWS updates the Palmer Index on a weekly basis. Current Palmer Drought Severity Index information can be found online at the NWS Climate Prediction Center's Drought Monitoring website, at: http://www.cpc.ncep.noaa.gov/products/monitoring_and_data/drought.shtml.

On the other hand, the US Drought Monitor indicates which parts of the country are experiencing short-term drought conditions. The US Drought Monitor can be accessed at the NIDIS website, at: http://www.drought.gov. Figure 3.9.3-2 shows the short-term drought conditions for the beginning of July 2011. The lack of any color shading over Wisconsin indicated that there were no short-term drought conditions in Wisconsin. This contrasts markedly with the extreme ongoing D4 (exceptional drought) conditions in Texas and New Mexico, which have over 240 and 180 reported impacts, respectively (NIDIS, 2011).

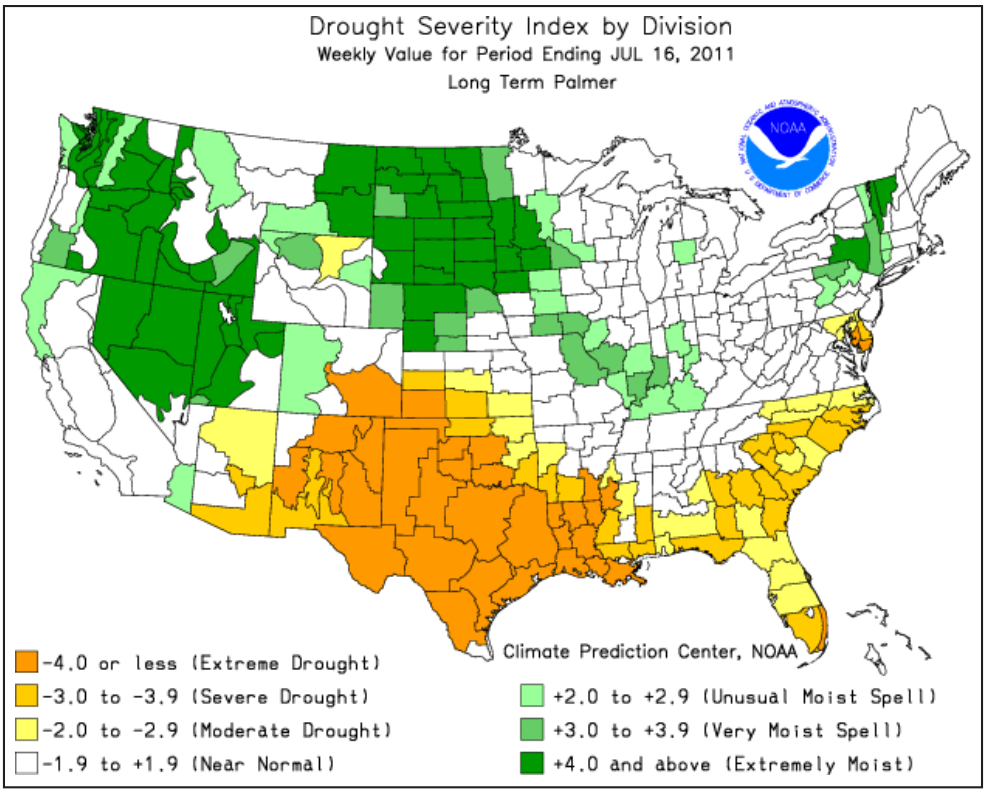


Figure 3.9.3-1 Palmer Drought Severity Index, July 16, 2011
Source: NOAA Climate Prediction Center, 2011.

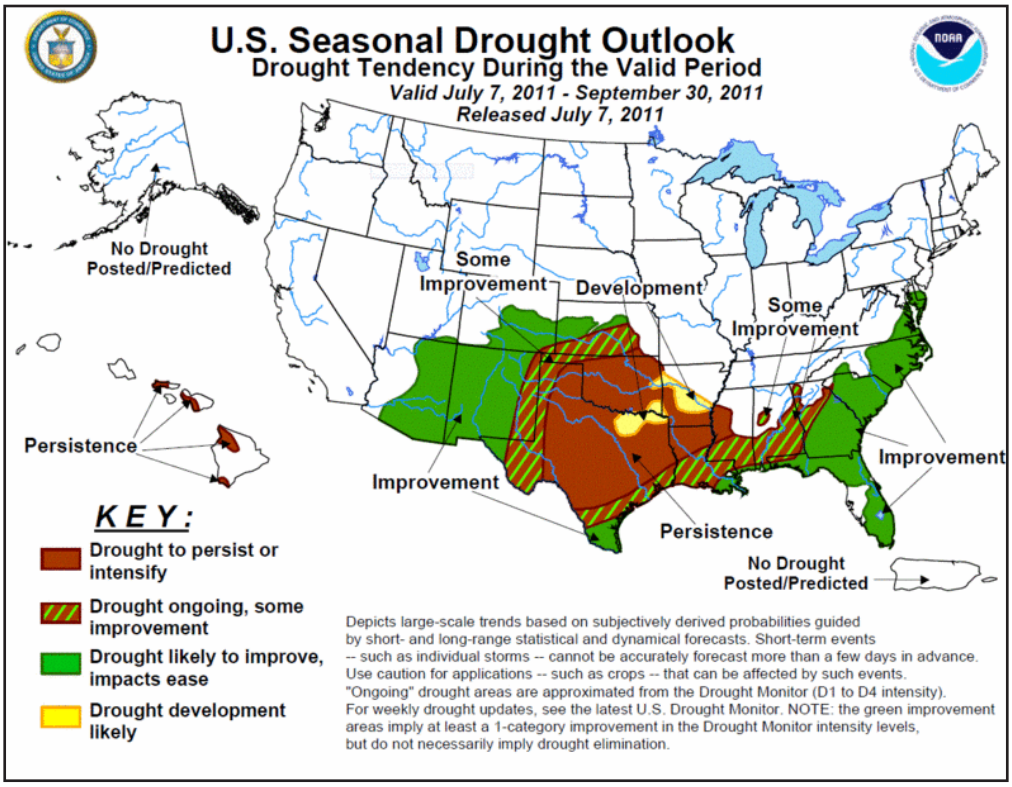


Figure 3.9.3-1 Palmer Drought Severity Index, July 16, 2011
Source: NOAA Climate Prediction Center, 2011.

3.9.4 Hazard Ranking

TABLE 3.9.4-1 HAZARD RANKING FOR DROUGHT		
Evaluation Criteria	**Description**	**Ranking**
Probability	• The hazard impacts the state occasionally, but not annually • The hazard is somewhat localized, affecting only relatively small or isolated areas when it occurs • The methodology for identifying events is not well-established, or is not applied across the entire state	Medium
Mitigation Potential	• Methods for reducing risk from the hazard are not well-established, are not proven reliable, or are experimental • The state or counties have little or no experience in implementing mitigation measures, and/or no technical knowledge of them • Mitigation measures are ineligible under Federal grant programs • There is a very limited range of mitigation measures for the hazard, usually only one feasible alternative • The mitigation measure(s) have not been proven cost effective and are likely to be very expensive compared to the magnitude of the hazard • The long-term effectiveness of the measure is not known, or is known to be relatively poor.	Low

3.9.4 Sources for Drought

TABLE 3.9.5-1 SOURCES FOR DROUGHT	
Source Title	**Link to Resource**
FEMA's Multi-Hazard Identification and Risk Assessment, "Subpart E: Other Natural Hazards"	http://www.fema.gov/library/viewRecord.do?id=2214
NOAA Drought Information Theme Site	http://www.noaawatch.gov/themes/droughts.php
NOAA US Drought Assessment	http://www.cpc.ncep.noaa.gov/products/expert_assessment/drought_assessment.shtml
Natural Hazards Center, University of Colorado Boulder	http://www.colorado.edu/hazards/
U.S. Drought Monitor	http://www.drought.unl.edu/dm/monitor.html
National Integrated Drought Information System	http://www.drought.gov
NOAA Drought Information Center	http://www.drought.noaa.gov/
NOAA State/Regional/National Moisture Status	http://www.ncdc.noaa.gov/sotc/drought/#regional-status
Wisconsin DNR Division of Water	http://dnr.wi.gov/environmentprotect/water.html
National Climatic Data Center Weather Event Database	http://www4.ncdc.noaa.gov/cgi-win/wwcgi.dll?wwevent~storms

3.10 EXTREME HEAT

3.10.1 Nature of the Hazard

Extreme summer heat is the combination of very high temperatures and exceptionally humid conditions. If such conditions persist for an extended period of time, it is called a heat wave. When possible, the National Weather Service (NWS) take precautions to warn people and agencies that extreme heat conditions are forecast:

- **Excessive Heat Outlook:** issued when conditions for an excessive heat event may occur in the next three to seven days; provides information to those who need to plan for heat (i.e. emergency management, public health officials, utility companies)
- **Excessive Heat Watch:** issued when conditions for an excessive heat event will occur in the next twelve to 48 hours
- **Excessive Heat Warning/Advisory:** issued when an excessive heat event is expected to happen (i.e. has a very high probability to occur) in the next 36 hours

NWS will issue an outlook, watch, or warning/advisory when the heat index (or how hot it really feels) is expected to exceed 105ºF to 110ºF for two consecutive days (NWS, 2011). At a heat index of 105ºF or higher, the heat is extreme enough to cause disorders associated with exposure to heat and/or physical activity.

Figure 3.10.1-1, below, shows the National Oceanic and Atmospheric Administration (NOAA) NWS Heat Index values. As indicated, the heat index is a function of the actual temperature and the relative humidity. The categories in light orange, dark orange, and red indicate when the heat index values are of concern, and precautions limiting sun exposure should be taken.

Temperature (ºF)

Relative Humidity (%)	80	82	84	86	88	90	92	94	96	98	100	102	104	106	108	110
40	80	81	83	85	88	91	94	97	101	105	109	114	119	124	130	136
45	80	82	84	87	89	93	96	100	104	109	114	119	124	130	137	
50	81	83	85	88	91	95	99	103	108	113	118	124	131	137		
55	81	84	86	89	93	97	101	106	112	117	124	130	137			
60	82	84	88	91	95	100	105	110	116	123	129	137				
65	82	85	89	93	98	103	108	114	121	126	130					
70	83	86	90	95	100	105	112	119	126	134						
75	84	88	92	97	103	109	116	124	132							
80	84	89	94	100	106	113	121	129								
85	85	90	96	102	110	117	126	135								
90	86	91	98	105	113	122	131									
95	86	93	100	108	117	127										
100	87	95	103	112	121	132										

Likelihood of Heat Disorders with Prolonged Exposure or Streuous Activity

Caution | Extreme Caution | Danger | Extreme Danger

Figure 3.10.1-1 NOAA's NWS Heat Index Scale
Source: NOAA National Weather Service, 2011.

Table 3.10.1-1, below, shows the danger categories and heat disorders with their corresponding heat index values. Note that caution should be taken when the heat index value approaches 90°F.

TABLE 3.10.1-1 HEAT INDEX AND DISORDERS

Danger Category		Heat Disorder	Heat Index Value (°F) (How Hot It Feels)
IV	Extreme Danger	Heatstroke or sunstroke imminent.	>130°F
III	Danger	Sunstroke, heat cramps, or heat exhaustion likely; heat stroke possible with prolonged exposure and physical activity.	105°F -130°F
II	Extreme Caution	Sunstroke, heat cramps, and heat exhaustion possible with prolonged exposure and physical activity.	90°F -105°F
I	Caution	Fatigue possible with prolonged exposure and physical activity.	89°F - 90°F

Source: NOAA National Weather Service, 2008.

Extreme heat is of great concern since exposure causes serious life-threatening conditions for humans. The risk to humans is grave, as heat is the number-one weather killer nationwide, killing 162 people annually, according to ten-year average from 2000-2009 (NWS). There are different stages of heat disorders associated with exposure to heat:

- **Heatstroke:** an often fatal medical emergency occurring when the body's responses to heat stress are insufficient to prevent a substantial rise in the body's core temperature, typically exceeding 105°F; even with rapid cooling and treatment, the average fatality rate is 15%
- **Heat Exhaustion:** less serious medical condition characterized by dizziness, weakness, or fatigue; body temperatures may be normal or slightly to moderately elevated; with fluid treatment, prognosis is typically good
- **Heat Syncope:** a sudden loss of consciousness, typically associated with people exercising who are not acclimated to warm temperatures; causes little or no harm to the individual
- **Heat Cramps:** may occur in people unaccustomed to exercising in the heat

In addition to affecting people, severe heat places significant stress on plants and animals. Severe heat may reduce the yields of crops, or contribute to the loss of crops. Similarly, livestock may become overheated, leading to reduced milk production and other problems (Garcia, September 2002).

3.10.2 Wisconsin Extreme Heat Event History

Wisconsin has had several notable extreme heat events since the last century; the first major one was the Dust Bowl. Lasting primarily from 1934 to 1936, the US was struck with extremely hot, dry conditions that exacerbated the already difficult economic times. July, 1936 saw some of the hottest temperatures on record for Wisconsin and the nation.

Many of those records still stand. Over 5,000 deaths nationwide were attributed to this heat wave (NWS).

Many of Wisconsin's all-time maximum daily temperatures were recorded during the Dust Bowl. On July 13, 1936, the highest temperature ever recorded in Wisconsin, 114°F, occurred in the Wisconsin Dells (Central Wisconsin). Table 3.10.2-1, at right, lists some of the Wisconsin locations that set all-time records for high temperatures during the Dust Bowl.

After the Dust Bowl, the way that meteorologists record excessive heat events changed significantly. It was not until 1979 that the NWS adopted the Heat Index Scale, forever changing the way that heat waves were documented.

The most significant heat event in Wisconsin did not occur until 1995, when the state experienced two major heat waves: one in June, one in July. Between the two heat waves, 1,021 people died nationwide.

TABLE 3.10.2-1 WISCONSIN ALL-TIME HIGH TEMPERATURES SET DURING THE DUST BOWL

Municipality	Temperature	Date
Wisconsin Dells	114°F	July 13, 1936
Mondovi	110°F	July 14, 1936
Richland Center	110°F	July 14, 1936
Hatfield	108°F	July 14, 1936
La Crosse	108°F	July 14, 1936
Lancaster	108°F	July 14, 1936
Viroqua	108°F	July 13, 1936
Appleton	107°F	July 14, 1936
Madison	107°F	July 14, 1936
Oshkosh	107°F	July 13, 1936
Mather	106°F	July 14, 1936
Milwaukee	105°F	July 24, 1934
Green Bay	104°F	July 13, 1936
Medford	104°F	July 13, 1936

Source: NOAA National Weather Service, 2008.

During the first of the 1995 heat waves, June 17-27, high temperatures were into the mid to upper 90s with heat index values of 98 to 104 degrees. Nine people in Wisconsin died directly from the heat.

During the second of the 1995 heat waves, July 12-15, Wisconsin witnessed the greatest number of weather-related deaths in state history, when 141 people died directly or indirectly from the heat. 85 of them were in Milwaukee alone (NWS). High temperatures were 100°F to 108°F with heat index values between 120°F and 130°F.

The relative humidity during the July heat wave produced heat index values of 120°F to 130°F, which are rarely reached. These high heat index values were the main contributing factor in the large number of fatalities in Wisconsin. In urban areas, such as Milwaukee County, heat index values were higher, due to the concentration of buildings, concrete, and asphalt. This phenomenon is known as the "urban heat island effect." The urban heat island effect intensified the effects of the heat. Figures 3.10.2-1 and 3.10.2-2, on the following page, depict the temperature, dew point, and heat index trend-lines for Milwaukee General Mitchell Field on July 13-14, 1995. Note that the high heat index values barely fell below 100°F overnight on July 13th.

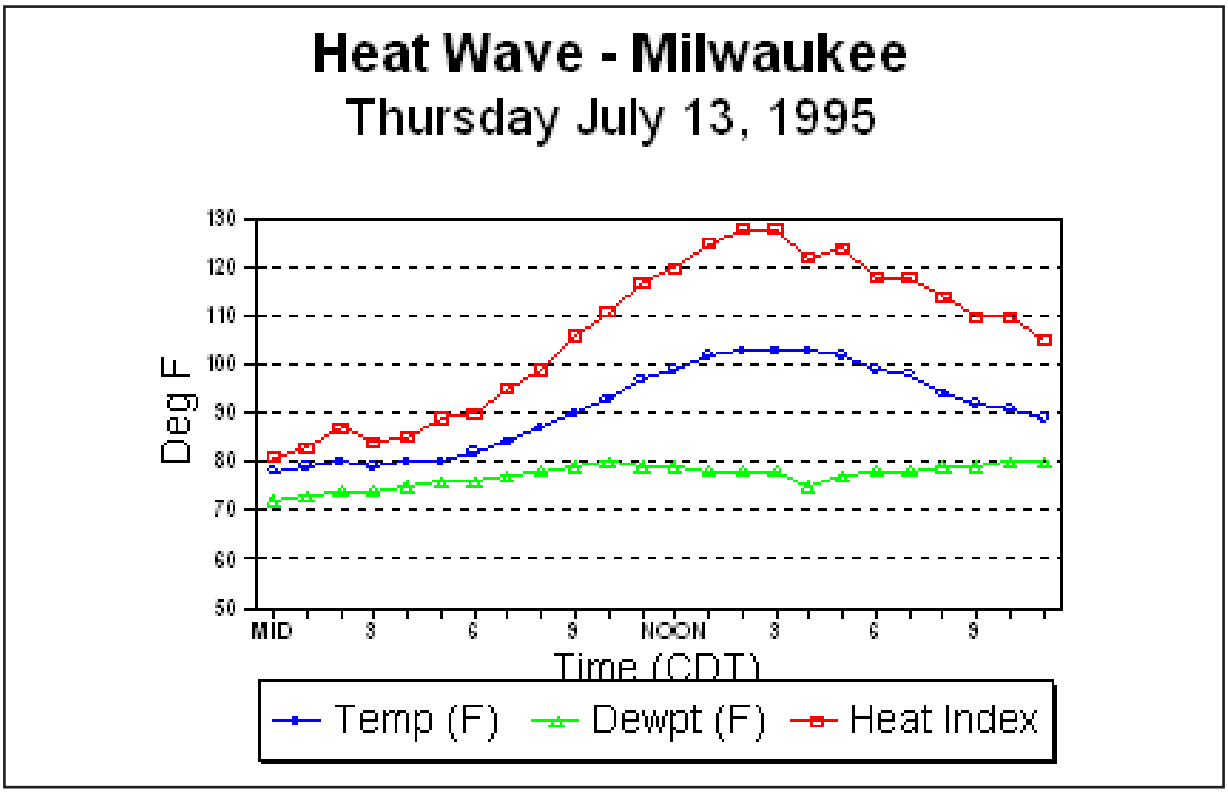


Figure 3.10.2-1 Meteorological Parameters at Milwaukee's Mitchell Field, July 13, 1995
Source: NOAA National Weather Service WFO, 2008.

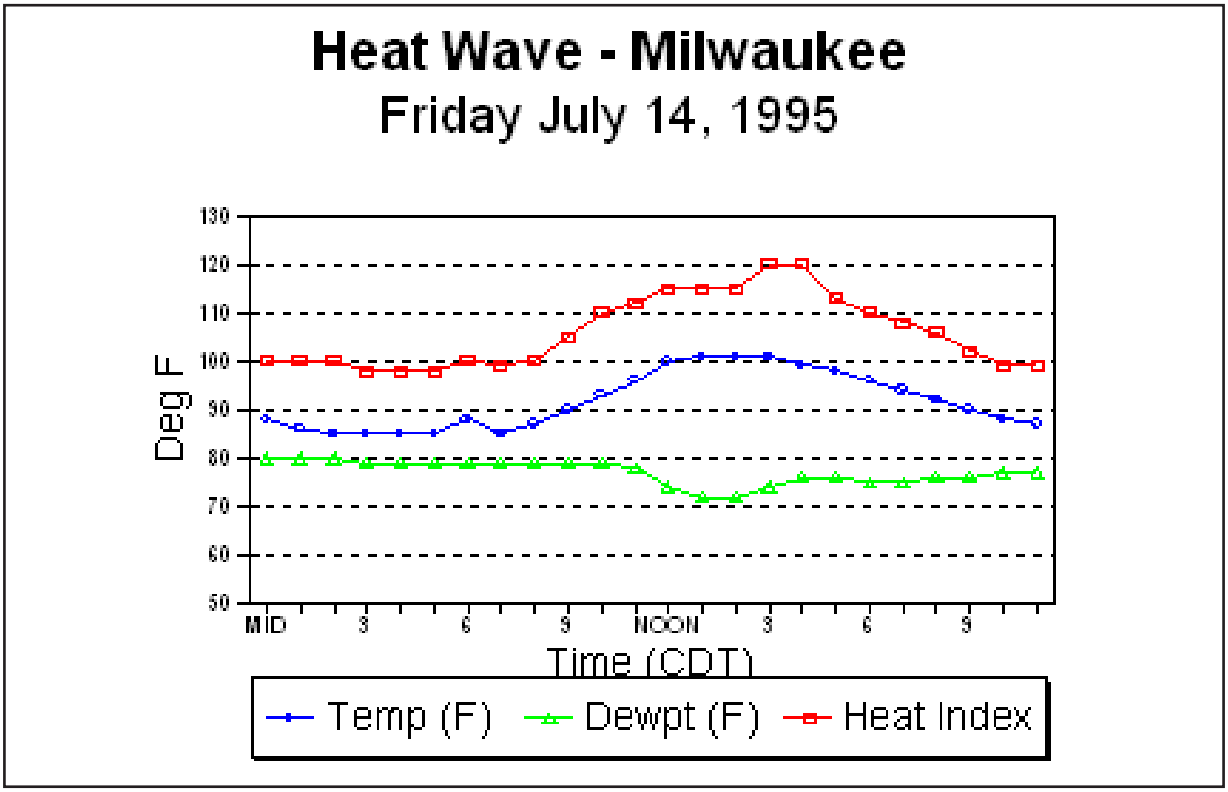


Figure 3.10.2-2 Meteorological Parameters at Milwaukee's Mitchell Field, July 13, 1995
Source: NOAA National Weather Service WFO, 2008.

Another heat wave struck Wisconsin during the last two weeks of July 1999 and peaked July 28-31. During those four days, high humidity and temperatures in the 90s and 100s produced heat index values of 110°F to 125°F. The heat wave resulted in twelve direct and eight indirect deaths (NWS). There was a record peak demand for electric power in the Milwaukee-area during this time, mirroring the record set during the same time period in the Midwest as a region.

Several heat waves from mid-July to early August 2001 claimed 15 lives (10 direct fatalities, five indirect) across Wisconsin. At least 300 people were treated at hospitals for heat exhaustion as temperatures topped out in the mid to upper 90s. However, on August 7, the temperature rose to 102°F at Mount Mary College (Milwaukee County), and 101°F in Buffalo and Trempealeau Counties.

In 2011, Wisconsin experienced its most widespread and probably most oppressive heat wave since July 1995. During the 4.5 day stretch of July 17-21, maximum heat indices peaked in the 105 to 115 range over much of the state. Air temperatures reached 95 to 100 while overnight minimum temperatures remained mostly in the 72 to 82 range. Three heat related fatalities occurred during this heat wave (NWS).

Figures 3.10.2-3 and 3.10.2-4, on the following pages, highlight heat wave events in Wisconsin from 1982 to 2010. Figure 3.10.2-3 shows the heat wave days per county, indicating the number of calendar days on which a heat advisory or excessive heat warning was observed. Southeastern Wisconsin has had a higher concentration of heat wave days, with Milwaukee, Kenosha, and Walworth Counties all experiencing 61 days total, with a 2.1 day annual average.

Figure 3.10.2-4 displays the number of heat wave events per county. This map, along with Figure 3.10.2-3, indicates that individual heat events have a tendency to last for multiple days at a time. In southeastern Wisconsin, where there are the most heat wave days and heat wave events, an event will last between 3.5 and 3.8 days, on average. Pepin and Crawford counties have also seen a higher number of heat wave events than the surrounding counties, with fifteen events each.

Extreme heat is the number-one weather killer in Wisconsin. Statewide there were 116 directly-related deaths from 1982-2010, and an additional 95 indirectly-related fatalities. This averages out to 4.1 directly-related fatalities and 3.4 indirectly-related fatalities per year (NWS). Most of the fatalities in Wisconsin occurred during the two major heat waves in June and July, 1995.

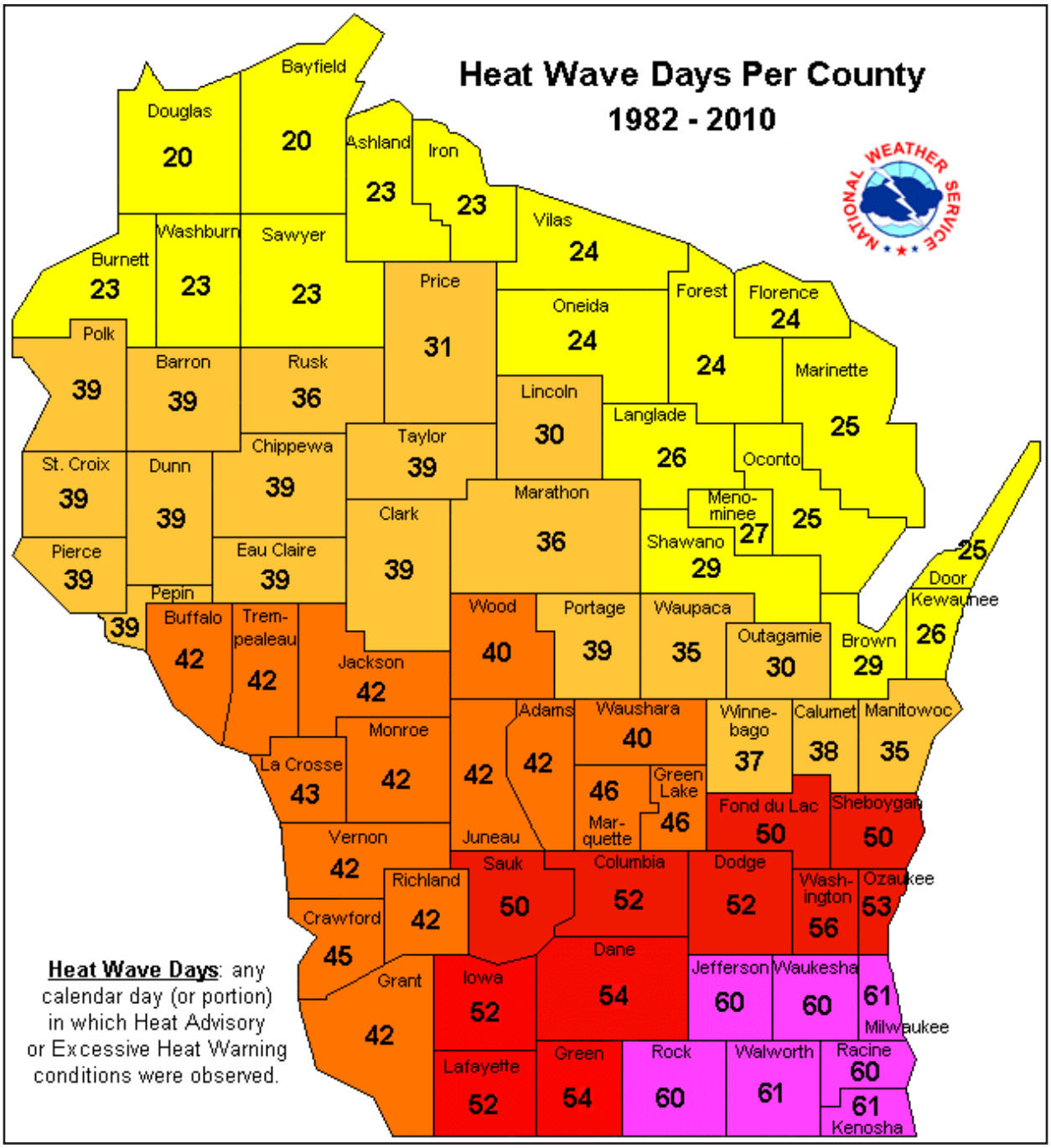


Figure 3.10.2-3 Heat Wave Days per Wisconsin County, 1982-2010
Source: NOAA National Weather Service, Milwaukee/Sullivan, WI, 2011.

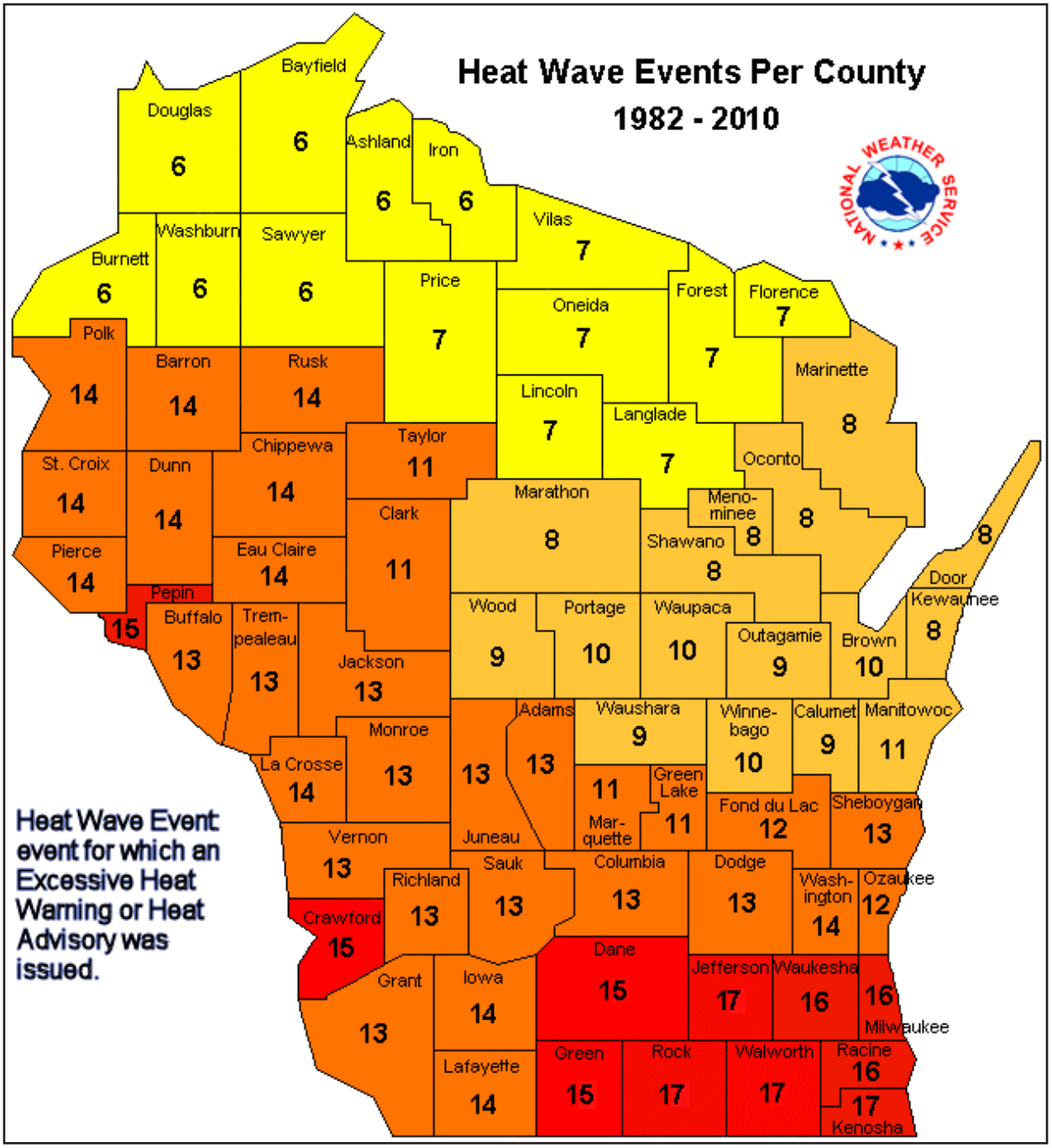


Figure 3.10.2-4 Heat Wave Events per Wisconsin County, 1982-2010
Source: NOAA National Weather Service, Milwaukee/Sullivan, WI, 2011.

Table 3.10.2-2, below, summarizes heat-related deaths in Wisconsin from 1986 to 2010. A death is considered to be "direct" if the medical examiner ruled that heat was the primary cause of death. If heat was a contributing factor (not main cause) of death, the examiner ruled that death to be "indirect." 1995 had the highest death count, as a result of the 1995 heat waves.

TABLE 3.10.2-2 HEAT-RELATED DEATHS IN WISCONSIN

Year	Direct Deaths	Indirect Deaths
1986	1	0
1987	0	0
1988	1	0
1989	0	0
1990	0	0
1991	0	0
1992	0	0
1993	2	0
1994	0	0
1995	82	72
1996	0	0
1997	1	0
1998	0	0
1999	13	8
2000	0	0
2001	10	5
2002	3	5
2003	0	4
2004	0	0
2005	0	0
2006	3	1
2007	0	0
2008	0	0
2009	0	0
2010	0	0
Totals	**116**	**95**

Source: NOAA National Weather Service, Milwaukee/Sullivan, WI, 2011.

Figure 3.10.2-5, below, shows the number of direct heat wave deaths per county from 1982 to 2010. Only 25 Wisconsin counties have experienced at least one direct heat-related death; of these counties, very few have had more than one or two heat-related deaths. Specifically, with 50, Milwaukee County alone has had more direct deaths than any other county. The next highest counties are Sheboygan, Manitowoc, Racine, and Fond du Lac, with eight, seven, seven, and six direct heat deaths, respectively.

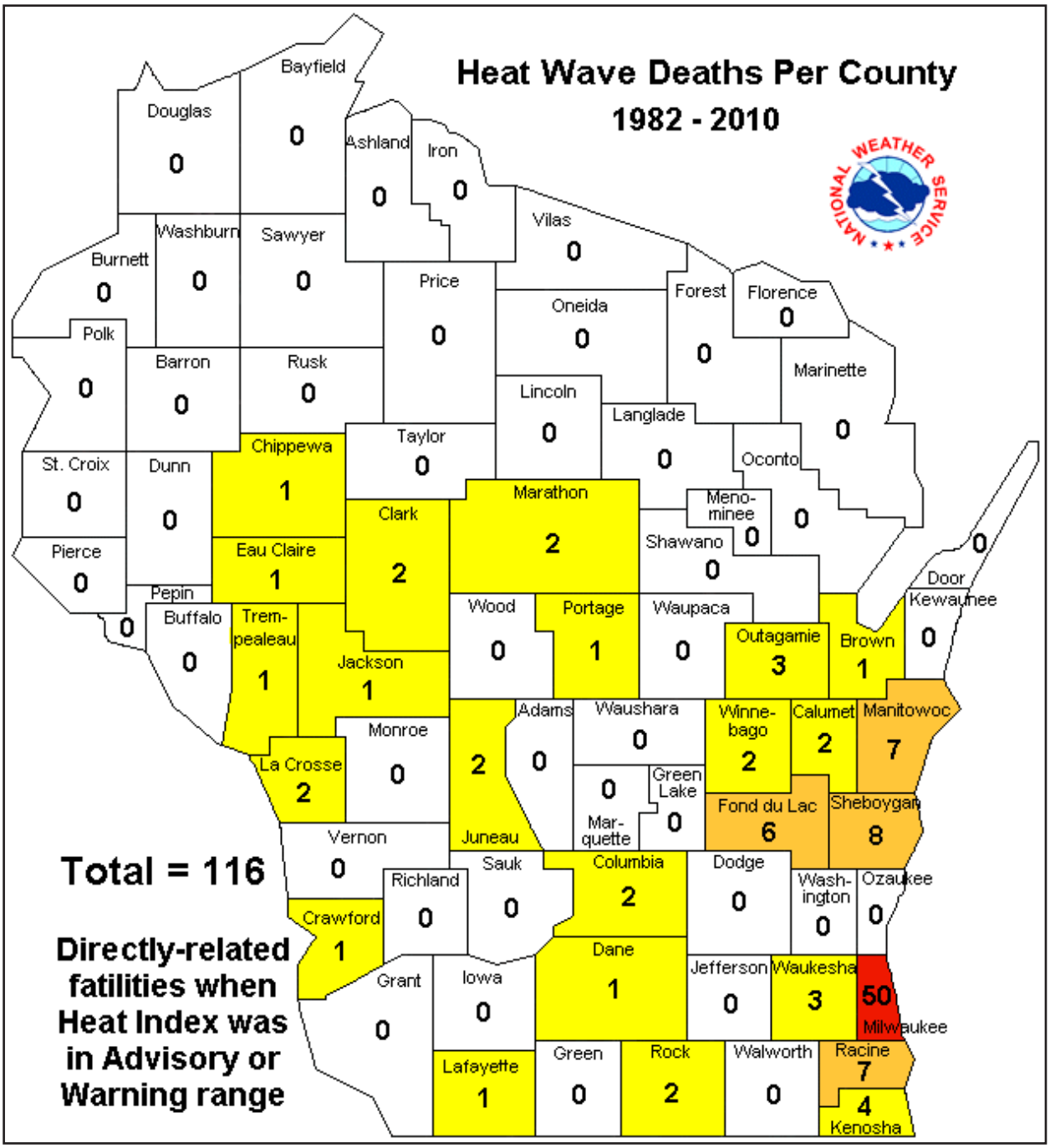


Figure 3.10.2-5 Heat Wave Deaths per Wisconsin County, 1982-2010
Source: NOAA National Weather Service, Milwaukee/Sullivan, WI, 2011.

3.10.3 Probability of Occurrence

The probability of exceeding 89°F is high (danger category I in Table 3.10.1-1), but temperatures are not the only determinant of effects that also include humidity, duration, and timing of the extreme temperature event.

3.10.4 Hazard Ranking

TABLE 3.10.4-1 HAZARD RANKING FOR EXTREME HEAT

Evaluation Criteria	Description	Ranking
Probability	• The hazard has impacted the state annually, or more frequently • The hazard is widespread, generally affecting regions or multiple counties in each event • There is a reliable methodology for identifying events and locations	High
Mitigation Potential	• Methods for reducing risk from the hazard are not well-established, are not proven reliable, or are experimental • The state or counties have little or no experience in implementing mitigation measures, and/or no technical knowledge of them • Mitigation measures are ineligible under federal grant programs • There is a very limited range of mitigation measures for the hazard, usually only one feasible alternative • The mitigation measure(s) have not been proven cost effective and are likely to be very expensive compared to the magnitude of the hazard • The long-term effectiveness of the measure is not known, or is known to be relatively poor	Low

3.10.5 Sources for Extreme Heat

TABLE 3.10.5-1 SOURCES FOR EXTREME HEAT

Source Title	Link to Resource
FEMA's Multi-Hazard Identification and Risk Assessment, "Part 1: Atmospheric Hazards"	http://www.fema.gov/library/viewRecord.do?id=2214
Occupational Safety and Health Administration (OSHA)'s Campaign to Prevent Heat Illness in Outdoor Workers	http://www.osha.gov/SLTC/heatillness/index.html
Environmental Protection Agency (EPA's) *Excessive Heat Events Guidebook*	http://www.epa.gov/heatisland/about/heatguidebook.html
NWS Heat Information Site	http://www.nws.noaa.gov/om/heat/index.shtml
NOAA Heat Wave Information site	http://www.noaawatch.gov/themes/heat.php
NWS Weather Forecast Office, Milwaukee/Sullivan, WI	http://www.crh.noaa.gov/mkx/
NWS Weather Forecast Office, Green Bay, WI	http://www.crh.noaa.gov/grb/
NWS Weather Forecast Office, La Crosse, WI	http://www.crh.noaa.gov/arx/
NWS Office of Climate, Water, and Weather Services Natural Hazard Statistics	http://www.nws.noaa.gov/om/hazstats.shtml

TABLE 3.10.5-1 CONTINUED	
Source Title	**Link to Resource**
National Climatic Data Center Weather Event Database	http://www4.ncdc.noaa.gov/cgi-win/wwcgi.dll?wwevent~storms
NOAA's Natural Disaster Survey Report on July 1995 Heat Wave	http://www.nws.noaa.gov/om/assessments/pdfs/heat95.pdf
"Dealing with Heat Stress in Dairy Cows" by Alvaro Garcia, South Dakota State University	http://pubstorage.sdstate.edu/AgBio_Publications/articles/ExEx4024.pdf

3.11 SEVERE WINTER WEATHER

3.11.1 Nature of the Hazard

Winter storms vary in size and strength and include heavy snowstorms, blizzards, freezing rain, sleet, ice storms, and considerable blowing and drifting snow conditions that can close roads. Additionally, another dangerous winter weather situation is the combination of extremely cold temperatures and strong winds that can result in wind chills that cause bodily injury such as frostbite and death due to exposure (hypothermia). Severe winter and ice storms can cause unusually heavy rain or snowfall, high winds, extreme cold, and ice storms throughout the continental US.

Winter storm occurrences tend to be very disruptive to transportation and commerce. Trees, cars, roads, and other surfaces develop a coating or glaze of ice, making conditions extremely hazardous to motorists and pedestrians. The most prevalent impacts of heavy accumulations of ice and snow are slippery roads and walkways that lead to vehicle and pedestrian accidents; collapsed roofs from fallen trees and limbs and heavy ice and snow loads; and felled trees, telephone poles and lines, electrical wires, and communication towers. As a result of severe winter storms, telecommunications and power can be disrupted for days. Such storms can also cause exceptionally high rainfall that persists for days, resulting in heavy flooding due to snow melt.

A variety of weather phenomena and conditions can occur during winter storms. The following are National Weather Service (NWS) approved descriptions of winter storm elements:

- **Heavy snowfall:** accumulation of six or more inches of snow in a twelve-hour period or eight or more inches in a 24-hour period
- **Blizzard:** sustained wind speeds or frequent wind gusts of at least 35 mph accompanied by heavy snowfall or large amounts of blowing or drifting snow
- **Ice storm:** rain freezing upon contact with the ground and/or exposed objects near the ground; at least ¼ inch of ice must accumulate within twelve hours
- **Freezing drizzle/freezing rain:** drizzle or rain freezes upon impact on objects with a temperature of 32ºF or below
- **Sleet:** solid grains or pellets of ice formed by the freezing of raindrops or the refreezing of largely melted snowflakes; does not cling to surfaces
- **Wind chill:** an apparent temperature describing the combined effect of wind and low air temperatures on exposed skin; measurement is based on the rate of heat loss from exposed skin caused by wind and cold

  If the temperature is 0ºF, with a 15 mph wind, the wind chill is -19ºF. At this wind chill temperature, exposed skin can freeze in 30 minutes, as shown in Figure 3.11.1-1, below. In general, the NWS regional offices will issue Wind Chill Advisories when wind chill values are expected to drop to -20 to -34ºF with winds 10 mph or higher.

Similarly, Wind Chill Warnings are issued in Wisconsin for wind chill values of -35ºF or lower along with winds 10 mph or higher.

If one knows the air temperature (T) in degrees Fahrenheit and the wind speed (V) in miles per hour, wind chill (WC) in degrees Fahrenheit can be calculated using the following formula:

$$WC = 35.74 + 0.6215(T) - 35.75(V\ 0.16) + 0.4275(T)(V\ 0.16)$$

Wind (mph)	Temperature (°F)																	
Calm	40	35	30	25	20	15	10	5	0	-5	-10	-15	-20	-25	-30	-35	-40	-45
5	36	31	25	19	13	7	1	-5	-11	-16	-22	-28	-34	-40	-46	-52	-57	-63
10	34	27	21	15	9	3	-4	-10	-16	-22	-28	-35	-41	-47	-53	-59	-66	-72
15	32	25	19	13	6	0	-7	-13	-19	-26	-32	-39	-45	-51	-58	-64	-71	-77
20	30	24	17	11	4	-2	-9	-15	-22	-29	-35	-42	-48	-55	-61	-68	-74	-81
25	29	23	16	9	3	-4	-11	-17	-24	-31	-37	-44	-51	-58	-64	-71	-78	-84
30	28	22	15	8	1	-5	-12	-19	-26	-33	-39	-46	-53	-60	-67	-73	-80	-87
35	28	21	14	7	0	-7	-14	-21	-27	-34	-41	-48	-55	-62	-69	-76	-82	-89
40	27	20	13	6	-1	-8	-15	-22	-29	-36	-43	-50	-57	-64	-71	-78	-84	-91
45	26	19	12	5	-2	-9	-16	-23	-30	-37	-44	-51	-58	-65	-72	-79	-86	-93
50	26	19	12	4	-3	-10	-17	-24	-31	-38	-45	-52	-60	-67	-74	-81	-88	-95
55	25	18	11	4	-3	-11	-18	-25	-32	-39	-46	-54	-61	-68	-75	-82	-89	-97
60	25	17	10	3	-4	-11	-19	-26	-33	-40	-48	-55	-62	-69	-76	-84	-91	-98

Frostbite Times: 30 minutes, 10 minutes, 5 minutes

$$\text{Wind Chill (°F)} = 35.74 + 0.6215T - 35.75(V^{0.16}) + 0.4275T(V^{0.16})$$

Where, T= Air Temperature (°F) V= Wind Speed (mph) Effective 11/01/01

Figure 3.11.1-1 NWS Windchill Chart
Source: NOAA National Weather Service, http://www.nws.noaa.gov/om/windchill/index.shtml.

3.11.2 Wisconsin Severe Winter Weather Event History

Generally, the winter storm season in Wisconsin runs from October through March. Severe winter weather has occurred, however, as early as September and as late as the latter half of April and into May in some locations.

Despite the fact that Wisconsin's harsh winter temperatures have become slightly milder over the past couple of decades, the number of severe winter storms shows an increasing trend. This may be partially related to better documentation generated by the NWS, but may also be related to the fact that warmer air can hold more moisture which ultimately can fall as snow. Figure 3.11.2-1, on the following page, shows the number of severe winter weather events that affected at least one Wisconsin county for the winter seasons of 1974-75 through 2009-10. The thick red line depicts the five-year running average, which aside from the winters of 2004-2005 and 2005-2006, has been higher than in years past.

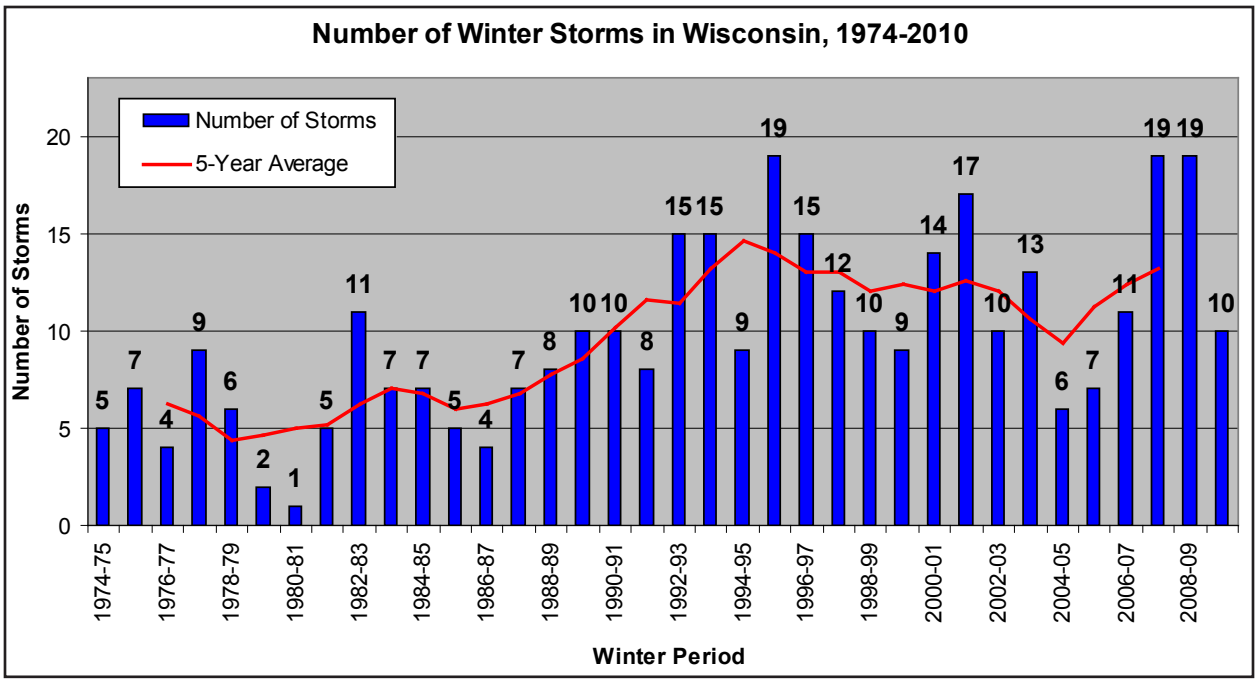


Figure 3.11.2-1 Number of Wisconsin Winter Storms per Winter, 1974-2010
Source: NOAA National Weather Service, Milwaukee/Sullivan, WI, 2011.

Much of the snowfall in Wisconsin occurs in small amounts of one to three inches per occurrence. Heavy snowfalls that produce at least six inches of accumulation in one county happen on the average about 10 to 12 times per winter. The northwestern and north-central portions of Wisconsin can experience early and late season storms, while any part of Wisconsin can receive heavy mid-winter snows.

Snowfall in Wisconsin varies between the seasonal average of approximately 30 inches in the extreme south-central area of the state to 120 to 160 inches in the Lake Superior snowbelt in Ashland and Iron Counties. Annual snowfall distribution across Wisconsin is shown in Figure 3.11.2-2 on the following page. Though this data represents the years 1971 through 2000, it is the most up-to-date available. The NWS is in the process of updating its graphics and new graphics will be incorporated in the 2014 Plan Update.

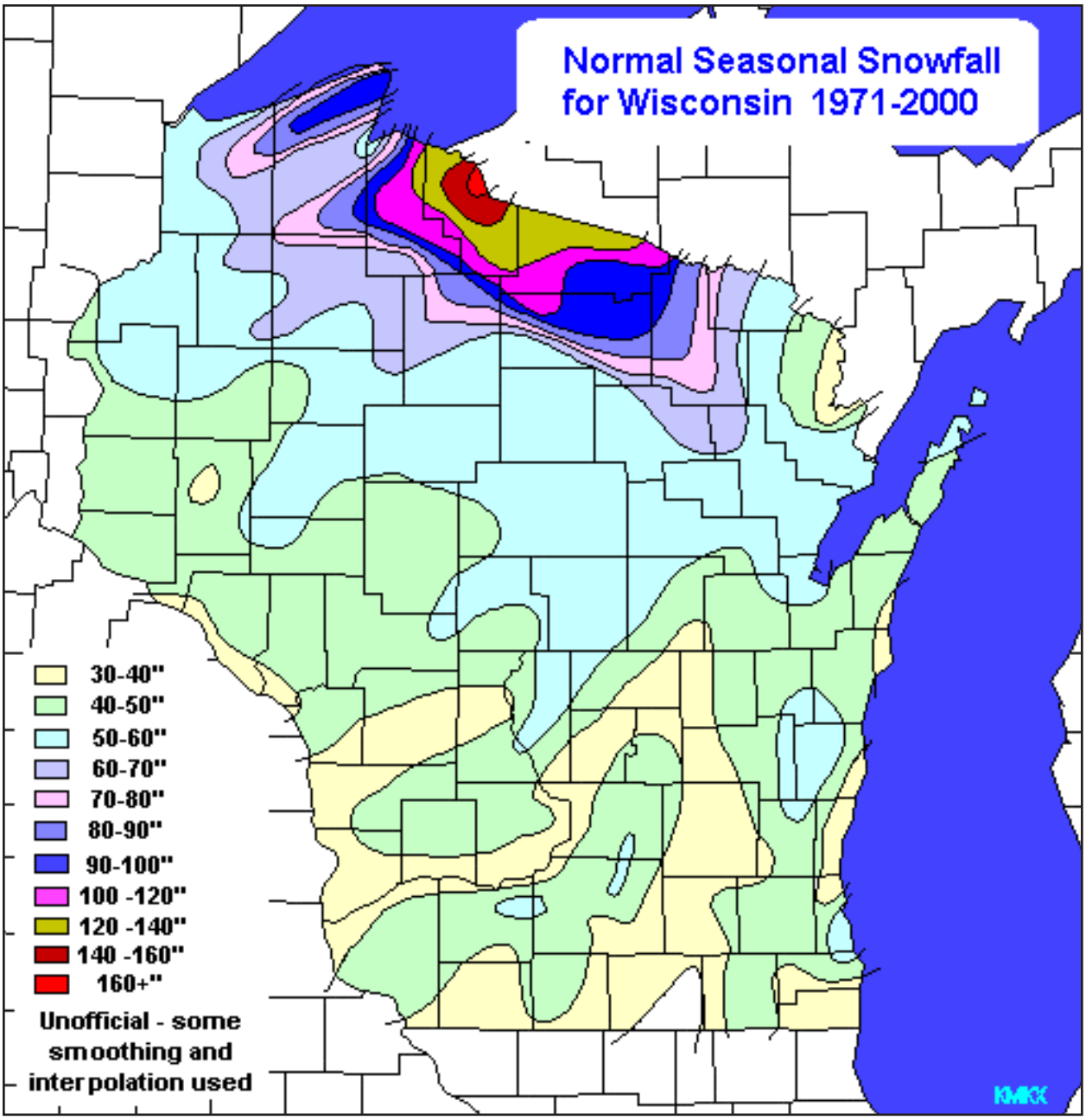


Figure 3.11.2-2 Annual Mean Snowfall Across Wisconsin, 1971-2000
Source: NOAA National Weather Service: http://www.weather.gov/mkx.

In Figure 3.11.2-3, on the following page, a count of Wisconsin blizzard events by county is shown for the winters from 1982-83 through 2009-10. Though the northern part of the state receives higher precipitation, more high-wind accumulations and drifting events occur in the southern half of the state, on average. Counties closer to Lake Michigan have had a higher number of blizzard events, due in part to the strong winds off of the lake, with Manitowoc, Calumet, Door, and Milwaukee counties all having five blizzards each. The map also indicates that there were no direct deaths or injuries during this time period, although it should be noted that vehicular accident fatalities and injuries are not included in this dataset.

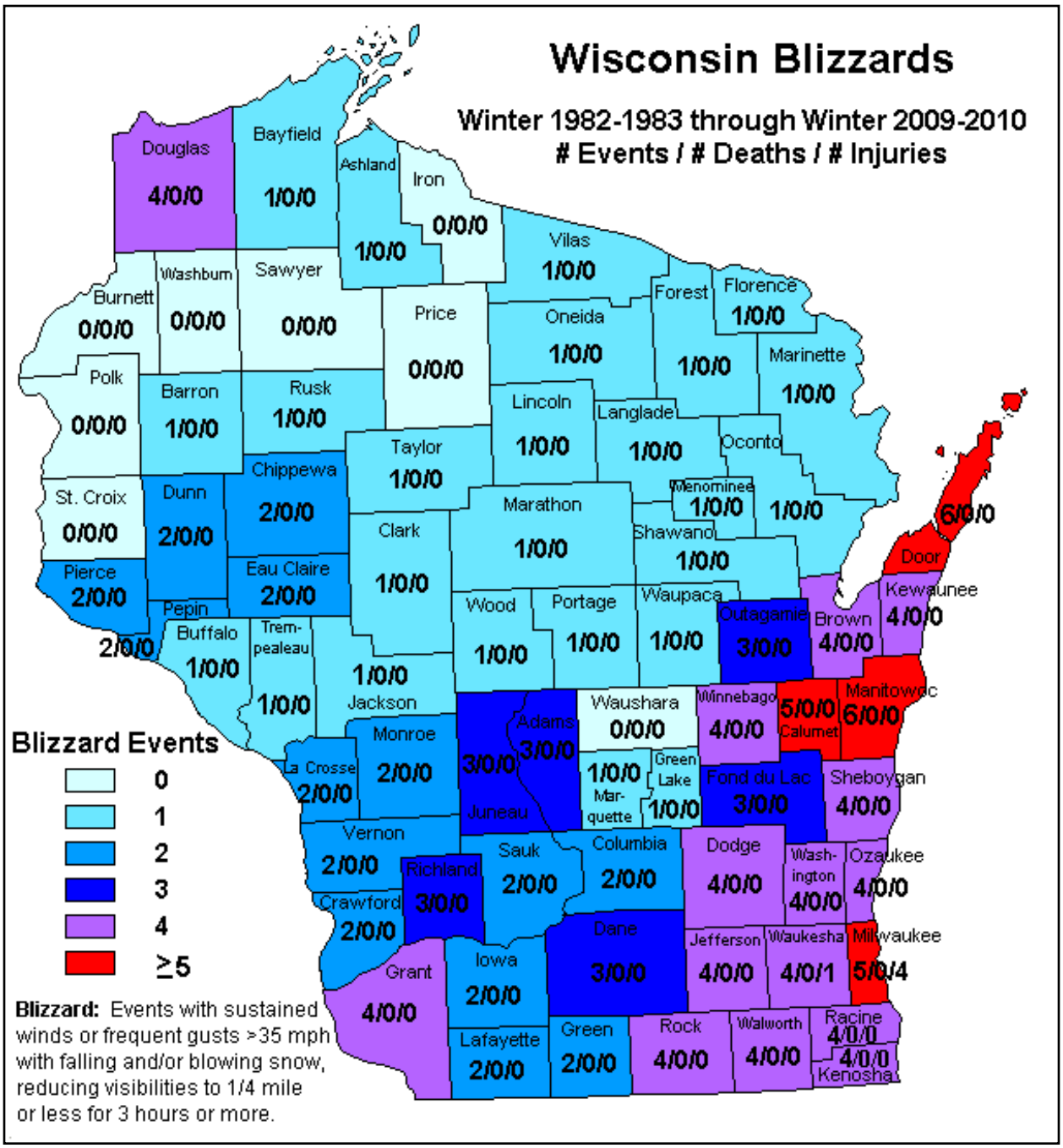


Figure 3.11.2-3 Wisconsin Blizzard Events per County, 1982-2010
Source: NOAA National Weather Service, Milwaukee/Sullivan, WI, 2011.

Ice and sleet storms can occur anytime throughout the winter season from October through April. Early and late season ice and sleet storms are generally restricted to northern Wisconsin, such as the November 7-8, 1943 and April 16-17, 1939 storms. Otherwise, the majority of these storms occur from west-central through northeast Wisconsin. On average, a major ice storm occurs on a frequency of about once every other year. If ½-inch of rain freezes on trees and utility wires, extensive damage can occur, especially if accompanied by high winds that compound the detrimental effects of the weight of the

ice. In addition, between three and five instances of glazing (less than ¼-inch of ice) occur throughout Wisconsin during a normal winter. A county distribution of ice storms for the winters 1982-83 through 2009-10 is shown below in Figure 3.11.2-4.

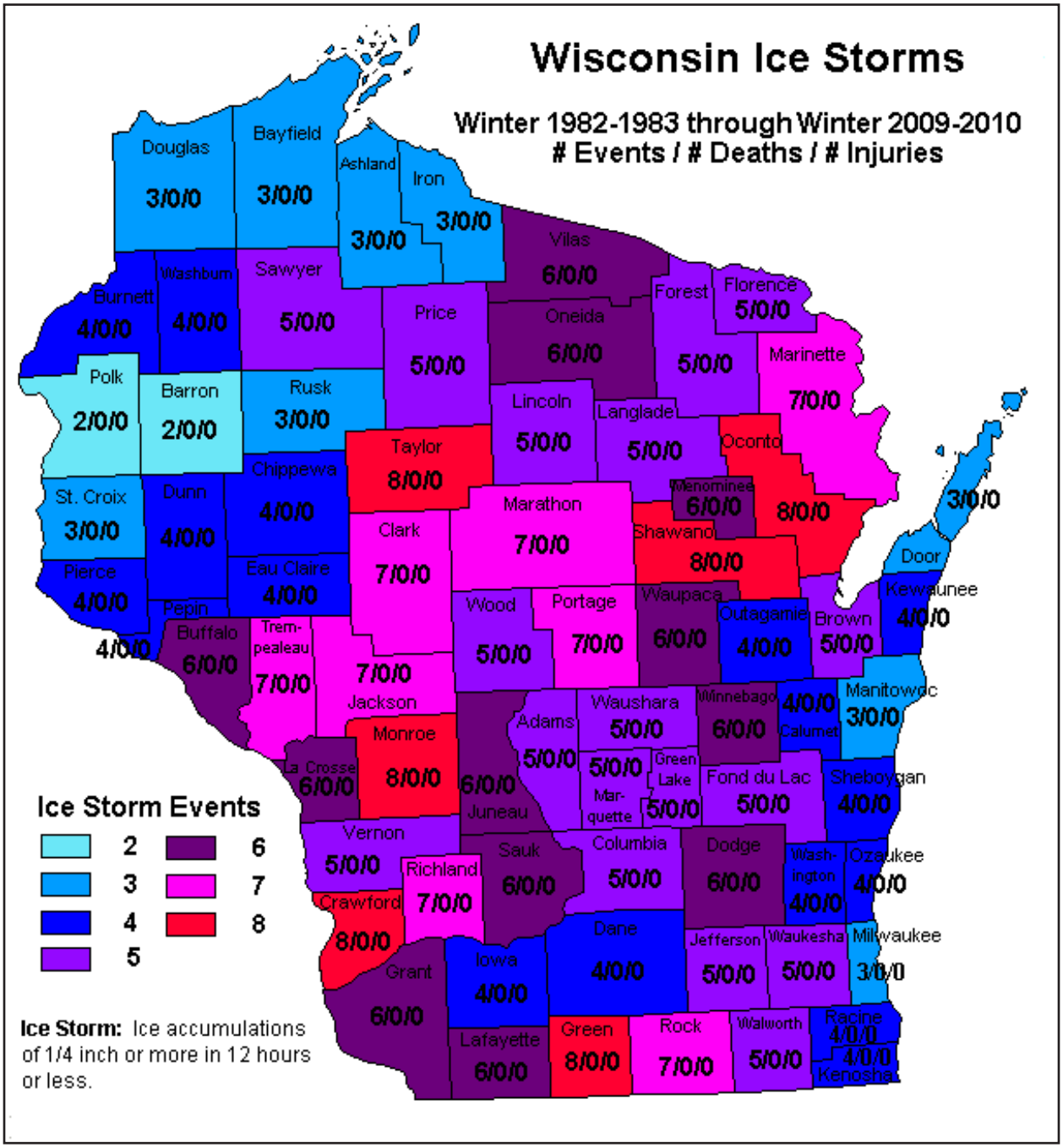


Figure 3.11.2-4 Wisconsin Ice Storm Events per County, 1982-2010
Source: NOAA National Weather Service, Milwaukee/Sullivan, WI, 2011.

Combining winter storms, blizzards, and ice storms together on a county-by-county basis leads to a final distribution shown in Figure 3.11.2-5, on the following page. This map reveals which counties have been affected by some kind of severe winter weather event for the period of 1982 through 2010. The northern counties of Wisconsin are most likely to

experience major winter systems. Iron County has experienced the most winter weather events in this time period, with 170 total, followed by Ashland with 159. Pepin County is the only county in Wisconsin with fewer than 70 winter weather events. There exists a fairly easy to see stratification of winter weather event occurrences, with color-groupings clustered together.

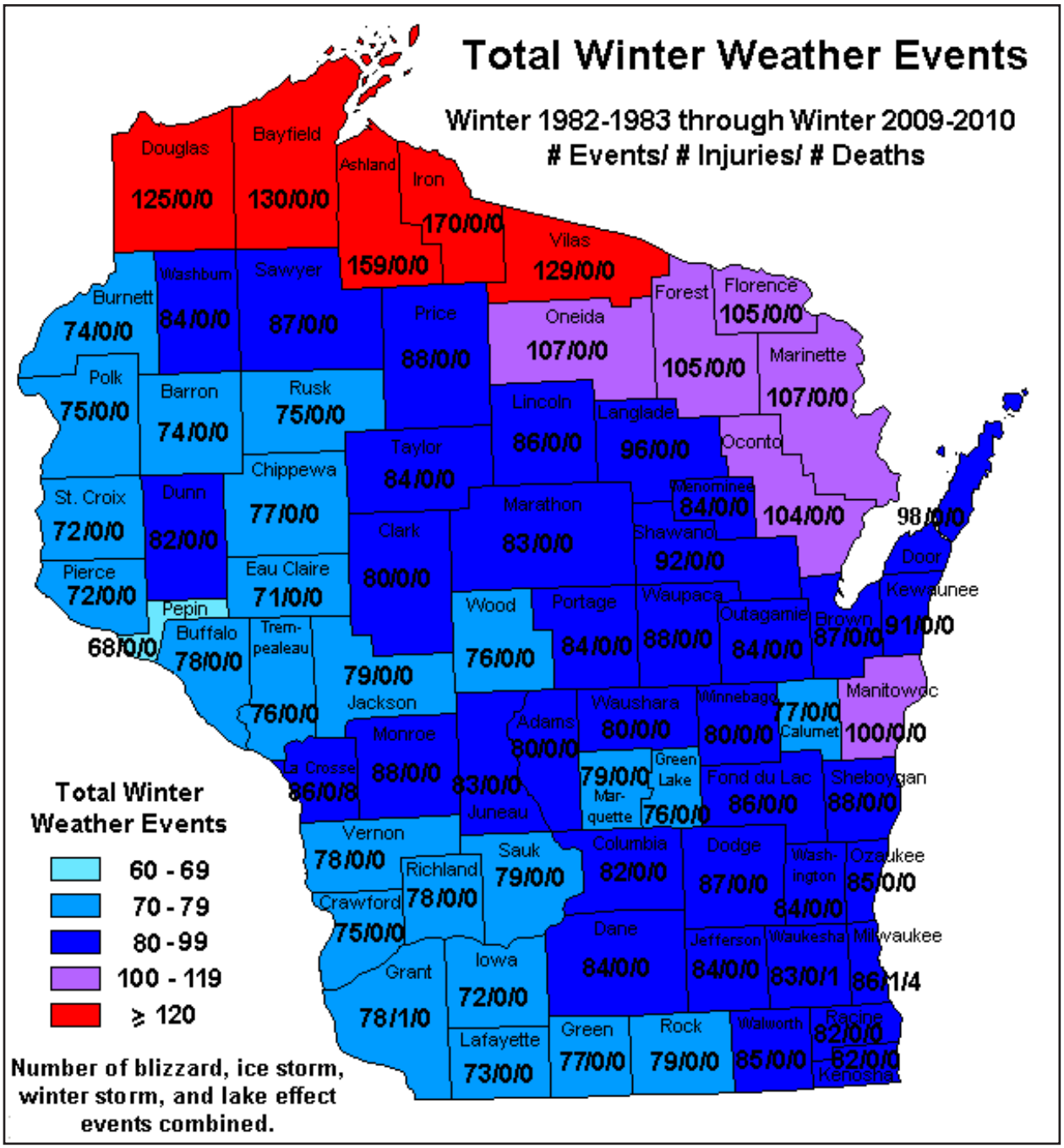


Figure 3.11.2-5 Wisconsin Winter Weather Events per County, 1982-2010
Source: NOAA National Weather Service, Milwaukee/Sullivan, WI, 2011.

Figure 3.11.2-6, on the following page, indicates the annual average number of severe winter weather events per winter for each county. This was calculated taking the total

number of events and dividing by the number of winter seasons. This map helps to reveal the "banding" of number of storm events, with a higher concentration in the northern counties of Douglas, Bayfield, Ashland, Iron, and Vilas.

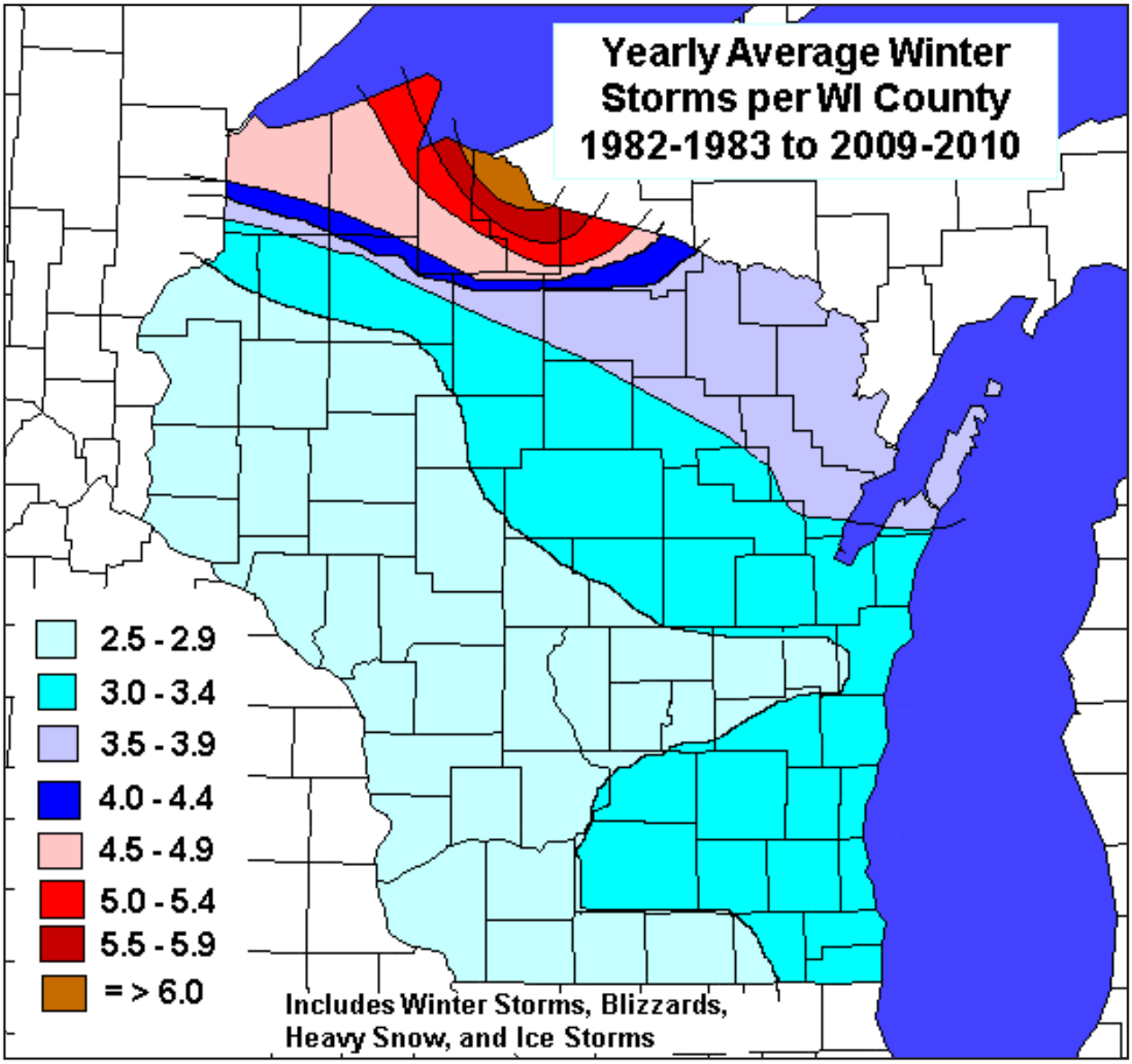


Figure 3.11.2-6 Annual Average Number of Severe Winter Weather Events per County, 1982-2010
Source: NOAA National Weather Service, Milwaukee/Sullivan, WI, 2011.

There have been many noteworthy winter events occurring in Wisconsin in recent years.

1976

In March 1976, an ice storm of disastrous proportions occurred in southern Wisconsin. This storm was of such magnitude and caused so significant an amount of damage that a Presidential Disaster Declaration was obtained. The storm affected 22 counties, resulted in extensive power outages, and caused more than $50 million in damage.

1979

Near blizzard conditions also existed in January 1979 when record snowfalls were recorded in many areas of Wisconsin and winds gusted to over 30 mph. Many people were isolated from assistance and services as roads drifted shut and highway crews were unable to keep them open. Conditions were extremely hazardous in the City of Milwaukee and Racine County where a Presidential Emergency Declaration was obtained to assist in snow removal operations.

1981-82

Blizzard-like conditions also occurred during the winter of 1981-82 when extremely cold temperatures were accompanied by wind speeds gusting to 50 mph. Wind chill factors reached -100ºF and severely affected the health and safety of those who ventured outdoors.

1990

A statewide blizzard occurred December 2-4, 1990, depositing over ten inches of snow across the central and southern portions of Wisconsin. Snowfalls of 22 inches were recorded in Juneau and Adams Counties, 20 inches in Marquette County, 19 inches in Dodge and Washington counties, and 17-18 inches in Columbia and Dane Counties. This excessive snowfall throughout such a large area severely taxed the state's capability to clear and remove snow.

1991

A storm lasting from October 31 to November 2, 1991 left large amounts of snow in northwest Wisconsin, with 35 inches in areas of Douglas County and more than 30 inches of snow in Bayfield, Polk, St. Croix, and Pierce counties. In late November 1991, a snowstorm struck northwestern Wisconsin and left accumulations of 18 to 20 inches in Sawyer County and over 10 inches of snow in Bayfield, Douglas, Burnett, Polk, St. Croix, Barron, Washburn, Ashland, and Iron counties. A heavy snowstorm the previous week dumped 10 or more inches of snow in a diagonal band from Vernon, La Crosse, and Buffalo Counties in the south to Iron, Vilas, and Forest counties in the north.

1994

During another storm in February 1994, 15 or more inches of snow were deposited in areas of Vernon, Juneau, Dane, Dodge, and Columbia Counties.

1996-97

The record for seasonal snowfall belongs to Hurley, Wisconsin (Iron County). Over an eight month period in the winter of 1996-97, a total of 301.8 inches, or 25.2 feet, of snow

fell. As that winter progressed, it became difficult to clear the streets because there was no place to put the snow.

1998-99

The winter of 1998-99 was quite mild as far as temperatures were concerned; however, a heavy snowfall and blizzard occurred January 1-3, 1999. Over ten inches fell in most southern counties with parts of Kenosha, Milwaukee, Ozaukee, Walworth, Washington, and Waukesha counties affected. Snow drifts of four to eight feet were reported in southeastern Wisconsin with northeast wind gusts from 45 to 63 mph. This winter storm/blizzard severely tasked snow plow crews and many roads were closed for a day or more.

2000

December 2000, in contrast, was one of the ten coldest Decembers on record throughout most of the state. In addition to low temperatures, record or near-record snow depths of 15 to 34 inches occurred in much of the southern part of Wisconsin during December. 14 counties (Columbia, Dane, Door, Green, Kenosha, Kewaunee, Manitowoc, Milwaukee, Ozaukee, Racine, Rock, Sheboygan, Walworth, and Waukesha) received a Presidential Emergency Declaration (EM-3163) as a result of record snowfalls. In total, these counties received $5,483,097 in federal funds to cover costs associated with snow removal and emergency response efforts.

2001

The first significant winter event of 2001 was an ice storm that left a ¼ inch of ice over large portions of Oneida and Forest counties. In addition, several heavy snowfalls were recorded in northern Wisconsin. The first heavy snow of the year occurred February 24-25, covering Douglas County with 20 inches of snow. A November 26-28 storm left 12 to 20 inches in a band from Burnett to Vilas County. A series of lake-effect snowfalls from Lake Superior left accumulations of one to four feet from Douglas to Vilas County.

2003

In February 2003, two waves of snow pushed through the northern part of Wisconsin when a low-pressure system passed through the region. Totals reached up to 16.5 inches at Presque Isle (Vilas County) and 12 inches at Phelps (Vilas County). Reports of 12 to 20 inches were received to the northeast of Park Falls (Price County). In the southeast portion of the state, light freezing rain and drizzle glazed roadways and caused multiple accidents. Ice thickness reached up to nearly four inches near La Valle (Sauk County).

2004-05

A major winter storm with lake-effect enhancement during the period of December 11-13, 2004, buried Iron County with up to 26 inches of snow. Yet another major winter storm on

March 18-19, 2005, plastered west-central Wisconsin with 14 to 16 inches and 18 to 23 inches in parts of Buffalo and Jackson counties.

2006

A powerful two-day winter storm on March 13-14, 2006, buried northwestern Wisconsin under 17 to 24 inches of snow from St. Croix County up to Iron County. Gile (Iron County) measured 32 inches in this storm.

2007

Three rounds of winter storms with heavy snow and blowing snow affected much of Wisconsin during the period of February 23-26, 2007. The first two rounds each left from six to 15 inches, while the third round affected mostly northeastern Wisconsin with six to 14 inches. Collectively the three rounds of snow severely taxed snowplow crews.

2007-08

The 2007-08 winter season was “one-for-the ages.” Numerous winter storms, including a couple of blizzards and four ice storms, pounded the southern half of the state. Winter snowfall totals of 70 to 122 inches across the southern counties established new all-time winter snowfall records at many locations. These totals were roughly 200 to 240% of normal, and many communities simply ran out of salt, or were unable to purchase additional supplies to meet increased demand.

The worst storm of the winter occurred on February 5-6, 2008 southeast of a line from Dubuque, Iowa to Madison (Dane County) to Sheboygan (Sheboygan County). 12 to 21 inches of snow combined with northeast winds of 20 to 30 mph and some gusts to 50 mph to create near-blizzard conditions. Major vehicle backups occurred in both southbound and northbound lanes on Interstate 39/90 in Dane and Rock Counties after several trucks could not make it up hills during intense snowfall rates of one to two inches per hour at the height of the storm. At least 1,548 vehicles and trucks were stranded for ten to 20 hours thanks to snowfalls of up to 21 inches in that area. Orfordville (Rock County) measured the maximum amount of 21 inches. Up to 20 inches fell in the Saukville (Ozaukee County) and Jackson (Washington County) areas. Several other major roads in southeast Wisconsin were closed by the intense snowfalls and blowing snow. As a result of this storm, eleven counties (Dane, Dodge, Green, Jefferson, Kenosha, Milwaukee, Racine, Rock, Walworth, and Waukesha) received federal funds to help with costs of maintaining safe roads and providing emergency response in Presidential Emergency Declaration (EM-3285).

The 2007-08 winter season snowfall totals through the end of March, 2008, across southern Wisconsin are shown in Figure 3.11.2-7, on the following page. Though additional snowfalls of up to 1.5 inches occurred in April 2008 in some locations, the map captures practically the entire total snowfall for winter 2007-08.

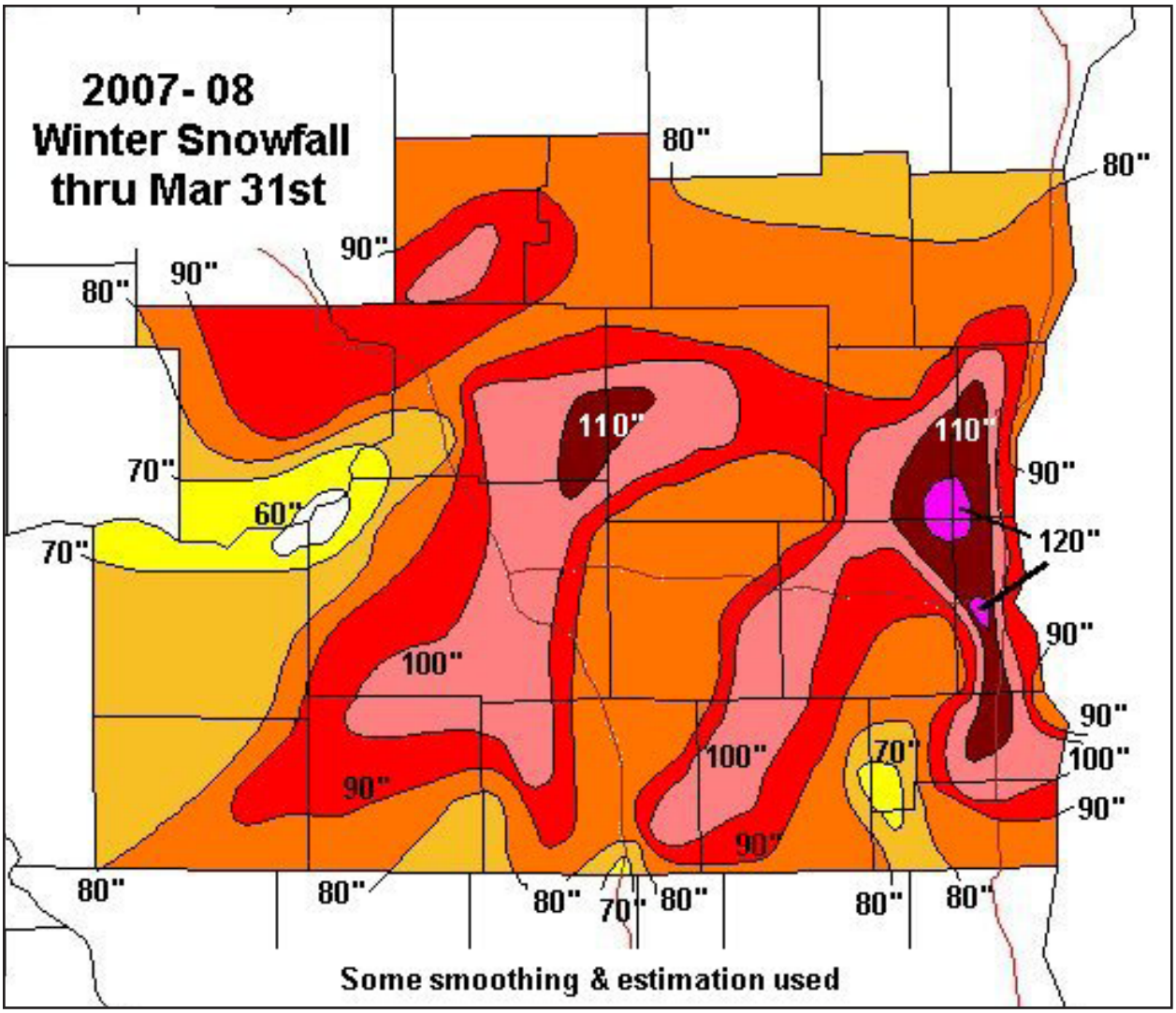


Figure 3.11.2-7 2007-08 Winter Snowfall Accumulations through March 31st
Source: NOAA National Weather Service, Milwaukee/Sullivan, WI, 2011.

By the end of May, 2008, the total 2007-08 winter season snowfall reached 122.1 inches in West Allis (Milwaukee County), which was the highest value in southeastern Wisconsin, and a new all-time winter season record for West Allis. Likewise, the 101.4 inches measured at Truax Field in Madison smashed the old winter record of 76.1 inches set during winter 1978-79. The winter snowfall at Milwaukee Mitchell Field of 99.1 inches was the second highest winter total on record.

2011

On February 1-2, 2011, southern Wisconsin was hit with the Groundhog Day Blizzard when a powerful low pressure center passed south of the state. Figure 3.11.2-8, on the following page, displays the total snowfall for the event. In Milwaukee, 19.8 inches snow fell from the mid-afternoon on Tuesday night through Wednesday morning, the fourth highest amount for any 24-hour period on record. Other areas, such as West Bend

(Washington County), saw over 22 inches of snow. Adding to the dangerous conditions were the blizzard-condition sustained winds of between 40 and 50 mph in many areas, with peak gusts of up to 55 mph in some locations. These winds caused snow drifts of three to eight feet in most areas, with report of drifts reaching 12 to 15 feet in many rural areas throughout southern Wisconsin. Wisconsin Emergency Management issued a Civil Danger Warning, urging motorists to stay off roads to avoid dangerous driving conditions. I-43 was closed from Beloit (Rock County) to Mukwonago (Waukesha County), along with portions of I-90. 100 National Guardspeople were mobilized throughout the state to rescue motorists stranded along roadways and to run emergency shelters. The severe winter storm caused the declaration of a Federal Major Disaster (DR-1966), allowing eleven counties (Dane, Dodge, Grant, Green, Iowa, Kenosha, Lafayette, Milwaukee, Racine, Walworth, and Washington) to use Public Assistance funds for emergency work and the repair or replacement of disaster-damaged facilities.

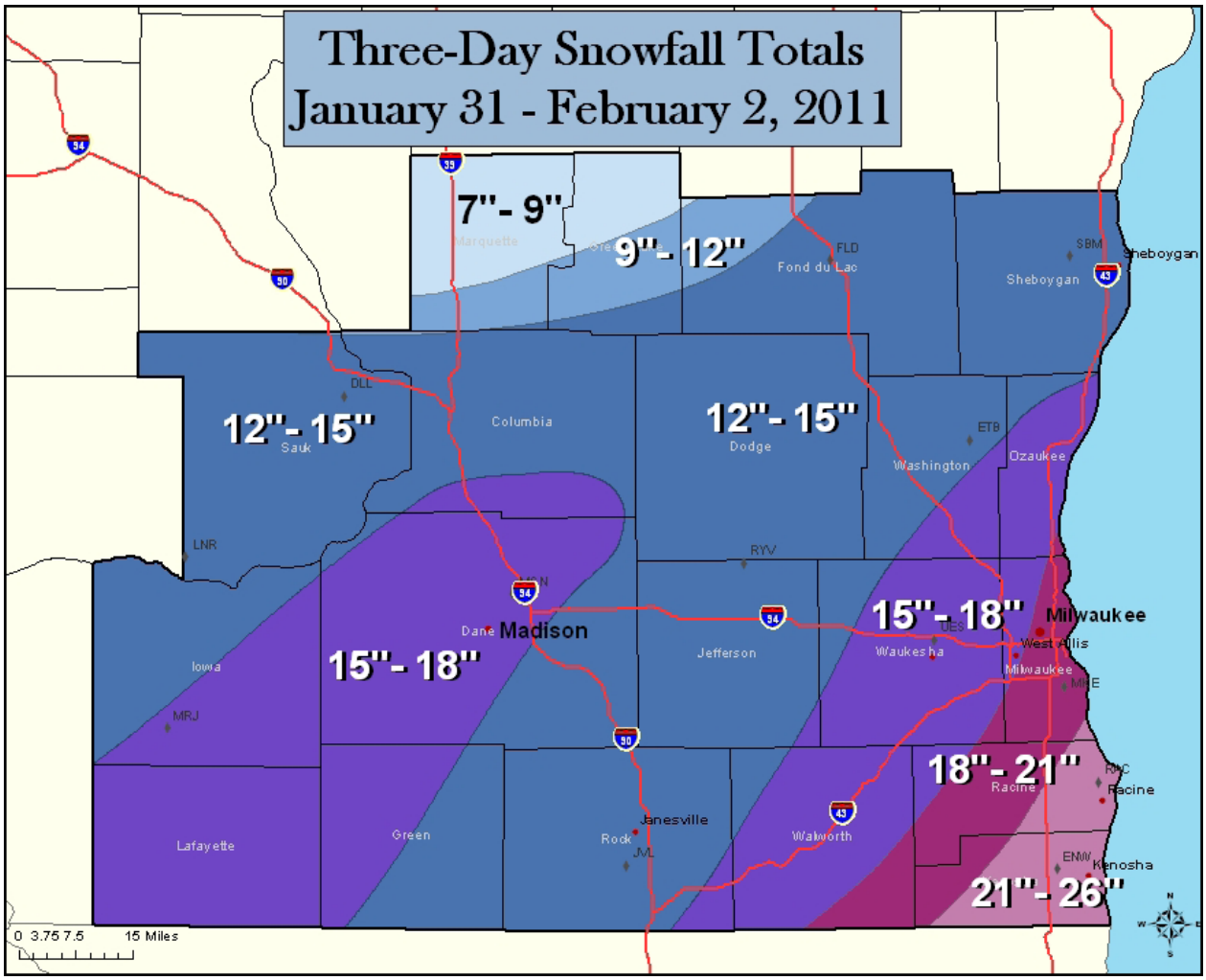


Figure 3.11.2-8 Groundhog Day Blizzard Three-Day Snowfall Totals, Jan. 31-Feb. 2, 2011
Source: NOAA National Weather Service, Milwaukee/Sullivan, WI, 2011.

3.11.3 Probability of Occurrence

Heavy snowfalls are likely to occur in northern Wisconsin in counties along Lake Superior. Though, based on snowfall totals across southern Wisconsin during the 2007-08 winter season, it is possible that winter-season totals of 150 inches or more can occur across southern and central Wisconsin; however, it is rare.

There is no clear pattern about the occurrence of ice storms throughout the state.

Blizzards are more likely to occur in eastern Wisconsin in counties along Lake Michigan.

3.11.4 Hazard Ranking

TABLE3.11.4-1 HAZARD RANKING FOR SEVERE WINTER WEATHER

Evaluation Criteria	Description	Ranking
Probability	• The hazard has impacted the state annually, or more frequently • The hazard is widespread, generally affecting regions or multiple counties in each event • There is a reliable methodology for identifying events and locations	High
Mitigation Potential	• Methods for reducing risk from the hazard are not well-established, are not proven reliable, or are experimental • The state or counties have little or no experience in implementing mitigation measures, and/or no technical knowledge of them • Mitigation measures are ineligible under federal grant programs • There is a very limited range of mitigation measures for the hazard, usually only one feasible alternative • The mitigation measure(s) have not been proven cost effective and are likely to be very expensive compared to the magnitude of the hazard • The long-term effectiveness of the measure is not known, or is known to be relatively poor	Low

3.11.5 Sources for Severe Winter Weather

TABLE 3.11.5-1 SOURCES FOR SEVERE WINTER WEATHER

Source Title	Link to Resource
FEMA's Multi-Hazard Identification and Risk Assessment, "Part 1: Atmospheric Hazards"	http://www.fema.gov/library/viewRecord.do?id=2214
FEMA Winter Storms Information Site	http://www.fema.gov/hazard/winter/index.shtm
NOAA's Office of Climate, Water, and Weather Services Winter Weather Safety and Awareness Site	http://www.weather.gov/om/winter/index.shtml
NOAA Winter Weather Information site	http://www.noaawatch.gov/themes/winter.php
NWS Hydrometerological Prediction Center, Winter Weather Forecast Site	http://www.hpc.ncep.noaa.gov/wwd/winter_wx.shtml
NWS Weather Forecast Office, Milwaukee/Sullivan, WI	http://www.crh.noaa.gov/mkx/

TABLE 3.11.5-1 CONTINUED	
Source Title	**Link to Resource**
NWS Weather Forecast Office, Green Bay, WI	http://www.crh.noaa.gov/grb/
NWS Weather Forecast Office, La Crosse, WI	http://www.crh.noaa.gov/arx/
Ready America Winter Storms and Extreme Cold Information Site	http://www.ready.gov/america/beinformed/winter.html
National Climatic Data Center Weather Event Database	http://www4.ncdc.noaa.gov/cgi-win/wwcgi.dll?wwevent~storms
Red Cross Winter Storms Preparedness Site	http://www.redcross.org/portal/site/en/menuitem.86f46a12f382290517a8f210b80f78a0/?vgnextoid=91435d795323b110VgnVCM10000089f0870aRCRD&vgnextfmt=default
Center for Disease Control and Prevention Winter Weather Site	http://www.bt.cdc.gov/disasters/winter/

3.12 COASTAL EROSION

3.12.1 Nature of the Hazard

Coastal erosion is defined as the wearing away of land and the loss of or displacement of lands along coastlines, beaches, or dune material over a period of time as a result of natural coastal processes or human influences.

Natural processes:

- Lake level change
- Currents
- Tides
- Waves and storm surges
- Winds
- Flooding
- Orientation of shoreline
- Sediment influx
- Littoral processes
- Ice floes
- Overwash

Human influences:

- Dredging
- Jetty and groin construction
- Hardening shorelines with seawalls
- Revetments
- Beach nourishment
- Boat wakes
- Construction of harbors
- Construction of sediment-trapping dams in the river tributaries

Coastal erosion affects Wisconsin along the shoreline of Lakes Michigan and Superior. Along the Great Lakes, cyclical changes in lake levels, disruption of beach building material transport, and storms all influence the rate of erosion. Annual variability in wave climate and lake levels causes the rates of bluff and dune erosion along the shores of the Great Lakes to “vary from near zero to tens of feet per year” (National Research Council, Managing Coastal Erosion, 1990; 40).

Times of high water or wave action accelerate this natural process. Bluff erosion is more likely to occur during major storm events as a result of increased wave action on the shoreline. The effects of wave-induced erosion are usually greater during those periods when the level of water is high.

As lake levels increase, bluff recession rates also increase. Lake level, in other words, is a significant factor in determining rate of erosion along Wisconsin’s coasts.

Other significant factors in the state that involve movement of beach-building sediments cause shoreline erosion. Navigational improvements, shoreline structures and some dredge-material disposal practices deplete both tributary and shoreland sources of sediment. Removing these sediments from the shore system contributes to erosion.

Even with all factors taken into consideration, coastal erosion is usually a gradual process; however, sudden incidents prompting emergency action do occur. These sorts of incidents, such as strong storms with high winds and/or heavy wave action causing bluff failure, are quite rare.

3.12.2 Wisconsin Coastal Erosion History

All 15 coastal counties in Wisconsin experience bluff erosion, coastal flooding, fluctuating water levels, and damage to shoreline structures along Lake Superior and Lake Michigan.

Bluff Erosion

According to the Wisconsin Coastal Management Program's (WCMP) "Needs Assessment and Strategy, 2011-2015," coastal erosion along Lake Michigan occurs along the 185 miles of shoreline from southern-most Kenosha County to Sturgeon Bay Canal (northern tip of Door County), and in the northeastern part of Brown County. Along the remainder of the Lake Michigan shore (from Sturgeon Bay Canal in Door County to Green Bay), bluff erosion is limited to smaller segments of bays and clay banks.

The "Needs Assessment and Strategy, 2011-2015" also describes Lake Superior's entire Wisconsin shoreline as vulnerable to coastal erosion, with the exception of:

- Rocky portions of the Bayfield Peninsula
- Low marshland in Chequamegon Bay
- The mouth of the Bad River

Vulnerability is highest along the high clay bluffs running from Bark Point in Bayfield County to Wisconsin Point in Douglas County, and from Iron County to the White River in Ashland County (Springman and Born, 1979).

Figure 3.12.2-1, at right, displays the vulnerable coastlines in Wisconsin.

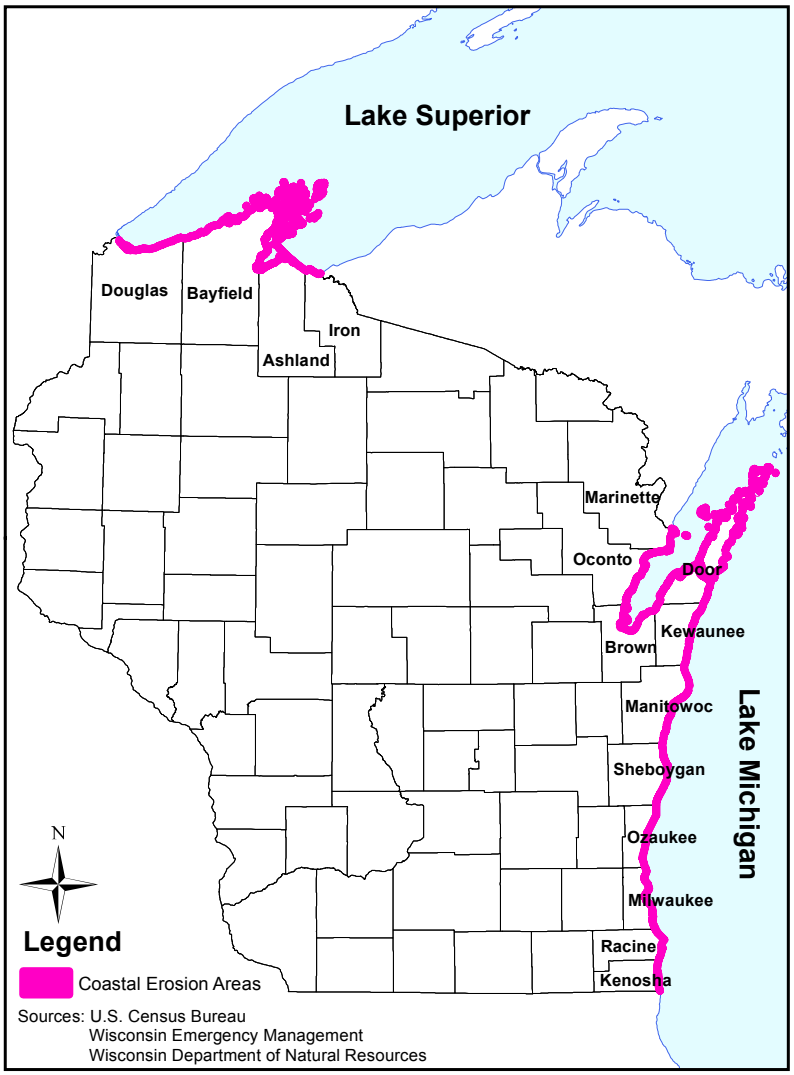


Figure 3.12.2-1 Great Lakes Coastal Erosion Areas in Wisconsin

Coastal Flooding

All 15 coastal counties in Wisconsin experience some coastal flooding; however, it tends to be most serious in the low-lying areas of southern Kenosha County, and from the City of Green Bay to the state

line of Upper Peninsula Michigan (WCMP, p. 19). Although the risk of coastal flooding is reduced when lake levels are low, lake levels are only one factor contributing to coastal flooding. Other factors include:

1. **Wind set-up:** the tendency for water levels to increase on downwind lakeshores, and decrease on upwind lakeshores
2. **Wave run-up:** the maximum vertical extent of the rush of water from a breaking wave onto a beach; caused by wind but is also dependent on the shore profile:
   - Waves form more readily where there is a shallow beach profile.
   - Strong winds can cause or exacerbate coastal flooding in these areas.

Water Levels in the Great Lakes

Water levels in the Great Lakes fluctuate on both a seasonal and long-term basis.

Seasonally, the lakes are at their lowest levels during the winter, when much of the precipitation is held on land as snow and ice and the open lake evaporation dominates. The highest seasonal levels are during the summer when snowmelt from the spring thaw and summer rains contribute to the water supply.

Long-term variation of lake levels depends on precipitation and evaporation trends in the Great Lakes watershed as a whole. Lake levels rise when net water supply exceeds outflow and above average lake levels can persist for extended periods even after the conditions that caused them have ended. The water volume of the Great Lakes is large and outflow from natural outlets is limited. Flow regulation structures exist in Lakes Ontario, Michigan, and Superior, but their influence is limited by their size. Controlled releases strive to simulate long-term averages in an effort to serve multiple interests. The source of about 40% of Lake Superior's annual water supply is from the snowpack around its shores. Lakes Michigan and Huron get up to 30% of their yearly supply from Superior's snowmelt when it flows into the lower lakes (Detroit Free Press, March 18, 2000).

Table 3.12.2-1, on the following page, shows the mean, maximum, and minimum lake levels for Lake Superior and Lakes Michigan and Huron.

Coastal property owners are acutely aware of hazards during periods of high-water levels and especially right after a damaging storm or a bluff failure, but this awareness can fade over time if low lake levels slow the erosion rate. Lake levels were above long-term averages from 1996 to 1998. The last period of significantly higher lake levels was in 1985 to 1986, resulting in $16 million of documented damage to public facilities alone (WCMP, 1992). Record snowfall in northern Wisconsin in 1996 was followed by near record high-water levels in 1997. However, unusually mild weather and light snowfall in the winters of 1998-1999 and 1999-2000 began to drop the lake levels once again to below long-term averages. These trends continued throughout the 2000-2007 period where record low Lake Superior water levels were set for the months of August and September in 2007. Lake Michigan water levels also approached record lows for the months of November

TABLE 3.12.2-1 LAKE SUPERIOR AND LAKES MICHIGAN AND HURON MEAN, MAXIMUM, AND MINIMUM WATER LEVELS, 1918-2010

	Jan.	Feb.	March	April	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.
Lake Superior												
2010	*601.1*	*600.9*	*600.7*	*600.7*	*600.7*	*600.8*	*601.0*	*601.0*	*601.1*	*601.0*	*600.9*	*600.6*
Mean	**601.5**	**601.3**	**601.1**	**601.2**	**601.6**	**601.9**	**602.1**	**602.2**	**602.2**	**602.1**	**601.9**	**601.7**
Max (Year)	602.7 (1986)	602.5 (1986)	602.4 (1986)	602.6 (1986)	602.8 (1986)	602.9 (1986)	603.1 (1950)	603.2 (1952)	603.2 (1985)	603.4 (1985)	603.3 (1985)	603.1 (1985)
Min (Year)	599.8 (1926)	599.6 (1926)	599.5 (1926)	599.5 (1926)	599.6 (1926)	599.9 (1926)	600.3 (1926)	600.4 (2007)	600.5 (2007)	600.7 (1925)	600.4 (1925)	600.1 (1925)
Lakes Michigan and Huron												
2010	*577.9*	*577.8*	*577.7*	*577.8*	*577.9*	*578.1*	*578.3*	*578.2*	*578.0*	*577.7*	*577.3*	*577.0*
Mean	**578.54**	**578.51**	**578.54**	**578.84**	**579.13**	**579.36**	**579.46**	**579.40**	**579.23**	**579.00**	**578.81**	**578.64**
Max (Year)	581.30 (1987)	581.07 (1986)	581.10 (1986)	581.46 (1986)	581.63 (1986)	581.79 (1986)	581.99 (1986)	581.99 (1986)	581.96 (1986)	582.35 (1986)	581.96 (1986)	581.56 (1986)
Min (Year)	576.12 (1965)	576.08 (1964)	576.05 (1964)	576.15 (1964)	576.57 (1964)	576.64 (1964)	576.71 (1964)	576.67 (1964)	576.64 (1964)	576.44 (1964)	576.28 (1964)	576.1 (2007)

Source: USACE, Long Term Average Min Max Water Levels, http://www.lre.usace.army.mil/greatlakes/hh/greatlakeswaterlevels/historicdata/longtermaveragemin-maxwaterlevels/.

through February during the winter of 2007-2008. During the 2008 year, the entire Great Lakes basin received above average precipitation. As a result, both Lake Superior and Lake Michigan water levels have risen from record or near record low levels to levels within 0.5 to 1.0 feet from their long term averages.

3.12.3 Probability of Occurrence

All of Wisconsin's coastal counties experience coastal erosion. The coastal erosion county-level analysis risk assessment provides additional information on the risk of coastal erosion. It should be noted, that coastal erosion is a function of rainfall and local conditions.

15 counties border the Great Lakes in Wisconsin. Coastal counties account for 19% of the area of the state, but comprise 36% of the population. Coastal counties range from very sparsely populated (i.e. Iron County) to highly urban (i.e. Milwaukee County).

The Great Lakes coast in Wisconsin can be divided into three sections based on population density characteristics.

1. **Southeastern Coastal Counties**
   This area includes the four southern-most coastal counties: Kenosha, Racine, Milwaukee, and Ozaukee. According to the 2010 Census, the Southeastern Coastal Counties have a population density of 1,293 persons per square mile. Much of the southeast Wisconsin coast is part of the urban corridor that stretches between

Milwaukee and Chicago. The southern counties include the coastal cities of Cudahy (Milwaukee County), Kenosha (Kenosha County), Mequon (Ozaukee County), Milwaukee (Milwaukee County), Oak Creek (Milwaukee County), Port Washington (Ozaukee County), Racine (Racine County), and St. Francis (Milwaukee County).

2. **Northern Lake Michigan Coastal Counties**
   This area contains seven counties: Brown, Door, Kewaunee, Manitowoc, Marinette, Oconto, and Sheboygan. The Northern Lake Michigan Coastal Counties have a moderate population density of 118 people per square mile. This section includes the coastal cities of Algoma (Kewaunee County), Green Bay (Brown County), Kewaunee (Kewaunee County), Manitowoc (Manitowoc County), Marinette (Marinette County), Oconto (Oconto County), Sheboygan (Sheboygan County), Sturgeon Bay (Door County), and Two Rivers (Manitowoc County). Much of the shoreline fronts Green Bay. Door County possesses the most extensive Great Lakes shoreline in Wisconsin at 240 miles.
3. **Northwestern Coastal Counties**
   This area borders Lake Superior and includes the counties of Ashland, Bayfield, Douglas, and Iron. This section has a low population density of approximately 17.8 people per square mile. Northwestern counties include cities of Ashland (Ashland County), Bayfield (Bayfield County), Superior (Douglas County), and Washburn (Bayfield County).

3.12.4 Vulnerability and Risk Assessment

Methodology

Existing maps depicting rates of coastal erosion and the FEMA HAZUS-MH inventory of structures in the coastal zone provided the basis for estimating the potential vulnerability and losses from this hazard. The number and types of structures subjected to high and low risk of erosion were determined from HAZUS-MH, which uses 2000 Census data, the best available for this simulation. The erosion risk zones were established based on the distance in miles from the Coastal Area Boundary.

1. High-Risk Erosion Zone – the area within 1/4 mile of the Coastal Area Boundary
2. Low-Risk Erosion Zone – the area within 1/2 mile of the Coastal Area Boundary

Based upon structure type and dimensions (including square footage), replacement values of structures were estimated. The estimated replacement value was assumed to be equal to the value of a total loss of the structure due to erosion.

Results

Table 3.12.4-1, on the following page, shows the loss estimation for the high-risk erosion zone. Within areas subjected to a high risk of erosion, Door County has the largest number of residential units (7,889), followed by Milwaukee (6,446) and Racine counties (4,125). Counties with the highest number of commercial structures are Kenosha, Mil-

waukee, and Door, with 110, 67, and 66 structures, respectively. For the governmental structures, the counties with the highest numbers include Ashland (5) and Ozaukee (2). With 7,956 structures, Door County has the most vulnerable structures in the high-risk area, followed by Milwaukee (6,513) and Racine (4,168).

Overall, Milwaukee County has the highest loss potential ($313 million), followed by Door ($254 million) and Ozaukee ($119 million) counties.

TABLE 3.12.4-1 HIGH-RISK EROSION ZONE LOSS ESTIMATION

County	Number of Structures			Total	Loss Estimation			Risk
	Residential	Commercial	Government		Residential	Commercial	Government	
Ashland	937	32	5	974	$11,220,780	$427,480	$71,060	Low
Bayfield	1,764	44	1	1,809	$31,007,020	$792,680	$19,420	Low
Brown	1,523	17	0	1,540	$46,697,640	$438,380	$0	Low
Door	7,889	66	1	7,956	$252,104,420	$2,074,860	$14,140	High
Douglas	1,185	15	0	1,200	$15,681,420	$183,720	$0	Low
Iron	34	0	0	34	$334,560	$0	$0	Low
Kenosha	2,185	110	0	2,295	$56,476,360	$477,340	$0	High
Kewaunee	1,374	13	1	1,388	$24,912,580	$203,400	$15,800	Low
Manitowoc	2,576	43	0	2,619	$42,246,160	$647,480	$0	High
Marinette	740	0	0	740	$12,367,300	$0	$0	Low
Milwaukee	6,446	67	0	6,513	$309,670,740	$3,817,400	$0	High
Oconto	406	0	0	406	$8,016,400	$0	$0	Low
Ozaukee	2,198	25	2	2,225	$118,415,560	$706,580	$49,640	High
Racine	4,125	43	0	4,168	$96,541,080	$561,400	$0	High
Sheboygan	3,077	2	0	3,079	$64,448,260	$27,180	$0	High
Total	**36,459**	**477**	**10**	**36,946**	**$1,090,140,280**	**$10,357,900**	**$170,060**	

Source: WEM, 2008.

Table 3.12.4-2, on the following page, shows losses sustained in low-risk erosion areas. Milwaukee County has the largest number of residential (15,669) and commercial structures (302) in the low-risk erosion zone. Door County has the second largest number of residential units (9,654) and the third largest number of commercial structures (92). Manitowoc County has the largest number of governmental structures (8), followed by Milwaukee County (6). The county with the most vulnerable structures in the low-risk area is Milwaukee (15,977), followed by Door County (9,747) and Racine County (7,401).

Furthermore, Milwaukee County has the highest loss potential ($1.2 billion) in the low-risk erosion zone, followed by Door ($604 million) and Ozaukee ($395 million) counties.

TABLE 3.12.4-2 LOW-RISK EROSION ZONE LOSS ESTIMATION

County	Number of Structures			Total	Loss Estimation			Risk
	Residential	Commercial	Government		Residential	Commercial	Government	
Ashland	1,873	34	5	1,912	$47,087,720	$896,320	$142,120	Low
Bayfield	2,565	49	2	2,616	$89,632,960	$1,748,840	$67,440	High
Brown	2,138	49	0	2,187	$127,852,760	$2,295,840	$0	High
Door	9,654	92	1	9,747	$598,461,600	$5,896,840	$28,280	High
Douglas	2,407	16	0	2,423	$62,880,680	$339,920	$0	High
Iron	34	0	0	34	$669,120	$0	$0	Low
Kenosha	4,416	136	4	4,556	$206,497,480	$1,724,080	$34,320	High
Kewaunee	1,977	14	1	1,992	$68,407,240	$435,480	$31,600	Low
Manitowoc	4,919	86	8	5,013	$160,909,560	$2,515,400	$224,000	High
Marinette	1,180	5	2	1,187	$35,641,920	$124,600	$49,840	Low
Milwaukee	15,669	302	6	15,977	$1,221,789,640	$21,579,320	$524,440	High
Oconto	474	0	0	474	$18,453,520	$0	$0	Low
Ozaukee	3,799	66	2	3,867	$390,146,560	$4,917,800	$99,280	High
Racine	7,345	56	0	7,401	$295,093,240	$1,399,360	$0	High
Sheboygan	5,377	32	0	5,409	$210,716,120	$1,027,240	$0	High
Total	**63,827**	**937**	**31**	**64,795**	**$3,534,240,120**	**$44,901,040**	**$1,201,320**	

Source: WEM, 2008.

Data Limitations

Replacement values for coastal structures were estimated and could be verified in future risk assessments.

Future Growth and Development Considerations

Increased population growth and development also increases the vulnerability of counties as property values increase and areas that may once have been undeveloped become developed. Because coastal erosion is fairly site-specific, the effect of increased development and population growth is more easily measured in terms of risk and vulnerability.

Although the Wisconsin coastal counties as a whole experienced an overall population gain from 2000 to 2010, six of the 15 counties experienced population losses (Ashland, Door, Iron, Manitowoc, and Marinette).

Northwestern Coastal Counties
The Northwestern Coastal Counties along Lake Superior experienced an overall loss of 781 persons or about 1% of its total population.

Northern Lake Michigan Coastal Counties
The Northern Lake Michigan Coastal Counties experienced an overall 4.2% population increase. Though Door, Manitowoc, and Marinette lost 0.6%, 1.8%, and 3.8%, respectively, the rest of the counties saw significant increases of over 1%. Brown County witnessed a 9.4% population increase during the ten year period.

This increase in Brown County comes from outside the Green Bay area, which is growing fastest. From 2000 to 2006, Green Bay experienced a 2.4% decrease in population. This population loss may decrease the number of people affected by coastal flooding, as Green Bay is among the lowest-lying areas in the state. However, according to the Bay-Lake Regional Planning Commission, the Northwestern portion of Brown County is one of the areas at greatest risk for coastal flooding.

Southeastern Coastal Counties
This area experienced an overall population gain of 2.6%, with all counties experiencing growth ranging from 0.8% in Milwaukee County to 11.3% in Kenosha County. The 11.3% increase in Kenosha County is particularly concerning, since it is the lowest-lying area of the County. The City of Kenosha, which experienced almost 6% growth from 2000 to 2006, may need to examine ways to mitigate this increased population exposure to coastal hazards.

Careful and strict enforcement of shore land and floodplain ordinances will be the key to preventing losses in these areas.

3.12.5 Hazard Ranking

TABLE 3.12.5-1 HAZARD RANKING FOR COASTAL EROSION

Evaluation Criteria	Description	Ranking
Probability	• The hazard has impacted the state annually, or more frequently • The hazard is widespread, generally affecting regions or multiple counties in each event • There is a reliable methodology for identifying events and locations	High
Mitigation Potential	• Methods for reducing risk from the hazard are technically reliable • The state or counties have experience in implementing mitigation measures • Mitigation measures are eligible under federal grant programs • There are multiple possible mitigation measures for the hazard • The mitigation measure(s) are known to be cost-effective • The mitigation measures protect lives and property for a long period of time, or are permanent risk reduction solutions	High

3.12.6 Sources for Coastal Erosion

TABLE 3.12.6-1 SOURCES FOR COASTAL EROSION	
Source Title	**Link to Resource**
FEMA's Multi-Hazard Identification and Risk Assessment, "Subpart C: Hydrologic Hazards"	http://www.fema.gov/library/viewRecord.do?id=2214
NOAA Coastal Services Center	http://www.csc.noaa.gov/
NOAA Ocean & Coastal Resource Management	http://coastalmanagement.noaa.gov/
U.S. Army Corps of Engineers Lake Michigan Potential Damages Study	http://www.lre.usace.army.mil/greatlakes/hh/greatlakestudies/lakemichiganpotentialdamagesstudy/
Wisconsin Coastal Management Program	http://www.doa.state.wi.us/section.asp?linkid=65&locid=9
Wisconsin Coastal Management Program *Needs Assessment Strategy, 2011-2015*	http://doa.wi.gov/docview.asp?docid=8442&locid=9
Springman and Born, *Wisconsin's Shore Erosion Plan: An Appraisal of Options and Strategies*	http://www.gpo.gov/fdsys/pkg/CZIC-tc224-w6-s6-1979/html/CZIC-tc224-w6-s6-1979.htm
DNR Shoreland Management Program	http://www.dnr.state.wi.us/org/water/wm/dsfm/shore/
Bay-Lake Regional Planning Commission "Guide to Hazard Mitigation Planning for Wisconsin Coastal Communities"	http://www.baylakerpc.org/media/46893/coastal%20hazards%20planning%20guide_june%202007.pdf
University of Wisconsin Sea Grant Institute	http://www.seagrant.wisc.edu/home/
National Research Council, *Managing Coastal Erosion.*	http://www.nap.edu/openbook.php?record_id=1446&page=R1

3.13 EARTHQUAKES

3.13.1 Nature of the Hazard

An earthquake is "a sudden motion or trembling caused by an abrupt release of accumulated strain in the tectonic plates that comprise the earth's crust" (FEMA 1997, p. 187). Dense, rigid tectonic plates move slowly over the earth's less-dense interior at a rate of about two inches per year, or a distance of 30 miles in about one million years.

Along plate boundaries, plates converge, diverge, or move against each other (i.e. transform plate boundaries), which may cause stress to accumulate along fault lines (plate boundaries). When this stress exceeds the elastic limit of the rock, pressure is released in the form of an earthquake, immediately causing sudden ground motion and seismic activity. Secondary hazards may also occur, such as surface faulting, sinkholes, and landslides. While the majority of earthquakes occur near the edges of the tectonic plates, earthquakes may also occur at the interior of plates.

Earthquake severity is a function of ground motion (waves) and seismic activity (magnitude and intensity).

Ground Motion

Ground motion describes the vibration or shaking of the ground during an earthquake. The severity of ground motion generally increases with the amount of energy released and decreases with distance from the fault or epicenter of the earthquake. Ground motion causes waves both in the earth's interior, known as body or seismic waves, and along the earth's surface, known as surface waves.

Seismic Waves (Interior Waves)

- **P-waves (primary waves)** are longitudinal or compressional waves that are the initial waves produced by an earthquake. The wave compresses (pushes) and dilates (pulls) rock in a back-and-forth oscillation, similar to a sound wave. P-waves travel very quickly at a speed of up to 15,000 mph through all forms of solid rock and liquid materials, such as magma or water.
- **S-waves (secondary or shear waves)** are slower than P-waves and cause structures to vibrate from side-to-side (horizontal motion) due to particle motion at right-angles to the direction of wave travel. Unreinforced buildings are more susceptible to damage from horizontal motion in S-waves than by vertical motion.

Surface Waves

- **Love waves** move the ground side-to-side horizontally, but differ from S-waves since Love waves have no vertical displacement and are much slower. These waves do not propagate through water. Love waves are the fastest of the surface waves, but still move slower than seismic waves.

- **Rayleigh waves** move the ground like ocean waves, both vertically and horizontally. They tend to move slower than Love waves, but can propagate through liquid since they move vertically.

Seismic Activity

Seismic activity is commonly described in terms of magnitude and intensity. Magnitude describes the total energy released and intensity subjectively describes the effects at a particular location. Although an earthquake has only one magnitude, its intensity varies by location.

Magnitude is the measure of the amplitude of the seismic waves and is expressed using the Richter scale. The Richter scale is a base-10 logarithmic measurement, where an increase in the scale by one whole number represents a tenfold increase in measured amplitude of the earthquake. For example, an earthquake measuring a 8.0 on the Richter scale has shaking amplitude that is ten times larger than one measuring 7.0.

Intensity is a measure of the strength of the shock at a particular location and is expressed by the Modified Mercalli Intensity (MMI) Scale. The MMI scale rates felt intensity on a 12-point scale.

Another way of expressing an earthquake's severity is to compare its acceleration to the normal acceleration due to gravity. If an object is dropped while standing on the surface of the earth, it will fall towards earth and accelerate faster until reaching terminal velocity. The acceleration due to gravity, referred to in calculations as g, is equal to 9.8 meters per second squared (980 cm/sec2). In other words, the velocity of an object falling towards earth increases by 9.8 meters per second or 980 centimeters per second, all other things constant. Peak ground acceleration (PGA) measure the acceleration of an earthquake on the ground. It does so using a calculation of the rate of change of motion relative to the rate of acceleration due to gravity. For example, acceleration of the ground surface of 244 cm/sec2 equals a PGA of 25.0% (i.e. 244/980 = 0.25 or 25%).

Figure 3.13.1-1, on the following page, displays the PGA in Wisconsin as reported in a 2008 U.S. Geological Survey (USGS) study. As shown in the map, the southeastern portion of the state has a PGA of between 4% and 6% (between 39.2 and 58.8 cm/sec2), while most of the state has a PGA of between 2% and 4% (between 19.6 and 39.2 cm/sec2). The northwestern corner of the state has very low PGA less than 2% of gravity (less than 19.6 cm/sec2). These lower PGA values indicate that earthquake damages are not likely to be high, due to the slower acceleration of the continental crust in the state.

It is possible to approximate the relationship between PGA, the Richter scale, and the MMI, as shown in Table 3.13.1-1 on the following page. The relationships are, at best, approximate, and also depend upon earthquake event details, such as the distance from the epicenter and depth of the focus. An earthquake with 10.0% PGA (98 cm/sec2) would roughly correspond to an MMI intensity of V or VI.

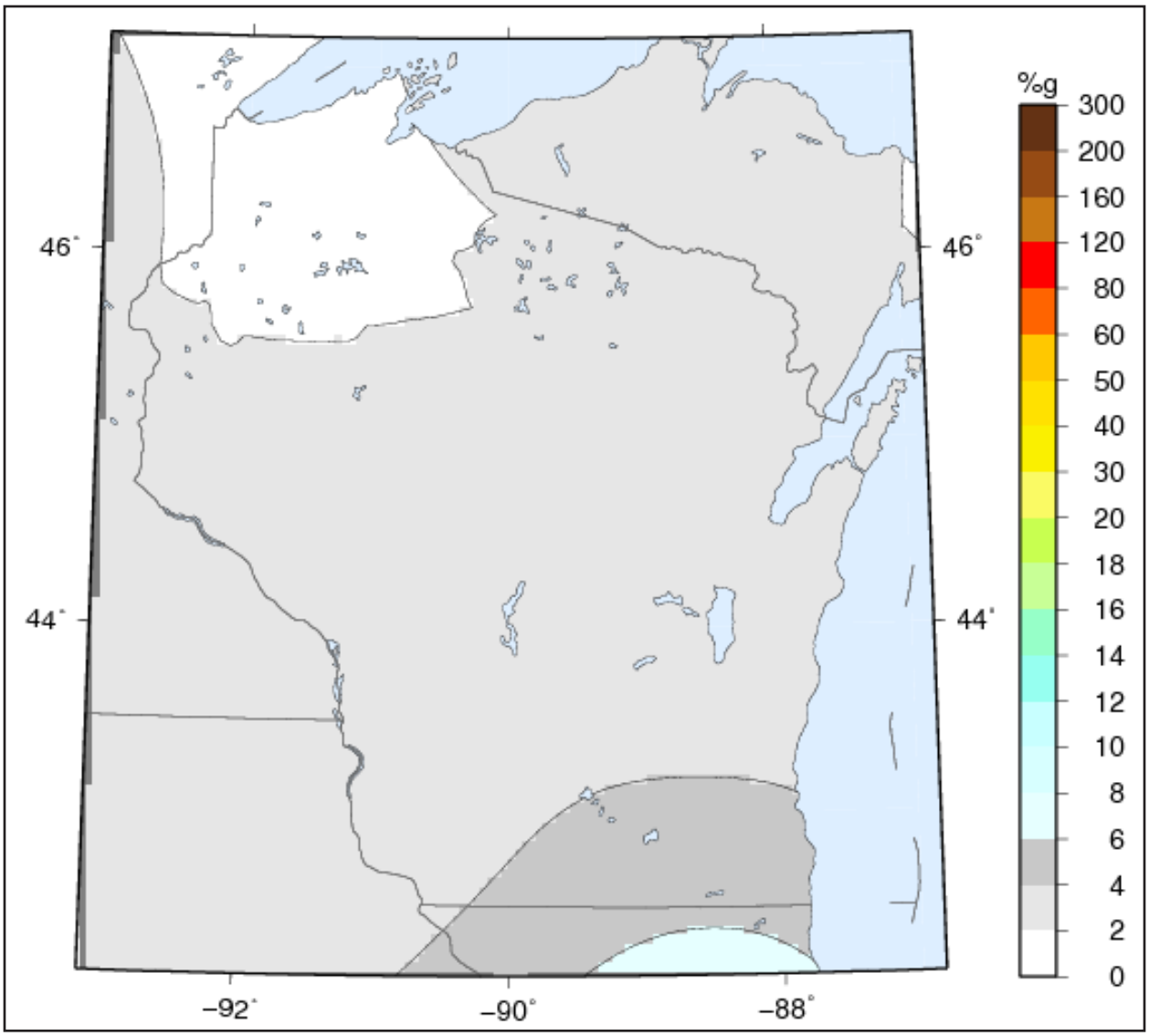


Figure 3.13.1-1 PGA in Wisconsin
Source: USGS, Custom Hazards Mapping, https://geohazards.usgs.gov/hazards/apps/cmaps/, 2008.

TABLE 3.13.1-1 EARTHQUAKE PGA, MAGNITUDE, AND INTENSITY COMPARISON

PGA (%g)	Magnitude (Richter Scale)	Intensity (MMI)	Description (MMI)
<0.17	1.0-3.0	I	I. Not felt except by a very few under especially favorable conditions.
0.17-1.4	3.0-3.9	II-III	II. Felt only by a few persons at rest, especially on upper floors of buildings. III. Felt quite noticeably by persons indoors, especially on upper floors of buildings. Many people do not recognize it as an earthquake. Standing motor cars may rock slightly. Vibrations similar to the passing of a truck. Duration estimated.

TABLE 3.13.1-1 CONTINUED			
PGA (%*g*)	**Magnitude (Richter Scale)**	**Intensity (MMI)**	**Description (MMI)**
1.4-9.2	4.0-4.9	IV-V	IV. Felt indoors by many, outdoors by few during the day. At night, some awakened. Dishes, windows, doors disturbed; walls make cracking sound. Sensation like heavy truck striking building. Standing motor cars rock noticeably. V. Felt by nearly everyone; many awakened. Some dishes, windows broken. Unstable objects overturned. Pendulum clocks may stop.
9.2-34	5.0-5.9	VI-VII	VI. Felt by all, many frightened. Some heavy furniture moved; a few instances of fallen plaster. Damage slight. VII. Damage negligible in buildings of good design and construction; slight to moderate in well-built ordinary structures; considerable damage in poorly built or badly designed structures; some chimneys broken.
34-124	6.0-6.9	VIII-IX	VIII. Damage slight in specially designed structures; considerable damage in ordinary substantial buildings with partial collapse. Damage great in poorly built structures. Fall of chimneys, factory stacks, columns, monuments, walls. Heavy furniture overturned. IX. Damage considerable in specially designed structures; well-designed frame structures thrown out of plumb. Damage great in substantial buildings, with partial collapse. Buildings shifted off foundations.
>124	>7.0	>X	X. Some well-built wooden structures destroyed; most masonry and frame structures destroyed with foundations. Rails bent. XI. Few, if any (masonry) structures remain standing. Bridges destroyed. Rails bent greatly. XII. Damage total. Lines of sight and level are distorted. Objects thrown into the air.

Source: Wald, Quitoriano, Heaton, and Kanamori, 1999.

3.13.2 Wisconsin Earthquake Event History

Moderate shaking was reported in many places in Wisconsin on August 31, 1886 as the result of a strong earthquake centered near Charleston, South Carolina. The intensity at Beloit (Rock County), Janesville (Rock County), and Milwaukee (Milwaukee County) was estimated to be V on the MMI Scale.

Table 3.13.2-1, on the following page, lists the locations and dates of the 24 recorded earthquakes that have occurred in Wisconsin since 1899, with none causing significant damage. Figure 3.13.2-1 shows the data on a map with PGAs for Wisconsin. The causes of these local quakes are poorly understood and are thought to be the result of continuing rebound of the earth's crust after the retreat of the last glacial ice.

TABLE 3.13.2-1 EARTHQUAKE HISTORY IN WISCONSIN, 1899-1990

Location	Year	Date	Latitude North	Longitude West	Felt Area (square km)	Maximum Intensity	Magnitude
Kenosha	1899	Oct. 12	42° 34’	87° 50’	--	II	3.0
Marinette	1905	Mar. 13	45° 08’	87° 40’	--	V	3.8
Shorewood	1906	Apr. 22	43° 03’	87° 55’	--	II	3.0
Milwaukee	1906	Apr. 24	43° 03’	87° 55’	--	III	--
Marinette	1907	Jan. 10	45° 08’	87° 40’	--	III	--
Beloit	1909	May 26	42° 30’	89° 00’	800,000	VII	5.1
Madison	1914	Oct. 7	43° 05’	89° 23’	--	IV	3.8
Madison	1916	May 31	43° 05’	89° 21’	--	II	3.0
Fond du Lac	1922	July 7	43° 47’	88° 29’	--	V	3.6
Madison	1931	Oct. 18	43° 05’	89° 23’	--	III	3.4
Stoughton	1933	Dec. 6	42° 54’	89° 15’	1,200	IV	3.5
Dubuque, IA	1938	Nov. 7	42° 30’	90° 43’	--	II	3.0
Dubuque, IA	1938	Nov. 8	42° 30’	90° 43’	--	II	3.0
Dubuque, IA	1938	Nov. 8	42° 30’	90° 43’	--	II	3.0
Thunder Mountain	1943	Feb. 9	45° 11’	88° 10’	--	III	3.2
Milwaukee	1947	May 6	43° 00’	87° 55’	8,000	V	4.0
Lake Mendota	1948	Jan. 15	43° 09’	89° 41’	--	IV	3.8
Oostburg	1956	July 18	43° 37’	87° 45’	--	IV	3.8
Oostburg	1956	July 18	43° 37’	87° 45’	--	IV	3.8
South Milwaukee	1956	Oct. 13	42° 55’	87° 52’	--	IV	3.8
Beaver Dam	1957	Jan. 8	42° 32’	98° 48’	--	IV	3.6
Bill Cross Rapids	1979	Feb. 28	45° 13’	89° 46’	Instrumental	--	<1.0 MoLg
Madison	1981	Jan. 9	43° 05’	87° 55’	Local	II	--
Madison	1981	Mar. 13	43° 05’	87° 55’	Local	II	--
Oxford	1981	June 12	43° 52’	89° 39’	Local	IV-V	--
Milwaukee	1987	Feb. 12	42° 95’	87° 84’	Local	IV-V	--
Milwaukee	1987	Feb. 12	43° 19’	87° 28’	Local	IV-V	--
W. Kenosha Co.	1990	June 18	42 60	88 20	160	III	--

Source: USGS, University of Wisconsin-Extension, Geological and Natural History Survey. List of Earthquakes in Wisconsin, M.G. Mudrey, Jr., Open File Report 84-1, 12/11/84. Ron Friedel, Department of Geological and Geophysical Sciences, UW-Milwaukee, 1987. Table has most current information available.

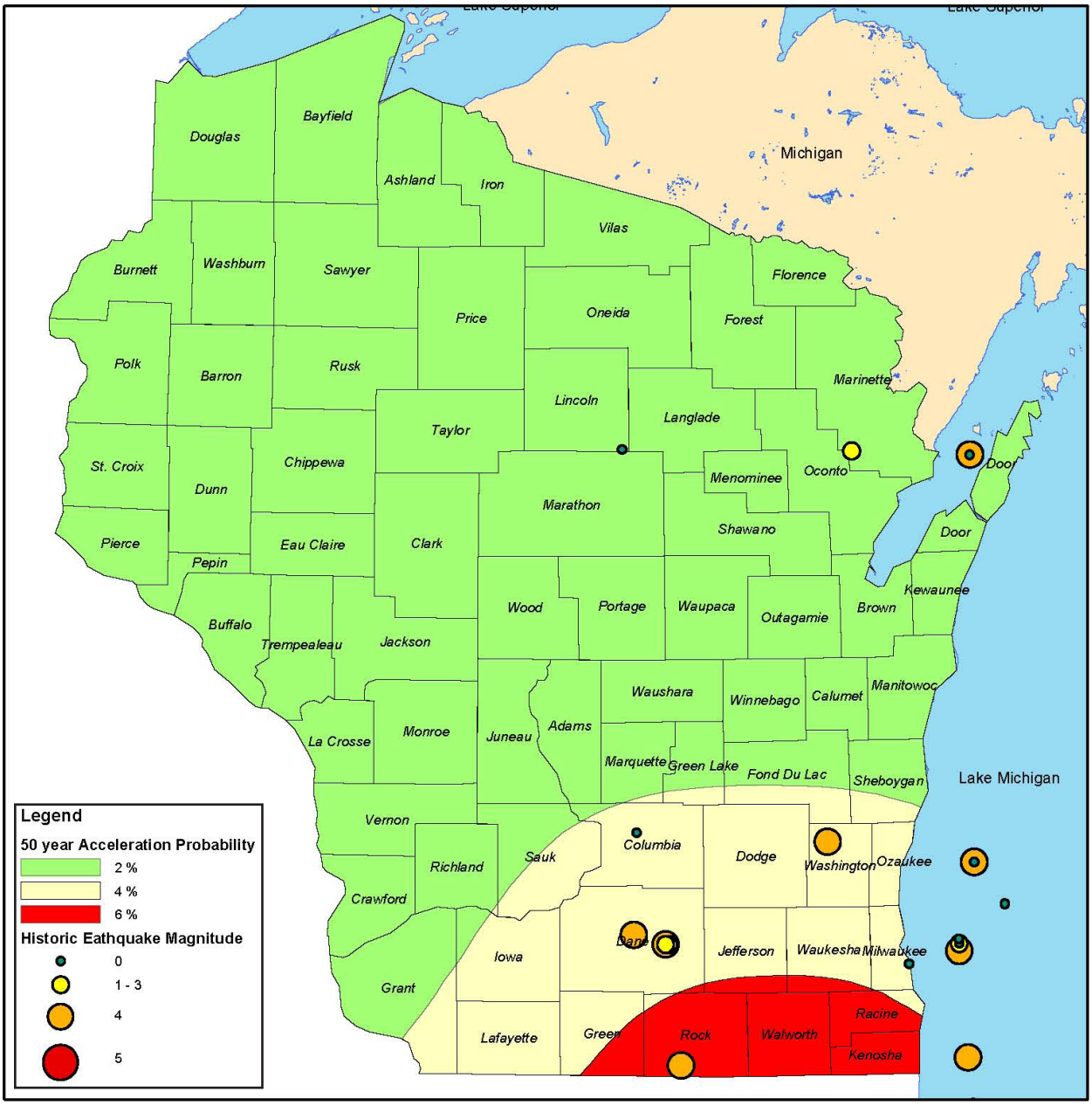


Figure 3.13.2-1 Wisconsin PGA and Historical Earthquakes, 1899-2003
Source: USGS, University of Wisconsin-Extension, Geological and Natural History Survey. List of Earthquakes in Wisconsin.

On May 26, 1909, an earthquake damaged many chimneys in Aurora, Illinois, and caused MMI VII effects over a considerable area from Bloomington, Illinois to Platteville, Wisconsin (Grant County). Two more moderate shocks affected the same area on January 2, 1912. The first tremor was MMI-VI in northern Illinois and was followed by a lighter shock. People as far away as Madison (Dane County) and Milwaukee noticed the tremor.

Scattered felt reports in Wisconsin were noted from a major earthquake in the St. Lawrence River region near La Malbaie, Quebec, Canada on February 28, 1925. The magnitude 7.0 earthquake encompassed an area of approximately 3.1 million square miles. Intensity at La Crosse (La Crosse County) and Milwaukee was estimated at MMI-III.

Another strong Canadian earthquake (magnitude 6.25) affected a large area of the northeastern and north-central US on November 1, 1935. The quake was felt in an area of more than 1.6 million square miles and included most of eastern Wisconsin (MMI-I through MMI-III) and scattered points elsewhere in the state.

A short, but moderately strong, earthquake centered just south of Milwaukee caused only minor damage on May 6, 1947. No injuries were reported. The 4:25 a.m. tremor shook buildings and rattled windows in communities in a 4,800 square mile area of southeastern Wisconsin. There were a few reports of broken windows in Kenosha (Kenosha County) and residents of other communities reported that dishes and glasses had fallen from shelves, indicating an intensity of MMI-V. Some of the frightened Milwaukee residents ran into the streets in their belief that there had been a serious explosion. The shock encompassed a 160-kilometer wide strip from Sheboygan (Sheboygan County) to the Wisconsin/Illinois border and extended from the lakeshore to Waukesha (Waukesha County), 24.9 miles inland. The earthquake lasted only about a half a second and could have caused serious damage if it had continued for as long as a typical major earthquake (30 seconds or more).

The strongest earthquake to occur in the central US in 74 years happened on November 9, 1968 in south-central Illinois. The shock was felt over an area of approximately 930,000 square miles, including all or portions of 23 states and southern Ontario, Canada. Measured at a magnitude of 5.3, maximum intensity reached VII in Illinois, Indiana, Kentucky, and Missouri. In Wisconsin, MMI-V was reported from Jefferson (Jefferson County) and Kenosha, and MMI-I through MMI-IV, at Baraboo (Sauk County), La Crosse, Milwaukee, Port Washington (Ozaukee County), Portage (Columbia County), Prairie du Chien (Crawford county), and Sheboygan. Press reports indicate the shock was also felt at Beloit, Janesville, and Madison.

A September 14, 1972, tremor (magnitude 3.7) was felt over 404,000 square miles, including Michigan, Minnesota, Missouri, Ohio, and Wisconsin. Cracked plaster (MMI-V) was noted at Kewaskum (Washington/Fond du Lac County), Milton (Rock County), Nashotah (Waukesha County), and Zenda (Walworth County). A report from Browntown (Green County) said that water pipes leaked after the shock.

Reports were received from Kansasville (Racine County), Mount Hope (Grant County), and Trevor (Kenosha County) following a magnitude 4.0 earthquake on April 3, 1974 centered near the 1968 epicenter in southern Illinois. Within one hour or so, a number of tornadoes passed through the area that was affected by the earthquake. Some of the reports may have confused the effects caused by the earthquake and those caused by the tornadoes (abridged from Carl A. Von Hake, Earthquake Information Bulletin, May/June 1978).

Two recent earthquakes have been felt by residents in southeastern Wisconsin. Both quakes occurred early in the morning and woke sleeping residents and shook furniture. The first occurred on June 28, 2004, centered eight miles northwest of Ottawa, Illinois.

The 4.1 magnitude earthquake was felt in Illinois, Indiana, Michigan, Missouri, and Wisconsin. In Milwaukee, the intensity was MMI-IV.

The second quake, of magnitude 5.4, occurred on April 18, 2008. Centered in southeastern Illinois, six miles from West Salem near Mount Carmel, the earthquake was felt in 18 states throughout the central and southeastern US. The epicenter of this earthquake is shown below in Figure 3.13.2-2.

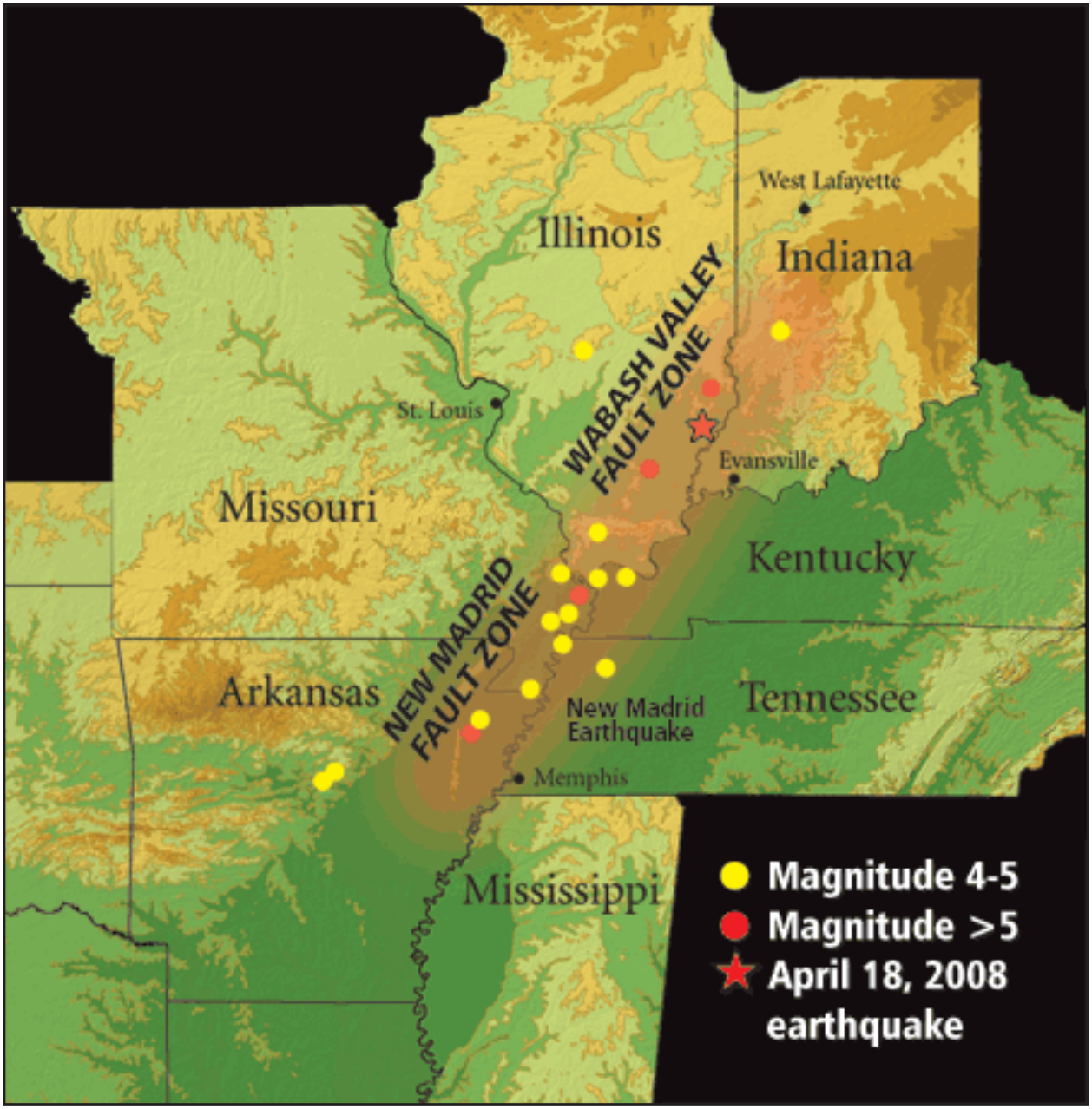


Figure 3.13.2-2 Active Seismic Zones near Wisconsin
Source: Purdue University College of Science, https://www.science.purdue.edu/insights/SP08/earthquake.php.

3.13.3 Probability of Occurrence

The earthquake threat to Wisconsin is considered low. Historically, few earthquakes of noticeable intensity and considerable magnitude have occurred in Wisconsin, relative to other states. Though there is a low probability of a significant earthquake occurring in Wisconsin, there are two active seismic areas with significant activity near the state: New Madrid Seismic Zone and the Wabash Valley Seismic Zone, depicted in Figure 3.13.2-2 on the previous page.

New Madrid Seismic Zone (NMSZ)

The NMSZ is located in northeast Arkansas, southeast Missouri, southern Illinois, western Kentucky, and western Tennessee. This fault produced two extremely strong earthquakes of 7.0 to 8.0 on the Richter scale in 1811 and 1812. If a strong earthquake of the same magnitude occurred in the NMSZ again, the effects would be devastating and far reaching, as the area has developed significantly in the two centuries since the events. If this sort of event were to occur today, Kenosha, Milwaukee, Racine, Rock, Walworth, and Waukesha Counties could experience localized severity of MMI-V to MMI-VII.

Another potential effect of a major NMSZ earthquake to the state could be decreased supply of both natural gas and petroleum, as major transmission pipelines pass through the NMSZ. A massive shortage would have far reaching economic and social impacts throughout Wisconsin and surrounding states. A depiction of the regional intensity that could result from a major earthquake at the NMSZ is shown below in Figure 3.13.3-1.

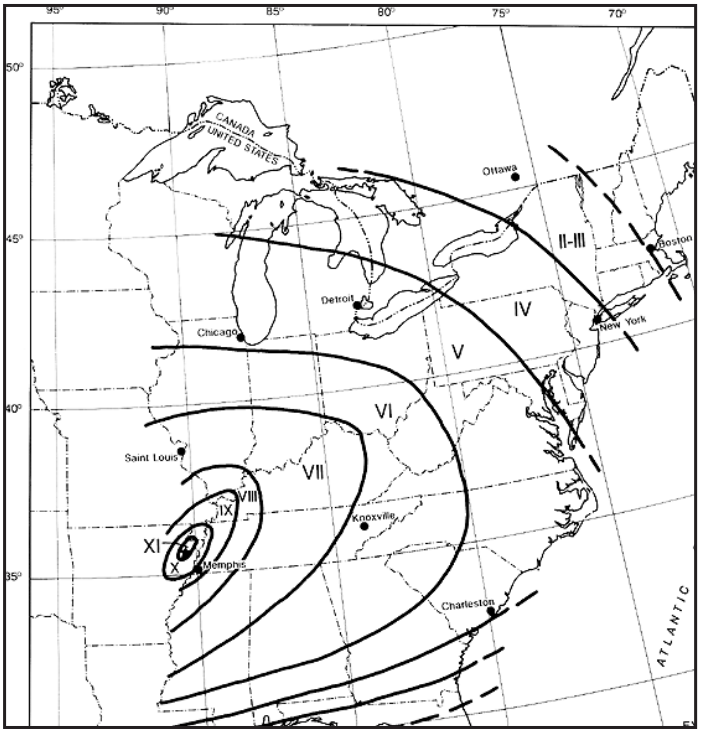


Figure 3.13.3-1 Regional Intensity from 1811-Strength Earthquake in NMSZ
Source: Mid-America Earthquake Center, University of Illinois at Urbana-Champaign.

Wabash Valley Seismic Zone (WVSZ)
Located along the Wabash River in southeastern Illinois and Indiana, this area has had active seismic activity for over 20,000 years (Mid-American Earthquake Center Report 09-03, p. 3). This area does not produce earthquakes on the same magnitude as the NMSZ; however, in 2008, the WVSZ produced a 5.2 magnitude quake detailed in Section 3.13.2.

Minor damages, such as plaster cracking, have occurred in Wisconsin, but most often the only results have been windows rattling and ground shaking. There is little risk posed to the state, except to poorly constructed structures.

Probabilistic ground motion maps are typically used to assess the magnitude and frequency of seismic events. These maps measure the probability of exceeding a certain ground motion, expressed as peak ground acceleration PGA, over a specified period of years. Figure 3.13.3-2, below, is a PGA map of the central and eastern US.

Overall, the severity of earthquakes is site specific, and is influenced by proximity to the earthquake epicenter, soil type, and local geologic characteristics, among other factors.

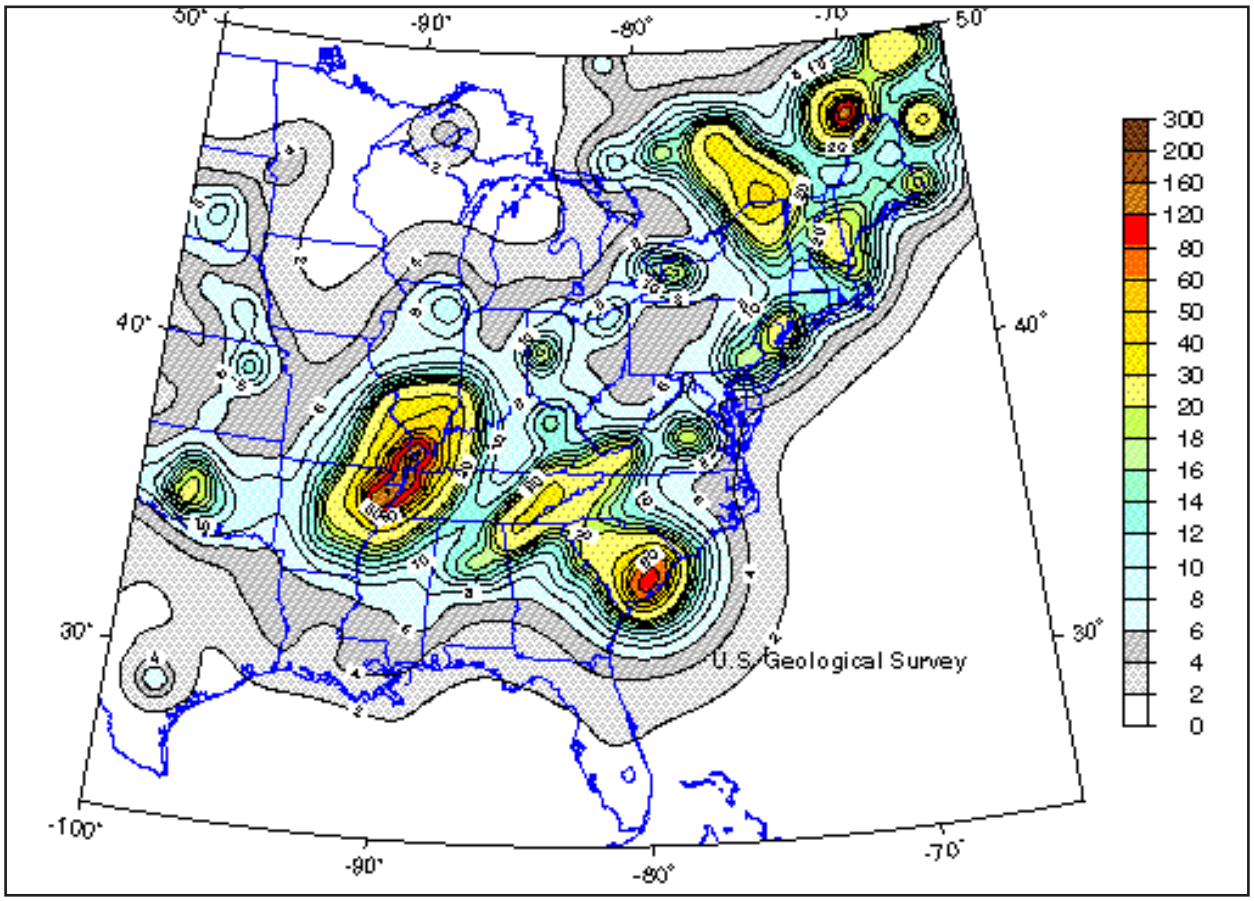


Figure 3.13.3-2 Peak Acceleration (%g) with 2% Probability of Exceedance in 50 Years
Source: USGS, 2011.

3.13.4 Hazard Ranking

TABLE 3.13.4-1 HAZARD RANKING FOR EARTHQUAKE		
Evaluation Criteria	**Description**	**Ranking**
Probability	• The hazard occurs only very infrequently, generally less than every five years on a large scale, although localized events may be more frequent • The hazard is generally very localized and on a small scale (i.e. sub-county level) • A methodology for identifying event occurrences and/or severities is poorly established in the state, or is available only on a local basis	Low
Mitigation Potential	• Methods for reducing risk from the hazard are not well-established, are not proven reliable, or are experimental • The state or counties have little or no experience in implementing mitigation measures, and/or no technical knowledge of them • Mitigation measures are ineligible under federal grant programs • There is a very limited range of mitigation measures for the hazard, usually only one feasible alternative • The mitigation measure(s) have not been proven cost effective and are likely to be very expensive compared to the magnitude of the hazard • The long-term effectiveness of the measure is not known, or is known to be relatively poor	Low

3.13.5 Sources for Earthquakes

TABLE 3.13.5-1 SOURCES FOR EARTHQUAKES	
Source Title	**Link to Resource**
FEMA's Multi-Hazard Identification and Risk Assessment, "Subpart D: Seismic Hazards"	http://www.fema.gov/library/viewRecord.do?id=2214
FEMA Earthquake Information Site	http://www.fema.gov/hazard/earthquake/
USGS Earthquakes Hazard Program	http://earthquake.usgs.gov/earthquakes/
USGS National Earthquake Information Center	http://earthquake.usgs.gov/regional/neic/
USGS Latest Earthquakes in the USA	http://earthquake.usgs.gov/earthquakes/recenteqsus/
USGS Wisconsin Earthquake History	http://earthquake.usgs.gov/earthquakes/states/wisconsin/history.php
Mid-America Earthquake Center, University of Illinois at Urbana-Champaign	http://mae.ce.uiuc.edu/
Mid-America Earthquake Center, "Impact of New Madrid Seismic Zone Earthquakes on the Central USA, Volume 1"	https://www.ideals.illinois.edu/bitstream/handle/2142/14810/ImpactofNewMadridSeismicZoneEarthquakeso%20theCentral%20USAVol1.pdf?sequence=3
University of Memphis Center for Earthquake Research and Information	http://www.ceri.memphis.edu/index.shtml
Wald et al., "Relationship between Peak Ground Acceleration, Peak Ground Motion and Modified Mercalli Intensity in California"	http://ecf.caltech.edu/~heaton/papers/Wald_intensity.pdf

3.14 LANDSLIDE AND LAND SUBSIDENCE

3.14.1 Nature of the Hazard

Landslides

Landslides are the downward and outward movement of slopes. The term refers to various kinds of events, including mudflows, mudslides, debris flows, rock falls, rockslides, debris avalanches, debris slides, and earth flows. Landslides may include any combination of natural rock, soil, or artificial fill, and are classified by the type of movement and the type of material (FEMA, 1997, p. 98). The types of movement include the following:

- **Slides** are downward displacements along one or more failure surfaces of soil or rock. The material may be a single intact mass or a number of pieces. The sliding may be rotational (turning about a point) or translational (movement roughly parallel to the failure surface). The most common type of slide is called a slump. A slump is a rotational slide occurring when a portion of a hillside moves downslope under the influence of gravity.
- **Flows** are a form of rapid mass movement by loose soils, rocks, and organic matter, together with air and water that form a rapidly downhill flowing slurry mixture. Flows are distinguished from slides by high water content and velocities that resemble those of viscous liquids.
- **Lateral spreads** are large movements of rock, fine-grained soils (i.e., quick clays), or granular soils, distributed laterally. Liquefaction may occur in loose, granular soils, and can occur spontaneously due to changes in pore-water pressure or due to earthquake vibrations.
- **Falls** and **topples** are masses of rocks or material that detach from a steep slope or cliff that free-fall, roll, or bounce. Movements typically are rapid to extremely rapid. Earthquakes commonly trigger rock falls.

A combination of two or more landslide movements is referred to as a complex movement.

Almost any steep or rugged terrain is susceptible to landslides under the right conditions. The most hazardous areas are steep slopes on ridges, hill, and mountains; incised stream channels; and slopes excavated for buildings and roads. Slide potentials are enhanced where slopes are destabilized by construction or river erosion. Road cuts and other altered or excavated areas are particularly susceptible to landslides and debris flows. Rainfall and seismic shaking by earthquakes or blasting can trigger landslides.

Debris flows (also referred to as mudslides) generally occur during intense rainfall on water-saturated soil. They usually start on steep hillsides as soil slumps or slides that liquefy and accelerate to speeds as great as 35 miles per hour. Multiple debris flows may merge, gain volume, and travel long distances from their source, making areas downslope par-

ticularly hazardous. Surface runoff channels along roadways and below culverts are common sites of debris flows and other landslides (USGS, 2000).

Landslides often occur together with other major natural disasters, thereby exacerbating relief and reconstruction efforts:

- Floods and landslides are closely related and both involve precipitation, runoff, and ground saturation that may be the result of severe thunderstorms or tropical storms.
- Earthquakes may cause landslides ranging from rock falls and topples, to massive slides and flows.
- Landslides into a reservoir may indirectly compromise dam safety or a landslide may even affect the dam itself.
- Wildfires may remove vegetation from hillsides, significantly increasing runoff and landslide potential.

Landslides are a major geologic hazard because they are widespread, occurring in all 50 states and US territories. It is estimated that landslide-related fatalities average from 25 to 50 per year and direct and indirect economic costs to the nation range between one to two billion dollars per year (USGS, 2011). The costs of landslides are increasing rapidly as lands susceptible to failure are developed for highways, housing, industry, and recreation (USGS, 2006). Landslides pose serious threats to highways and structures that support fisheries, tourism, timber harvesting, mining, and energy production, as well as general transportation.

Land Subsidence

Land subsidence occurs when subsurface supports (i.e. bedrock or soils) fail, causing a loss of surface elevation (FEMA, 1997, p. 108). This hazard is primarily caused by human activities in relation to mining and drainage of soils, but is also caused by geologic conditions. Annually in the US, land subsidence and sinkholes account for an average $125 million in damages (FEMA, p. 112).

In certain parts of the state, sinkholes are more likely to be caused by human activity. Some parts of southern and western Wisconsin have experienced sinkholes from collapsed, abandoned underground mines. In urban flooding and storm events, the Milwaukee area has had sinkholes occur in the middle of busy streets above storm sewers.

In other instances, sinkholes causing land subsidence are caused from geologic properties of bedrock, called karst formations. Karst formations are prevalent in areas where carbonate rocks, such as limestone or dolomite, are present. As the limestone rock under the soil dissolves over time from rainfall or flowing groundwater, a hollow area may form underground into which surface soil can sink.

Furthermore, karst features provide direct conduits to groundwater. Areas with karst conditions can be subject to groundwater contaminants from pollutants entering a sinkhole, fissure, or other karst features. Karst features should be identified and considered in a community, especially for land use planning, stormwater management, and hazardous materials planning, to avoid possible damage to structures or contamination of groundwater.

3.14.2 Landslide and Land Subsidence Event History

The bluffs of the "driftless" region that stretches along the Mississippi River are formed of limestone bedrock covered by an ancient mix of clay and river silt. Under most conditions, this provides a solid base for home building, though most counties restrict building to a slope of 20-30%. Homes that are built on "benches" may have much steeper areas above them (or below).

As water particles fill the space between silt particles, the silt and clay first become "plastic" and then "viscous." When "plastic" the soil will move when pressure is applied to it (such as the weight of a home). When "viscous" it begins to slow under its own weight like a glacier, only much more quickly.

Landslides in the form of stream bank erosion and hillside slumping have been a factor in several Wisconsin disasters. In 2000, during Disaster Declaration 1332, a home in Grant County was damaged when its foundation partially collapsed as the hillside slumped from heavy rainfall. Falling rock is also a common problem along the bluffs of the Mississippi River.

In 2001, a home in the City of Superior (Douglas County) was endangered as the entire yard started slipping downhill toward the Namdji River. Although the house was not in the floodplain and 100 yards from the river, stream bank erosion from the spring floods had caused the ground within fifteen feet of the house to slide downhill. The City of Superior applied for and received funding through the Hazard Mitigation Grant Program (HMGP) under Disaster Declaration 1369 to buy the threatened structure from the landowner and demolish it to protect public safety.

In several areas where railroad tracks run along the river, fences have been erected with sensors to detect rock falls that could otherwise damage or derail a train (Ron Hennings, Wisconsin Geological and Natural History Survey, 2002). According to a Wisconsin State Journal article, a 400,000-pound boulder rolled down a bluff in Fountain City (Buffalo County) in July 2002, leveling trees but causing little damage otherwise. The rock was the second to fall from the bluff in the last seven years. In 1995, a 55-ton boulder crashed into a Fountain City house, causing serious damage but fortunately no injuries (Wisconsin State Journal, 2002).

In 2002, seven properties in the Village of Oliver (Douglas County) experienced some severe land subsidence along the St. Louis River. Three of the seven properties were in

imminent danger. The Village received HMGP grants in Disaster Declarations 1429 and 1432 to purchase and demolish the three homes. In mid-August 2002, owners of one of the properties discovered cracks in their garage floor. By mid-September, what was once their garage had broken off and dropped about 12 feet from the main garage slab. This property has experienced a large ground failure that has jeopardized the integrity and stability of the home. To date, there has been an 18-foot scarp that is situated approximately one foot from the rear entrance of the home. The slump at this property is approximately 100 yards in width and extends 100 to 150 feet downslope to the river's edge. The slip rate was in excess of 4.5 inches/day early on. Currently the slump is on the order of 1.5 inches/day.

Contributing to the collapse of the property is its location on top of a steep slope next to the St. Louis River (Douglas County). The soil in this area is a thick substrate of red clay, which when dry can sustain a property, but when wet loses that strength. Also, the property is approximately 300 yards from a railroad bridge. Trains passing by cause significant ground vibrations (equivalent to a 3.0 to 4.9 earthquake), disturbing the ground and causing it to collapse.

August 2007 was devastating to Wisconsin along the Upper Mississippi River. Mudslides covered roads and bluffsides collapsed into yards. One yard in the Goose Island area (La Crosse County) had 25 dump trucks of mud removed and Hwy 35 from Goose Island to Stoddard (Vernon County) had mud and debris. Two homes slid onto Hwy 35 south of La Crosse (La Crosse County). A third home near Chaseburg (Vernon County) was destroyed by a mudslide.

On August 20th of 2007, rainfall of 11-15" over two days left the Coulee country from Winona, MN to Genoa and Viroqua (Vernon County), virtually impassable. Mudslides, a few carrying homes with them, littered both major and minor roads. Bridges were awash, as creeks that normally carried a 20 foot creek flooded to 100 feet or flooded entire valleys. Household water wells filled with mud and bacteria. Waterfalls gushing over the rocky bluff faces turned normally stable hillsides into a gelatinous consistency that began an unstoppable flow down the 600 foot high bluffs. Canyons formed were there were none.

3.14.3 Probability of Occurrence

Landslide probability is highly site-specific, and cannot be accurately characterized on a statewide basis, except in the most general sense. Statewide analyses for potential have been performed by the US Geological Survey (USGS) and the Wisconsin Geological and Natural History Survey (WGNHS).

Figure 3.14.3-1, on the following page, displays the karst potential in the state. Most areas at greatest risk of shallow karst potential (less than five feet below surface) can be found in the far western and southwestern portions of the state in Buffalo, Crawford, Grant, Green, Iowa, La Crosse, Lafayette, Monroe, Pepin, Richland, Trempealeau, and Vernon counties. One main outlying area, Door County, is also at risk for shallow karst

potential. Deeper karst potential (five to 300 feet below ground surface) is found largely in the eastern portion of the state along the Fox River, and into southeastern Wisconsin.

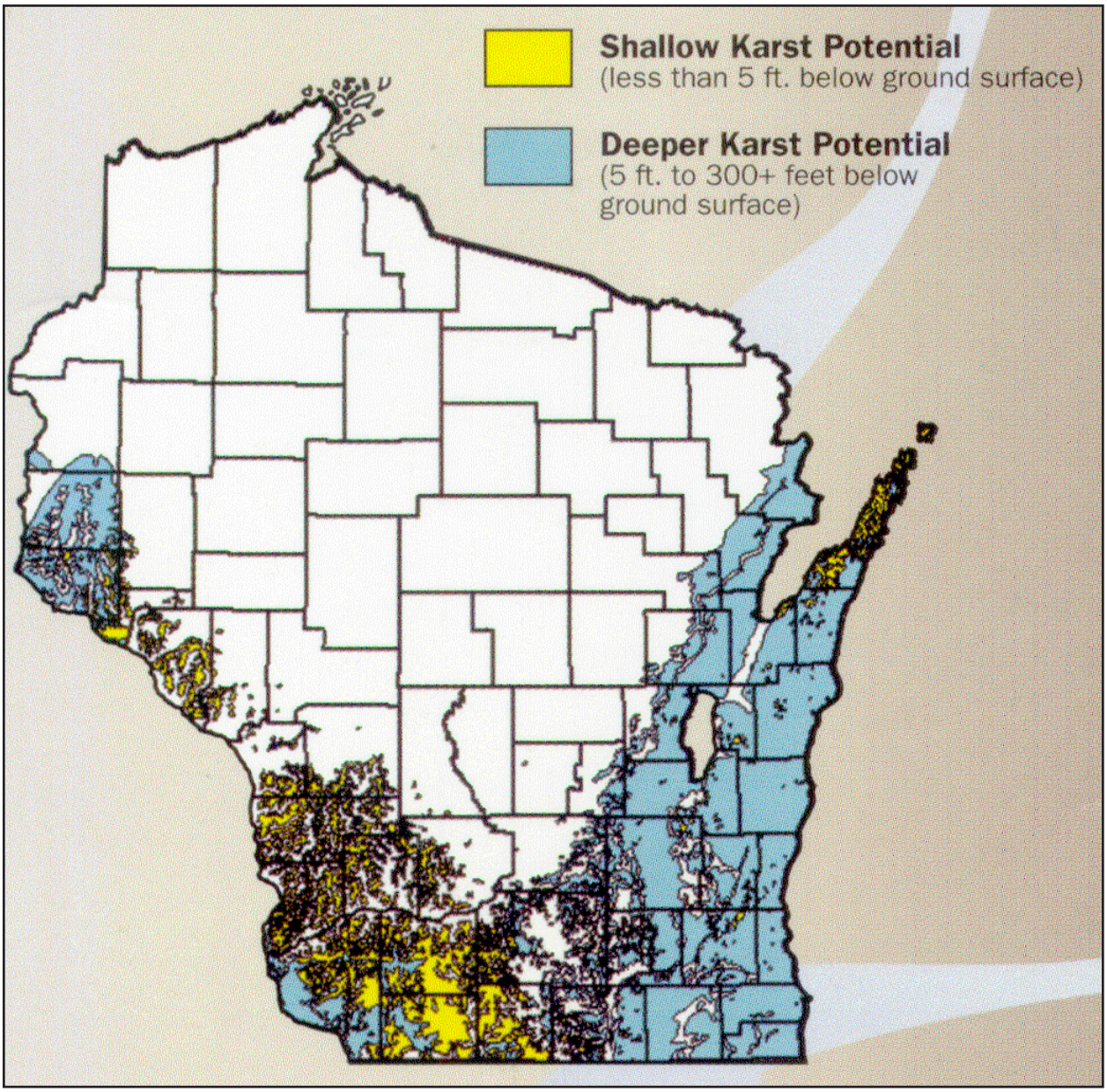


Figure 3.14.3-1 Karst Potential in Wisconsin
Source: Wisconsin Geological and Natural History Survey, 2008.

Figure 3.14.3-2, on the following page shows the areas of high landslide incidence and susceptibility in the state. The dark green areas indicate the portions of the state with high susceptibility and moderate incidence of landslides. This area coincides with the shallow karst potential along the western part of the state in Figure 3.14.3-1 in Buffalo, Crawford, Grant, La Crosse, Pepin, Pierce, Treempealeau, and Vernon counties. The area with the highest incidence, in red, is limited to Douglas County along the St. Louis River, near the City of Superior.

Another area to highlight is the shoreline along Lake Michigan. Racine and Kenosha counties are highly susceptible, due to coastal erosion, but experience low incidence. The rest of the Lake Michigan coastal counties (Door, Kewaunee, Manitowoc, Milwaukee, Ozaukee, and Sheboygan) experience moderate incidence of landslides.

Last, the Fox River valley, along with other areas in the state vulnerable to deeper karst potential, experiences moderate suceptibility, but low incidence of landslide.

Legend
Landslide Incidence and Susceptibility

- High susceptibility and moderate incidence
- High susceptibility and low incidence
- Moderate susceptibility and low incidence
- High incidence
- Moderate incidence
- Low incidence

Figure 3.14.3-2 Landslide Incidence and Susceptibility in Wisconsin

3.14.4 Hazard Ranking

TABLE 3.14.4-1 HAZARD RANKING FOR LANDSLIDES AND LAND SUBSIDENCE		
Evaluation Criteria	**Description**	**Ranking**
Probability	• The hazard impacts the state occasionally, but not annually • The hazard is somewhat localized, affecting only relatively small or isolated areas when it occurs • The methodology for identifying events is not well-established, or is not applied across the entire state	Medium
Mitigation Potential	• Methods for reducing risk from the hazard are not well-established, are not proven reliable, or are experimental • The state or counties have little or no experience in implementing mitigation measures, and/or no technical knowledge of them • Mitigation measures are ineligible under federal grant programs • There is a very limited range of mitigation measures for the hazard, usually only one feasible alternative • The mitigation measure(s) have not been proven cost effective and are likely to be very expensive compared to the magnitude of the hazard • The long-term effectiveness of the measure is not known, or is known to be relatively poor	Low

3.14.5 Sources for Landslides and Land Subsidence

TABLE 3.14.5-1 SOURCES FOR LANDSLIDES AND LAND SUBSIDENCE	
Source Title	**Link to Resource**
FEMA's Multi-Hazard Identification and Risk Assessment, "Subpart B: Geologic Hazards"	http://www.fema.gov/library/viewRecord.do?id=2214
FEMA Landslide and Debris Flow Information Site	http://www.fema.gov/hazard/landslide/index.shtm
USGS Landslide Hazards Program	http://landslides.usgs.gov/
USGS National Landslide Information Center	http://landslides.usgs.gov/nlic/
USGS Landslide Monitoring	http://landslides.usgs.gov/monitoring/
USGS *National Landslide Hazards Mitigation Strategy: A Framework for Loss Reduction*	http://pubs.usgs.gov/of/2000/ofr-00-0450/ofr-00-0450.html
Association of Environmental & Engineering Geologists	www.aegweb.org
Wisconsin Geological and Natural History Survey	http://wisconsingeologicalsurvey.org/
Wisconsin Geological and Natural History Survey Karst Program	http://wisconsingeologicalsurvey.org/karst.htm
Wisconsin DNR Groundwater Site	http://www.dnr.state.wi.us/org/water/dwg/GCC/

3.15 DAM FAILURE

3.15.1 Nature of the Hazard

Wisconsin Dams

A dam is a barrier, typically constructed of earth, rock, concrete, or mine tailings, used to store, control, or divert water. The water impounded behind a dam is referred to as the reservoir and its volume is measured in acre-feet, with one acre-foot being the volume of water that covers one acre of land to a depth of one foot. Due to topography, even a small dam may have a reservoir containing many acre-feet of water (FEMA 1997).

Wisconsin's approximately 3,800 dams serve many purposes. Many of these dams were constructed before 1900 and were used for logging and milling operations – though these are typically not used for their original purpose today. An additional 700 dams were built but have subsequently washed out and no longer exist. Approximately 100 dams have been removed since 1967. Today, the dams are used for agricultural production/land management, recreational uses, electrical power generation, and erosion, water level, and flood control (DNR, 2011). Of the existing dams,

- 60% are owned by individuals or former companies;
- 9% are owned by the State of Wisconsin;
- 17% are owned by municipal governments (i.e. towns and counties); and
- 14% are owned by other groups.

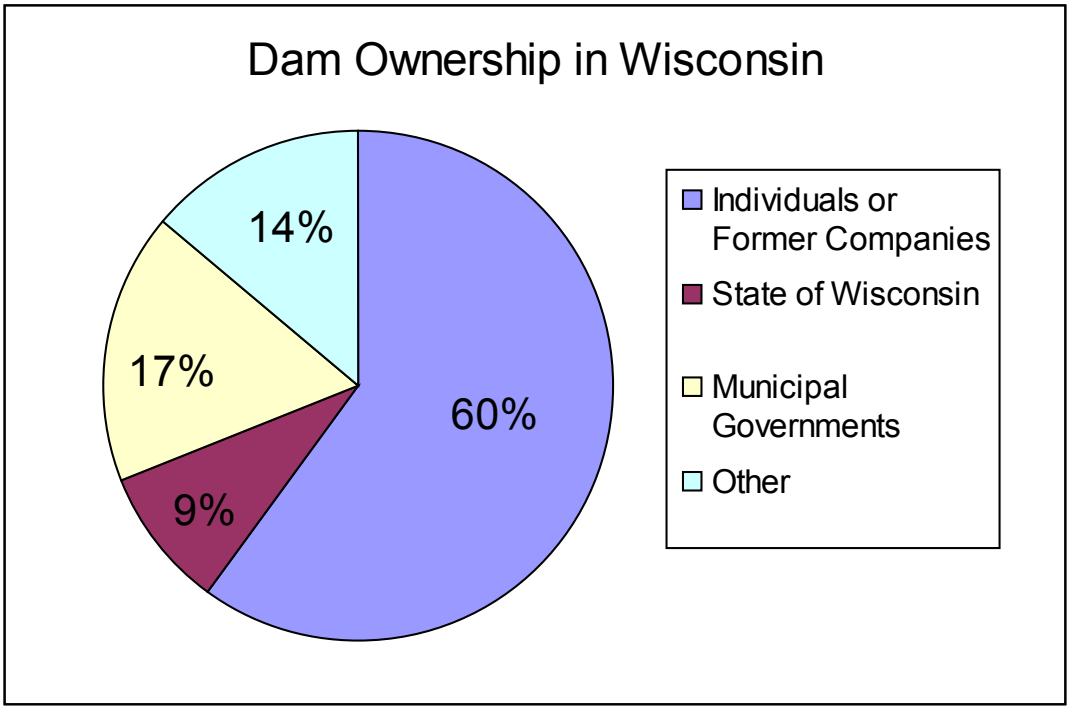


Figure 3.15.1-1 Distribution of Dam Ownership in Wisconsin
Source: Wisconsin Department of Natural Resources, 2011.

About 200 large hydroelectric dams in Wisconsin are federally regulated, while the remaining 3,600 dams are regulated at the state level by the WDNR.

Additionally, State-regulated dams are classified by the DNR as either large or small. Large dams have either

- a structural height of over six feet and impound 50 acre-feet of water or more, or
- a structural height of over 25 feet and impound 15 acre-feet of water or more.

There are approximately 1,160 large dams in the state (DNR, 2011). The remaining dams are classified as small dams, and tend to be subject to less stringent regulation. Figure 3.15.1-2, on the following page, displays the location of large and small State-regulated dams in Wisconsin. Notice the large concentration of small dams along the western part of the state.

Dam Failure

A dam failure is the collapse, breach, or other failure of a dam that causes downstream flooding (FEMA, 1997). Dam failures usually occur when the spillway capacity is inadequate and water overtops the dam or when internal erosion through the dam foundation occurs (also known as piping). If internal erosion or overtopping cause a full structural breach, a high-velocity, debris-laden wall of water is released and rushes downstream, damaging or destroying whatever is in its path. Dam failures may result from one or more the following:

- Prolonged periods of rainfall and flooding (the cause of most failures)
- Inadequate spillway capacity which causes excess overtopping flows
- Landslides into reservoirs
- High winds
- Improper maintenance
- Internal erosion erosions due to embankment or foundation leakage or piping
- Improper design
- Negligent operation
- Failure of upstream dams
- Earthquakes

For emergency planning purposes, dam failures are categorized one of the following:

1. Rainy Day Failures
   Rainy day failures involve periods of excessive precipitation leading to unusually high runoff. This high runoff increases the reservoir level, and if not controlled, the overtopping of the dam or excessive water pressure can lead to dam failure. Normal storm events can also lead to rainy day failures if water outlets are plugged with debris or otherwise made inoperable.
2. Sunny Day Failures
   Sunny day failures occur due to poor dam maintenance, damage/obstruction of outlet systems, or vandalism. This is the worst type of failure and can be catastrophic because the breach is unexpected and there may be insufficient time to properly warn downstream residents.

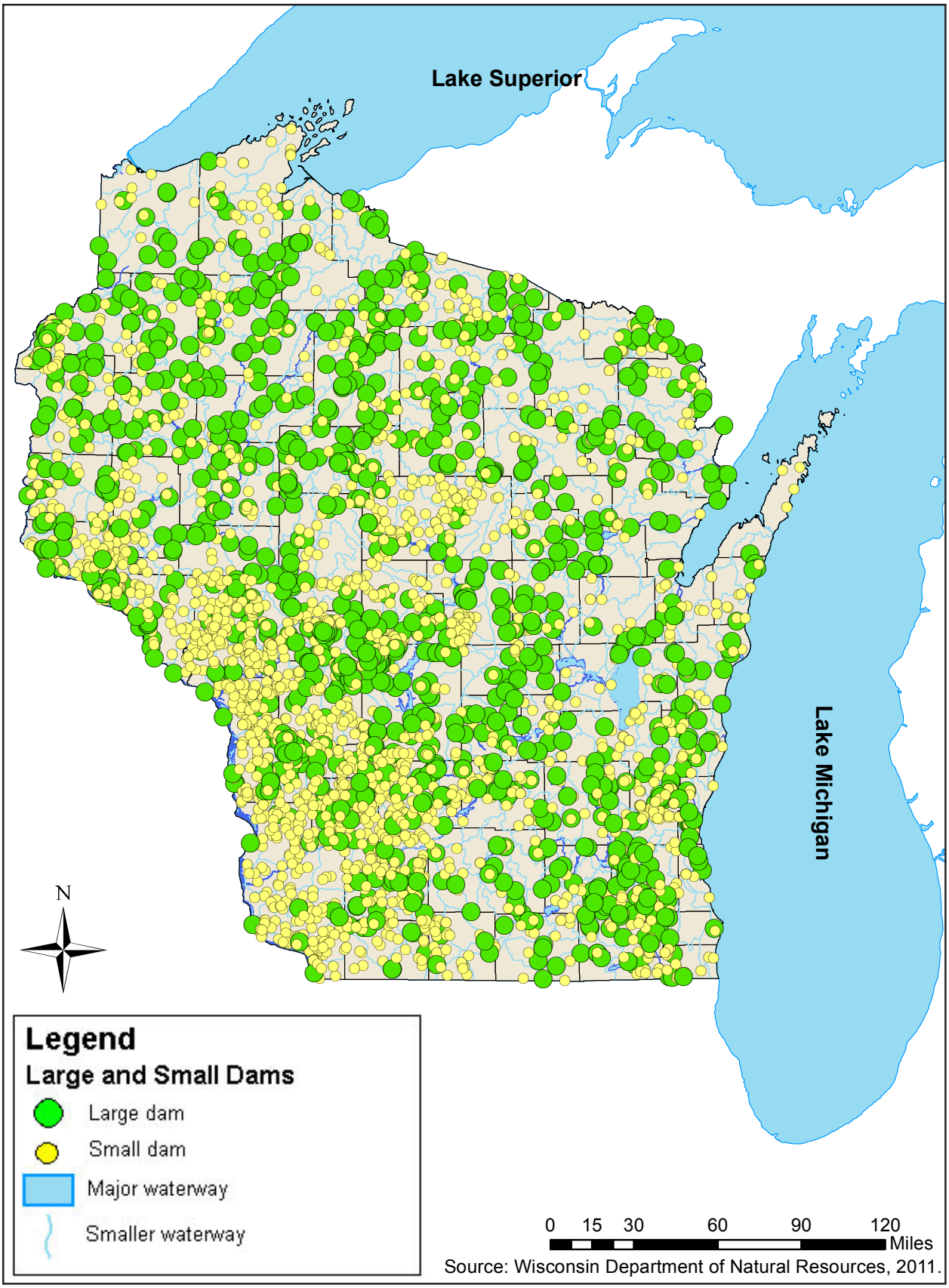


Figure 3.15.1-2 Locations of Large and Small Dams in Wisconsin

Among the 3,800 dams in Wisconsin, there is a wide variance in the potential to cause damage in the event of failure. Very few dams in Wisconsin were built primarily to protect people and property from floods. Most of the dams that provide a flood-control benefit are large hydroelectric dams on major rivers where flood control is a secondary benefit, or they are what are referred to as PL-566 dams, which are dams built through the Watershed Protection and Flood Prevention Act of 1954. Wisconsin has 83 PL-566 dams, located mainly in the western part of the state. The PL-566 dams often hold little or no water in their reservoirs under normal conditions. Since these dams only hold significant amounts of water during floods, they present a special hazard as everyday water-related problems such as seepage cannot be readily seen and corrected.

3.15.2 Wisconsin Dam Failure Event History

Nationwide, the deadliest dam failure in US history occurred in Johnstown, Pennsylvania in 1889. More than 2,200 people died. Another significant failure on June 5, 1976 at the Teton Dam in Idaho killed 11 people and caused approximately $1 billion in damages (FEMA, 1997).

On the night of September 1, 1985, a flooding event nearly overtopped the 66-foot tall Orienta Falls power-generating dam on the Iron River (Bayfield County). Heavy waters overwhelmed the earth embankment and bulldozed away the dam's powerhouse walls. The dam, operated by Northern States Power, was severely damaged. Additionally, three bridges were destroyed, telephone service was cut, many roads and culverts were washed away, and although no one died, two families downstream were evacuated for fear the whole dam would collapse. The flood brought down the Orienta Dam, but changing times prevented its expensive $500,000 repair. The river was returned to its natural state (Katherine Esposito, Wisconsin Natural Resources Magazine, April 1999).

Excessive precipitation (nine inches of rain in four hours) in August 1990 stressed the 50-year old Lake Tomah Dam (Monroe County), imperiling the lives of approximately 2,000 residents of the City of Tomah (Monroe County) who had to be evacuated from their homes. Municipal workers, volunteers, and Wisconsin National Guard personnel averted a breach by using more than 20,000 sand bags to reinforce the structure. A large crane was used to open the floodgates and the level of the lake dropped eight inches in one hour. The excess water emptied into the Lemonweir River, which overtopped its banks and rose approximately two inches per minute until it stabilized.

In March 1993, the Briggsville Dam (Marquette County) failed and washed out the embankment. Fortunately, severe property damage was averted, but a recreational lake was completely drained. This failure was just one of many that occurred in 1993, a record year for precipitation and flooding.

One of the more publicized 1993 incidents involved the Hatfield Dam (Jackson County). A power canal dike at the dam failed due to flooding. Initial reports from the area indicated that the main dam had failed, but this proved to be incorrect. A summary of dam

washouts, overtopping, or damages associated with the 1993 floods is provided in Table 3.15.2-1, below.

TABLE 3.15.2-1 1993 DAM FAILURES/DAMAGES IN WISCONSIN

Season	County	Dam	Event
Winter	Juneau	Partridge Lake Dam	Dam was washed out
Spring	Dodge	Lake Emily Dam	Dam was washed out/damaged
Spring	Dodge	Lowell Dam	Dam was washed out/damaged
Spring	Iowa	Cox Hollow Dam	Dam was washed out/damaged
Spring	Iowa	Wright Dam	Dam was washed out/damaged
Spring	Jefferson	Hebron Dam	Dam was overtopped
Spring	Jefferson	Upper Watertown Dam	Dam was overtopped
Spring	Marquette	Briggsville Dam	Dam was washed out/damaged
Spring	Racine	Waterford Dam	Dam was washed out/damaged
Spring	Sheboygan	Gooseville Dam	Dam was washed out/damaged
Summer	Clark	Humbird Dam	Embankments washed out
Summer	Columbia	Jordan Dam	Emergency repairs made to prevent embankment failure
Summer	Columbia	Cambria Dam	Dam was washed out
Summer	Dodge	Fox Lake Dam	Embankment problems caused seepage
Summer	Eau Claire	Dells Dam	Damage to waterwheel
Summer	Eau Claire	Fairchild Dam	Dike overtopped, road washed out
Summer	Eau Claire	Lake Dam	Dam was washed out
Summer	Eau Claire	Lake Eau Claire Dam	Gate broken in attempt to open it
Summer	Eau Claire	Rock Dam	Dam was washed out
Summer	Jackson	ASP Cranberry Dikes	Two dikes were washed out
Summer	Jackson	Hatfield Dam	Dam was washed out
Summer	Jackson	Roberts Cranberry Dikes	Four dikes were washed out
Summer	Marquette	Packers Bay Dam	Embankment overtopped
Summer	Oconto	Reservoir/Dummy Dams	Lake bypassed through low area, road damage
Summer	Outagamie	Upper Appleton Dam	high head caused grout patch failure, seepage through wall
Summer	Rock	Shopier Dam	Emergency repairs made to fill embankment breach
Summer	Waupaca	Auld & Rohrer Dam	Contractor breached embankment to prevent spillway construction from failing
Summer	Waupaca	Bass Lake Dam	Dam was washed out
Summer	Trempealeau	Blair Dam	Slow gate operation caused downstream road embankment erosion

Source: Wisconsin Department of Natural Resources, 1993.

In September 1994, heavy rainfall in Price County caused concern over the potential failure of the Musser, Jobe, and Weimer Dams. Price County Emergency Management, Wisconsin Emergency Management (WEM), and DNR Dam Safety staff monitored a command post above the Musser dam, while the Wisconsin Conservation Corps coordinated local sandbagging efforts. Evacuation of low-lying areas below the Musser Dam was ordered as construction crews attempted to open the inoperable floodgates. The floodgates were opened, allowing maximum release of water behind the dam and averting a near catastrophic situation at the Musser Dam. Nearby, the Ladysmith Dam (Rusk County) overtopped during this event and partially failed. City, County, and State emergency personnel responded.

The Radigan Dam (Douglas County) sustained major damage from flooding associated with Disaster Declaration 1369 in May 2001. Fortunately, the dam did not completely fail, but the amount of damages exceeded $300,000.

Between 1990 and 1995, over 75 Wisconsin dams failed. Many of these dam failures were associated with the Great Midwest Flood of 1993. Though none of these failures resulted in any loss of life, injuries and extensive property damage occurred during several events.

On September 2, 2002, heavy rains occurred in the far western counties of Wisconsin. In the Village of Osceola (Polk County), heavy rain caused an old milldam to breach, crashing floodwaters through a mobile home park. The torrent continued downstream, overtopping a second dam and causing extensive road damage.

In August of 2007, heavy rains severely affected southwest Wisconsin. Many dams were stressed and overtopped. In Vernon County, many dams were overwhelmed with debris (in the form of large, round hay bails) and water. As a result, the dams either failed, seeped water, or were under significant stress. Major repairs needed to be made to at least 22 dams in Vernon County. Unfortunately, the funds were not available for these repairs. As a result, Vernon County passed a county sales tax referendum in 2008 to assist with funding the repairs. With the additional revenue the county would see from the 0.5% countywide sales tax, an estimated $1.1 million per year will be raised for dam repair.

With the severe flooding in June 2008, many dams in southern Wisconsin were stressed and overtopped. In Sauk County, Dell Creek Dam on Lake Delton overtopped and the lake washed out the isthmus separating it from the Wisconsin River, taking five homes and part of County Highway A with it. Throughout the storm event, Wisconsin DNR Dam Safety staff monitored over 200 stressed dams.

Counties across the State are struggling to find funds for repair and maintenance. In a 2007 report, the American Society of Civil Engineers noted that Wisconsin's "dams are not being inspected as required and repair grants have been curtailed due to lack of funding." The increased number of flooding events exacerbate the problem. Lack of funding is most conspicuous in the state's Dam Maintenance, Repair, Modification, and Removal

Grant, established by the Wisconsin legislature in 1989. At its inception, the grant was funded but since 2001, the grant has gone essentially unfunded (Wisconsin Dams, 2008).

3.15.3 Probability of Occurrence

The direct economic impact of a dam or levee failure includes, but is not limited to, the cost of repair of the dam or levee, the flood damage resulting from the failure, and loss of income due to displaced businesses or workers. Though there have been very few dam failures in Wisconsin resulting in major damages or loss of life, many existing dams are starting to need more frequent repairs.

Since 1917, the DNR has administered the Dam Safety program, under Chapter 31 in the Wisconsin State Statues which regulates all dams and bridges affecting navigable waters in the State (Wisconsin Code § 31). Chapter NR 333 was updated in 1985, changing the way that dam safety is enforced for large dams that are State-regulated in order "to minimize the danger to life, health, and property" (Wisconsin Code § NR 333.01). NR 333 mandates that an Inspection, Operation, and Maintenance (IOM) Plan is approved in accordance with NR 333. Dam IOM Plans are evaluated for compliance in the following situations:

- When a new dam is being designed and constructed
- Within ten years of performing a hazard analysis on an existing dam
- When an existing dam is reconstructed
- After a dam failure analysis is approved by the DNR
- When a dam is adopted in a floodplain zoning ordinance
- When the DNR issues a department directive ordering a dam safety inspection

Figure 3.15.3-1, on the following page, shows the approval status of IOM Plans for large dams. There are about 970 dams without approved IOM Plans as of December 2010. It is important to note that many of these dams have not had a hazard analysis performed or are within the initial ten years of having their hazard analysis performed; however, some of these dams were found to be out of compliance at a later date.

Under NR 333 the DNR assigns hazard ratings to large dams in the state. Two factors are considered when assigning hazard ratings: existing land use and land use controls (zoning) downstream of the dam. Dams are classified in one of three categories that identify the potential hazard to life and property:

1. **High hazard** – failure of dam would probably result in the loss of life
2. **Significant hazard** – failure of dam could result in appreciable property damage
3. **Low hazard** – failure would result in only minimal property damage and loss of life is unlikely

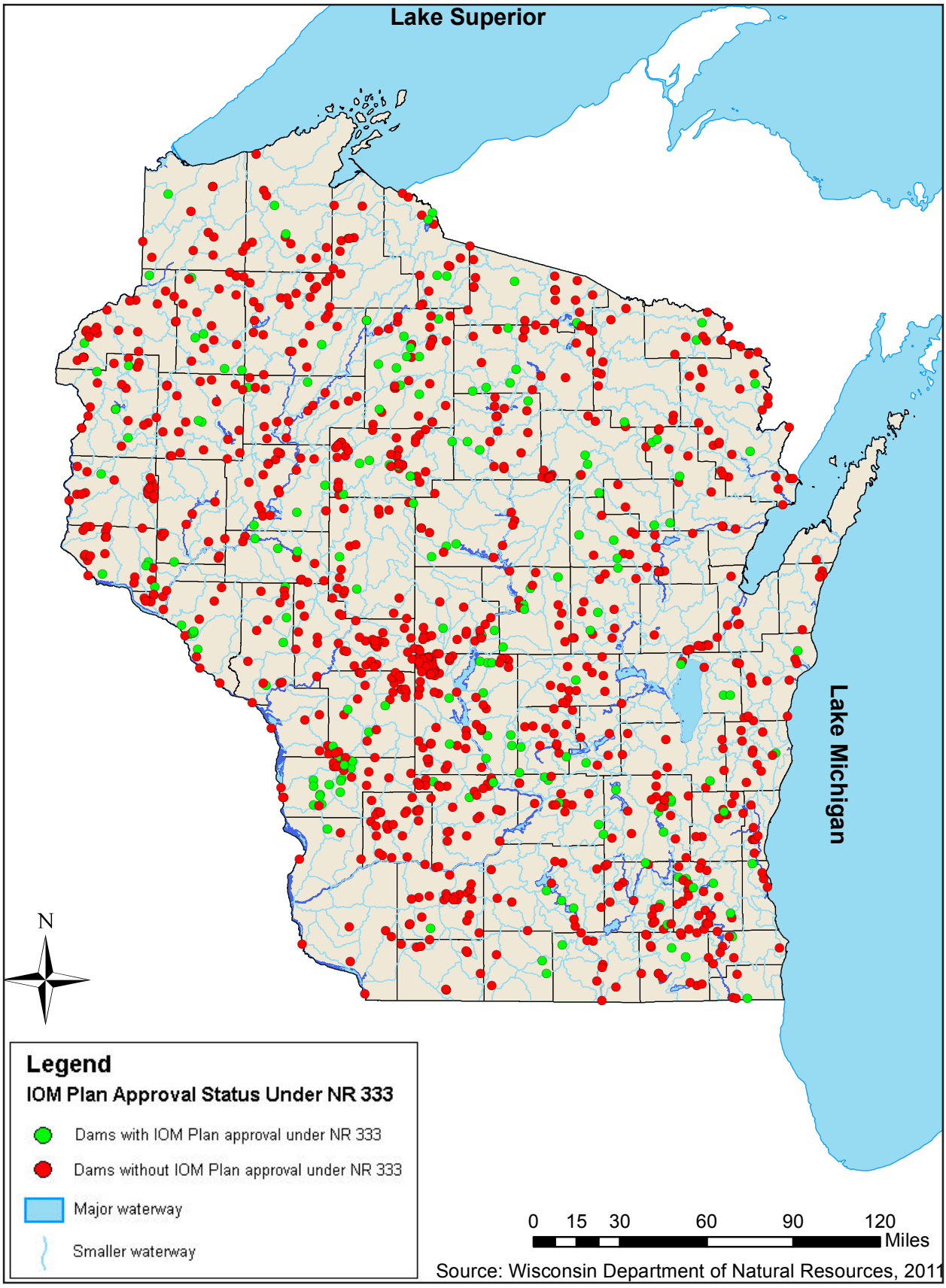


Figure 3.15.3-1 Dam Inspection, Operation, and Maintenance Plan Approval Status in Wisconsin

Figures 3.15.3-2 and 3.15.3-3 are on the following two pages. Figure 3.15.3-2 shows the locations of dams in Wisconsin with high or significant hazard ratings. The map only includes dams on which the DNR has performed a dam failure analysis and rated as high or significant. As previously stated, there are hundreds of dams without dam failure analyses throughout the state. Most dams displayed on the map are large dams, since very few small dams have had hazard analyses performed. Of the dams shown on the map, very few high- or significant-hazard dams are near high population centers such as the Madison or Milwaukee areas.

Figure 3.15.3-3 displays dams that have not had a hazard analysis. A vast majority of these dams are those classified as small dams. There are several large dams and un-classified dams without hazard analyses.

Furthermore, according to the American Society of Civil Engineers (ASCE) "Report Card for America's Infrastructure," 55% of Wisconsin's high hazard dams have no emergency action plan addressing surveillance, response, and evacuation in the event of dam failure (ASCE, 2010).

3.15.4 Hazard Ranking

TABLE 3.15.4-1 HAZARD RANKING FOR DAM FAILURE

Evaluation Criteria	Description	Ranking
Probability	• The hazard has impacted the state annually, or more frequently • The hazard is widespread, generally affecting regions or multiple counties in each event • There is a reliable methodology for identifying events and locations	High
Mitigation Potential	• Mitigation methods are established • The state or counties have limited experience with the kinds of measures that may be appropriate to mitigate the hazard • Some mitigation measures are eligible for federal grants • There is a limited range of effective mitigation measures for the hazard • Mitigation measures are cost-effective only in limited circumstances • Mitigation measures are effective for a reasonable period of time	Medium

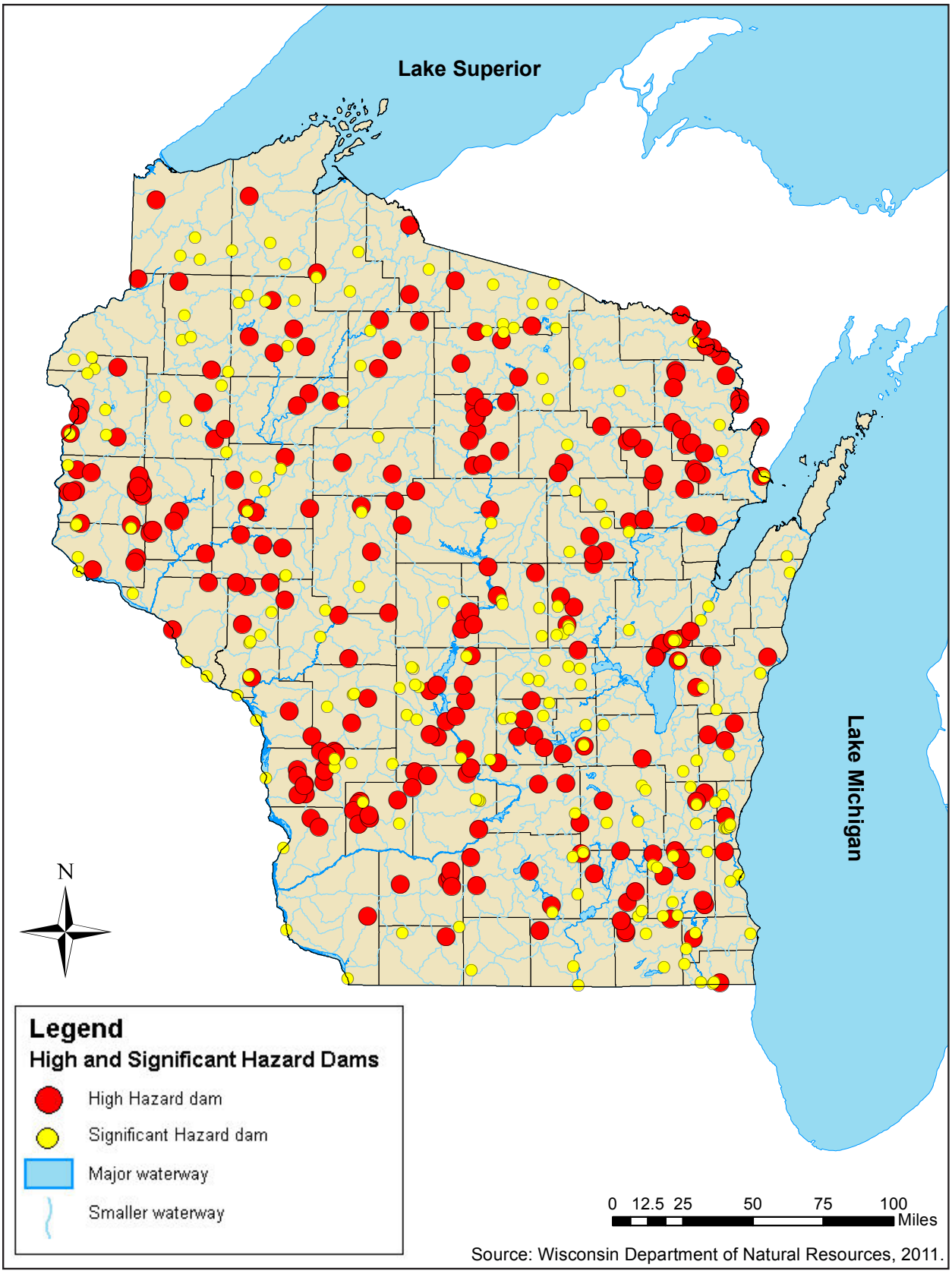


Figure 3.15.3-2 High- and Significant-Hazard Dams in Wisconsin

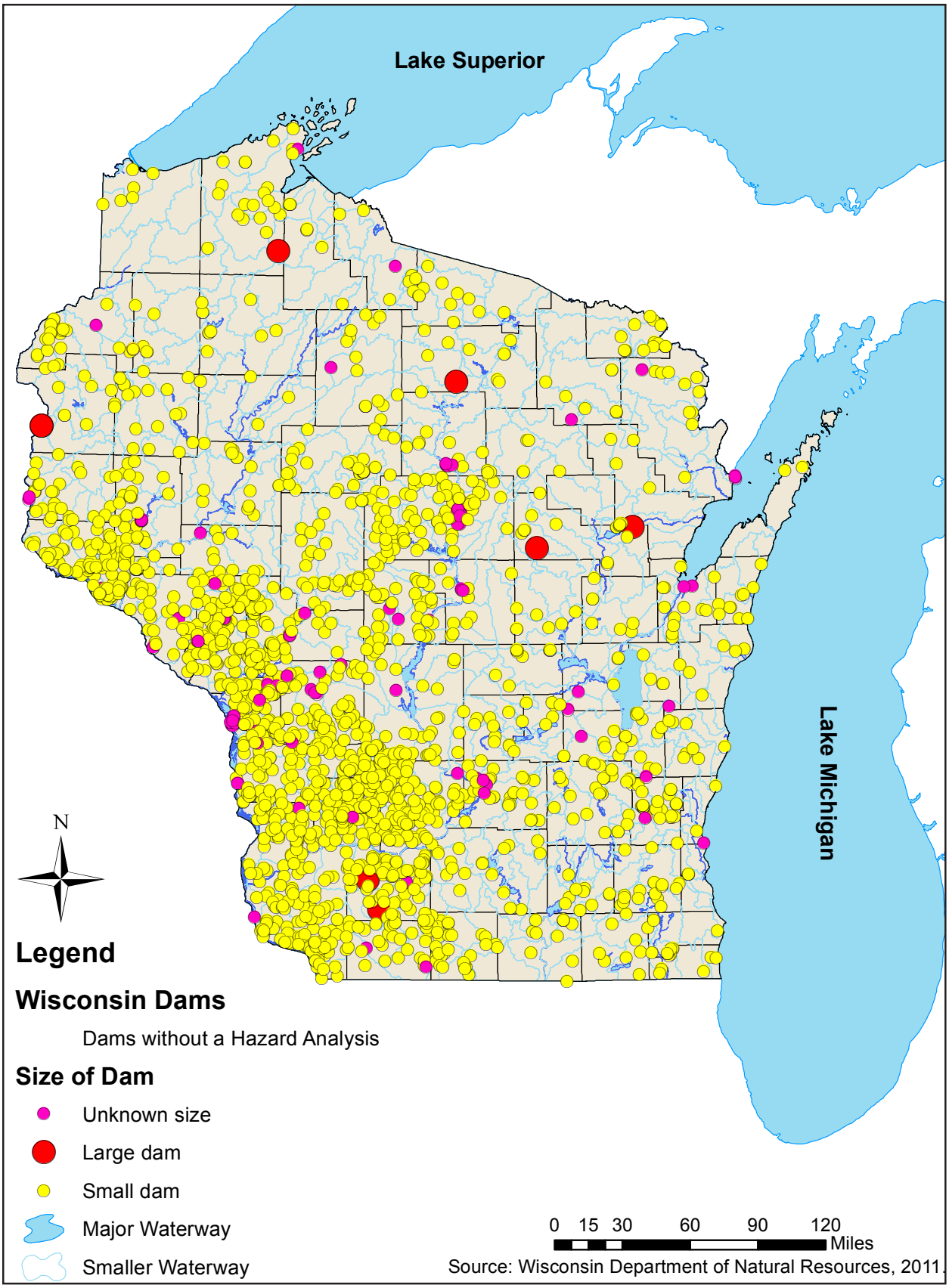


Figure 3.15.3-3 Dams without a Hazard Analysis in Wisconsin

3.15.5 Sources for Dam Failure

TABLE 3.15.5-1 SOURCES FOR DAM FAILURE	
Source Title	**Link to Resource**
FEMA's Multi-Hazard Identification and Risk Assessment, "Part 2: Technological Hazards"	http://www.fema.gov/library/viewRecord.do?id=2214
FEMA Dam Failure Information Site	http://www.fema.gov/hazard/damfailure/index.shtm
FEMA Dam Safety Publications and Resources	http://www.fema.gov/plan/prevent/damfailure/publications.shtm
US Department of the Interior, Bureau of Reclamation Dam Safety	http://www.usbr.gov/ssle/damsafety/
Wisconsin DNR Dam Safety Program	http://dnr.wi.gov/org/water/wm/dsfm/dams/
Wisconsin DNR Dam Inspection Database Search	http://dnr.wi.gov/damsafety/search.aspx
Association of State Dam Safety Officials	http://www.damsafety.org/
US Society on Dams	http://www.ussdams.org/
American Society of Civil Engineers Dam Report Card	http://www.infrastructurereportcard.org/fact-sheet/dams
American Society of Civil Engineers Levee Report Card	http://www.infrastructurereportcard.org/fact-sheet/levees
American Society of Civil Engineers Wisconsin Infrastructure Report Card	http://www.infrastructurereportcard.org/state-page/wisconsin

Other Sources:

Esposito, Katherine. 1999. "Dammed If You Do and Damned If You Don't," Wisconsin Natural Resources Magazine, April 1999. Wisconsin Department of Natural Resources. Accessed on the World Wide Web at http://dnr.wi.gov/wnrmag/html/stories/1999/apr99/dams.htm.

3.16 CLIMATE CHANGE

Weather is the short-term condition of the atmosphere. Climate is the long-term behavior of the atmosphere. Climate change indicates a significant, long-term change in weather patterns (NASA, 2011).

Global warming has been occurring over the past century. The average surface temperature of the earth has risen by about 0.8°C (= 1.4°F) (EPA, 2011). Most scientists agree that the dramatic increase is the result of human actions, but a few scientists think that it may be a coincidence or that other forces may be responsible. In addition, there is a debate over the potential effects of global warming. Some believe it will be very detrimental to the Earth's environment. Others believe the impacts will be small and humans and the environment will adapt easily. Because the potential for adverse or catastrophic situations resulting from global warming exists, this update of the Plan addresses the issue of climate change. This section will be expanded upon in future Plan updates as more information becomes available.

3.16.1 Nature of the Hazard

In the state, the Wisconsin Initiative on Climate Change Impacts (WICCI) has been researching specific effects of climate change in Wisconsin. WICCI is a partnership between the University of Wisconsin, Wisconsin Department of Natural Resources (DNR), and other state agencies and institutions. The group was formed in 2007 as a response to a bi-partisan State legislative committee wanting to better understand potential effects of this hazard in the state.

In much of its preliminary work, WICCI has found that Wisconsin's climate has changed in a pattern that is consistent with the well-documented historical global trend. This analysis was completed after examining daily weather data gathered from 176 weather stations from throughout the state from 1950 through 2006. Specifically, WICCI worked with the National Weather Service (NWS) to measure daily maximum and minimum temperatures, and used linear regression to configure the "best fit lines" for the entire time series (WICCI, 2009). (For more about the methodology used by WICCI, please visit: http://www.wicci.wisc.edu/climate-modeling-methods.php.)

Key findings from analyzing historical data:

- Figure 3.16.1-1, on the following page, shows the annual average temperature change throughout the state. Based on the data collected from 1950 through 2006, there was a statewide increase in annual average temperature of 1.1°F, with the peak warming in the northwest portion of Wisconsin (WICCI, 2009).
- The observed average temperature increase in the state has been highest for winter. Statewide, the temperatures have increased 2.5°F since 1950, with 3.5°F to 4.5°F increases in the northwest portion of the state, as seen in Figure 3.16.1-2.
- Wisconsin experiences fewer nights below 0°F than in 1950. Specifically, most of the state sees between two and six fewer nights, while the extreme northwest-

ern portion of the state experiences between 18 and 24 fewer nights below 0°F (WICCI, 2009).

- Statewide, the average growing season lasts 12 days longer than it did in the 1950 (WICCI, 2009). In other words, the "spring thaw" comes sooner, and the "fall freeze" comes later.
- Wisconsin has experienced a 10% increase in average annual precipitation over the 56 year period from 1950 to 2006. This is an annual average of about three more inches of precipitation than in the 1950s (WICCI, 2009). Figure 3.16.1-3 , on the following page, shows the statewide distribution. Noteworthy is the additional precipitation, as much as seven inches, in areas with high population density, such as near Madison (Dane County), Milwaukee (Milwaukee County), Eau Claire (Eau Claire County), and Hudson (Saint Croix County).

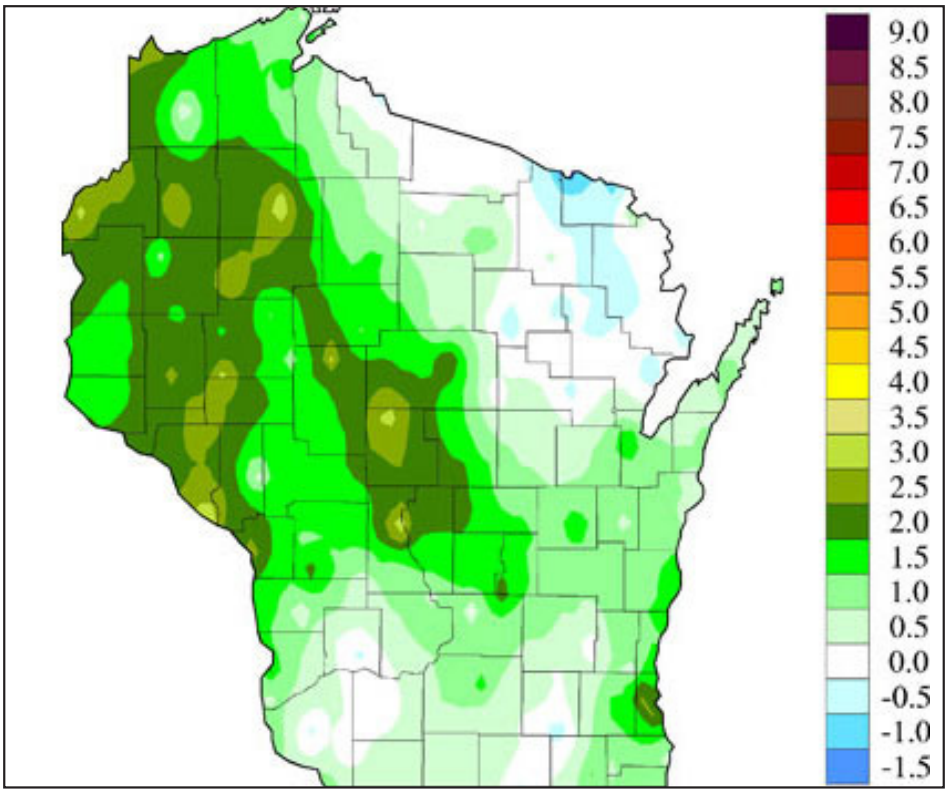


Figure 3.16.1-1 Change in Average Annual Temperature (°F), 1950-2006
Source: Wisconsin Initiative on Climate Change Impacts, "How is Wisconsin's Climate Changing?" 2009.

3.16.2 Probability of Occurrence

In relation to climate change, the future is uncertain, with varying models predicting a range of outcomes. It is unknown how much the climate will change and at what speed it will change. As further research is performed, better models can be created and understood. The 2014 State Hazard Mitigation Plan Update will have new data and modeling methods to draw from, in the hope that this hazard can be better understood.

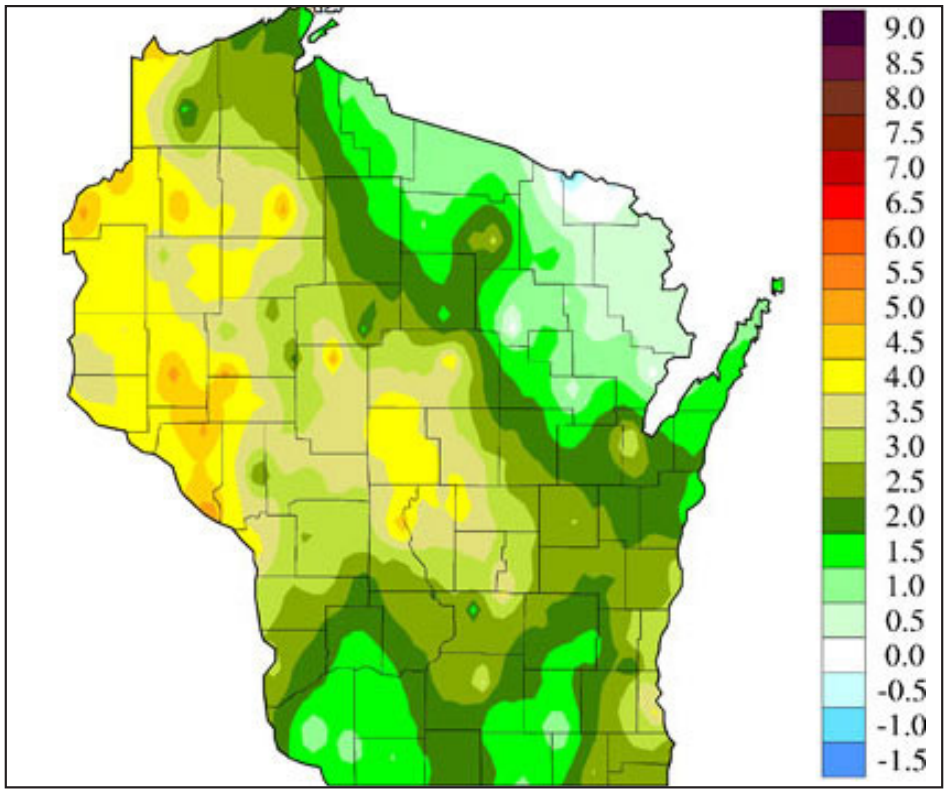


Figure 3.16.1-2 Change in Average Winter Temperature (°F), 1950-2006
Source: Wisconsin Initiative on Climate Change Impacts, "How is Wisconsin's Climate Changing?" 2009.

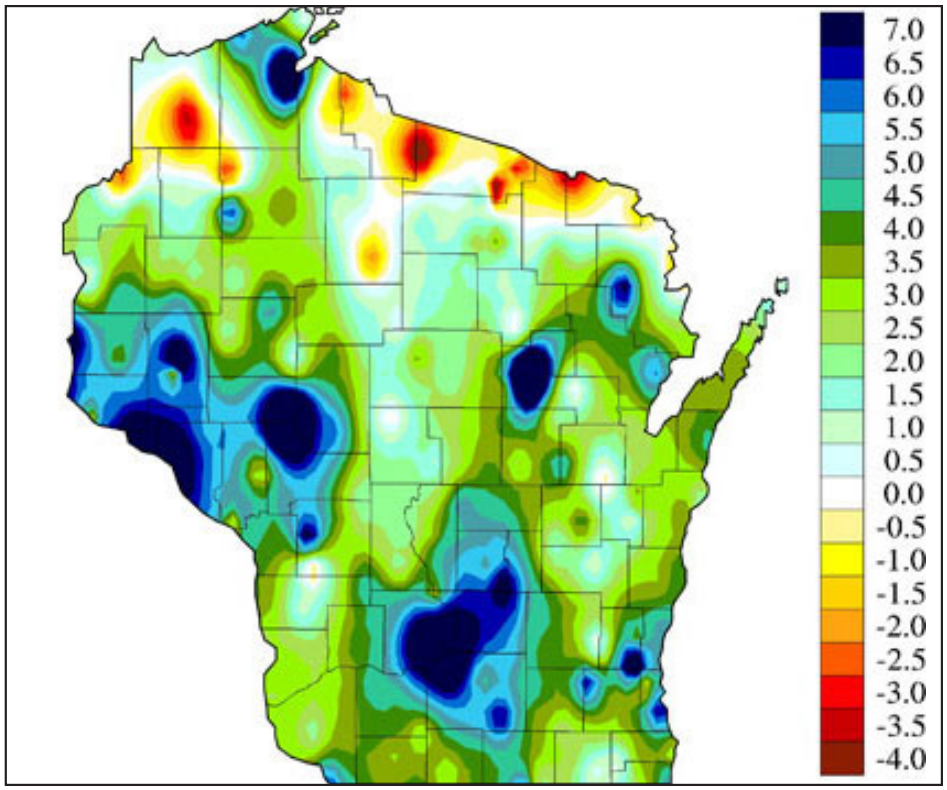


Figure 3.16.1-3 Change in Average Annual Precipitation (inches), 1950-2006
Source: Wisconsin Initiative on Climate Change Impacts, "How is Wisconsin's Climate Changing?" 2009.

3.16.3 Sources for Climate Change

TABLE 3.16.3-1 SOURCES FOR CLIMATE CHANGE	
Source Title	**Link to Resource**
Intergovernmental Panel on Climate Change	http://www.ipcc.ch/
NOAA Climate Services	http://www.wicci.wisc.edu/resources.php
United States Environmental Protection Agency Climate Change Site	http://www.epa.gov/climatechange/
NASA Global Climate Change Site	http://climate.nasa.gov/
WICCI Homepage	http://www.wicci.wisc.edu/
WICCI Climate Change Overview	http://www.wicci.wisc.edu/climate-change.php
WICCI Climate Change Modeling Methodology	http://www.wicci.wisc.edu/climate-modeling-methods.php
WICCI Resources	http://www.wicci.wisc.edu/resources.php
University of Wisconsin Nelson Institute for Environmental Studies	http://www.nelson.wisc.edu/
University of Wisconsin Sea Grant Institute Climate Change Site	http://www.seagrant.wisc.edu/home/Topics/ClimateChange.aspx

3.17 RISKS TO STATE-OWNED AND -OPERATED CRITICAL FACILITIES

This section of the Wisconsin risk assessment is intended to meet IFR requirements in subsection 201.4 (c) (2) (iii). The IFR states that the State Hazard Mitigation Plan:

> "[S]hall include…[a]n overview and analysis of potential losses to the identified vulnerable structures, based on estimates provided in local risk assessments as well as the State risk assessment. The State shall estimate the potential dollar losses to State owned or operated buildings, infrastructure, and critical facilities located in the identified hazard areas."

The 2008 plan included a flood, tornado, and straight-line wind risk assessment of State-owned and -operated critical facilities that used data at the facility level. Wisconsin Emergency Management (WEM) is currently in the process of completing a statewide, State-owned and -operated critical facility project. The completed project will allow WEM to do a more comprehensive risk assessment on State-owned and -operated critical facilities.

Critical infrastructure includes any system or asset that, if disabled or disrupted in any significant way, would result in catastrophic loss of life or catastrophic economic loss.

Critical facilities commonly include all public and private facilities that a community considers essential for the delivery of vital services and for the protection of the community. They usually include emergency response facilities, custodial facilities, schools, emergency shelters, utilities, communications facilities, and any other assets determined by the community to be of critical importance for the protection of the health, safety, and welfare of the population. The adverse effects of damaged critical facilities can extend far beyond direct physical damage. Disruption of health care, fire, and police services can impair search and rescue, emergency medical care, and even access to damaged areas. Furthermore, there exists the potential to cause serious bodily harm, extensive property damage, or disruption of vital socioeconomic activities if they are destroyed or damaged or if their functionality is impaired.

3.17.1 Flood Risk

Flood risk is highly site- and building-specific; truly accurate risk calculations can be accomplished only when there is detailed information about floodplain characteristics and the various aspects of an asset that could be damaged by floods. The flood risk assessment is done by two methods, discussed in more detail in the sections below. Note that unlike some other hazards (tornadoes for example), flood risk assessments must be conducted at the level of specific buildings, assets, or sites in order to be accurate. The methods used in this section provide a general idea of risk under pre-determined flood scenarios but do not use site-specific flood risk data, such as Flood Insurance Studies (FIS) or Flood Insurance Rate Maps (FIRMs). Because of this, there is no way to accurately determine the probability of floods occurring there. As discussed elsewhere in

this report, probability is an essential feature of accurate risk assessment, so the results of this assessment should be considered only a general guide to risk under certain flood scenarios. The information should be used to prioritize those facilities that appear to have the most risk (i.e. the most significant potential future losses) and those facilities should be provided more detailed risk assessments in the future.

The 2005 plan included a flood risk assessment of State-owned and -operated critical facilities that used data at the facility level. Since 2005, Wisconsin Emergency Management (WEM) has been conducting a statewide, State-owned and -operated critical facility project. Currently, the only State agency with a completed building inventory is the Department of Corrections. The findings from the Department of Corrections are detailed in Section 3.17.4.

Data Management

Two kinds of data are required for risk assessments:

1. Probability and severity of the hazard
2. Physical and operational characteristics of vulnerable assets

Section 3.2 provides a general discussion of risk and vulnerability. The primary source of information about the State-owned and -operated facilities considered in this section was a database created by WEM in the form of a spreadsheet that included approximately 6,500 assets statewide. The accuracy and completeness of this database was not independently verified as part of this risk assessment.

The data provided by WEM include a wide range of State assets that were determined to be critical facilities. Based on the limited data available on State-owned buildings from an initial list provided by the Department of Administration, WEM reviewed the inventory and identified those buildings that could be considered critical facilities. In determining whether or not a building or structure was potentially a critical facility, WEM looked at its purpose and function(s), whether the facility's operation was critical to State operations, or critical in protecting the public health and safety of citizens and property during a disaster. Critical structures fell into the following categories:

1. A facility or structure related to communications – includes radio and television facilities for EAS, communications towers, etc.
2. A facility or structure that generated electrical power, provided heating, wastewater treatment, or water sources
3. Hospitals, homes, and other medical type facilities
4. Correctional facilities
5. Major state government facilities that house key state operations
6. Critical military facilities
7. Emergency response facilities related to law enforcement, security, fire, etc.

Based on this methodology, WEM identified an initial list of 460 critical facilities. The list was reduced to 452 for analyses because eight of the facilities did not have sufficient basic data to conduct the calculations. The following data were used in the calculation:

- **Asset Name Data**
  The Asset Name field in the database was fully populated in the initial version and required no adjustment.
- **Year Occupied Data**
  The Year Occupied field in the database was mostly populated, with only a few entries missing in the initial version. This is not a critical field for analysis except in cases where it is used in conjunction with the Use field to populate the construction type field by algorithm (see notes below).
- **Gross Square Footage Data**
  The Gross Square Footage (GSF) field in the database was partially populated in the initial version of the database. Several facilities did not list the GSF. In that case, the GSF for each facility was estimated based on similar facilities in the database. If there was no comparable facility, that particular facility was removed from the database, which was the case for eight facilities (two lightly engineered and six fully engineered buildings). The total number of structures considered in the risk assessment is 452. The GSF data was used to estimate the building occupancy which is included in the injury and mortality calculations.
- **Replacement Value Data**
  The Replacement Value field was populated in the initial version of the database. The data was used verbatim in the analysis. Table 3.17.1-1, below, shows the replacement values of the initial list of critical facilities provided by the Department of Administration and the final list of critical facilities selected by WEM for the risk assessment.

TABLE 3.17.1-1 STATE-OWNED AND -OPERATED CRITICAL FACILITIES SELECTED BY WEM

Category	Replacement Value Range	Initial List of Facilities	Facilities Selected by WEM
1	$100,000 - $599,999	1404	0
2	$600,000 - $1,000,000	238	52
3	$1,000,000 +	1223	408
4	Less than $100,000	3,595	0
Total		**6460**	**460**

Source: WEM, 2008.

Flood Probability

The basic assumption of the calculation is that the State-owned assets are subject to a two-foot flood. This is in turn based on an assumption that the facilities are within the boundaries of the 100-year floodplain. As discussed earlier, true flood risk assessments

must be based on local conditions, i.e. flood probabilities in specific places. A single 1% annual probability is used for the present calculation. In fact, all floodprone sites are subject to a range of floods annually, and a comprehensive risk assessment would consider the annual probability of each flood event, and use an integrated calculation to determine the true risk. The figures generated by this method are best characterized as "potential flood exposure" rather than an absolute measure of risk.

Calculation Methodology

As noted, flood risk calculations are performed by assuming a two-foot flood in State-owned (and -operated) assets. The calculation uses a simple 1% probability flood (the 100-year flood) to determine damages. The damages from this event are then projected to a 30-year horizon using the OMB-mandated methodology.

TABLE 3.17.1-2 BUILDING TYPE AND NUMBER IN DATABASE

Asset Type	Number
Manufactured Housing	0
Non-Engineered Wood Frame	38
Lightly Engineered	290
Non-Engineered Masonry	0
Fully-Engineered	124
Total	**452**

Source: WEM, 2008.

The facilities were sorted into one of five building types, as shown in Table 3.17.1-2 (left). Many of the State-owned and -operated structures in the Wisconsin database provided by WEM included an "ISO Building Type," but this classification system could not be readily translated to flood (or wind, in later sections) damage functions, so it was necessary to assign more appropriate building types to the structures in the database. The assignment of building types to the structures was based on a combination of construction date, use (as determined by the name of the building which appeared representative of the use in most cases), and size.

The occupancy load of each facility was determined by estimating the number of people per square foot that would occupy the facility. Then this number was divided by the total GSF per facility. For example, in living quarters the square foot estimate per person may be 100, whereas the per person square foot estimate for a communications tower could be 5,000.

The database of State-owned and -operated facilities was organized by building class and presence or absence of a basement. Building flood damage functions are extracted from the FEMA Full-Data Benefit-Cost Analysis Module, and adjusted for the different building types in the state database. The functions are estimates. Since there are no standard damage functions for non-residential buildings, the analysis is based on adapting standard FEMA/NFIP damage functions to the facilities database provided by Wisconsin. Table 3.17.1-3, on the following page, shows the damage functions at a two-foot flood depth.

The nature of the contents in the assets in the State database is not known. Therefore, damages to contents are calculated by simply assuming their value is 30% of the value of

the structure itself, and that the damage function is the same as the structure. The results of this method should be used only to get a general idea of flood risk, not as the basis for mitigation actions for individual facilities.

TABLE 3.17.1-3 ASSUMED DAMAGE PERCENT FOR TWO-FOOT FLOOD DEPTH

Building Type	Without Basement	With Basement
Manufactured Housing	40	N/A
Non-Engineered Wood Frame	20	30
Lightly Engineered	15	25
Non-Engineered Masonry	15	25
Fully-Engineered	15	25

Source: WEM, 2008.

Calculating Annual Damages

The calculation is performed as follows:

$$(P)(RV_b)(F_d)(1.3) = D$$

where:

P is the flood probability, assumed to be 1%
RV_b is the replacement value of the building in dollars
F_d is the flood damage function
1.3 accounts for the additional value of contents
D is the total expected damages

For example, consider a non-engineered, wood-frame building without a basement and replacement value of $1,000,000:

0.01 (Flood Probability) x $1,000,000 (Replacement Value) x 0.20 (Damage Function from Table 3.17.1-3) x 1.3 (Contents Value) = $2,600 (Total Expected Damages)

The calculation of future risk from this flood scenario is done as follows:

$$D*12.41 = D_{npv}$$

where:

D is the total expected damages in a two-foot flood
12.41 is the present value coefficient for a 30-year horizon with a 7% discount rate
D_{npv} is the net present value of damages for a 30-year horizon

For example, consider the previous damage calculation:

$2,600 (Total Expected Damages in a two-foot flood) x 12.41 (Present Value Coefficient) = $32,266 (Net Present Value of Damages for a 30-Year Horizon)

Results

TABLE 3.17.1-4 TWO-FOOT FLOOD AND FUTURE RISK			
Building Type	**Number**	**Damages in Two-Foot Flood**	**Future Risk**
Manufactured Housing	0	-	-
Non-Engineered Wood Frame	38	$182,919	$2,270,022
Lightly Engineered	290	$5,694,992	$70,674,847
Non-Engineered Masonry	0	-	-
Fully-Engineered	124	$3,102,789	$38,505,611
Total	452	$8,980,700	$111,450,480

Source: WEM, 2008.

3.17.2 Tornado Risk

Without evaluations of individual buildings by qualified structural engineers or architects, even qualified and general estimates of wind damage functions using the limited data available in the Wisconsin database is certain to include errors. The State will use the output of this analysis only to prioritize its mitigation actions in a relative sense, i.e. in comparisons among buildings, not to determine if it is worthwhile to perform mitigation actions on particular facilities. This will form the basis of an initial prioritization that will begin the process of identifying the most at-risk structures for further examination and potential mitigation efforts.

Calculation Methodology

Expected damages, injuries and deaths at each State-owned facility were calculated using the following steps, which are discussed in detail below:

1. Determine building type
2. Determine building occupancy load
3. Determine building size (footprint)
4. Determine annual probability of impact by range of tornadoes
5. Develop damage, injury, and mortality functions for building type classes
6. Calculate expected annual damages using damage functions and probabilities
7. Project future damages to 30-year horizon using the OMB-mandated method

Building Type

The facilities identified by WEM (452) were sorted into one of five building types identified in the FEMA Full-Data Benefit-Cost Analysis Module for floods. The criteria used to determine the building type were gross square footage, replacement value, and use. The sorting was conducted based on the available data. Table 3.17.1-2 in Section 3.17.1 shows the building type and the number that are included in the risk assessment database.

Occupancy Load
The occupancy load of each facility was determined by estimating the number of people per square foot that would occupy the facility. Then this number was divided by the total GSF of the facility. For example, in living quarters the square foot estimate per person may be 100, whereas the per person square foot estimate for a communications tower could be 5,000. The occupancy load will be used in the injury and mortality functions.

Building Size (GSF Data)
The GSF field was partially populated in the initial version of the database. Several facilities did not list the GSF. In those cases, the GSF for each facility was based on similar facilities in the database. If there was no comparable facility, that particular facility was removed from the database.

Annual Probability of Tornado
The meaning of the Fujita classes was discussed in the tornado hazard profile in Section 3.6 and will not be reviewed here. Tornado probability data was obtained from FEMA's Tornado Wind Benefit-Cost Analysis Module. The metadata used in the software was obtained from NOAA records, and is documented in the technical materials for the program. In this assessment, a proportional risk methodology was employed, as described below in steps. The purpose of these steps was to determine the annual probability of each F-class impacting the individual State-owned buildings in the data set.

1. Extract probability metadata from the FEMA software. This data indicates the area (in acres) that tornadoes of all the F-classes affect in Wisconsin every year. The data is expressed in acres of impact.
2. Determine the percentage of area in the state that is impacted by various tornado classes annually.
3. Determine the footprint area of buildings in the State-owned facilities database.
4. Determine the likelihood of buildings being impacted by the various F-classes each year by proportion.

TABLE 3.17.2-1 TORNADO AREAS OF IMPACT BY FUJITA CLASS

Data Parameter	Tornado Fujita Class					
	F0	F1	F2	F3	F4	F5
Number in Sample	130	315	255	57	13	2
Percentage of Sample (%)	16.84	40.80	33.03	7.38	1.68	0.26
Total Area of Impact (acres)	545	11710	45674	85193	42398	12611
Avg. Area of Impact per Event	4.19	37.17	179.11	1494.61	3261.38	6305.50
Avg. Annual Area of Impact	11.85	254.57	992.91	1852.02	921.70	274.15
Annual Probability (%)	0.0000283	0.000607	0.002368	0.004418	0.002199	0.000654

Source: WEM, 2008.

Injury and Mortality Functions

Injury and mortality functions are estimates of how many people will be injured and killed by tornadoes. There is no nationally-recognized method or proven source of data for these functions. The risk of tornado deaths and injuries (i.e. the dollar value of future risk) depends on several inter-related factors including those shown below. Given the number of State-owned facilities included in this assessment, it was not possible to determine items 4 and 5 in the list below with any certainty, so these were not taken into account.

1. Tornado probability by Fujita class
2. The number of people in a facility
3. The performance of the building that individuals are in during the tornado (if they are inside), i.e. the building damage function
4. The availability of advance warning about the event
5. The availability and accessibility of appropriate shelter

The figures used for valuation of deaths and injuries, shown below in Table 3.17.2-2, are approximations based on FEMA guidance used in benefit-cost analysis of hazard mitigation measures. Major and minor injuries are combined in the NOAA data, so it was necessary to use a blended number in the valuation.

TABLE 3.17.2-2 MONETARY CONVERSION VALUES FOR INJURIES AND DEATHS

Damage Category	Value for Monetary Conversion
Injury (blended major and minor)	$7,500
Death	$3,000,000

Source: WEM, 2008.

Table 3.17.2-3, on the following page, shows injury and mortality functions by building type. The functions are linked to the performance of the various building types during tornadoes. These figures are estimates and should not be used in any context other than the State Hazard Mtigation Plan. In order to accurately assess the expected mortality and injuries in specific buildings, it would be necessary to assess numerous aspects of those buildings, and to ascertain if occupants had adequate warning and shelter, as discussed previously. The figures in the table are used to calculate future risk for comparison among building types and uses in the Wisconsin database. The results of the calculations should be used only to gauge the relative risk as a part of the mitigation planning process.

TABLE 3.17.2-3 INJURY AND MORTALITY FUNCTIONS BY BUILDING TYPE (% OF OCCUPANTS INJURED OR KILLED)

Building Type	Fujita Tornado Class											
	F0		F1		F2		F3		F4		F5	
	I	M	I	M	I	M	I	M	I	M	I	M
Manufactured Housing	20	0	30	0	50	20	25	75	10	90	0	100
Non-Engineered Wood Frame	10	0	15	0	30	0.5	50	50	10	90	0	100
Lightly Engineered	5	0	5	0	25	0	40	40	65	80	10	100
Non-Engineered Masonry	0	0	5	0	25	0	40	40	65	80	10	100
Fully-Engineered	0	0	0	0	10	0	30	0	35	50	50	30

Source: WEM, 2008.

Building Tornado Damage Functions

Building damage functions were developed for each of the building types identified earlier. Damage functions describe the percentage to which buildings or other assets are damaged at various wind stress levels, in the case of tornadoes at various Fujita class wind speeds. The damage functions are expressed as percentages of damages, and are multiplied by building replacement value to determine expected damage under given wind loads. It is important to recognize that there exist no nationally-recognized wind damage functions based on building classification. The wind damage functions in this are estimated, referring to FEMA's Hurricane Wind Benefit-Cost Analysis Module as appropriate.

TABLE 3.17.2-4 WIND SPEED CLASSES: SAFFIR-SIMPSON HURRICANE VS FUJITA TORNADO

Classification	Saffir-Simpson	Fujita
0	60-73	40-72
1	74-95	73-112
2	96-110	113-157
3	111-130	158-206
4	131-155	207-260
5	>155	261-318

Source: WEM, 2008.

Table 3.17.2-5, on the following page, shows the wind damage function defaults in FEMA's Hurricane Wind Benefit-Cost Analysis Module. Because the Fujita classifications for tornado wind speeds are calibrated on a much higher scale, there is no reliable method for directly converting hurricane categories to the Fujita scale for tornadoes.

Table 3.17.2-6, on the following page, provides wind damage functions by Fujita class based on an estimated conversion from hurricane category functions. As noted above, the results of this analysis should be considered reliable only in relative terms, i.e. for comparisons in the State of Wisconsin.

TABLE 3.17.2-5 WIND DAMAGE FUNCTIONS FOR HURRICANE CLASS						
Building Type	Percent Damage by Saffir-Simpson Class					
	0	1	2	3	4	5
Manufactured Housing	10	25	50	80	100	100
Non-Engineered Wood Frame	0	7.5	20	50	90	100
Lightly Engineered	0	5	15	40	80	100
Non-Engineered Masonry	0	5	15	40	80	100
Fully-Engineered	0	2.5	5	20	40	60

Source: WEM, 2008.

TABLE 3.17.2-6 WIND DAMAGE FUNCTIONS FOR FUJITA CLASS						
Building Type	Percent Damage by Fujita Class					
	0	1	2	3	4	5
Manufactured Housing	10	35	75	100	100	100
Non-Engineered Wood Frame	5	30	50	100	100	100
Lightly Engineered	0	15	25	65	100	100
Non-Engineered Masonry	0	15	30	80	100	100
Fully-Engineered	0	10	25	60	100	100

Source: WEM, 2008.

Calculating Annual Damages

The basic damage calculation is accomplished by multiplying the values of buildings, injuries and deaths by the probabilities of various classes of tornadoes impacting the structure in question. Since the probabilities are calculated proportionally, they are not performed using an integration methodology, but are rather compiled as individual scenario events and added together.

The tornado risk calculation is performed as:

$$P_a[(RV)(DF_c)(1.3) + (O)(DF_i)(M_i) + (O)(DF_m)(M_m)] = D_a$$

where:

P_a is the annual event probability
RV is the replacement value of the asset in dollars
DF_c is the damage function for the various building classes in the database
1.3 accounts for the additional value of the contents
O is the occupancy of the asset
DF_i is the injury function
M_i is the monetary value for a blended injury
DF_m is the mortality function
M_m is the monetary value for a mortality
D_a is the annual expected damage

The 1.3 multiplier on the replacement value reflects the value of contents. Given the size of the database there is no way to accurately assess the value or damage functions of the various contents. In these calculations the value figure is calculated by algorithm as 30% of the value of the structure, and the damage function is assumed to be the same as the structure.

For example, consider a non-engineered wood frame building with a replacement value of $1,000,000 and occupancy 10:

> 0.000000283 (Probability F0) * [$1,000,000 (Replacement Value) * 0.05 (Damage Function from Table 3.17.2-6) * 1.3 (Contents Value) + 10 (Occupancy) * 0.10 (Injury Function from Table 3.17.2-3) * $7,500 (Blended Injury Monetary Value from Table 3.17.2-2) +10 (Occupancy) * 0 (Mortality Function from Table 3.17.2-3) * $3,000,000 (Mortality Monetary Value from Table 3.17.2-2)] = $0.02 = Total Annual Expected Damages for an F0 tornado

This must be completed for all F classes and the results added together to calculate the total expected annual damage.

In accordance with Office of Management and Budget guidelines found in Circular No. A-94, future expected damages are expressed as net present value with a 7% discount rate. For this report, a 30-year time horizon is employed, although this figure can be adjusted using different present value coefficients. In the present calculations, the annual risk from tornadoes is multiplied by a present value coefficient of 12.41 to determine future risk at a 7% discount, as required. The calculation is done as follows:

$$D_a PVC = R$$

where:

> D_a is the annual expected damage
> PVC is the present value coefficient (7% discount rate, 30-year horizon)
> R is the risk (i.e. the cumulative losses over the 30-year horizon, discounted to present value)

Results

TABLE 3.17.2-7 TORNADO ANNUAL AND FUTURE RISK

Building Type	Number	Structural and Contents Damage	Injury and Mortality Damage	Annual Risk	Future Risk
Manufactured Housing	0	0	0	0	0
Non-Engineered Wood Frame	38	$6,282	$400,708	$406,990	$5,050,741
Lightly Engineered	290	$172,118	$10,310,741	$10,482,859	$130,092,280
Non-Engineered Masonry	0	0	0	0	0
Fully-Engineered	124	$87,480	$957,034	$1,044,514	$12,962,418
Total	452	$265,880	$11,668,483	$11,934,363	$148,105,439

Source: WEM, 2008.

3.17.3 High Wind Risk

As discussed in the high winds hazard profile in Section 3.6, high winds are winds unrelated to tornadoes. They are typically created by downbursts from thunderstorms or by strong weather fronts. Although Wisconsin has a history of these events, by nature they are very difficult to predict, particularly on a site-specific basis. In its ASCE 7-98 publication the American Society of Civil Engineers provides design guidelines for structures based on anticipated wind speeds in various parts of the US. For most of the country (including Wisconsin) the "design wind speed" is 90 mph. This figure is the 3-second peak gust at 33 feet above ground level. This wind speed is calculated as a 50-year event, i.e. one with a 2% annual recurrence probability.

Calculation methodology

The methodology used to calculate damages (including injuries and deaths) from high winds is identical to that used for tornadoes, except that there is only one probability function required. The calculation sequence is as follows:

1. Determine building type
2. Determine building occupancy load
3. Determine building size (footprint)
4. Determine annual probability of impact
5. Develop damage, injury, and mortality functions for building types
6. Calculate expected annual damages using damage functions and probabilities
7. Project future damages to 30-year horizon using OMB-mandated method

All these items are discussed in the tornado section above, and are not revisited here, except for a few brief comments below on probability and wind damage functions.

High Wind Probability
The probability calculation is done as a simple annual return frequency of 2%, or a 0.02 annual probability.

Building Wind Damage Functions
For this risk assessment, building wind damage functions are simply derived from the equivalent tornado wind damage functions by equating the baseline 90-mph wind to a Fujita Class 1 tornado. Table 3.17.3-1, at right, shows the percentage of building damage for the 90 mph peak gust.

TABLE 3.17.3-1 WIND DAMAGE FUNCTIONS FOR 90 MPH PEAK WIND GUST

Building Type	Building Damage (%)
Manufactured Housing	35
Non-Engineered Wood Frame	30
Lightly Engineered	15
Non-Engineered Masonry	15
Fully-Engineered	10

Source: WEM, 2008.

TABLE 3.17.3-2 INJURY AND MORTALITY FUNCTIONS BY BUILDING TYPE

Building Type	Injured (%)	Killed (%)
Manufactured Housing	30	0
Non-Engineered Wood Frame	15	0
Lightly Engineered	5	0
Non-Engineered Masonry	5	0
Fully-Engineered	0	0

Source: WEM, 2008.

Table 3.17.3-2, at left, shows injury and mortality functions by building type. The functions are linked to the performance of the various building types during tornadoes. These figures are estimates and should not be used in any context other than the State Hazard Mitigation Plan. In order to accurately assess the expected mortality and injuries in specific buildings, it would be necessary to assess numerous aspects of those buildings, and to ascertain if occupants had adequate warning and shelter, as discussed previously. The figures in the table are used to calculate future risk for comparison among building types and uses in the Wisconsin database. The results of the calculations should be used only to gauge the relative risk as a part of the mitigation planning process.

The figures in this table match the injury and mortality functions for Fujita Class 1 tornadoes.

Calculating Annual Damages

The basic damage calculation is accomplished by multiplying the values of buildings, injuries, and deaths by the probability of a Fujita class 1 tornado impacting the structure in question.

The high wind risk calculation is performed as:

$$P_a[(RV)(DF_c)(1.3) + (O)(DF_i)(M_i) + (O)(DF_m)(M_m)] = D_a$$

where:

P_a is the annual event probability
RV is the replacement value of the asset in dollars
DF_c is the damage function for the various building classes in the database
1.3 accounts for the additional value of the contents
O is the occupancy of the asset
DF_i is the injury function
M_i is the monetary value for a blended injury
DF_m is the mortality function
M_m is the monetary value for a mortality
D_a is the annual expected damage

The 1.3 multiplier on the replacement value reflects the value of contents. Given the size of the database there is no way to accurately assess the value or damage functions of the various contents. In these calculations the value figure is calculated by algorithm as

30% of the value of the structure, and the damage function is assumed to be the same as the structure.

For example, consider a non-engineered wood frame building with a replacement value of $1,000,000 and occupancy of 10:

> 0.02 (Probability) * [$1,000,000 (Replacement value) * 0.30 (Damage Function from Table 3.17.3-1) * 1.3 (Contents value) + 10 (Occupancy) * 0.15 (Injury Function from Table 3.17.3-2) * $7,500 (Blended Injury Monetary Value from Table 3.17.2-2) + 10 (Occupancy) * 0 (Mortality Function from Table 3.17.3-2) * $3,000,000 (Mortality Monetary Value from Table 3.17.2-2) = $8,025.00 = Total Annual Expected Damages

In accordance with Office of Management and Budget guidelines found in Circular No. A-94, future expected damages are expressed as net present value with a 7% discount rate. For this report, a 30-year time horizon is employed, although this figure can be adjusted using different present value coefficients. In the present calculations, the annual risk from tornadoes is multiplied by a present value coefficient of 12.41 to determine future risk at a 7% discount, as required. The calculation is done as follows:

$$D_a PVC = R$$

where:

> D_a is the annual expected damage
> PVC is the present value coefficient (7% discount rate, 30-year horizon)
> R is the risk (i.e. the cumulative losses over the 30-year horizon, discounted to present value)

Results

TABLE 3.17.3-3 HIGH WINDS ANNUAL AND FUTURE RISK

Building Type	Number	Structural and Contents Damage	Injury and Mortality Damage	Annual Risk	Future Risk
Manufactured Housing	0	0	0	0	0
Non-Engineered Wood Frame	38	$436,328	$60,439	$496,767	$6,164,874
Lightly Engineered	290	$8,058,825	$615,248	$8,674,073	$107,645,247
Non-Engineered Masonry	0	0	0	0	0
Fully-Engineered	124	$2,842,064	0	$2,842,064	$35,270,017
Total	452	$11,337,217	$675,687	$12,012,904	$149,080,139

Source: WEM, 2008.

3.17.4 Critical Facility Risk Assessment by State Agency

There are approximately 6,500 state facilities not including infrastructure. In order to collect comprehensive data, it would take one person working full-time nearly 28 years to visit every facility. Therefore, the following strategy has been developed to obtain the necessary site-specific information on those facilities and infrastructure that are most critical and may be at most risk from future disasters. The information will be used for future updates to the State of Wisconsin Hazard Mitigation Plan.

1. Through the Wisconsin Hazard Mitigation Team and the Governor's Homeland Security Council's Interagency Working Group,
    a. conduct more in-depth analysis to determine the state facilities that are considered critical facilities;
    b. conduct more in-depth analysis to identify critical state infrastructure; and
    c. determine which state facilities are low priorities for further analysis or data collection. This would include such structures as outhouses and sheds, i.e., those facilities that are not critical or essential to state operations and would not be significantly affected by a disaster.
2. Prioritize facilities by county for further analysis and data collection. This would be based upon the following:
    - Number of state facilities
    - Number of state critical facilities
    - Number of federal disaster declarations that include the county
    - Total value of the state facilities
    - Total value of the state critical facilities
    - Whether there is Q3 floodplain data available
3. Work with state agencies to generate proper building contacts for the critical facilities.
4. Send out the finalized Wisconsin Risk Assessment Data Collection Worksheet to each contact at the critical facilities.
5. Work with Department of Administration Risk Management staff to create a secure database that can be easily accessed.
6. Hire staff to conduct site visits to collect additional data on facilities without a completed Data Collection Worksheet.
7. Develop a process to determine vulnerability and risk from natural and/or technological hazards based on probability. This may include utilizing HAZUS-MH if staff obtain adequate training and receive technical support.
8. Identify and prioritize potential mitigation measures for critical facilities and infrastructure in coordination with the Wisconsin Hazard Mitigation Team.
9. Incorporate identified potential mitigation measures into the Mitigation Strategy and Action Plan of the State of Wisconsin Hazard Mitigation Plan, as well as local hazard mitigation plans where appropriate.

10. Working with the Wisconsin Hazard Mitigation Team and other state agencies, apply for funding to implement mitigation measures for identified state facilities, critical facilities, and infrastructure.

Critical facilities include all State-owned facilities that are considered essential because of their function, size, service area, or uniqueness; because they deliver vital services; or because their purpose is the protection of the health and safety of citizens. They may include:

- Correctional facilities and other custodial facilities
    - Prisons
    - Jails
    - Facility heating plant
    - Food storage
- Certain University facilities
    - UW system
- Telecommunications
    - Radio and television facilities for EAS, communication towers, etc.
    - Repeaters
- Facilities that provide electrical power, heating, wastewater treatment, or water
- Hospitals, homes, and other medical facilities
    - Shelters
    - Nursing homes
    - Veterans Affairs nursing care
    - Mental health institutions
- Major state government facilities that house key state operations
- Critical military facilities
    - Headquarters
    - Air fields
- Emergency response facilities related to law enforcement, security, fire, etc.
    - Law enforcement
    - Fire rescue
    - Rescue facilities
- Agricultural/food supply

WEM, along with the Department of Administration, has created a Wisconsin Risk Assessment Data Collection Worksheet that will be used to collect information for each critical facility. The collection worksheet covers everything from general information, such as location, to more detailed facts regarding construction materials. All of this data is needed to create an accurate risk assessment on State-owned and -operated facilities. Based on the responses, the data is then assigned a number representing the relative risk associated with that attribute for each hazard. The questionnaire and scoring can be found in Appendix H.

Risk Assessment Scoring

TABLE 3.17.4-1 RISK ASSESSMENT SCORE RANGE		
Hazard	**Low Score**	**High Score**
Flood Risk Assessment	17	85
Wind Risk Assessment	21	87

Source: WEM, 2008.

The total score range was divided into five risk divisions. Each division was given a qualitative title as shown in Table 3.17.4-2 below.

TABLE 3.17.4-2 RISK LEVEL CATEGORIES		
Risk Level	**Low Score**	**High Score**
Low	0	16
Medium Low	17	34
Medium	35	52
Medium High	53	70
High	71	87

Source: WEM, 2008.

Table 3.17.4-3, attributed risk, shows the Data Collection Worksheet questions that have risk values associated with them. The “high” and “low” columns represent the highest score possible and the lowest score possible associated with each question. The empty cells in the table mean that the question does not pertain. Each column has the tabulated risk assessment score total that is possible.

TABLE 3.17.4-3 ATTRIBUTED RISK						
			Flood		**Wind**	
Question	**High**	**Low**	**High**	**Low**	**High**	**Low**
30	4	1	4	1	4	1
31	3	1	3	1	3	1
33	3	0	3	0		
34	3	1			3	1
35	5	1			5	1
36	3	1			3	1
37	3	1			3	1
38	2	0			2	0
39	2	1			2	1
40	3	1			3	1
41	3	1			3	1
42	5	1	5	1	5	1

TABLE 3.17.4-3 ATTRIBUTED RISK						
			Flood		Wind	
Question	High	Low	High	Low	High	Low
43	5	1	5	1	5	1
44	5	1	5	1	5	1
45	3	1	3	1	3	1
51	5	1	5	1	5	1
61	5	1	5	1		
65	5	1	5	1		
69	7	0	7	0		
70	5	1	5	1		
71	7	0	7	0		
72	3	1	3	1		
74	5	0	5	0		
76	5	0	5	0		
77	5	1			5	1
78	5	5	5	5		
79	3	1			3	1
80	7	1			7	1
81	4	1			4	1
82	3	1			3	1
83	3	0			3	0
84	3	1			3	1
85	5	1			5	1
86	5	1	5	1		
Total	**142**	**31**	**85**	**17**	**87**	**21**

Source: WEM, 2008.

3.17.5 Department of Corrections

The Department of Corrections (DOC) was used to pilot the questionnaire and data collection process that will be utilized to create a State critical facility inventory, giving more specific information to create a detailed risk assessment for the State of Wisconsin.

DOC critical facilities may include:

- Correctional facilities and other custodial facilities
    - Prisons
    - Jails
    - Facility Heating Plant
    - Food storage

WEM worked with the DOC on the collection of data for 471 DOC-owned buildings, within 25 different institutions, centers, and schools. DOC collected information on all buildings within their institutions, not only those considered critical facilities.

Flood Risk Assessment

Based on Data Collection Worksheets completed by DOC, the final range of scores saw a low of 5, and a high of 63. There were a wide range of totals, with most of the buildings falling within the Medium Low to Medium risk range. The following summarizes the final risk scores:

- 18 buildings were rated “Low,” with total scores between 0 and16.
- 166 buildings were rated “Medium Low,” with total scores between 17 and 34.
- 257 buildings were rated “Medium,” with total scores between 35 and 52.
- 30 buildings were rated “Medium High,” with total scores between 53 and 70.
- 0 buildings were rated “High,” with total scores between 71 and 87.

Out of the 471 buildings that DOC collected information on, 30 of those buildings were deemed to having a “Medium High” risk when looking at the buildings’ vulnerability to floods. The buildings were from a wide range of institutions and were not all deemed critical by DOC. Half of the buildings would be considered non-critical infrastructure, meaning they were storage, cellars, and garages. The other buildings would be considered critical infrastructure because of the services that they provide. Examples would be residence halls, barracks, and power plants.

3.17.6 Critical Facility Risk Assessment Summary and Recommendations

To have true accurate risk assessments for any of the hazards it requires site- and hazard-specific information. As such, WEM aims to continue to develop the comprehensive State-owned and -operated building inventory to better understand the State’s vulnerability to natural hazards.

Currently, WEM has a full inventory of the Department of Corrections. In upcoming updates, WEM plans to work with other State agencies to create a more complete inventory of State-owned and -operated buildings, so that additional critical facilities may be included.

As mentioned previously, there are over 6,500 state-owned and -operated facilities, critical facilities, and infrastructure components. The data collection process is very detailed and time-consuming to complete. Recognizing that it will take many years to complete the detailed structure inventory, for the purpose of future state hazard mitigation plan updates, the following strategy has been developed to address risk to state-owned critical facilities and infrastructure in the shorter-term:

1. WEM will obtain from the Department of Administration an updated spreadsheet of state-owned and -operated facilities.
2. Working through the Wisconsin Hazard Mitigation Team and the Governor's Homeland Security Council's Interagency Working Group, determine by Department the state facilities that fall within the definition of a critical facility.

   Critical facilities and infrastructure, as defined by the State of Wisconsin, consist of all state-owned facilities deemed essential due to their function, size, service area, uniqueness, delivery of vital services, and for the protection of the health and safety of citizens. This scope includes buildings and infrastructure that meet characteristics such as:

   - Communications facilities
   - Correctional facilities and other custodial facilities
   - Utility services, including: electrical power generation, heating, wastewater treatment, water treatment, etc.
   - Hospitals and other medical facilities, including: group homes, shelters, mental health facilities, etc.
   - Major state government facilities that house key state operations
   - Critical military facilities
   - Emergency response facilities, including: law enforcement, security, fire, etc.
3. Work with the individual departments to complete the detailed structure inventory of identified critical facilities in subsequent plan updates. Non-critical facilities will be low priority for further analyses and data collection.
4. Again, the State recognizes that the detailed structure inventory will be very time consuming and will take numerous plan updates to complete. Modeled after some of the best practices in other state hazard migration plans, the State of Wisconsin will create a database of state-owned or operated critical facilities and infrastructure that meets the following criteria:

   A. Replacement value of over $1,000,000: Using $1,000,000 as the cut-off focuses on buildings that are most difficult and costly to replace, as well as recognizes that most critical facilities within the State of Wisconsin have higher building replacement values.

B. Conveys the use characteristics of critical facilities, placing critical facilities and infrastructure in broad categories encompassed in the State definition of critical facility, such as:

- agricultural/food supply
- correctional
- education
- government
- public health
- public safety/emergency response
- residential
- utility

C. Highlights the location of facilities, indicating the county in which each facility or infrastructure is located.

Based on this database, WEM can use a combination of means such as tables, charts or GIS maps in order to analyze which counties and State agencies have the highest concentration of critical facilities valued at $1,000,000 or above. Using this data can be analyzed to better understand where the locations of critical facilities intersect with areas of high population density, increased population change, and increased hazard-risk or historical occurrences. As a result, the focus can be narrowed to understand where efforts to mitigate the exposure of vulnerability to critical facilities could potentially have a greater amount of impact.

In the long term, once this database is generated, WEM will be able to evaluate the vulnerability to specific hazards (high, medium, low), and whether or not the above criteria are sufficient for evaluating risk to State-owned and operated critical facilities and infrastructure.

3.18 LIFELINES

Lifelines are critical to the health and well-being of all Wisconsin residents. Lifelines, such as highways, railroads, power transmission lines, and water supply pipelines, tend to be linear in nature with key facilities, such as pumping stations, located at specific points. Due to the extensive geographic distances covered by lifelines, they tend to be exposed to a full range of natural hazards in the environment. By their nature, some lifelines are more hardened than others to specific hazards. For example, buried transmission lines have extremely low vulnerability to wind damage. On the other hand, all transmission lines have some level of vulnerability to earthquakes.

The purpose of this section is to provide a list of the general types of lifelines and their components and identify the major natural hazards to which the lifelines are most vulnerable. It is beyond the scope of this effort to attempt to provide a detailed vulnerability assessment and loss estimation for lifelines. Based upon American Lifelines Alliance's categorization, Table 3.18-1, below, provides a list of the major types of lifelines and their key components. An asterisk (*) indicates that a particular component has a high level of vulnerability to a given natural hazard. This assessment is intended to provide a relative indication of risk and is not intended to represent a quantitative valuation of risk. The focus of Table 3.18-1 is to highlight key vulnerabilities.

In an effort to more fully address risks to lifelines, WEM has developed a Rural Electric Cooperative Annex (see Appendix G) for the 2011 Plan Update. The Annex includes a risk assessment and profiles some of the hazards to which electrical facilities and lines are most vulnerable.

TABLE 3.18-1 WISCONSIN LIFELINES AND VULNERABILITY

Category	Description	Number/ Line Miles	Flood	Wind	Earthquake	Snow	Ice	Landslide
Communications Facility	Communication Lines, Control Vaults, Switching Stations, Radio/TV Stations, Weather Station	362	*	*	*	*	*	*
Waste Water Facility	Treatment Plants, Control Vaults, Stations	500	*	*	*	*	*	
Potable Water Facility	Pipelines, Treatment Plants, Control Vaults and Control Stations, Wells, Storage Tanks and Pumping Stations	5	*	*	*	*	*	
Oil Facility	Pipelines, Refineries, Control Vaults and Control Stations, and Tank Farms	6	*	*	*			
Electric Power Facility	Generating Plants, Substations, Distribution Circuits, and Transmission Towers	56	*	*	*	*	*	*

TABLE 3.18-1 CONTINUED								
Category	**Description**	**Number/ Line Miles**	**Flood**	**Wind**	**Earthquake**	**Snow**	**Ice**	**Landslide**
Electric Transmission Lines	Electric Transmission Lines	6,151 mi	*	*	*	*	*	*
Natural Gas Facility	Pipelines Control Vaults and Control Stations, and Compressor Stations	6	*	*	*			
Natural Gas Pipelines	Ductile and Brittle Pipe	85,737 mi	*	*	*			
Railroad Systems	Tracks, Bridges, Tunnels, Stations, Fuel, Dispatch and Maintenance Facilities	99 / 6,821 mi	*	*	*	*	*	*
Port Facility	Water Front Structures, Cranes/Cargo Handling Equipment, Warehouses and Fuel Facilities	142	*	*				
DOT Highways	Roadways, Bridges and Tunnels	11,753 state mi / 19,665 cty. trk. hwy. mi	*		*	*	*	*
Airports	Control Towers, Runways, Terminal Buildings, Parking Structures, Fuel Facilities, and Maintenance and Hanger Facilities	150	*	*	*	*	*	
Hospital	Medical Centers and Hospitals	230	*		*			

Source: WEM, 2008; based on the American Lifeline Alliance, 2003.

The natural hazards threat to lifelines has two components. The first is direct damage to the lifeline from a natural hazard that causes significant physical damage. The second is a denial of use or loss of function due to a natural hazard event. Snow and ice events on roadways are a significant and common example of this type of threat. Typically, such threats are temporary and do not result in a high level of physical damage to the lifeline. Figures 3.18-1 to 3.18-15, on the following pages, show the locations of at-risk Wisconsin lifelines.

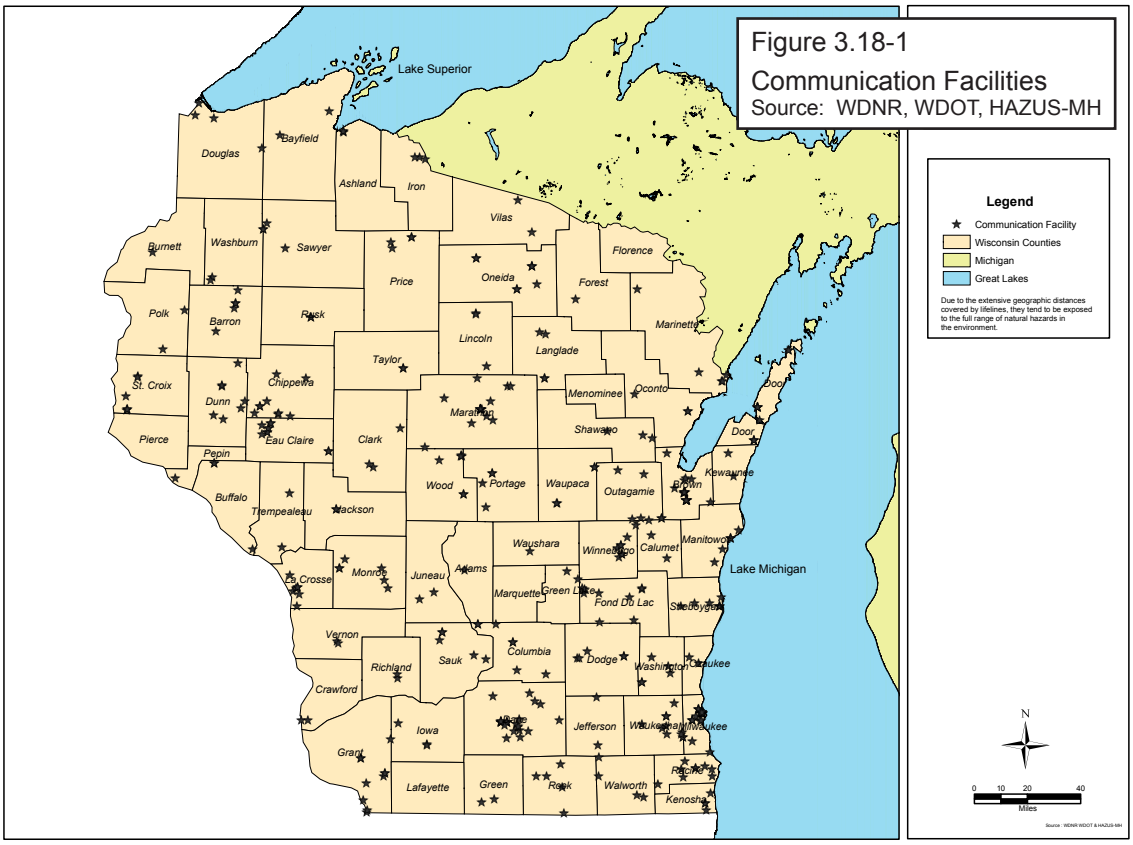


Figure 3.18-1
Communication Facilities
Source: WDNR, WDOT, HAZUS-MH

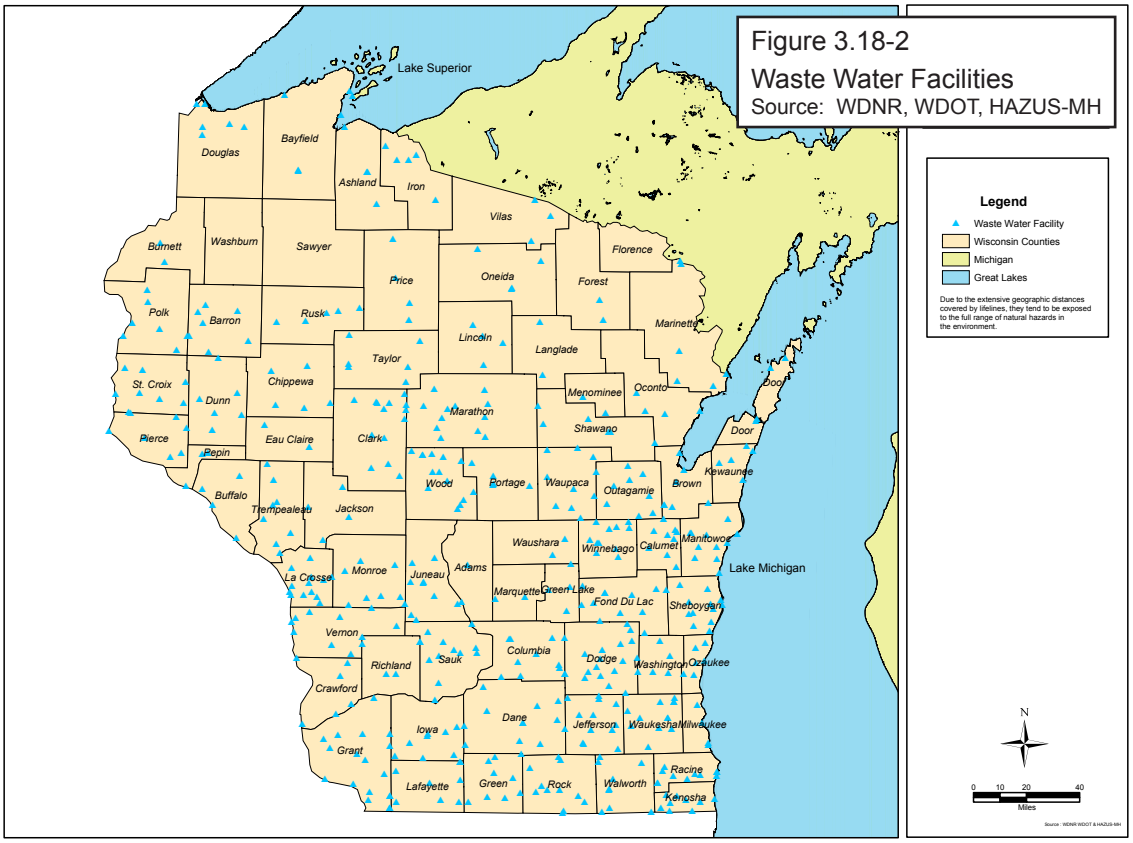


Figure 3.18-2
Waste Water Facilities
Source: WDNR, WDOT, HAZUS-MH

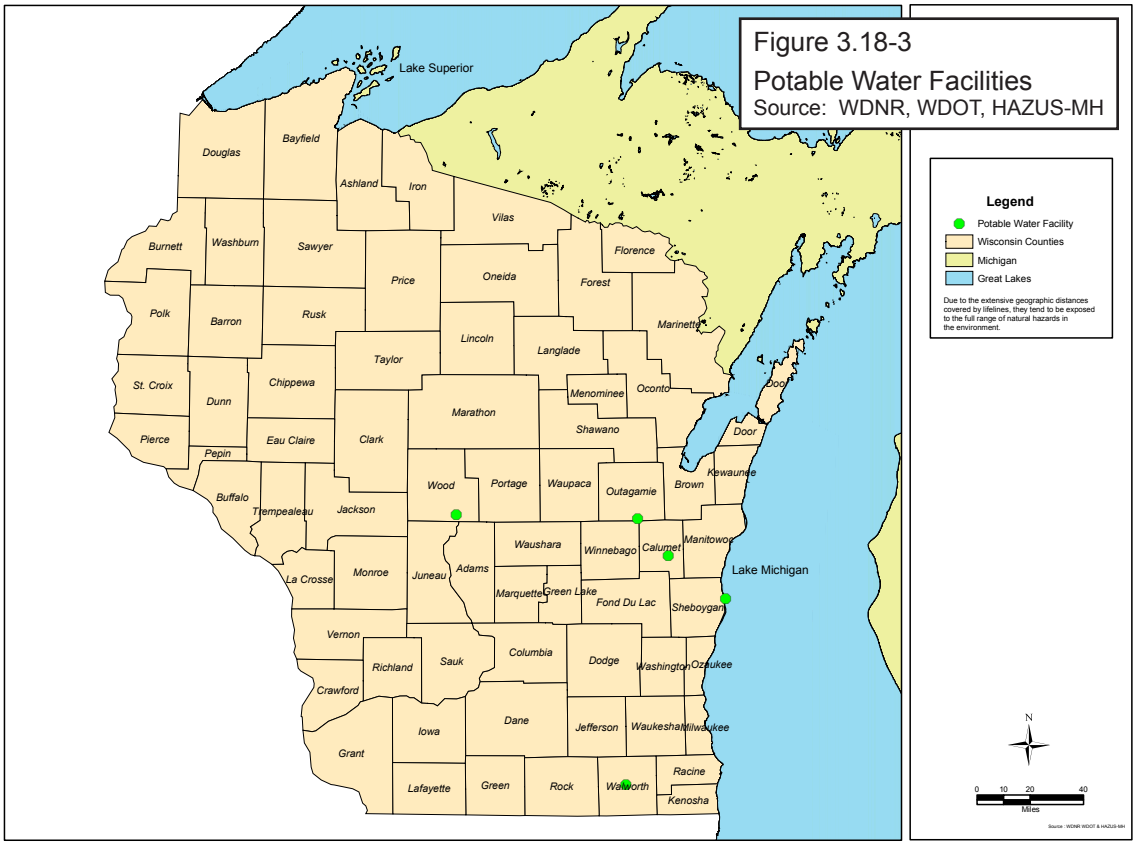


Figure 3.18-3
Potable Water Facilities
Source: WDNR, WDOT, HAZUS-MH
Legend
Potable Water Facility
Wisconsin Counties
Michigan
Great Lakes
Due to the extensive geographic distances covered by lifelines, they tend to be exposed to the full range of natural hazards in the environment.
Lake Superior
Lake Michigan
Douglas
Bayfield
Ashland
Iron
Vilas
Florence
Burnett
Washburn
Sawyer
Price
Oneida
Forest
Marinette
Polk
Barron
Rusk
Taylor
Lincoln
Langlade
Oconto
St. Croix
Dunn
Chippewa
Menominee
Marathon
Shawano
Door
Pierce
Pepin
Eau Claire
Clark
Wood
Portage
Waupaca
Outagamie
Brown
Kewaunee
Buffalo
Trempealeau
Jackson
Waushara
Winnebago
Manitowoc
Calumet
La Crosse
Monroe
Juneau
Adams
Marquette
Green Lake
Fond Du Lac
Sheboygan
Vernon
Richland
Sauk
Columbia
Dodge
Washington
Ozaukee
Crawford
Dane
Jefferson
Waukesha
Milwaukee
Grant
Iowa
Lafayette
Green
Rock
Walworth
Racine
Kenosha
N
0 10 20 40
Miles

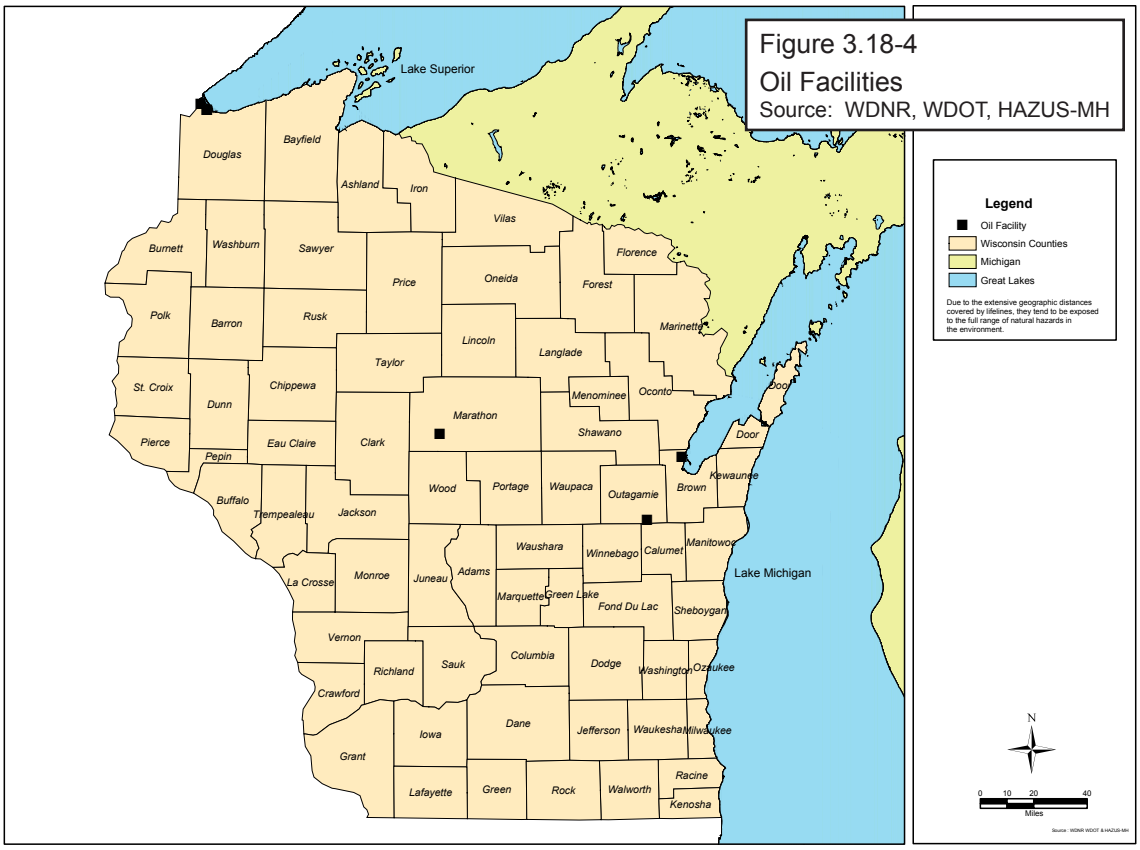


Figure 3.18-4
Oil Facilities
Source: WDNR, WDOT, HAZUS-MH
Legend
Oil Facility
Wisconsin Counties
Michigan
Great Lakes
Due to the extensive geographic distances covered by lifelines, they tend to be exposed to the full range of natural hazards in the environment.
Lake Superior
Lake Michigan
Douglas
Bayfield
Ashland
Iron
Vilas
Florence
Burnett
Washburn
Sawyer
Price
Oneida
Forest
Marinette
Polk
Barron
Rusk
Taylor
Lincoln
Langlade
Oconto
St. Croix
Dunn
Chippewa
Menominee
Marathon
Shawano
Door
Pierce
Pepin
Eau Claire
Clark
Wood
Portage
Waupaca
Outagamie
Brown
Kewaunee
Buffalo
Trempealeau
Jackson
Waushara
Winnebago
Manitowoc
Calumet
La Crosse
Monroe
Juneau
Adams
Marquette
Green Lake
Fond Du Lac
Sheboygan
Vernon
Richland
Sauk
Columbia
Dodge
Washington
Ozaukee
Crawford
Dane
Jefferson
Waukesha
Milwaukee
Grant
Iowa
Lafayette
Green
Rock
Walworth
Racine
Kenosha
N
0 10 20 40
Miles

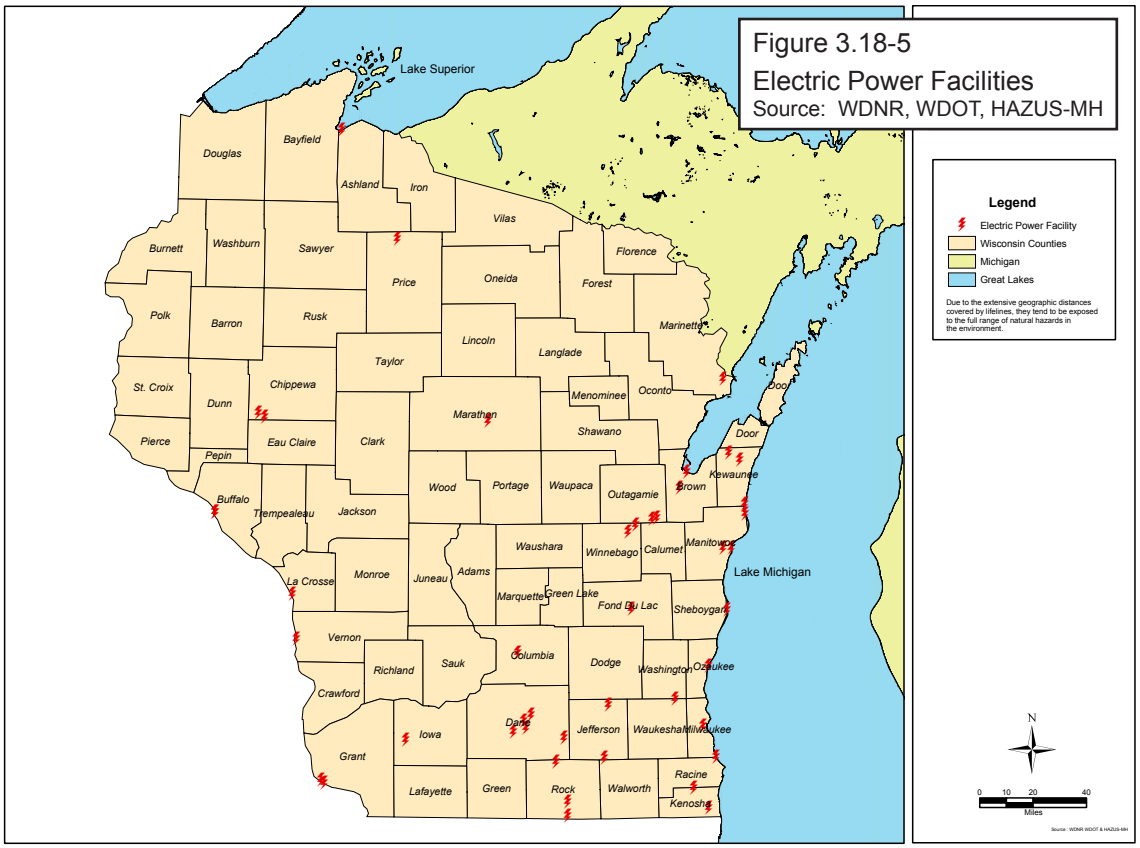


Figure 3.18-5
Electric Power Facilities
Source: WDNR, WDOT, HAZUS-MH

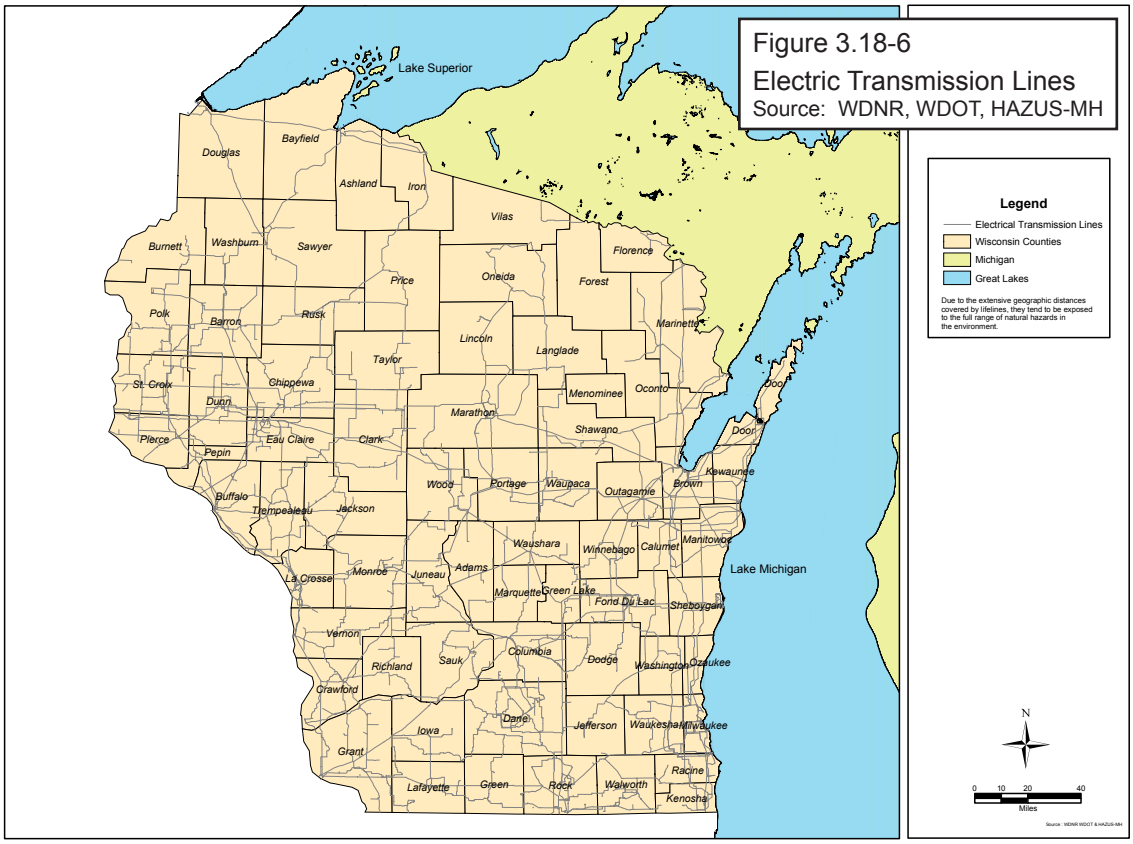


Figure 3.18-6
Electric Transmission Lines
Source: WDNR, WDOT, HAZUS-MH

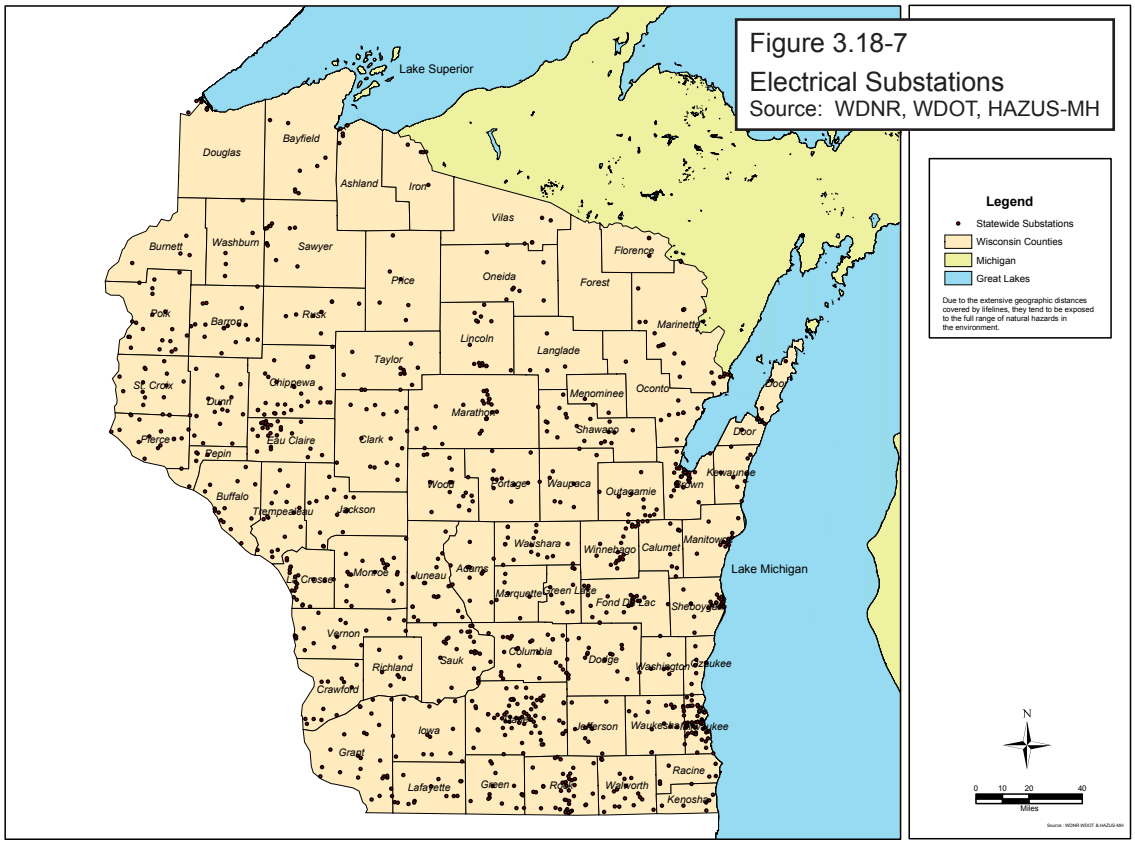


Figure 3.18-7
Electrical Substations
Source: WDNR, WDOT, HAZUS-MH
Legend
Statewide Substations
Wisconsin Counties
Michigan
Great Lakes
Due to the extensive geographic distances covered by lifelines, they tend to be exposed to the full range of natural hazards in the environment.
Lake Superior
Lake Michigan
Douglas
Bayfield
Ashland
Iron
Vilas
Florence
Burnett
Washburn
Sawyer
Price
Oneida
Forest
Marinette
Polk
Barron
Rusk
Taylor
Lincoln
Langlade
Oconto
St. Croix
Dunn
Chippewa
Menominee
Marathon
Shawano
Door
Pierce
Pepin
Eau Claire
Clark
Wood
Portage
Waupaca
Outagamie
Brown
Kewaunee
Buffalo
Trempealeau
Jackson
Waushara
Winnebago
Manitowoc
Calumet
La Crosse
Monroe
Juneau
Adams
Marquette
Green Lake
Fond Du Lac
Sheboygan
Vernon
Richland
Sauk
Columbia
Dodge
Washington
Ozaukee
Crawford
Dane
Jefferson
Waukesha
Milwaukee
Iowa
Grant
Lafayette
Green
Rock
Walworth
Racine
Kenosha
N
0 10 20 40
Miles

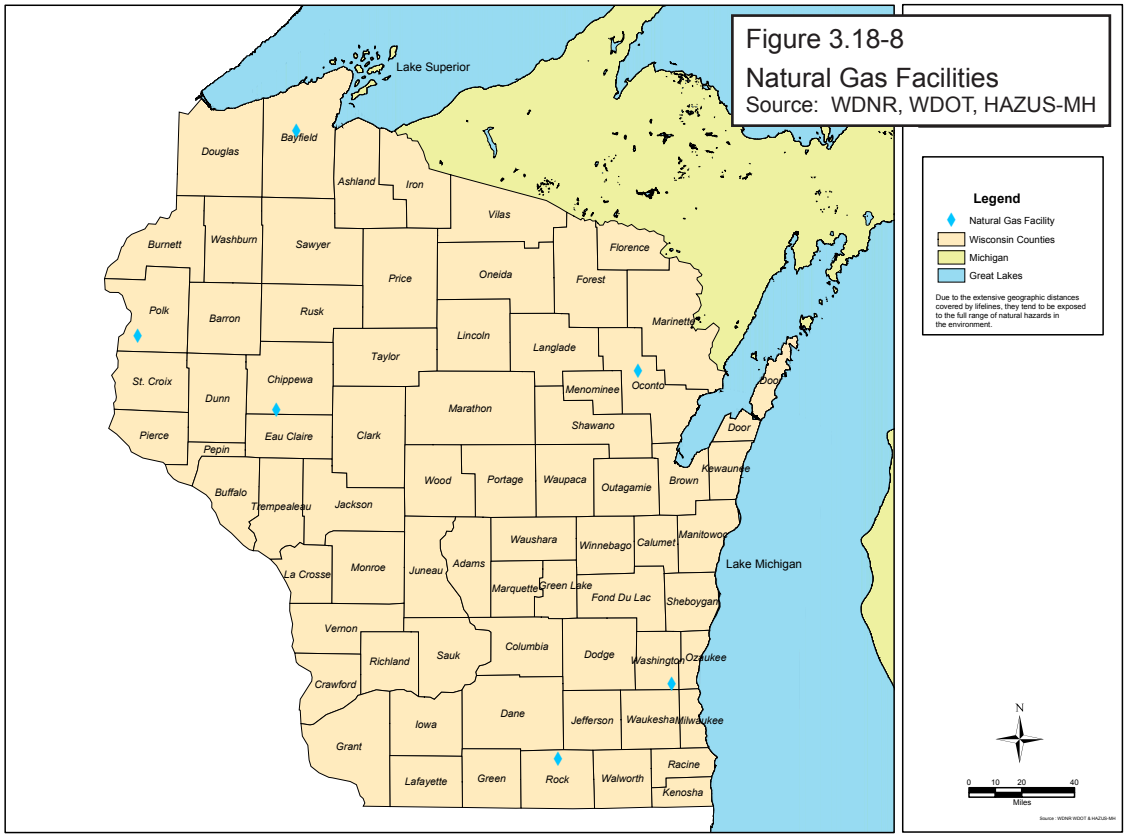


Figure 3.18-8
Natural Gas Facilities
Source: WDNR, WDOT, HAZUS-MH
Legend
Natural Gas Facility
Wisconsin Counties
Michigan
Great Lakes
Due to the extensive geographic distances covered by lifelines, they tend to be exposed to the full range of natural hazards in the environment.
Lake Superior
Lake Michigan
Douglas
Bayfield
Ashland
Iron
Vilas
Florence
Burnett
Washburn
Sawyer
Price
Oneida
Forest
Marinette
Polk
Barron
Rusk
Taylor
Lincoln
Langlade
Oconto
St. Croix
Dunn
Chippewa
Menominee
Marathon
Shawano
Door
Pierce
Pepin
Eau Claire
Clark
Wood
Portage
Waupaca
Outagamie
Brown
Kewaunee
Buffalo
Trempealeau
Jackson
Waushara
Winnebago
Manitowoc
Calumet
La Crosse
Monroe
Juneau
Adams
Marquette
Green Lake
Fond Du Lac
Sheboygan
Vernon
Richland
Sauk
Columbia
Dodge
Washington
Ozaukee
Crawford
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Jefferson
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Milwaukee
Iowa
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Kenosha
N
0 10 20 40
Miles

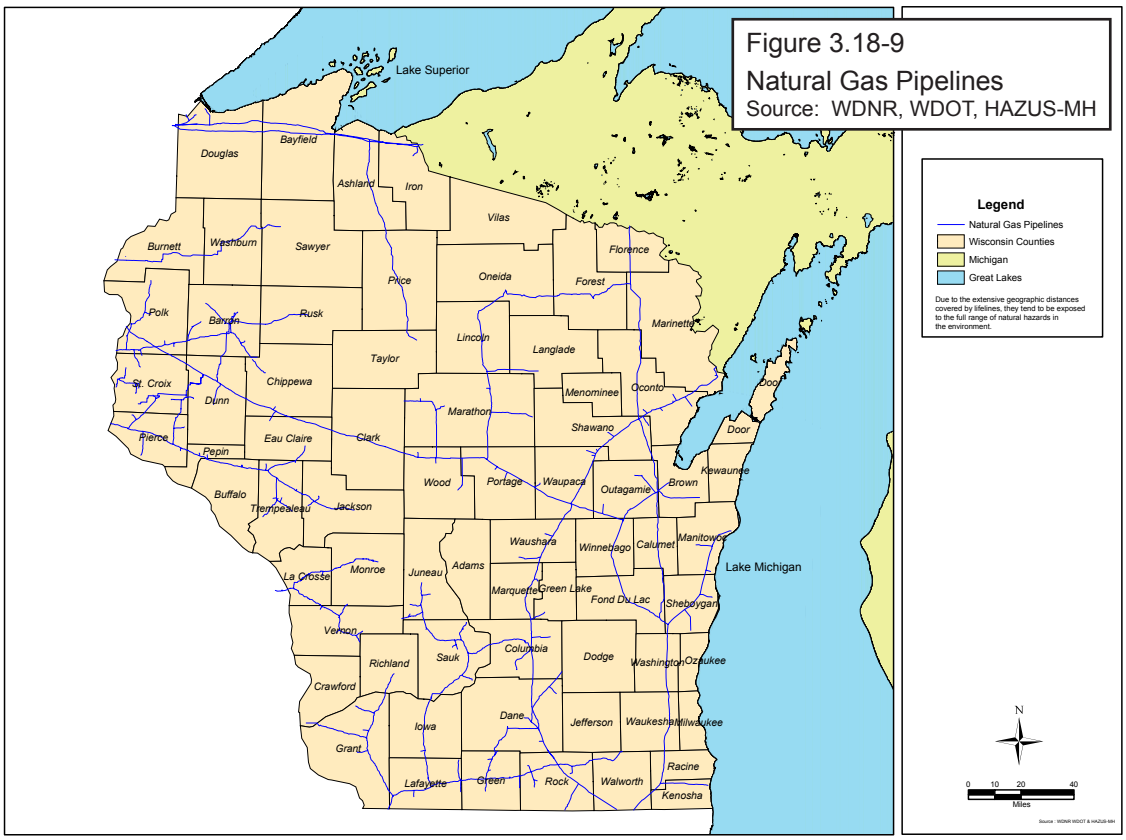

Figure 3.18-9
Natural Gas Pipelines
Source: WDNR, WDOT, HAZUS-MH

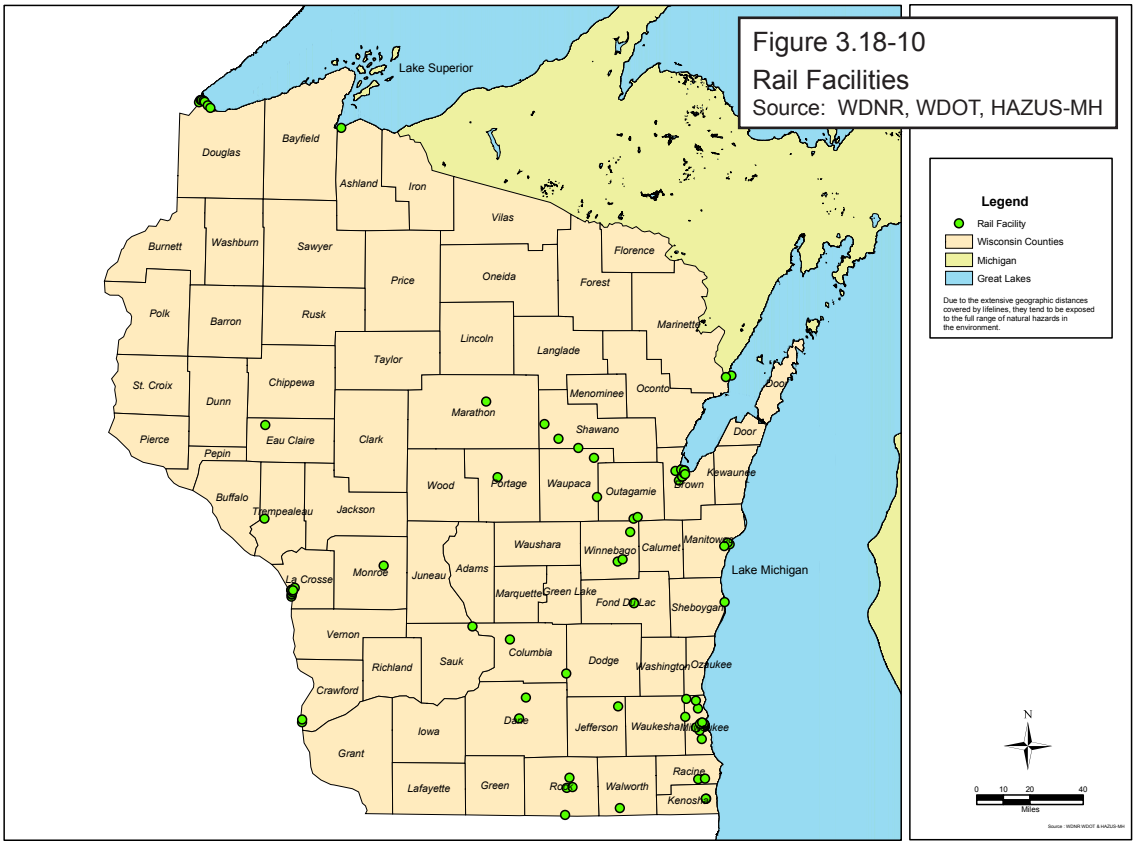

Figure 3.18-10
Rail Facilities
Source: WDNR, WDOT, HAZUS-MH

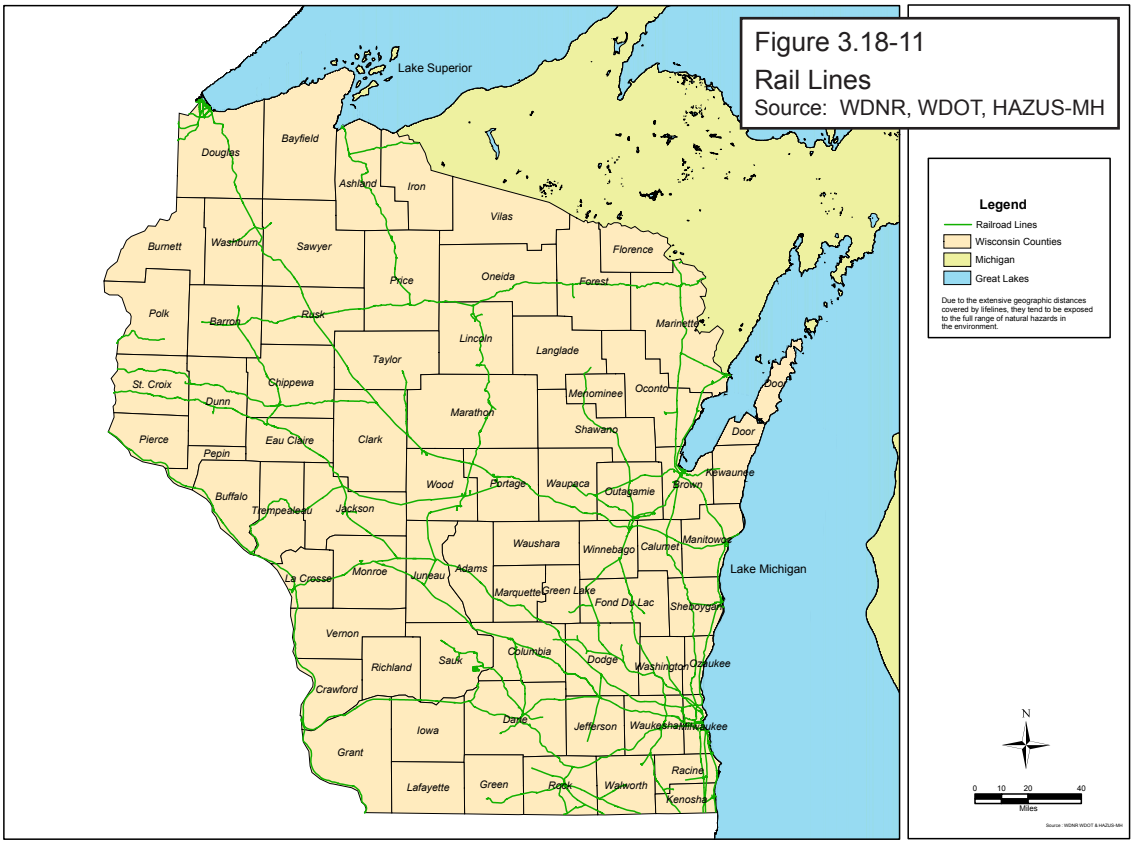
Figure 3.18-11
Rail Lines
Source: WDNR, WDOT, HAZUS-MH
Legend
Railroad Lines
Wisconsin Counties
Michigan
Great Lakes
Due to the extensive geographic distances covered by lifelines, they tend to be exposed to the full range of natural hazards in the environment.
Lake Superior
Lake Michigan
Douglas
Bayfield
Ashland
Iron
Vilas
Florence
Burnett
Washburn
Sawyer
Price
Oneida
Forest
Marinette
Polk
Barron
Rusk
Taylor
Lincoln
Langlade
Oconto
St. Croix
Dunn
Chippewa
Menominee
Marathon
Shawano
Door
Pierce
Pepin
Eau Claire
Clark
Wood
Portage
Waupaca
Outagamie
Brown
Kewaunee
Buffalo
Trempealeau
Jackson
Waushara
Winnebago
Calumet
Manitowoc
La Crosse
Monroe
Juneau
Adams
Marquette
Green Lake
Fond Du Lac
Sheboygan
Vernon
Richland
Sauk
Columbia
Dodge
Washington
Ozaukee
Crawford
Dane
Jefferson
Waukesha
Milwaukee
Grant
Iowa
Lafayette
Green
Rock
Walworth
Racine
Kenosha
N
0 10 20 40
Miles

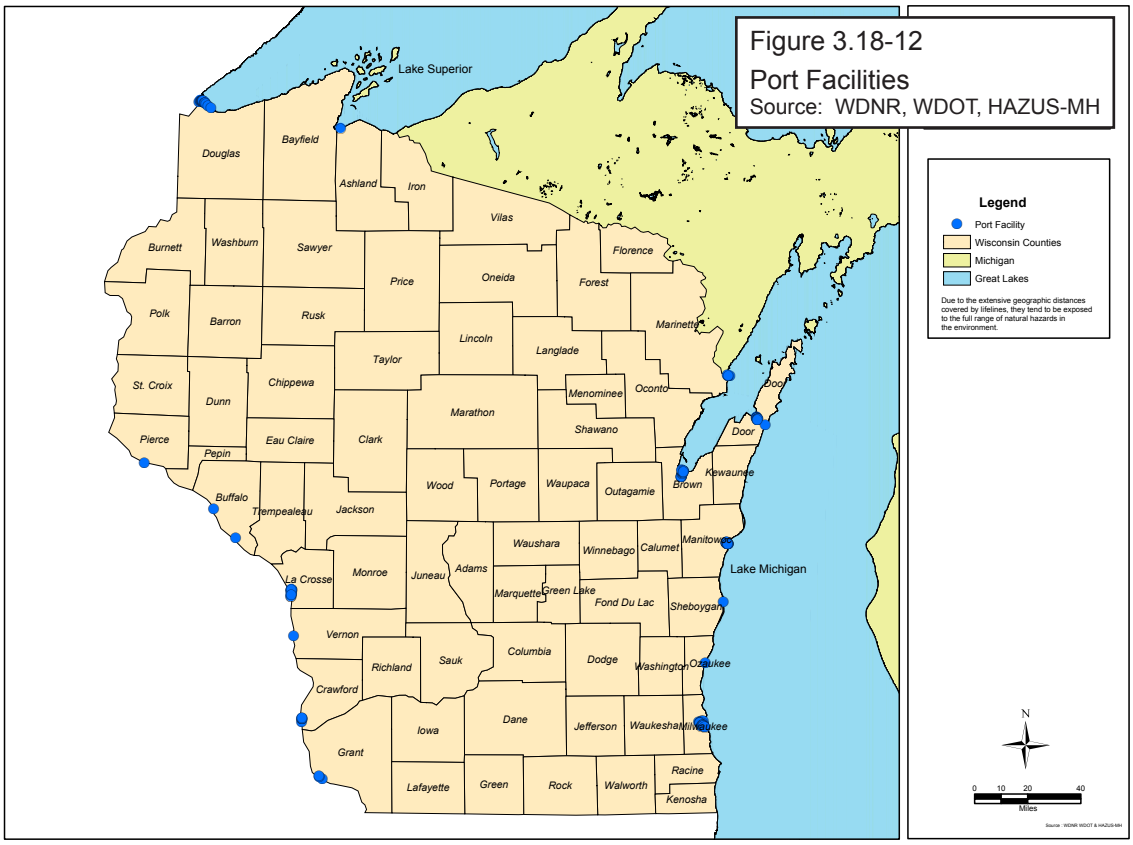
Figure 3.18-12
Port Facilities
Source: WDNR, WDOT, HAZUS-MH
Legend
Port Facility
Wisconsin Counties
Michigan
Great Lakes
Due to the extensive geographic distances covered by lifelines, they tend to be exposed to the full range of natural hazards in the environment.
Lake Superior
Lake Michigan
Douglas
Bayfield
Ashland
Iron
Vilas
Florence
Burnett
Washburn
Sawyer
Price
Oneida
Forest
Marinette
Polk
Barron
Rusk
Taylor
Lincoln
Langlade
Oconto
St. Croix
Dunn
Chippewa
Menominee
Marathon
Shawano
Door
Pierce
Pepin
Eau Claire
Clark
Wood
Portage
Waupaca
Outagamie
Brown
Kewaunee
Buffalo
Trempealeau
Jackson
Waushara
Winnebago
Calumet
Manitowoc
La Crosse
Monroe
Juneau
Adams
Marquette
Green Lake
Fond Du Lac
Sheboygan
Vernon
Richland
Sauk
Columbia
Dodge
Washington
Ozaukee
Crawford
Dane
Jefferson
Waukesha
Milwaukee
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Iowa
Lafayette
Green
Rock
Walworth
Racine
Kenosha
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0 10 20 40
Miles

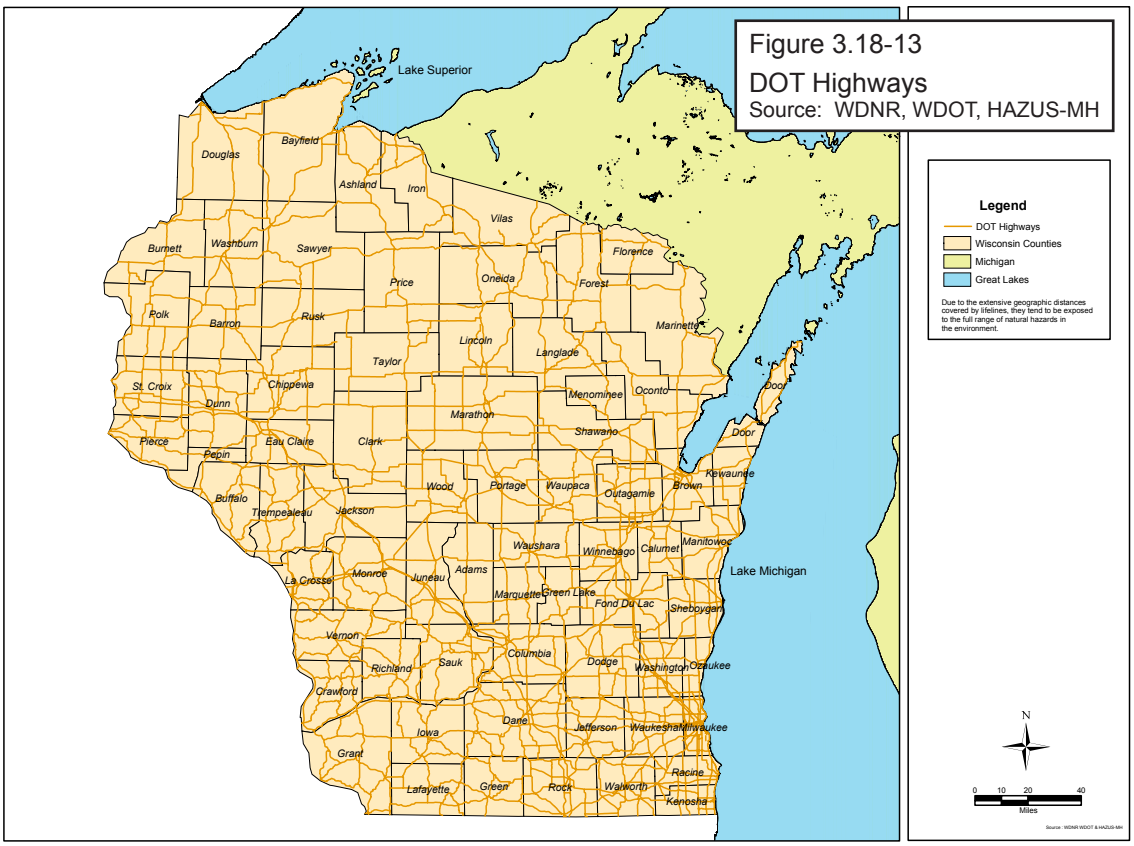


Figure 3.18-13
DOT Highways
Source: WDNR, WDOT, HAZUS-MH
Lake Superior
Lake Michigan
Douglas
Bayfield
Ashland
Iron
Vilas
Florence
Burnett
Washburn
Sawyer
Price
Oneida
Forest
Marinette
Polk
Barron
Rusk
Taylor
Lincoln
Langlade
Oconto
St. Croix
Dunn
Chippewa
Menominee
Marathon
Shawano
Door
Pierce
Pepin
Eau Claire
Clark
Wood
Portage
Waupaca
Outagamie
Brown
Kewaunee
Buffalo
Trempealeau
Jackson
Waushara
Winnebago
Manitowoc
Calumet
La Crosse
Monroe
Juneau
Adams
Marquette
Green Lake
Fond Du Lac
Sheboygan
Vernon
Richland
Sauk
Columbia
Dodge
Washington
Ozaukee
Crawford
Dane
Jefferson
Waukesha
Milwaukee
Iowa
Grant
Racine
Lafayette
Green
Rock
Walworth
Kenosha
Legend
DOT Highways
Wisconsin Counties
Michigan
Great Lakes
Due to the extensive geographic distances covered by lifelines, they tend to be exposed to the full range of natural hazards in the environment.
N
0 10 20 40
Miles

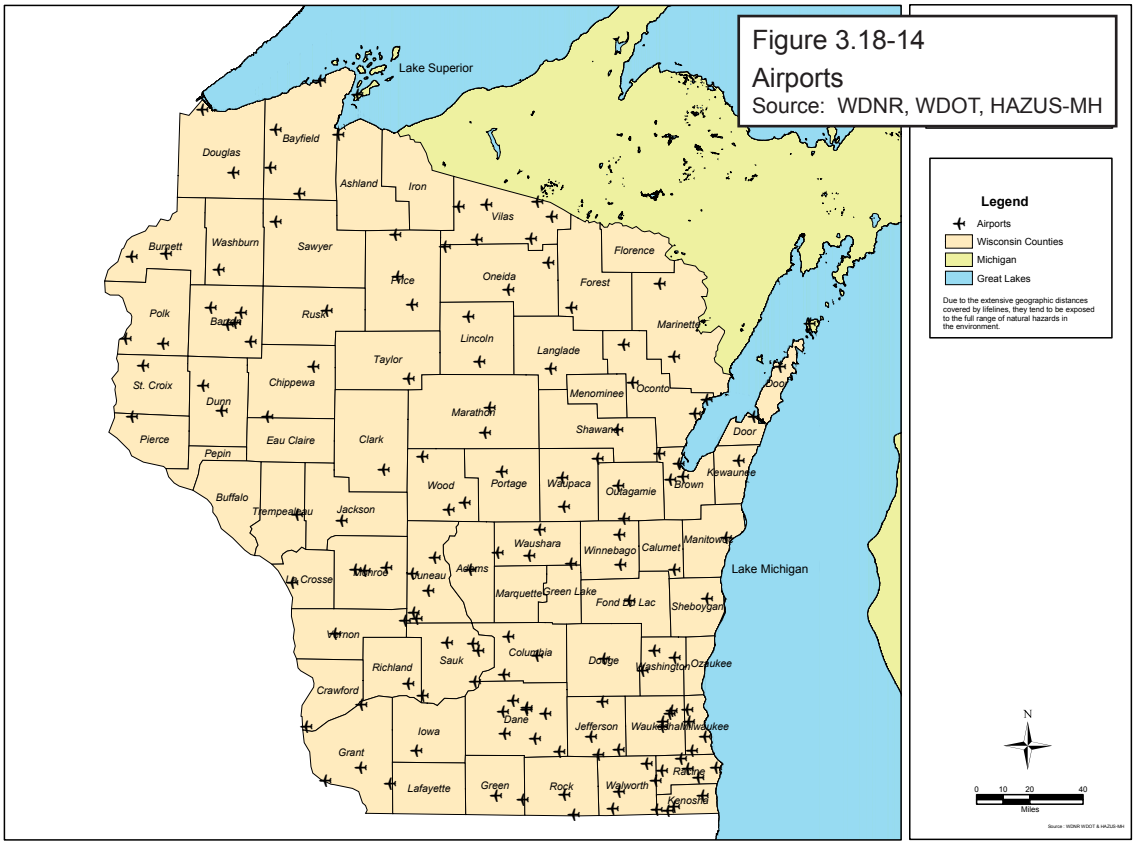
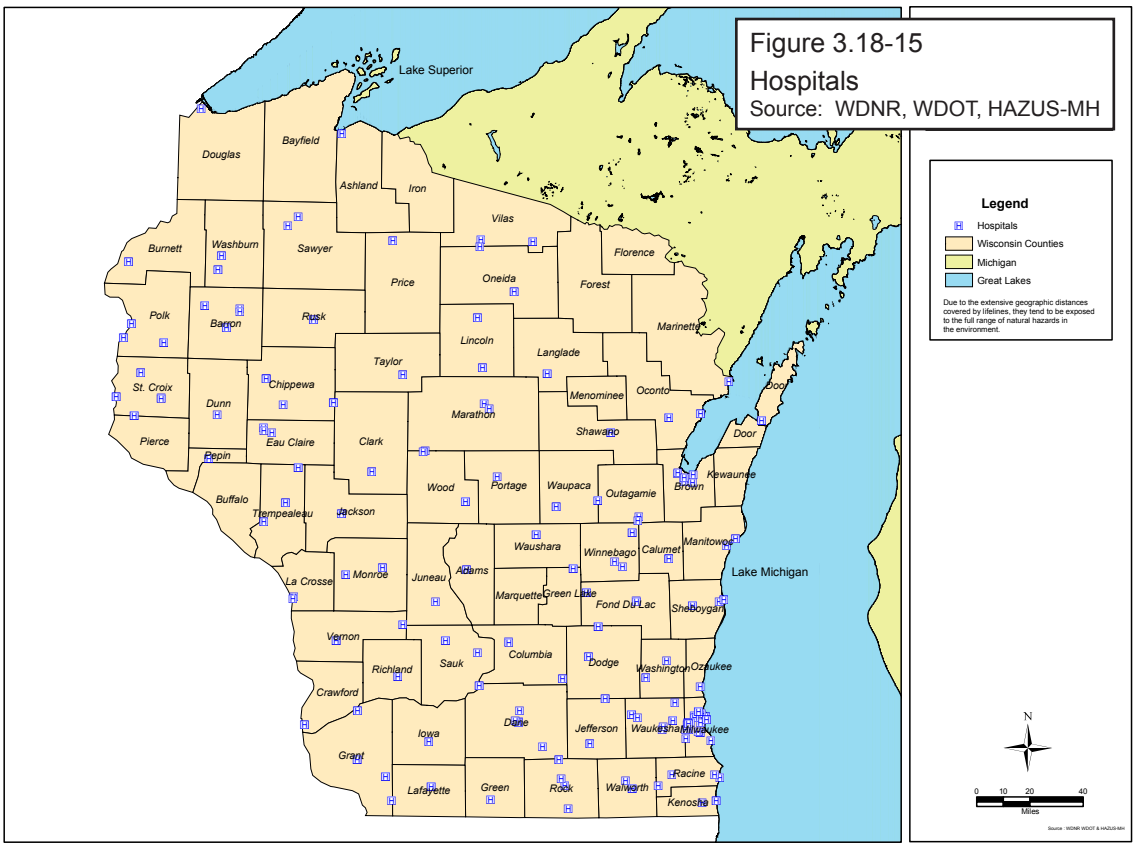


Figure 3.18-14
Airports
Source: WDNR, WDOT, HAZUS-MH
Lake Superior
Lake Michigan
Douglas
Bayfield
Ashland
Iron
Vilas
Florence
Burnett
Washburn
Sawyer
Price
Oneida
Forest
Marinette
Polk
Barron
Rusk
Taylor
Lincoln
Langlade
Oconto
St. Croix
Dunn
Chippewa
Menominee
Marathon
Shawano
Door
Pierce
Pepin
Eau Claire
Clark
Wood
Portage
Waupaca
Outagamie
Brown
Kewaunee
Buffalo
Trempealeau
Jackson
Waushara
Winnebago
Manitowoc
Calumet
La Crosse
Monroe
Juneau
Adams
Marquette
Green Lake
Fond Du Lac
Sheboygan
Vernon
Richland
Sauk
Columbia
Dodge
Washington
Ozaukee
Crawford
Dane
Jefferson
Waukesha
Milwaukee
Iowa
Grant
Racine
Lafayette
Green
Rock
Walworth
Kenosha
Legend
Airports
Wisconsin Counties
Michigan
Great Lakes
Due to the extensive geographic distances covered by lifelines, they tend to be exposed to the full range of natural hazards in the environment.
N
0 10 20 40
Miles



Data Limitations

As stated previously, this section provides a listing of the general types of lifelines and their components and identifies the major natural hazards to which the lifelines are most vulnerable. A detailed vulnerability assessment and loss estimation for lifelines is beyond the scope of this effort, with the exception of some of the electrical facilities addressed in the Rural Electric Cooperative Annex (Appendix G). At this time, the risk assessment for lifelines is included in Table 3.18-1, which provides a general indication of risk to lifelines based on the American Lifelines Alliance.

3.19 JURISDICTIONS MOST THREATENED AND VULNERABLE TO DAMAGE AND LOSS

This section of the plan addresses requirements of the Final Rule Section 201.4(c)(2)(ii).

The subsection 201.4 (c)(2)(ii) requires that the State Risk Assessment include an "overview and analysis of the State's vulnerability to the hazards described in this paragraph (c)(2), based on estimates provided in local risk assessments…The State shall describe vulnerability in terms of the jurisdictions most threatened by the identified hazards, and most vulnerable to damage and loss associated with hazard events." Ultimately, the State shall describe which jurisdictions are most threatened and vulnerable to hazards and the process used to identify them. Identification of these jurisdictions shall be based

on an analysis of available local risk assessments conducted throughout the state, and where not available, on the State Risk Assessment.

This section will examine the risk assessments from local hazard mitigation plans and integrate them into the State Plan. Next, the section will review and analyze the HAZUS Flood Hazard Analysis by county, the Tornado Risk Assessment by county, and the Wildfire and Coastal Hazard Analyses. Once complete, the results will be compared to the Natural Disaster Activity by County (see Appendix A). The comparison will determine whether the risk analysis substantiates the actual natural disaster events.

3.19.1 Local Risk Assessment Integration

In this three-year update of the State of Wisconsin Hazard Mitigation Plan, Wisconsin Emergency Management (WEM) chose to focus on integrating the local mitigation plans of those communities located along the Mississippi and Wisconsin rivers and the southeast counties of Kenosha, Milwaukee, and Racine that were higher risk and more vulnerable based on past events, number of repetitive loss properties, and the number of disaster declarations. Due to the number of completed and approved local mitigation plans within the State of Wisconsin, it would have been an overwhelming task to review and incorporate all approved local plans. In the next State Hazard Mitigation Plan update, more local jurisdiction plans will be included in the local risk assessment integration as they are approved.

Figure 3.19.1-1, on the following page, illustrates the focus counties used for the local risk assessment integration. Of the 21 counties in this area, two (Iowa and Pepin) are still in the initial planning process. Therefore, only the 19 counties with approved plans are included in the local risk assessment analysis.

In the local risk assessment integration analysis, potential losses and top hazards (as identified by the focus county) were reviewed. It was difficult to compare each of the counties' potential losses plan component because the State of Wisconsin does not require a standardized plan template. Therefore, each county had the liberty to create its own methodology for determining potential losses. However in some instances, multiple county plans were written by the same consultants or Regional Planning Commissions (RPCs) and do utilize the same potential loss methodology. Figure 3.19.1-2 illustrates the various methods of potential loss calculations used by the focus counties. (An important point to keep in mind is that estimating potential losses is not a required element in a plan but rather a recommended one so not all county plans include an estimate of losses.)

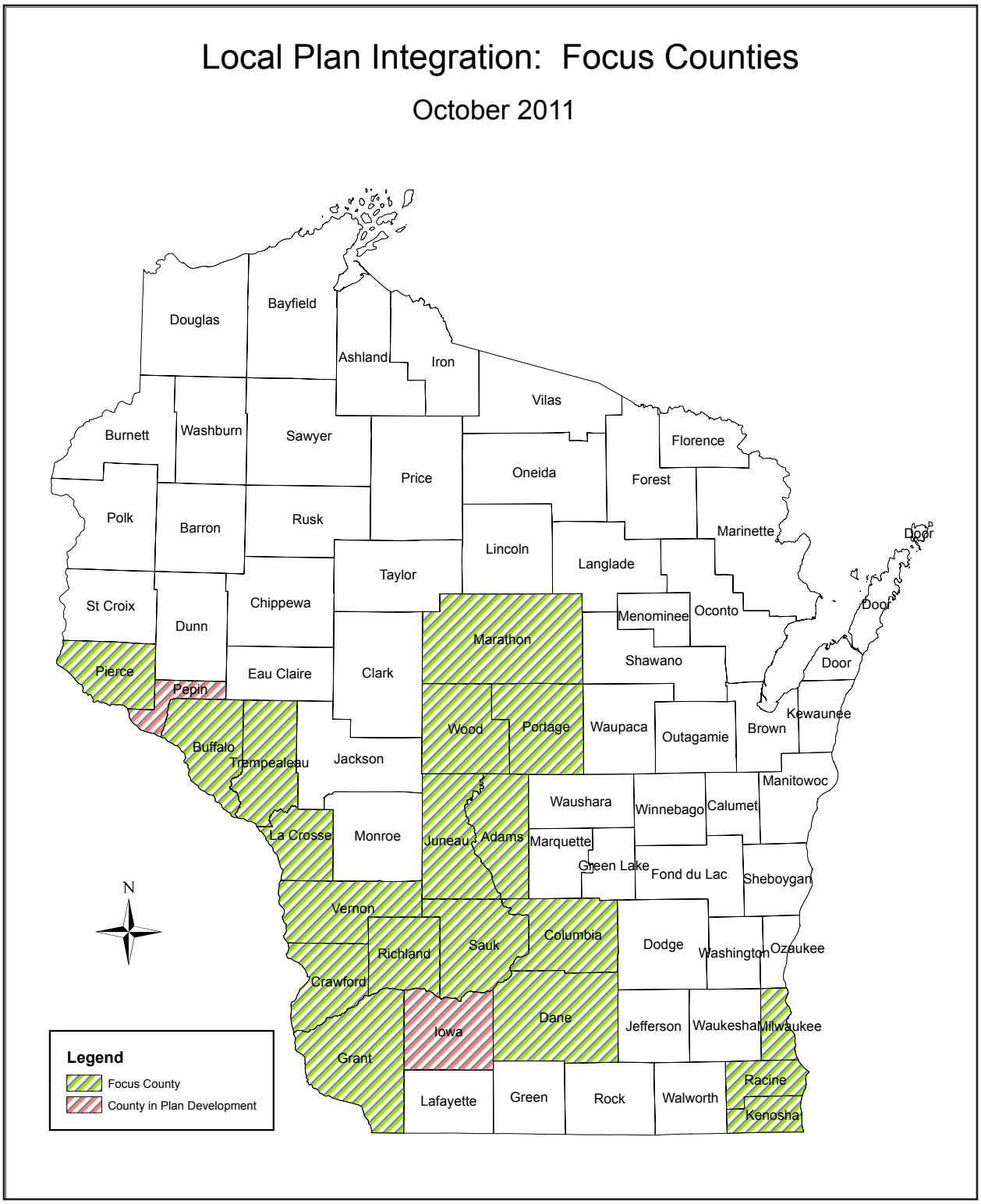


Figure 3.19.1-1 Local Plan Integration: Focus Counties
Source: WEM, 2011.

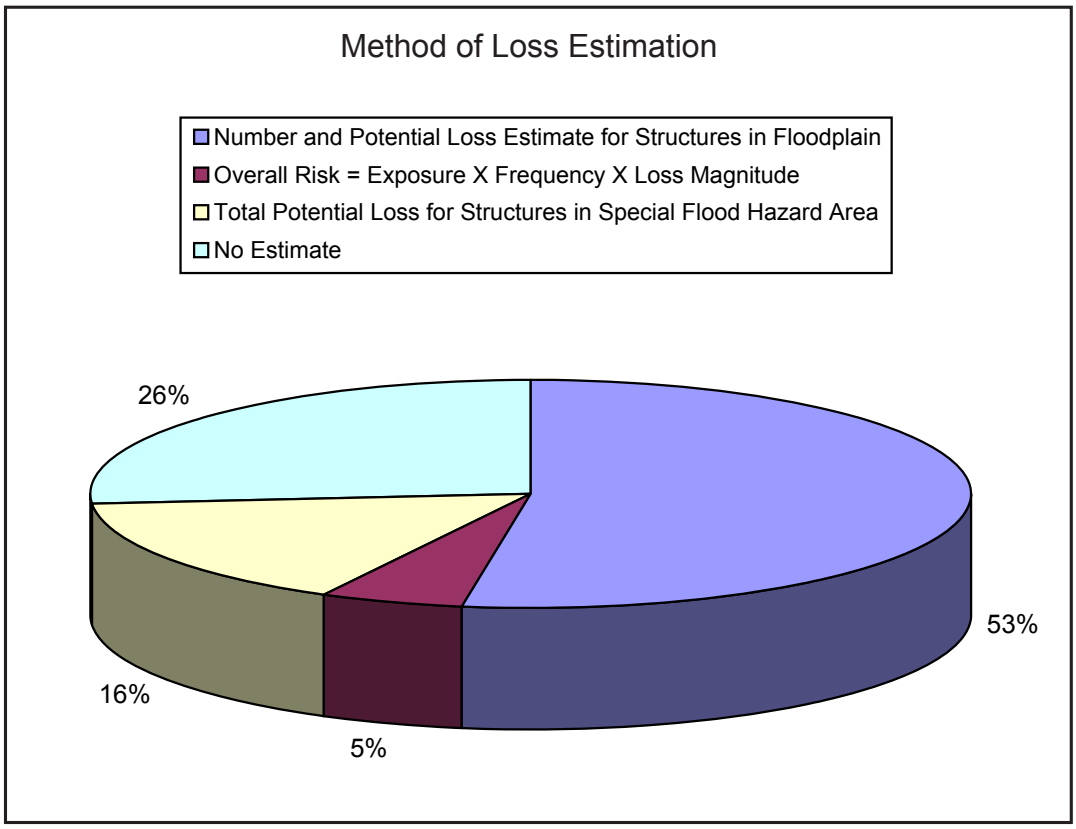


Figure 3.19.1-2 Methods of Loss Estimation by Focus Counties
Source: WEM, 2011.

Table 3.19.1-1, on the following page, lists the potential flooding losses for the focus counties by loss estimation methodology. According to the potential loss analysis, Milwaukee County (predictably because of the largest population and correspondingly highest property value) forecast the highest potential flooding loss of the 19 focus counties. Milwaukee County determined their potential flood losses by:

Overall Risk = Exposure x Frequency x Hazard Loss Magnitude (Building Risk)

In addition to determining the potential flood loss in this manner, Milwaukee County also determined losses from winter storms, tornadoes, and wind/hail storms.

The counties of Portage, Adams, Grant, Racine, Kenosha, Crawford, Dane, Vernon, Buffalo, and La Crosse determined potential losses by identifying the number of structures in the 100-year floodplain and subsequently estimating the potential losses of the structures. Marathon and Columbia counties included the number of structures in the 100-year floodplain, but did not do a loss estimate. Marathon County had a staggering 2,695 structures in the floodplain, which was more than any of the other counties that utilized this methodology.

Pierce, Wood, and Richland counties calculated potential losses by identifying the number of commercial and residential structures in the Special Flood Hazard Area (SFHA) and then determined the total potential loss for structures in the SFHA. Wood County

TABLE 3.19.1-1 FLOOD LOSS ESTIMATES BY METHODOLOGY

Methodology	Pierce	Trempealeau	Marathon	Wood	Portage	Juneau	Adams	Grant	Racine	Kenosha	Milwaukee	Crawford	Sauk	Dane	Vernon	Buffalo	La Crosse	Richland	Columbia
Overall Risk = Exposure x Frequency x Hazard Loss Magnitude ($1,000,000)											$17,530								
Flooding ($1,000,000)											$15,086								
Winter Storms ($1,000,000)											$2,053								
Tornadoes ($1,000,000)											$56.7								
Wind/Hail Storms ($1,000,000)											$91.8								
Loss Estimate of Structures in Floodplain ($1,000,000)					$52.8		$52	$13.9	$17.8	$6.3		$28.2		$105.4	$10.5	$4.5	$40.8		
Number of Structures in 100-Year Floodplain			2,695		537		824	221	793	359		632		1,645	292	290	1,570		1,880
Loss Estimate for Residential Structures in the SFHA (2-Foot Flood) ($1,000,000)	$20.7			$34.5														$8.1	
Number of Structures in SFHA	897			2,107														543	
Loss Estimate for Commercial Structures in the SFHA (2-Foot Flood) ($1,000,000)	$1.6			$12.8														$2.7	
Number of Structures in SFHA	4			24														3	
No Determination of Potential Losses		X	X			X							X	X					X

Source: WEM, 2011.

has 2,107 residential structures and 24 commercial structures in the SFHA. The potential losses for residential and commercial structures in Wood County are $34,500,000 and $12,800,000 respectively.

Another highlight of this table is Kenosha County: the loss estimate for structures in the 100-year floodplain in the 2008 Plan update was over $13 million. Since then, Kenosha County updated their local hazard mitigation plan to reflect numerous floodplain structures that were acquired and demolished through FEMA's Hazard Mitigation Assistance programs. For this Plan update, Kenosha County's loss estimate is only $6.3 million, less than half of what it was just a few years ago!

Of the 19 focus counties with approved local mitigation plans, five did not determine the potential loss in their communities, most likely because of insufficient data but also possibly because it is not a required element in the plan. It is expected that the county potential losses will be addressed in the five-year local plan updates. Dane County did complete a potential flood loss analysis as part of their FMA plan, however, that plan was not included in this analysis. In addition, Dane County only had 13 of 60 jurisdictions participate in the initial plan development. Dane County's plan update intends to include the rest of the jurisdictions.

In addition to examining the potential flood losses, the local risk assessment integration analysis identified the top hazards as determined by the focus counties.

Figure 3.19.1-3, below, highlights the top hazards as identified by the 18 of the 19 focus counties (Richland County did not specify which was the top hazard). Most of the counties noted that either flooding/dam failure or winter storms were the most precarious natural hazard they faced. However, thunderstorms and tornadoes also pose a significant threat to some counties.

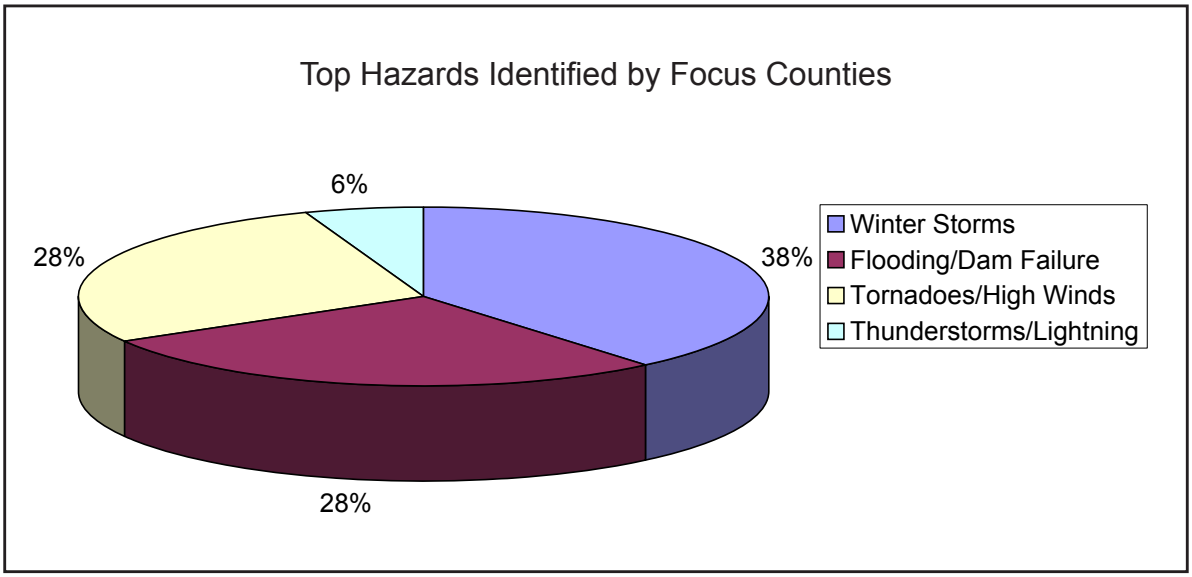


Figure 3.19.1-3 Top Hazards Identified by Counties
Source: WEM, 2011.

Table 3.19.1-2, below, shows all of the significant hazards identified by the focus counties. The "X" with the asterisk denotes the top hazard perceived by the community. As expected, all of the counties experience flooding to some degree. In addition, almost all of the counties identified winter storms and tornadoes as significant hazards. These two hazards are more likely to be identified as significant because they have a higher probability of occurrence. Winter storms have traditionally posed little risk for damage; however, tornadoes damages can be devastating. The remaining hazards are not as widespread. In fact, the hazards start to develop a regional pattern. For instance, forest and wild land fires were determined to be significant hazards in central and northern Wisconsin.

TABLE 3.19.1-2 TOP HAZARDS IDENTIFIED BY FOCUS COUNTIES

Hazard	Pierce	Trempealeau	Marathon	Wood	Portage	Juneau	Adams	Grant	Racine	Kenosha	Milwaukee	Crawford	Sauk	Dane	Vernon	Buffalo	La Crosse	Richland	Columbia
Flooding/Dam Failure	X*	X	X	X	X	X*	X*	X*	X*	X	X	X	X	X	X	X	X	X	X
Winter Storms		X*	X	X	X	X	X	X	X	X*	X*	X*	X	X	X*	X*	X*	X	X
Tornadoes/ High Winds	X	X	X*	X*	X*	X	X	X	X	X	X	X	X	X*	X	X	X	X	X*
Hail Storms	X	X			X				X	X		X		X	X	X	X	X	X
Extreme Temps		X	X	X	X	X		X	X	X	X			X		X	X	X	X
Forest Fires			X	X	X	X	X	X		X								X	X
Drought	X		X	X		X	X	X	X	X				X				X	X
Thunderstorms/ Lightning	X	X	X	X			X	X	X	X	X	X	X*	X	X	X	X	X	X
Coastal Erosion									X	X								X	
Landslides/ Subsidence			X					X											
Fog			X							X			X					X	

Source: WEM, 2011.

3.19.2 Jurisdictions Most Vulnerable to Loss from Floods

As described in Section 3.7, the loss estimation was performed using HAZUS-MH. The HAZUS-MH flood modeling was performed one county at a time. A stream network was delineated for every square mile within the county. The HAZUS-MH flood model performs an area weighted assessment of flood damage.

Tables 3.19.2-1 through 3.19.2-3 summarize the results of the HAZUS-MH flood analysis. It is not a surprise that Milwaukee County has with the highest total building exposure (Table3.19.2-1). The sheer volume of structures and number of rivers within Milwaukee

County account for almost $79 billion in building exposure. Dane County and Waukesha County also have high building exposure totals, but do not come close to Milwaukee County. When examining total economic loss from flooding (Table 3.19.2-2), Brown County had the highest total with $921,418. Once again, Waukesha County and Milwaukee County find themselves in the top three counties; however, Eau Claire County also had a significant economic loss total.

Brown County also had the highest risk of building loss (Table 3.19.2-3). However, Eau Claire rose to the second position in the building loss table. Waukesha and Milwaukee Counties were again in the top four. It is apparent from the Flood Risk Analysis that Brown County, Milwaukee County, Waukesha County, Eau Claire County, and Dane County face the greatest risk for losses in economics and structures due to flooding.

TABLE 3.19.2-1 TOTAL BUILDING EXPOSURE OVER $10 BILLION ($1,000)	
Milwaukee County	$ 78,904,721
Dane County	$ 37,942,411
Waukesha County	$ 35,955,764
Brown County	$ 19,969,696
Racine County	$ 15,693,961
Rock County	$ 12,746,145
Winnebago County	$ 12,530,045
Kenosha County	$ 12,467,944
Outagamie County	$ 12,467,944
Washington County	$ 10,613383
Sheboygan County	$ 10,241,080
Marathon County	$ 10,032,014

Source: WEM, 2011.

TABLE 3.19.2-2 TOTAL ECONOMIC LOSS ESTIMATE OVER $250 MILLION ($1,000)	
Brown County	$ 921,418
Waukesha County	$ 739,788
Milwaukee County	$ 732,195
Eau Claire County	$ 709,564
Dane County	$ 460,477
Marathon County	$ 365,012
Washington County	$ 351,573
Rock County	$ 316,841
Fond du Lac County	$ 300,969
La Crosse County	$ 294,438
Ozaukee County	$ 257,259
Kenosha County	$ 250,736

Source: WEM, 2011.

TABLE 3.19.2-3 BUILDING LOSS ESTIMATE OVER $100 MILLION ($1,000)	
Brown County	$ 430,304
Eau Claire County	$ 363,228
Waukesha County	$ 291,616
Milwaukee County	$ 286,370
Dane County	$ 180,345
Marathon County	$ 146,104
St. Croix County	$ 138,451
Washington County	$ 134,719
Columbia County	$ 130,669
Walworth County	$ 120,010
La Crosse County	$ 112,867
Racine County	$ 106,819

Source: WEM, 2011.

3.19.3 Jurisdictions Most Vulnerable to Loss from Tornadoes

Tables 3.19.3-1 and 3.19.3-2, on the following page, were complied using historic data from the National Climatic Data Center (NCDC). The tornado risk assessment reviewed the average damage amounts per tornado and the annual probability of tornadoes to determine the estimated future annual loss. In addition, injury and death were calculated using the 2008 figures from the Benefit-Cost Analysis Inflation Calculator. Ultimately, higher risks are associated with areas with increased populations as well as residential growth.

Table 3.19.3-1 shows Dane County as the county with the highest estimated future annual loss. Over the last 58 years, Dane County has had 44 tornadoes totaling approximately $69 million in damages. When considering the probability, Dane County can estimate that it may incur about $1.2 million a year in tornado losses. Fond du Lac and Dunn counties also have high estimated future annual losses because of the previous number of tornadoes and previous total damages, respectively.

Table 3.19.3-2 takes into account the loss of life and the number of injuries from tornadoes. Dunn County has had the most injuries (77) and deaths (21) due to tornadoes over the last 61 years. These factors contribute to its high estimate of total damages. Dane County had 66 injuries and 4 deaths while Oneida County has 36 injuries and 5 deaths. The final factor that contributes to the estimated annual loss number is the estimated annual loss for property damage. Both Dane and Dunn ranked in the top three counties because of the number of tornadoes.

It is interesting to note that Iowa County had a staggering 206 injuries and 9 deaths over the last 61 years, but because of its relatively low estimated annual loss for property damage, it ranked lower than Dane and Dunn Counties.

TABLE 3.19.3-1 TORNADO PROPERTY LOSS ESTIMATE BY COUNTY	
Dane County	$ 1,142,812
Fond du Lac County	$ 987,180
Dunn County	$ 955,689
Oneida County	$ 839,033
St. Croix County	$ 620,574
Chippewa County	$ 604,803
Waukesha County	$ 592,824
Washington County	$ 496,393
Waushara County	$ 472.623
Dodge County	$ 465,213
Wood County	$ 434,590
Vilas County	$ 433,607

Source: WEM, 2011.

TABLE 3.19.3-2 TORNADO TOTAL LOSS ESTIMATE BY COUNTY	
Dunn County	$ 3,016,787
Dane County	$ 1,578,320
Oneida County	$ 1,344,541
Fond du Lac County	$ 1,197,410
Chippewa County	$ 1,155,459
Iowa County	$ 1,064,000
Green Lake County	$ 1,015,831
St. Croix County	$ 840,000
Washington County	$ 829,295
Eau Claire County	$ 846,311
Waukesha County	$ 714,660
Waupaca County	$ 647,660

Source: WEM, 2011.

3.19.4 Jurisdictions Most Vulnerable to Loss from Wildfires

According to the Wildfire Risk Assessment found in Section 3.8, the approach used in the risk assessment model is based on the methodology developed in the NASF Field Guidance document. It recommends that assessment and mapping include four factors: 1) historic fire occurrences; 2) hazard; 3) values protected; and 4) protection capabilities. Modifications to the methodology were made to fit the data layers available for Wisconsin. The Wisconsin DNR used three factors to assess the Communities-at-Risk (CAR) to wildfire damage: 1) hazard (40%); 2) wildland-urban interface (30%); and 3) ignition risk (30%). Definitions of these three factors can be found in Section 3.8.

Unlike many hazard risk assessments (such as the tornado risk assessment) that rely solely on population, the Wildfire Risk Assessment primarily weighed the relative likelihood that an ignited wildfire will achieve sufficient intensity to threaten life or property based on land cover type and historic fire regime. More importantly, it also examined the vulnerability of each census block to wildfire damage based on housing density and spatial relationship with undeveloped vegetation based on density and proximity to vegetation, which is referred to as Wisconsin's Wildlife-Urban Interface.

Communities-at-Risk are reported at the municipal civil division (MCD) level. MCD was chosen due to its identifiable legal boundaries, ease in reporting, and use in the development of Community Wildfire Protection Plans (CWPPs). Each of Wisconsin's 1,864 towns, villages, and cities was defined as a community. Using the combination of natural breaks and filed verification, quantitative markers were assigned for five threat levels: very low, low, moderate, high, and very high. Ultimately, those communities determined to have a high or very high threat of wildfire were considered Communities-at-Risk. Three hundred and thirty-seven communities met the requirements for being at risk.

Using Figure 3.8.6-1, "Communities-at-Risk, Communities-of-Concern Map," Table 3.19.4-1 was derived. The red jurisdictions (Communities-at Risk, Very High) were counted for each county and the results were tabulated below. Adams and Burnett counties had the most Communities-at-Risk, Very High (12). Waushara, Washburn, and Juneau counties also had a number of CARs with 8, 7, and 7, respectively.

TABLE 3.19.4-1 NUMBER OF COMMUNITIES-AT-RISK BY COUNTY

Adams County	12
Burnett County	12
Waushara County	8
Washburn County	7
Juneau County	7
Jackson County	5
Oneida County	4
Douglas County	3
Monroe County	3
Sawyer County	3
Vilas County	3

Source: WEM, 2011.

3.19.5 Jurisdictions Most Vulnerable to Loss from Coastal Hazards

Table 3.19.5-1 and 3.19.5-2, on the following page, identify the counties with high and low coastal erosion risk. The data used for the coastal erosion analysis were derived from existing maps depicting rates of coastal erosion and the FEMA HAZUS-MH inventory of structures in the coastal zone.

High erosion risk is defined as the area within a one-quarter mile of the coast and low erosion risk is defined as the area within one-half mile. Tables 3.19.5-1 and 3.19.5-2 depict the total structures and loss estimation for residential, commercial, and governmental structures within the high and low erosion risk areas.

Milwaukee County's high population and the sheer number of structures make it the county ranked first in both the low and high erosion risk categories. Door County, a popular tourist destination located on the eastern peninsula of Wisconsin, has many primary and secondary residences, and commercial structures along the coast. Door County also has a great risk in both the low and high erosion risk categories.

TABLE 3.19.5-1 HIGH EROSION RISK LOSS ESTIMATION

County	Total Structures in Boundary	Loss Estimation
Milwaukee	6,513	$ 313,488,140
Door	7,956	$ 254,193,420
Ozaukee	2,225	$ 119,171,780
Racine	4,168	$ 97,102,480
Sheboygan	3,079	$ 64,475,440
Kenosha	2,295	$ 56,953,700

Source: WEM, 2008.

TABLE 3.19.5-2 LOW EROSION RISK LOSS ESTIMATION

County	Total Structures in Boundary	Loss Estimation
Milwaukee	15,977	$ 1,243,893,400
Door	9,747	$ 604,386,720
Ozaukee	3,867	$ 395,163,640
Racine	7,401	$ 396,492,600
Sheboygan	5,409	$ 211,743,360
Kenosha	4,556	$ 208,221,560

Source: WEM, 2008.

3.19.6 Summary

In Appendix A, the Natural Disaster Activity by County (1990-2011). Each of the events had a request for a Presidential Declaration; however, not all requests were approved. Most, if not all, of these events were due to a flood, severe storm, or tornado.

Table 3.19.6-1 shows the number of Presidential Disaster or Emergency Declarations issued for the highest ranking counties in the state. Dane County had 12 declarations over the last 22 years. Crawford, Green, and Milwaukee counties each had 10 events. All of the counties in 3.19.6-1 are located in the southern part of Wisconsin and were part of the 2008 flood declaration. The southern part of Wisconsin, compared to the rest of the state, receives strong storms and high rainfall amounts.

TABLE 3.19.6-1 NATURAL DISASTER ACTIVITY BY COUNTY (1990-2011)	
County	**Number of Declarations**
Dane County	12
Crawford County	10
Green County	10
Milwaukee County	10
Grant County	9
Sauk County	9
Vernon County	9
Waukesha County	9
Dodge County	8
Racine County	8
Richland County	8
Rock County	8
Columbia County	7
Juneau County	7
Kenosha County	7

Source: WEM, 2011.

The counties that consistently reappeared in the hazard risk assessments include Milwaukee, Dane, Waukesha, Racine, Kenosha, Brown, Eau Claire, and Marathon. These counties are among the most populous in the state and have substantial numbers of residential, commercial, industrial, and governmental structures. When determining risk in terms of loss of building structures and human life, the most populous counties typically will have the highest risk.

However, certain hazards' risks, such as the wildfire hazard, are dependent on the environment in the county. For instance, risk could be defined by examining the spatial relationship between housing density and with undeveloped vegetation. While population would play a part in the assessment, it would not be the deciding factor.

Regardless of the methodology used, it is important to complete risk assessments. Ultimately, the assessments need to be shared with local governments, state agencies, and most importantly, the citizens.

SECTION 4: MITIGATION STRATEGY

The Wisconsin Hazard Mitigation Team (WHMT) prepared the goals, mitigation actions, and Mitigation Action Plan included in Wisconsin's State Hazard Mitigation Plan. The goals and mitigation actions were developed based on the experience of WHMT members, presentations and discussions about the natural hazards that impact the State, information from the State Risk Assessment, review and discussion of previous mitigation planning and activities, and review and discussion of the mitigation goals of the state's local mitigation plans. For the 2011 version of the Plan, Wisconsin Emergency Management (WEM) met one-on-one with representatives of the other WHMT agencies to review and update their contributions.

Through the WHMT's planning process, the mitigation goals below were developed for State Hazard Mitigation Plan. The goals guided the development of mitigation actions and the Mitigation Action Plan, and will foster a vision for hazard mitigation and disaster resistance throughout the state.

4.1 STATE MITIGATION GOALS

1. Minimize human, economic, and environmental disruption from natural hazards.
2. Enhance public education about disaster preparedness and resistance, and expand public awareness of natural hazards.
3. Encourage hazard mitigation planning.
4. Support intergovernmental coordination and cooperation among federal, state and local authorities regarding hazard mitigation activities.
5. Improve the disaster resistance of buildings, structures, and infrastructure whether new construction, expansion or renovation.

Goals were initially developed during the planning process for the original State Hazard Mitigation Plan completed in 2001. Through the planning process for the 2008 plan update, in a meeting held on February 21, 2008, the WHMT modified goals 2 and 5. For the 2011 version of the Plan, the WHMT revised goals 1, 2, 3, and 4 on December 9, 2010 to more thoroughly encompass the purpose of hazard mitigation in the state and the mission of the WHMT.

As of June 30, 2011, 68 counties, 7 single jurisdictions, and 7 tribal governments in Wisconsin have developed or are developing hazard mitigation plans. After reviewing these plans, WEM mitigation staff determined that the goals of these local plans and the goals of the State Plan closely mirror each other. Section 5 discusses this in more detail. The plans and the areas they represent will provide ample information to ensure that the Mitigation Strategy of the State Hazard Mitigation Plan reflects the counties', tribal organizations', and single jurisdictions' goals and strategies.

4.2 CAPABILITY ASSESSMENT

4.2.1 State Capability Assessment

As part of the Mitigation Strategy, the State Hazard Mitigation Plan includes a discussion of the State's pre- and post-disaster hazard management capabilities, including an evaluation of state laws, regulations, policies, and programs related to hazard mitigation as well as to development in hazard-prone areas, and a discussion of state funding capabilities for hazard mitigation projects.

A capability assessment survey was developed to collect information on policies, programs, regulations, authorities, agency initiatives, training, and technical assistance provided by state agencies that address hazard mitigation. Members of the WHMT coordinated with staff in their agencies to obtain information on all relevant activities. This inventory assisted the WHMT in identifying what capabilities existed, which were working well, and where there were unmet needs. Through the capability assessment, the WHMT determined whether their missions adequately addressed and supported loss reduction at both the state and local levels.

For the three-year plan update in 2008, the members of the WHMT were asked to review and evaluate the state capability assessment. Revisions and additions were made. For the 2011 update, members of the WHMT met in person with WEM staff to review and evaluate each agency's contribution to the state capability assessment. This approach yielded more robust insights.

Completing a thorough capability assessment led to the identification and development of specific mitigation recommendations and actions. By evaluating the effectiveness of the existing state capabilities with respect to capabilities of local governments, the State discovered the need for additional programs to assist communities in their mitigation efforts, and included those mitigation action items in the Mitigation Action Plan.
WEM has identified the following programs as having the greatest impact on mitigating damage from natural hazards:

- The Pre-Disaster Mitigation Competitive Program (PDM-C) provides mitigation grants to state and local governments, and tribal organizations for comprehensive all-hazards mitigation planning and to implement cost-effective mitigation projects.
- The Hazard Mitigation Grant Program (HMGP) provides mitigation grants to state and local governments, eligible private, non-profit organizations, and tribal organizations for comprehensive all-hazards mitigation planning and to implement cost-effective mitigation projects.
- Increased Cost of Compliance (ICC) coverage pays insurance claims for the cost of compliance with state or community floodplain management laws or ordinances after a direct physical loss by flood. When a building covered by a Standard Flood Insurance Policy under the NFIP sustains a flood loss and the State or community

declares the building to be substantially or repetitively damaged, ICC will pay up to $30,000 for the cost of elevation, floodproofing, demolition, or relocation.

- The Flood Mitigation Assistance (FMA) program provides annual funding for the development of comprehensive flood mitigation plans and implementation of cost-effective mitigation measures on NFIP insured properties.
- The Repetitive Flood Claims (RFC) grant program is designed to reduce or eliminate the long-term risk of flood damage to structures that are insured under the NFIP and have had one or more claim payments for flood damages. RFC funds may only be used to mitigate structures located within a state or community that is participating in the NFIP and cannot meet the requirements of the FMA program due to lack of cost share funding or lack of capacity to manage the activities.
- The Severe Repetitive Loss (SRL) program provides funds to assist states, tribal organizations, and local governments participating in the NFIP in reducing or eliminating the long-term flood risks to severe repetitive loss properties, thus reducing outlays from the NFIP.
- NR 116 Local and State Floodplain Standards prohibits construction in floodways and requires elevation and dry-land access in flood fringe areas. It limits improvements to non-conforming structures and requires compensatory storage in flood storage areas.
- Comprehensive planning legislation requires local governments to have comprehensive plans to guide them in making good land use decisions. It complements mitigation planning and has added momentum to the mitigation planning movement by requiring the incorporation mitigation elements into comprehensive plans by 2010.
- The Home Safety Act requires the State's Uniform Dwelling Code (UDC) be enforced throughout the state. It includes the imperative to have all new construction inspected for compliance with the UDC. This law will improve the disaster resistance of homes, by requiring implementation of safety standards at the time of construction. The effect will be a reduction in injury and property loss from all types of natural hazards.
- The Municipal Flood Control and Riparian Restoration Program provides grants for the mitigation of flood-prone property, the restoration of riparian areas, and the construction of flood control projects.
- The Firewise Communities program is intended to serve as a resource for agencies, tribes, organizations, fire departments, and communities across the U.S. who are working toward a common goal: reduce loss of life, property, and resources to wildland fire by building and maintaining communities in a way that is compatible with our natural surroundings. Firewise Communities is part of the National Wildland/Urban Interface Fire Program.

Because of their length, Tables 4.2-1 and 4.2-2 are at the end of this section on pages 4-51 and 4.83. Table 4.2-1 identifies and assesses state agency activities that support hazard mitigation. Definitions for the last two columns in the table are as follows:

Financial Support – Provides funding that helps implement mitigation measures.

Facilitation – Programs, plans, policies, regulations, etc., that make implementing mitigation measures easier.

Table 4.2-2 identifies and lists potential funding sources for mitigation activities. The State relies heavily upon federal hazard mitigation programs available through FEMA to fund state and local hazard mitigation projects.

4.2.2 Local Capability Assessment

As part of the State's mitigation strategy, the State Hazard Mitigation Plan shall include a general description and analysis of the effectiveness of local mitigation policies, programs, and capabilities.

As of June 2011, 68 of the 72 counties in Wisconsin have completed or are developing all-hazards mitigation plans. The local plans are discussed further in Section 5 of the Plan.

There are several local regulations or programs that assist counties and communities in addition to several key statewide regulations or initiatives that provide for mitigation capabilities at the local level. They are identified in Table 4.2-3, Local Capability Assessment, on page 4-93 of this section. (See the State Capability Assessment, page 4-51 for information on policies, programs and initiatives that support statewide mitigation.)

In addition to the policies and/or regulations identified in the table, WEM mitigation staff has been actively working with local governments to develop an awareness of mitigation opportunities and to further identify policies, programs and capabilities that exist that may advance mitigation efforts at the local level. This is done through the following activities:

- Provide information and guidance regarding the benefits of comprehensive hazard mitigation planning and the development of long-term, permanent mitigation measures. WEM with assistance of the Association of Wisconsin Regional Planning Commissions developed mitigation planning guidance, the Resource Guide to All Hazards Mitigation Planning in Wisconsin, that has been widely distributed and can be accessed at WEM's website.
- Develop and conduct All-Hazards Mitigation Planning Workshops for interested communities. In addition, hazard mitigation has been included in WEM's training curriculum in other courses such as the Disaster Response and Recovery Course, Local Damage Assessment, New Directors Series Workshop, and Municipal Planning Course. Hazard mitigation is also included in the Local Officials Public Assistance Briefings held after each disaster declaration. WEM staff has teamed up with Wisconsin DNR staff in presenting at Substantial Damage Workshops.

- Develop and publish articles regarding all-hazards mitigation in various newsletters such as the WEM Digest, Department of Natural Resource's Floodplain and Shoreland Management Notes, Wisconsin Association for Floodplain, Stormwater, and Coastal Managers' (WAFSCM's) Water Matters, as well as others when requested.
- Make presentations on all-hazards mitigation whenever the opportunity presents itself. This includes at the Annual Governor's Conference on Homeland Security and Emergency Management, Wisconsin Emergency Management Association, WAFSCM's Annual Conference, Wisconsin Land Information Association, Association of Wisconsin Regional Planning Commissions, Wisconsin Utilities Association, Wisconsin State Bar Association, the UW-Madison Student Planning Organization, and Great Lakes Tribal organization among others.
- Utilize WEM's website to publish information and guidance on all-hazards mitigation. This includes information on the federal mitigation programs, state and local all-hazards mitigation planning, mitigation success stories, and other general information on mitigation. Documenting successful local mitigation stories demonstrates the long-term benefits of mitigation to other communities and the public as well as local policy- and decision-makers. Documenting success stories has generated an increase in awareness and interest in mitigation at the local level. Most of the presentation materials from the various workshops (Planning Workshop, Governor's Conference, and Buyout Workshop) are located on WEM's website.
- Develop and exhibit a mitigation display that identifies the different components of a comprehensive all-hazards mitigation program and includes mitigation success stories as examples. The display is used at training functions, conferences, and when other opportunities arise.
- Effectively administer the federal mitigation grant programs (FMA, HMGP, PDM, RFC, and SRL) to fund cost-effective, environmentally-sound, long-term mitigation measures as well as comprehensive all-hazards mitigation planning.
- WEM hosted 2007, 2009, and 2011 Benefit-Cost Analysis Workshops and a 2006 HAZUS Workshop conducted by FEMA contractors for local Emergency Managers, consultants, and other interested parties. All were very well received and attended.

4.3 MITIGATION ACTION PLAN

In developing the mitigation actions the WHMT considered the following:

- The mission of the strategic plan of Wisconsin Emergency Management 2004-2006 (WEM is currently working on an update of the strategic plan): Wisconsin Emergency Management (WEM) coordinates effective disaster response and recovery efforts in support of local governments. Through planning, training and exercising we prepare ourselves, our citizens, and response personnel to minimize the loss of lives and property. Further the plan includes the following goal: Develop

and evaluate emergency management plans and processes to ensure that they reflect our hazards, risks, capabilities, resources, and mitigation opportunities.

- Issues, concerns and recommendations of the Post-Event Mitigation Strategies or Action Plans for major disaster declarations 1429, 1432, 1526, 1719, 1768, 1933, 1944, and 1966.
- The mitigation goals and objectives from local plans.
- Impacts of past disaster events.
- Recommendations from FEMA staff.
- The state's priority hazards: floods, tornadoes, high winds, wildfires, and coastal erosion. (See Section 3 for more information.)

For the 2011 Plan update, members of the WHMT met individually with WEM staff to review and revise the Action Plan, specifically those items for which their agency is responsible. They also provided new action items as appropriate.

In previous versions of the plan, Action Items were listed according to which State Mitigation Goal they satisfied. This version lists them according to lead agency for two primary reasons: 1) it is easier for agencies to find their contributions, especially when updating the Plan; and 2) many of the Action Items satisfy more than one of the State Mitigation Goals. (Table 4.3-1 on page 4-99 at the end of this section lists which Action Item numbers in this version of the Plan correspond with each of the Action Item numbers from the previous version of the Plan.) The Action Items are summarized in Table 4.3-2 for quick reference at the end of this section on page 4-100. The table includes a priority level (high, medium, or low) for each action item as specified by the lead agency. In addition, the table describes how each action item contributes to the overall State Mitigation Strategy and which of the State Mitigation Goals it meets.

The order the Action Items are in under each agency does not reflect priority or level of importance. Listed with each Action Item are background information; supporting agencies; the scheduled timeframe for implementation; and any changes since the previous update. New action items use red text for the Action Item number. Following the list are two tables: Table 4.3.15-1 Completed Action Items and Table 4.3.15-2 Deleted Action Items. These tables list the Action Items from the previous version of the plan that are not included as Action Items in this version and give a brief explanation as to why.

4.3.1 Lead Agency: Department of Administration (DOA)

DOA - Division of Housing

1.1 Action: Distribute hazard mitigation materials at housing workshops, trainings, and orientation sessions.

Supporting Agency: WEM

Implementation: Continue to distribute hazard mitigation materials at workshops annually.
Background: WEM will provide hazard mitigation materials and the Division of Housing will distribute these materials at CDBG and HOME workshops and training sessions.
2008 Update Status: Status unchanged.
2011 Update Status: Status unchanged.

1.2 Action: Include the Wisconsin Disaster Fund as a topic at trainings and workshops that also discuss the Emergency Assistance Program.
Supporting Agency: WEM
Implementation: Ongoing.
Background: WEM will present information about the Wisconsin Disaster Fund at Emergency Assistance Program trainings and workshops. WEM and the Division of Housing will work together to provide mitigation information to grantees receiving housing and community development rehabilitation assistance.
2008 Update Status: Status unchanged.
2011 Update Status: Status unchanged.

1.3 Action: Incorporate mitigation practices into the Division of Housing's Emergency Assistance Program.
Supporting Agency: WEM
Implementation: The Division of Housing began incorporating mitigation practices into its housing rehabilitation programs in June 2001.
Background: The Division of Housing was able to identify eligible improvements using CDBG funds. "Safe Rooms" are listed as eligible activities for grantees that are able to identify a need. The "Eligible Activities List" was amended to include floodproofing as eligible, and even required in certain rehabilitation projects. Retrofitting for greater wind resistance was added to the list of eligible CDBG activities where property conditions require the replacement of the roof or siding.
2008 Update Status: Status unchanged.
2011 Update Status: Action delayed because CDBG funds are not usually used for the type of substantial rehabilitation necessary for the incorporation of hazard mitigation practices; however, mitigation remains an eligible activity.

1.4 Action: Do not approve grants or loans to communities to construct critical facilities in floodplains or hazard prone areas.
Supporting Agencies: WEM, DNR
Implementation: Ongoing.
Background: Community development programs within the Division of Housing, such as the CDBG Community Facilities program, help disadvantaged communities finance the construction of community facilities and infrastructure. These are key components of the community and need to be disaster resistant. The Division of Housing will follow federal and state standards for flood risk mitigation and address other natural hazards as applicable when funding the construction of community facilities.

2008 Update Status: Status unchanged.
2011 Update Status: Action delayed because CDBG and HOME funds are not usually used for the type of substantial rehabilitation necessary for critical facility construction.

DOA - Division of Intergovernmental Relations:
Comprehensive Planning

1.5 Action: Coordinate and incorporate hazard mitigation planning concepts in future updates to the State Guide on Developing the Natural Resources Element of the Comprehensive Planning Guides.
Supporting Agencies: WEM, DNR, and UW-Sea Grant Institute
Implementation: Ongoing.
Background: Wisconsin Comprehensive Planning legislation was created in 1999 to address the planning needs of Wisconsin communities. Many communities have outdated plans, inconsistent plans, or no plans at all. This legislation requires communities that engage in zoning, subdivision regulations, or official mapping to have a comprehensive plan in place by January 1, 2010. Communities must address nine elements within the comprehensive plan. DOA drafted guides for each element. Hazard mitigation planning is mentioned briefly in the guide for the Natural Resources Element.
2008 Update Status: Status unchanged. Mitigation planning information was provided to DOA by WEM.
2011 Update Status: Mitigation planning information was provided to DOA by WEM. The planning guides are now only available online.

1.6 Action: Promote hazard mitigation planning by maintaining a close relationship with the Comprehensive Planning Grant Program.
Supporting Agencies: WEM, RPCs
Implementation: Staff will provide an annual update on communities developing comprehensive plans so that, if possible, the information from the comprehensive plans can be used in the development of local hazard mitigation plans.
Background: Comprehensive plans for local communities contain information that is useful in hazard mitigation planning such as floodplain maps, future land use maps, contaminated site information, wetlands maps, stream corridors, etc.
2008 Update Status: Status unchanged.
2011 Update Status: WEM is preparing to update the Resource Guide to All Hazards Mitigation Planning in Wisconsin.

1.7 Action: Invite WEM staff to participate in the State Agency Resource Working Group (SARWG).
Supporting Agency: WEM
Implementation: 2004 and ongoing.
Background: The SARWG is a group of representatives from various agencies that promote and cooperate on land use issues. SARWG is administered by DOA. Other agencies represented include DNR, DATCP, DOT, PSC, WHS, DOA, and UW-LICGF.

2008 Update Status: SARWG is not active. Although the group is inactive due to the sunset of the Wisconsin Land Council, members continue to communicate to promote comprehensive and mitigation planning.
2011 Update Status: Status unchanged.

DOA - Division of Intergovernmental Relations:
Wisconsin Coastal Management Program (WCMP)

1.8 Action: The WCMP will continue to raise awareness of coastal hazards through activities such as Coastal Awareness Month, trainings and workshops, and include concepts of disaster resistant communities to promote hazard mitigation.
Supporting Agencies: WEM, DNR
Implementation: Ongoing. WCMP will support activities to raise awareness of coastal hazards.
Background: The WCMP seeks to prevent and minimize potential threats posed by coastal hazards through outreach efforts, grant programs, and agency partnerships.
2008 Update Status: Status unchanged. WAFSCM, WEM, and WCMP sponsored a Coastal Hazards Workshop in Ashland in 2006.
2011 Update Status: Status unchanged. WAFSCM, WEM, and WCMP will try to schedule a Coastal Hazards Workshop in fall 2011 or spring 2012.

1.9 Action: The WCMP will seek to help communities develop and implement shoreline and bluff erosion policies.
Supporting Agencies: WEM, DNR, UW-Sea Grant Institute
Implementation: Current and ongoing. WCMP will seek to increase the number and the effectiveness of policies regulating coastal hazards in Wisconsin.
Background: The WCMP continues to work to update methodologies and technical information regarding coastal erosion in the Great Lakes. This information is intended to help devise mitigation activities, update current ordinances and other policies, and raise stakeholders' awareness of risks posed by coastal erosion.
2008 Update Status: Status unchanged.
2011 Update Status: Status unchanged.

1.10 Action: The Wisconsin Coastal Hazards Work Group (CHWG) will work with local governments in the state's 15 coastal counties to develop and revise policies relevant to coastal hazards.
Supporting Agencies: UW-Sea Grant Institute, DNR
Implementation: Ongoing.
Background: The most recent GIS effort that supports the work of the CHWG involves the visualization of coastal erosion processes. The UW's Sea Grant Institute collaborated on a project funded by NASA to apply remote sensing to local government problems. The Wisconsin State Cartographer approached the Sea Grant Institute and the UW-Madison Geography Department about the use of visualization software to communicate the risks of coastal erosion to development in Ozaukee County, WI.

Their work has helped make sense of a large volume of scientific and spatial data while emphasizing the role that imagery and animation have in the public understanding of coastal erosion. The work has also helped identify the most suitable software tools for representing dynamic coastal processes.
2008 Update Status: New action item.
2011 Update Status: The CHWG continues to develop tools and convey challenges of coastal erosion and flooding to coastal communities.

1.11 Action: The WCMP will continue to coordinate with the Coastal Hazards Work Group (CHWG) to expand hazard mitigation activities in those coastal areas vulnerable to destruction.
Supporting Agencies: WEM, UW-Sea Grant Institute, DNR
Implementation: The WCMP will continue to hold CHWG meetings as needed.
Background: The WCMP works with its partner agencies in the CHWG. The CHWG provides an opportunity for agencies to discuss current challenges and potential projects relevant to coastal hazards. They have developed various tools to convey the challenges of coastal erosion including an educational web site: http://www.geography.wisc.edu/coastal. Using 3-D animations of bluff erosion, coastal landowners can see the complex changes that happen as coastal bluffs erode. This successfully bridges the gap between scientific understanding and public perception of coastal hazards.
2008 Update Status: The CHWG and its partner agencies have developed tools to convey the challenges of coastal erosion. One tool is a successful educational website (see link above) that bridges the gap between scientific understanding and public perception of coastal hazards. Using 3D animations of bluff erosion coastal landowners can see the complex changes that happen as coastal bluffs erode.
2011 Update Status: The CHWG continues to develop tools and convey to coastal communities the challenges of coastal erosion and flooding.

4.3.2 Lead Agency: Department of Agriculture, Trade, and Consumer Protection

2.1 Action: Encourage communities to sign up for and participate in the Conservation Reserve Enhancement Program (CREP) to reduce crop losses.
Supporting Agencies: County Land Conservation Departments, USDA: Farm Services Agency and Natural Resources Conservation Service
Implementation: The program began in 2001. The sign-up period ends in October 2012.
Background: The CREP is a federal and state program that focuses on improving water quality. The program promotes reducing non-point pollutant runoff from agricultural lands, reducing sediment, nutrient and pesticide loads, installing riparian buffers, filter strips and grassed waterways, and restoring wetlands and prairie grasses. The program helps reduce runoff and peak flows in streams. The project goals were to set aside 100,000 acres. While primarily a water quality program, removing flood prone cropland from production is a secondary benefit.
2008 Update Status: Ongoing.

2011 Update Status: Ongoing; state funding was reduced from the $40 million estimate to $28 million in bond authority in 2009 Wisconsin Act 28.

4.3.3 Lead Agency: Department of Natural Resources (DNR)

DNR - Division of Water

3.1 Action: Give extra points to communities applying for DNR Stewardship programs if their proposal satisfies multiple objectives including mitigation elements.

Implementation: 2005

Background: DNR's stewardship grant program allocates additional points for projects that acquire, enhance, or protect natural areas that provide water quality and water quantity benefits. Many of these projects often also serve as flood mitigation measures. Adding specific mitigation actions, such as increasing floodwater storage capacity, to the project ranking criteria would help conserve natural resources while reducing flood losses.

2008 Update Status: Status unchanged.

2011 Update Status: Status unchanged.

3.2 Action: Promote the No Adverse Impact (NAI) floodplain management approach statewide.

Supporting Agencies: Wisconsin Association for Floodplain, Stormwater and Coastal Managers (WAFSCM), WEM

Other Organizations: Association of State Floodplain Managers (ASFPM), Zoning Administrators Association

Implementation: 2005

Background: With over $6 billion of flood damages annually, the drain on all levels of resources needs to be reduced. With intensifying development within watersheds and floodplains, the rationale is to manage that type of development more fervently. The NAI approach makes sense and will result in reduced damages. NAI increases support for watershed management by promoting multiple objectives through management strategies. This means it appeals to a wider range of interests and will broaden approval of flood management actions.

2008 Update Status: Ongoing. Promote NAI at workshops, meetings, conferences and through the newsletter. Plan to incorporate NAI principles into NR 116 revisions. NAI training session planned for the 2008 WAFSCM (Wisconsin Association of Floodplain, Stormwater and Coastal Managers) conference.

2011 Update Status: An NAI training session was held at the 2008 WAFSCM conference. Promote NAI activities, including higher regulatory standards, to ensure that the actions of property owners are not allowed to adversely affect the rights of other property owners. Discuss adverse effects or impacts with communities such as increased flood peaks, increased flood stages, higher flood velocities, increased erosion and sedimentation, and other impacts the community considers important.

3.3 Action: Promote substantial damage inspections.

Supporting Agency: WEM

Implementation: 2011 and ongoing.

Background: To maintain membership in the NFIP, communities must have substantial damage inspection requirements in their floodplain zoning code. Substantial damage inspections following flood events help determine eligibility for state and federal disaster assistance, so it is crucial that communities enforce the inspection requirements in the zoning code and that they have qualified individuals performing the inspections. DNR will discuss substantial damage inspection requirements at workshops and other public speaking venues; stress that the requirements are in the community's floodplain zoning code and are a minimum standard for NFIP compliance; discuss training opportunities and assistance available from state and federal sources after a flood event; promote the use of the new Substantial Damage Estimator Tool; and encourage cooperation among neighboring communities.

2011 Update Status: New action item.

3.4 Action: Promote more efficient methods of detecting non-compliant structures in the floodplain and reviewing local floodplain management procedures.

Supporting Agency: FEMA

Implementation: Ongoing.

Background: Flood damages are increasing annually. Limiting non-compliant floodplain development will decrease potential damages. Developing more efficient methods of identifying non-compliant structures and reviewing local floodplain management procedures will facilitate the limiting of non-compliant development, thus reducing the number of structures and individuals at risk during flood events.

2011 Update Status: New action item. In 2008, a method of conducting aerial photo comparisons was developed and implemented. It resulted in an increase in the number of non-compliant structures identified and mitigated. The aerial photo process will be refined and other tools developed and implemented.

3.5 Action: Encourage restoration of natural wetland functions.

Supporting Agencies: NRCS, USFWS, local communities, property owners

Implementation: Ongoing.

Background: Wetlands provide natural flood storage areas. Restoring the natural function of these areas can reduce the flooding potential of other areas in the watershed. For many years, DNR has been working with NRCS, USFWS, and other entities interested in wetland restoration to streamline the regulatory process of these activities. Efficient spending of federal funds promotes access to future funding opportunities. DNR has worked with partners on enabling legislation to develop a permit process for certain classes of federally funded and designed wetland restoration projects, to develop a general permit process, and to train staff from impacted agencies. Staff from NRCS, USFWS, DNR, WEM in cooperation with local governments, UW-Extension, the Environmental Law Institute, the University of South Carolina – Chapel Hill, and the Rock River Coalition planned and conducted a Wetlands, Wildlife Habitat, and Flood Hazards in the Rock River Basin workshop in May 2011. The workshop

was designed to facilitate greater collaboration between emergency managers and wetland and wildlife conservation managers to strengthen protection of vital wetlands and floodplains. It explored how agencies and organizations can work effectively together to meet multiple goals and identify the information needed and funding sources available for joint projects.

2011 Update Status: New action item. DNR will continue to work with federal and other partners to improve the wetland restoration permitting process. DNR will use lessons learned from the Wetlands, Wildlife Habitat, and Flood Hazards in the Rock River Basin workshop to identify and restore converted wetland areas.

3.6 Action: Provide workshops and distribute informational materials to improve understanding and enforcement of floodplain, coastal, shoreline, and wetland regulations, including mitigation techniques.

Supporting Agencies: DOA-WCMP, UW-Sea Grant institute, WEM

Implementation: Ongoing.

Background: Educating the public on flood hazards is one of the first duties and greatest challenges of any flood mitigation and prevention program. DNR will coordinate with DOA-WCMP to improve coastal hazards awareness, coastal hazards mitigation, and floodplain, shoreline and wetland regulations. Staff will continue to have workshops on floodplain management regulations, substantial damage determinations, flood insurance, and compliance. They will conduct Community Assistance Visits to assess local floodplain management performance and compliance.

2008 Update Status: Conducted substantial damage determination workshops for local officials after the 2007 and 2008 flooding. Provided technical assistance to communities for substantial damage determinations. Annually conducted 10 floodplain management workshops and attended more than 10 meetings of local government officials, realtors, insurance agents, and the general public to promote floodplain management.

2011 Update Status: Will annually conduct 10 floodplain management workshops and attend 10 or more meetings of local government officials, realtors, insurance agents, and the general public to promote floodplain management.

3.7 Action: Provide sewer back-flow prevention information and other floodproofing measures to affected communities through public information programs.

Supporting Agencies: WEM, OCI

Implementation: Ongoing.

Background: Sewer back-flow has been identified as a major cause of damage during heavy rain events in Wisconsin's urbanized areas. Thus, it is important to provide information in these areas on how to prevent losses. Producing a pamphlet and/or web page about insurance and property protection options will assist in this.

2008 Update Status: Will coordinate with Milwaukee Metropolitan Sewerage District (MMSD) about expanding distribution of informational materials to other parts of the state.

2011 Update Status: Contacted MMSD staff to discuss enhanced distribution of informational materials. Plan to meet with appropriate staff before the end of FY2011.

3.8 Action: Compile and distribute the Floodplain/Shoreland Notes newsletter.

Supporting Agency: FEMA

Implementation: Ongoing.

Background: The newsletter is an effective method of providing local officials and others with information on all aspects of the NFIP, shoreland issues, dam safety, and hazard mitigation. It is also an avenue for providing a wide range of information of flood hazard risks and mitigation. The newsletter is stored online and past issues are used for reference by state and local officials and the public.

2011 Update Status: New action item. The newsletter is mailed three times per year to local officials and other interested individuals. The DNR currently uses electronic delivery. Past issues are maintained on the DNR website.

3.9 Action: Provide workshops and distribute informational materials to improve understanding and awareness of flood insurance.

Supporting Agency: FEMA

Implementation: Ongoing.

Background: Workshops and visits will improve awareness of flood insurance and methods of reducing flood risks. Improving local awareness will increase the number of flood insurance policies. DNR held 11 flood insurance workshops and participated with other agencies in producing material for the 2010 Flood Awareness Week.

2011 Update Status: New action item. DNR will continue to hold at least three flood insurance workshops annually and continue participating in the annual Flood Awareness Week. DNR will work to update flood insurance information available on their website.

3.10 Action: Promote dam safety awareness through workshops, and the development of Emergency Action Plans (EAPs) and Inspection, Operation, and Maintenance (IOM) guidebooks, templates, and newsletters.

Supporting Agency: FEMA

Implementation: Ongoing.

Background: The number and increasing age of dams escalates the need to ensure dam owners understand their responsibilities and the risk a dam can pose to surrounding properties and infrastructure. By increasing the number of EAPs, IOMs and public awareness, the overall level of risk from dam failure can be reduced. DNR has held five DAM Safety Workshops throughout the state for owners of large dams. An EAP Guidebook and Template were developed and posted on the Dam Safety website. A Dam Safety News newsletter was sent to the owners of large dams.

2011 Update Status: New action item. Dam safety workshops will be held on an annual basis throughout the state on a rotating basis. A new IOM Guidebook and Template will be developed and posted on the DNR website. The Dam Safety News newsletter will be published twice a year.

3.11 Action: Continue to provide technical assistance to non-National Flood Insurance Program (NFIP) communities that have had flood damage and encourage them to join the NFIP.

Supporting Agency: WEM
Implementation: Ongoing.
Background: Although most communities that are not in the NFIP are not at high risk for flooding, many of these communities do have some flood risk and need to establish a community flood mitigation program to clearly identify and mitigate flood risk. The department has coordinated with several communities interested in joining the NFIP. Community Assistance Visits (CAVs) were conducted in these communities. In addition, the department is working with other newly incorporated communities. The remaining HMGP communities will receive CAV's in 2004.
2008 Update Status: Ongoing. Five communities have joined the NFIP in the past two years and several more are in the process. DNR is working with other communities through the map revision process. DNR and FEMA staff contacted non-participating communities in the declared areas after the 2007 and 2008 flooding to provide information on joining the program.
2011 Update Status: Ongoing. 20 communities have joined the NFIP since June 2008. Several more have expressed interest in the NFIP or are in the process of joining. Non-participating communities will continue to be contacted and encouraged to join the NFIP as part of the ongoing RiskMAP process.

3.12 Action: Work with local communities to encourage mapping of floodplains and coastal areas. DNR will help identify flood hazard and coastal erosion areas, especially in those communities where mapping of hazard areas is most needed.
Supporting Agency: WEM, RPC's, WCMP
Implementation: Ongoing.
Background: Many developing areas of Wisconsin have flood and erosion risk but are poorly mapped for these risks or not mapped at all. Promoting hazard mapping will empower local communities and individuals to manage and reduce their risks. Each year DNR will try to help at least one priority community map its flood hazard areas. DNR will coordinate with WCMP to identify areas of coastal erosion. Staff conducted a pilot project to update coastal erosion information for Bayfield County on Lake Superior. A statewide process is underway to completely update Wisconsin's floodplain map base. The desired outcome is that all Wisconsin NFIP communities receive new flood maps.
2008 Update Status: 52 Wisconsin counties will receive updated mapping through the Map Modernization process. More counties may be added if additional funds are appropriated by the U.S. Congress. Coastal erosion is being addressed in updated mapping in the following counties: Brown, Door, Manitowoc, Milwaukee, Kenosha, Oconto, Ozaukee, Racine, and Sheboygan. No funding is available at this time for Ashland, Bayfield, Douglas, Iron, Kewaunee, or Marinette.
2011 Update Status: Since 2008, 43 counties have received updated mapping through the Map Modernization process. DNR mapping staff produced many of the new countywide maps while floodplain management staff help conduct outreach meetings and work with communities to adopt the maps into their floodplain zoning ordinances. DNR participated with FEMA to inventory all mapped floodplains in the state and determine if existing floodplain studies are valid or need updating. The

results have been entered into FEMA's Community Needs Management System (CNMS) and will be used to prioritize future mapping efforts. The counties funded through the Map Modernization will be completed. Funding through the RiskMAP initiative will result in the production of maps on a watershed basis. RiskMAP will also provide communities with additional products that will help better identify risks and opportunities for mitigation. New meetings have also been added to the process that will encourage participation in the mapping process by emergency managers and planning agencies. This will establish better links between the maps, mitigation opportunities, and sound land management. CNMS will be integrated into the DNR's Floodplain Analysis Database so that new mapping needs for developing areas can be tracked and considered in funding priorities.

3.13 Action: Promote mandatory disclosure of hazard-prone property to buyers.

Implementation: Ongoing.

Background: The NFIP Community Rating System (CRS) already provides incentives via CRS points for communities that require full hazard disclosure in real estate listings because it promotes hazard awareness and helps individuals better manage their risk before making an investment in a home or other structure.

2008 Update Status: Ongoing through CRS; encouraged through workshops and outreach efforts.

2011 Update Status: Ongoing outreach efforts to community officials; will include an article on this in the newsletter in the near future.

3.14 Action: Encourage sewer utilities to provide back-up power sources at lift stations to help prevent sewer back-flow flooding.

Implementation: Ongoing.

Background: Some sewer back-flow problems occur only because power outages prevent lift stations from operating to pump sewage out of low-lying areas and into the main lines. Providing back-up power sources for these lift stations would help reduce or eliminate back-flow problems in these areas.

2008 Update Status: Status unchanged.

2011 Update Status: Status unchanged.

3.15 Action: Encourage sewer utilities to provide public information regarding sewer back-flow prevention to reduce basement flooding.

Supporting Agency: WEM

Implementation: Ongoing.

Background: Since sewer back-flow has been identified as a problem in several urban areas of the state, promoting prevention at the local level would help reduce basement flooding.

2008 Update Status: Status unchanged.

2011 Update Status: Status unchanged.

3.16 Action: Promote the NFIP Community Rating System (CRS) to local governments.

Supporting Agencies: WEM, FEMA, WAFSCM

Other Organizations: ASFPM
Implementation: 2005 and ongoing.
Background: A high CRS ranking will offer citizens of that locality reduced flood insurance premiums and other benefits. This action reduces flood risk by rewarding communities through lower premiums for their residents when they meet the three goals of the CRS: (1) reduce flood losses; (2) facilitate accurate insurance rating; and (3) promote awareness of flood insurance.
2008 Update Status: DNR sends out a CRS invitation letter to Wisconsin communities once a year. The City of Evansville joined the project in 2008.
2011 Update Status: Two CRS workshops were held in FY2010. DNR will continue to contact communities participating in CRS with program-specific information. DNR will work with communities that expressed interest in CRS after the FY2010 workshops and will conduct more workshops in FY2013.

3.17 Action: Participate in the Regional Flood Risk Management Team (RFRMT)
Supporting Agencies: WEM, USACOE, FEMA
Implementation: Ongoing.
Background: The purpose of the RFRMT is to enable the federal, tribal, state, and local governmental partners within the states of Minnesota, Wisconsin, Iowa, Illinois, and Missouri to coordinate and collaborate of flood risk management initiatives within the region. The RFRMT will help ensure that those responsible for implementing flood recovery measures do so taking into consideration all long-term mitigation planning being done by federal, tribal, state, and local agencies in order to optimize flood risk reduction opportunities. This includes the assessment of promising non-structural alternatives to the conventional levee rehabilitation approach to reduce future flood risk within the region. The Regional Interagency Levee Task Force (ILTF) was formally established to address the flood recovery effort for the June 2008 floods. Wisconsin participated in the activities of the ILTF and became a charter agency as that group evolved into the RFRMT.
2011 Update Status: New action item.

DNR - Division of Forestry

3.18 Action: Implement a new burning permit process through which people would be issued an annual permit but be required to check burning restrictions (on the phone or internet) each day prior to burning debris.
Implementation: Beginning in 2008 and ongoing.
Background: In the past, the Wisconsin DNR has required people to obtain a burning permit each time they want to burn debris or perform broadcast burns. The permit would then be effective for three days, after which a new permit had to be obtained. The local conditions could easily change over the three days of the permit, leaving the debris burner unaware of new dangers. Under the new system, people will be issued burning permits annually, but they must check burning restrictions each day they want to burn debris. This decreases effort and expense in the permitting process and results in individuals being better informed of the fire risk.
2011 Update Status: New action item.

3.19 Action: Promote Wildfire Prevention Week and National Fire Prevention Week throughout the state using media blitzes, brochures, and events to increase public awareness about fire hazards, fire prevention, and the Firewise Communities program. Coordinate efforts with the Ready Wisconsin campaign.

Supporting Agency: WEM
Implementation: Ongoing.
Background: Wildfire Prevention Week is observed annually the third week in April among the Great Lakes states to promote wildfire prevention and education efforts during traditional spring fire season. National Fire Prevention Week is an annual observance sponsored by the National Fire Protection Association to inform the public about the importance of general fire prevention. It is celebrated the week in which October 9th falls. October 9th, was proclaimed National Fire Prevention Day by President Woodrow Wilson in 1922 because it is the anniversary of not only the Great Chicago Fire, but also the Peshtigo Fire. The Peshtigo Fire occurred in northeastern Wisconsin and was the deadliest, most devastating fire in American history. This grim reminder demonstrates the vulnerability of our state to fire hazards and the need to educate the public about fire prevention.
2011 Update Status: New action item.

3.20 Action: Create and maintain interactive county map on the state DNR website to show the current fire danger in each county, including the cooperative areas.

Supporting Agency: WEM
Implementation: Ongoing.
Background: In the past, the public has had to call the DNR or their local officials to find out the local fire danger and burning restrictions. With the new interactive map, people can visit the DNR website and click on the county of interest to find the same information updated daily. The website is located at http://dnr.wi.gov/forestry/fire/fire_danger/wis_burn/statecounties.asp.
2011 Update Status: New action item.

3.21 Action: Promote the concept of Firewise Communities USA statewide.

Supporting Agencies: WEM, FEMA, USDA, USDI, National Fire Protection Association, International Association of Fire Chiefs, National Association of State Foresters, National Emergency Managements Association, US Fire Administration
Other Organizations: WEMA, State Fire Chiefs Association
Implementation: Beginning in 2005 and ongoing.
Background: The Firewise Communities USA recognition program enables communities to achieve a high level of protection against wildland/urban interface fires and maintain a sustainable ecosystem balance. The goal is to encourage and acknowledge action that minimizes home loss to wildfire. The program adapts well to small communities, developments, and residential associations. To date, there are ten Firewise Communities in Wisconsin. By promoting the concept and providing information to local governments, WEM hopes that more communities will join.
2008 Update Status: A fire risk assessment was included in the 2008 State Plan Update.

2011 Update Status: Four additional communities are now participating in the program bringing the total to 14 Firewise Communities in the state.

3.22 Action: Promote the creation and implementation of Community Wildfire Prevention Plans (CWPPs), particularly in communities at high risk of fire hazard and those near the wildland/urban interface (WUI).

Supporting Agency: WEM

Other Organizations: FEMA, USDA, USDI, National Fire Protection Association, International Association of Fire Chiefs, National Association of State Foresters, National Emergency Managements Association, US Fire Administration, WEMA, State Fire Chiefs Association

Implementation: Ongoing

Background: Title I of the Healthy Forests Restoration Act, passed in 2003, authorizes and defines CWPPs. It provides an opportunity to address fire hazards along the WUI. CWPPs are developed locally and the format is flexible. They are required to include collaboration among levels of government and stakeholders, prioritized fuel reduction, and treatment of structural integrity. The adaptability of CWPPs to local conditions makes them excellent fire hazard mitigation tools for a wide variety of communities.

2011 Update Status: New action item, there are 11 CWPPs in the state covering 21 communities-at-risk.

3.23 Action: Identify permanent fire mitigation projects that can be supplemented by ongoing temporary mitigation projects.

Supporting Agency: WEM

Other Organizations: FEMA, USDA, USDI, National Fire Protection Association, International Association of Fire Chiefs, National Association of State Foresters, National Emergency Managements Association, US Fire Administration, WEMA, State Fire Chiefs Association

Implementation: Ongoing.

Background: Between 2009 and 2011, DNR's Division of Forestry received grant funding for 29 educational projects, 28 fuel reduction projects, and 22 planning projects. Forest Fire Protection grants are only available in relatively small amounts. Working with the Division, WEM may be able to identify permanent fire mitigation projects that could qualify for the FEMA Hazard Mitigation Grant Program.

2011 Update Status: New action item.

4.3.4 Lead Agency: Department of Health Services

4.1 Action: Survey healthcare facilities to determine if they have NOAA weather alert radios and severe weather response plans. Provide information about NOAA radios and seek sources of funding to obtain NOAA radios for facilities lacking them.

Supporting Agencies: WEM

Implementation: Ongoing.

Background: NOAA weather alert radios are a cost-effective way of alerting facilities of dangerous weather conditions. DHS - Division of Quality Assurance (DQA) will

explore ways to provide NOAA radios in health care facilities that do not currently have them. DHS has surveyed the healthcare facilities that it regulates. Staff from the Divisions of Supportive Living (DSL), Children and Family Services (DCFS), and Care and Treatment Facilities (DCTF) will survey their facilities and provide information, including potential sources of funding, for facilities that lack them.

2008 Update Status: Status unchanged.

2011 Update Status: By December 31, 2011 DQA will conduct a survey with regulated facilities and home health agencies about access to and use of NOAA radios. In 2012, DQA will work with WEM to acquire funding to support purchase of radios, installation, and training as needed.

4.2 Action: Conduct public health hazard risk assessments at all local and tribal health departments throughout the state.

Supporting Agencies: Center for Disease Control, WEM, Wisconsin Association of Local Health Departments and Boards, Emergency Medical Services (EMS), Hospital Preparedness Program, local and tribal health departments

Implementation: Beginning in 2011 with completion in 2012.

Background: Local and tribal health departments will be required to complete a public health hazard risk assessment by mid-2012. They will work in conjunction with local hospitals, emergency management agencies, EMS, and trauma centers.

2011 Update Status: New action item. An inter-agency group has met several times to determine a methodology to recommend to local and tribal health departments for completing the hazard risk assessment.

4.3.5 Lead Agency: Department of Safety and Professional Services (DSPS)

DSPS - Division of Safety and Buildings (SB)

5.1 Action: Work with the municipal fire departments to collect all fire incidents occurring within the state. Train fire departments to use of the National Fire Incident Reporting System program. Data collected can be uploaded to FEMA directly and is then used to develop new policies and laws for fire-safe construction.

Supporting Agency: State Fire Chiefs' Association

Implementation: Ongoing.

Background: The need for fire data was recognized in 1974 when the Fire Prevention and Control Act authorized the US Fire Administration (USFA) to gather and analyze fire data relevant to the nation's fire problem. The National Fire Prevention and Control Administration (NFPCA, the predecessor to USFA), through a contract with the National Fire Protection Association (NFPA) in the mid 1970's, established the first National Fire Incident Reporting System (NFIRS), Version 1. The latest version, Version 5, published in 2000 is used today. NFIRS is the largest source of fire data in the world.

2008 Update Status: Status unchanged. 2007 Wisconsin Act 75 requires fire departments in Wisconsin to report specific building fire incident information to Comm-SB within 60 days using NFIRS.

2011 Update Status: Status unchanged.

5.2 Action: Require all fire departments within the state to inspect existing commercial buildings annually and provide them guidance in doing so. Routine inspections are performed to ensure the existing building still meets its design-specific building code requirements.

Supporting Agency: State Fire Chiefs' Association

Implementation: Ongoing.

Background: The chief of every fire department will be responsible for having all public buildings and places of employment within their territory inspected annually. This inspection should ascertain whether any conditions liable to cause fire exist or whether there are any violations of laws or ordinances relating to fire hazards or prevention. If such conditions or violations are discovered, the fire chief is responsible for making sure they are corrected.

2008 Update Status: Status unchanged.

2011 Update Status: Status unchanged.

5.3 Action: Provide for Administrative Code changes to adopt the 2011 edition of the National Electrical Code (NEC). The rule will affect any building or structure within the state in which electric wiring will be installed. The department estimates that it will take approximately 400 hours to develop this rule.

Implementation: Ongoing.

Background: The state electrical code has adopted the NEC by reference since 1972. Currently, the 2008 edition of the NEC is adopted in the Administrative Code Comm Chapter 16. This action item will update the state code to the 2011 edition of the NEC, while evaluating the electrical requirements in Comm Chapter 16 that add to and modify the requirements in the NEC. The alternative to not updating Comm Chapter 16 would result in the state electrical code being out-of-date with current nationally recognized standards for the design, installation, and operation of electrical conductors and equipment in all buildings and structures.

2008 Update Status: SB initially adopted the 2005 NEC and is now adopting the 2008 NEC with an estimated effective date of January 2009.

2011 Update Status: SB is now adopting the 2011 NEC with an estimated effective date of April 1, 2012.

5.4 Action: Adopt the 2009 editions of the national model codes from the International Code Council and the National Fire Protection Association.

Implementation: Adopted July 2011.

Background: The State of Wisconsin adopted a model building code that became effective on July 1, 2011. This new code is actively enforced statewide.

2008 Update Status: Status unchanged.

2011 Update Status: Status unchanged.

5.5 Action: Address the disaster resistance of manufactured homes by reviewing tie-down standards, installation standards, and inspection standards.

Implementation: Ongoing.
Background: Manufactured homes are particularly vulnerable to wind hazards. The State is committed to developing and enforcing tie-down standards to reduce the risk of property loss, injury, and death for people who live in manufactured homes.
2008 Update Status: Status unchanged.
2011 Update Status: Status unchanged.

5.6 Action: Enforce the requirement to inspect structures and buildings when permitting construction projects to ensure compliance with state building codes and promote disaster resistance and public safety. Municipalities can apply to become designated agents to enforce building codes.
Implementation: Ongoing.
Background: Without inspection of new construction for compliance with state building codes, there is no insurance that structures will be built to the properly. As of January 1, 2005, all municipalities are responsible for enforcement of the Uniform Dwelling Code. This includes submitting building plans and inspections for electrical, construction, plumbing, and HVAC. All post-1980 dwellings were covered by the code, however, in communities under 2,500, there was the option not to enforce the code (i.e., plan review and inspections).
2008 Update Status: Status unchanged.
2011 Update Status: Status unchanged.

5.7 Action: Create and maintain a tracking system for all Privately Owned Wasterwater Treatment Systems (POWTS).
Implementation: Ongoing.
Background: 2005 Wisconsin Act 347 requires the development and maintenance of a database for tracking POWTS systems. This ensures that information on all existing POWTS systems is collected and all future maintenance actions on these systems are tracked. This will aid in determining the status of POWTS systems following a flood event.
2008 Update Status: New action item.
2011 Update Status: The State now tracks all POWTS established since 2007. County governments track all POWTS in their county.

5.8 Action: Require carbon monoxide detectors in all existing residential occupancies with fuel burning appliances, including single family housing units.
Implementation: Ongoing.
Background: 2007 Wisconsin Act 205 mandated the development of rules requiring carbon monoxide detectors in all existing residential occupancies to protect occupants from unseen leaks. This will be particularly important following a disaster when fuel burning appliances may have been disturbed or damaged.
2008 Update Status: New action item.
2011 Update Status: The rules requiring carbon monoxide detectors went into effect on January 1, 2011 and are now being implemented and enforced.

5.9 Action: Require the inspection of all electrical construction within commercial buildings through the statewide electrical inspection program.

Implementation: Ongoing.

Background: 2007 Wisconsin Act 63 requires electrical wiring is to be inspected in all construction involving public buildings, commercial properties, and farms. Municipalities may opt to be responsible for such inspections in their jurisdictions. The state will provide electrical inspections in municipalities that do not conduct such inspections. (Currently, Uniform Dwelling Code electrical inspections are required to obtain building permits for new construction or remodeling of one- and two-family dwellings.)

2008 Update Status: New action item.

2011 Update Status: Status unchanged.

5.10 Action: Develop and implement rules requiring statewide electrical inspection for all buildings.

Implementation: Ongoing.

Background: 2007 Wisconsin Act 63 mandatess the development of rules requiring statewide inspection of all electrical wiring. Rules are also being developed to allow municipalities to assume authority on behalf of the State to perform all electrical inspections in their jurisdiction. The state will be responsible for inspections in areas where municipalities do not assume authority.

2011 Update Status: New action item.

5.11 Action: Require statewide licensing of all electrical workers.

Implementation: April 1, 2013

Background: 2007 Wisconsin Act 63 mandates the creation of a new statewide licensing system for electrical workers. Previously, Wisconsin law did not require that a person be licensed or certified by either the state or a local government to work as an electrician or electrical contractor.

2008 Update Status: New action item.

2011 Update Status: Status unchanged.

5.12 Action: Participate at the national level on code development for the National Fire Alarm Code.

Implementation: Ongoing.

Background: The National Fire Protection Association is drafting a new chapter for the 2013 Fire Alarm Code to aid in emergency communications in disasters. The new chapter will establish minimum standards for the installation of mass notification systems. Mass notification is the capacity to provide real-time information to all building occupants or personnel in the immediate vicinity of a building during an emergency. To reduce the risk of mass casualties there must be a timely means to notify building occupants of threats and appropriate responses. Staff from Wisconsin were asked to participate on the national committee because of current state efforts to implement related technologies.

2008 Update Status: New action item.
2011 Update Status: Status unchanged.

5.13 Action: Consider the adoption of the International Residential Code written by the International Code Council.
Implementation: Ongoing.
Background: Over 40 states and hundreds of municipalities across the country use the International Residential Code as a standard for building one- and two-family homes. Currently the State drafts its own code for these types of occupancies. This change would align Wisconsin with the national standards and most recent initiatives used for the safety of homeowners.
2008 Update Status: New action item.
2011 Update Status: Status unchanged.

4.3.6 Lead Agency: Office of the Commissioner of Insurance (OCI)

6.1 Action: Distribute hazard mitigation materials to insurance companies, agents, and consumers to support the Wisconsin Hazard Mitigation Team (WHMT) in developing, establishing and implementing permanent and viable statewide mitigation programs.
Implementation: Ongoing.
Background: As the regulatory agency for insurance and insurance carriers, OCI staff members serve as experts in the field of insurance. Staff cooperates with other agencies to encourage loss prevention and enhance consumer protection through the licensing and education of insurance agents and carriers. They inform businesses and individuals on insurance matters. OCI requires continuing education for agents. Credit can be obtained through flood insurance courses provided by the National Flood Insurance Program.
2008 Update Status: Status unchanged.
2011 Update Status: Status unchanged.

4.3.7 Lead Agency: Public Service Commission of Wisconsin (PSCW)

7.1 Action: Encourage telecommunication utilities to obtain information about floodplains in advance of construction and avoid construction in these areas. If construction in floodplains is unavoidable, the utilities will be encouraged to use alternative methods or technologies for plant additions. The utilities will be encouraged to know and use construction practices that avoid or minimize loss of service.
Implementation: Ongoing.
Background: The PSCW is an independent regulatory agency responsible for the regulation of Wisconsin public utilities. PSCW prior-approval of construction by telecommunications utilities is not required. However, the PSCW will work with the Wisconsin State Telecommunications Association to alert telecommunications utilities to the hazards of construction in the floodplain.
2008 Update Status: Status unchanged.
2011 Update Status: Status unchanged.

7.2 Action: Perform hazard mitigation reviews for electric, natural gas, and water utility construction projects.

Implementation: Ongoing.

Background: All reviews and approvals of electric, natural gas, and water utility construction projects must include a determination of floodplain impacts and mitigation.

2008 Update Status: Status unchanged.

2011 Update Status: Status unchanged.

7.3 Action: Continue to educate the public about safety issues related to natural hazards at electric and natural gas utilities.

Implementation: Ongoing.

Background: The PSCW prepares a wide variety of public information brochures and makes them available to the public on its website at http://psc.wi.gov/theLibrary/publications.htm#Electric. These brochures are updated and others are produced on an as-needed basis.

2008 Update Status: Status unchanged.

2011 Update Status: Status unchanged.

4.3.8 Lead Agency: Department of Transportation (DOT)

8.1 Action: Present information about the Public Assistance and Hazard Mitigation Assistance programs at the annual County Highway Association Commissioner training.

Supporting Agency: WEM

Implementation: Ongoing.

Background: Wisconsin County Highway Association holds an annual training session for Highway Commissioners which provides an opportunity to disseminate information about how the Public Assistance and Hazard Mitigation Assistance Programs work. This will not only keep the Highway Commissioners informed about the programs, but will also keep mitigation involved in discussions of future highway projects.

2011 Update Status: New action item.

8.2 Action: DOT will coordinate with WEM to sponsor a workshop for DOT engineers, technicians, and other staff to review the components of post-disaster damage and mitigation programs.

Supporting Agencies: WEM, FEMA

Implementation: DOT will coordinate with WEM to plan a disaster damage mitigation workshop to review mitigation components of the Public Assistance, Emergency Relief, and Flood Damage Aids programs. WEM, DOT and FEMA will all provide support to the workshop with presentations and materials. DOT has already incorporated a small mitigation element with its Flood Damage Aids (FDA) training course which last took place in October 2003. If the program is ever implemented, it would be ideal to hold the workshop annually.

Background: DOT provides engineers and technicians to assist local governments with post-disaster damage assessments of roads, bridges, and public works facilities. Their expertise is needed to implement the three highway emergency aid programs

mentioned above, which all include mitigation components.
2008 Update Status: On hold due to higher work priorities.
2011 Update Status: Still on hold. If time and resources become available, this project may move forward.

8.3 Action: As a disaster is unfolding, send an email alert to DOT field staff to remind them to keep track of their time and costs for possible reimbursement from the Public Assistance Program and to alert them to the possibility of assisting Wisconsin Emergency Management with a Preliminary Damage Assessment.
Supporting Agency: WEM
Implementation: Ongoing.
Background: As a state agency, the DOT can apply to the Public Assistance Program for reimbursement of expenses under a federal disaster declaration. To receive reimbursement, accurate records must be kept of staff time and related expenses to submit to WEM. In addition, DOT field staff often assists WEM with Preliminary Damage Assessments. An email alert will prepare staff for that possibility.
2011 Update Status: New action item.

4.3.9 Lead Agency: University of Wisconsin - Cooperative Extension

9.1 Action: Develop guidance for businesses, provide information and resources about how businesses could plan to continue their operations if they were affected by the following situations:

- without electrical power, gas, telephone and/or other utilities;
- inaccessible because of flooding, debris, road or bridge damage, chemical spills, transportation accidents, etc.;
- partially or completely destroyed by fire, flood, tornado, etc.; and
- a major supplier (of materials, transportation, information, etc.) was put out of action by disaster.

Supporting Agency: WEM
Implementation: Ongoing.
Background: Guidance needs to be developed first. Businesses, organizations, and local governments can often continue to operate either at full capacity or a portion thereof, if they have planned for contingencies prior to the event(s).
2008 Update Status: Status unchanged. Due to workload, this item was not completed.
2011 Update Status: Status unchanged.

9.2 Action: Integrate hazard mitigation concepts into Extension programs for community development, lake and watershed management, farm management, and housing.
Supporting Agencies: WEM, WCMP, DOA, and DNR
Implementation: Ongoing. Update the information as appropriate. County extension agricultural faculty and emergency management directors are forming new partnerships to accomplish these efforts.

Background: UW-Extension develops and provides educational programming for community, agricultural, family, youth, business, and non-profit organizations, and local governments statewide. Important programming areas that can support hazard mitigation include community, natural resource and economic development; lake and watershed management; farm management; and housing. Extension programs are delivered via face-to-face presentations, distance learning, printed material, and the media. When appropriate, Extension educators integrate material on major state initiatives into educational programs. Extension staff will prepare and adapt materials and update educational programs to include information on hazard mitigation.

2008 Update Status: Staff gave Disaster Mitigation Act education and awareness presentations to county officials representing about thirty Wisconsin counties. They have had ongoing discussions to secure funding for a business-focused hazard planning education program. Hazard planning is being integrated in the security assessment efforts in many Wisconsin counties.

2011 Update Status: Status unchanged.

4.3.10 Lead Agency: Department of Military Affairs

DMA - Division of Emergency Management (WEM)

10.1 Action: Administer the Hazard Mitigation Grant Program (HMGP), the Flood Mitigation Assistance (FMA) program, and the Pre-Disaster Mitigation (PDM) program by providing grants for planning and long-term, permanent, cost-effective mitigation measures.

Supporting Agencies: FEMA, Wisconsin Hazard Mitigation Team (WHMT), Regional Planning Commissions (RPCs)

Implementation: Ongoing.

Background: WEM has administered over $40 million in HMGP, FMA, and PDM funds for projects that eliminate or reduce disaster damages and protect lives and property. WEM, together with the WHMT, will continue to encourage communities to apply for mitigation planning grants and fund cost-effective projects that reduce disaster costs. WEM will coordinate with other agencies through the WHMT to identify potential funding sources for projects and "package" funding to facilitate implementation of these projects.

2008 Update Status: WEM has now administered over $56 million in HMGP, FMA, and PDM funds. In addition to administering the above-mentioned programs, Repetitive Flood Claims (RFC) and Severe Repetitive Loss (SRL) will also be added to the cadre of programs. Priority will be given to repetitive loss and severe repetitive loss properties.

2011 Update Status: WEM has now administered over $86 million in HMGP, FMA, and PDM funds. The RFC and SRL programs have not yet been administered in the state, but remain in WEM's mitigation toolkit.

10.2 Action: Develop uniform guidance for providing replacement and supplemental housing assistance.

Supporting Agencies: DOA Division of Housing, DNR
Implementation: 2011 and ongoing.
Background: After a disaster, individuals and communities may be eligible for replacement and/or supplemental housing assistance. The guidelines for administering assistance have not been clearly defined in the past. This can lead to delays and incorrect approvals or denials of claims. Developing uniform guidance will streamline the process and keep all agencies involved operating in a consistent manner. This will result in a faster recovery.
2011 Update Status: New action item.

10.3 Action: Promote mitigation for the general public using the WEM website. Link to other agencies' websites as appropriate including FEMA, DNR, DOA, OCI, and others.
Supporting Agencies: WCMP, OCI, DNR, DHFS, DATCP, DOA, and RPCs
Implementation: Ongoing.
Background: There is useful information appropriate for managing natural hazard risk currently available through the various state agencies' websites. Advertising these links helps address many hazard awareness objectives. WEM's web page will be utilized to the fullest extent to educate all on the benefits of mitigation. The State Hazard Analysis, the State Hazard Mitigation Plan, including the mitigation activities of the communities and mitigation program information, are included on the website. Staff will foster linkages between these agencies and areas of expertise:

DNR – Municipal Flood Control and riparian Restoration Program
DNR – Dam Safety
DNR – Wisconsin Waters Initiative
FEMA's – NFIP map site and FIMA
DOA – Comprehensive Planning
DNR – Stewardship Programs
DATCP – Conservation Reserve Enhancement Program (CREP)

2008 Update Status: Status unchanged.
2011 Update Status: Status unchanged. WEM has also committed to linking to the OCI website to promote flood insurance.

10.4 Action: Develop and document mitigation success stories. Publish reports and include on WEM's website and in WEM's Mitigation Display.
Supporting Agencies: FEMA
Implementation: Ongoing.
Background: By 2004, WEM had administered over $40 million in mitigation planning and project grants. In some instances, those mitigation measures have been tested through recent events. It is important to document the damages that have been avoided through these mitigation measures by publishing these success stories. Documentation of the damages averted by these mitigation measures is provided to Congress to validate the continuation of mitigation programs. In addition, 44 CFR Part 201.5(b)(2)(iv) requires the State to have a system and strategy by which it will conduct an assessment of completed mitigation actions.
2008 Update Status: Currently WEM has administered over $56 million in mitigation

grants. All mitigation success stories are published on WEM's website. In addition, mitigation success stories are posted on the Mitigation Display. WEM staff will continue to develop success stories or best practices as they present themselves. In addition, WEM will work on developing loss avoidance studies where possible.

2011 Update Status: WEM has now administered over $86 million in mitigation grants. Loss avoidance studies were conducted for mitigation projects in Kenosha, Jefferson, Crawford, and Milwaukee counties. Best practices articles and success stories continue to be developed and are published on the WEM and FEMA websites.

10.5 Action: Work with the Office of the Commissioner of Insurance to promote public education about flood insurance during Flood Safety Awareness Week.

Supporting Agency: OCI

Implementation: Annually during the third week of March.

Background: The National Weather Service started Flood Safety Awareness Week in 2006. It is held the third week of March each year. Its purpose is to teach people about flood risks and how to save lives and protect property from flooding. WEM already promotes public education about flood safety during Flood Safety Awareness Week. Flood insurance participation is very low throughout the state. Incorporating education about flood insurance into Flood Safety Awareness Week will encourage more people to purchase flood insurance and thus protect their assets from flood losses.

2011 Update Status: New action item.

10.6 Action: Create an online flood insurance education course for insurance agents.

Supporting Agency: OCI

Implementation: 2012 and ongoing.

Background: Flood insurance participation in the state is very low. Insurance agents who provide flood insurance through the National Flood Insurance Program are required to take a continuing education course in flood insurance. The availability of an online course would facilitate agents meeting this requirement. The agents will then be able to encourage consumers to purchase flood insurance which will help them recover after a flood event.

2011 Update Status: New action item.

10.7 Action: Research the possibility of requiring all insurance agents to complete a course in flood insurance periodically.

Supporting Agency: OCI

Implementation: 2012 and ongoing.

Background: Flood insurance participation in the state is low. Currently insurance agents who provide flood insurance through the National Flood Insurance Program are required to complete a one-time flood insurance course. Extending this requirement to all agents would increase the promotion of flood insurance to potential consumers. In addition, requiring that the course be taken periodically would keep agents informed of changes to the program and serve as a reminder of the importance of flood insurance.

2011 Update Status: New action item.

10.8 Action: Create links from WEM's Recovery website to OCI's websites about flood insurance.

Supporting Agency: OCI
Implementation: 2011.
Background: Flood insurance participation in the state is very low. OCI has websites explaining the National Flood Insurance Program and flood insurance benefits for homes and businesses. Creating a link from WEM's Recovery website to OCI's websites about flood insurance will allow easy access to the information and promote the purchase of flood insurance.
2011 Update Status: New action item.

10.9 Action: Utilizing the Wisconsin Historical Society's GIS database on historical and archeological sites, develop a GIS layer identifying those that are located within the 100-year floodplain.

Supporting Agencies: WHS, DNR, FEMA
Implementation: Six year plan update - 2010 or before. **Revised:** As time allows.
Background: Developing a GIS floodplain layer on state historical and archeological sites will assist in state and local risk assessments for flood hazards. It will help to identify the most vulnerable structures and focus efforts on developing appropriate mitigation actions for these structures and sites. In addition, it will expedite environmental reviews in the post-disaster recovery as well as in implementing mitigation measures.
2008 Update Status: Status unchanged.
2011 Update Status: Status unchanged. Due to staff time constraints, this action item has not yet been pursued, but may still be undertaken as staff time allows.

10.10 Action: Research and identify GIS resources that would assist WEM and local governments in developing their mitigation programs.

Supporting Agency: RPCs
Implementation: Ongoing.
Background: WEM recognizes that GIS can be a valuable tool for hazard mitigation planning, implementation of mitigation measures, and monitoring mitigation progress at both the state and local levels. To further this effort, WEM will continue to identify resources and provide for staff needs in the area of GIS development.
2008 Update Status: Status unchanged.
2011 Update Status: Status unchanged.

10.11 Action: Update the State Hazard Mitigation Plan to include technological and man-made hazards.

Supporting Agency: WHMT
Implementation: Ongoing and to be completed for the 3 year update.
Background: 44 CFR Part 201 requires that the State Hazard Mitigation Plan address natural hazards that impact the state. However, the State recognizes that technological and manmade hazards also pose a risk to citizens and facilities. Therefore, the State Hazard Mitigation Plan will begin to include technological and manmade hazards, based on available data, in future updates of the State Hazard Mitigation Plan.

2008 Update Status: Status unchanged. Due to workload, this item was not completed for this update. However, this remains a recommendation for subsequent updates and for EMAP accreditation requirements.
2011 Update Status: Status unchanged.

10.12 Action: Incorporate mitigation into WEM's Strategic Plan (short-term) and work with other state agencies (long-term) to incorporate mitigation into their strategic plans where appropriate.
Supporting Agency: WHMT
Implementation: Ongoing.
Background: In 2004 WEM updated its Strategic Plan and included mitigation as a component. To further the State's mitigation efforts, mitigation should become part of the agency's day-to-day activities and considered in decision-making. Therefore, mitigation needs to become a component of all state agencies' strategic plans. This will be a long-term project for WEM to work with state agencies through the WHMT to further these efforts.
2008 Update Status: Status unchanged. The Department of Military Affairs' Strategic Plan identified the goal of having 90% of the state covered by approved hazard mitigation plans.
2011 Update Status: Status unchanged. The Department of Military Affairs is working on updating their Strategic Plan.

10.13 Action: As local and tribal plans are completed, incorporate pertinent information into the State Hazard Mitigation Plan.
Supporting Agency: WHMT
Implementation: Ongoing.
Background: 44 CFR Part 201 requires that the State Hazard Mitigation Plan and hazard mitigation actions coordinate with local hazard mitigation thus providing a complete assessment of state and local hazard mitigation priorities.
2008 Update Status: Completed. More jurisdictional plans will be included in the next update.
2011 Update Status: For this Plan update, additional jurisdictional plans were reviewed. A new portion in Section 5 highlights best practices in local mitigation plans from around the state.

10.14 Action: Develop a structure inventory of state-owned and -operated buildings, structures, and facilities and complete a risk assessment based on data collected specific to each building. Priority will be given to those structures considered a critical facility.
Supporting Agencies: DOA, other state agencies
Implementation: Beginning in 2007 and ongoing.
Background: 44 CFR § 201.4 requires that the State Hazard Mitigation Plan include an overview and analysis of potential losses to state-owned or -operated buildings, infrastructure, and critical facilities located in identified hazard areas. There are an estimated 6,500 state-owned buildings, structures, and facilities identified on the State Facility Database. WEM received a FFY05 PDM-C planning grant to begin conducting

a structure inventory and risk assessment of state-owned buildings beginning with critical facilities. To date, the information to be collected has been determined and a database developed. This is a joint effort between WEM and DOA.

2008 Update Status: New action item.

2011 Update Status: To date, only the Department of Corrections has provided WEM with information about their structures. This information is included in the State Structure Inventory in Section 3. WEM will continue to solicit information from other state agencies and update the Inventory as needed.

10.15 Action: Continue to lead the WHMT in establishing and implementing a long-term, permanent and viable statewide mitigation program.

Supporting Agency: WHMT

Implementation: Ongoing.

Background: The Wisconsin Interagency Disaster Recovery Group (IDRG) was organized in response to the 1993 Midwest Flood to coordinate relief and recovery efforts and to prevent duplication of efforts. The success of the group has been demonstrated by the various mitigation projects completed often with multi-agency funding and technical assistance provided. The IDRG was a "reactive" group that was activated after a disaster. Staff recognized the need to formalize a group and thus designated the State Hazard Mitigation Team (SHMT) that would be a "pro-active" expansion of the IDRG with policy-making authority. The SHMT was responsible for the development of a statewide mitigation strategy as part of the State Hazard Mitigation Plan. Both groups played a vital role in furthering mitigation efforts in the state. In 2004, WEM consolidated these groups into the Wisconsin Hazard Mitigation Team (WHMT). WEM will further define the roles and responsibilities of the group; continue the development, implementation and update of the State Hazard Mitigation Plan; expand the viable ongoing mitigation program in the state; educate state, federal and local agencies regarding mitigation; and provide support to the WHMT.

2008 Update Status: Status unchanged. After the 2008 flooding event, the State of Wisconsin created the Wisconsin Recovery Task Force. One of the subgroups of that Task Force is Mitigation. WHMT members are members of the Mitigation Subcommittee.

2011 Update Status: Status unchanged. WEM continues to lead the WHMT and schedules regular meetings to discuss and promote mitigation projects and opportunities and to update the State Hazard Mitigation Plan.

10.16 Action: Encourage Emergency Management Directors to work with Local Emergency Planning Committees (LEPCs) to participate in local hazard mitigation planning activities.

Implementation: Ongoing.

Background: WEM is committed to promoting local all-hazards mitigation planning. Including the LEPCs in local mitigation planning will help address technological hazards and improve coordination between response and planning emergency functions.

2008 Update Status: Status unchanged.

2011 Update Status: Status unchanged.

10.17 Action: Promote use of FEMA's HAZUS hazard-analysis, GIS-based software as the modules become available. The earthquake module became available in 2002, the flood module became available in 2004 and the wind module in 2006.

Supporting Agencies: FEMA, RPCs

Implementation: Ongoing.

Background: WEM has not used HAZUS to date because Wisconsin is not vulnerable to earthquakes. However, Wisconsin is vulnerable to flood and wind. Therefore WEM is exploring the use of HAZUS as a hazard-analysis tool for improving the State Risk Assessment. A WEM staff member attended HAZUS training at EMI in September 2004.

2008 Update Status: WEM staff has been trained on HAZUS software. In 2006, WEM hosted a HAZUS workshop conducted by FEMA contractors. In addition, the 2008 Plan update has a comprehensive Flood Risk Analysis that utilized HAZUS software. WEM staff will continue to attend trainings and develop competency with the software. The wind module is for hurricane winds, therefore not applicable to Wisconsin.

2011 Update Status: WEM staff is continuously updating the Flood Risk Analysis that was developed for the previous plan. Updates include re-running counties that did not have an available DFIRM. Completed HAZUS runs will continually be sent to counties, along with updated analysis to be included in their county mitigation plan.

10.18 Action: Attend training on the HAZUS-MH software and determine its feasibility for use in Wisconsin.

Supporting Agencies: FEMA, RPCs

Implementation: To be completed by three-year update (2007)

Background: HAZUS-MH is a GIS-based multi-hazard risk assessment and loss estimation software developed by FEMA to help prepare and plan for safer and stronger communities. The software can help communities complete the Risk Assessment portion of local all-hazards mitigation plans by estimating potential losses for wind, flood, and earthquake hazards. WEM staff will need to obtain adequate training before they can determine appropriate use in Wisconsin at the State and local level.

2008 Update Status: Completed.

2011 Update Status: WEM staff is continually attending HAZUS training when offered. Previous training completed by staff includes Application to HAZUS-MH for Risk Planning in 2010. Staff also attended the HAZUS Conference in 2011.

10.19 Action: After HAZUS-MH software training, provide information to local governments as a tool in mitigation planning and provide training and technical assistance.

Supporting Agencies: WHMT, RPCs

Implementation: 2004 and ongoing.

Background: HAZUS-MH is a GIS-based multi-hazard risk assessment and loss estimation software developed by FEMA to help prepare and plan for safer and stronger communities. The software can help communities complete the Risk Assessment portion of local all-hazards mitigation plans by estimating potential losses for wind, flood, and earthquake hazards. Upon completion of adequate training on HAZUS-MH, WEM staff will determine appropriate use in Wisconsin at the State and local

level. Information will then be provided to local governments so they can make a determination as to its use within their community.

2008 Update Status: Completed. WEM hosted a HAZUS Workshop for local governments in 2006. Continue to provide training when opportunities arise.

2011 Update Status: HAZUS training to locals is not provided regularly, but WEM staff is available to field questions as needed. HAZUS runs performed by WEM are sent to the counties.

10.20 Action: Work with FEMA and appropriate state agencies to identify pre-disaster mitigation techniques that can be funded through Section 406. This may include identifying and establishing new standards in codes.

Supporting Agencies: FEMA, DOT, DOA, DNR, PSC and others

Implementation: Ongoing.

Background: In major disaster declarations, cost effective mitigation measures can be implemented through the Section 406 program on damaged public facilities. The program is sometimes under-utilized because mitigation opportunities are not properly identified on a timely basis. By working with FEMA and appropriate state agencies, this action will attempt to pre-identify those items that will be included in the Section 406 program. Further, costs to bring a damaged site to current codes and standards are eligible. This process may lead to the identification and establishment of new or additional codes and standards.

2008 Update Status: Status unchanged. Process varies from disaster to disaster and from Federal Coordinating Officer (FCO) to FCO. FEMA has established a workgroup that is addressing this issue nationally.

2011 Update Status: Status unchanged. WEM has met with DOT to discuss the possibility of training DOT field staff to identify Section 406 mitigation measures prior to and immediately following events, but before repairs are made.

10.21 Action: Attend training and continue to build expertise in performing Benefit-Cost Analyses (BCAs), which is a major component of mitigation grant applications.

Supporting Agency: FEMA

Implementation: Ongoing.

Background: The BCA component of the FEMA grant application process requires the use of FEMA's BCA software. The software calculates benefits based on critical project information that is entered by staff performing the analysis. FEMA uses this information when determining if a project will receive funding. It is important for staff to attend training and build expertise in this area to ensure that they understand the important elements of the software to calculate accurate BCAs for hazard mitigation and pre-disaster mitigation projects.

2008 Update Status: In 2007, WEM hosted a BCA workshop conducted by FEMA contractors that was very well received and attended. Fall of 2008 FEMA released the new BCA software. WEM mitigation staff will need to get fully trained in the new software so that they can provide training and technical assistance to local governments. In addition, WEM would like to conduct specific training for the electric cooperatives on the limited data BCA.

2011 Update Status: WEM hosted BCA workshops conducted by FEMA in 2009 and 2011. The focus of the workshops were the Flood module and the Damage Frequency Assessment module of the BCA software. Both workshops were well-attended.

10.22 Action: Provide training and technical assistance to local governments and tribal organizations on FEMA's e-grants system.

Supporting Agency: FEMA
Implementation: Ongoing.
Background: FEMA requires electronic applications for its mitigation grant programs. WEM worked with local governments and tribal organizations to submit the 2003 Pre-Disaster Mitigation program applications. WEM will continue to train and work with subgrantees to successfully submit electronic applications as required by FEMA.
2008 Update Status: Status unchanged. WEM provided technical assistance in the FFY 05, 06, 07, 08, and 09 funding cycles.
2011 Update Status: Status unchanged. WEM provided technical assistance in the FFY 10, 11, and 12 funding cycles.

10.23 Action: Revise the Resource Guide to All-Hazards Mitigation Planning in Wisconsin and post the new version on the WEM and DOA websites to be available for both mitigation and comprehensive planning efforts.

Supporting Agency: DOA
Implementation: 2011 and ongoing
Background: The Guide to All-Hazards Mitigation Planning in Wisconsin was published in 2003 to serve as a tool for mitigation and comprehensive planners. The Guide was not posted to the DOA website, which is a primary source of comprehensive planning information for communities around the state. Upon completion of the update, it will be reviewed by the DOA to be sure it conforms to state comprehensive planning requirements. Posting it to the DOA website will promote the inclusion of a mitigation element in communities' comprehensive plans.
2011 Update Status: New action item.

10.24 Action: Continue to administer FEMA's Hazard Mitigation Assistance (HMA) grant programs to strengthen buildings against disaster by providing long-term, permanent and cost-effective mitigation measures.

Supporting Agencies: Agencies belonging to the WHMT
Implementation: Ongoing.
Background: WEM has administered over $40 million in HMA funds for projects that eliminate or reduce disaster damages and protect lives and property. With the assistance of the WHMT, WEM will continue to encourage communities to apply for mitigation grant funds and fund cost-effective projects and projects that make the biggest impact in reducing disaster costs. In addition, WEM will coordinate with other agencies through the WHMT to identify potential funding sources for projects and "package" funding to ensure implementation of projects at the local level.
2008 Update Status: WEM has now administered over $56 million in HMA funds.

Priority is given to repetitive loss and severe repetitive loss properties (as defined by FEMA).

2011 Update Status: WEM has now administered over $86 million in HMA funds.

10.25 Action: Promote the purchase and use of NOAA weather radios (especially in critical facilities, daycare centers, schools, and hospitals) through the WEM website, public service announcements, etc.

Implementation: Ongoing.

Background: NOAA weather radios have been identified in the Plan as a valuable tool for warning people to take shelter during extreme weather events.

2008 Update Status: Status unchanged. Mitigation presentations identify NOAA weather radios as a mitigation option. In addition, WEM has awarded six HMGP grants for the purchase and distribution of NOAA weather radios.

2011 Update Status: Status unchanged. WEM continues to publicize the benefits of NOAA weather radios and has awarded one additional HMGP grant for NOAA weather radios since 2008. There are two more HMGP grant applications for NOAA weather radios pending.

10.26 Action: Participate in conferences and give presentations to promote mitigation to local interest groups and associations. These groups could include but are not limited to Wisconsin Land Information Associations, Wisconsin Chapter of the American Planning Association, the League of Wisconsin Municipalities, Wisconsin Counties Association (WCA), Wisconsin Emergency Management Association and the Wisconsin Manufactured Housing Association.

Supporting Agencies: DNR, UW-Extension, DOA-WCMP, and RPCs

Implementation: Ongoing.

Background: While the awareness of the importance of mitigation has improved in recent years, more can be done. Recognizing that mitigation activities occur at the local level, WEM staff will be able to reach local audiences by attending and participating in conferences sponsored by various organizations.

2008 Update Status: WEM has been working with the WCA and Wisconsin County Highway Commissioners organization to promote mitigation for road and bridge projects; expanding outreach on this topic with other groups; and making presentations at the WAFSCM (Wisconsin Association of Floodplain, Stormwater, and Coastal Managers) annual conferences and WEM County Emergency Management Directors' annual meetings.

2011 Update Status: WEM continues to promote mitigation whenever possible. This has included making presentations for the Southwest Building Inspectors Group, Wisconsin Claims Council, State Bar Association, University of Wisconsin Student Planning Association, GIS Day at the State Capitol, PRIMA (Risk Managers Association), LaFollette School of Public Affairs, Kickapoo River Seminar sponsored by the National Weather Service, Rural Electric Cooperatives Association, Wisconsin American Planning Association, and the Wetlands, Wildlife Habitat, and Flood Hazards in the Rock River Basin Workshop sponsored by the Environmental Law Institute.

10.27 Action: Continue to develop and use the WEM mitigation information display at training sessions, conferences, workshops, and other public awareness activities.

Supporting Agency: RPCs

Implementation: Ongoing.

Background: Educating individuals about hazard mitigation will help promote hazard mitigation in their communities. A display that is portable and clearly conveys these concepts will help communicate these concepts.

2008 Update Status: Display was updated to include new mitigation projects and mitigation material.

2011 Update Status: Display is updated as needed and utilized at various conferences as well as mitigation training functions. This includes the Wisconsin Association for Floodplain, Stormwater, and Coastal Managers annual conference, the annual Governor's Conference on Emergency Management and Homeland Security, and the Wisconsin Emergency Management Association annual conference.

10.28 Action: Include the Hazard Mitigation Planning Workshop into WEM's training curriculum and the Emergency Manager certification program, and hold at least one workshop annually.

Supporting Agency: RPCs

Implementation: Beginning in 2005 and at least annually thereafter.

Background: Beginning November 1, 2004, communities are required to have an approved all hazards mitigation plan that meets 44 CFR Part 201 in order to be eligible for funds through the FEMA mitigation programs. WEM mitigation staff has developed a curriculum for an All-Hazards Mitigation Workshop. Since mitigation planning will be a requirement, it is important that this workshop become a part of the Emergency Managers certification program. Therefore, the course must be held at least once a year to provide an opportunity for all Emergency Managers to participate.

2008 Update Status: Workshops are conducted annually in the spring as part of the certification program. A total of 10 planning workshops have been held. Workshops will continue to be held annually.

2011 Update Status: The Hazard Mitigation Planning Workshop is part of the Emergency Manager certification program and is held annually, normally in April. The workshop is held more often if requested. One workshop was held in 2009, two in 2010, and one in 2011.

10.29 Action: Continue to develop guidance and resource information that will assist with the development of local mitigation plans to meet the federal planning criteria for All-Hazards Mitigation Plans.

Supporting Agency: RPCs

Implementation: April 1, 2001 and ongoing.

Background: Beginning November 1, 2004, communities are required to have an approved all-hazards mitigation plan that meets the criteria in 44 CFR Part 201 in order to be eligible for funds through the FEMA mitigation programs. To assist the local governments in developing such plans, WEM worked with the Council of Regional Planning Organizations in the development of the Resource Guide to All-Hazards

Mitigation Planning in Wisconsin. In addition, WEM developed a curriculum for an All-Hazards Mitigation Planning Workshop, provides guidance through its website, and mails guidance electronically to local governments. As information becomes available, WEM continues to develop and share guidance with the local governments.
2008 Update Status: An All-Hazards Mitigation Resource Guide was developed and posted to the WEM website along with other planning tools. In addition, WEM regularly provides planning information to the local governments.
2011 Update Status: Although the Resource Guide is useful and is included in the Hazard Mitigation Planning Workshops and posted on WEM's website, it needs to be updated. WEM will work to update the Resources Guide. As part of the annual Hazard Mitigation Planning Workshop, each attendee receives a binder with extensive resource materials as well as a CD containing the materials. The contents are also posted on WEM's website.

10.30 Action: Identify and develop GIS applications to be used as a mitigation tool.
Supporting Agencies: DNR, and RPCs
Implementation: Beginning in 2004.
Background: Once GIS resources have been identified and provided, WEM can begin to develop GIS applications. Possible GIS applications include mapping repetitive loss properties; grants management; public education and outreach activities; success stories; mitigation planning; and post-disaster project development and recovery.
2008 Update Status: WEM hired a GIS Specialist and has used the technology for projects and planning. WEM is in the process of developing a GIS map of repetitive loss properties. WEM would also like to develop a GIS database and map of mitigated properties (acquisition, demolition, relocation, and elevation).
2011 Update Status: Maps identifying repetitive loss properties as well as mitigation projects throughout the state were completed. The maps will need to be updated at least annually. Future projects can include mapping properties acquired with mitigation funds since GPS coordinates are available. In addition, WEM mitigation staff purchased a camera in 2011 with GPS capability. This camera can be utilized during damage assessment, project development, and final inspections among other activities.

10.31 Action: Work with Wisconsin universities to develop Disaster Resistant University (DRU) Plans.
Implementation: Ongoing.
Background: In order to assist the state with 44 CFR Part 201 (which requires that the State Hazard Mitigation Plan include an overview and analysis of potential losses to state owned or operated buildings, infrastructure and critical facilities located in identified hazard areas), State Universities will need to participate. In turn, the structure information gathered may be used to assist the universities in the development of the Disaster Resistant University plan.
2008 Update Status: New action item.
2011 Update Status: The University of Wisconsin-River Falls developed a hazard mitigation plan which was approved by FEMA. As a result, they applied for and were

awarded a Pre-Disaster Mitigation grant to construct small storm shelters at two of their research farms. The University of Wisconsin-Superior has participated in the Douglas County Hazard Mitigation Plan. The University of Wisconsin-Madison, the largest UW campus, is presently developing a hazard mitigation plan and we expect a detailed structure inventory included in the plan. WEM will continue to work with other universities in the development of hazard mitigation plans.

10.32 Action: Annually update the Green Sheet to assist in environmental review process for hazard mitigation projects.

Supporting Agencies: WHMT/FEMA

Implementation: Ongoing.

Background: The Green Sheet is a resource guide for local governments that contains basic information on the environmental laws and policy requirements that must be considered when communities respond to and recover from disasters. The document also contains contact information for state and federal officials. The annual update will help ensure the document is current and will require less time to update when a disaster is declared.

2008 Update Status: FEMA has reduced the Green Book to a Green Sheet that contains important state and federal regulatory information. This document was updated for DR-1768. The State will continue to update this document with state and local officials when a disaster is declared.

2011 Update Status: The Green Sheet is updated after each disaster declaration. This included two declarations in 2009 and one in 2011.

10.33 Action: Maintain the Wisconsin Recovery Task Force as a standing task force for disaster recovery with defined expectations of duties for each subcommittee chair.

Supporting Agency: Wisconsin Recovery Task Force

Implementation: 2008 and ongoing.

Background: The Wisconsin Recovery Task Force was established after the 2008 flooding disaster declaration to coordinate the recovery activities. Six subcommittees were established with identified chairs. The Task Force subcommittee chairs met bi-weekly. It is recommended that the Task Force continue and develop pre-disaster policies, standard operating procedures for the task force and the subcommittees, and assessment protocols. It is also recommended that semi-annual meetings be held to ensure preparedness and facilitate effective operational readiness of the Task Force.

2008 Update: New action item.

2011 Update: The Wisconsin Recovery Task Force has not met since 2008. However, it is WEM's intent to convene the group after large disasters to address short- and long-term recovery needs.

4.3.11 Wisconsin Historical Society (WHS)

11.1 Action: WHS is using GIS to identify and map locations of known historical and archeological sites in floodplains.

Supporting Agencies: DOA, DNR

Implementation: Ongoing. The WHS completed digitizing historical and archeological site locations in 2001.

Background: Section 106 of the National Historic Preservation Act requires federal agencies and the programs that they fund avoid the alteration, damage to, or destruction of significant historical and archeological sites. Knowing that an area contains significant historical or archeological sites is considered when determining the appropriate treatment of these resources before, during, and after a disaster. This statewide GIS database contains the locations of significant historical and archeological sites making information on these resources more widely available. Mitigation planning can help protect these resources and critical historical facilities. The WHS site lists and maps for all properties listed in the National Register of Historic Places as the data becomes available. Staff has developed agreements on data access and use.

2008 Update Status: Status unchanged.

2011 Update Status: Status unchanged.

11.2 Action: Provide ongoing support and coordination with the WHMT in developing, establishing, and implementing a permanent and viable statewide mitigation program while protecting historical and cultural resources.

Supporting Agencies: WEM, WHMT

Implementation: Ongoing.

Background: Section 106 of the National Historic Preservation Act requires federal agency programs to avoid the alteration of, damage to, or destruction of significant historical and archeological sites. Coordination with WEM on hazard mitigation activities will help fulfill this mission.

2008 Update Status: Status unchanged.

2011 Update Status: Status unchanged.

4.3.12 National Weather Service

12.1 Action: Achieve near 100% NOAA weather radio tower coverage in the state. WEM will work with the Educational Communications Board to pursue this goal.

Supporting Agency: WEM

Implementation: Ongoing.

Background: NOAA weather radios have been identified in the plan as a valuable tool for warning people during extreme weather events. As near as possible to 100% coverage would help warn people in all areas of Wisconsin.

2008 Update Status: There is approximately 95% coverage statewide.

2011 Update Status: Status unchanged. There is 95% coverage statewide. New transmitters are currently being installed, but are not yet operational.

4.3.13 Wisconsin Economic Development Corporation

13.1 Action: Develop an Economic Recovery Framework to help businesses recover following a disaster.

Supporting Agencies: DOA - Division of Housing, WEM

Implementation: 2011 and ongoing.

Background: An increased understanding of how significantly job loss and business failure impact community recovery is emerging. A Business Recovery toolkit will help civic leaders minimize job losses, thereby shortening recovery time. This action item not only provides specific tools to communities to increase disaster preparedness and reduce the potential for business failure immediately following a disaster, but it also integrates economic stability as a factor in long-term community recovery.

2011 Update Status: New action item.

13.2 Action: Target business-related mitigation materials to Wisconsin businesses, especially in vulnerable areas.

Implementation: Ongoing.

Background: Businesses are excellent and important partners to community mitigation efforts. To encourage business participation in disaster mitigation activities, it will be useful to concentrate efforts in areas with flood vulnerability to reduce future losses and build strong partnerships.

2008 Update Status: Status unchanged.

2011 Update Status: Status unchanged.

4.3.14 All State Agencies

14.1 Action: Provide incentives such as awarding additional points for grant proposals competing for state funds when proposals address hazards with appropriate mitigation measures.

Implementation: Ongoing.

Background: Many projects funded by state agencies can fulfill multiple objectives. For example, a storm water project that addresses water quality issues can also address flood issues. A bike trail along a river can prevent more intense development in a flood-prone area and therefore prevent flood damage. Although state programs are funded as directed by the state legislature and with formulas that cannot be altered by agency staff, it would be beneficial to recognize those projects that accomplish mitigation objectives.

2008 Update Status: Status unchanged.

2011 Update Status: Status unchanged.

14.2 Action: Seek out opportunities to sponsor low-cost hazard mitigation demonstration projects.

Implementation: Ongoing.

Background: Organizing low-cost mitigation demonstration projects at the state level helps lead by example and epitomizes a disaster resistant community approach.

2008 Update Status: Status unchanged.
2011 Update Status: Status unchanged.

4.3.15 Completed and Deleted Action Items

TABLE 4.3.15-1 COMPLETED ACTION ITEMS 2011

2008 Action Item Number	Action	Agencies: Lead Supporting	2008 Update Status	2011 Update Status
1.11	Review licensing requirements for medical and residential care facilities for promoting disaster resistant health care facilities.	**DHS**	Status unchanged.	Completed. DHS – Division of Quality Assurance requires residential and home health programs to have emergency plans. Hospitals and other health facilities that receive DHS / Department of Public Health / Wisconsin Hospital Emergency Preparedness Program funds also have emergency plans.
2.3	Make readily available the Disaster Health and Safety Tips in a highly visible area on the DHS website.	**DHS** WEM	Status unchanged.	Completed. Website: http://www.dhs.wisconsin.gov/eh/DisasterHealthSafety/
2.14	Develop a household preparedness survey to utilize as a tool to educate the public about hazard mitigation and obtain interest levels in mitigation opportunities.	**WEM**	Status unchanged.	Completed. The survey served its purpose, and is no longer utilized.
3.3	Place all hazards emergency management guidelines on websites to facilitate the education of healthcare facilities in emergency management activities.	**DHS**	Status unchanged.	Completed. Website: http://www.dhs.wisconsin.gov/rl_dsl/EmergencyPreparedness/EmPrepIndex.htm
3.12	Facilitate hazard mitigation planning by conducting an inventory of coastal protective structures along the Lake Michigan coast in Racine County.	**DOA-WCMP** SEWRPC, DNR	Completed.	
3.17	Develop an annex to the State Plan for the rural electric cooperatives (RECs) statewide.	**WEM** RECs	New action item.	Completed. The annex is included in the 2011 Plan Update.
4.8	Invite a representative from the Regional Planning Commission and the Wisconsin Association of Floodplain, Stormwater, and Coastal Managers (WAFSCM) to participate on the WHMT.	**WEM**	Completed. A VOAD and NWS representative also joined the WHMT.	
4.12	Put a link on the DOA website to the WEM website to provide access to information on hazard mitigation planning.	**DOA**	Completed.	Completed. Website: http://www.doa.state.wi.us/category.asp?linkcatid=748&linkid=128&locid=9

TABLE 4.3.15-2 DELETED ACTION ITEMS 2011

2008 Action Item Number	Action	Agencies: **Lead** Supporting	2008 Update Status	Reason for Deletion in 2011
1.7	Allow mitigation projects to be funded under the Flood Damage Aids statute using the same funding percentage for improvements during a presidential disaster declaration.	**DOT**	Deleted.	The project has not been pursued because of limited funds.
4.10	Promote hazard mitigation planning by including information in the directory for comprehensive planning.	**DOA** WEM, RPCs	There are no plans to update the October 2003 version of the directory.	There are no plans to use this directory in the future. Other resources will be used instead.
4.11	Promote hazard mitigation planning in cooperation with the Comprehensive Planning Grant Administrator. Workshops explain how to apply for a comprehensive planning grant.	**DOA** WEM	DOA holds workshops on how to apply for a comprehensive planning grant in August and September.	There is no more grant funding.
4.25	Work with Wisconsin Land Council through SARWG to develop a hazard mitigation planning requirement in the state's Comprehensive Planning Law.	**WEM** DOA	The Wisconsin Land Council was sunset in 2005 and SAWRG is inactive.	The Wisconsin Land Council was sunset in 2005 and SAWRG is inactive.
4.26	Work with the Wisconsin Land Council through SARWG to provide information and guidance on all hazards mitigation planning and coordinate with state comprehensive planning efforts.	**WEM** DOA, RPCs	The Wisconsin Land Council was sunset in 2005 and SAWRG is inactive. WEM provided information to DOA regarding hazard mitigation planning.	The Wisconsin Land Council was sunset in 2005 and SAWRG is inactive.
5.8	Encourage safe rooms in new residential construction.	**Comm-DHCD** (now in DOA) WEM	Status unchanged.	CDBG and HOME funds are not available for the type of substantial rehabilitation necessary for safe room construction.
5.12	Work to develop code language adopting the 2009 editions of the national model codes from the International Code Council and the National Fire Protection Association.	**Comm-Safety & Buildings** (now in DSPS)	New action item.	Combined with 2008 Action Item 5.2 to become Action Item 5.4.

4.3.16 Prioritizing Mitigation Action Items

The Mitigation Action Plan is consisted of Action Items identified by the WHMT for state government to pursue over the next three years and beyond. The actions include developing and/or enhancing state programs, policies, regulations, planning, or other practices that will assist the local governments in furthering hazard mitigation goals. Each WHMT member prioritized the actions for their respective agency as high, medium, or low with the caveat that the priority may change based on circumstances such as: 1) availability of funds; 2) availability of resources; 3) legislative or programmatic changes; and 4) disaster events that may have occurred.

Wisconsin has a home-rule style of government. As a home-rule state, control of government services and actions is maintained at the most local level possible. The State recognizes that decisions for implementing local mitigation measures remain at the local level. Therefore, this plan does not identify and prioritize site-specific mitigation projects. It is left to the communities to identify and prioritize those mitigation measures that are best for their community. WEM encourages communities to develop comprehensive plans that include all potential mitigation measures instead of simply listing projects that are eligible for the federal hazard mitigation programs. As local plans are completed and approved, information regarding local projects will be included in future updates of the State Plan.

Since 1993, WEM and the WHMT have given priority to acquisition, demolition, relocation, and/or floodproofing of floodprone properties, especially substantially damaged or repetitive loss properties, and have approved projects for these activities. The State's funding priorities are listed in Section 7 of this Plan.

When mitigation projects are proposed, WEM performs an initial review to ensure that the projects are eligible for the Hazard Mitigation Assistance grant programs. If the projects are eligible, WEM reviews, scores, and ranks them according to the criteria set forth in the State Administrative Plan for the Hazard Mitigation Grant Program (Appendix F). The criteria reflect the State priorities, so non-structural projects such as acquisition, demolition, relocation, and/or floodproofing receive the highest ranking and the greatest consideration for funding. Based on the evaluation and funding availability, a list of recommended projects is submitted to the WEM Administrator. Some projects may be referred to other agencies for appropriate funding. In addition, WEM will work with WHMT members to "package" funding for projects where possible to maximize the amount of funds available.

Items considered in evaluating proposed projects:

1. Type of project (structural versus non-structural)
2. Site vulnerability
    - Frequency of event
    - Does the project involve removing structures from the hazard area?

- Does the project address multiple hazards?

3. Project Benefits
    - Alleviates or reduces the need for emergency services during disasters
    - Alleviates or reduces damages to improved structures
    - Beneficially impacts more than one community
    - Solves a problem independently or as part of another project with assurance that the project will be completed
    - Solves a repetitive or imminently dangerous problem long-term
    - Prevents death and injury by reducing a people's vulnerability to the hazard
    - Substantially reduces future disaster costs
    - Reduces the cost of repairing repetitive damages
    - Restores floodplains and/or wetlands
    - Accomplishes multiple objectives such as damage reduction, environmental enhancement and economic recovery
    - Promotes economic growth and community development
    - Promotes development of recreational areas/historic areas
    - Provides flood protection beyond the 100-year flood event
4. Other Considerations
    - Is the project in a declared disaster area?
    - What is the status of the local mitigation plan?
    - Does the project involve the use of innovative approaches to mitigation?
    - Has the project been submitted previously?
    - Are other agencies willing to provide funds towards the proposed project?
    - Are there funds available to fund the entire project?
    - Is the community willing to put funds towards the project over and above the required local match?
    - Are there future maintenance requirements for the project and will the community commit to performing future maintenance?
    - Does the community participate in the Community Rating System?

For the Flood Mitigation Assistance Program, additional criteria includes the community to have an approved flood mitigation plan with the proposed project identified in the plan, and the proposed project must address mitigating a NFIP insured property.

4.3.17 Addressing Cost-Effectiveness, Environmental Soundness, Technical Feasibility

In addition to the above priorities and considerations, the hazard mitigation programs administered by WEM require all mitigation projects proposed for funding (including state agency projects) to meet the following criteria:

1. Solve a repetitive problem.
2. Be cost-effective.
3. Be a permanent, long-term solution.
4. Be environmentally sound.
5. Be technically feasible.

From October, 2000 to February, 2006, a Memorandum of Understanding (MOU) existed between FEMA and WEM recognizing the state as a Hazard Mitigation Grant Program Managing State. The MOU was developed to build a FEMA-State collaborative partnership for the implementation of the HMGP. The agreement defined the roles and responsibilities of each agency. Under the arrangement, responsibility for eligibility reviews for each project application was shifted to WEM with FEMA reviewing the project summaries provided by WEM for compliance with program requirements. In addition, FEMA would conclude the environmental review. The changes in the roles and responsibilities resulted in a faster approval of projects, in most cases less than 30 days after submittal from the State to FEMA. Per the agreement WEM agreed to do the following:

- Perform eligibility reviews for full project applications
- Apply streamlined procedures for certain project types as identified in the MOU
- Determine cost-effectiveness for all projects using standard benefit-cost methodology and provide documentation
- Undertake environmental review tasks and complete the Record of Environmental Review (RER) for FEMA's signature
- Provide complete project applications to FEMA within 18 months (now one year) for each project that WEM selects for funding and submit through NEMIS

The Memorandum of Agreement can be found in Appendix H.

With the passage of the Disaster Mitigation Act of 2000 (DMA2K), 44 CFR 201, published February 26, 2002, stated, "Management State means a State to which FEMA has delegated the authority to administer and manage the HMGP under the criteria established by FEMA…" Six years after the passage of DMA2K, FEMA had not developed such criteria, therefore, on February 15, 2006, the MOU recognizing Wisconsin as a Managing State was terminated by FEMA, Region V. Although the MOU is no longer in effect, the State continues to perform all of the activities identified in the MOU.

Benefit-Cost Analysis (BCA)

Per the HMGP Managing State MOU, WEM will do the following:

1. Determines the cost-effectiveness of projects using standard benefit-cost methodology. (FEMA's standard methodology is recommended, however, WEM may use any standard methodology, including narrative, mutually agreed upon by FEMA and WEM.) WEM has the option of using any of the three FEMA BCA software modules (Full Data, Limited Data, and Very Limited Data) based on the availability of accurate and verifiable damage/benefit data and project costs.
2. Provides full documentation for the BCA, including explanations of assumptions, data derivations, and analytical techniques.
3. Attaches the BCA summary sheet to project application packages for FEMA review.
4. Utilizes a technical contractor if the need arises.

Per the MOU, FEMA will do the following:

1. Provides BCA module software, accompanying technical manuals and training.
2. Reviews the benefit-cost summary sheet before approving projects.
3. If the BCA summary is determined to be unacceptable, provides within 15 days, a written explanation of the problems and (where possible) proposes solutions to those problems.

A narrative analysis is used when the benefits of a project cannot be easily quantified into specific categories and do not conform to any of the other modules or formats. This analysis allows for a subjective, broad-based approach to quantifying the benefits of a project so that all benefits of the project can be recorded and the project objectively assessed. This type of analysis is normally used for the HMGP 5% State Initiative projects.

The results of the BCA will determine if the project is cost-effective. If the project is cost-effective, it is still under consideration by WEM for further funding. At this step in the application process, WEM starts the environmental review for the project. If the project is not cost-effective, mitigation staff attempt to obtain additional information from the applicant to calculate a positive benefit-cost ratio. If there is no additional credible data available and the project is not cost-effective, the project is rejected.

WEM mitigation staff have been performing and completing BCAs since 1997 for the federal hazard mitigation grant programs. The staff has developed expertise in performing this function by attending BCA training when it is offered by FEMA, and by utilizing the FEMA Mitigation BCA Toolkit.

The mitigation staff's ability to complete accurate BCAs was demonstrated by their success in the first year of the Pre-Disaster Mitigation-Competitive Program. The State

submitted six project applications in the national competition and all of the projects were successful through the evaluation process. The process included review and evaluation of the BCA based on its credibility and documentation.

Environmental Review

Per FEMA's consolidated grant program, WEM undertakes environmental review tasks and completes the Record of Environmental Consideration (REC) for FEMA's signature. WEM's responsibilities include the following:

1. Coordinate with the FEMA Regional Environmental Officer (REO), Project Officer, and other state and federal agencies during the project development process to address environmental issues.
2. Obtain formal consultations required specifically of federal agencies under federal environmental laws other than the National Environmental Policy Act (NEPA) including, but not limited to, formal endangered species consultations or historic preservation MOUs and Programmatic Agreements.
3. Undertake environmental review tasks (including tasks related to the National Historic Preservation Act); gather necessary environmental data through the applicant, past studies, and informal consultation with state and federal agencies; and recommend level of review under the NEPA.
4. Complete and submit the Record of Environmental Consideration (REC) and all supporting documentation with submission of the project application.
5. Ensure that the required public notices are completed.

FEMA's responsibilities include the following:

1. Provide WEM with the current REC.
2. Review WEM's REC, supporting documentation, and recommendation for level of review and make a final decision on level of NEPA review.
3. Coordinate with WEM to complete the preparation of an Environmental Assessment (EA) or Environmental Impact Statement (EIS) for projects that do not clearly qualify for a Categorical Exclusion (CATEX).
4. Prepare and/or review appropriate NEPA and other environmental documents. Approve REC or request additional information with 30 business days of receipt of a project summary from WEM.
5. Coordinate with WEM if there is a need to utilize a technical contractor.

The criteria and procedures for the above are established in the State's Hazard Mitigation Administrative Plan and are discussed in more detail in Section 7.

4.4 HAZARD MITIGATION FUNDING

As stated previously in this section, the primary funding sources for state and local hazard mitigation projects have been federal hazard mitigation programs available through FEMA. Funds for the state match or state contribution toward the local match (12.5% for the Hazard Mitigation Grant Program) come from the state's general fund budget. Local governments have used a variety of other sources to fund hazard mitigation projects including local revenues, local in-kind goods and services, Community Development Block Grants, grants through the Department of Natural Resources Stewardship Programs and the Municipal Flood Control and Riparian Restoration Program, and others.

The State Capability Assessment, Section 4.2 and Tables 4.2-1 and 4.2-2, identifies a variety of sources that have been and will continue to be used to fund hazard mitigation projects, plans, and other initiatives by local and state governments. Additionally, other federal agencies and related organizations have been identified as potential funding sources to further hazard mitigation efforts in the state.

To help relieve the debt of some $4 billion, the state government has cut back on programs and services. With a slow economic recovery, a limited long-term state GPR budget, and diminishing federal funding, it may be more difficult to fund mitigation efforts in the future.

A majority of state tax revenue is transferred to local governments. General purpose state taxes are combined with locally-collected revenues to fund local government in Wisconsin. In addition to the state's general purpose tax collection, local governments rely heavily on property taxes to fund their programs and services.

With fiscal challenges facing both the federal and state governments, not only will it be more difficult for local governments to secure funding for mitigation projects, but it will also be more difficult for them to raise matching funds. This short-term lack of money to fund mitigation projects may cause larger long-term losses if a disaster occurs, because mitigation projects that would have protected life and property were not implemented.

TABLE 4.2-1 STATE CAPABILITY ASSESSMENT

Department of Administration (DOA)

DOA - Division of Housing

Program, Policy, Regulation, Plan, or Practice	Description	Needs Addressed	Unmet Needs	Hazards Addressed	Support Local Mitigation	
					Financial Support	Facilitation
Community Development Block Grant (CDBG) – Housing Program	Makes loans to low- to moderate-income households to rehabilitate their homes. Hazard mitigation and building code compliance activities are eligible.	The CDBG Housing Program is designed to address housing needs as identified by the community. Compliance with building codes can reduce wind damage vulnerability.	Funds are available annually to local governments on a competitive basis and there are never enough funds to go around. Additionally, mitigation is not a priority in the minds of most homeowners.	All Natural and Man-Made Hazards	◙	◙
Home Investment Partnerships Program (HOME)	HOME provides grants to assist communities in establishing affordable housing for low-income people.	HOME can incorporate mitigation into new construction projects.	HOME cannot make awards based on an emergency.	All Natural and Some Man-Made Hazards		◙
CDBG – Emergency Assistance Program (EAP)	Following a disaster, EAP is a source of loans to low- to moderate-income households to restore their homes to pre-disaster condition. Hazard mitigation activities are promoted wherever appropriate.	EAP is awarded following a disaster. It is designed to help households recover. Some projects include acquisition and demolition of properties in floodplains that have had repetitive damages. Loans can also be used as the local match for HMGP, PDM, and FMA grants.	EAP funds are awarded to local governments in response to a disaster and are restricted to low- to moderate-income households. EAP assistance can be provided only after official requests and often has no mitigation component.	All Natural and Man-Made Hazards	◙	◙
CDBG – Public Facilities (PF) Program	The PF program is a source of grant money for local governments to bring municipal public facilities up to code. The grants can help fund projects such as community tornado shelters, shelter retrofits, infrastructure upgrades, and other hazard mitigation projects.	The mitigation needs of small communities are often overlooked. They can be addressed by the PF program as part of the overall effort to improve housing conditions.	Funds are available annually to local governments on a competitive basis; there are never enough funds to go around. Many small communities lack local support for projects or are unable to raise funds for the local cost share of the project.	All Natural and Man-Made Hazards	◙	◙

Program, Policy, Regulation, Plan, or Practice	Description	Needs Addressed	Unmet Needs	Hazards Addressed	Support Local Mitigation	
					Financial Support	Facilitation
Environmental review assistance for CDBG-EAP projects	CDBG Technical Assistance funds can be used to pay DHCD staff to conduct the environmental review record for EAP grants, thus decreasing community workload at a stressful time.	These funds help a community get housing assistance needed.	EAP assistance can only be provided when requested and some communities are still not aware of the program.	All Natural and Man-Made Hazards	◙	◙
CDBG, EAP and HOME program implementation training	Program implementation training sessions provide information on mitigation activities that are eligible for assistance.	These sessions raise awareness of consultants and local officials about mitigation efforts.	The sessions are held only annually and the audience is limited to those with funding.	All Natural and Man-Made Hazards	◙	◙

DOA - Division of Intergovernmental Relations: Comprehensive Planning

Program, Policy, Regulation, Plan, or Practice	Description	Needs Addressed	Unmet Needs	Hazards Addressed	Support Local Mitigation	
					Financial Support	Facilitation
Census and Population Information – Demographic Services Center	The Demographic Services Center's primary responsibility is to develop annual total population estimates for all Wisconsin towns, villages, and cities. It also develops population projections by age and sex for each county; population projections of total population for each municipality; and estimates of total housing units and households for each county.	Supplies federal, state, and local agencies with population and housing estimates and projections. This information can be used by planning and zoning agencies to mitigate hazards.	For cities, villages, and towns the population projections do not include age or gender.	All Hazards		◙
Comprehensive Planning Grant Program	This program financially assists local governments in the development and adoption of comprehensive plans. The program awards grants, maintains a library of comprehensive plans, and serves as a resource directory for local governments.	Comprehensive planning increases awareness of hazards and encourages authorities to plan future land uses and to mitigate hazards. Comprehensive plans include maps of floodplains, wetlands, and steep slopes.	This program is not tied to hazard mitigation. There are no funds available for 2011 or 2012, possibly not for 2013.	All Hazards	◙	◙

Program, Policy, Regulation, Plan, or Practice	Description	Needs Addressed	Unmet Needs	Hazards Addressed	Support Local Mitigation	
					Financial Support	Facilitation
Comprehensive Planning Element Guides	Guides to assist local governments are available for the following comprehensive planning elements: Housing; Transportation; Agricultural, Natural and Cultural Resources; Economic Development; Intergovernmental Cooperation; Land Use; and Implementation.	These element guidebooks assist local governments in the development of their comprehensive plans. The Natural Resources guide discusses planning in floodplains.	The land use guide is not used enough in hazard mitigation planning.	All Hazards		◙
Comprehensive Planning Web-Based Resources	Collection of documents, guides, tools, and other useful information on topics including model ordinances, webmapping, comprehensive planning elements, and land use regulations.	This collects comprehensive planning information from various sources in one location.	Information is not complete, should be linked to more hazard mitigation planning resources.	All Hazards		◙
Land Subdivision Plat Review	Plat Review regulates the creation of parcels on subdivision plats and the correction of faulty parcels on assessor plats. It also functions as a clearinghouse for the three state agencies and seventeen county planning agencies with statutory “objecting” authority.	Plat Review uses statutes to insure plat follow zoning and planning.		All Hazards		◙
Municipal Boundary Review (MBR)	MBR regulates the transition of unincorporated areas to city or village status through municipal annexation, incorporation, consolidation, or through joint city-village-town activities involving cooperative boundary plans and agreements. Such agreements may change territorial boundaries and may provide for the sharing of municipal services.	MBR handles annexations and incorporations. If the land is contiguous to a municipality the MBR will review and give recommendations.	This is only advisory opinion on annexation, but has full authority on incorporation, consolidation, and boundary agreements.	All Hazards		◙
Wisconsin Land Information Program (WLIP)	WLIP is a voluntary, statewide program that provides financial support (from register of deeds fees) to local governments for land records modernization efforts. All seventy-two Wisconsin counties participate in the Program.	WLIP is a data resource for local governments and consultants developing Comprehensive and All Hazards Mitigation Plans.	WLIP does not actively promote hazard mitigation planning.	All Hazards	◙	◙

DOA - Division of Intergovernmental Relations: Wisconsin Coastal Management Program (WCMP)

Program, Policy, Regulation, Plan, or Practice	Description	Needs Addressed	Unmet Needs	Hazards Addressed	Support Local Mitigation	
					Financial Support	Facilitation
Coastal Grant Program	Awards grants to communities for the protection of Wisconsin coastal resources.	The program is focused on a specific area of Wisconsin (15 coastal counties). Coastal erosion and flooding are the focuses of the program. Funding for land use planning aims at incorporating coastal hazards into planning.	Communities need financial and technical support in developing setback standards. The minimum setback stipulated in the DNR NR-115 is not adequate for many Great Lakes coastal areas.	Coastal Storms and Erosion	◙	◙
Interagency Coastal Hazards Work Group	Formulates strategies, goals and policies for managing coastal hazards.	Members of the work group identify needs and opportunities for communities in the coastal counties. The work group is a forum to share information and opportunities regarding coastal hazards.	The work group continues to identify opportunities to help communities address their coastal hazards needs.	Coastal Storms and Erosion	◙	◙
WCMP Public Outreach	WCMP conducts public outreach activities related to coastal hazards and mitigation planning.	Public outreach is a component of the WCMP's coastal hazards strategy, with a goal of educating landowners and other stakeholder about the threats posed by coastal hazards. WCMP also supports efforts to train state and county staff, coastal engineers, and real estate interests on identifying and addressing such hazards.	WCMP's efforts are limited to the 15 coastal counties in the state.	Coastal Storms and Erosion		◙

FUNDING DISCUSSION

The State of Wisconsin currently receives an annual federal allocation of approximately $2 million dollars for the approved Wisconsin Coastal Management Program (WCMP) in the Wisconsin Department of Administration. About 65% of the total funds are made available for local projects for the protection, preservation, development, and restoration of coastal resources in the state. An annual request for proposals (RFP) is available every fall from the WCMP website: http://coastal.wisconsin.gov. A multidisciplinary, governor-appointed council representing local governments, the Legislature, academic and state agencies, Indian tribes, and the public guides WCMP policies, establishes annual funding priorities, and recommends grants for state and local projects. Hazard mitigation activities the WCMP has funded include comprehensive planning, coastal hazard planning, ordinance updates, technical assistance, and public outreach.

Department of Agriculture, Trade, and Consumer Protection (DATCP)

Program, Policy, Regulation, Plan, or Practice	Description	Needs Addressed	Unmet Needs	Hazards Addressed	Support Local Mitigation	
					Financial Support	Facilitation
Conservation Reserve Enhancement Program (CREP)	This program removes sensitive riparian areas from crop or pasture production. Filter strips, grassed waterways, grass habitat, and restored wetlands are established.	This program helps reduce environmental damage from flooding. It provides cost-sharing and incentives for landowner participation.	A lack of funding for county staff to administer the program has resulted in counties being unable to fully utilize the program.	Flooding	◙	
Soil and Water Resources Management Program	This program provides state cost-share funds to counties for implementing their land and water resources management plan. The program also provides staffing grants to counties for performing necessary technical assistance. (Wisconsin Statutes Chapter 92)	This program helps reduce environmental damage from flooding. Measures can include stream-bank protection, barnyard and manure management, and others.	A lack of funding for county staff has resulted in the inability to fully implement the program in many counties. Cost-sharing for implementing conservation practices is not adequate in many counties.	Flooding, Landslides, Sinkholes	◙	
Drainage Districts	This program provides operation and maintenance of agricultural drains by local drainage districts. (Wisconsin Statutes Chapter 88; WAC Chapter ATCP 48)	This program provides technical assistance to drainage districts to help maintain drainage ditches.	There is a need for additional state and local staff.	Flooding		◙
Engineering Support	DATCP engineers and engineering techs provide counties and landowners engineering design and project review.	DATCP engineers will design or help design conservation projects that protect water quality.	More engineering staff could better assist counties and landowners design and build structures and projects.	Flooding, Landslides, Sinkholes		◙

FUNDING DISCUSSION

Funding for Wisconsin's CREP comes from two sources. The U.S. Department of Agriculture is providing $200 million through 2012. The State of Wisconsin is providing another $28 million of state bond money. All the money is earmarked for actual implementation of practices. The program has enrolled about 44,000 acres at a state cost of just over $12 million. The participating county land conservation departments provide necessary technical assistance. Their reimbursement is not increased based on participation in this program.

The state segregated working lands fund (SEG) also supports nine DATCP field engineers. They provide engineering services and technical assistance to counties and landowners in designing and installing conservation projects.

Soil and Water Resources Management Program funding comes from SEG and state General Purpose Revenue (GPR) funds and from state bonding funds. The SEG and GPR funds provide staffing grants to counties help support local staff and associated costs. Soil and Water Resource Management bond funding provides counties with money to use as their cost-share for the implementation of conservation measures and management practices.

Department of Natural Resources (DNR)

DNR - Division of Water

Program, Policy, Regulation, Plan, or Practice	Description	Needs Addressed	Unmet Needs	Hazards Addressed	Support Local Mitigation	
					Financial Support	Facilitation
NR 115 – Shoreland Protection	This regulation requires minimum setbacks from water bodies for new structures and requires permits for grading in shoreland areas.	New impervious surface standards and shoreland buffer restoration requirements will promote sustainable shoreland development, reduce runoff, promote infiltration of rainfall and protect natural shoreland functions. This regulation prevents construction in dangerous near-shore areas, thereby mitigating possible flood damages. Grading restrictions prevent increased runoff and resulting flood damages.	Greater setbacks and more restrictive grading restrictions would reduce flood damages even more, but present political climate makes this unlikely.	Flooding, Sloughing	◙	
NR 116 – Floodplain Management	This regulation prohibits construction in floodways and requires elevation and dry-land access in flood fringe areas. It limits improvements to nonconforming structures and requires compensatory storage in flood storage areas.	This regulation prevents flood damages by controlling the placement and elevation of structures. It sets strict standards for the removal of lands from the floodplain and limits the granting of variances in floodplains. New floodplain maps more accurately delineate flood hazard areas and encourage achievable mitigation projects. RiskMAP products will incorporate mitigation data and provide support for mitigation planning efforts.	Prohibiting all development in floodplains would limit future flood damages, but such a change is unlikely.	Flooding	◙	
NR 117 – Shoreland-Wetland Protection Program	This regulation prohibits development in mapped wetland areas.	This regulation preserves wetland areas that retain and allow infiltration of flood water. It provides buffer areas for urbanizing watersheds.	Small, isolated wetlands and degraded wetlands can be developed in some cases, which can cause higher flood levels and increased damages.	Flooding	◙	

Program, Policy, Regulation, Plan, or Practice	Description	Needs Addressed	Unmet Needs	Hazards Addressed	Support Local Mitigation	
					Financial Support	Facilitation
Municipal Flood Control and Riparian Restoration Program	This program provides grants for the mitigation of flood-prone property, the restoration of riparian areas, and the construction of flood control projects.	This program enables communities to acquire, relocate, and floodproof flood-prone structures. It allows restoration of flood-carrying and storage capacity of watersheds. It also funds new detention basins and flood walls.	Limited funding which typically can meet less than 1/4 of requested project dollars. Does require a match, which some communities are unable to provide. Counties are not eligible. More acquisition projects have been funded recently due to the 2007-08 disaster declarations and higher appropriations.	Flooding	◙	
Dam Safety Section	This group of DNR employees inspects dams, reviews dam repair plans, reviews dam transfer documents, and approves dam operation and maintenance plans.	This section of the DNR provides technical assistance to dam owners and consultants on the safe operation and maintenance of privately-owned dams. This prevents flooding by ensuring that dams are in good operating condition.	Limited staff cannot perform inspections on a timely basis; more dams are built each year, increasing the workload; staff encounter problems with ownership and the availability of financial resources for repairing dams.	Flooding	◙	
NR 335 – Municipal Dam	This program provides grants to repair and remove dams.	Old, unsafe dams which are a threat to downstream residents can be removed or repaired under this program.	Limited funding addresses only a very limited part of the total need for dam repairs and removal.	Flooding	◙	
NR 333 – Large Dam Standards and Emergency Action Plan (EAP)	This program ensures that large, high-hazard dams have a comprehensive, current EAP.	This program ensures that dam owners have the staff and systems in place to give adequate notice to downstream property owners in the event of a dam failure.	There is limited staff to provide technical assistance to dam owners and consultants.	Flooding	◙	

Program, Policy, Regulation, Plan, or Practice	Description	Needs Addressed	Unmet Needs	Hazards Addressed	Support Local Mitigation	
					Financial Support	Facilitation
Executive Order 67: The State Must Follow State Wetland, Floodplain, Erosion, and Shoreland Standards	State agencies must comply with local zoning standards if feasible.	Compliance reduces the risks of flood damages and loss of flood storage areas. It also decreases erosion hazards.	None	Flooding	◙	
Executive Order 73: Flood Mitigation for State-Owned Facilities - 100 Year Floodplain Standard for State Buildings, and 500 Year Standard for Critical Facilities	State agencies must comply with local zoning standards if feasible.	Compliance reduces the risks of flood damages and loss of flood storage areas. It also reduces erosion hazards.	None	Flooding	◙	
Chapter 30	This regulation sets standards for placement of structures and material, diversion of water and other activities in navigable water of the state.	This regulation limits alterations to natural waterways in the state. It prevents flooding by strictly regulating in-water activities and preventing unauthorized diversions, discharges, and placement of structures.	Allows placement of rip-rap, piers, wharves, bulkheads, and other structures which could affect flood levels and velocities.	Flooding	◙	
Chapter 31 Regulation of Dams and Bridges (2011)	This provides a framework for the regulation of dams to protect life, health, and property and to protect the public's rights in the waterways of the state. The new inspection requirements were added to the statute in 2009 and are being implemented in the 2011 inspection season. The grant programs were funded in 2009 for the first time in 10 years and received additional funding in 2011.	This sets mandatory inspection frequency and requirements for large dams. It provides grant programs to repair, reconstruct, or remove municipally-owned dams and removal of any dam where the owner no longer wants to own and operate the dam.		Flooding	◙	◙

Program, Policy, Regulation, Plan, or Practice	Description	Needs Addressed	Unmet Needs	Hazards Addressed	Support Local Mitigation	
					Financial Support	Facilitation
Storm Water	This regulation requires erosion control and storm water management practice implementation on construction sites of one acre or greater.	Adequate infiltration standards are required for new construction. If met, this volume control will have lasting effects on the overall hydrology of a drainage area and can improve the efficiency and flood mitigation of downstream projects. Projects at a minimum control the2-year, 24-hour storm, but most storm water ponds will control the 10, 25, or even 100-year event using the same practices.	Infiltration is not feasible in all areas and limited resources do not allow the review and inspection of all projects.	Flooding	◙	◙
Nonpoint Targeted Runoff Management (TRM) Program	Governmental units can be reimbursed up to 70 percent of eligible costs associated with installing Best Management Practices (BMP) to limit or end nonpoint source (run-off) water pollution.	Examples of eligible projects include, stream bank protection projects, wetland construction, detention ponds, barnyard and feedlot protection practices, livestock waste management practices, and design as part of construction.	Grant awards cannot exceed $150,000. Grants are made for specific projects and have a 2-year implementation time frame.	Flooding	◙	

DNR - Division of Forestry

Program, Policy, Regulation, Plan, or Practice	Description	Needs Addressed	Unmet Needs	Hazards Addressed	Support Local Mitigation	
					Financial Support	Facilitation
Healthy Forest Initiative	Provides federal funds to thin forests around cities to mitigate damage from forest fire.	Reduces fire hazards near populated areas.		Fire	◙	
Forest Fire Protection Grant Program	Increases forest fire protection and suppression capabilities through cooperative efforts with local fire departments and county fire associations through a 50% cost share as per § 917, 1997 Wisconsin Act 27.	Personal protective clothing, forest fire training, forest fire prevention projects, forest fire suppression equipment, dry hydrants, communications equipment, mapping equipment, maps, GPS units and off-road vehicles primarily used for fighting forest fires.	Funding is low; more grants are requested than can be funded. Fire departments that do not have a DNR-approved forest fire suppression agreement are not eligible to apply.	Fire	◙	

Program, Policy, Regulation, Plan, or Practice	Description	Needs Addressed	Unmet Needs	Hazards Addressed	Support Local Mitigation	
					Financial Support	Facilitation
Single Engine Air Tanker Program	Provides aircraft that can drop 500 gallons of fire suppressing agent (foam, retardant, etc.) on initiating and wildland urban interface (WUI) fires.	Knocks down initiating fires to allow time for ground suppression equipment to create control lines around the fire. May also be used for structural protection tactics in the WUI.	After spring 2011, the aircraft will no longer be pre-positioned, but will be available on an as-needed basis.	Fire	◙	
Gypsy Moth Suppression Program	Spraying occurs in the springtime. Traps are set to track the spread of moths, locate the hot spots, and treat those areas. Quarantines are issued to control their spread.	Slows the progress of moths in the state, decreasing the rate of defoliation, and reducing the risk of fire from defoliated trees.	Not enough funding to stop the spread.	Fire	◙	
Fire Department Advisory Council (FDAC)	Member fire organizations include the Wisconsin State Firefighters Association and the State Fire Chiefs Association. Member fire departments represent broad geographical areas and different fire protection areas. The FDAC was formed as a partnership and forum for the discussion of issues that affect fire departments and the DNR on a statewide basis.	Wildland training programs, Forest Fire Protection Grants, and Federal Excess Property vehicle program.	Level of funding is low and more grants are requested than can be funded. Requested 2 FTE's but only .25 FTE assigned.	Fire	◙	◙
Le May Center Sales	Tools and training programs sold to fire departments at GSA costs.	Supports local fire departments with tools and training at government contract prices.		Fire	◙	◙
Wildland Urban Interface and Firewise Program	State programs encourage community members to work together to lower their collective wildfire risk.	Landowners are educated on how to make their properties safer from fire. Community leaders are encouraged to prepare Community Wildfire Protection Plans in communities at risk from wildfire. Homeowner associations in fire-prone areas are encouraged to become Firewise Communities. DNR staff and partners are encouraged to implement mitigation strategies to prepare for wildfire.	All initiatives related to the Wildland Urban Interface and Firewise Programs are funded through federal grants. National Fire Plan funds are declining over time and may not be available to sustain programs. Alternative funding is being sought. State funding is encouraged.	Fire		◙

Program, Policy, Regulation, Plan, or Practice	Description	Needs Addressed	Unmet Needs	Hazards Addressed	Support Local Mitigation	
					Financial Support	Facilitation
Urban Forestry Technical Assistance and Grants	The purpose of the grant is to fund projects that improve a community's capacity to manage its trees. The applicant may be a city, village, town, county, tribal government, or 501(c)(3) nonprofit organization. Joint applications are encouraged.	Strategic plans, management plans, and work plans including community tree inventories, vegetation ordinances, urban forestry, tree boards or tree action groups, urban forestry staff training, urban forestry public awareness programs and materials, urban forestry volunteer/neighborhood involvement programs, tree health care plans, hazard tree inventories, and contract specifications for urban tree planting, maintenance, and/or removal. Limited funds may be available for tree planting, maintenance, or removal.	Level of funding is low and more grants are requested than can be funded.	Fire , Hail, High Wind, Ice Storms	◙	◙
Wildland Urban Interface and Firewise Program	State programs encourage community members to work together to lower their collective wildfire risk.	Landowners are educated on how to make their properties safer from fire. Community leaders are encouraged to prepare Community Wildfire Protection Plans in communities at risk from wildfire. Homeowner associations in fire-prone areas are encouraged to become Firewise Communities. DNR staff and partners are encouraged to implement mitigation strategies to prepare for wildfire.	All initiatives related to the Wildland Urban Interface and Firewise Programs are funded through federal grants. National Fire Plan funds appear to be declining over time and may not be able to sustain programs in the future. Alternative funding is being sought. State funding of these programs is encouraged.	Fire		◙
Managed Forest Law	Provides financial incentive to owners of private forests to manage their woodlands sustainably.	Encourages landowners to plan and manage sustainable forests.		Fire, Hail, High Wind, Ice Storms		◙

Program, Policy, Regulation, Plan, or Practice	Description	Needs Addressed	Unmet Needs	Hazards Addressed	Support Local Mitigation	
					Financial Support	Facilitation
Burning Regulations and Permits	In most areas of the state a written permit is needed from the DNR, local fire warden or Township official prior to outdoor debris burning. Intensive Areas – Heavily forested areas where DNR has primary fire responsibility. Agreements in place with local fire departments for fire suppression assistance. Burning permits required anytime the ground is not snow covered. Extensive Areas – Less forested areas where DNR has lighter fire suppression presence. Agreement with local fire departments in place for fire suppression assistance. Burning permits required from January 1 to May 31 when the ground is not snow covered. Cooperative Areas – Local fire departments have primary fire suppression responsibility. DNR can be used as Mutual Aid. Town chair must expend more than $3,000 before DNR can take over responsibility of the forest fire. Burning permits are by town ordinance only.	The review of burning permits allows control of burns, prohibits burning in high fire risk times, and controls burning in low and moderate risk periods. Applicants are educated about burning. Burning permits are issued annually with the requirement that the holder check the burning restrictions for their county online or by phone the day of the burn.	Not all of areas in Wisconsin are required to procure a permit. DNR has requested 10 staff to help manage Cooperative Areas; however this request was not funded. The Wildland/Urban Interface is growing quickly and limited fire fighting resources are asked to protect more and more infrastructure for higher value homes.	Fire	◙	◙

FUNDING DISCUSSION

Urban Forestry Technical Assistance and Grants: This is a 50-50 cost share grant. Applicants must match grant funds with cash, in-kind services, and/or donations. Non-profit organizations may ask for a 50% advance on the grant at the time of award, but otherwise grants are provided on a reimbursement basis after the projects are completed. Grants range from $750 to $25,000. The minimum total project size is $1,500. There is no maximum project size; however reimbursement is limited to $25,000.

Managed Forest Law (MFL): MFL participants pay property taxes at a reduced rate. A portion of the forgone taxes is recouped by the state at the time of a timber harvest when a yield tax is imposed based on the volume of timber removed.

Department of Health Services (DHS)

Program, Policy, Regulation, Plan, or Practice	Description	Needs Addressed	Unmet Needs	Hazards Addressed	Support Local Mitigation	
					Financial Support	Facilitation
People with Access and Functional Needs	This is the provision of technical assistance and/ or personnel to assist people with access or functional needs.	Personnel with expertise in human service and/ or functional needs are available to assist if actual or potential problems are present, or have the potential of occurring, at the state or local level. Technical assistance can determine if an actual or potential human service and/or functional needs threat is present and if hazard mitigation is warranted or desirable. DHS, DCF, and WEM are currently redefining Emergency Support Function (ESF) 6 and DHS and WEM are redefining ESF 8. The two plans will be done by May 2012.	None at this time with the State's coordination role. However, any decreases in funding may negatively affect the ability to provide technical assistance at the local level.	All Hazards		◙
Chemical Contamination of Groundwater, Surface Water, Soil, and Air	DHS provides technical assistance and/ or personnel to assist with environmental health issues.	Personnel with expertise in environmental health issues are available to provide information specific to local concerns. Technical assistance can determine if an actual or potential public health threat is present and if hazard mitigation is warranted or desirable.	None at this time. However, any decreases in funding may negatively affect the ability of DHS / DPH / Environmental Health specialists to respond and assist local EH staff.	All Hazards		◙
Communicable or Infectious Disease	DHS provides technical information regarding communicable or infectious diseases.	Personnel with expertise in communicable/infectious diseases are available to provide information specific to state or local concerns. Technical assistance can determine if an actual or potential public health threat is present and if hazard mitigation is warranted or desirable.	None at this time. However, any decreases in funding may negatively affect the DHS / DPH communicable disease specialists who do surveillance, case investigation, and data/trends analysis.	Communicable or Infectious Diseases		◙
Radiological/ Nuclear	DHS provides technical information regarding radiological/ nuclear issues and/or concerns.	Personnel with expertise in radiological/nuclear health issues are available to provide information specific to local concerns. Technical assistance can determine if an actual or potential radiological/nuclear public health threat is present and if hazard mitigation is warranted or desirable.	None at this time. However, any decreases in funding may negatively affect the ability of DHS / DPH / radiological staff to respond to radiological events.	Radiological and Nuclear Hazards		◙
Emergency Preparedness	DHS is working to increase state infrastructure for planning and preparedness.	DHS / DPH is currently the recipient of federal grants to increase Wisconsin's public health, medical, and hospital capacity to respond to incidents of all hazards and other public health emergencies including disease outbreak.		All Hazards and Other Public Health Emergencies	◙	◙

FUNDING DISCUSSION

Funding is obtained from various sources: Federal Grants, General Purpose Revenue, and Program Revenue.

Department of Safety and Professional Services (DSPS)

DSPS - Division of Safety and Buildings (SB)

Program, Policy, Regulation, Plan, or Practice	Description	Needs Addressed	Unmet Needs	Hazards Addressed	Support Local Mitigation	
					Financial Support	Facilitation
State Building Code Development	The Safety and Buildings Division protects the health, safety and welfare of people in constructed environments in Wisconsin by developing the building code.	The Division develops, administers, and enforces state laws and rules relating to building construction safety and health.		All Natural and Some Man-Made Hazards	◙	◙
State Building Code Enforcement	The Safety and Buildings Division reviews plans for public buildings, places of employment, and multi-family dwellings for compliance with the state statutes and building codes. The Division administers inspection certifications and evaluates building materials for conformance with standards.	Division plan reviewers and field inspectors provide consultation and education for designers, builders, and local officials. The Division also certifies municipalities to perform certain plan review and inspection services.	Funding for program execution is low. Statewide program execution is at a minimum. Further program enhancement is restricted due to lack of funding	All Natural and Some Man-Made Hazards	◙	◙
The Wisconsin Commercial Building Code (Wisconsin Statutes section 101)	The Wisconsin Enrolled Commercial Building Code includes Chapters Comm. 61 through 66 and the adopted provisions of the International Code Council codes: *International Building Code*, *International Energy Conservation Code*, *International Mechanical Code*, *International Existing Building Code,* and *International Fuel Gas Code*.	The purpose of the Commercial Building Code is to protect the health, safety, and welfare of the public and employees by establishing minimum standards for the design, construction, maintenance, and inspection of public buildings, including multi-family dwellings and places of employment.	Ongoing code review and development is based on supportive funding.	All Natural and Some Man-Made Hazards	◙	◙
Certifications, Licenses, and Registrations for Tradespeople and Inspectors	The Safety and Buildings Division administers the certifications, licenses, and registrations of approximately 44,000 individuals in 64 categories.	The division provides for quality assurance measures with the development and administration of certifications.		All Natural and Some Man-Made Hazards		◙

Program, Policy, Regulation, Plan, or Practice	Description	Needs Addressed	Unmet Needs	Hazards Addressed	Support Local Mitigation	
					Financial Support	Facilitation
Home Safety Act	The Uniform Dwelling Code (UDC) is the statewide building code for one-and two-family dwellings built since June 1, 1980. Wisconsin law requires that the UDC be enforced in all municipalities. This includes having new construction inspected for compliance.	This ensures that one- and two-family homes meet uniform safety standards. Inspection agencies perform inspection services on behalf of the state where municipalities choose not to perform the services.	Providing for adequate inspection and consultation is limited due to lack of funding.	All Natural and Some Man-Made Hazards	◙	◙
Building Code Training	This annual training consists of continuing education classes on codes used in building design, construction, or inspection.	This provides an opportunity for the public to learn about specific codes and construction topics.		All Natural and Some Man-Made Hazards		◙
Manufactured Housing Regulation	The Safety and Buildings Division regulates various aspects of manufactured housing. Division staff license manufacturers and review and approve plans for new manufactured home parks and additions. Staff also provides consultation, education, inspection, and complaint investigation services. The Division cooperates with agents to administer park licensing rules.	The Division works to provide safe living conditions and structures for manufactured housing consumers. Education and inspection are vital to the safety assurance program.		All Natural Hazards	◙	◙
Delegated Municipalities (Wisconsin Statutes section 101.12)	The Safety and Buildings Division may certify cities, villages, towns, and counties as delegated municipalities, which gives them the authority to review building plans and perform building inspections. The municipality or county must comply with specific administrative rules to ensure uniform application of the building code.	The Division provides opportunities for partnering with other governmental agencies to extend the effectiveness of Division programs and funds administration.		All Natural and Some Man-Made Hazards	◙	◙
Statewide Electrical Inspection (2011)	2007 Act 60 mandates statewide inspection of all electrical wiring. The Safety and Buildings Division works with municipalities that choose to assume authority for electrical inspection. The Division is responsible for providing this service to municipalities that elect not to assume this authority.	This ensures safe and proper electrical wiring throughout the state. This will decrease fire risk and increase building safety in other disaster events.	The Division must identify and review municipal ordinances and work with municipalities who choose to assume authority for this service. The Division has yet to contract out this service for all other areas within the state.	All Natural and Some Man-Made Hazards	◙	◙

Office of the Commissioner of Insurance (OCI)

Program, Policy, Regulation, Plan, or Practice	Description	Needs Addressed	Unmet Needs	Hazards Addressed	Support Local Mitigation	
					Financial Support	Facilitation
Regulation of the Insurance Carriers and Agents	Regulation ensures policyholders, claimants and insurers are treated fairly and equitably; and encourages full cooperation of the office with other regulatory bodies. The OCI provides experts in the field of insurance and strives for loss prevention.	Regulation protects insured individuals and businesses, and requires insurance carriers and agents to comply with the policies customers purchase.	Regulatory priorities and budget restraints affect what can be delivered.	All; where significant insurance exclusions or limitations exist (such as flooding and earth-movement losses), OCI can facilitate communication about alternatives and policy language.	◙	◙
Public Information on Insurance Issues	OCI provides insurance information for consumers to enable them to better manage their risks. Information is available from brochures, the OCI website, and OCI staff members.	This provides the public with resources for understanding insurance policies and regulations.	Regulatory priorities and budget restraints affect what can be delivered.	All; where significant insurance exclusions or limitations exist (such as flooding and earth-movement losses), OCI can facilitate communication about alternatives and policy language.	◙	◙
Pre-Licensing Education and Continuing Education for Insurance Agents	OCI provides instruction on insurance exclusions and coverage including flood insurance. The FEMA course on writing flood insurance satisfies a continuing education requirement for insurance agents.	This keeps insurance agents well-educated so they can provide the best and most fair service to customers.	Regulatory priorities and budget restraints affect what can be delivered.	All; where significant insurance exclusions or limitations exist (such as flooding and earth-movement losses), OCI can facilitate communication about alternatives and policy language.	◙	◙

Public Service Commission (PSC)

Program, Policy, Regulation, Plan, or Practice	Description	Needs Addressed	Unmet Needs	Hazards Addressed	Support Local Mitigation	
					Financial Support	Facilitation
Participation in WHMT	The PSC participates in the development and implementation of the State Hazard Mitigation Plan.	This comprises a collaborative effort for planning and preparedness by state and local governmental agencies.	N/A	All Hazards		◙

Program, Policy, Regulation, Plan, or Practice	Description	Needs Addressed	Unmet Needs	Hazards Addressed	Support Local Mitigation	
					Financial Support	Facilitation
Electric Utility Regulation	This provides for the regulation of construction, service, and operations of electric utilities and the administration of Wisconsin State Electric Code, Volume 1, and safe and adequate service and operations by Wisconsin electric utilities through Wis. Stat. Chapter 196 and Wis. Adm. Code Chapters PSC 111, 112, 113, and 114.	This provides regulatory oversight to the construction and operation of electric utility facilities, and the provision of safe and adequate electric services.	N/A	All Hazards		◙
Natural Gas Utility Regulation	This provides for the regulation of construction, service, and operations of natural gas utilities and the administration of the federal pipeline safety program through Wis. Stat. Chapter 196 and Wis. Adm. Code Chapters PSC 133, 134, and 135.	This provides regulatory oversight to the construction and operation of natural gas utility facilities, and the provision of safe and adequate natural gas services.	N/A	All Hazards		◙
Telecommunications Utility Regulation	This provides for the regulation of service and operations of telecommunications utilities and safe and adequate service and operations by telecommunications utilities through Wis. Stat. Chapter 196, Wisconsin Administrative Code Chapters PSC 165 and 114.	This provides regulatory oversight to telecommunications infrastructure, the operation of telecommunications facilities, and the provision of safe and adequate telecommunications services.	N/A	All Hazards		◙
Water Utility Regulation	This provides for safe and adequate service and operations by Wisconsin water utilities and the regulation of construction, service and operations of water utilities through Wis. Stat. Chapter 196 and Wis. Adm. Code Chapters PSC 184 and 185.	This provides regulatory oversight to the construction and operation of water utility facilities, and the provision of safe and adequate water services.	N/A	All Hazards		◙

Department of Transportation

Program, Policy, Regulation, Plan, or Practice	Description	Needs Addressed	Unmet Needs	Hazards Addressed	Support Local Mitigation	
					Financial Support	Facilitation
§ 86.34 Flood Damage Aids Program	Covers restoration of flood damages to any roadway or roadway structure that is not in the Official State Trunk Highway System. Also allows improvements to be made during repairs that will help mitigate the future occurrence of similar damages.	(1) For claims > $15,000, applicant receives 75% of replacement costs plus 50% of improvement costs. (2) For claims ≤ $15,000, applicant receives payment equal to 75% of WisDOT's estimate for all repairs (replacement and improvement), which may include final costs if available. (3) For claims ≤ $15,000 when applicant disagrees with WisDOT's estimate, applicant submits final costs payable as noted in (1). (4) If federal aid is granted for damage reimbursement, it shall be in lieu of aid otherwise available under FDA.	Funding is only available after an event occurs. Local match is required.	Flooding	◙	
Statewide Traffic Operations Center (STOC), Bureau of Traffic Operations	Provides motorists with real-time information on traffic congestion and lane/ highway closures. Information for ongoing highway incidents is posted on WisDOT website.	Prevents user delay of interstate/ freeway system and other state highways. STOC operates on a 24/7/365 basis. Coordinates with DOT highway representatives (WisHELP) when EOC is activated.	Lack of funding prevents addressing all DOT needs.	Natural Hazards and Man-Made Events		◙
Winter Maintenance Program	Removal of snow and ice from state trunk highways.	Prevention of property damage and injuries/ death using planted vegetation as a living snow-fence along highways, and an anti-icing process to reduce ice on highways.	Lack of funding prevents addressing all DOT needs.	Snow, Sleet, Human Error While Driving	◙	
Highway Improvement Program	Hazard mitigation.	With highway or bridge improvement projects, DOT strives to eliminate, shield, or reduce potential damages from hazards.	Lack of funding prevents addressing all DOT needs.	Rain, Flooding, Human Error While Driving	◙	

Program, Policy, Regulation, Plan, or Practice	Description	Needs Addressed	Unmet Needs	Hazards Addressed	Support Local Mitigation	
					Financial Support	Facilitation
Trans 213, Wisconsin Administrative Code § 84.18 – Local Bridge Improvement Assistance Program	Helps rehabilitate and replace, on a cost-share basis, the most seriously deficient existing bridges in local highway systems.	Counties, cities, villages, and towns are eligible for rehabilitation funding for bridges with sufficiency ratings < 80, and replacement funding on bridges with sufficiency ratings < 50.	Lack of funding prevents addressing all local needs.	Flooding, Structural Decay	◙	
Trans 213, Wisconsin Administrative Code § 85.026 – Transportation Enhancement Program	Funds projects that enhance communities and the environment.	Up to 80% of project costs paid with federal funds; provides for a wide variety of highway projects that can also mitigate flooding such as landscaping or mitigation of water pollution due to highway runoff.	Lack of funding prevents addressing all local needs.	Flooding	◙	
Transportation Security	Critical Infrastructure Vulnerability Assessment	Prevention of damage on critical state trunk highways and bridges through security enhancements.	Lack of funding may prevent DOT from implementing the results of the study.	Terrorism, Other ManMade Incidents		◙
Transportation Security	General Aviation Airport Vulnerability Assessment	Prevention of damage to Wisconsin's 135 general aviation airports through security enhancements.	Lack of funding may prevent DOT from implementing the results of the study.	Terrorism, Other ManMade Incidents		◙
Transportation Security	Rail Infrastructure Vulnerability Assessment	Prevention of damage to state-owned rail corridors through security enhancements.	Lack of funding may prevent DOT from implementing the results of the study.	Terrorism, Other ManMade Incidents		◙
Transportation Security	Maritime Infrastructure Vulnerability Assessment	Prevention of damage to Wisconsin's major waterways, ports, and harbors through security enhancements.	Lack of funding may prevent DOT and USCG from implementing the results of the study.	Terrorism, Other ManMade Incidents		◙
Transportation Security	Blast Design Training for Bridges/Structures	Training of bridge design engineers to mitigate the effects of explosions.	Lack of funding may prevent DOT from implementing the results of the study.	Terrorism, Other ManMade Incidents		◙

Program, Policy, Regulation, Plan, or Practice	Description	Needs Addressed	Unmet Needs	Hazards Addressed	Support Local Mitigation	
					Financial Support	Facilitation
Transportation Security shared by DOT, DOA, DHFS, DNR, WEM	The WISCOM secure communications system for first responders will be self-maintained and independent from the private sector.	Provides secure communication among specific Wisconsin agencies, and between those agencies and other local, state, and federal agencies. This would provide for interoperable communications during incident management, as well as day-to-day use by participating agencies.	WISCOM system is currently being implemented. System will be fully operational prior to January 1, 2013.	Terrorism, Other ManMade Incidents		◙

FUNDING DISCUSSION

Flood Damage Aids Program: On claims over $15,000, applicant may receive 75% of replacement costs plus 50% of improvement costs. On claims of less than $15,000, the applicant has the option of accepting payment equal to 75% of the total amount of WisDOT's estimate OR submitting final costs and receiving payment as described above for claims larger than $15,000.

UW Cooperative Extension

Program, Policy, Regulation, Plan, or Practice	Description	Needs Addressed	Unmet Needs	Hazards Addressed	Support Local Mitigation	
					Financial Support	Facilitation
UW-Cooperative Extension	Provides community education and public information programs promoting hazard awareness and mitigation concepts.	Offices in each county are linked to university and agency resources.	Local educational priorities and budgets affect the ability to deliver programs.	All Hazards		◙

Department of Military Affairs (DMA)

DMA - Division of Emergency Management (WEM)

Program, Policy, Regulation, Plan, or Practice	Description	Needs Addressed	Unmet Needs	Hazards Addressed	Support Local Mitigation	
					Financial Support	Facilitation
State Disaster Fund ss.166.03 (**2**) (b) 9., Wis. Stats	This fund provides for reimbursement to local units of government of eligible costs arising from a major catastrophe that are a direct result of response or recovery operations for the declared major catastrophe during the incident period if federal disaster assistance is not available.	Funding is for three types of eligible costs (debris clearance, protective measures, and roads and bridges). The state share of the damages and eligible costs incurred by local governmental units shall not be greater than 70% of the eligible disaster costs. The local share of damages and eligible costs incurred by local governmental units may not be less than 30%.	Costs which the WEM administrator determines are not of such severity and magnitude that they are beyond the capabilities of the affected local governmental unit are not eligible.	All Natural Hazards	◙	
Hazard Mitigation Grant Program (HMGP), 44 CFR, Section 206, Subpart N	This program provides post-disaster mitigation grants to state, local, and tribal governments, and private non-profits. This is the primary source of funding at the state level to implement cost effective mitigation projects. The cost share is 75% federal, 12.5% state, 12.5% local.	Funding can be substantial for major disasters. Timing of funds after a disaster encourages some applicants to solve long-standing problems. State provides half (12.5%) of the 25% local match that is required.	Funding is only available after a disaster declaration. With the present economic situation, local governments are having difficulty funding the required local match. Many more applications are received than funds available. Demonstrating the cost-effectiveness of projects is difficult. Communities must have approved all-hazards mitigation plans.	All Natural Hazards	◙	◙

Program, Policy, Regulation, Plan, or Practice	Description	Needs Addressed	Unmet Needs	Hazards Addressed	Support Local Mitigation	
					Financial Support	Facilitation
Flood Mitigation Assistance (FMA) Program, 44 CFR, Part 79	This program provides mitigation grants to state, local, and tribal governments to mitigate NFIP-insured structures. Planning grants are available for the development of comprehensive flood mitigation plans. Project grants are available for communities with an approved flood mitigation plan to implement mitigation measures identified in the plan. Grants are available for the State to administer the program and provide technical assistance to local governments. The cost share is 75% federal, 25% local.	This program provides an annual source of funds for flood mitigation. ($10,000 minimum for planning and $100,000 for project funds. The State may request up to 10% for management.) The formula is based on the number of NFIP repetitive loss properties and flood insurance policies in the state. Additional funds above the state allocation can be requested as part of a national competition.	Guidance is very restrictive that funds must be used to mitigate NFIP-insured properties. With the present economic situation, local governments are having difficulty funding the required local match. Communities must have an approved flood mitigation plan prior to receiving project grant funds. Demonstrating the cost-effectiveness of projects is difficult. Planning grant funds can only be used towards flood mitigation plans and not all-hazards plans.	Flooding	◙	◙
Pre-Disaster Mitigation (PDM) Program, Section 203 of the Stafford Act, 42 USAC 5133	This program provides mitigation grants to state, local, and tribal governments for comprehensive all-hazards mitigation planning and to implement cost effective mitigation projects.	This program involves an annual national competition. Funds can be used pre or post-disaster. Comprehensive hazard mitigation plans will ensure a well thought out process for identifying viable and cost-effective mitigation measures. In addition, planning will shorten the recovery phase after a disaster. The State and subgrantees may also request management costs.	Applicants must have an approved all-hazards mitigation plan with identified mitigation measures in order to be eligible for project grant funds. Funds are available through a national competition. Demonstrating the cost-effectiveness of projects is difficult. Funding is unpredictable. With the present economic situation, local governments are having difficulty funding the required local match.	All Natural Hazards	◙	◙

Program, Policy, Regulation, Plan, or Practice	Description	Needs Addressed	Unmet Needs	Hazards Addressed	Support Local Mitigation	
					Financial Support	Facilitation
Repetitive Flood Claims (RFC) Program, Section 1323 of the NFIA of 1968,USC §4030, as amended PL 108-264	This program provides mitigation grants to state, local, and tribal governments to mitigate NFIP-insured structures with at least one paid claim. 100% funding is only available for states or communities that cannot meet the requirements of the FMA program for either cost share or management capability.	This program involves an annual national competition. Funds can be used pre or post-disaster. The program mitigates flood prone properties. A mitigation plan is not required. The State and subgrantees may also request management costs.	Funds are available annually through a national competition. Demonstrating the cost-effectiveness of projects is difficult. The program can only be used for NFIP-insured structures with at least one paid claim.	Flooding	◙	
Severe Repetitive Loss (SRL) Program, Section 1361A of the NFIA, 42 USC 4102a, as amended by PL 108-264	This program provides grants to state, local, and tribal governments to mitigate NFIP-insured structures that meet FEMA's definition of a severe repetitive loss property. The cost share is 75% federal, 25% local.	This program involves an annual national competition. It addresses those properties in the state that meet the SRL definition. Management costs are also available for the State and subgrantees to administer the grants.	Funds are available through a national competition. Demonstrating the cost-effectiveness of projects is difficult. This program can only be used for those properties that meet FEMA's SRL criteria. There are only SRL properties in the State. A FEMA approved mitigation plan is required. With the present economic situation, local governments are having difficulty funding the required local match. Difficult program to administer.	Flooding	◙	

Program, Policy, Regulation, Plan, or Practice	Description	Needs Addressed	Unmet Needs	Hazards Addressed	Support Local Mitigation	
					Financial Support	Facilitation
Public Assistance (PA) Program, 44 CFR, Section 206, Subpart H	This program provides post-disaster grants to state, local, and tribal governments and private non-profits for disaster-related costs. Cost effective hazard mitigation measures may be included as eligible costs in the restoration of facilities. The cost share is 75% federal, 12.5% state, 12.5% local.	Timing of funds after a disaster encourages mitigation during the recovery phase in repairing public facilities. In many instances, mitigation is included on a site that has been repetitively damaged and received disaster assistance previously. Therefore, reducing or eliminating future costs.	Funding only available after a disaster declaration, and for a damaged facility. Demonstrating cost-effectiveness is difficult. Additional training is needed for local officials and inspectors on identifying eligible types of hazard mitigation measures. The mitigation measure has to be identified prior to repair in order to be eligible and considered for funding.	All Natural Hazards	◙	◙
Hazard Mitigation Planning, 44 CFR, Part 201 (201.4-7)	WEM develops the Wisconsin Hazard Mitigation Plan and coordinates with other federal and state agencies and organizations through the Wisconsin Hazard Mitigation Team. WEM provides technical planning assistance to local and tribal governments through development and distribution of guidance, training, and plan reviews.	Mitigation planning curriculum and guidance have been developed. A mail and e-mail list have been established for the continued distribution of information regarding mitigation planning. All local plans are reviewed and required and recommended revisions are identified..	A consistent funding source to ensure that mitigation planning continues is lacking. 68 of 72 counties are participating in the planning process. Without an approved all-hazards mitigation plan, counties and jurisdictions within are not be eligible for funding to implement mitigation measures. At this point, the State of Wisconsin plan will address natural hazards.	All Natural Hazards. Some local plans are including technological hazards.		◙
Technical Assistance	WEM provides technical assistance to local governments in project development and implementation.	WEM has developed expertise in performing benefit-cost analyses and environmental reviews for mitigation projects. WEM has also developed acquisition and floodproofing handbooks to assist applicants in administering such programs. WEM conducts onsite visits to assist communities in developing mitigation alternatives.	Local governments must contract out for engineering expertise for structural projects. There is a lack of knowledge and expertise in mitigating technological hazards.	All Natural Hazards		◙

Program, Policy, Regulation, Plan, or Practice	Description	Needs Addressed	Unmet Needs	Hazards Addressed	Support Local Mitigation	
					Financial Support	Facilitation
Agency Initiatives	Interagency cooperation among federal, state, local, tribal, and non-profit agencies to further the State's Hazard Mitigation Goals.	This provides for agency cooperation. Examples: Association of State Floodplain Managers; Wisconsin Association for Floodplain, Stormwater and Coastal Managers; Wisconsin Hazard Mitigation Team; Coastal Hazards Work Group; State Agency Resource Workgroup of the Wisconsin Land Council; Wisconsin Recovery Task Force. Members of these groups include federal and state agencies, universities, and representatives from WAFSCM, WEMA, and the Association of Regional Planning Commissions.	The need to continue to work with other agencies and organizations.	All Natural Hazards		◙

Program, Policy, Regulation, Plan, or Practice	Description	Needs Addressed	Unmet Needs	Hazards Addressed	Support Local Mitigation	
					Financial Support	Facilitation
Public Information and Education Initiatives	WEM promotes hazard awareness with an annual Spring Flood Report, Tornado and Severe Weather Awareness Week, Fire Prevention Awareness Week, and Winter Weather Awareness Week. In addition, there is NOAA Weather Radio Day and Heat Awareness Day. WEM publishes a newsletter every two months. Information on current hazard mitigation activities is included. Hazard information is included on the WEM website along with a blog and links to other information sources and emergency management information. The WEM Public Information Officer distributes press releases and coordinates relations with the media. Mitigation articles are provided for other publications such as Floodplain-Shoreland Management Notes (WNDR), and Water Matters (WASFSM). WEM uses a Hazard Mitigation Display Board at meetings, conferences, and training sessions to promote mitigation statewide. Mitigation Success Stories are published and included on the agency website. Information on Hazard mitigation is provided at agency training sessions such as the Disaster Response and Recovery Course, Hazard Mitigation Planning, Damage Assessment Workshops, Local Officials Disaster Briefings as well as at local, state, and/or national conferences and workshops upon request.	Hazard mitigation information is provided on a timely basis to local emergency management, local officials, schools, and others. The WEM website provides good information to a wide variety of officials and the general public.	There is limited outreach to organizations outside of the emergency management arena such as private organizations, associations, and businesses that cold make an impact on mitigation and land use decisions within the state. Web access is not yet universal.	All natural hazards		◙

FUNDING DISCUSSION

State Disaster Fund: The State of Wisconsin will reimburse (up to 70%) local governmental units for damages and costs incurred as the result of a major catastrophe if federal disaster assistance is not available. When applicable, eligible reimbursement includes damages and costs for debris clearance, protective measures and roads and bridges with the local governmental unit's share of the costs being not less than 30%.

Hazard Mitigation Grant Program (HMGP): The State of Wisconsin currently provides half of the required 25% local match for the HMGP. When possible, other funding sources are used to supplement the remaining 12.5% local match. Local match sources that have been utilized in the past include the Wisconsin Department of Natural Resources' Stewardship programs and Municipal Flood Control program, and Community Development Block Grants through the Department of Commerce. HMGP funding is dependent on the State receiving a federal disaster declaration and federal disaster assistance thereafter. Historically the State has received more requests for funding after a major disaster than the funds that have been available.

Flood Mitigation Assistance (FMA): Local governments find it difficult to provide the required 25% local match. When possible, other funding sources are used to supplement the remaining local match. Local match sources that have been utilized in the past include the Wisconsin Department of Natural Resources' Stewardship programs and Municipal Flood Control program, and Community Development Block Grants through the Department of Commerce. Communities must have a FEMA-approved flood mitigation plan in order to receive mitigation project funds.

Pre-Disaster Mitigation (PDM): Local governments find it difficult to provide the required 25% local match. When possible, other funding sources can and will be used to supplement the remaining local match. Communities must have an approved all-hazards mitigation plan in order to be eligible for project grant funds. All grant funds are awarded through a national competition. Fund availability from year to year is unpredictable. The State receives management costs based on the approved grants. Staff spends a tremendous amount of time soliciting applications and providing technical assistance to potential subgrantees without any guarantee of receiving State Management Costs.

Repetitive Flood Claims (RFC): This program is 100% funded without the requirement for a mitigation plan. However, it can only be used for properties that are NFIP-insured and have had at least one paid claim. In addition, the community has to certify that they cannot meet the local match or program management requirements of the other programs. RFC has great potential if the State can identify the eligible properties.

Severe Repetitive Loss (SRL): Local governments may find it difficult to provide the required 25% local match. When possible, other funding sources can and will be used to supplement the remaining local match. Communities must have an approved all-hazards mitigation plan in order to be eligible for project grant funds. The program can only be used for flood mitigation of NFIP-insured properties that meet FEMA's criteria for SRL properties. There are very few such properties identified in the State. Two are located in Washington County, a community with no intent of developing a mitigation plan..

Public Assistance (PA): The State of Wisconsin currently provides half of the required 25% local match for the PA program. Mitigation funding through this program could be substantial. However, the program is underutilized for several reasons. The more mitigation measures included in the PA program, the more funds will be made available for not only PA, but also for the HMGP. (HMGP is calculated as 15% [20% with an approved enhanced state mitigation plan] of eligible FEMA Public and Individual Assistance programs.)

Presently there is no designated state program or funding source for all-hazards mitigation for planning or project implementation. The State does provide half or up to 12.5% of the local match required for the HMGP and the PA program. If the state were to lose federal funds, the State's hazard mitigation program would certainly suffer.

Wisconsin Historical Society

Program, Policy, Regulation, Plan, or Practice	Description	Needs Addressed	Unmet Needs	Hazards Addressed	Support Local Mitigation	
					Financial Support	Facilitation
Historical Preservation Assistance	The National Historic Preservation Act contains Section 106 implementing regulation 36CFR800 NEPA (National Environmental Policy Act) which requires agencies to consider the effects of their projects on all aspects of the environment, including the cultural environment.	Prior to approving an undertaking a federal agency head must take into account the effects on historic properties and give the ACHP a reasonable opportunity to comment. Digitized data sets in the Wisconsin Architecture and History Resources Database provide the foundation for performing the review and consultation process. It contains sets for historic structures, archeological sites, burial sites, modern cemeteries and pre-settlement sites.	There is information only for sites reported to the WHS. Not all data is verified.	All Hazards		◙

Milwaukee Metropolitan Sewerage District (MMSD)

Program, Policy, Regulation, Plan, or Practice	Description	Needs Addressed	Unmet Needs	Hazards Addressed	Support Local Mitigation	
					Financial Support	Facilitation
Water-course Policy	Provide recommendations and criteria for a strong regional funding role and system plans for assigning the construction and maintenance of major structural and non-structural measures for mitigating or eliminating existing flooding issues as defined by MMSD Watercourse Policy.	Out of bank flooding, regional funding role, determination of MMSD responsibility.		Flooding		◙
Water-course Management Plans	Floodwater management plans for individual watersheds for rivers under MMSD jurisdiction: Menomonee, Milwaukee, Kinnickinnic, Root, and Oak Creek. Also developed plans for the following tributaries of the Milwaukee River: South Branch Creek, Indian Creek and Lincoln Creek. Stakeholder groups from each watershed were formed to provide input and review the plans. Stakeholder groups were comprised of municipalities within the watershed, environmental and citizen groups, WDNR, and regional agencies.	Current and future out of bank flooding. The management plans produce individual projects for each flood problem area. The projects will contain both design and construction. Projects may include acquisition of flooded or flood-threatened structures, construction of flood management structures.		Flooding		◙

Program, Policy, Regulation, Plan, or Practice	Description	Needs Addressed	Unmet Needs	Hazards Addressed	Support Local Mitigation	
					Financial Support	Facilitation
Chapter 13 Storm water Rule	Provide a regionally-based minimum standard for storm water control for all new development within the MMSD service area.	Future flooding problems and local drainage.		Flooding, Stormwater		◙
Green-seams Program	This program identifies riparian properties in private hands (public lands may be considered under special circumstances) that would link existing public open space or provide other public benefit in the form of wetland protection, future flood protection, or erosion management.	Future flooding, stream channel protection.		Flooding		◙
Conservation Plan	This program identifies existing open space in private hands that meets criteria for providing natural flood storage. Lands that are identified as having hydric soils, wetlands, or old wetlands are considered. The purchase of these properties provides public benefit in the form of wetland protection, water quality, future flood protection, and erosion management.	Future flooding, stream channel protection.		Flooding	◙	◙
Floodplain Re-Mapping Effort	MMSD has contracted with SEWRPC to build off the existing HEC-RAS and HSPF Hydraulic and Hydrologic models used for the MMSD Watercourse Management Plans and update the existing regulatory FIS rate maps.	Future floodplain mapping and planning		Flooding		◙

Wisconsin Association for Floodplain, Stormwater, and Coastal Management (WAFSCM)

Program, Policy, Regulation, Plan, or Practice	Description	Needs Addressed	Unmet Needs	Hazards Addressed	Support Local Mitigation	
					Financial Support	Facilitation
Annual Conference	An annual conference is held to inform a broad range of professionals and public officials on issues relating to reducing flood damages including managing floodplain resources, coastal issues, and stormwater. Concurrent sessions, workshops, plenary sessions, and events to foster networking are held.	Flooding, storm water, coastal issues.		Flooding, Stormwater, Coastal Issues		◙

Program, Policy, Regulation, Plan, or Practice	Description	Needs Addressed	Unmet Needs	Hazards Addressed	Support Local Mitigation	
					Financial Support	Facilitation
Chapter Activities	The state chapter works with the national organization and independently to educate local, state, and federal officials on flooding, stormwater, and coastal issues through office visits and written information.	Flooding, storm water, coastal issues.		Flooding, Stormwater, Coastal Issues		◙
Newsletter	WAFSCM sends out up to three newsletters per year to inform membership on issues relating to reducing flood damages including managing floodplain resources, coastal issues, and stormwater.	Flooding, storm water, coastal issues.	Difficult to gather articles. Done voluntarily by several agencies.	Flooding, Stormwater, Coastal Issues		◙
Scholarships	WAFSCM provides scholarships for members to attend the national Association of State Floodplain Managers annual conference, as well as the WAFSCM annual conference.	Provides individuals opportunity to attend conferences they otherwise might not be able to. This serves to further education as well as network with peers.		Flooding, Stormwater, Coastal Issues		◙
Awards	WAFSCM presents awards in several categories at annual conference to recognize individuals for their efforts: the Chapter Service Award, Local Award for Excellence, and Excellence in Project Design or Implementation.	Provides recognition to those that go above and beyond.		Flooding, Stormwater, Coastal Issues		◙
Stormwater Model	Watershed model with a stream and associated floodplain and upland areas. Different land uses can be applied to the model. It has the ability to simulate levees along floodplains to demonstrate the impacts on the floodplain and downstream. The model is available for member use.	Public education and outreach.		Flooding, Stormwater		◙

Regional Planning Commissions

Program, Policy, Regulation, Plan, or Practice	Description	Needs Addressed	Unmet Needs	Hazards Addressed	Support Local Mitigation	
					Financial Support	Facilitation
Planning Services	RPCs offer services for preparing comprehensive plans and special purpose plans including all-hazards and flood mitigation plans.	These planning services play a major role in determining the location of future development and the direction of hazard mitigation actions.	State funding never meets the demand for planning services.	All Hazards	◙	◙
Administration and Implementation Services	RPC offer services for writing zoning, subdivision, and other land use ordinances; for implementing projects through administering grants; for sharing costs in county administrative services and building and zoning code enforcement.	These administrative and implementation services address many community development needs including in some instances hazard mitigation.	More specific concepts should be developed to include hazard mitigation components in policies, programs, and projects.	All Hazards	◙	◙
Technical Services	RPCs provide the following services: GIS mapping; zoning and subdivision ordinance preparation; environmental assessments and impact reviews; grant writing for park and recreation projects, business park development, housing development, hazard mitigation projects and Brownfield projects; administration of business and housing rehabilitation revolving loan funds; business incubator services; civil and traffic engineering; administration of Wisconsin's Technology Zone Income Tax Credit Program to encourage growth of high technology businesses in the state; administration of the U.S. Department of Commerce- Economic Development Administration's Economic Development District Program; forest resource, and air and water quality management services.	These technical services implement local government plans and address key community development needs that in many instances also mitigate losses from hazards.	Limited budgets and funding levels do not allow Wisconsin's RPCs to meet the demand for the technical services requested of them. Hazard mitigation activities should be regularly considered when these services are provided.	All Hazards	◙	◙

Program, Policy, Regulation, Plan, or Practice	Description	Needs Addressed	Unmet Needs	Hazards Addressed	Support Local Mitigation	
					Financial Support	Facilitation
Integration of Comprehensive Planning and Hazard Mitigation Planning	The integration of comprehensive planning and hazard mitigation planning is increasing throughout the state. The plans build on each other to direct new development to areas at low risk of disaster. WEM and the RPC's partnered in developing a resource guide that identified how comprehensive and hazard mitigation plans could be integrated.	Much comprehensive planning data collection, analysis, projections, mapping, programs, policies, and projects complements hazard mitigation planning. Storm water, floodplain management, and sewer service area planning are addressed in comprehensive and other plans and complement flood hazard mitigation planning.	A more formal policy for integrating and coordinating comprehensive planning and all-hazards mitigation planning should be considered.	All Hazards	◙	◙

TABLE 4.2-2 POTENTIAL FUNDING AND TECHNICAL SUPPORT RESOURCES

Federal Agencies

Organization	Site Summary	Contact Information
Federal Emergency Management Agency (FEMA) (http://www.fema.gov/)		
FEMA	General information on hazards, disaster assistance programs, current disasters, etc.	http://www.fema.gov/
FEMA National Floodplain Insurance Program	Detailed information on the National Flood Insurance Program and other mitigation activities.	http://www.fema.gov/business/nfip/
FEMA US Fire Administration	Information about reducing loss of life and economic loss due to fire and related emergencies, through leadership, advocacy, and coordination.	http://www.usfa.fema.gov/
US Department of Agriculture (USDA) (http://www.usda.gov)		
Natural Resources Conservation Service	Provides leadership in a partnership effort to help conserve, improve, and sustain our natural resources and environment.	http://www.nrcs.usda.gov/
Farm Service Agency (FSA)	Emergency Conservation Program shares the cost of rehabilitating eligible farmlands.	http://www.fsa.usda.gov/
Rural Development	Enhancing the ability of rural communities to develop, to grow and to improve their quality of life by targeting financial and technical resources in areas of greatest need through activities of greatest potential. Local offices deliver programs and offer assessments of emergencies and program help available.	http://www.rurdev.usda.gov/wi/
Rural Development Human Resources	USDA Rural Development in Wisconsin offers personnel to help staff a command site in case of natural or man-made disasters in Wisconsin. Cooperating with FSA, Rural Development Managers assess damage at the site of the disaster for the USDA Flash Report to the USDA National Office. Assessment of housing needs for displaced rural residents – temporary placement in Rural Development Multi Family Housing Projects near disaster struck area. Administrative staff is also available to assist in the areas of procurement, contracting, and IT.	Lori.Wells@wi.usda.gov
Rural Development Rural Business-Cooperative Services	Business and Community Programs offer a variety of assistance to rural business and communities. The programs revolve around financial partnerships with local economic organizations such as banks, lenders, economic development groups, cities, counties, tribes, and utility cooperatives.	http://www.rurdev.usda.gov/wi/programs/rbs/index.htm

Organization	Site Summary	Contact Information
USDA (continued)		
Rural Development Rural Housing Service (RHS)	The Rural Housing Service delivers a variety of assistance to support the housing needs of rural people. Most involve direct assistance by the USDA, while others work through local partnerships. Programs offer assistance with purchasing or repairing Single Family homes, loans for Multi-Family Housing, Farm Labor Housing Loans and Grants, and Self-Help Technical Assistance Grants.	http://www.rurdev.usda.gov/wi/programs/rhs/index.htm
Rural Development Rural Utility Services	Offers emergency Community Water Assistance Grants that may be available to rural communities when disaster strikes. Congress may appropriate funds for the program after a disaster if the county or area has been designated eligible under a presidential emergency declaration.	http://www.rurdev.usda.gov/wi/programs/rus/index.htm
Rural Development 10.352 Value Added Ag Product Market Development Grants	Helps independent producers and produce organization enter into value-added activities.	http://www.rurdev.usda.gov/wi/programs/rbs/valueadd.htm
Rural Development 10.427 Rural Rental Assistance Program	Reduce the tenant contribution paid by low-income occupying eligible Rural Rental Housing projects financed by USDA, Rural Development, RHS through its Sections 515, 514, and 516 loans and grants. If available, can be used to aid disaster victims for temporary shelter in RHS properties.	http://www.rurdev.usda.gov/rhs/mfh/brief_mfh_rra.htm
Rural Development 10.444 Direct Housing Natural Disaster Loans and Grants	USDA Rural Development Section 504 Home Improvement Loans and Grants. Assists very-low income owner-occupants in repairing or replacing property damaged as a direct result of a natural disaster. Loans are made in counties eligible for federal assistance under an emergency declaration by the President. Grant recipients must be 62 years of age or older and unable to repay a loan.	http://www.rurdev.usda.gov
Rural Development 10.763 Emergency Community Water Assistance Grants	USDA, Rural Development, Rural Utility Service is authorized to help rural residents who have experienced a significant decline in quantity or quality of water to obtain adequate quantities of water that meet the standards of the Safe Drinking Water Act.	http://www.rurdev.usda.gov/UWP-ecwag.htm
Rural Development 10.766 Community Facilities Loans and Grants	USDA Rural Development Community Facilities (CF) Loans and Grants are available to rural communities for public projects such as fire and rescue services, utility extensions, clinics, child care facilities, industrial parks, and cultural centers. In April, 2004 the First Responders Initiative was introduced and offers CF funding for the improvement of first responder and emergency services in small communities and rural areas.	http://www.rurdev.usda.gov/HCF_CF.html
Rural Development 10.770 Water and Waste Disposal Loans and Grants (Section 306C)	USDA Rural Development Rural Utility Services loans and grants provide water and waste disposal facilities and services to low income rural communities whose residents face significant health risks.	http://www.usda.gov/rus/water/program.htm

Organization	Site Summary	Contact Information
US Department of Commerce (DOC) (http://www.doc.gov)		
Economic Development Administration	Information about generating jobs, retaining existing jobs, and stimulating industrial and commercial growth in economically distressed areas of the US.	http://www.eda.gov/
US Census Bureau	Profile of Wisconsin and each Wisconsin County.	http://quickfacts.census.gov/qfd/states/55000.html
National Oceanic and Atmospheric Administration (NOAA)	Provides detailed information about coastal waters issues, including the Great Lakes.	http://www.noaa.gov/coasts.html
NOAA, National Climatic Data Center	Current and historical archive of climatic data and information.	http://www.ncdc.noaa.gov/oa/ncdc.html
NOAA, Drought Information Center	NOAA, Drought Information Center.	http://www.drought.noaa.gov
NOAA, National Severe Storms Laboratory	Comprehensive information on severe weather research.	http://www.nssl.noaa.gov
NOAA, National Weather Service	Provides all available weather information including warning updates.	http://www.nws.noaa.gov
NOAA and USDA	Weekly Weather and Crop Bulletin.	http://www.usda.gov/oce/weather/pubs/Weekly/Wwcb/
US Department of Defense (DOD) (http://www.defenselink.mil/)		
US Coast Guard, National Response Center	Point of contact for reporting all oil, chemical, radiological, biological, and etiological discharges into the environment of the United States.	http://www.nrc.uscg.mil/
US Army Corps of Engineers	Provides information on assistance available for planning, engineering, and design of permanent flood control projects, and assistance to communities during flood emergencies.	http://www.usace.army.mil
US Department of the Housing and Urban Development (HUD) (http://www.hud.gov/)		
Public Housing Capital Fund	Provide funds to Public Housing Authorities to rehabilitate structures and include hazard mitigation projects for the low income public housing program in Wisconsin.	http://portal.hud.gov/hudportal/HUD?src=/recovery/programs/capital_stimulus
HUD Disaster Recovery Assistance	Provide critical housing and community development resources to aid disaster recovery.	http://www.hud.gov/offices/cpd/communitydevelopment/programs/dri/index.cfm
Mortgage Insurance for Disaster Victims	HUD has a special mortgage insurance program under Section 203(h) of the National Housing Act to assist disaster victims.	http://portal.hud.gov/hudportal/HUD?src=/program_offices/housing/sfh/ins/203h-dft
Public and Indian Housing (PIH) Resources	For PHAs' disaster recovery costs not covered by insurance and essential assistance from FEMA, HUD will provide funding from the capital public housing reserve authorized by section 9(k) of the United States Housing Act of 1937, authority, as amended (42 U.S.C. 1437g(k)), or similar statutory authority, subject to the availability of appropriations.	http://portal.hud.gov/hudportal/HUD?src=/program_offices/public_indian_housing

Organization	Site Summary	Contact Information
HUD (continued)		
Ginnie Mae	For a Presidentially declared disaster, Ginnie Mae issues an All Participant Memorandum, *"Forbearance and a Buyout Authorization for Loans in Areas Declared a Disaster by President..."*	http://portal.hud.gov/hudportal/HUD?src=/hudprograms/Ginnie_Mae_I
Community Planning and Development (CPD) Resources	HUD can waive regulatory and statutory program requirements to increase the flexibility of CDBG and HOME for disaster recovery.	http://portal.hud.gov/hudportal/HUD?src=/program_offices/comm_planning
Community Development Block Grant (CDBG)	Because the Federal government provides disaster relief, primarily through FEMA and SBA, to meet emergency, short-term recovery needs, the most appropriate use of CDBG funds is generally for longer term needs such as economic redevelopment of affected areas.	http://portal.hud.gov/hudportal/HUD?src=/program_offices/comm_planning/communitydevelopment/programs
HOME Investment Partnerships Program	HOME provides grants to states and localities to build, buy, or rehabilitate affordable housing or to provide rental assistance to low-income people.	http://www.hud.gov/offices/cpd/affordablehousing/programs/home/index.cfm
US Department of the Interior (DOI) (http://www.doi.gov/)		
US Geological Survey	Excellent source of natural disaster information.	http://www.usgs.gov
US Department of Transportation (DOT) (http://www.dot.gov/)		
Federal Highway Administration	Responsible for improving the quality of the nation's highway systems and its intermodal connections.	http://www.fhwa.dot.gov/
US Environmental Protection Agency (EPA) (http://www.epa.gov/)		
EPA, Office of Solid Waste and Emergency Response	Provides guidance and direction for solid waste and emergency response programs.	http://www.epa.gov/swerrims
US Small Business Administration (SBA) (http://www.sba.gov)		
Small Business Administration	Provides training and advocacy for small firms.	http://www.sba.gov

Related Organizations

Organization	Site Summary	Contact Information
American Red Cross	Provides relief to victims of disasters and helps people prevent, prepare for, and respond to emergencies.	http://www.redcross.org
American Water Works Association	Provides information on water conservation and contains a comprehensive list of water-related sites.	http://www.awwa.org
Association of State Dam Safety Officials	General information about dams and dam safety in the US.	http://www.damsafety.org

Organization	Site Summary	Contact Information
Association of State Floodplain Managers	Information on floodplain management, flood hazard mitigation, the National Flood Insurance Program, and flood preparedness, warning, and recovery.	http://www.floods.org
National Association of Counties	The only nationwide organization representing county governments.	http://www.naco.org
National Drought Mitigation Center	Information on drought preparation and risk management.	http://drought.unl.edu/
National Emergency Management Association	The professional association of state, Pacific, and Caribbean insular state emergency management directors.	http://www.nemaweb.org
National Fire Protection Association	Provides scientifically based fire codes and standards, research, training, and education.	http://www.nfpa.org
National Lightning Safety Institute	Independent, non-profit consulting, education, and research organization focusing on lightning.	http://www.lightningsafety.com
Natural Hazards Center, University of Colorado	Clearinghouse for natural hazards information.	http://www.colorado.edu/hazards
Societal Aspects of Weather - Injury and Damage Statistics	Contains societal impact data for weather related disasters.	http://sciencepolicy.colorado.edu/socasp/stats.html
Disaster Links from CBS News	Clearinghouse of links to more than 100 websites related to all types of hazards.	http://www.cbsnews.com/digitaldan/disaster/disasters.shtml
The Disaster Center	Provides news and information on current disasters and emergency management. Links to each state included.	http://www.disastercenter.com
The Disaster Research Center, University of Delaware	Research center for the preparation and mitigation of natural disasters for groups, organizations, and communities.	http://www.udel.edu/DRC
Firewise Communities / USA Recognition Program	Site information available to help become a Firewise Community.	http://firewise.org
The Tornado Project	Offers tornado books, posters, videos, and links to other websites.	http://www.tornadoproject.com
United Nations International Strategy for Disaster Reduction	Increases public awareness of hazard and risk issues for the reduction of disasters in modern societies; motivates public administration policies and measures to reduce risks; and improves access of science and technology for risk reduction in local communities.	http://www.unisdr.org
Tornadoes in Wisconsin 1950 – 1995	Lists the date and location of all the tornadoes that occurred in Wisconsin from 1950 to 1995.	http://www.tornadoproject.com/alltorns/witorn.htm
Disaster Management Center, University of Wisconsin	Helps improve emergency management performance of non-governmental organizations, local and national governments, and international organizations through a comprehensive professional development program in disaster management.	http://epdweb.engr.wisc.edu/dmc

Financial Assistance by Catalog of Federal Domestic Assistance Numbers

The searchable Catalog can be found online at https://www.cfda.gov/?s=program&.

Code / Topic	Description
Hazards: All	
10.417 Very Low-Income Housing Repair Loans and Grants	To help very low-income owner-occupants in rural areas repair their properties.
10.433 Rural Housing Preservation Grants	To assist very low- and low-income rural residents, individual homeowners, or rental property owners (single/multi-unit) by providing the consumer cooperative housing projects (co-ops) the necessary assistance to repair or rehabilitate their dwellings.
10.444 Direct Housing – Natural Disaster Loans and Grants	To assist qualified recipients to meet emergency assistance needs resulting from natural disaster. Funds are only available to the extent that funds are not provided by the Federal Emergency Management Agency. For the purpose of administering these funds, natural disaster will only include those counties identified by a Presidential declaration.
14.119 Mortgage Insurance – Homes for Disaster Victims	To help victims of a major disaster undertake homeownership on a sound basis.
14.218 Community Development Block Grants/Entitlement Grants	To develop viable urban communities, by providing decent housing and a suitable living environment, and by expanding economic opportunities, principally for persons of low and moderate income.
14.228 Community Development Block Grants / States Program	The primary objective of this program is the development of viable urban communities by providing decent housing and a suitable living environment, and by expanding economic opportunities, principally for persons of low- and moderate-income. Each activity funded must meet one of the program's National Objectives by: Benefiting low- and moderate-income families; aiding in the prevention or elimination of slums or blight; or meeting other community development needs having a particular urgency because existing conditions pose a serious and immediate threat to the health or welfare of the community where other financial resources are not available.
59.008 Disaster Assistance Loans	To provide loans to the victims of declared disasters for uninsured or otherwise uncompensated physical damage.
97.024 Emergency Food and Shelter National Board Program	To supplement and expand ongoing efforts to provide shelter, food, and supportive services for needy families and individuals. To strengthen efforts to create more effective and innovative local programs by providing supplemental funding for them.
97.025 National Urban Search and Rescue (US&R) Response System	Develop, maintain, deploy, coordinate, and support National Urban Search and Rescue resources on-scene to locate, provide initial medical treatment, and extricate victims of incidents requiring specialized search and rescue operations while simultaneously enhancing the US&R response capabilities of state and local governments.
97.026 Emergency Management Institute – Training Assistance	To defray travel and per diem expenses of state, local, and tribal emergency management personnel who attend training courses conducted by the Emergency Management Institute.
97.030 Community Disaster Loans	To provide loans subject to Congressional loan authority, to any local government that has suffered substantial loss of tax and other revenue in an area in which the President designates a major disaster exists.
97.034 Disaster Unemployment Assistance	To provide federally-funded weekly benefits and re-employment assistance to workers and self-employed individuals who are unemployed as a direct result of a Presidentially-declared major disaster, and who are not eligible for any other state or federal regular unemployment insurance benefits.

Code / Topic	Description
Hazards: All (continued)	
97.036 Public Assistance Disaster Grants	To assist state and local governments in responding to and recovering from the devastating effects of disasters by providing assistance for debris removal, emergency protective measures and the repair, restoration, reconstruction or replacement of public facilities or infrastructure damaged or destroyed.
97.039 Hazard Mitigation Grant	To provide funding support to states, tribes, territories, communities, and other eligible applicants to implement mitigation planning and hazard mitigation measures that are cost effective and which substantially reduce the risk of future damage, hardship, loss or suffering in any area affected by a major disaster.
97.042 Emergency Management Performance Grants (EMPG)	To provide resources to assist state and local governments in sustaining and enhancing all-hazards emergency management capabilities. All-hazards approach to emergency response, including the development of a comprehensive program, planning, training, exercises, sets the stage for an effective and consistent response to any threatened or actual disaster or emergency, regardless of the cause. States have the opportunity to use EMPG funds to further strengthen their ability to support emergency management activities while simultaneously addressing issues of national concern as identified in the National Priorities of National Preparedness Guidelines.
97.047 Pre-Disaster Mitigation	To provide funding support to states, tribes, territories, communities, and public colleges and universities for pre-disaster mitigation planning and projects primarily addressing natural hazards. This program promotes implementation of activities designed to reduce injuries, loss of life, and damage and destruction to property from natural hazards.
97.048 Federal Disaster Assistance to Individuals and Households in Presidential Declared Disaster Areas	To provide financial assistance and, if necessary, direct assistance to individuals and households affected as a direct result of a Presidentially declared major disaster or emergency, who have uninsured or under-insured, necessary expenses and serious needs and are unable to meet such expenses or needs through other means.
97.049 Presidential Declared Disaster Assistance – Disaster Housing Operations for Individuals and Households	To address disaster-related housing needs of individuals and households suffering hardship within an area that, by Presidential declaration, has been designated as a disaster area.
97.050 Presidential Declared Disaster Assistance to Individuals and Households – Other Needs	To provide assistance to individuals and households affected by a disaster or emergency declared by the President, and enable them to address necessary expenses and serious needs, which cannot be met through other forms of disaster assistance or through other means such as insurance.
97.052 Emergency Operations Center (EOC)	The purpose of the EOC grant program is to improve emergency management and preparedness capabilities by supporting flexible, sustainable, secure, strategically located and fully interoperable EOCs with a focus on addressing identified deficiencies and needs. This program provides funding for construction or renovation of a state, local, or tribal government's principal EOC.
Hazards: Flooding and Coastal Erosion	
12.101 Beach Erosion Control Projects	To control beach and shore erosion to public shores through projects not specifically authorized by Congress.
12.102 Emergency Rehabilitation of Flood Control Works or Federally Authorized Coastal Protection Works	To assist in the repair and restoration of flood control works damaged by flood, or federally authorized hurricane flood and shore protection works damaged by extraordinary wind, wave, or water action.

Code / Topic	Description
Hazards: Flooding and Coastal Erosion (continued)	
12.103 Emergency Operations Flood Response and Post-Flood Response	To provide emergency flood response and post-flood response assistance as required to supplement state and local efforts and capabilities in time of flood or coastal storm.
12.104 Flood Plain Management Services	To promote appropriate recognition of flood hazards in land and water use planning and development through the provision of flood and flood plain related data, technical services, and guidance.
12.105 Protection of Essential Highways, Highway Bridge Approaches, and Public Works	To provide bank protection of highways, highway bridges, essential public works, churches, hospitals, schools, and other non-profit public services endangered by flood-caused erosion.
12.106 Flood Control Projects	To reduce flood damages through projects not specifically authorized by Congress.
12.108 Snagging and Clearing for Flood Control	To reduce flood damages.
12.111 Emergency Advance Measures for Flood Prevention	To perform activities prior to flooding or flood fight that would assist in protecting against loss of life and damages to property due to flooding.
97.022 Flood Insurance	To enable persons to purchase insurance against physical damage to or loss of buildings and/or contents caused by floods, mudslide/mudflow, or flood related erosion.
97.023 Community Assistance Program State Support Services Element (CAP-SSSE)	CAP-SSSE funds are for providing technical assistance to National Flood Insurance Program (NFIP) communities, to evaluate NFIP management activities, and to build floodplain management expertise and capacity in order to ensure that NFIP goals are being met.
97.029 Flood Mitigation Assistance	To assist states, Indian tribal governments, and communities in reducing or eliminating the long-term risk of flood damage to structures insured under the National Flood Insurance Program.
97.045 Cooperating Technical Partners	To increase local involvement in and ownership of, the development and maintenance of flood hazard maps produced for the National Flood Insurance Program.
97.092 Repetitive Flood Claims	To assist states, tribes, and communities in reducing or eliminating the long-term risk of flood damage to structures insured under the National Flood Insurance Program that have had one or more claims for flood damages through mitigation activities that are in the best interest of the National Flood Insurance Fund.
97.110 Severe Repetitive Loss Program	To assist states and local governments in supporting actions that reduce or eliminate the long-term risk of flood damage to residential properties insured under the National Flood Insurance Program that meet the definition of severe repetitive loss property, and to reduce losses to the National Flood Insurance Fund (NFIF) by funding projects that result in the greatest savings to the NFIF in the shortest time period.
10.904 Watershed Protection and Flood Prevention	To provide technical and financial assistance in carrying out works of improvement to protect, develop, and utilize the land and water resources in watersheds.
10.916 Watershed Rehabilitation Program	To provide technical and financial assistance to rehabilitate dams originally constructed with assistance of USDA Watershed Programs. Rehabilitation must extend the life of the dam and meet applicable safety and performance standards. Priority is given to dams that could result in loss of life if the dam should fail.

Code / Topic	Description
Hazards: Flooding and Coastal Erosion (continued)	
10.072 Wetlands Reserve Program	To assist landowners in restoring and protecting wetlands on eligible lands on which they agree to enter into a permanent or 30-year long-term easement (30-year contract for Indian tribes), or a restoration cost-share agreement with the Secretary. The goal is to maximize wetland functions, values, and wildlife benefits on every acre enrolled in the program.
10.763 Emergency Community Water Assistance Grants	The Rural Utilities Service is authorized to help rural residents who have experienced a significant decline in quantity or quality of water to obtain adequate quantities of water that meet the standards of the Safe Drinking Water Act.
10.902 Soil and Water Conservation	Provide conservation technical assistance to private landowners, conservation districts, tribes, and other organizations through a national network of locally-respected, technically-skilled, professional conservationists and assist them in conserving, improving and sustaining our natural resources and environment.
12.110 Planning Assistance to States	To cooperate with any state in the preparation of comprehensive plans for the development, utilization and conservation of water and related land resources of drainage basins located within the boundaries of such state.
15.065 Safety of Dams on Indian Lands	To improve the structural integrity of dams on Indian lands, including operations and maintenance of the dams.
15.037 Water Resources on Indian Lands	To support Indian tribes in the effective and efficient management, planning, and use of their water resources.
97.041 National Dam Safety Program	To support state governments and the Commonwealth of Puerto Rico in the development and maintenance of dam safety programs. To enable states and the Commonwealth of Puerto Rico to take precautions that ensure the safety of the dams, such as the development of regulatory authority for the design, construction, operation, and maintenance of dams, the undertaking of dam inspections, and development of Emergency Action Plans for dams.
Hazard: Fire	
15.031 Indian Community Fire Protection	To provide funds to perform fire protection services for Indian tribal governments that do not receive fire protection support from state or local government.
97.044 Assistance to Firefighters Grant	To provide funding directly to fire departments and emergency medical services organizations of a state for the purpose of enhancing departments' abilities to protect the health and safety of the public, as well as that of firefighting personnel, facing fire and fire-related hazards.
97.046 Fire Management Assistance Grant	To provide grants to states, Indian tribal governments, and local governments for the mitigation, management and control of any fire burning on publicly (nonfederal) or privately owned forest or grassland that threatens such destruction as would constitute a major disaster.
Hazard: Chemical / Hazardous Materials Spill	
20.218 National Motor Carrier Safety	To reduce the number and severity of accidents and hazardous materials incidents involving commercial motor vehicles (CMV). The goal is to reduce CMV-involved accidents, fatalities, and injuries through consistent, uniform, and effective CMV safety programs.
66.810 Chemical Emergency Preparedness and Prevention (CEPP) Technical Assistance Grants Program	To provide financial assistance to states, local agencies, and Indian tribes for chemical accident prevention activities that relate to the Risk Management Program under the Clean Air Act Section 112(r). To provide financial assistance to tribes for chemical emergency planning, and community right-to-know programs which are established to prevent or eliminate unreasonable risk to the health and environment of communities within the state.

Code / Topic	Description
Hazard: Chemical / Hazardous Materials Spill (continued)	
66.812 Hazardous Waste Management Grant Program for Tribes	To provide financial assistance to tribal governments and tribal consortia for the development and implementation of hazardous waste programs; for building capacity to improve and maintain regulatory compliance; and for developing solutions to address hazardous waste impacting tribal lands.
Programs for Farmers and Farmland	
10.054 Emergency Conservation Program	To enable farmers to perform emergency conservation measures to control wind erosion on farmlands, to rehabilitate farmlands damaged by wind erosion, floods, hurricanes, or other natural disasters and to carry out emergency water conservation or water enhancing measures during periods of severe drought.
10.404 Emergency Loans	To assist established (owner or tenant) family farmers, ranchers and aquaculture operators with loans to cover losses resulting from major and/or natural disasters, which can be used for annual farm operating expenses, and for other essential needs necessary to return disaster victims' farming operations to a financially sound basis in order that they will be able to return to private sources of credit as soon as possible.
10.450 Crop Insurance	To promote the national welfare by improving the economic stability of agriculture through a sound system of crop insurance and providing the means for the research and experience helpful in devising and establishing such insurance.
10.451 Noninsured Assistance	To provide crop loss assistance comparable to the catastrophic risk protection level of crop insurance to producers of commercial crops or other agricultural commodities for which the catastrophic risk protection level of crop insurance is not available.
10.069 Conservation Reserve Program	To protect the Nation's long-term capability to produce food and fiber; to reduce soil erosion and sedimentation, improve water quality, and create a better habitat for wildlife.

TABLE 4.2-3 LOCAL CAPABILITY ASSESSMENT
(This table was reviewed and revised for the 2011 Plan update.)

Policy, Program, or Initiative	Description	Support for Local Mitigation	Effectiveness in Local Mitigation
Wisconsin Commercial Building Code	The Wisconsin Enrolled Commercial Building Code is chapters Comm. 61 to 65 of the Wisconsin Administrative Code and the adopted provisions of the International Code Council codes: *International Building Code, International Energy Conservation Code, International Mechanical Code, International Existing Building Code,* and *International Fuel Gas Code*. The 2009 IBC was adopted with State of Wisconsin amendments in 2011. The Department of Safety and Professional Services, Division of Safety and Buildings reviews and approves plans for compliance with building codes and administers inspection certificates.	The code protects the health, safety, and welfare of the public and employees by establishing minimum standards for the design, construction, maintenance, and inspection of public buildings, including multi-family dwellings and places of employment. Notable requirements of the code: • Windows, doors, parapets, awnings, exterior wall coverings, and rooftop equipment must be designed to resist wind loads up to 90 mph • Wind loads are factored during design by a factor of safety as high as 1.6 (calculated wind load)	All structures built after the adoption of the state building code have increased resistance to hazards due to code enhancements. However, for existing structures, state building code requirements indicate that damaged building components only need to be replaced to the pre-damage condition as specified by the building code in effect at the time of original construction. If the structure is improved, the current code is to be used to regulate the redesign and reconstruction.

Policy, Program, or Initiative	Description	Support for Local Mitigation	Effectiveness in Local Mitigation
Wisconsin Uniform Dwelling Code	The Wisconsin Uniform Dwelling Code is the State's administrative code Comm. 20 and 21, provides construction and remodeling requirements for one- and two-family dwellings built after June 1, 1980. The code is administered by the Department of Safety and Professional Services, Division of Safety and Buildings who is responsible for compliance with state building codes.	The code protects the health, safety, and welfare of the public by establishing minimum standards for the design, construction, maintenance, and inspection for one- and two-family dwellings. (Multi-family structures are covered under the commercial code.) Beginning January 1, 2005, all municipalities will have enforcement requirement of the code. Enforcement involves submitting building plans in order to obtain a building permit, and having electrical, construction, plumbing, and HVAC inspections during construction. (Previously municipalities with a population of 2,500 or less could choose by resolution to decline code enforcement although construction had to follow the code, but there may not have been any plan review or inspections.) Notable requirements of the code: • Roof surfaces must be designed to resist wind uplift of a minimum of 20 pounds per square foot • Clips, straps, or mechanical fasteners are required to connect roof framing members to load-bearing walls (regardless of construction type) when the roof framing has a span of six feet or more • Wall framing must be connected to the foundation or slab with half-inch diameter anchor bolts spaced at six feet on-center (or less) and placed within 18 inches of each building corner • Garages have the same structural requirements as dwellings • A minimum of two exits are required from the first floor of the structure	All structures built after adoption of state building code have increased resistance to hazards due to code enhancements. Approximately 900 municipalities that previously were not required to enforce the UDC have been required to do so since January 1, 2005. It will take time and training to get an established effective enforcement system into place. With the home building boom of the past decade, especially in rural areas, there were notable economic, safety, and legal problems due to non-conforming construction. It was estimated that about only 5,000 of 25,000 new dwellings built in a year were being inspected for code requirements.

Policy, Program, or Initiative	Description	Support for Local Mitigation	Effectiveness in Local Mitigation
NR115 Shoreland Protection	Administrative Code NR115, Shoreland Protection Program, is administered by the Wisconsin Department of Natural Resources and establishes statewide minimum standards for shoreland development to control the intensity of development and create a buffer around water. It requires counties to adopt and administer shoreland zoning ordinances that meet or exceed the minimum standards. Standards include lot sizes, buffer strips, setbacks, and legal non-conformities.	Shoreland management and zoning promote mitigation by restricting development near water. This may prevent construction in dangerous near-shore areas, thereby mitigating possible flood damages. Grading restrictions prevent increased runoff and resulting erosion and flood damages.	Many counties have adopted ordinances that exceed the state minimum standards. New impervious surface standards and shoreland buffer restoration requirements will promote sustainable shoreland development, reduce runoff, promote infiltration of rainfall and protect natural shoreland functions. In conjunction with NR 116, this can be a powerful tool in regulating development in or near floodplains and near water.
NR 116 Floodplain Management	Administrative Code NR 116, Floodplain Management is administered by the Wisconsin Department of Natural Resources. It requires local governments (counties, cities, and villages) to adopt reasonable and effective zoning ordinances to regulate floodplains in their jurisdictions. Floodplain zoning prohibits new construction or reconstruction of substantially damaged structures in mapped floodways. In addition, it requires elevation (two feet above the base flood elevation) and dry-land access in flood fringe areas. It also limits improvements to non-conforming structures and requires compensatory storages in flood storage areas.	Floodplain management and zoning promote mitigation by restricting development in mapped floodplains. This prevents flood damages by controlling the placement and elevation of structures. It sets strict standards for the removal of lands from the floodplain and limits the granting of variances in floodplains. New floodplain maps more accurately delineate flood hazard areas and encourage achievable mitigation projects. RiskMAP products will incorporate mitigation data and provide support for mitigation planning efforts.	The State's floodplain management law exceeds National Flood Insurance Program requirements. The additional two feet of flood elevation help protect structures from severe floods. It limits construction in the floodplain with no new construction in the floodway. Local governments can set more restrictive standards than the state and federal government. The rules are complicated and there is a lack of understanding in many communities particularly with enforcing the substantial damage or improvement provision of the law. There is a need for continued outreach and education to ensure that the program is implemented and enforced properly.

Policy, Program, or Initiative	Description	Support for Local Mitigation	Effectiveness in Local Mitigation
NR 117 Shoreland-Wetland Protection Program	Administrative Code NR117, Shoreland-Wetland Protection Program, is administered by the Wisconsin Department of Natural Resources. It establishes statewide minimum standards for cities' and villages' shoreland-wetland zoning ordinances in order to accomplish shoreland protection objectives. Cities and villages are required to adopt and administer shoreland-wetland zoning ordinances within six months or receipt of final wetland inventory maps, which are prepared by the DNR. The ordinance creates a shoreland-wetland zoning district for all wetlands of five acres or more, and all portions of wetlands of five acres or more located in the jurisdiction.	This preserves wetland areas which retain and infiltrate flood waters. A jurisdiction may not rezone a wetland in a shoreland-wetland zoning district, or any portion thereof, if the proposed rezoning may result in a significant adverse impact to stormwater and floodwater storage capacity and shoreline protection against soil erosion.	Local governments can adopt ordinances that exceed the state minimum standards. In conjunction with NR 115 and 116, this can be a powerful tool in regulating development in or near floodplains and wetlands and near water in general. Small, isolated wetlands and degraded wetlands can be developed in some cases, which can cause higher flood levels and increased damages.
Comprehensive Planning	The State's Comprehensive Planning Law, commonly recognized as Wisconsin's "Smart Growth" legislation, requires any program or action of a town, village, city, county, or regional planning commission that affects land use after January 1, 2010 must be guided by, and consistent with, an adopted comprehensive plan. Comprehensive plans must contain 9 elements: issues and opportunities; housing; transportation; utilities and community relations; land use; agricultural, natural and cultural resources; economic development; intergovernmental cooperation; and implementation.	This provides the opportunity for communities to incorporate their comprehensive planning with their all-hazards mitigation planning efforts. It presents an opportunity to build community support for investing in long-term hazard reduction. Comprehensive plans will include activities such as land use planning, zoning ordinances, construction site erosion control ordinances, stormwater management zoning, and agricultural preservation plans all of which can contribute to hazard mitigation within a community.	There is not a specific element pertaining to hazard avoidance or hazard reduction. However, all-hazards mitigation plans can be integrated into a community's comprehensive plan through the various planning elements or as its own element. Comprehensive plans should also be consulted when developing hazard mitigation plans. A good comprehensive plan that addresses its hazards will lead to good land use decisions. Information and data collected for comprehensive planning is also useful and necessary in all-hazards mitigation planning.

Policy, Program, or Initiative	Description	Support for Local Mitigation	Effectiveness in Local Mitigation
Milwaukee Metropolitan Sewerage District (MMSD)	With a multi-objective mission to reduce sewer inflows into Lake Michigan and reduce stormwater flood damage to structures in Milwaukee's metro area, MMSD is executing a comprehensive stormwater and flood protection program. MMSD has developed Floodwater Management Plans for the individual watersheds and rivers in their jurisdiction. Stakeholders groups were formed and provided input and plan review. Chapter 13, Stormwater Rule, provides a regionally based minimum standard for stormwater control for all new development within the service area. The Greenseams Program identifies riparian properties in private hands (public lands may be considered under special circumstances) that would link existing public open spaces or provide other public benefits in the form of wetland protection, future flood protection, or erosion management. The Conservation Plan identifies existing open space in private hands that meet specific criteria for providing natural flood storage. Lands that are identified as having hydric soils, wetlands or old wetlands are considered. The purchase of these properties provides public benefits in the form of wetland protection, water quality, and most important future flood protection or erosion management.	MMSD has taxing authority in the most densely populated area of the state and uses this authority to engineer controls for stormwater and flooding. It has used no emergency management funds for any of its buy-outs or other mitigation initiatives and projects. This area of the state has been included in several flood declarations and has a high flood risk. MMSD addresses current and future out-of-bank flooding. Plans present specific projects which contain both design and construction. Projects include structural and non-structural approaches. Capital expenditures for 2010 totaled $266 million. The MMSD programs listed address future flood and drainage problems and stream channel protection.	According to engineering reports, most residential structures within the floodplains of some of the most notoriously flooding creeks have been acquired and demolished, or floodproofed above the 100-year base flood elevation through a variety of methods including stormwater storage, levees, and flow rate reduction controls.

Policy, Program, or Initiative	Description	Support for Local Mitigation	Effectiveness in Local Mitigation
Wisconsin Regional Planning Commissions	The Wisconsin Regional Planning Commissions (RPCs) provide planning and technical services to the counties and municipalities that participate in the Commission. RPCs provide technical services through GIS mapping, zoning, and subdivision ordinance preparation; environmental assessments and impact reviews; and engineering services. RPCs provide planning services for development of hazard mitigation plans and comprehensive plans in addition to special purpose plans. RPCs develop zoning, subdivision and other land use ordinances for local governments. They implement projects through administration of grants. They also share costs in county administrative services and building and zoning code enforcement.	Services provided assist in land use planning and implementation of local government plans that address key community development needs. In many cases, the plans also mitigate losses from hazards. Data collection, analysis projections, mapping, programs, policies, and projects in comprehensive plans complement hazard mitigation planning. Stormwater, floodplain management, and sewer service area planning are a few of the areas addressed in comprehensive plans that have policies, programs, and projects that complement flood hazard mitigation. RPCs have partnered with Wisconsin Emergency Management in developing a resource guide that identified how comprehensive and hazard mitigation plans could be integrated.	Local governments are used to working through and with the RPCs in development of various plans. The RPCs are familiar with the local governments and the issues and politics that are involved at the local level. They provide a valuable service to local governments in the development of various planning efforts and in the provision of technical services. Limited budgets and funding levels do not allow the RPCs to meet the demand for technical and planning services requested of them. Hazard mitigation should be regularly considered when these services are provided. More specific concepts need to be developed to include hazard mitigation policies, programs, and projects when administering and implementing other plans and projects. A more formal policy for integrating comprehensive and hazard mitigation planning needs to be developed.
County Emergency Management	Emergency Management is a county office mandated by the State of Wisconsin. It is supported by county funds, which are reimbursed in part by federal funding. Emergency Management comprises organized analyses, planning, decision-making, and assignment of available resources to mitigate, prepare for, respond to, and recover from the effects of all hazards.	The County Emergency Management department cooperates with the County in preparing timely releases that inform the public on actions and precautions they can take to minimize disruptions and losses. County staff works to reduce or eliminate repetitive loss or substantially damaged structures by writing letters to owners to inform them of techniques and potential state and federal resources available to reduce further flood losses.	

TABLE 4.3-1 2008 AND 2011 ACTION ITEM NUMBERS

2008	2011	2008	2011	2008	2011	2008	2011	2008	2011	2008	2011	2008	2011
1.1	10.1	2.3	Completed	3.1	1.5	3.14	10.19	4.8	Completed	4.21	10.32	5.5	7.1
1.2	2.1	2.4	4.1	3.2	1.9	3.15	10.13	4.9	1.6	4.22	10.21	5.6	7.2
1.3	10.17	2.5	3.6	3.3	Completed	3.16	10.14	4.10	Deleted	4.23	10.22	5.7	10.24
1.4	10.25	2.6	7.3	3.4	11.1	3.17	Completed	4.11	Deleted	4.24	1.2	5.8	Deleted
1.5	12.1	2.7	10.3	3.5	10.9	3.18	10.31	4.12	Completed	4.25	Deleted	5.9	5.6
1.6	3.1	2.8	10.26	3.6	9.2	3.19	1.10	4.13	1.7	4.26	Deleted	5.10	5.7
1.7	Deleted	2.9	10.27	3.7	10.29	4.1	1.11	4.14	10.16	4.27	5.1	5.11	5.8
1.8	9.1	2.10	3.7	3.8	10.10	4.2	3.11	4.15	3.13	4.28	5.2	5.12	Deleted
1.9	14.1	2.11	14.2	3.9	10.30	4.3	3.12	4.16	3.14	4.29	5.3	5.13	5.9
1.10	3.2	2.12	10.28	3.10	10.11	4.4	8.2	4.17	3.15	5.1	1.3	5.14	5.11
1.11	Completed	2.13	13.2	3.11	10.12	4.5	6.1	4.18	10.20	5.2	5.4	5.15	5.12
2.1	1.1	2.14	Completed	3.12	Completed	4.6	11.2	4.19	3.21	5.3	5.5	5.16	5.13
2.2	1.8	2.15	10.4	3.13	10.18	4.7	10.15	4.20	3.16	5.4	1.4	5.17	10.33

Detailed tables of completed and deleted action items can be found in Section 4.3.15.

TABLE 4.3-2 ACTION ITEMS

Action	Goal(s) Met	Priority	Supporting Agencies	Contribution to Mitigation Strategy	2011 Update Status
Lead Agency: Department of Administration (DOA)					
1.1 – Distribute hazard mitigation materials at housing workshops, trainings, and orientation sessions.	1, 2	High	WEM	Expands and promotes public awareness.	Status unchanged.
1.2 – WEM staff will be available to make Wisconsin Disaster Fund presentations at Emergency Assistance Program trainings and workshops.	1, 2, 4	High	WEM	Conferences, trainings, and workshops are effective venues for reaching multiple agencies and citizens with mitigation information.	Status unchanged.
1.3 – Incorporate mitigation practices into DOA-DH's housing Emergency Assistance Program.	4, 5	Medium	WEM	Maintaining consistency within state and federal programs regarding planning, preparation and mitigation is evidence of cooperation and coordination.	Action delayed because CDBG and HOME funds are not usually used for the type of substantial rehabilitation necessary for the incorporation of hazard mitigation practices.
1.4 – DOA-DH will not approve grants or loans to communities for constructing critical facilities in floodplains or hazard-prone areas.	5	High	DNR, WEM	Constantly looking at ways to improve and incorporate mitigation actions into state and local government legislation is a key to successful mitigation.	Action delayed because CDBG and HOME funds are not usually used for the type of substantial rehabilitation necessary for critical facility construction.
1.5 – Coordinate with agencies to incorporate hazard mitigation planning concepts in the Comprehensive Planning Guides.	3, 4	Medium	WEM, DNR, UW-Sea Grant Institute	By addressing hazard mitigation in the comprehensive planning process, more communities will be aware of natural hazards and their impacts and the need for preparation.	The guides are now only available online.
1.6 – Promote hazard mitigation planning by maintaining a close relationship with the Comprehensive Planning Grant Program.	3, 4	Medium	WEM, RPCs	This action broadens exposure to hazard mitigation principles and programs.	WEM is preparing to update the Resource Guide to All Hazards Mitigation Planning in Wisconsin.
1.7 – Invite WEM staff to participate in the State Agency Resource Working Group (SARWG).	3, 4	Low	WEM	Promotion of proper land use measures is one element of a mitigation strategy and can save lives.	Group is inactive, but members continue to communicate to promote comprehensive and mitigation planning.
1.8 – Promote hazard mitigation and raise awareness of coastal hazards.	1, 2	High	WEM, DNR	Further use and distribution of mitigation materials during special events will meet the public awareness and community outreach goals.	Status unchanged. WAFSCM, WEM, and WCMP will try to sponsor a Coastal Hazards Workshop in fall 2011 or spring 2012.

Action	Goal(s) Met	Priority	Supporting Agencies	Contribution to Mitigation Strategy	2011 Update Status
Lead Agency: DOA (continued)					
1.9 – Help communities develop and implement shoreline and bluff erosion policies.	1, 3	High	WEM, DNR, UW-Sea Grants Institute	New ordinances and other policies will serve to establish revised setbacks and minimize future damages.	Status unchanged.
1.10 – The Wisconsin Coastal Hazards Work Group will work with local governments in the state's 15 coastal counties to develop and revise policies relevant to coastal hazards.	1, 3	High	UW-Sea Grants Institute, DNR	It enhances public education about disaster preparedness and resistance and expands public awareness of natural hazards.	Status unchanged.
1.11 – Continue to coordinate with the Coastal Hazards Work Group (CHWG) to expand hazard mitigation activities in those coastal areas vulnerable to destruction.	1, 4	High	WEM, UW-Sea Grants Institute, DNR, RPCs	Expanding mitigation activities in coastal areas will reduce storm and erosion-related damage and protect lives and property.	The CHWG continues to develop tools and convey challenges of coastal erosion and flooding to coastal communities.
Lead Agency: Department of Agriculture, Trade, and Consumer Protection					
2.1 – Encourage communities to sign up for and participate in the Conservation Reserve Enhancement Program (CREP).	1	High	CLCDs, USDA: FSA and NRCS	The CREP focuses on improving water quality by reducing runoff and peak flows in streams which prevents pollution. A secondary benefit is removing flood-prone cropland from production.	Ongoing; state funding was reduced from the $40 million estimate to $28 million in bond authority in 2009 Wisconsin Act 28.
Lead Agency: Department of Natural Resources (DNR)					
3.1 – Add extra points to communities applying for DNR Stewardship programs if their proposal includes mitigation elements.	1	Medium		Promoting flood mitigation values to acquisition criteria (i.e., flood water storage capacity removes floodplain from development) consideration can conserve natural resources while helping to reduce flood losses.	Status Unchanged.
3.2 – Promote the "No-Adverse Impact" floodplain management approach statewide.	1	High	WAFSCM, WEM	The NAI approach makes sense and will result in reduced damages. By using NAI you have a tool to increase support for watershed management as it promotes multi objective management strategies, which appeal to wider range of interests. This increases support for any actions proposed or taken for flood management.	An NAI training session was held at the 2008 WAFSCM conference.

Action	Goal(s) Met	Priority	Supporting Agencies	Contribution to Mitigation Strategy	2011 Update Status
Lead Agency: DNR (continued)					
3.3 – Promote substantial damage inspections.	1, 5	High	WEM	Substantial damage inspections are required to maintain membership in the NFIP. DNR will promote these to assist communities in remaining compliant.	New action item.
3.4 – Promote more efficient methods of detecting non-compliant structures in the floodplain and reviewing local floodplain management procedures.	1, 5	High	FEMA	Limiting non-compliant floodplain development will decrease potential damages.	New action item.
3.5 – Encourage restoration of natural wetland functions.	1	High	USDA: NRCS, UWFWS, local communities, property owners	Restoring the natural function of wetlands can reduce flooding potential of other areas in the watershed.	New action item.
3.6 – Provide workshops and distribute informational materials to improve understanding and enforcement of floodplain, shoreline, coastal, and wetland regulations.	1, 2	High	DOA: WCMP, UW-Sea Grants Institute, WEM	Assessing and improving local floodplain management and coastal hazard awareness is a key component of the outreach program efforts.	Annually conduct 10 floodplain management workshops.
3.7 – Provide sewer back flow prevention information and other flood proofing measures to affected communities through public information curriculum. Coordinate with MMSD on expanding distribution of its brochure to other parts of the state.	1, 2	High	WEM, OCI, insurance industry	Using this mitigation technique decreases residential damage during major storm events.	Contacted MMSD staff to discuss enhanced distribution of informational materials. Plan to meet with appropriate staff before the end of FY2011.
3.8 – Compile and distribute Floodplain/ Shoreland Notes newsletter.	2	High	FEMA	The newsletter provides local officials and others with information on the NFIP, shoreland issues, dam safety, and hazard mitigation.	New action item. The newsletter is distributed three times per year.
3.9 – Provide workshops and distribute informational materials to improve understanding and awareness of flood insurance.	1, 2	High	FEMA	Distributing information on flood insurance will help reduce risks by increasing the number of flood insurance policies.	New action item. DNR will hold at least three workshops annually and participate in Flood Awareness Week.
3.10 – Promote dam safety awareness through workshops, the development of EAPs and IOM guidebooks, templates, and newsletters.	1, 2	High	FEMA	Increasing the number of EAPs and IOM plans will reduce the overall risk of dam failure.	New action item. Dam safety workshops will be held annually.

Action	Goal(s) Met	Priority	Supporting Agencies	Contribution to Mitigation Strategy	2011 Update Status
Lead Agency: DNR (continued)					
3.11 – Continue to provide technical assistance to non-NFIP communities that have had flood damage and encourage them to join the NFIP.	1, 2, 4	High	WEM	To raise awareness of the NFIP to Wisconsin citizens and squelch misconceptions will only enhance the mitigation program.	20 communities have joined the NFIP since 2008 and several more have expressed interest.
3.12 – Work with communities to encourage mapping of floodplains and coastal areas.	1, 2, 4	High	WEM, RPCs, WCMP	Promoting hazard mapping will empower communities and individuals to manage and reduce their risks.	Since 2008, 43 counties have received updated mapping through Map Mod. The State is now working on the Risk-MAP initiative.
3.13 – Promote mandatory disclosure of hazard-prone property to buyers.	1, 2, 4	Low	DNR	This allows homeowners to make informed decisions about mitigation.	Outreach efforts to community officials continue. The newsletter will feature an article on this topic in the near future.
3.14 – Encourage sewer utilities to provide back-up power sources at lift stations to help prevent sewer back-flow flooding.	1, 4	Low	DNR	Some sewer backflow problems occur because of power outages at lift stations. Back-up power sources would reduce this type of flood risk.	Status unchanged.
3.15 – Encourage sewer utilities to provide public information regarding sewer back-flow prevention	1, 4	Low	DNR, WEM	Promoting sewer back-flow prevention at the local level will help reduce this type of flood risk.	Status unchanged.
3.16 – Promote the NFIP CRS to local governments.	1, 2, 4	High	WEM, FEMA, WAFSCM, ASFPM	This reduces flood risk by rewarding communities for meeting CRS goals with lower insurance premiums.	Two CRS workshops were held in FY2010, more will be held in FY2013.
3.17 – Participate in the Regional Flood Risk Management Team	1, 4	Medium	WEM, USACOE, FEMA	The Team will help ensure long-term mitigation planning is taken into account when implementing flood recovery measures.	New action item.
3.18 – Implement a new burning permit process.	1, 2	Medium		People will be required to check burning restrictions daily which will reduce the risk of fire.	New action item.
3.19 – Promote Fire Prevention Week throughout the state.	1, 2	Medium	WEM	Public education about fire prevention will help reduce the risk of fire.	New action item.
3.20 – Create and maintain an interactive county map on the DNR website showing the current fire danger.	1, 2	Medium	WEM	Public access to the most current fire danger information will help reduce the risk of fire.	New action item.

Action	Goal(s) Met	Priority	Supporting Agencies	Contribution to Mitigation Strategy	2011 Update Status
Lead Agency: DNR (continued)					
3.21 – Promote the concept of Firewise Communities USA statewide.	1, 2, 4	Low	WEM, FEMA, USDA, State Fire Chiefs' Association	This program encourages action that minimizes home loss to wildfire and protects lives.	Four additional communities are now participating in the program bringing the total to 14.
3.22 – Promote the creation of Community Wildfire Prevention Plans.	1, 3	Low	WEM	This provides an opportunity to address fire hazards along the wildland/ urban interface.	New action item.
3.23 – Identify permanent fire mitigation projects that can be supplemented by ongoing temporary fire mitigation projects.	1, 4	Low	WEM	Permanent fire mitigation projects will help reduce the risk of fire.	New action item.
Lead Agency: Department of Health Services (DHS)					
4.1 – Survey healthcare facilities for the use of NOAA weather radios and severe weather response plans to enable DHS and WEM to pursue funding for these activities.	1	High	WEM	This project further advances the goal of saving lives in severe weather events.	By the end of 2011, the Division of Quality Assurance (DQA) survey health facilities about the use of NOAA radios. In 2012, DQA will pursue funding for the radios.
4.2 – Conduct public health hazard risk assessments at all local and tribal health departments throughout the state.	1, 4	High	CDC, WEM, WAHLDAB, EMS, HPP, local and tribal health departments	This will identify risks to health departments, allowing them to take action to reduce the risks.	New action item. The risk assessments will be complete by July 31, 2012.
Lead Agency: Department of Safety and Professional Services - Safety and Buildings Division (DSPS-SB)					
5.1 – Train municipal fire departments on the use of the National Fire Incident Reporting System and work to collect information on all fire incidents in the state. Data collected is directly uploaded to FEMA and then used to develop new policies and laws for fire-safe construction.	1, 4, 5	High	State Fire Chiefs' Association	Effective regulations for fire-safe construction will decrease fire hazards and losses.	Status unchanged.

Action	Goal(s) Met	Priority	Supporting Agencies	Contribution to Mitigation Strategy	2011 Update Status
Lead Agency: DSPS-SB (continued)					
5.2 – Require all fire departments within the state to inspect existing commercial buildings annually and provide them guidance in doing so. Routine inspections are performed to ensure the existing building still meets its design-specific building code requirements.	1, 4, 5	High		Fire-safe buildings are at a lower risk of fire hazards and losses.	Status unchanged.
5.3 – Provide for Administrative Code changes to adopt the 2011 edition of the National Electrical Code (NEC). The rule will affect any building or structure within the state in which electrical wiring will be installed.	1, 4, 5	High		Fire-safe installation of electric wiring decreases the risk of fire hazards and losses.	SB is now adopting the 2011 NEC with an estimated effective date of April 1, 2012.
5.4 – Adopt the 2009 editions of the national model codes from the International Code Council and the National Fire Protection Association.	1, 5	High		Constantly looking at ways to improve and incorporate mitigation actions into government legislation is a key to successful mitigation.	Status unchanged.
5.5 – Address the disaster resistance of manufactured homes by reviewing tie-down standards, installation standards, and inspection standards.	1, 5	Medium		Constantly looking at ways to improve and incorporate mitigation actions into government legislation is a key to successful mitigation.	Status unchanged.
5.6 – Enforce the requirement to inspect structures and buildings when permitting construction projects to ensure compliance with state building codes. Municipalities can apply to become designated agents to enforce building codes.	1, 5	High		These safety inspections promote disaster resistance and ensure public safety.	Status unchanged.
5.7 – Create and maintain a tracking system for all Privately Owned Wastewater Treatment Systems (POWTS).	1, 5	Medium		Having this information will aid in determining the status of POWTS systems following flood events.	The State tracks all POWTS established since 2007. County governments track all POWTS in their county.
5.8 – Require carbon monoxide detectors in all existing residential occupancies with fuel burning appliances.	1, 5	Medium		This will protect occupants of residential occupancies against possible carbon monoxide leaks during the recovery period after a disaster.	The rules requiring carbon monoxide detectors went into effect January 1, 2011
5.9 – Require the inspection of all electrical construction within commercial buildings through the statewide Electrical Inspection Program.	1, 5	Medium		Ensuring all electrical wiring within commercial structures meets the minimum national code requirements will enhance building survivability and life safety in the event of a disaster.	Status unchanged.

Action	Goal(s) Met	Priority	Supporting Agencies	Contribution to Mitigation Strategy	2011 Update Status
Lead Agency: DSPS-SB (continued)					
5.10 – Develop and implement rules requiring statewide electrical inspection for all buildings.	1, 5	Medium		This will ensure that wiring meets appropriate codes, reducing the risk of damages in a disaster.	New action item.
5.11 – Require statewide licensing of all electrical workers.	1, 5	Medium		This ensures all electrical wiring is installed and maintained by people who have demonstrated competency. This will aid in the survivability of structures following a disaster.	Status unchanged.
5.12 – Participate at the national level on code development for the National Fire Alarm Code.	1, 5	Medium		This establishes minimum standards for mass notification systems. Mass notification systems inform building occupants and personnel in the area of appropriate responses in emergencies. This will help reduce loss of life and property.	Status unchanged.
5.13 – Consider the adoption of the International Residential Code written by the International Code Council.	1, 5	Medium		Use of the International Residential Code would improve the level of construction of all one- and two-family homes within Wisconsin. This standard is proven to enhance the survivability of structures and the safety of occupants.	Status unchanged.
Lead Agency: Office of the Commissioner of Insurance (OCI)					
6.1 – Distribute hazard mitigation materials to insurance companies, agents, and consumers to support the Wisconsin Hazard Mitigation Team in developing, establishing and implementing permanent and viable statewide mitigation programs.	1, 2, 4	Low		This will expand mitigation education in Wisconsin.	Status unchanged.
Lead Agency: Public Service Commission of Wisconsin (PSCW)					
7.1 – Encourage telecommunication utilities to obtain information about floodplains in advance of construction and avoid construction in these areas.	1, 5	Medium		Continuing oversight will help to keep telecommunications utilities focused on mitigation and will minimize service disruptions.	Status unchanged.
7.2 – Perform hazard mitigation reviews for electric, natural gas, and water utility construction projects.	1, 5	High		Continuing oversight will help to keep utilities focused on mitigation and will minimize service disruptions.	Status unchanged.
7.3 – Continue to educate the public about safety issues related to natural hazards at electric and natural gas utilities.	1, 2	High		Public education and outreach will be improved by this activity.	Status unchanged.

Action	Goal(s) Met	Priority	Supporting Agencies	Contribution to Mitigation Strategy	2011 Update Status
Lead Agency: Department of Transportation (DOT)					
8.1 – Present information about the PA and HMA programs at the annual County Highway Association Commissioner training.	1, 2, 4	Medium	WEM	This will keep Highway Commissioners informed about the programs and keep mitigation involved in discussions of future highway projects.	New action item.
8.2 – DOT will coordinate with WEM to sponsor a workshop for DOT engineers, technicians, and other staff to review the components of post-disaster damage and mitigation programs.	1, 2, 4	Low	WEM, FEMA	Conferences, workshops, and trainings are ways to reach multiple agencies and citizens to advance mitigation knowledge.	Still on hold. If time and resources become available, this project may move forward.
8.3 – As a disaster unfolds, send an email alert to DOT field staff reminding them to keep track of costs for possible reimbursement from the PA program and to keep in mind the possibility of assisting with Preliminary Damage Assessments.	1, 4	Medium	WEM	This will allow DOT to claim as much reimbursement as possible and prepare them for assisting with Preliminary Damage Assessments.	New action item.
Lead Agency: University of Wisconsin - Cooperative Extension					
9.1 – Develop guidance for businesses for continuing operations if affected by disaster.	1, 2	Low	WEM	Making businesses aware of planned contingencies and options during major operational disruption can minimize human and economic loss.	Status unchanged.
9.2 – Integrate hazard mitigation concepts into local extension programs for community development, lake and watershed management, farm management and housing development.	1, 3	Medium	WEM, WCMP, DOA, DNR	The more efforts made to expand mitigation awareness and proper land management, the more damage prevention and preparation will occur within the state.	Status unchanged.
Lead Agency: Department of Military Affairs - Division of Emergency Management (WEM)					
10.1 – Administer the HMGP, FMA, and PDM programs.	1, 3, 5	High	WHMT, RPCs	WEM will continue to solicit applications for these funds in order to reduce property losses and save lives in Wisconsin caused by disasters.	WEM has administered over $86 million in funds from the HMGP, FMA, and PDM programs.
10.2 – Develop uniform guidance for providing replacement and supplemental housing assistance.	1, 4	Medium	DOA-DH, DNR	This will streamline the process of receiving replacement and/or supplemental housing assistance, making recovery quicker.	New action item.

Action	Goal(s) Met	Priority	Supporting Agencies	Contribution to Mitigation Strategy	2011 Update Status
Lead Agency: WEM (continued)					
10.3 – Promote mitigation for the public using the WEM website.	1, 2, 3	High	DNR, DOA, WCMP, OCI, DHS, DATCP, RPCs	Public education and outreach will be improved by this activity.	Status unchanged.
10.4 – Develop and document mitigation success stories. Publish them on the WEM website.	2, 4	High	FEMA	The goal in sharing success stories is to motivate communities to come up with solutions to better withstand the next disaster and prevent future damage.	Loss avoidance studies and best practices stories have been written for many of WEM's mitigation projects.
10.5 – Work with the OCI to promote public education about flood insurance during Flood Safety Awareness Week	1, 2, 4	High	OCI	Promoting flood insurance education will increase the number of policies which will in turn decrease losses from flood events.	New action item.
10.6 – Create an online flood insurance education course for insurance agents.	1, 2	High	OCI	Agents will be able to encourage consumers to purchase flood insurance which will decrease losses from flood events.	New action item.
10.7 – Research the possibility of requiring all insurance agents to complete a course in flood insurance periodically.	1, 2	High	OCI	This will increase the promotion of flood insurance to consumers which will increase flood insurance participation, thereby decreasing losses from flood events.	New action item.
10.8 – Create links form WEM's Recovery website to OCI's websites about flood insurance.	1, 2, 4	High	OCI	This will allow for easier access to flood insurance information which will increase participation, thereby decreasing losses from flood events.	New action item.
10.9 – Develop a GIS layer identifying historic and archaeological sites in the 100-year floodplain.	1, 3	Medium	WHS, DNR, FEMA	By decreasing the impact to these historical sites in the disaster recovery phase, preservation of Wisconsin's historical and archeological areas will be secured.	Status unchanged.
10.10 – Research and identify GIS resources that would assist WEM and local governments in developing their mitigation programs.	1, 3	High	RPCs	Ongoing mitigation efforts lessen the impact that disasters have on people's lives and property through damage prevention.	Status unchanged.
10.11 – Update the State Hazard Mitigation Plan to include technological and man-made hazards.	1, 3	High	WHMT	Identifying and subsequently mitigating man-made and technological disasters will be of benefit to the citizens of Wisconsin and reduce risk to property and life.	Status unchanged.

Action	Goal(s) Met	Priority	Supporting Agencies	Contribution to Mitigation Strategy	2011 Update Status
Lead Agency: WEM (continued)					
10.12 – Incorporate mitigation into WEM's Strategic Plan and work with other agencies to do the same.	1, 3, 4	Medium	WHMT	Cooperation and communication between agencies and sharing of goals and priorities is one way to accomplish the strategy set forth in this document.	Status unchanged. The DMA is planning to update the Strategic Plan in 2012.
10.13 – As local and tribal plans are completed, incorporate pertinent information into the State Hazard Mitigation Plan.	1, 3	High	WHMT	Providing a complete assessment of state and local hazard mitigation priorities is required by law.	Additional jurisdictional plans were incorporated into this update including a new section highlighting best practices.
10.14 – Develop a structure inventory and risk assessment for state-owned and -operated buildings.	1, 3, 5	High	DOA	A state structure inventory will inform hazard preparation for state-owned and -operated buildings.	WEM has only received information from the DOC thus far.
10.15 – Continue to lead the WHMT in establishing and implementing a statewide mitigation program.	1, 4	High		Interagency cooperation in expanding mitigation education in Wisconsin accomplishes several goals in the Mitigation Strategy.	Status unchanged.
10.16 – Encourage EM directors to work with LEPCs to participate in local hazard mitigation planning activities.	1, 3	Medium		Mitigation planning at the local level is required by statute.	Status unchanged.
10.17 – Promote use of FEMA's HAZUS hazard-analysis, GIS-based software.	1, 3	Medium	RPCs	With the addition of the flood and wind module, HAZUS-MH may provide Wisconsin with a hazard-specific analysis tool for estimating potential losses.	WEM staff continues to update the flood risk analysis HAZUS component.
10.18 – Attend training on the HAZUS-MH software and determine its feasibility for use in Wisconsin.	1, 3	Medium	FEMA, RPCs	The information that will result from inputting critical facility data and damage-type information will help reduce losses in future disasters.	WEM staff is continually attending HAZUS training.
10.19 – After HAZUS-MH training, provide information to local governments about it as a tool in mitigation planning.	1, 3	Medium	WHMT, RPCs	HAZUS-MH can provide critical risk assessment information that will allow communities to better prepare for disasters and mitigate damage.	HAZUS training to locals is not provided regularly, but WEM staff is available to field questions as needed. HAZUS runs completed by WEM are sent to the counties.
10.20 – Identify pre-disaster mitigation techniques that can be funded through Section 406.	1, 4	Medium	FEMA, DOT, DOA, DNR, PSCW	Identifying techniques prior to a disaster will allow field staff to be properly trained to recognize opportunities for mitigation through Section 406.	Status unchanged. WEM has met with DOT to discuss training field staff to identify Section 406 mitigation measures as disaster repairs are being made.

Action	Goal(s) Met	Priority	Supporting Agencies	Contribution to Mitigation Strategy	2011 Update Status
Lead Agency: WEM (continued)					
10.21 – Attend training and continue to build expertise in Benefit-Cost Analyses.	1, 4	High	FEMA	BCA is a required element of applying for mitigation funds.	WEM hosted BCA workshops conducted by FEMA in 2009 and 2011.
10.22 – Provide training and technical assistance to local governments and tribal organizations on FEMA's e-grants system.	1, 4	Medium	FEMA	The e-grant process will be a required element for applying for FEMA's mitigation funds.	Status unchanged.
10.23 – Revise the Resource Guide to All-Hazards Mitigation Planning in Wisconsin and post it on the WEM and DOA websites.	1, 3, 4	High	DOA	The guide functions to assist local communities in mitigation and comprehensive planning efforts. It is outdated. An update will make it more useful and posting it on the websites will make it more accessible.	New action item.
10.24 – Continue to administer FEMA's HMA grant programs.	1, 3, 5	High	WHMT member agencies	This is a key element to the mitigation strategy.	WEM has administered over $86 million in HMA funds.
10.25 – Promote the purchase and use of NOAA weather radios.	1, 2	High		Reducing the threat to lives will be realized by the use of radios in private residences and in schools, critical facilities, and daycare centers.	Status unchanged. WEM has administered grants to purchase NOAA weather radios.
10.26 – Participate in conferences and give presentations to promote mitigation to local interest groups and associations.	1, 2, 3, 5	Medium	DNR, UW-Extension, WCMP, RPCs	WEM staff can reach local audiences and reinforce that mitigation planning and activities occur at the local level. More education can always be accomplished.	WEM continues to promote mitigation whenever possible.
10.27 – Continue to develop and use the WEM mitigation information display.	1, 2, 4	High	RPCs	Continuing outreach efforts meets multiple goals of expanding public awareness, supporting interagency cooperation and promoting mitigation techniques.	Display is updated as needed and utilized at conferences and trainings.
10.28 – Include the Hazard Mitigation Planning Workshop in WEM's training curriculum and the EM certification program.	1, 3, 4	High	RPCs	This action enables mitigation measures through planning efforts.	The workshop is part of the EM certification program and is held at least once a year.
10.29 – Continue to develop guidance and resource information that will assist with the development of local mitigation plans.	1, 3, 4	High	RPCs	This raises awareness of mitigation assists with the local planning process, which is now required by law.	WEM will work to update the Resources Guide and continue to hold the Hazard Mitigation Planning Workshop.
10.30 – Identify and develop GIS applications to be used as a mitigation tool.	1, 3, 4, 5	High	DNR, RPCs	This will help minimize damages.	Maps identifying repetitive loss properties and mitigation projects were completed.

Action	Goal(s) Met	Priority	Supporting Agencies	Contribution to Mitigation Strategy	2011 Update Status
Lead Agency: WEM (continued)					
10.31 – Work with Wisconsin universities to develop Disaster Resistant University Plans.	1, 3, 4	Medium		These plans will guide mitigation actions which help save lives and property.	UW-River Falls developed a mitigation plan. UW-Superior participated in Douglas County's plan. UW-Madison is currently developing a plan.
10.32 – Annually update the Green Sheet to assist in environmental reviews for hazard mitigation projects.	1, 4, 5	Medium	WHMT, FEMA	This resource guide is used by federal, state, and local governments to understand environmental laws and policy requirements.	The Green Sheet is updated after each disaster declaration.
10.33 – Maintain the Wisconsin Recovery Task Force as a standing task force.	1, 4, 5	High	WRTF member agencies	It is recommended that semi-annual meetings be held to ensure preparedness and facilitate effective operational readiness of the task force following a disaster declaration.	Status unchanged.
Lead Agency: Wisconsin Historical Society (WHS)					
11.1 – Use GIS to identify and map locations of known historical and archaeological sites in floodplains.	1, 5	Medium	DOA, DNR	By decreasing the impact to these historical sites in the disaster recovery phase, preservation of Wisconsin's historical and archeological areas will be secured.	Status unchanged.
11.2 – Provide ongoing support and coordination with the WHMT in developing, establishing, and implementing a permanent and viable statewide mitigation program while protecting historical and cultural resources.	1, 4, 5	High	WEM, WHMT	Interagency cooperation in expanding mitigation education in Wisconsin accomplishes several goals in the Mitigation Strategy.	Status unchanged.
Lead Agency: National Weather Service (NWS)					
12.1 – Achieve near 100% NOAA weather radio tower coverage in the state.	1, 2	High	WEM	This action will help protect people during severe weather events.	Status unchanged.
Lead Agency: Wisconsin Economic Development Corporation (WEDC)					
13.1 – Develop an Economic Recovery Framework to help businesses recover following a disaster.	1, 2, 4	Medium	DOA-DH, WEM	This will hasten business recovery, thereby minimizing losses.	New action item.
13.2 – Target business-related mitigation materials to Wisconsin businesses, especially in vulnerable areas.	1, 2	Medium		This action is further advancing the goal of saving lives and reducing damage in severe weather events.	Status unchanged.

Action	Goal(s) Met	Priority	Supporting Agencies	Contribution to Mitigation Strategy	2011 Update Status
All Agencies					
14.1 – Provide incentives when grant proposals address hazards with appropriate mitigation measures.	1, 4, 5	High		State funded mitigation grant proposals can only benefit the residents of Wisconsin and further the goals in the State Mitigation Plan.	Status unchanged.
14.2 – Seek out opportunities to sponsor low-cost hazard mitigation demonstration projects.	1, 2, 4, 5	Medium		Implementing mitigation demonstration projects sets an example to all communities that mitigation clearly reduces damage.	Status unchanged.

SECTION 5: LOCAL HAZARD MITIGATION PLANNING

The Mitigation staff of the Wisconsin Emergency Management (WEM) works with counties and local jurisdictions to encourage and support all-hazards mitigation planning since publication of the hazard mitigation planning regulations (44 CFR Parts 201 and 206) in the Federal Register dated February 26, 2002. On July 1, 2008, the Final Rule was published to include local mitigation plan update requirements and the Tribal Multi-Hazard Mitigation Planning Guidance (44 CFR 201.7). The updated local and tribal guidance was designed for three major objectives:

1. To help local jurisdictions develop and adopt new mitigation plans or revise existing mitigation plans to meet the requirements of 44 CFR Part 201;
2. To help federal and state reviewers evaluate mitigation plans from different jurisdictions in a fair and consistent manner; and
3. To help local jurisdictions conduct comprehensive reviews and prepare updates to their plans to meet the requirements of 44 CFR Part 201.

On October 31, 2007, FEMA published amendments to the 44 CFR Part 201 and 72 Federal Register 61720 to incorporate mitigation planning requirements for the Flood Mitigation Assistance (FMA) program. The amendments impacted 44 CFR §201.6, Local Mitigation Plans, as follows:

1. Combined the Local Mitigation Plan requirement for all hazard mitigation assistance programs under 44 CFR §201.6 to include the FMA as well as the HMGP, PDM, and SRL programs, thus eliminating duplicative mitigation plan regulations;
2. Incorporated the requirement for communities with National Flood Insurance Program (NFIP) insured properties that have been repetitively damaged from floods to address such properties in their risk assessment and mitigation strategy; and,
3. Incorporated the requirement for communities that participate in the NFIP to include a strategy for continued compliance with the NFIP.

As of October 1, 2008, these three amendments must be included in the DMA2K plans to be FEMA approved.

5.1 FUNDING OF LOCAL PLANNING EFFORTS

Prior to the publication of the planning regulations in 2002, the only funds available for mitigation planning were through the FMA program. Planning was limited to addressing only flood hazards in a community and not all hazards. Between 1996 and 2007, WEM received $118,931 for the development of comprehensive local flood mitigation plans. Planning grants were awarded to 13 jurisdictions during this timeframe and have been formally approved by FEMA. Since 2007, WEM has not applied for FMA planning grants.

The City of Darlington was the first community in the state to have an approved flood mitigation plan that met the FMA planning requirements. The plan was funded with regional hazard mitigation assistance and local funds.

In 2002, each state was eligible for Pre-Disaster Mitigation (PDM) funds based on one percent of the PDM appropriation of $25 million. The remaining balance of the funding was based on each state's percentage of total US population. Wisconsin received $376,883 (WEM received an additional $100,000 that was left over from other states in Region V, totaling $476,883) in federal funds. A 25% local match was required.

For the FFY02 PDM funding cycle, planning grant applications were solicited statewide. Forty applications were received totaling $1,765,185.51 with $635,844 available. Thirty of the applications were for countywide plans, nine were for single jurisdictions, and one for a tribal government. (Two tribal governments applied directly to FEMA for planning grant funds.)

Each application was reviewed, scored, ranked, and prioritized. At that time, grants were awarded based on the following criteria:

- Those that already had an approved flood hazard mitigation plan
- Those that were in the process of developing a flood mitigation plan either through FMA or because of a federal HMGP grant condition
- Those that had to develop a plan due to a state HMGP grant condition
- With remaining funds, try to fund at least one application in each WEM region considering risk and past disaster history

Based on the above strategy, funds were awarded to thirteen counties and five single jurisdictions for the development of all-hazards mitigation plans. In addition, FEMA provided planning grants directly to three of the states' tribal governments.

The 2003 PDM budget provided $150 million nationwide. FEMA distributed $248,375 in federal funds to each state. WEM received twelve applications totaling $545,000 with $331,167 available. Ten applications were for countywide plans and two for tribal governments. Seven planning grants were awarded through the allocation and the other five planning grants were submitted through the new PDM-Competitive grant process and received funding (three counties and two tribal governments). In addition, one tribal organization applied directly to FEMA as a grantee and received funding.

The State of Wisconsin has been very successful in securing hazard mitigation plan funding, especially through the PDM-Competitive program. PDM planning grants were awarded in 2005-2011 as follows:

- 2005 PDM cycle funded 16 planning grants to develop all-hazards mitigation plans.
- 2006 PDM cycle funded the development of three all-hazards mitigation plans.
- 2007 PDM cycle funded Dane County's plan update, UW-River Falls' hazard miti-

gation plan, and five counties' all-hazard mitigation plan development.

- 2008 PDM cycle funded seven plan updates.
- 2009 PDM cycle funded nine plan updates and one new plan.
- 2010 PDM cycle funded seven plan updates and two new plans.
- 2011 PDM cycle funded six plan updates and one new plan.

Appendix D Table D.6 provides details on the counties and communities that have received PDM planning grants.

DMA2K also authorized 7% of HMGP funds to be used for developing and updating mitigation plans. Based on the above application selection criteria and the amount of funding availability, WEM has also utilized the 7% planning funds available under federal declarations 1332-DR, 1369-DR, 1429-DR, 1432-DR, 1526-DR, 1719-DR, 1768-DR and1933-DR to fund another 33 plans. Appendix D Table D.2 shows the counties and communities that have received HMGP planning grants. Two more countywide plans have been developed under the Project Impact initiative (see Section 7). 68 of the 72 counties in Wisconsin have completed or are developing all-hazards mitigation plans as of June 30, 2011. Additionally, 7 single jurisdictions and 7 tribal governments have completed or are developing plans with PDM or HMGP.

Figures 5.1-1, 5.1-2, and 5.1-3 are on the following pages. Figure 5.1-1 shows the status of local hazard mitigation planning grants from 2002-2011 in the State. Figure 5.1-2 shows the plans that were approved in 2005, 2008 and 2011. The areas in pink are the tribal plans, the areas in orange are single-jurisdiction plans, and the areas in green are countywide plans. Figure 5.1-3 shows the planning status of all counties in Wisconsin.

5.2 HAZARD MITIGATION PLANNING PROGRAM PROCESS

In 2011, almost all counties in the State of Wisconsin have gone through the initial plan development phase. In addition, more than half of the counties with approved plans are in process of a five-year plan update.

WEM gives funding priority to those communities that have yet to develop a plan and/or are in a county included in the most recent federal disaster declaration. Additional priority is given to counties with plans expiring in the next two years. The ranking and prioritization of grant applications is based on the following criteria:

- Budget and local share secured
- Reasonable work schedule
- Description of the planning process
- Geographic and political areas to be covered in the plan
- Reference maps attached
- Population to be covered by the planning area

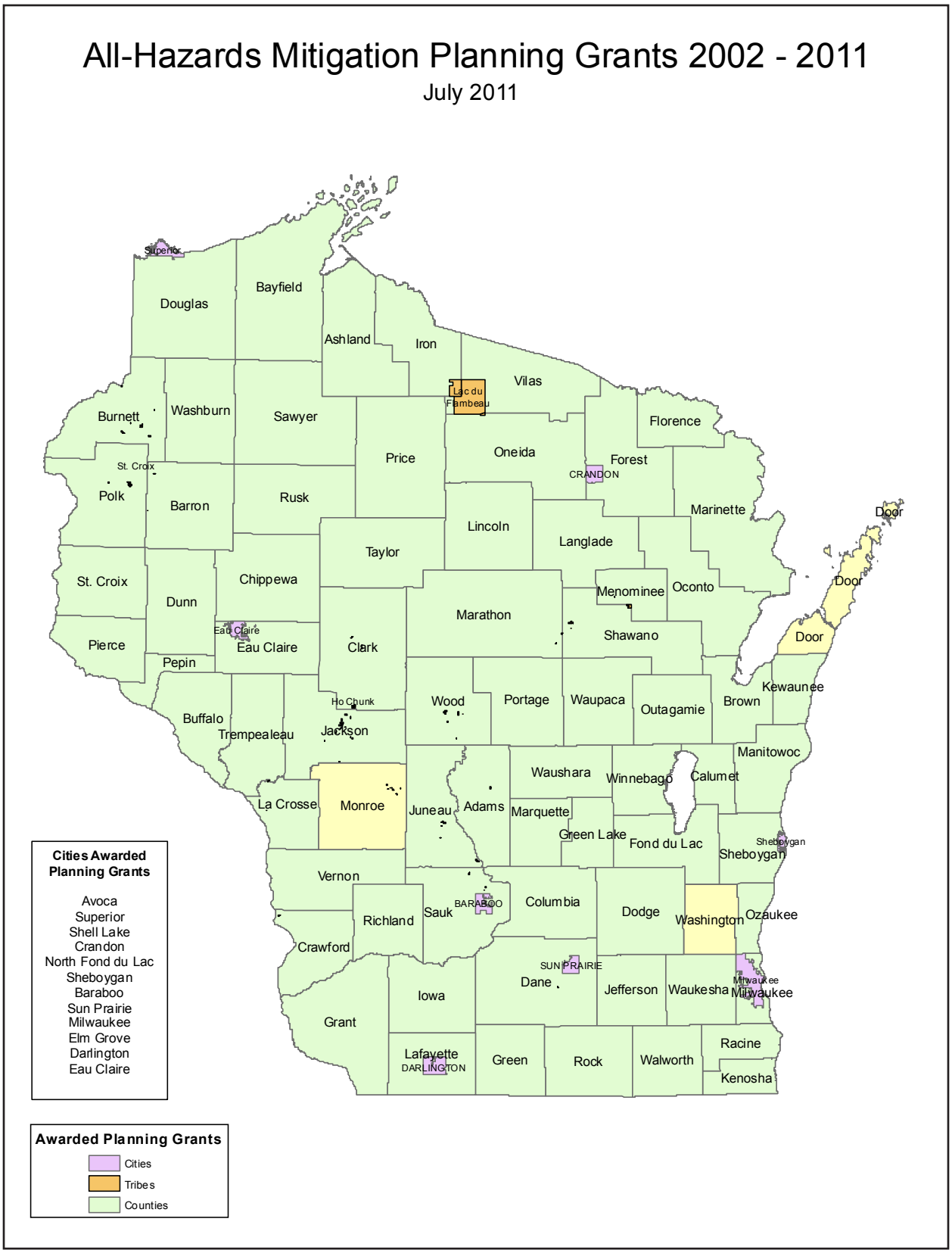
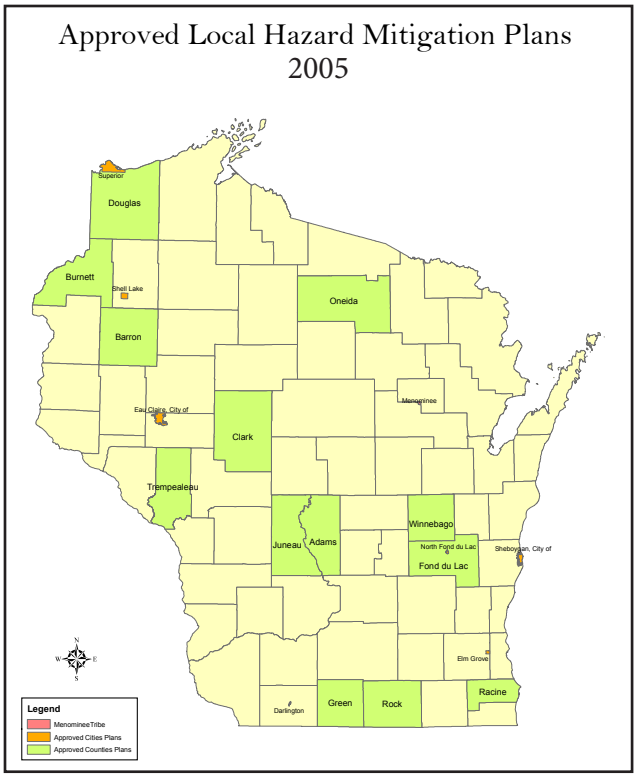
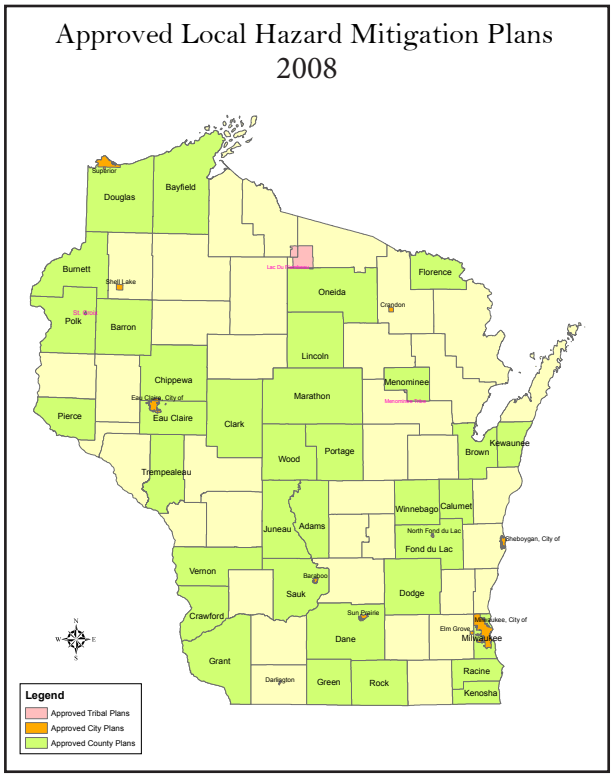


Figure 5.1-1 Local Hazard Mitigation Planning Grants, 2002-2011
Source: WEM, 2011.





- Is the community small and impoverished?
- Description of the hazards to be included
- Description of the problems
- Other community planning initiatives
- Expected benefits of the planning process
- Is the county in a disaster declared area?
- Does not have a plan
- Plan expiration date

The above criteria apply to PDM, FMA, and HMGP planning grant applications. Per FEMA guidance, FMA planning grant funds can only be used for the flood mitigation component of the all-hazards mitigation plan.

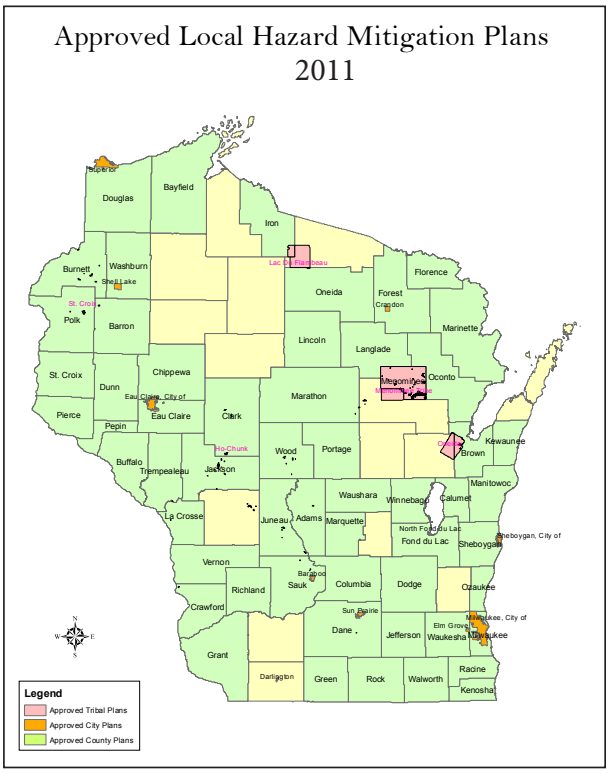


Figure 5.1-2 Local Hazard Mitigation Plan Approvals, 2005, 2008, 2011
Source: WEM, 2011.

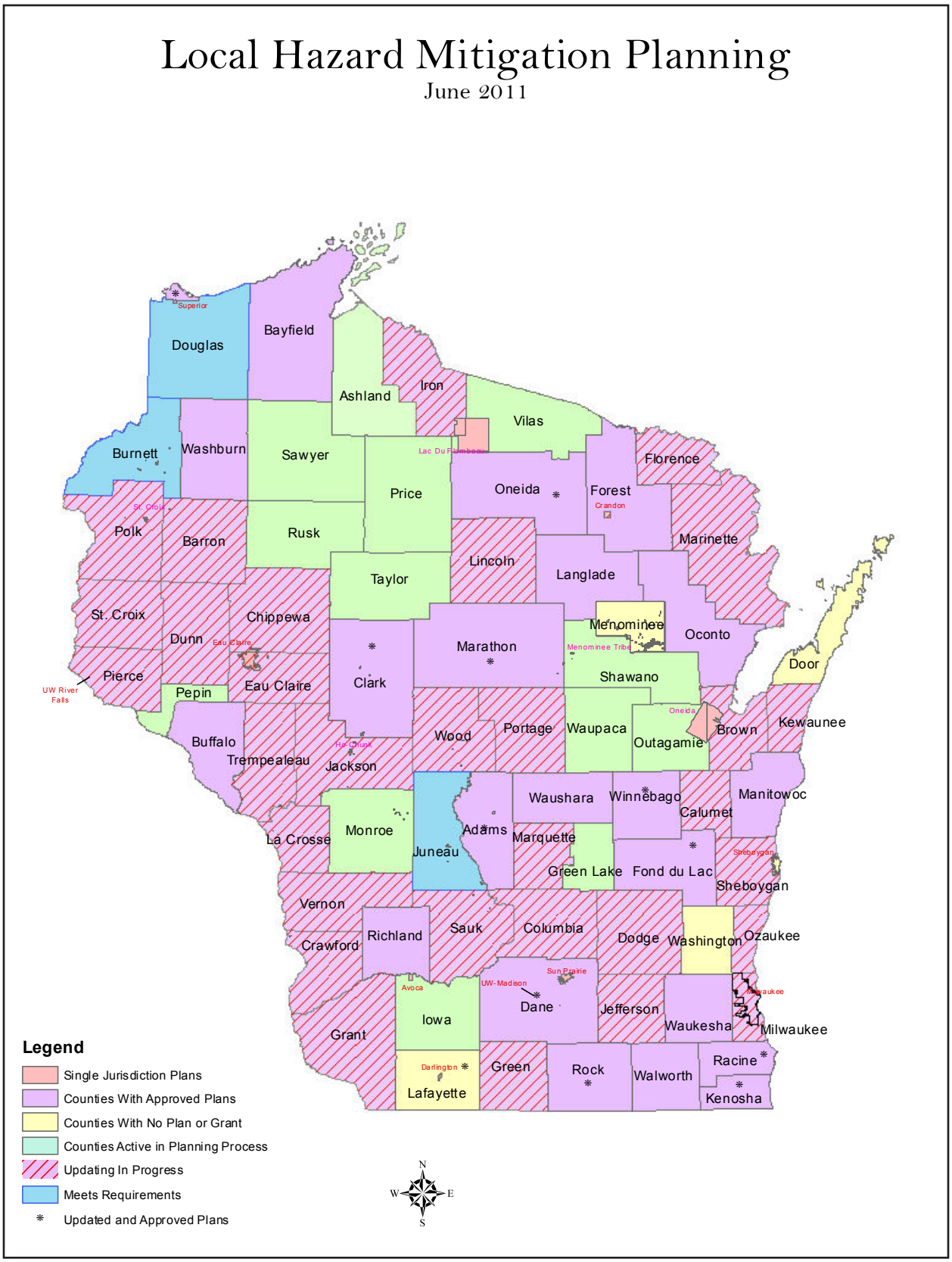


Figure 5.1-3 Local Hazard Mitigation Planning Status, 2011
Source: WEM, 2011.

The mitigation plan can be a separate, stand-alone plan or part of a comprehensive plan. In addition, plan participation can be single-jurisdiction, countywide, or other multi-jurisdictional such as by region or watershed. Some counties may develop their hazard mitigation plan as an annex to their Emergency Operations Plan.

In Wisconsin there are 72 counties, 1,850 local jurisdictions (585 cities and villages, and 1,265 towns). Due to the large number of local jurisdictions in the state, limited funds available for planning, and personnel limitations, WEM has determined that countywide mitigation plans should be encouraged and will receive priority in funding decisions. The countywide plan refers to the hazard mitigation plan for the county and includes all the incorporated and unincorporated areas of the county, unless otherwise stated. Any jurisdiction within a county may prepare a mitigation plan specific to that jurisdiction, separate from the countywide mitigation plan.

WEM works closely with the local governments to provide technical assistance in plan development. Draft mitigation plans and completed review crosswalks are submitted to WEM mitigation staff for review and comment. Based on the criteria and guidance, review comments are provided to the community. The review ensures that each plan meets the requirements of 44 CFR Part 201, complies with existing federal and state policies and regulations, and complements the State of Wisconsin Hazard Mitigation Plan and State mitigation priorities.

Plans are reviewed on a first-come, first-served basis with every effort to complete the review within 45 days of submission. Once the plan meets all of the required planning criteria, mitigation staff notifies the community that the plan will be sent to FEMA for review. State mitigation staff completes a final crosswalk and submits the final plan in electronic format. FEMA then reviews the plan and either requests additional revisions or issues a conditional approval letter. Once FEMA issues the conditional approval letter, the county and participating jurisdictions can formally adopt the plan.

Future mitigation projects and initiatives are based on those identified in the local hazard mitigation plans. Jurisdictions are allowed the flexibility to add and subtract established mitigation projects as priorities, funding, and situations change. The ongoing mitigation strategy review process is a vital process for the State and local governments.

5.3 TECHNICAL RESOURCES

WEM mitigation staff provides ongoing support through technical assistance and guidance to counties and communities developing all-hazards mitigation plans. Assistance provided includes, but is not limited to:

- Meeting with communities to review mitigation planning requirements.
- Conducting annual All-Hazards Mitigation Planning Workshops for communities and consultants developing or updating hazard mitigation plans. Since the 2004 plan, workshops have been held at least annually for a total of 13 general work-

shops and one tribal workshop. Class attendees receive all class and supplemental information in a binder and on a CD. In addition, the information is posted to WEM's Hazard Mitigation website.

- Providing written and oral guidance. All communities developing or updating mitigation plans are provided a copy of the Resource Guide to All Hazards Mitigation Planning, the FEMA State and Local Hazard Mitigation Planning How-to-Guides, and the Multi-Hazard Mitigation Planning Guidance Under the DMA2K (dated July 2008), as well as other planning documents.
- Delivering technical assistance through reviewing sections of plans under development and providing feedback.
- Relaying relevant information obtained from FEMA.
- Identifying information sources available through state and federal agencies, locally and nationally.
- Interpreting state and federal guidelines.
- Distributing planning examples and making approved plans available.
- Providing information via WEM's website. The website provides:
  - Local Hazard Mitigation link:
    - Resource guides and tools for developing local all-hazards mitigation plans
    - Approved local hazard mitigation plans
    - Guidance and crosswalk
    - Individual county flood risk assessments
  - State Risks and Hazard Mitigation link:
    - Information on the hazards that impact the state
    - Repetitive loss information
    - State Hazard Mitigation Plan
- Writing and distributing via email planning updates to provide local governments with the latest information, guidance, and suggestions related to hazard mitigation planning.
- Providing information on repetitive loss properties and NFIP claim information as well as disaster payments for the community.
- Promoting all-hazards mitigation planning at various WEM trainings such as:
  - New Directors Series
  - Introduction to Emergency Management
  - Disaster Response and Recovery Course
  - Pre-conference training session at the Governor's Conference
  - Local damage assessment classes
- Informing Wisconsin Association of Floodplain, Stormwater, and Coastal Managers membership on all-hazards mitigation programs and planning through the newsletter and annual conference.

- Traveling mitigation display that has been showcased at various conferences including the following:
  - Governor's Conference on Homeland Security and Emergency Management
  - Wisconsin Emergency Management Association Conference
  - Wisconsin Association for Floodplain, Stormwater, and Coastal Managers Conference
- Writing hazard mitigation planning articles in various newsletters like the DNR Floodplains quarterly newsletter.
- Presenting to the UW Student Planning Association the process and benefits of hazard mitigation planning.

Publications

To assist communities in developing flood mitigation plans, in 1995 the Department of Natural Resources developed the Wisconsin Community Flood Mitigation Planning Guidebook. In addition to the guidebook, WEM developed additional planning guidance to meet FMA planning requirements. The guidebook and guidance were provided to assist local governments in developing local flood mitigation plans and focused on the planning process. WEM and WDNR conducted several flood mitigation planning workshops throughout the state for those communities interested in developing plans.

In 2002 FEMA provided a one-time grant in the amount of $50,000 to the states for developing a statewide strategy for the newly created Pre-Disaster Mitigation (PDM) program. The grants were to assist the states in preparing for and developing processes and procedures for implementing the program. The State used the funds to contract with the Council of Regional Planning Commissions to develop local mitigation planning guidance. Members of the Council are representatives from the nine Regional Planning Commissions throughout the State. The Resource Guide to All Hazards Mitigation Planning in Wisconsin was completed and has been used to provide guidance to local and tribal governments developing mitigation plans. The Guide is utilized at planning workshops and distributed upon request. The Guide can be found on WEM's website at http://emergencymanagement.wi.gov.

One of the mitigation action items of Wisconsin Emergency Management listed in the 2011 State of Wisconsin Hazard Mitigation Plan is to update the 2003 Resource Guide to All Hazards Mitigation Planning in Wisconsin to include new planning regulations and guidance.

5.4 STATE HAZARD MITIGATION PLANNING

The State of Wisconsin also benefitted from the 2005 and 2007 PDM programs. WEM received a FFY05 planning grant to assist with the state structure inventory. In addition, WEM received a FFY07 PDM planning grant to assist in the three-year State Plan update. Some of the FFY07 planning funds were used to do a statewide HAZUS analysis for all counties. WEM contracted with the University of Wisconsin Land Information and Com-

puter Graphics Facility (LICGF) and the Polis Center to complete a statewide flood risk assessment. The results of that risk assessment can be found in Section 3 of this plan. Each of the 72 Wisconsin counties received its respective flood risk assessment that can be incorporated into its hazard mitigation plan. Finally, some of the FFY07 planning funds were used to help in the 2011 State of Wisconsin Hazard Mitigation Plan Update.

The integration of local plans and the State Plan is a priority for WEM and FEMA. This three-year update of the State of Wisconsin Hazard Mitigation Plan chose to focus on integrating the local mitigation plans of 19 communities adjacent to the following major bodies of water: the Kinnickinnic, Mississippi, St. Croix, and Wisconsin rivers; and lakes Michigan and Winnebago. Due to the sheer number of completed and approved local mitigation plans in the state, it would have been an overwhelming task to review and incorporate them all. In addition to an analysis of those 19 plans, for this update, WEM profiled several other plans that highlight current trends and best practices in local planning.

5.4.1 Goals, Existing Strategies, and Proposed Strategies

After an analysis of the 19 focus counties' hazard mitigation goals, strategies, and projects, it can be surmised that the State of Wisconsin and local governments generally have the same hazard mitigation objectives. In 2005, the State of Wisconsin identified five hazard mitigation goals in its initial plan, which were updated with very minor revisions for the 2008 and 2011 Plans. Almost 70%, or 13, of the 19 counties had four or five of the same goals as State of Wisconsin Hazard Mitigation Plan. Another 26% (5 counties) had three of the same goals as the State Plan. All 19 county mitigation plans reviewed included state goal 1 and all but three and two included state goals 4 and 5, respectively. Goals 2 and 3 were included by many of the counties. It is important to note that while only six counties included a goal about enhancing public education, most counties did have a public education component in their strategy or as a mitigation action item. Table 5.4.1-1, on the following page, shows the breakdown of goals by county.

State of Wisconsin Hazard Mitigation Goals
2011

1. Minimize human, economic and environmental disruption and reduce the potential for injury and loss of life from natural hazards.
2. Enhance public education about disaster preparedness and resilience, and expand public awareness of natural hazards.
3. Encourage and promote continued comprehensive hazard mitigation planning and implementation of the plan.
4. Support coordination and collaboration among federal, state, and local authorities, and non-governmental organizations regarding hazard mitigation activities.
5. Improve the disaster resistance of buildings, structures, and infrastructure whether new construction, expansion or renovation.

TABLE 5.4.1-1 STATE AND LOCAL MITIGATION GOALS

County/Jurisdiction	State Goal				
	1	2	3	4	5
Pierce County	X			X	X
Trempealeau County	X	X		X	X
Marathon County	X		X	X	X
Wood County	X			X	X
Portage County	X			X	X
Juneau County	X		X	X	X
Adams County	X	X	X	X	X
Grant County	X		X	X	X
Racine County	X		X	X	X
Kenosha County	X		X	X	X
Milwaukee County	X		X	X	X
Crawford County	X	X		X	X
Sauk County	X	X	X	X	X
Dane County	X	X	X	X	X
Vernon County	X	X		X	X
Fond du Lac County	X	X	X		
Winnebago County	X	X			
UW River Falls	X	X			X
Oneida Tribe of Wisconsin	X	X	X	X	X

Source: WEM, 2011.

Similar to having comparable hazard mitigation goals, the state and local governments also share similar views on hazard mitigation strategies and projects. The counties in the State of Wisconsin were already cognizant of mitigation strategies prior to the development and adoption of the State Hazard Mitigation Plan. Table 5.4.1-2, on the following page, identifies the mitigation strategies and actions that were emphasized in the counties' plans.

The top seven strategies of the focus counties are listed below. The ones in bold are the strategies that coincide with the state priorities:

- **Communication: Public Education**
- **Purchase of Houses in Floodplain**
- Warning System: Sirens/Reverse 911/211
- **Structural Mitigation: Safe Shelters**
- Planning: Encourage NFIP or Crop Insurance
- Planning: Update Databases and Maps
- Regulations, Laws, and Codes: Strengthen Local Building Codes

After reviewing the 19 focus counties' goals, strategies, and actions, WEM is confident that the state goals and strategies that are included in the plan will coincide closely with what the individual counties hope to accomplish. Providing ongoing training, technical, and financial support to the counties will assist them in fulfilling their objectives and implementing their strategies.

TABLE 5.4.1-2 STRATEGIES (IN BOLD) AND SPECIFIC ACTIONS BY COUNTY OR JURISDICTION

Strategies	State Priorities	Pierce	Trempealeau	Marathon	Wood	Portage	Juneau	Adams	Grant	Racine	Kenosha	Milwaukee	Crawford	Sauk	Dane	Vernon	Fond du Lac	Winnebago	UW River Falls	Oneida Tribe of Wisconsin
Communication: Public Education	**X**	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Communication: Multi-Lingual Educational Material	**X**														X		X			
Purchase of RLS	**X**	X	X	X								X	X	X	X	X	X	X		
Purchase of Houses in Floodplain	**X**	X	X	X		X	X	X			X	X	X	X	X	X	X	X		X
Relocation of Buildings (Shoreland/Bluff)	**X**										X									
Flood Proofing	**X**	X					X			X	X	X			X			X		
Elevation of Structures	**X**	X									X				X		X	X		
Warning System: Increase Use of NOAA Weather Radio	**X**	X			X			X	X	X	X			X	X		X	X		X
Warning System: Sirens/Reverse 911/211		X			X	X	X	X		X	X	X	X	X	X	X	X	X	X	X
Structural Mitigation: Sewer Upgrades/ Improve Existing Stormwater Management Systems	**X**			X		X	X	X		X	X	X			X			X		X
Structural Mitigation: Flood Walls and Berms										X		X								
Structural Mitigation: Culverts		X		X			X			X	X	X			X		X			
Structural Mitigation: Minor Flood Control/ Dams								X		X		X			X		X	X		X
Structural Mitigation: Enhance Slope Stability									X		X	X								
Structural Mitigation: Retrofitting Structures	**X**										X						X	X		
Structural Mitigation: Safe Shelters	**X**	X	X	X		X		X	X	X	X		X	X	X	X	X	X	X	X
Non-Structural Mitigation: River/ Stream/ Lake Maintenance										X	X	X			X		X	X		
Non-Structural Mitigation: Wetland Restoration						X				X	X				X		X			

TABLE 5.4.1-2 CONTINUED

Strategies	State Priorities	Pierce	Trempealeau	Marathon	Wood	Portage	Juneau	Adams	Grant	Racine	Kenosha	Milwaukee	Crawford	Sauk	Dane	Vernon	Fond du Lac	Winnebago	UW River Falls	Oneida Tribe of Wisconsin
Planning: Resource Inventory												X			X		X	X		
Planning: Locate Vulnerable Facilities	X									X	X	X			X		X	X		X
Planning: Operations/Drills						X														
Planning: Development of Emergency MA Agreements										X		X								
Planning: Incorporation of All-Hazards Plan into Comprehensive Plan		X			X	X		X	X	X				X	X		X			X
Planning: Encourage NFIP or Crop Insurance		X	X		X	X	X	X		X	X		X	X	X	X	X	X		X
Planning: Update Databases and Maps		X	X	X	X	X	X	X	X	X	X		X	X	X		X	X		X
Regulations, Laws, and Codes: Dissuade Development in Hazard Areas		X			X	X				X				X	X		X	X		
Regulations, Laws, and Codes: Water Usage		X		X	X					X	X				X		X	X		
Regulations, Laws, and Codes: Shoreland/ Floodplain Protection										X	X				X	X	X	X		
Regulations, Laws, and Codes: Strength Local Building Codes		X	X	X	X	X	X	X	X	X	X		X	X	X	X				X
Protect Critical Facilities: Utilities	X		X	X		X	X			X	X		X		X	X	X	X	X	

5.5 CURRENT TRENDS

Multi-County Plans: In 2010, four counties in northern Wisconsin decided to band together to apply to develop Wisconsin's first multi-county mitigation plan. Sawyer, Rusk, Price, and Taylor Counties will work with the Regional Planning Commission to develop a plan. Collaboration on this planning effort will help jurisdictions financially and holistically. In the difficult economic times, governments can pool their money together to develop a product that crosses political lines. After all, hazards know no boundaries.

University Plans: UW-River Falls (UW-RF) was the first university in the state to develop a hazard mitigation plan. Subsequently, it has applied for a hazard mitigation project to develop two storm shelters at its farm labs. Several other universities have taken UW-RF's lead. UW-Superior (UW-S) participated in and adopted the City of Superior's Hazard Mitigation Plan in 2011. UW-S is now eligible to apply for HMA project grant funding. In addition, UW-Madison applied for a FFY10 planning grant to develop a hazard mitigation plan. The plan is currently in the development process.

Inclusion of Rural Electric Cooperatives: Many local plans are looking to include Rural Electric Cooperatives (RECs) in the planning process. RECs are private, non-profit entities that are eligible to apply for PDM and HMGP funds, so long as they participate in a plan. To address the gap in REC plan participation, WEM worked with RECs that have not participated in a local hazard mitigation planning process and developed an annex to the State of Wisconsin Hazard Mitigation Plan. The annex is new to the State of Wisconsin Hazard Mitigation Plan in 2011 and can be found in Appendix G.

5.6 BEST PRACTICES

City of Darlington (Update): As previously mentioned, the City of Darlington has been exemplary in flood mitigation efforts. The City has strategically implemented projects identified in its plan. In their most recent plan update (2010), the City developed a detailed map of buildings in the floodplain. The continued removal of structures from the floodplain, focusing on repetitive loss structures, is of utmost importance to Darlington. Another effective mitigation strategy identified in the City's plan (but rarely seen in plans) involves continuing to document, analyze, and learn from flood events. The City has had a long history of flooding and has learned that through proper mitigation techniques, it does not have to repeat past errors.

This plan is an excellent example of a community tailoring the plan to fit its needs, while at the same time, meeting the planning criteria. This is a small, rural community with a goal of eliminating flood losses. It recognizes the importance of planning in trying to reach that goal. In the 2014 plan update, the community will strive incorporate the hazard mitigation plan into the comprehensive plan.

Marquette County (New): In 2008, Marquette County developed its hazard mitigation plan and did an excellent job utilizing technology. This plan used innovative mapping

techniques to help identify and illustrate the County's and incorporated jurisdictions' risks to development. In addition, they overlaid future residential and non-residential growth area layers on the risk assessment maps.

The mapping exercise done in Marquette County is an effective way of conveying risk to local officials and citizens. A picture is worth a thousand words.

Clark County (Update): Clark County is very rural and has approximately 28.5 persons per square mile. While it is a county with a small population, it has a sizable Amish and Mennonite population. The County recognized its unique challenges and used the hazard mitigation planning process to identify potential implications of emergency response and hazard mitigation planning.

The County's plan mapped hazard vulnerability for all of the incorporated jurisdictions. However, the mapping exercise was taken a step further to include areas of mitigation interest. The maps identify problems areas, where past mitigation projects have occurred and where future projects may solve current problems. One of the most effective ways to include jurisdictions in the planning process is to sit down with them and bring a map. Let them explain their problems, where they occur, and what they think can be done to break the cycle. Clark County did just that and the plan exhibits their success.

Barron County (Update): Since multiple types of natural hazards could potentially result in long-term power loss, the County devoted a section of the hazard mitigation plan update (2011) to analyzing this specific topic. The County felt that this approach allowed for additional attention to the critical threat, while avoiding undue repetition within the individual natural hazard assessment sub-sections.

The analysis included a long-term power loss risk assessment and vulnerability assessment. In addition, the long-term power loss section discusses Barron Electric Cooperative's 2003 hazard mitigation grant that buried three miles of overhead lines in Chetek. In June 2010, high winds took down many trees and some lines in the same area. The REC's power restoration and clean-up efforts were mostly complete within 26 hours. This clean-up may have required many days if power lines had not been buried.

Barron County's plan did a fantastic job of including the Rural Electric Cooperative in the planning process. It is important to consider all major stakeholders when developing or updating a plan. In addition, highlighting mitigation successes in a county is also beneficial. WEM hopes to do a best practice story on Barron Electric Cooperative's project in the next year.

Dane County (Update): Dane County is one of the most urban counties in the State of Wisconsin. However, it is also a county that worked very hard to include the public in the planning process during its 2010 hazard mitigation plan update. Nearly ten public meetings were held to garner public comments. Four of the public meetings were considered "regional" in nature and held throughout the county. The sites were chosen based upon

local government officials' interest in being a part of the planning process, geographical distribution of sites around the County, and the County's desire to sample opinions from citizens in different watersheds.

Dane County's plan also highlighted its success in incorporating by reference the 2004 Flood Mitigation Plan into the 2007 Dane County Comprehensive Plan, with the recommendation to fully implement the plan. However Dane County hopes to take it a step further by exploring and adding the hazard mitigation plan as the tenth comprehensive planning element.

In Dane County's plan update, the County demonstrates the need and importance of public participation in the planning process. In addition, it recognizes that plans should not be created in a silo. Plan integration is vital to a community's sustainable development and growth.

UW-River Falls (Update): UW-River Falls (UW-RF) is the first FEMA-approved hazard mitigation plan for a university in the State of Wisconsin. The plan highlighted the distinctive issues and problems that face a campus. It identified very specific mitigation actions that would reduce or eliminate the loss of property or human life.

Shortly after the plan was approved by FEMA, the University applied for a PDM-C grant to construct two stand-alone community shelters for the campus farm labs. The UW-River Falls application was successful in the national competition and funded in FFY2010. While it is important to develop a mitigation plan, planning is only the first step in the mitigation process. A mitigation plan is successful when an identified project is implemented.

5.7 PLANNING CHALLENGES

Plan update every three years (state) or five years (local): Both the State of Wisconsin and local governments struggle to update hazard mitigation plans in the short timeframe provided in the regulations. It is an incredible burden to staff and agencies to conduct a complete overhaul of the existing plan. It is a fear of WEM that the frequent and arduous plan update process will affect HMA program implementation.

Over the last three years, a major challenge for WEM has been monitoring local hazard mitigation plan expiration dates. Figure 5.7-1, on the following page, shows counties with approved hazard mitigation plans and respective year of expiration. At present, all counties with plans expiring in 2013 have applied for planning grants through HMGP or PDM.

Inclusion of mitigation planning into comprehensive planning: While some counties and local jurisdictions have successfully included mitigation in comprehensive planning, it is rare. The challenge is to convey to emergency management staff the importance of working with and including county and local government planning departments in the hazard mitigation planning process.

Conveying a compelling reason to plan: In an age of competing local interests and issues, it is difficult to convince communities at risk from natural hazards to complete hazard mitigation plans. Hazard mitigation is not the most exciting phase in the emergency management cycle. However, it is the phase of emergency management that will make the most impact in future disasters.

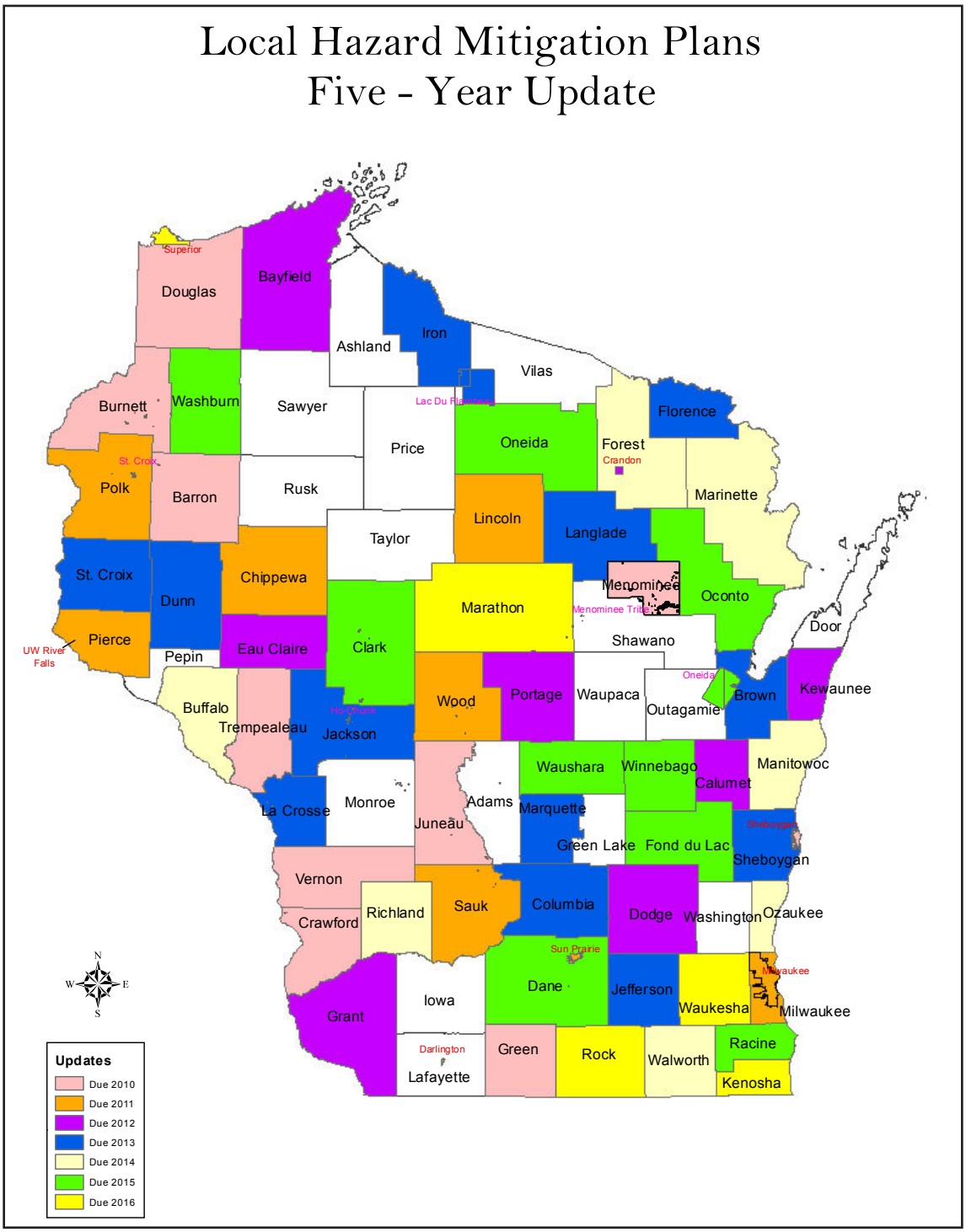


Figure 5.7-1 Local Plan Five-Year Plan Expiration Dates
Source: WEM, 2011.

SECTION 6: PLAN MAINTENANCE PROCESS

Hazard mitigation planning is a continuous and ongoing process. The policies and procedures established in the State of Wisconsin Hazard Mitigation Plan reflect the current emergency management and hazard mitigation philosophy at both the state and federal levels. Federal regulations [44 CFR 201.4 (d)] require the State Plan to be reviewed, revised, and submitted for approval to the Region V Director of FEMA every three years. The regulations also require a plan maintenance process that includes an established method and schedule for monitoring, evaluating, and updating the plan; a system for monitoring implementation of mitigation measures and project closeouts; and a system for reviewing progress on achieving goals as well as activities and projects identified in the Mitigation Strategy.

6.1 MONITORING, EVALUATING, AND UPDATING THE PLAN

Wisconsin Emergency Management (WEM) is responsible for developing, reviewing, evaluating, and updating the State Hazard Mitigation Plan and submitting to FEMA for approval every three years. The State Hazard Mitigation Officer (SHMO), with the support of the Wisconsin Hazard Mitigation Team (WHMT) will coordinate the implementation and update of the State Plan.

The State Plan approved in 2005 and 2008 stated that a review will take place in three ways:

- Annually for progress made on mitigation actions and projects identified in the Mitigation Strategy of the State Plan.
- After each major disaster declared by the President in the state to look for areas where the State Plan should be amended to reflect the impact to the disaster.
- Every three years before submission to FEMA for approval.

The SHMO will convene regular WHMT meetings to monitor and evaluate progress on achieving hazard mitigation program goals and actions as identified in the Mitigation Strategy. In addition, the WHMT will continue to discuss, research, and develop mitigation recommendations in support of the Plan's goals. These recommendations will then be added to the Plan during the three-year Plan update.

In the event of a major disaster declaration, the SHMO and the WHMT will review the existing State Hazard Mitigation Plan to determine if existing policies, priorities, programs, and/or capabilities are adequate to address the issues generated by the disaster. The SHMO and Federal Hazard Mitigation Officer, Region V National Flood Insurance Program (NFIP) Specialist, and the Wisconsin Department of Natural Resources floodplain management staff will develop the Post-Event Mitigation Action Plan at the Joint Field Office. This strategy will identify mitigation opportunities and issues that need to be addressed based on the event and identify the specific activities that each partner will ac

complish in administering mitigation programs for the declaration. This report will become an integral part of the annual report as well as the three-year Plan update.

During this three-year update cycle, there were three federal disaster declarations, FEMA-1933-DR declared August 11, 2010, FEMA-1944-DR declared October 21, 2010, and FEMA-1966-DR declared May 5, 2011. The WHMT met to discuss the impacts of the disasters and it was felt that the goals and mitigation actions of the State Plan as well as the Post-Event Mitigation Action Plans for those events were current and adequate. This method of analysis has worked well during the update process. WEM mitigation staff and WHMT members are presently involved in recovery efforts for these events which will be ongoing for the foreseeable future.

This update of the plan looked at the following. Subsequent updates will continue addressing the items identified below:

- Review and revise the State Plan's Risk Assessment. This will include a review and update of hazard profiles and data on vulnerable state facilities as new information becomes available.
- Include information from local and countywide all-hazards mitigation plans completed as of the start of the three-year update cycle especially those sections related to the Risk Assessment and Mitigation Strategy.
- Examine progress on and determine effectiveness of mitigation actions in the Mitigation Strategy and determine how the performance of those actions should influence the State Plan's Mitigation Strategy.
- Examine implementation of the State Plan and identify problems (technical, political, legal, and financial) and develop recommendations to overcome them.
- Examine the effectiveness of state-funded, local mitigation projects and determine how the performance of those projects should influence the Mitigation Strategy.
- Recommend ways to increase involvement by state agencies and local jurisdictions in hazard mitigation.
- Recommend revisions to the Mitigation Strategy's goals, recommendations, projects, and Action Plan to reflect changes in policies, priorities, programs, and funding; as appropriate, recommendations will include findings of any hazard mitigation reports following disaster events.
- Following review and revision of the State Plan, the WHMT will analyze the plan maintenance process, and make changes to improve the process and method used to review the plan.
- The State Plan update will be coordinated with other state plans, as appropriate.

It was the State's goal that this edition of the plan addresses both natural and man-made or technological hazards. Due to staff time constraints that has not occurred. It is still the State's goal to address technological hazards in a future update.

The WHMT will review and concur with the Plan update before transmission to FEMA. WEM will request signed state agency concurrences from those agencies represented on the WHMT when FEMA advises that the update meets requirements. Agency concurrences will be incorporated into the Plan update as adoption of the update and included in Appendix M. Table 6.1-1, below, shows the schedule of activities for the next Plan update cycle.

The SHMO will distribute copies of the approved Plan to federal, state, and local agencies as appropriate. In addition, the Plan can be viewed and downloaded at WEM's website, http://emergencymangement.wi.gov.

TABLE 6.1-1 PLAN UPDATE SCHEDULE OF ACTIVITIES

Activity	Target Date
Hold a WHMT meeting to discuss development of the update and the agencies' roles and the responsibilities of the WHMT. (WEM)	11/1/13
Review the Post-Event Mitigation Strategies for any declared disasters since the last update to identify new issues generated by the disaster(s). (WEM, WHMT)	11/1/13
Review and update the State Risk Assessment [201.4(c)(2)] incorporating information from local all-hazards mitigation plans. (WEM)	2/1/14
Review and update the Mitigation Strategy [201.4(c)(3)] incorporating information from local all-hazards mitigation plans. (WEM, Team) • Update the State Capability Assessment. • Update the Local Capability Assessment. • Review existing mitigation actions and report progress. • Identify new mitigation actions based on recent disasters, information from local plans, and changes in programs, regulations, policies, and funding. • Identify any new potential funding sources or programs.	4/1/14
Review and update the mitigation and disaster history portions of the plan including status of mitigation projects completed and those currently in progress from the last update of the Plan. (WEM)	6/1/14
Review and update the Local Hazard Mitigation [201.4(c)(4)] portion of the plan. (WEM)	6/1/14
Review and update the Plan Maintenance [201.4(c)(5)] section of the plan. (WEM)	6/1/14
Review and update the Enhanced [201.5(b)] section of the plan. (WEM)	6/1/14
Assemble draft of the Wisconsin Hazard Mitigation Plan update. (WEM)	7/1/14
Copy and distribute the draft Wisconsin Hazard Mitigation Plan update requesting agency review and comments. (WEM, participating agencies)	8/1/14
Incorporate changes into final draft of the Wisconsin Hazard Mitigation Plan update. (WEM)	9/1/14
Distribute Wisconsin Hazard Mitigation Plan update for final review and concurrence. (WEM, participating agencies)	9/15/14
Submit Wisconsin Hazard Mitigation Plan update to the Federal Emergency Management Agency for review and approval. (WEM)	10/1/14
Distribute approved State Hazard Mitigation Plan update to state and federal agencies, as appropriate; place on WEM's website. (WEM)	12/1/14

6.2 MONITORING PROGRESS OF MITIGATION ACTIONS

In previous versions of the State plan, it stated that the State Plan will be reviewed and evaluated semi-annually to ensure that program implementation is on schedule. WHMT members will complete semi-annual progress reports and submit the report to the SHMO. This process has not worked well for WEM and the rest of the team. Therefore, the process will be changed to require annual reports instead of semi-annual ones. The annual reports will be due October 31st of each year. Figure 6.2-1, on the following page, shows the annual report form. The annual reports will identify the agency and contact person, the mitigation action and its number as identified in the Plan, and the schedule for implementation. To facilitate this process, the action items in the Mitigation Strategy have been reorganized by lead agency. This will make it easier for each agency to locate their contribution(s). It will include a brief summary of the actions completed to date, the actions remaining, the problems encountered, and the type(s) of assistance needed to resolve any problems or to complete the mitigation action. It will also include a summary of the status of the mitigation actions (on-schedule, delayed, suspended, deleted, and/or completed). The WHMT will continue to discuss progress of mitigation actions at their regular meetings.

The previous editions of the State Plan stated that WEM's mitigation staff will track progress of actions identified in the State Plan and will prepare an annual report by December 31st. The annual report will include a progress report on action items and whether that progress is meeting the goals identified in the Mitigation Strategy. The report will also contain a review of the effectiveness of current programs and recommend additional mitigation activities for the future. The information contained in the annual reports will be incorporated into the three-year Plan update. These annual reports were not completed during the update cycle as planned due to staffing shortages and other work priorities. WEM still intends to accomplish this task during future update cycles.

6.3 PROJECT MONITORING AND CLOSEOUTS

State agencies and local governments with projects funded through any of FEMA's Hazard Mitigation Assistance (HMA) programs are required to submit quarterly reports to WEM. Additionally, agencies and local governments receiving hazard mitigation grants are required to submit a closeout report at the conclusion of any project. More information on the process used to monitor progress of mitigation projects funded by HMA programs can be found in Section 7.4, Program Management Capability, and Appendix F, the Hazard Mitigation Grant Program Administrative Plan.

Summary of progress for the period:	November 1, 2011 – October 31, 2012 _____ November 1, 2012 – October 31, 2013 _____ November 1, 2013 – October 31, 2014 _____
Agency:	
Contact:	
Action Item Subject Title:	
Action Item Number:	
Schedule for Implementation:	
Actions Completed To Date (Be Specific)	
Actions Remaining (Be Specific):	
Assistance Needed:	
Summary of Action Item Status: _____(A) Recommended actions on-schedule. _____(B) Recommended actions delayed. _____(C) Recommended actions suspended. _____(D) Recommended actions completed.	
Comments:	
Signature:	Date:

Figure 6.2-1 Wisconsin State Hazard Mitigation Plan: Annual Progress Report on Recommended Mitigation Actions

SECTION 7: COMPREHENSIVE STATE HAZARD MITIGATION PROGRAM

This section of the Plan will serve as the State's Enhanced Hazard Mitigation Plan and will demonstrate that the State of Wisconsin has developed a comprehensive, effective and integrated hazard mitigation program. This section will describe how the Plan has been integrated with other State planning initiatives as well as the FEMA mitigation programs. Further, it will provide documentation and describe how the State effectively utilizes available mitigation funding and is capable of managing increased mitigation funding that will become available upon approval.

The State of Wisconsin Hazard Mitigation Plan was updated and approved as a Standard State Mitigation Plan by the Federal Emergency Management Agency (FEMA) in a letter from the Regional Administrator dated December 9, 2008 with the enhanced plan approved June 15, 2009.

This update of the State of Wisconsin Hazard Mitigation Enhanced Plan has addressed several of the recommended revisions identified in the review crosswalk in 2009.

7.1 INTEGRATION WITH OTHER PLANNING INITIATIVES

The Mitigation staff within the Wisconsin Emergency Management is responsible for integrating, to the extent practicable, hazard mitigation planning and programs with other State and local planning initiatives and programs. This section includes a discussion of the state agencies that the Mitigation staff cooperates with as partners in the effort to meet the State mitigation goals as identified in Section 4. Throughout the planning process mitigation staff coordinated with and utilized information provided by the other state agencies. Section 2 provides a thorough discussion of the State planning process and initiatives while Section 4 identifies the State's pre and post-disaster hazard management policies, program and capabilities to mitigate the State's hazards. As planning efforts continue and mature, interaction among the various agencies will expand. The state agencies, as part of the Wisconsin Hazard Mitigation Team, were integral in the creation of the State's mitigation goals and action plan found in Section 4.

Section 2 as well as the State Capability Assessment found in Section 4.2 discusses related mitigation programs and projects that make up the State's overall mitigation capability and contributes to the State's mitigation program. Table 7.1-1 below summarizes the integration of hazard mitigation planning with other State planning initiatives. They are discussed in more detail in Section 2.

TABLE 7.1-1 STATE PLANNING INITIATIVES

Initiative	Description
Comprehensive Planning – State Agency Resource Working Group	The State's comprehensive law requires communities to develop a comprehensive plan by January 1, 2010, if they wish to make decisions to change and manage land use within their jurisdiction. The State Agency Resource Working Group (SARWG) was a statutory funded group of the

TABLE 7.1-1 STATE PLANNING INITIATIVES	
Initiative	**Description**
	Wisconsin Land Council administered through the Department of Administration, Division of Intergovernmental Relations which is responsible for administering the Comprehensive Planning Grant Program for the State. Representatives were from various state agencies and participated in promoting and cooperating on land use issues. The State Hazard Mitigation Officer participated on the group to promote mitigation planning as part of the comprehensive planning process. The DOA-Comprehensive Planning Grants Program representative on the SARWG also participates on the WHMT. With the sunset of the Wisconsin Land Council, the group is no longer statutorily funded or required, however, members continue to communicate and share information via e-mail to promote comprehensive and mitigation planning. The nine comprehensive planning elements and some ideas on how to integrate into mitigation planning is included in local hazard mitigation guidance, *Resource Guide to All Hazards Mitigation Planning in Wisconsin.* The nine planning elements include: Issues and Opportunities; Housing; Transportation; Utilities and Community Facilities; Agriculture, Natural and Cultural Resources; Economic Development; Intergovernmental Cooperation; Land Use; and Implementation.
Coastal Hazards Work Group	Provides technical assistance and coordinates state resources addressing coastal hazards. WEM participates on the workgroup. In turn, there is a representative from Wisconsin Coastal Management on the WHMT. The group meets with three coastal regional planning commissions and local governments. Multi-year strategy includes: • Continue updating and integrating information and methods in a Geographic Information System (GIS) compatible format regarding shoreline hazards. • Develop a comprehensive education and dissemination program regarding erosion rates and disclosure of erosion hazard and floodprone areas directed at the public, government officials and private sector. • Develop an institutional framework to improve the State's regulatory mechanism and local mitigation efforts. • Continue to expand technological tools and technology transfer on coastal hazards for Lake Superior and Lake Michigan as identified in the WCMP Needs Assessment and Strategic Plan 2011-2015. Recently, the Coastal Hazards Work Group has developed a subgroup to discuss climate change.
Wisconsin Emergency Response Plan	The State Hazard Mitigation Plan is an appendix to the Wisconsin Emergency Response Plan. Each ESF includes mitigation activities in support of the function. ESF-14 was developed in 2008 for the Wisconsin Emergency Response Plan. The Assistant State Hazard Mitigation Officer served as the lead for the development of this ESF. In addition, WEM is working on Long Term Recovery and Mitigation in both the State Emergency Response Plan as well as guidance for Local Emergency Response Plans. The State's Long-Term Recovery strategy is outlined in ESF 14 which is a part of the State Emergency Response Plan.
Wisconsin Disaster Recovery Plan	The Plan describes the recovery process as it occurs at the state level and includes the organizational structure, staffing patterns and operational responsibilities of any recovery team members. The long-term recovery priorities, as determined during the post disaster workshops and strategy sessions, are part of the Individual Assistance (IA) program and Public

TABLE 7.1-1 STATE PLANNING INITIATIVES	
Initiative	**Description**
	Assistance (PA) program in concert with the State's Hazard Mitigation program. Again, the State's Long-Term Recovery strategy is outlined in ESF 14 which is a part of the State Emergency Response Plan.
WEM Strategic Plan 2004-2006	The Plan identifies 7 goals. One of the goals is to develop and evaluate emergency management plans and processes to ensure that they reflect our hazards, risks, capabilities, resources, and mitigation opportunities. Along with the goal are 5 objectives. The goals and mitigation actions in the State of Wisconsin Hazard Mitigation Plan will assist WEM in achieving the goals of the Strategic Plan. The strategic plan remained in effect during the rapid turnover of 5 administrators. The plan is scheduled to be updated in FY 2012.
Wisconsin Recovery Task Force (WRTF)	A key element of ESF 14 and long-term recovery is the Wisconsin Recovery Task Force, which was created after the June 2008 Flooding Disaster. The WRTF is comprised of more than 20 state and federal agencies with recovery responsibilities. The WRTF will become a standing task force which will be active on a year-round basis and gear up when a disaster occurs. The WRTF is chaired by the WEM Administrator and consists of six subcommittees; agriculture, business, housing, human needs, infrastructure, and mitigation. The State Hazard Mitigation Officer serves as the Chairman of the mitigation subcommittee. The subcommittees identify disaster impacts, challenges associated with those impacts and resources available to meet the challenges. Collectively, the agencies package funding for local housing, infrastructure, business repair, and mitigation projects. Members of the Wisconsin Hazard Mitigation Team are also members of the Wisconsin Recovery Task Force Mitigation Subcommittee.
Homeland Security Council – Interagency Working Group	The Interagency Working Group is chaired by Wisconsin Emergency Management and comprised of representatives of the Departments of Administration; Agriculture, Trade and Consumer Protection; Health Services; Children and Family Services; Correctins; Justice; Natural Resources; Office of Energy Independence; and Transportation, as well as the Office of Justice Assistance, National Guard and University of Wisconsin Police. The Group was formed in the late 90's with its original focus on terrorism preparedness. Since that time, its mission has evolved to cover all hazards and all phases of emergency management. The Group meets monthly or more often if dictated by current events and acts as a support group to the Governor's Homeland Security Council.
Wisconsin Voluntary Organizations Active in Disasters (WIVOAD)	WI VOAD is a humanitarian association of independent voluntary organizations who may be active in all phases of disaster. Its mission is to foster efficient, streamlined service delivery to people affected by disaster, while eliminating unnecessary duplication of effort, through cooperation in the four phases of disaster. Staff from WEM provides coordination and assistance to WIVOAD members. WIVOAD has taken a lead role in long-term recovery and sponsors Long Term Recovery Committees. These committees, using WIVOAD's 501(c)(3) tax exempt status, focus on fundraising, reaching out to individual/families with unmet disaster needs and providing services to them through a uniform case management process. The WIVOAD chair also sits on the WHMT and the WRTF.
Risk Assessment of State-Owned and Operated Buildings, Critical Facilities and	There is approximately 6,500 state facilities not counting infrastructure. It would take one person working full-time nearly 28 years to visit every facility. Therefore, a strategy was developed to obtain needed site specific information on those facilities and infrastructure that are most critical and may be at most risk

TABLE 7.1-1 STATE PLANNING INITIATIVES	
Initiative	**Description**
Infrastructure	from future disasters. WEM, along with the Department of Administration, created a Wisconsin Risk Assessment Data Collection Worksheet that is the basis for collecting information from each of the determined critical facilities. The collection worksheet covers everything from general information, such as location, to more detailed questions involving construction materials. All of this data is needed to create an accurate risk assessment. Appendix H contains the Wisconsin Risk Assessment Data Collection Worksheet.

As stated above, the state agencies on the Wisconsin Hazard Mitigation Team were integral in the creation of the State Plan in the development of the mitigation goals, capability assessment, and the action plan found in Section 4. Table 7.1-2 lists the agencies that were active in the planning process and summarizes their contributions to the process and the State's overall mitigation program.

TABLE 7.1-2 CONTRIBUTING AGENCIES	
Agency	**Contribution to Process**
Department of Administration	• Demographic Services Center supplies state and local agencies with population and housing estimates and projections. Information used in hazard mitigation planning. • Comprehensive Planning provides guidance and assistance to local governments in the development of comprehensive plans. Planning elements are included in hazard mitigation planning guidance. Hazard mitigation is identified in several planning elements. • The Wisconsin Land Information Program provides a data resource for state and local governments in the development of both comprehensive and hazard mitigation plans. • Wisconsin Coastal Management Program provides guidance and assistance to the 15 coastal counties on incorporating coastal hazards into comprehensive and hazard mitigation planning. • The Geographic Information System program developed the Wisconsin Recovery Task Force website which is now maintained by WEM. • The Division of State Facilities and WEM created a Wisconsin Risk Assessment Data Collection Worksheet that is the basis for collecting information from each of the determined critical facilities for the Risk Assessment of State-Owned and Operated Buildings, Critical Facilities, and Infrastructure. • Manages and administers the State's Community Development Block Grants for both housing and public facilities. Mitigation activities are encouraged and costs are eligible within the programs. Coordinates closely with WEM to further mitigation and disaster recovery after an event and in many instances provides local match to FEMA grant programs. • After the June 2008 Flood, three Flood Recovery Specialists were added to the Department of Administration (formerly Commerce) and are assisting communities, especially businesses, in the flood recovery process.
Department of Agriculture, Trade and Consumer Protection	• Manages and administers several programs that reduce environmental damages from flooding. • Chairs the WRTF Agriculture Subcommittee.
Wisconsin Emergency	• Responsible for the development, maintenance and implementation of the State Hazard Mitigation Plan.

TABLE 7.1-2 CONTRIBUTING AGENCIES	
Agency	**Contribution to Process**
Management	• Responsible for administration of HMGP, FMA, PDM, RFC and SRL programs. • Provides guidance and assistance in the development and updates of local hazard mitigation plans. This includes plan review and providing comments. As plans are approved, local goals/objectives, capabilities, and mitigation actions are incorporated into updates of the State Plan. • Promotes hazard awareness and mitigation through awareness campaigns, newsletter, agency website, and workshops. • The State Hazard Mitigation Officer is chair of the Mitigation Subgroup on the WRTF and also leads the WHMT.
Department of Health Services	• Provides technical assistance and/or personnel to assist special population needs, environmental health issues, communicable or infectious disease, radiological/nuclear issues, and bio-terrorism preparedness. • Administers FEMA crisis counseling grants and case management for declared disasters. Works closely with the Long Term Recovery Committees, Individual Assistance and Mitigation staff. • Chairs the WRTF Human Needs Subcommittee.
Wisconsin Historical Society	• Provides historical preservation assistance. Reviews proposed mitigation projects to meet Section 106 requirements. Maintains inventory of historic structures. Provides technical assistance in projects involving historic structures.
Office of the Commissioner of Insurance	• Responsible for the regulation of insurance carriers and agents. Provides public information on insurance issues. Provides CEU instruction to insurance industry. • Coordinates with WEM and DNR on annual Flood Awareness Week.
Department of Natural Resources	• DNR staff has provided text, review and comment on this State Plan as well as previous plans as well as Mitigation Strategies after each disaster event. • Floodplain management staff assists WEM mitigation staff in reviewing proposed mitigation projects for engineering feasibility and provide information from Flood Insurance Studies for conducting Benefit-Cost Analysis. • Environmental staff provides review and input in the environmental review process on proposed mitigation projects. • Administers the State's Shoreland Protection Program, Local Floodplain Management Standards, and State Wetland Standards. • Administers the Municipal Flood Control and Riparian Restoration Program that provides grants to local governments for flood mitigation. Coordinates closely with WEM and in some cases provides local match to federal mitigation grants. • Administers the NFIP and provides information on flood insurance, floodplain management and flood hazard mapping.. • Administers the Dam Safety Program which inspects dams, reviews repair plans, operation and maintenance plans. Provides grants to repair and remove dams. Ensure that high-hazard dams have the required emergency action plans. • Administers Chapter 30 which sets standards for placement of structures and material, diversion of water and other activities in navigable waters. • Stormwater management requires erosion controls and stormwater management practices on construction sites. • Administers Non-point Targeted Runoff Management Program. • Manages and administers the provisions of the Managed Forest Law, and provides technical assistance to private forests statewide. • Administers Forest Fire Protection Grant Program, Health Forest Initiative, Single Engine\ Air-Tanker Program and the Wildland Urban Interface and Fire Wise Communities programs. • DNR representative co-chairs with WisDOT the WRTF Infrastructure Subcommittee.

TABLE 7.1-2 CONTRIBUTING AGENCIES	
Agency	**Contribution to Process**
	• Coordinates with Office of Commissioner of Insurance and WEM on annual Flood Awareness Week.
Department of Safety and Professional Services	• Administers the State's Building Codes. This includes training, inspection licensing, plan reviews, and enforcement. Coordinating with WEM and DNR on the development of response teams that would assist local governments after a disaster in inspection of damaged structures.
Public Service Commission	• Regulation of construction, service and operations of electric, natural gas, telecommunications, and water utilities.
Department of Transportation	• Administers the Flood Damage Aids Program that provides grants to local governments for flood damaged roads. Allows improvements to prevent future damages. • In highway and bridge improvement projects, strives to eliminate or reduce potential damages from hazards. • Identifies mitigation opportunities as part of project developments. • Transportation Security identifies measures to reduce damages to critical infrastructure, airports, rail, and maritime. • DOT representative co-chairs with DNR the WRTF Infrastructure Subcommittee.
University of Wisconsin Extension	• Provides community education and public information programs promoting hazard awareness and mitigation concepts.
Wisconsin Economic Development Corporation	• Chairs the WRTF Business Subcommittee.

7.1.1 Comprehensive Planning

Wisconsin's Comprehensive Planning Law was enacted in 1999 and is often referred to the "smart growth law" requires all local governments to develop and adopt a comprehensive plan. Beginning January 1, 2010, if a town, village, city or county enacts or amends an official mapping, subdivision regulation, or zoning ordinance, the enactment or amendment ordinance must be consistent with the community's comprehensive plan. The law was amended in 2010 to delay the requirements until January 1, 2012 for those local governments that have applied for but have not received a comprehensive planning grant; and allows the Department of Administration the authority to grant local governments that have received a planning grant a time extension to adopt the plan by January 1, 2012.There are nine planning elements:

- Issues and Opportunities
- Housing
- Transportation
- Utilities and Community Facilities
- Agricultural, Natural and Cultural Resources
- Economic Development
- Intergovernmental Cooperation
- Land Use
- Implementation

At the same time the legislation was passed, a Comprehensive Planning Grant Program was created in the Department of Administration (DOA) to help local governments develop their comprehensive plans. Grant funds are available through the Department of Administration (DOA) for completing comprehensive plans. As of September 2010, $21 million in grants had been awarded to 1,171 communities.[1] As of March 24, 2011, 59 county plans and 1,382 municipal plans had been submitted with another 150 plans estimated under development.

Although there is no requirement element for hazard mitigation, the importance of comprehensive planning is discussed and stressed at the annual Hazard Mitigation Planning Workshops held by Wisconsin Emergency Management. It is imperative future development plans identify and locate hazards to assist policymakers in making the best, most safe decisions for their residents. In turn, hazard mitigation planning needs to be cognizant of future development plans. A list of the nine comprehensive planning elements and some ideas on how to integrate all hazards mitigation planning concepts into them are included in the *Resource Guide to All Hazards Mitigation Planning in Wisconsin* (http://emergencymanagement.wi.gov/mitigation/docs/wem_mitigation?guide-402003.pdf.) In addition, where to integrate the comprehensive planning elements into the all hazards mitigation plan are also described in the guidance. The Department of Administration's website includes a link to the Guide.

There is a DOA representative on the Wisconsin Hazard Mitigation Team. The State Hazard Mitigation Officer (SHMO) was also a member and participated on the State Agency Resource Working Group.

7.1.2 Regional Planning

The Council of Regional Planning Organizations represents the nine Regional Planning Commissions in Wisconsin (see Figure 7.1.2-1). For most communities in Wisconsin, Regional Planning Commissions serve as the only affordable local planning body available and are a source of planning expertise in the development of comprehensive plans and special purpose plans including all hazard and flood mitigation plans. The Commissions provide the mechanism by which multiple jurisdictions within a region may coordinate their plans. Most of Wisconsin's Commissions are engaged in assisting communities in developing their comprehensive plans as required by State Law. Recognizing the close relationship that the Commissions have with local governments and the resources that they can provide, and the link between comprehensive and hazard mitigation planning, WEM utilized its 2002 FEMA Pre-Disaster Mitigation $50,000 (one-time) grant to contract with the Council of Regional Planning Organizations to develop local mitigation planning guidance. The *Resource Guide to All Hazards Mitigation Planning in Wisconsin* is provided to local and tribal governments to assist them in the development of hazard mitigation plans. The Guide is utilized at

[1] Due to budget cuts, no grants were awarded in fiscal years 2011 and 2012. It is uncertain whether grant funds will be available again in 2013.

planning workshops and distributed upon request. The Guide can be found on WEM's website at http://emergencymanagement.wi.gov/mitigation/docs/wem_mitigation?guide-402003.pdf. A list of the nine comprehensive planning elements and some ideas on how to integrate all hazards mitigation planning concepts into them are included in the Resource Guide. In addition, where to integrate the comprehensive planning elements into the all hazards mitigation plan are also described in the guidance.

When Wisconsin Emergency Management holds Hazard Mitigation Planning Workshops, the importance of comprehensive planning is stressed. It is imperative future development plans identify and locate hazards to assist policymakers in making the best, most safe decisions for their residents. In turn, hazard mitigation planning needs to be cognizant of future development plans.

Since there is a close relationship between the Regional Planning Commissions and the local governments, and a link between comprehensive and hazard mitigation planning, a representative from the Council of Regional Planning Organizations joined the Wisconsin Hazard Mitigation Team in 2003. This member serves as a conduit between the Commissions and the Team. Having a Council member participate on the Team helps the state share resources, combine planning requirements, avoid duplication, and provide additional local and regional assistance to communities that choose to plan. This individual is also a member of the WRTF Mitigation Subcommittee.

As a result of the 2008 flood disaster, the Economic Development Administration (EDA) provided grants to the Regional Planning Commissions in the disaster area for the development of Flood Recovery Strategies. To accomplish the tasks assigned, the Department of Commerce as the lead coordinated the effort that was referred to as the EDA Disaster Recovery Collaboration. The group met monthly up through August 2011. WEM mitigation staff participated in the collaboration by attending the meetings and providing input. Potential projects were brought forward and discussed to maximize funding opportunities. In addition, a collaboration website was established where members shared information. One of the outcomes of the group, again with the Department of Commerce as the lead, was the development of a Community Economic Recovery Guidebook to assist economic development organizations, businesses and community leaders in preparation of economic recovery from a disaster. A link to the guidebook was placed on WEM's website and can be downloaded at http://emergencymanagement.wi.gov/recovery/business.asp.

The Regional Planning Commissions are one of WEM's strongest partners in mitigation planning. The RPCs have provided planning services to many of the counties in the development and update of the all hazard mitigation plans. In addition, the Commissions prepare grant applications for local governments to obtain federal and state assistance for many types of activities including mitigation grant applications for both planning and projects. After the 2008 floods, RPCs located in the southern part of the state worked with their respective local jurisdictions to assist in the completion of additional grant applications for recovery assistance. With the involvement of the Commissions in the state and local planning process, they are knowledgeable on both

state and local mitigation priorities and program requirements. Therefore, they are able to develop comprehensive project grant applications.

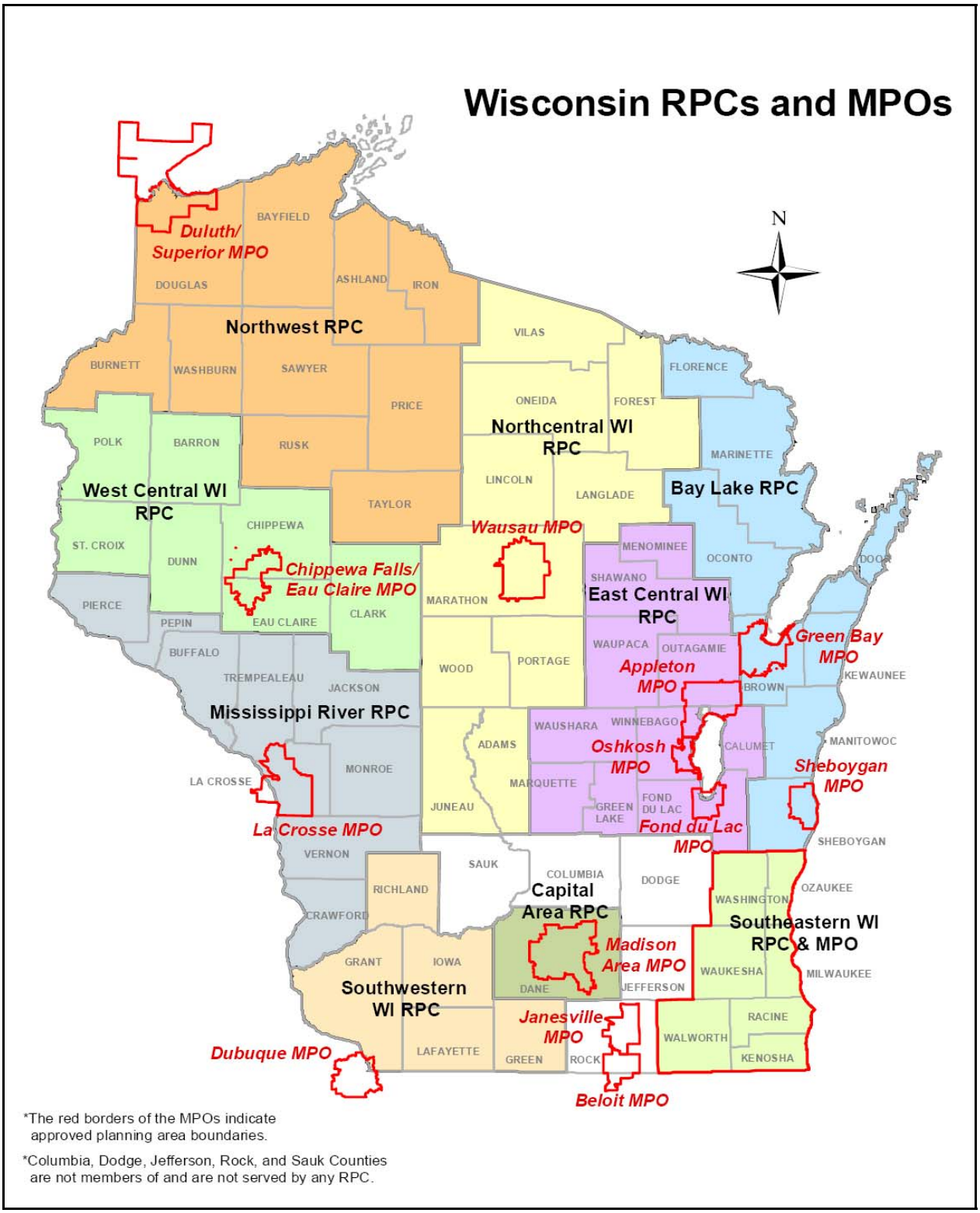


Figure 7.1.2-1 Regional Planning Commissions and Metropolitan Planning Organizations in Wisconsin

The majority of the local hazard mitigation plans in Wisconsin are countywide plans. The Northwest Wisconsin Regional Planning Commission is working on the development of a four-county all hazard mitigation plan (Rusk, Sawyer, Price and Taylor).

7.1.3 Rural Electric Cooperatives

Rural Electric Cooperatives are integral to the State of Wisconsin and its communities. The first electric cooperative in Wisconsin energized its system in the spring of 1937 and the last cooperative energized its system in 1945. Today, there are 25 electric cooperatives in Wisconsin that generate, transmit and distribute electric power. Wisconsin's electric cooperatives collectively serve more than 267,000 consumers; and maintain more than 49,000 miles of power lines.

Initial discussions of development of an electric cooperative annex to the State of Wisconsin's Hazard Mitigation Plan began in late 2007. Several electric cooperatives in the State had been recipients of hazard mitigation funding. WEM approached the Cooperative Network (at that time Wisconsin Federation of Cooperatives) to gage the interest of the state's electric cooperatives in developing an electric cooperative annex to the State of Wisconsin Hazard Mitigation Plan.

Thirteen of the state's electric cooperatives entered into a Memorandum of Understanding with Wisconsin Emergency Management that included the following:

- Joint development of an electric cooperative annex for the inclusion in the State of Wisconsin's Hazard Mitigation Plan
- Identification of natural hazards that have the potential of affecting an electric cooperative's infrastructure
- Conducting an assessment of vulnerabilities of the infrastructure to these hazards and mitigation measures to reduce these vulnerabilities
- Active participation in the periodic review, evaluation, and update of the electric cooperative annex.

This annex ensures that participating Rural Electric Cooperatives will be eligible to apply for hazard mitigation funds to prevent loss of function and damage in rural Wisconsin. The Rural Electric Cooperative Annex is Appendix G of the State Plan.

7.1.4 Other Planning Initiatives

In 2008, WEM partnered with the University of Wisconsin Land Information and Computer Graphics Facility, and the Polis Center at Indiana-Purdue University at Indianapolis on a joint effort to create at statewide HAZUS flood risk assessment for all 72 Wisconsin counties. This statewide HAZUS flood risk assessment is included in this Plan. In addition, the individual county HAZUS flood risk assessments were distributed to all counties and each respective Regional Planning Commission. WEM's website

includes an interactive map where the county HAZUS risk assessment can be viewed and downloaded.

WEM Staff also joined the Central HAZUS Users Group. Staff from the East Central and Bay Lakes Regional Planning Commissions joined the group and worked with State mitigation staff in the use of HAZUS to assist in the development of hazard mitigation plans.

As a result of the Floods of 2008, 11 Long-Term Recovery Committees were created to assist in the flood recovery efforts addressing unmet needs of flood victims. WIVOAD has worked tirelessly to assist flood victims in their complex recovery issues. WEM Mitigation Staff has also worked with the Long-Term Recovery Committees in meeting unmet needs of those impacted by disasters particularly in those communities where HMGP buyout programs were implemented. Figure 7.1.4-1 below shows the 11 Long-Term Recovery Committees from the 2008 Floods. The committees have continued to provide recovery assistance in events that have occurred since 2008.

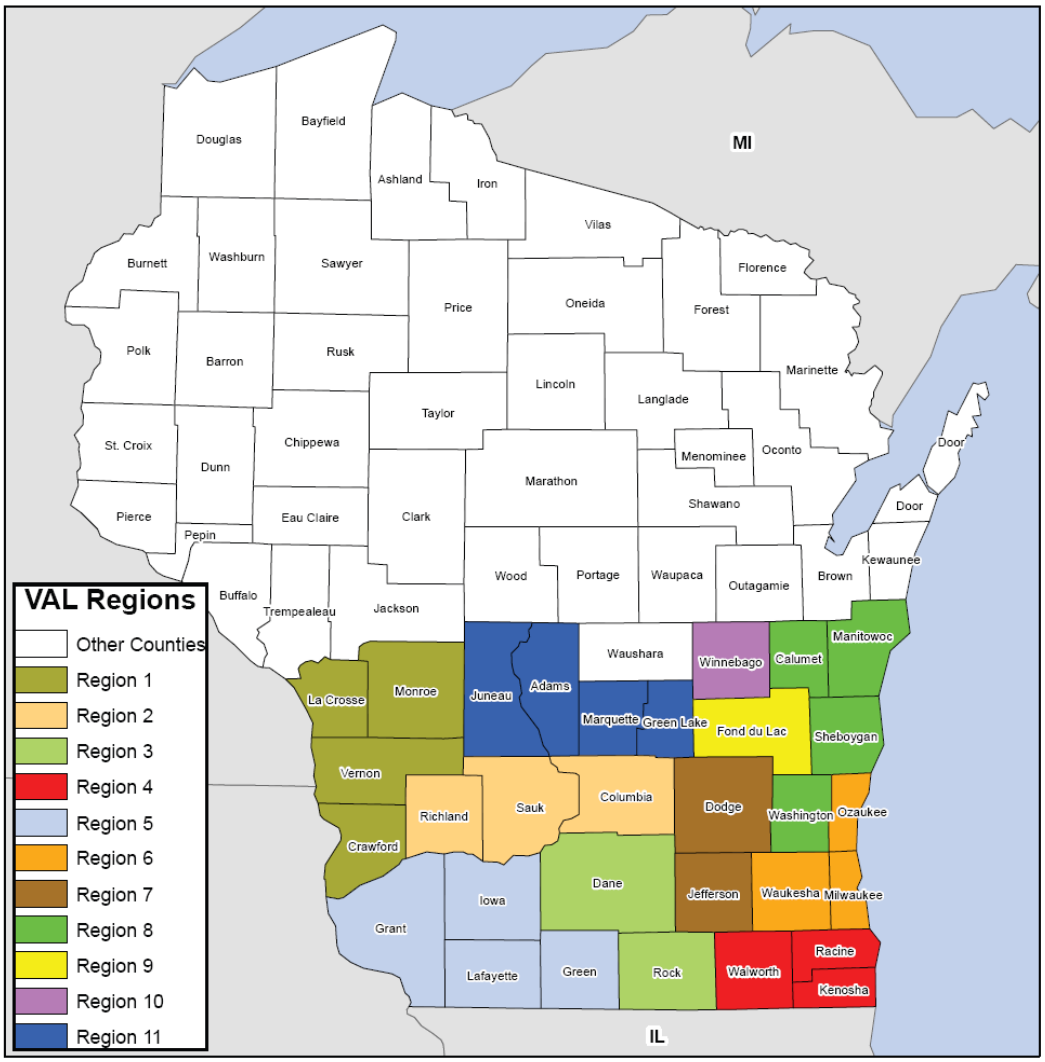


Figure 7.1.4-1 Wisconsin VOAD Long-Term Recovery Committees

7.2 INTEGRATION WITH FEMA MITIGATION PROGRAMS AND INITIATIVES

There are several federal programs that the State utilizes, which include regulations that provide local communities with guidance for state and regional agencies. Section 4, Table 4.2-2 beginning on page 4-83 provides information on federal capabilities.

7.2.1 Project Impact

In 1998, FEMA created Project Impact. Project Impact was a community-based initiative where public and private partners worked together to improve disaster resistance. Each year between 1998 and 2002 one Wisconsin community was selected as a Project Impact community and received Project Impact funds. The purpose of becoming a Project Impact community was to permanently embrace disaster resistance as a community-wide effort. Another goal the initiative was for the designated communities to share their experiences and successes with other communities and mentor them in implementing similar programs.

City of Wauwatosa

The City of Wauwatosa became the first Project Impact community in Wisconsin in November 1998. The City conducted a wide variety of mitigation activities: acquisition and demolition of 66 flood-prone properties along the Menomonee River; riverside clean up with partners AmeriCorps and Milwaukee County; stormwater and sewer projects that will reduce future flood damages; hazard mitigation planning; and an ongoing public awareness and information program on hazard reduction efforts.

Racine County

In 1999, Racine County was selected as Wisconsin's second Project Impact community. Their mitigation activities included the following:

- Development of a local all-hazards mitigation plan (the first in the state)
- Completion of a tornado shelter assessment of schools in the County
- Distribution of weather radios to all schools in the County
- Collaboration with the local technical college to collect information about residents' opinions, attitudes, and preparedness regarding disasters
- Development of public awareness campaigns
- Promotion of Project Impact and hazard mitigation through safety fairs, workshops, and booths at community functions
- Presentation of Project Impact and hazard mitigation topics to a variety of groups in the community
- Creation and distribution of a Project Impact coloring book for children about staying safe during natural hazard events

- Promotion of Project Impact through local broadcast weather reports and articles for local newsprint
- Collaboration with the local Housing Authority to include a safe room in the construction of a new home
- Incorporation of wind resistant construction techniques in the Town of Norway's new town hall

City of Waukesha

The 2000 Project Impact community selected in Wisconsin was the City of Waukesha. The City of Waukesha has experienced flooding in the past during major rain events and has had many severe weather events. However, the City is also home to numerous highway and railroad corridors that pose technological hazards from accidental spills of industrial chemicals. Therefore, the City completed an all-hazards risk analysis. The information gathered was used to develop an all-hazards mitigation plan.

Other activities included an assessment of tornado shelters for all schools and public buildings in the City, promotion of hazard mitigation techniques with local developers and architects, and integration of emergency and mitigation planning with the City's GIS system. In addition, the City installed protective film on the City's Council Chambers and upgraded it to an Emergency Operations Center. They also worked with Habitat for Humanity to include a safe room in the construction of a new house and implemented a public awareness and education program that included a variety of activities.

City of Eau Claire

The City of Eau Claire has had a long history of river flooding. It incurred flood damages in 1971, 1973, 1980, 1992, 1993, and in September 2000, just prior to being selected as Wisconsin's 2001 Project Impact community. Thunderstorms and tornadoes have also affected the City and surrounding areas.

Based on past flood events, the City acquired and demolished flood-prone structures on the south and northwest sides of the City using Project Impact funds. The City also developed a local all-hazards mitigation plan, the first in the state to meet the minimum planning criteria per 44 CFR Part 201. Another project the City completed was a tornado shelter assessment of all schools, colleges, and public buildings in the City. The results were incorporated into the existing School Crisis Intervention Plans. The City also integrated information such as wetlands, floodplains, and hazardous materials sites, into its GIS system to assist in emergency and mitigation planning as well as emergency response and recovery. Additionally, the City implemented a public education and outreach program. Some of the activities in the program included producing a natural hazard safety calendar and working with local media to develop videos and safety messages. For the Project Impact program, they also purchased and distributed 125 weather radios to critical facilities within the City including schools, hospitals, nursing homes, clinics, and day care centers.

7.2.2 Public Assistance Program

Mitigation measures can also be implemented through FEMA's Public Assistance (PA) Program after a disaster declaration (under Section 406 of the Robert T. Stafford Disaster Relief and Emergency Assistance Act, 42 U.S.C. 5172). PA funds allow an existing damaged facility to incorporate mitigation measures during repairs if the measures are cost-effective or are required by code.

This provision in the regulations, however, has been very much underutilized. Initially, the PA Program provided funds to repair facilities to pre-disaster condition without considering mitigation opportunities. Beginning in 1996 with disaster declaration FEMA-1131-DR-WI, a greater effort was made to fund Section 406 mitigation through the PA Program. Federal mitigation staff was assigned to liaise with state PA staff and to provide technical assistance. To further emphasize mitigation opportunities, a Memorandum of Understanding (MOU) for disaster declaration FEMA-1180-DR-WI was developed between state and federal representatives to promote the implementation of Section 406 mitigation measures.

In disaster FEMA-1332-DR declared in July 2000, the Federal Coordinating Officer's goal was to incorporate Section 406 mitigation in 20% of all projects. Mitigation was actually incorporated in 40% of projects, significantly exceeding the goal. Mitigation staff coordinates with the PA staff to ensure that Section 406 mitigation opportunities are included wherever possible.

7.2.3 National Flood Insurance Program (NFIP)

The three components of the program are: flood insurance, floodplain management, and flood hazard mapping. By participating in the NFIP, communities agree to adopt and enforce a floodplain management ordinance to reduce future flood risks to new construction in Special Flood Hazard Areas (SFHA). In turn, federally backed flood insurance is made available within the community as financial protection against flood losses. Flood insurance and floodplain management is the first line of flood mitigation. Flood insurance is an alternative to disaster assistance, which is not available in every flood event. Gaining participation in the NFIP and encouraging property owners to purchase flood insurance significantly reduces disaster costs. Together these programs reduce flood exposure to people and their property.

Flood insurance policies within communities participating in the regular NFIP program include benefits for Increased Cost of Compliance (ICC). For structures with a substantial damage determination, up to $30,000 is made available to bring the structure to current NFIP standards, which will mitigate the structure from future flood events. This can include elevation, relocation or demolition. State Mitigation Staff provides ICC information and guidance to communities after a flood disaster. The ICC can provide for demolition costs in a HMGP acquisition/demolition project and count towards the required local match. ICC benefits are also available for severe repetitive

loss properties mitigated with SRL funds regardless of whether recent flood damage has occurred.

Knowing the importance of flood insurance, WEM, the Office of the Commissioner of Insurance (OCI) and the Department of Natural Resources participated in an effort that promoted flood insurance in Wisconsin during Flood Insurance Awareness Week (March 16-20, 2009). Several press releases were distributed to the media outlets encouraging citizens to purchase flood insurance. On March 17, 2009, the WEM Administrator, the Insurance Commissioner, the DNR Secretary, and the Region V Mitigation Division Director toured three Wisconsin cities promoting the need and importance of flood insurance. The three agencies again coordinated efforts to promote subsequent Flood Awareness Weeks March 15-19, 2010 and March 14-18, 2011. Efforts include mailing media packets to the County Emergency offices and media outlets promoting flood safety awareness and encouraging residents to assess their risks and purchase flood insurance. The information was posted to WEM's and Ready Wisconsin websites.

The NFIP's Community Rating System (CRS) was implemented in 1990 to recognize and encourage community floodplain management activities that exceed the minimum NFIP standards. The National Flood Insurance Reform Act of 1994 codified the CRS in the NFIP. Policy holders within communities that participate in the Community Rating System (CRS) are entitled to a discount on their policy. Under the CRS, flood insurance premium rates are adjusted to reflect the reduced flood risk resulting from community activities that meet the three goals of the CRS: (1) reduce flood losses; (2) facilitate accurate insurance rating; and (3) promote the awareness of flood insurance.

There are 10 CRS classes (categories): class 1 requires the most credit points and results in the largest premium reduction; class 10 receives no premium reduction. The CRS recognizes 18 creditable activities, in four categories: Public Information, Mapping and Regulations, Flood Damage Reduction, and Flood Preparedness. Table 7.2.3-1 below shows the credit points earned, classification awarded, and premium reductions given for Wisconsin communities in the CRS.

TABLE 7.2.3-1 WISCONSIN COMMMUNITIES IN THE CRS

Community Number	Community Name	Entry Date	Current Effective Date	Current Class	Credit For SFHA	Credit For Non- SFHA
550001	Adams County	10/1/1991	5/1/2007	8	10	5
550612	Allouez, Village	10/1/1992	10/1/2002	7	15	5
550128	Eau Claire, City	10/1/1991	10/1/2008	7	15	5
550578	Elm Grove, Village	4/1/2001	10/1/2006	6	20	10
550366	Evansville, City	5/1/2010	5/1/2010	7	15	5
550022	Green Bay, City	10/1/1991	10/1/2001	7	15	5

TABLE 7.2.3-1 WISCONSIN COMMMUNITIES IN THE CRS						
Community Number	Community Name	Entry Date	Current Effective Date	Current Class	Credit For SFHA	Credit For Non- SFHA
555562	La Crosse, City	10/1/1991	10/1/2002	8	10	5
550085	Mazomanie, Village	10/1/1991	10/1/1991	9	5	5
550487	New Berlin, City	10/1/2005	5/1/2010	7	15	5
550310	Ozaukee County	10/1/1991	10/1/2007	8	10	5
550660	Suamico, Village	5/1/2008	5/1/2008	8	10	5
550107	Watertown, City	10/1/1991	10/1/2007	7	15	5
550108	Waupun, City	10/1/1991	10/1/2001	8	10	5
550537	Winnebago County	10/1/1991	10/1/2001	8	10	5

Source: FEMA, 2010.

In addition to providing flood insurance and reducing flood damages through floodplain management regulations, the NFIP identifies and maps the Nation's floodplains. Mapping flood hazards creates the broad-based awareness of the flood hazards and provide the data needed for floodplain management programs and to actuarial rate new construction for flood insurance.

Floodplain maps and Flood Insurance Studies (FIS) provide critical flood hazard information needed to develop effective planning to focus on the State's areas with the greatest flood risk. In addition, WEM utilizes this flood hazard information in evaluating proposed hazard mitigation projects and conducting benefit-cost analyses.

Table 7.2.3-2 below shows NFIP participation statistics for Wisconsin as of June 30, 2011. There are serious consequences for communities that elect not to participate in the NFIP: flood insurance is not available to individuals or businesses (lending institutions cannot approve mortgages for properties located in a SFHA without the purchase of flood insurance); certain disaster assistance (HGMP, FMA, PDM and SRL programs) and other federal grants are not available to individuals, businesses, or local governments.

TABLE 7.2.3-2 NFIP STATISTICS FOR WISCONSIN	
Participating communities - regular program	522
Participating communities - emergency program	10
Total participating communities	532
Participating communities with no special flood hazard area (SFHA) identified	15

TABLE 7.2.3-2 NFIP STATISTICS FOR WISCONSIN	
Non-participating communities with SFHAs identified	67
Total communities with (SFHAs) identified	584*
Suspended communities	12
Withdrawn communities	1

*This number includes all 72 counties.
Source: FEMA, 2011.

As part of the mitigation action plan after a disaster declaration, DNR contacts the non-participating and suspended communities to provide them with information and technical assistance and encourage them to join the program.

The National Flood Insurance Program (NFIP) is administered by the Wisconsin Department of Natural Resources (DNR) Floodplain Management Program. WEM works closely with DNR on NFIP issues, since community eligibility for pre and post-disaster programs relies on program participation. The DNR Floodplain Management Program plays an important role in state mitigation. The responsibilities of FMP staff members include, but are not limited to, the following:

- Help communities administer local floodplain management programs
- Make substantial damage determinations after a flood
- Ensure that communities are in compliance with local ordinances
- Assist to non-participating communities in enrolling in the National Flood Insurance Program (NFIP)
- Assist NFIP-participating communities in enrolling in the Community Rating System (CRS)
- Represent the FMP on the Wisconsin Hazard Mitigation Team
- Work with WEM mitigation staff to administer mitigation programs and develop a repetitive loss strategy for the state
- Provide training to local government and emergency management officials on floodplain management and mitigation

In 1995 the Department of Natural Resources (DNR) developed the “Wisconsin Community Flood Mitigation Planning Guidebook.” WEM then developed additional flood mitigation planning guidance to assist local governments in meeting Flood Mitigation Assistance program planning requirements. WEM and the DNR sponsored and conducted flood mitigation planning workshops using both of these documents as training tools.

As complement to the guidebook, the DNR, with financial assistance from FEMA/WEM, developed the video “Mitigation Revitalizes a Flood Community: The Darlington Story.” The video showed how the city investigated mitigation measures following recurrent

flooding events. The City followed a mitigation planning process similar to the one described in the guidebook to produce a plan that included strategies to decrease future flood damages and attack the underlying economic problems. The video explained how the City brought civic leaders, business owners, and citizens together. The efforts of the City have been recognized in videos produced by FEMA and the Association of State Floodplain Managers.

The DNR has produced a brochure, "Living in the Floodplain: What You Need to Know – Who You Need to Know", which has been widely distributed since 2007. The brochures are handed out at the Public Officials Briefings, training workshops, public meetings, mitigation training sessions/meetings and at the Disaster Recovery Centers.
After flooding events, local officials are responsible for inspecting flood damaged structures in the special flood hazard area (SFHA) to determine if they are substantially damaged (50% or more damaged), therefore, requiring the property owner to bring a non-conforming structure into compliance with the local floodplain ordinance. After the 2004, 2007, 2008 and 2010 federal disaster declarations DNR and WEM mitigation staff conducted Substantial Damage Determination Workshops to provide information to local officials on their responsibilities under their local floodplain ordinance as well as advise them of their mitigation options. In addition, DNR sponsored the FEMA L-273 course, Managing Floodplain Development through the NFIP in 2007 in LaCrosse and 2008 in Kenosha County. Local officials from around the state attended the class. To further support floodplain management in the State, DNR conducted 19 floodplain development and permitting workshops in 2008 and 2009; 15 flood insurance workshops in 2010 and 2011; developed and distributed a newsletters to over 1,000 subscribers; and provide support to the Wisconsin Association for Floodplain, Stormwater and Coastal Managers. Staff outreached to the following organizations: Wisconsin County Code Administrators, Wisconsin Building Inspectors Association, Wisconsin League of Municipalities; Wisconsin Counties Association; American Society of Civil Engineers, Wisconsin Bar Association, Wisconsin Surveyors Association and Wisconsin Counties Highways Association as well as several tribal governments HoChunk and the Potowatomi/Sakaogon Tribes.

7.2.4 Map Modernization

Flood Hazard Maps produced by the NFIP are one of the basic and essential tools for flood insurance, floodplain management and flood hazard mitigation. However, due to the manual cartographic processes used and limited topographic information available when they were initially developed, today's flood hazard maps are inadequate to meet the current needs. Recognizing the need to upgrade the existing maps, FEMA developed a Flood Map Modernization Plan, which was funded based on Congressional backing beginning in FY03 (excerpts taken from the *Map Modernization Plan for the State of Wisconsin, WDNR, May 2008)*.

The *Map Modernization Plan for the State of Wisconsin* also noted that older maps reflect outdated flood hazard information that limits their utility for insurance and floodplain management purposes. Most of the maps were prepared using now outdated

road network information and manual cartographic techniques, which introduced errors and made the maps difficult for State and local customers to use and expensive to maintain. In addition, there is development pressure on some Wisconsin streams and lakes where the flood hazard has not yet been mapped (excerpts taken from the *Map Modernization Plan for the State of Wisconsin, WDNR, and May 2008)*.

DNR started working with FEMA as a Cooperating Technical Partner (CTP) in 2001. Under Map Modernization DNR had three Goals:

1. To serve our customers, the local communities and public of Wisconsin, and to ensure that flooding sources depicted on FEMA Flood Insurance Rate Maps are accurate enough for local zoning administrators to make reasonable determinations case by case.
2. To facilitate partnerships with Wisconsin communities and leverage existing resources when available.
3. To reduce appeals and minimize future maintenance costs.

Wisconsin DNR accepted the fact that the type of funding required to properly map all flooding sources throughout the State is simply not available. Map 7.4 highlights the counties currently involved in the Map Modernization process

As of September 2011, 2 counties are in the preliminary map production phase, 15 counties are in the final map production phase, and 44 counties have DFIRMS available. Elevent counties will not be mapped due to limited funding.

The Map Modernization program will achieve its performance goals, but will not address all of the unmet needs. FEMA has headed into a map maintenance type of phase that will build on the foundation of Map Modernization and strive to meet unmet needs. Nationwide, their efforts will focus on three main areas: Coastal flood studies; mapping of levee areas and addressing other significant flood hazard engineering needs.

7.2.5 RiskMAP

During 2009 FEMA began to develop a robust multi-year plan called RiskMAP (Risk Mapping, Assessment and Planning) to address the full scope of the remaining needs. RiskMAP is the successor to FEMA's Map Modernization and expands the focus to include risk assessment, mitigation planning and traditional hazard identification (flood mapping) activities. RiskMAP is meant to better inform communities as they make decisions related to reducing flood risk by implementing mitigation actions. RiskMAP will built on the strong foundation of Map Modernization that is in place. This integrated flood risk management approach will weave county-level flood hazard data developed in support of the NFIP into watershed-based risk assessments that serve as the foundation for local hazard mitigation plans and targeted risk communication activities.

The vision for RiskMAP is to deliver quality data that increases public awareness and leads to action that reduces risk to life and property. The RiskMAP goals are the following:

1. Address gaps in flood hazard data;
2. Measurably increase public's awareness and understanding;
3. Lead effective engagement in mitigation planning;
4. Provide an enhanced digital platform; and
5. Align risk analysis programs and develop synergies.

The outcomes and benefits are: engaged communities making informed decisions; increases in accuracy and reliability of products; effective risk assessments and mitigation plans; and communities can more effectively communicate risk. RiskMAP products may include: Flood risk database; flood risk report; and/or flood risk map.

DNR's priorities for watershed selection were based on flood risk, recent flood events, and availability of digital floodplain and high quality elevation data. The primary area of focus in FFY 2011 was the Upper and Lower Rock River watersheds along with one study in the Lower Wisconsin watershed and a few others in the Upper and Lower Chippewa and Eau Claire watershed. The Upper and Lower Rock River watersheds as well as Chippewa and Eau Counties are still in the discovery phase in which the areas in greatest need of new engineered floodplains are determined. Discovery meetings for Chippewa and Eau Counties was held in January 2011 and for the Upper and Lower Rock River watershed in February 2011 to view maps with streams with invalid studies. Community officials had the opportunity to share their local knowledge and concerns on which streams warranted new floodplain engineering and pointed out their areas of concerns. In addition, the State Hazard Mitigation Officer attended the discovery meetings for the Upper and Lower Rock River watershed and discussed the status of the communities' hazard mitigation plans and how RiskMAP products might assist in making the plans more comprehensive; previous mitigation projects in the area; and hazard mitigation funding opportunities. Mitigation will be part of future discovery meetings as they are held in the Lower Wisconsin River watershed.

7.2.6 Flood Mitigation Assistance Program

On September 23, 1994, the National Flood Insurance Reform Act (NFIRA) was signed into law. The purpose of the NFIRA is to improve the financial condition of the National Flood Insurance Program (NFIP) and reduce the federal expenditures for federal disaster assistance to flood damaged properties. One of the things that the NFIRA did was create a pre-disaster mitigation program called the Flood Mitigation Assistance (FMA) program. Although DNR administers the NFIP, WEM administers the FMA. It is a cost-share program (75 % federal, 25% local match) through which states and communities can receive grants for flood mitigation planning, technical assistance and mitigation projects.

The overall goal of the FMA is to fund cost-effective measures that reduce or eliminate the long-term risk of flood damage to buildings, manufactured homes and other NFIP-insured structures. Other goals are: Reduce the number of repetitively or substantially damaged structures and the associated claims on the NFIP; encourage long-term, comprehensive mitigation planning; respond to the needs of communities participating in the NFIP; and complement other federal and state mitigation programs with similar goals.

The program is subject to the availability of appropriation funding as well as any directive or restriction made with respect to the funds. Each state receives an allocation based on the number of flood insurance policies in force and the number of repetitive loss structures in the state. Repetitive loss structures are those structures that have had two or more flood insurance claims of at least $1,000 each in the last ten years. The minimum amount any state receives is $10,000 for mitigation planning grants and $100,000 for project grants to implement mitigation activities identified in approved mitigation plans. States may submit applications above the allocation to be considered through a national competition. In addition, up to 10% of the project funds are allowed for the state to use for management costs. Up until 2003, the state did not utilize the management cost (or previously known as technical assistance) funds and applied those funds to implement projects. The State utilized management cost funds again in 2005, 2007, and 2010, but not 2006 and 2009. Subapplicants may also now request up to 5% of the grant for management costs. In 2004 funds were required to be used on for RLPs. The State solicited applications, but there were no projects submitted that met the requirement. Although the state solicited FMA applications in 2008, no applications were received, therefore, the State did not apply for FMA funds. The State solicited FFY 11 FMA applications during the annual HMA (Hazard Mitigation Assistance) program application period. The State reviews applications to determine if any of the projects will fit the FMA program criteria. None were received. However, the project funded in FFY10 is incurring a cost overrun. Therefore, it was the State's intent to reapply to the FFY11 FMA program when the application reopened in the spring of 2011 to mitigate one of the properties originally approved as part of the FFY10 award. Normally there are funds available after the national competition. However, in 2011 all funds were exhausted. The subgrantee will be applying for the FFY12 FMA funds. Due to program restrictions, the State is not always able to spend the available allocation. Below challenges to the program are discussed. Appendix C contains detailed tables describing the FMA projects and plans that have been funded in Wisconsin. Below in Table 7.2.6-1 is the FMA funds (federal share) the State has received and implemented:

TABLE 7.2.6-1 FLOOD MITIGATION ASSISTANCE FUNDING

FFY	Planning	Project	Tech. Asst.	Total
1996/1997	$ 11,800	$ 117,100	-	$ 128,900
1998*	$ 30,754	$ 401,500	-	$ 432,254

TABLE 7.2.6-1 FLOOD MITIGATION ASSISTANCE FUNDING				
FFY	**Planning**	**Project**	**Tech. Asst.**	**Total**
1999	$ 11,250	$ 125,100	-	$ 136,350
2000	$ 13,307	$ 148,110	-	$ 161,417
2001	$ 14,257	$ 145,250	-	$ 159,507
2002	$ 13,800	$ 114,125	-	$ 127,925
2003	-	$ 89,349	$ 3,811	$ 93,160
2004	-	-	-	-
2005	$ 13,399	$ 107,512	$ 8,183	$ 129,094
2006	$ 10,364	-	-	$ 10,364
2007	-	$ 180,441	$ 5,360	$ 185,801
2009	-	$ 153,000	-	$ 153,000
2010	-	$134,348	$8994	$143,342
Total	**$118,931**	**$1,562,835**	**$26,348**	**$1,708,114**

Due to unspent funds of other states, Wisconsin was able to receive additional funds.
Source: WEM, 2011.

To receive FMA grant funds, the community must be participating and in good standing with the NFIP. Eligible projects and criteria are basically the same as for the Hazard Mitigation Grant Program. The biggest difference is that the projects must reduce the risk of flood damage to structures insured under the NFIP.

Emphasis and priority is given to insured repetitive loss properties including severe repetitive loss properties. WEM makes every attempt to utilize FMA funds to mitigate losses to these properties. A summary of Wisconsin's Repetitive Loss Report dated December 2010 is presented in Appendix D. The state makes every attempt to mitigate repetitive loss properties through all of the HMA programs.

There are several challenges with the FMA Program. Planning grant funds can only be used to address flood hazards, not all hazards in a community. They can be used to complete flood mitigation components of local all-hazards mitigation plans. Due to this restriction it makes it difficult to award planning grant funds. Subgrantees are not interested in having to apply for two different planning grants to complete one all hazard mitigation plan. The result is that the State has great difficulty in getting communities to apply for the FMA planning grant funds. Planning grant funds awarded in 2005 and 2006 were utilized to enhance the flood risk assessments in existing all hazard mitigation plans. The State has encouraged counties to apply for FMA funds to

enhance the flood risk assessment portion of the all hazard mitigation plan such as doing a detailed floodplain structure inventory.

In the past, due to restrictions in certain fiscal years, the State was denied planning grant funds for communities with no repetitive loss properties even when those were the only communities in the state to submit planning grant applications.

The limited amount of planning grant funds received annually is inadequate for producing more than one plan per year. However, in order to receive FMA project grant funds, a community must have a FEMA-approved hazard mitigation plan that identifies the proposed project(s). Prior to the creation of the Pre-Disaster Mitigation Program (PDM), which is the primary funding source for the development and update of all hazard mitigation plans, initially there was a concentration of projects in just four jurisdictions with approved flood mitigation plans: the cities of Darlington and Brookfield, and Kenosha and Jefferson counties.

The program is restrictive in that funds can only be used to protect structures insured through the NFIP. Further when projects are submitted that include NFIP-insured structures, the project may not pass the benefit-cost analysis. This can be very frustrating particularly if the property has been identified as a repetitive loss or severe repetitive loss property.

Finally, all applications have to be submitted through FEMA's e-Grants system. Subgrantees are not familiar with utilizing this system and some have great difficulty in completing the required application. In addition, the system itself has had problems, but has improved in recent years. Another issue is the application utilized in e-Grants does not request the required information needed for the BCA.

7.2.7 Hazard Mitigation Grant Program

The Section 404-Hazard Mitigation Grant Program (HMGP) is a critical component of the state’s mitigation efforts. The program was created in November 1988 as a result of the Robert T. Stafford Disaster Relief and Emergency Assistance Act that amended PL 93-288, the Federal Disaster Relief Act of 1974. The HMGP is administered by Wisconsin Emergency Management and makes grants available to state and local governments as well as eligible private, non-profit organizations and Indian tribes to implement long-term mitigation measures following a major disaster declaration. Eligible projects must be environmentally sound, cost-effective, solve a problem and prevent future disaster damages. The grants are cost-shared with 75% provided in federal funds through FEMA with a 25% local match. Wisconsin provides half of the local match, thereby the required local match is reduced to 12.5%. In order to receive HMGP funds, a community must be participating and in good standing with the National Flood Insurance Program (NFIP). Further, beginning November 1, 2004, communities must have a FEMA approved all hazards mitigation plan to be eligible for funds for project implementation.

President Clinton signed the Hazard Mitigation and Relocation Assistance Act that amended Section 404 of the Stafford Act on December 3, 1993. This amendment significantly increased the amount of funding available in the HMGP in two ways. First, it increased the federal share of grant funds from 50% to 75%. Second, the proportion of federal funds allotted to the HMGP was increased to 15% of the federal funds spent on the Individual and Public Assistance Programs for each disaster, whereas before it was based on 10% of the federal funds spent in the Public Assistance Program only. The change of the funding formula raised the amount of HMGP funds available in the state for the 1993 Midwest Flood from $2 million to $14 million. Unfortunately, in 2003 the amount of federal funds allocated to each federal declaration was reduced from 15% to 7.5%. States including Wisconsin supported restoring the federal share back to 15% of the Individual and Public Assistance Funds for each federal declaration.

On October 30, 2000, the Disaster Mitigation Act of 2000 (DMA2K) was enacted and amended the Stafford Act. The purpose of the Act was to establish a national program for pre-disaster mitigation, streamline administration of disaster relief and control federal costs of disaster assistance. Section 322 of the act will have a great impact on the HMGP. States are required to have a FEMA approved Standard Hazard Mitigation Plan to be eligible for certain disaster assistance programs including the HMGP. This section also increased HMGP funding from 15% (previously 7.5%) to 20% for those states that have an approved State Enhanced Hazard Mitigation Plan. In addition, it established a requirement for local and tribal mitigation plans and authorized 7% of the HMGP funds to be available to states to be used in developing such plans. The Interim Final Rule, 44 CFR Part 201, Hazard Mitigation Planning, published February 26, 2002, and Final Rule published October 31, 2007, established criteria for State and local hazard mitigation planning authorized by Section 322 of the Stafford Act, as amended by Section 104 of the DMA2K, contained the rules for hazard mitigation planning and the Hazard Mitigation Grant Program. The rules addressed state and local mitigation planning requirements.

WEM Mitigation staff solicits, review, evaluate and rank HMGP applications before presenting to the Wisconsin Hazard Mitigation Team for discussion. Based on those discussions, funding recommendations are made to the Division Administrator for a final decision on which applications are forwarded to FEMA for approval. As of June 30, 2011, $73,045,269 in HMGP project funds and $1,228,594 in HMGP planning funds have been used in or allocated to the State for 104 mitigation projects and 33 local plans or plan updates. Two federal declarations (1933-DR and 1944-DR) were declared in 2010 and one in 2011 (1966-DR). The State's mitigation staff members are presently processing applications. Based on the six-month allocation, the estimated amount of funds available for 1933-DR and 1944-DR is $21,338,523 and $1,050,261. The best estimate for 1966-DR is $1,900,000. This will bring the total for HMGP funds to over $98 million for the history of the program. Projects consist of acquisition and demolition, floodproofing, wind retrofit, storm shelters, education and outreach, structural such as stormwater management, utility protection, NOAA weather radios, and planning. Table 7.10 identifies funding approved funding allocation by declaration. In addition, Appendix B provides a detailed history of the disaster declarations and the

HMGP. Appendix C identifies mitigation projects implemented statewide. HMGP is the primary funding component for implementing mitigation actions identified in state and local hazard mitigation plans.

The mitigation staff makes every attempt to fully utilize all available funding. Applications are submitted in the amount of or exceeding all available funding for the declaration within the required timeframe (i.e., 18 months from the declaration.) In addition, eligible projects over above the allocation are submitted in the event funds become available. As projects are completed, any unspent funds in projects are reobligated to projects that have cost overruns. The goal is to spend as much funds as possible and returning as little as possible at the end of the performance period.

The program does have some challenges which are not unique to HMGP, but impact all of the FEMA mitigation programs. The requirement for the project to be cost-effective, meaning that the benefits must outweigh the cost of one to one is the largest challenge that faces projects submitted for funding. Many viable mitigation projects are not funded as they cannot meet FEMA's strict BCA requirements. In most situations the required documentation cannot be obtained. This is particularly frustrating when repetitive loss or severe repetitive loss properties are involved. The planning requirements, in some cases, are another challenge. In order for a community to be eligible for funding, they must have an approved hazard mitigation plan. This requirement in some instances may delay funding of mitigation projects by either the community not having an approved hazard mitigation plan or the plan has expired. In some instances the plan may be in the update process, but not yet completed. WEM diligently works with counties to ensure that the plans remain current and do not expire. If there is a county that doesn't have a plan or if it is expired, they would be a high priority to receive HMGP planning grant funds.

Under the HMGP program, the BCA requirement is waived for properties that are determined by the authorized local official to be substantially damaged under the local floodplain ordinance. This greatly expedites project approval for acquiring flood damaged properties. However, a challenge is getting the community to complete the substantial damage determinations. After a declaration, DNR contacts all communities to remind them of their responsibility to complete substantial damage determinations. WEM will work with those communities that have substantially damaged structures to apply for HMGP funding to mitigate those structures. In addition, DNR and WEM conduct substantial damage workshops for local officials. DNR also provides technical assistance to communities if requested.

In October 2000, Wisconsin became a Managing State for the HMGP. This means that FEMA recognized that the State is capable of performing benefit-cost analyses and environmental reviews for proposed projects. Based on a Memorandum of Understanding signed by FEMA and WEM, the State prepared a project summary sheet for all HMGP applications submitted to FEMA. Then, instead of reviewing the entire application package, FEMA reviewed the project summary sheet and approved the project and environmental documents. This significantly streamlined the approval

process. In a letter dated February 15, 2006, the MOU was terminated. The reason was that with the passage of the DMA2K, Interim Final Rule published on February 26, 2002, 44 CFR 201, stated: "Management State means a State to which FEMA has delegated the authority to administer and manage the HMGP under the criteria established by FEMA . . ." To date, such criteria has never been developed. Therefore, there are no "managing states."

7.2.8 Pre-Disaster Mitigation Program

The Disaster Mitigation Act of 2000 (DMA2K), Public Law 106-390, was signed into law on October 30, 2000, and established a national program for pre-disaster hazard mitigation. The purpose of the law was to create a significant opportunity to reduce disaster losses through pre-disaster mitigation planning; streamline recovery process through planned, pre-identified, cost-effective mitigation; and link pre- and post-disaster mitigation planning and initiatives.

Section 203 of the Stafford Act, as amended by Section 102 of the DMA2K, created the Pre-Disaster Mitigation (PDM) program. The PDM makes funding available to state, local and Indian Tribal governments to implement cost-effective hazard mitigation activities that complement a comprehensive mitigation program. Funding may be awarded for the development and update of an all-hazards mitigation plan or for a cost-effective hazard mitigation project. Applicants must be participating in the NFIP for projects located in a special flood hazard area.

Interim Final Rule, 44 CFR Part 201, Hazard Mitigation Planning, published February 26, 2002, and Final Rule published October 31, 2007, established criteria for State, local and tribal hazard mitigation planning authorized by Section 322 of the Stafford Act, as amended by Section 104 of the DMA2K. After November 1, 2004, local and tribal governments applying for PDM funds through the states have to have an approved local mitigation plan prior to the approval of local mitigation project grants. States are also required to have an approved Standard State mitigation plan in order to receive PDM funds for State or local mitigation projects after November 1, 2004. A major change in the final rule was that all plans approved after October 1, 2008, must address participation in the NFIP and continued compliance with the NFIP requirements as well as NFIP insured properties that have been repetitively damaged by floods. The development and subsequent updates of the State of Wisconsin Hazard Mitigation Plan will meet that requirement. Therefore, the development of State and local hazard mitigation plans is the key to maintaining eligibility for PDM funding.

Successful grants receive 75% federal funding to total project costs. The applicant is responsible for 25%. Small impoverished communities may receive federal funding of 90%. The local share may be in the form of in-kind services as well as dollars; however, no other federal source of money may be used to fund the local share.

In 2002 FEMA provided a one-time grant in the amount of $50,000 to the states for developing a statewide strategy for PDM program implementation. Wisconsin used the

funds to contract with the Council of Regional Planning Organizations to develop local mitigation planning guidance. Members of the Council are representatives from the Regional Planning Commissions throughout the State. The Resource Guide to All Hazards Mitigation Planning in Wisconsin was completed and has been used to provide guidance to local and tribal governments developing mitigation plans. The Guide is utilized at planning workshops and distributed upon request. It can be found on WEM's website at http://emergencymanagement.wi.gov. In addition, the State received $476,883 in federal funds for local hazard mitigation planning. The funds were used to award planning grants to thirteen counties and five jurisdictions for the development of all hazard mitigation plans. In addition, FEMA provided planning grants directly to three of the states Tribal governments.

The 2003 PDM budget provided $248,375 in federal funds to each state. The State used the funds to award planning grants to another seven counties for the development of mitigation plans.

The remaining PDM appropriation of approximately $130 million was made available to initiate a national PDM competitive grant program for pre-disaster mitigation activities. The intent of the PDM-C is to provide a consistent source of funding to sate, tribal and local governments for pre-disaster mitigation planning and projects. The State submitted five Planning Grant applications (three counties and two Tribal governments), six Project Grant applications, as well as a State Management Cost grant for a total of $4,166,387 ($3,142,442 federal share.) One planning and one project subgrant were determined to be small and impoverished, therefore, eligible for 90% federal funding. The PDM-C applications were determined to be eligible by a National Evaluation Panel in accordance with PDM-C Grant Guidance and Notice of Funds Availability, and subsequently were approved for funding. In addition, one tribal organization applied as a grantee to FEMA and received a planning grant.

PDM-C funds for 2004 and 2005 were combined and announced in FFY2005. The State's application included 19 planning and 5 project grants in addition to State Management Costs in the amount of $3,549,249. The State was awarded $1,556,063 for 17 planning grants, and two projects along with State Management Costs.

PDM-C funding in 2006 was reduced to $50 million nationwide. This limited the states applications to five subapplications plus management costs. The State submitted three planning, two project grants, and state management costs totaling $947,011. The planning grants and one project were funded in the amount of $243,553. The second project application for a storm shelter was determined to be eligible, but was not funded due to the lack of funds. The application was resubmitted and funded in 2007.

The State submitted a PDM-C application in 2007 for $1,831,102. The application included a request for 11 planning grants and 2 projects as well as state management costs. Nine of the 11 planning grants and 1 project grant have been approved along with State Management Costs for a total of $1,758,611.

The 2008 PDM-C application included 7 planning grants and 1 project along with State Management Cost for a total of $2,167,758. The planning grants and State Management Costs were approved in the amount of $262,914. As a result of a Congressional Directive, the State submitted a LPDM (Legislative Pre-Disaster Mitigation) grant in the amount of $630,000. The initial application was denied as it was determined not to be cost effective. The community resubmitted an application that was approved in the amount of $238,344.

The 2009 PDM-C application included eight planning and one project grant along with State Management Costs totaling $5,155,319. All of the planning subgrants and State Management Costs were approved for a total of $379,217. Again in 2009, the state was designated with a LDPM grant in the amount of $300,000 (federal share). The county was approved two subgrants for a generator and sirens in the amount of $136,500 and $229,883 for a total of $366,383. Along with State Management Costs the total grant was $383,409.

The 2010 PDM-C application included 11 planning and two project subgrants along with State Management Costs in the amount of $1,104,398. Nine of the planning subgrants and one project along with State Management Costs were approved for $734,825.

The 2011 PDM-C application included eight planning and three project subgrants along with State Management Costs totaling $4,228,135. The State was initially notified that all of the planning subgrants and two of the projects were selected for further review. However, due to funding cuts, one of the planning and one of the project subgrants was no longer under consideration. The State resubmitted these two subapplications, along with one of the other unfunded projects, for funding through the HMGP program under declaration 1933-DR. The one remaining project is presently undergoing the required environmental review. The planning subgrants have been approved in the amount of $275,924. State Management costs are still pending approval.

TABLE 7.2.8-1 PRE-DISASTER MITIGATION FUNDING

FFY	Planning	Project	State Mgmt.	Total
2002	$476,883	$0	$50,000*	$ 526,883
2003	$230,990	$3,758,585	$176,812	$4,166,387
2004-05	$1,064,142	$341,600	$150,321	$1,556,063
2006	$156,412	$65,000	$22,141	$243,553
2007	$1,037,919	$650,500	$70,092	$1,758,611
2008	$239,017	$0	$23,897	$262,914
2008-LPDM	$0	$238,344	$18,906	$257,250
2009	$353,639	$0	$25,579	$379,218

TABLE 7.2.8-1 PRE-DISASTER MITIGATION FUNDING				
FFY	**Planning**	**Project**	**State Mgmt.**	**Total**
2009-LPDM	$0	$366,383	$17,026	$383,409
2010	$593,373	$93,593	$47,859	$734,825
2011	$275,924	$2,064,738**	$58,878**	$2,399,540
Total	**$4,428,299**	**$4,428,299**	**$8,856,598**	**$12,668,653**

*One-time grant, **Pending Approval
Source: WEM, 2011.

On January 22, 2009, the State of Wisconsin had its first Disaster Resistant University (DRU) approved for the University of Wisconsin-River Falls. As a result of the plan, the University received a project subgrant for the construction of small storm shelters located at two research farms. The University of Wisconsin-Madison, the State's largest campus, was granted a FFY 11 PDM subgrant for the development of a hazard mitigation plan, which is presently underway. The University of Wisconsin-Superior is participating in the City of Superior's plan update. There are several other state universities interested in developing DRU plans and mitigation staff is committed to assisting in the plan development. The DRU plans will follow the same methodology as the local mitigation plans for the incorporation into the State of Wisconsin Hazard Mitigation Plan in future updates.

In FFY05, WEM received a PDM state planning grant for a Risk Assessment of State-Owned and Operated Buildings, Critical Facilities and Infrastructure. There are approximately 6,500 state facilities (not counting infrastructure) in the State of Wisconsin. It would take one person working full-time nearly 28 years to visit every facility. Therefore, a strategy was developed to obtain needed site specific information on those facilities and infrastructure that are most critical and may be at most risk from future disasters. WEM along with the Department of Administration created a Wisconsin Risk Assessment Data Collection Worksheet that is utilized for collecting information on structures. The collection worksheet covers everything from general information, such as location, to more detailed questions involving construction materials. All of this data is needed to create an accurate risk assessment. Section 3.17 of the State Hazard Mitigation Plan discusses the process and results to date. The Wisconsin Risk Assessment Data Collection Worksheet can be found in Appendix H. Future updates of the State of Wisconsin Hazard Mitigation Plan will include assessment of additional structures.

WEM applied for and received a 2007 PDM-C grant for updating the State Hazard Mitigation Plan. A larger portion of the grant was for the development of a statewide HAZUS flood risk assessment. With support from the University of Indiana Purdue-POLIS Center, the University of Wisconsin-Land Information and Computer Graphics Facility (LICGF) completed a statewide HAZUS flood risk assessment. The results can be found in Section 3.7. The statewide HAZUS flood risk assessment was included in

the 2008 update of the State of Wisconsin Hazard Mitigation Plan. In addition, the individual county HAZUS flood risk assessments were distributed to all counties and to each respective Regional Planning Commission. WEM's website includes an interactive map where the county HAZUS risk assessment can be viewed and downloaded. FEMA highlighted Wisconsin's Statewide Flood Risk Assessment efforts in a Best Practices story that can be found at http://www.fema.gov/mitigationbp/brief.do?mitssId=4453. With the 2011 update of the State Plan, a HAZUS risk assessment was completed for the counties that had digitized FIRM maps completed since the 2008 update. This included new assessments for thirteen (13) counties. The statewide summary was updated to reflect these changes. The project was also highlighted at GIS Day held at the State Capitol in February 2009 for State Legislators.

There are several challenges in administering and implementing the PDM program. As in the FMA and HMGP programs, meeting FEMA's BCA requirements is again a challenge. Another major challenge is that the annual funding for the program is uncertain from year to year. States solicit and process applications without knowing what the funding availability is. In the past funding has been cut resulting in a limited number of applications allowed to be submitted, or projects that passed the national evaluation and were selected for funding consideration were eliminated from consideration after funding cuts. In addition, the guidance changes from year-to-year, although it has been more consistent in the last two years. Another challenge is the short application period of six months. In this time period the State has to review the guidance, solicit applications, review and process those applications including completing the benefit-cost analysis and the preliminary consultation for the environmental review. The State does not get any management costs up-front to complete this effort. Management Costs are only awarded based on subgrant awards. So if funding is drastically reduced, the state may have put a considerable amount of effort and resources into the program without being awarded adequate management costs. Finally, all applications have to be submitted through FEMA's e-Grants system. Subgrantees are not familiar with utilizing this system and some have great difficulty in completing the required application. In addition, the system itself has had problems, but has improved in recent years. Another issue is the application utilized in e-Grants does not request the required information needed for the BCA.

WEM Mitigation staff work with local jurisdictions and Regional Planning Commissions to develop projects. State Mitigation staff have served on FEMA's National Evaluation panels every year. WEM will continue to work directly with FEMA Region V to submit projects for future PDM funding. Further, the SHMO participated on the National Review Panel for the Maryland, Washington, and Florida State Enhance Plan reviews. Another mitigation staff person sat on the panel that reviewed the second update of the State of Washington's enhanced plan.

Appendix C contains detailed tables describing the PDM projects and plans that have been funded in Wisconsin.

7.2.9 Repetitive Loss Properties

The NFIP paid over $700 million in 2010 in flood insurance claims. Historically, over 30% of claims go to property owners who hold only 1% of the policies issued. To address this issue, Congress passed the Flood Insurance Reform Act on June 30, 2004. The Act created the Repetitive Flood Claims (RFC) and Severe Repetitive Loss (SRL) programs described below. Repetitive loss properties (RLPs) are properties that have had two or more flood insurance claims of at least $1,000 each within a ten-year period since 1978. Severe RLPs (SRLPs) are properties with four or more flood losses where cumulative payments exceed $20,000, or two or more flood losses where cumulative payments exceed the property value. There are an estimated 6,200 SRL properties nationwide.
A summary of repetitive loss properties in Wisconsin can be found in Appendix D, Wisconsin's Repetitive Loss Report. As of December 2010, there were 579 statewide repetitive loss properties. Of that number 112 (19.34%) have been mitigated, whether by removal or elevation. The report identifies 97 communities with repetitive loss properties. Nearly 85% of the communities with repetitive loss properties in Wisconsin have five or less repetitive loss properties, as displayed in Table 3 of the report. The City of Milwaukee is the only community with more than 50 RLP.

The report provides the state with a resource to identify the properties with the most repetitive losses and to prioritize specific mitigation recommendations for those properties. The state utilizes the Repetitive Loss Report statistics from past and current mitigation projects to provide guidance for future mitigation projects and reduce flood losses. Repetitive loss information is a consideration of the funding criteria for mitigation projects. When a community submits an application for mitigation funding, the state refers to the Repetitive Loss Report to determine if the repetitive loss properties are identified on the application. If they are not identified and the properties fit within the original scope of the project, the state recommends that the repetitive loss properties become part of the project. RLP information is also provided to local governments to address and include in development of Flood and/or All-Hazard Mitigation Plans.

The majority of the RLP in the state are located in the City of Milwaukee, the most densely populated city in the State. The City of Milwaukee and the Milwaukee Metropolitan Sewage District (MMSD) actively undertake mitigation projects. In most cases, they are not funded with federal mitigation grants, therefore, WEM is not aware of all of the activities undertaken. It can therefore be difficult to track the status of repetitive loss properties in Milwaukee. The same is true for other communities around the state that engage in locally-funded mitigation activities.

Probably the greatest challenge in mitigating RLP and SRL properties is meeting FEMA's strict BCA requirements. As stated previously, the benefits of a project must exceed the cost of at least a one to one ratio. It is frequently difficult to achieve this ratio. For the SRL program, the State can utilize the "greatest savings to the fund" BCA methodology, however, that has also not been successful.

Another challenge is that as flood claims are processed, the repetitive loss data constantly changes. As the state works to mitigate repetitive loss properties, additional properties are identified in subsequent flooding events. In addition, some of the repetitive loss properties are impossible to identify due to poor location information.

As stated previously, mitigating RLP and SRL properties is high State priority. WEM strongly encourages local governments to mitigate such properties, however it cannot force local governments to do so.

7.2.10 Repetitive Flood Claims Program

In 2006, Congress appropriated $10 million for the Repetitive Flood Claims (RFC) program to provide funding to reduce or eliminate the long-term risk of flood damage to structures insured through the NFIP. RFC funds are made available to mitigate residential or commercial properties that have received one or more NFIP insurance payments within a state or community that cannot meet the requirements of the FMA program for either cost share or capacity to manage the activities. In order to be eligible, the community and the state must include a letter explaining why the FMA cost-sharing requirement cannot be met. FEMA may contribute up to 100% of the project cost. Like the FMA program, state and local management costs are available. Like the other programs, the State is required to have an approved Hazard Mitigation Plan; however, a local mitigation plan is not required. WEM solicits applications for RFC through the annual HMA application period, and are submitted to FEMA for the national competition. FEMA ranks the eligible projects on the basis of the greatest savings to the National Flood Insurance Fund (NFIF) as verified by the benefit-cost ratio (BCR.) Projects are ranked from highest verified BCR to lowest verified BCR. FEMA considers the national ranking and program priorities in determining which projects are identified for further review up to the amount of funds available for the RFC program. To date the State has not received any eligible RFC applications from local governments. In 2009, the State worked with a community in Waukesha County where they did not have an approved all hazard mitigation plan on the potential acquisition and demolition of a property that was substantially damaged in the June 2008 floods. However, the project did not have a positive BCR, therefore, was determined not to be cost effective.

Again, the greatest challenge as in the other FEMA mitigation programs, is meeting the BCA requirements. In addition, the program is restrictive in that funds can only be used to protect structures insured through the NFIP, and there has to have been at least one paid claim. Finally, RFC applications have to be submitted through FEMA's e-Grants system. Subgrantees are not familiar with utilizing this system and some have great difficulty in completing the required application. In addition, the system itself has had problems, but has improved in recent years. Another issue is the application utilized in e-Grants does not request the required information needed for the BCA.

7.2.11 Severe Repetitive Loss Program

The NFIP pays out $200 million annually in flood insurance claims, but about 30% of the total claims go to property owners who hold only 1% of the 4.5 million policies issued. Congress worked on a bill for several years to address these Severe Repetitive Loss (SRL) properties. As a result of that work, the Bunning-Bereuter-Blumenauer Flood Insurance Reform Act of 2004 was signed into law on June 30, 2004. The Act includes measures to address those properties that result in a disproportionate amount of claims on the NFIP. The Act created a pilot program for mitigation of severe repetitive loss properties, and funding in the FMA Program will be increased from $20 to $40 million for five years. “Severe repetitive loss properties” are defined as a NFIP-insured residential property that meet one of two triggers: four or more claims over $5,000 (including building and contents) each, and the cumulative amount of such claims payments exceed $20,000; or at least two claims with cumulative amount exceeding the value of the building. For both, at least two of the claims must have occurred within any ten-year period and must be greater than ten days apart.

The SRL Pilot Program was announced in 2008 with $80 million available to mitigate properties that met the SRL definition. The purpose of the program is to reduce or eliminate the long-term risk of flood damage to SRL residential properties and the associated drain on the NFIP from such properties. Eligible activities include acquisition, demolition or relocation; elevation; dry floodproofing of historic structures; minor physical localized flood control projects; and mitigation reconstruction (demolition and rebuilding of structures.) Like the FMA and RFC programs, state and local management costs are available. Both the State and community must have an approved hazard mitigation plan that meets the requirements of 44 CFR Part 201. Funding is 75% federal with a 25% local match. The match can be reduced to 10% for states with an approved State mitigation plan that includes a strategy for reducing the number of repetitive loss properties.

If the owner of a severe repetitive loss property refuses an offer made under the program, the flood insurance premium will increase to 150%. At no time can the premium be more than the actuarial rate. Any eligible mitigation proposal for properties that fit this criteria in Wisconsin would be an extremely high priority for mitigation funding at WEM. There were 17 states designated at "target states" meaning they had more than 51 identified SRL properties. Illinois was the only State in Region V that met these criteria. Target states received allocations based on the number of SRL properties in the state. Ten percent was set aside for non-target states.

As of June 1, 2011, Wisconsin had 11 identified properties that met the SRL definition. Four of the properties identified have been "validated" by FEMA as a SRL property. One of the four properties has been recently included in a HMGP application. Two properties are "validated uninsured." One of those properties has been mitigated through HMGP. Five of the properties are "pending uninsured." Of those five, two have been mitigated again through HMGP, and one of the properties cannot be located due to insufficient data. That brings the number of potential SRL properties down to six statewide. (In the previous update of this plan, there had been a SRL property identified

in Jefferson County. The County has since acquired and demolished the identified structure utilizing HMGP funds.)

The State of Wisconsin supports, through funding and technical assistance, the development of local mitigation plans in counties with severe repetitive loss properties. In addition, WEM will work with the county to assist in the plan, as well as with the community to assist in the project application for SRL properties. All of the communities with an identified SRL property either have an approved hazard mitigation plan or are in the process of updating the plan with one exception. Washington County is identified with two SRL properties, but has chosen not to apply for a grant to develop the required mitigation plan. WEM has strongly encouraged them to develop a hazard mitigation plan and offered them grant funds to do so.

TABLE 7.2.11-1 SEVERE REPETITIVE LOSS PROPERTIES

Community	Severe Repetitive Loss Properties	Comment
Crawford County	1	Cannot be located due to insufficient data
Jefferson County	1	Mitigated
Kenosha County	1	Has been included in a pending HMGP application
Milwaukee, City of	3	1 validated uninsured; 2 pending uninsured
Prescott, City of	1	Validated
Trempealeau County	1	Mitigated
Washington County	2	Validated; county has no mitigation plan
Wauwatosa, City of	1	Mitigated
Total	**11**	

WEM outreaches to those communities with identified SRL properties annually as part of the HMA application period as well as after disasters when HMGP funds are available. The State has not applied for SRL funds to date, however, it has mitigated several SRL properties through other programs such as FMA and HMGP.

As with the other mitigation programs, the greatest challenge is meeting the BCA requirements. For the SRL program, the State can utilize the "greatest savings to the fund" BCA methodology, however, that has also not been successful. In addition, the program is restrictive in that funds can only be used to protect SRL structures insured through the NFIP. The other challenges were mentioned above. First, two of the properties are located in a community with no mitigation plan. Therefore, they are ineligible for the SRL program. In addition, there are serious consequences to the property owner if they are made a mitigation offer through the SRL program, and they

do not participate. Therefore, the state looks for wayts to fund mitigating SRL properties through other mitigation programs. Finally, SRL applications also have to be submitted through FEMA's e-Grants system. Subgrantees are not familiar with utilizing this system and some have great difficulty in completing the required application. In addition, the system itself has had problems, but has improved in recent years. Another issue is the application utilized in e-Grants does not request the required information needed for the BCA.

7.2.12 Unified Hazard Mitigation Assistance Program

Beginning FFY 2009, FEMA unified the PDM program with the FMA, RFC and SRL programs into a unified Hazard Mitigation Assistance (HMA) program application cycle. The statutory origins of the programs differ, but all share the common goals of reducing the loss of life and property due to natural hazards. It is said that 80% of the programs are similar with 20% in unique difference. FEMA has combined the guidance for the four programs into one comprehensive document. It consolidates program eligibility information under one cover and outlines both the common elements and spells out the unique requirements among the programs so that officials can easily identify key similarities and differences between the various programs. Ultimately the HMGP was integrated into the HMA guidance in FFY10, providing a single guidance and referenced documents for both pre and post disaster hazard mitigation assistance.

7.2.13 HAZUS-MH

HAZUS-MH was developed by the Federal Emergency Management Agency [FEMA] under contract with the National Institute of Building Sciences [NIBS]. NIBS maintains committees of wind, flood, earthquake, hurricane and software experts to provide technical oversight and guidance to HAZUS-MH development. Loss estimates produced by HAZUS-MH are based on current scientific and engineering knowledge of the effects of hurricane winds, floods, and earthquakes. Estimating losses is essential to decision-making at all levels of government, providing a basis for developing mitigation plans and policies, emergency preparedness, and response and recovery planning. HAZUS-MH provides estimates of hazard-related damage before a disaster occurs and takes into account various impacts of a hazard event. The impacts include the following:

- Physical damage to residential and commercial buildings, schools, critical facilities and infrastructure.
- Economic loss, including lost jobs, business interruptions, repair and reconstruction costs.
- Social impacts, including impacts to people, including requirements for shelters and medical aid.

HAZUS-MH uses state-of-the-art geographic information system [GIS] software to map and display hazard data and the results of damage and economic loss estimates for buildings and infrastructure. It also allows users to estimate the impacts of hurricane

winds, floods, and earthquakes on populations. HAZUS-MH provides for three levels of analysis:

- A **Level 1 analysis** yields a rough estimate based on the nationwide database and is a way to begin the risk assessment process and prioritize high-risk communities.
- A **Level 2 analysis** requires the input of additional or refined data and hazard maps that will produce more accurate risk and loss estimates. Assistance from local emergency management personnel, city planners, GIS professionals, and others may be necessary for this level of analysis.
- A **Level 3 analysis** yields the most accurate estimate of loss and typically requires the involvement of technical experts such as structural and geotechnical engineers who can modify loss parameters based on to the specific conditions of a community. This level analysis will allow users to supply their own techniques to study special conditions such as dam breaks and tsunamis. Engineering and other expertise is needed at this level.

The risk assessment and vulnerability analysis is one of the most difficult tasks for local governments to complete in developing a hazard mitigation plan. HAZUS can greatly assist in this effort. In addition HAZUS may assist local governments in developing mitigation policies, developing and improving emergency operations plans, assist in generating scenarios for exercises and training purposes and for quickly estimating losses after a disaster and what resources will be required for response and recovery. The GIS capability of local governments will determine how successful they are in utilizing HAZUS.

A previous WEM mitigation staff member completed HAZUS-MH training at the Emergency Management Institute, and interfaced with software developers to gain access to updated versions of the programs and to solve problems encountered with the software. Several mitigation staff including the SHMO participates on the Central HAZUS Users Group (CHUG). WEM hosted a four-day HAZUS class in 2006 conducted by FEMA contractors. The four-day class included both an introduction to GIS component followed by an advanced HAZUS-MH Flood class. Thirty-two people attended the training that included state staff, RPC staff, and local government staff. Mitigation staff members have also attended HAZUS classes at EMI. FEMA highlighted Wisconsin's Statewide HAZUS Flood Risk Assessment efforts in a Best Practices story that can be found at http://www.fema.gov/mitigationbp/brief.do?mitssId=4453.

As mentioned before, WEM applied for and received a FFY07 PDM grant to complete a level 1.5 HAZUS-MH flood risk assessment for the entire state. WEM contracted with the University of Wisconsin Land Information and Computer Graphics Facility, and the Polis Center at Indiana - Purdue University at Indianapolis on a joint effort to create the statewide flood risk assessment. This statewide HAZUS flood risk assessment was included in the 2008 update of the State of Wisconsin Hazard Mitigation Plan. In addition, the individual county HAZUS flood risk assessments were distributed to all counties and to each respective Regional Planning Commission. In addition, an

interactive map can be found at http://emergencymanagement.wi.gov/mitigation/maps/statewide_flood_risk_assessment_map.asp where the individual county reports can be accessed. Digitized FIRMs (Flood Insurance Rate Maps) provide better results in HAZUS-MH. Therefore, as additional FIRMs were digitized, WEM reran the HAZUS-MH for those counties for the 2011 update of the State Plan. This included thirteen (13) additional counties with digitized FIRMS. The statewide summary was then updated to include the data.

Mitigation staff made a presentation for State Legislators on the statewide HAZUS flood risk assessment at GIS Day at the State Capitol in February 2009. In addition, a presentation was made to the Wisconsin Land Information Association in June 2010.

7.3 PROJECT IMPLEMENTATION CAPABILITY

The Wisconsin Emergency Management (WEM) is responsible for the management and responsibility of the federal hazard mitigation grant programs. The responsibility for program coordination, implementation and administration is delegated to the State Hazard Mitigation Officer who complies with federal requirements and involves appropriate state and local governments in pre- and post-disaster hazard mitigation programs. Close coordination is maintained with the agencies on the Wisconsin Hazard Mitigation Team (WHMT) as well as the Wisconsin Recovery Task Force (WRTF) Mitigation Subcommittee who provide financial and technical assistance during disaster recovery as well as implementing the mitigation strategy of the State Hazard Mitigation Plan.

Since 1993, WEM and the WHMT have established the priority of acquisition, demolition, relocation, and/or floodproofing of floodprone properties, and have approved projects for these activities. In administering the hazard mitigation programs, WEM has established the following priorities based on funding availability and provided the projects meet all of the program criteria:

- Acquisition and demolition of properties substantially damaged (properties in the floodplain where losses are greater than 50% of equalized assessed value);
- Acquisition and demolition or relocation of repetitive loss properties and severe repetitive loss properties;
- Acquisition and demolition or relocation of damaged properties in the floodplain;
- Acquisition and demolition or relocation of floodplain properties;
- Acquisition or relocation of flood damage properties not in the floodplain;
- Floodproofing or retrofitting flood damaged structures in the floodplain;
- Floodproofing or retrofitting flood damaged structures not in the floodplain; and
- Other hazard reduction projects (such as detention ponds, storm sewer improvements, protection of utilities, drainage, safe rooms and storm shelters, etc.);

- Promotion of the National Flood Insurance Program.

Educational or public awareness and NOAA weather radio projects are funded under the 5% Hazard Mitigation Grant Program (HMGP) set-aside when it is felt there will be a positive outcome from the project. In addition, the State has utilized 7% of the HMGP funds available since 2001 to award Planning Grants to communities for the development and update of all hazard mitigation plans. The above priorities can also be found in this Plan in Section 4 as well as the State Administrative Plan for the HMGP, Appendix F.

To be eligible for the federal hazard mitigation programs, a project must meet the federal minimum project criteria listed below.

1. Be in conformance with the State Hazard Mitigation Plan.
2. Have a beneficial impact upon the project area.
3. Be in conformance with 44 CFR Part 9, Floodplain Management and Protection of Wetlands and 44 CFR Part 10, Environmental Considerations.
4. Solve a problem independently or constitute a functional portion of a solution where there is assurance that the project as a whole will be completed. (Projects that merely identify or analyze hazards or problems without a funded, scheduled implementation program are not eligible.)
5. Addresses a problem that has been repetitive, or a problem that poses a significant risk if left unsolved (*i.e.* evaluating the hazard in terms of the frequency and intensity of expected occurrences).
6. Be cost-effective. Demonstrate that the project will not cost more than the anticipated value of the reduction in both direct damages (property) and subsequent negative impacts (loss of function, deaths, injuries) to the area if future disasters were to occur. Both costs and benefits will be computed on a net present value basis (*i.e.* obtaining expected damage estimates as a function of hazard intensity).
7. Has been determined to be the most practical, effective, and environmentally sound alternative after consideration of a range of options, including the “no action” alternative.
8. Contributes, to the extent practicable, to a long-term solution to the problem it is intended to address.
9. Considers long-term changes to the areas and entities it protects, and has manageable future maintenance and modification requirements.
10. Have an approved hazard mitigation plan. If they do not (for HMGP), must have the capability and desire to complete within twelve months.

In addition, WEM also considers the following criteria in evaluating proposed mitigation projects. This criteria has not changed from the last plan update:

1. Conformance with the goals and priorities of the State Hazard Mitigation Plan.
2. Mitigation activities that fit within an overall plan for development in the community, disaster area, or state.
3. Mitigation activities that if not taken will have a severe detrimental impact on the community such as the loss of life, loss of essential services, damage to critical facilities, or economic hardship.
4. Mitigation activities that have the greatest potential for reducing future disaster losses.
5. Mitigation activities that are designed to accomplish multiple objectives, including damage reduction, environmental enhancement, historical preservation, recreational opportunities, and economic recovery.
6. The community's level of interest and demonstrated degree of commitment to mitigation programs and activities.
7. Communities' participation in and compliance with the National Flood Insurance Program (NFIP). WEM coordinates closely with the Wisconsin Department of Natural Resources in determining a community's compliance with the NFIP.
8. The proposed project does not encourage development in a SFHA.
9. The proposed project is in conformance with the community's comprehensive land use plan, hazard mitigation plan, and capital improvements program where such plans and programs exist.

WEM reviews all proposed mitigation measures to ensure that the proposed projects are eligible and meet minimum criteria as outlined above. In evaluating proposed projects, WEM reviews, ranks and scores proposed projects based on certain criteria (see Appendix F, State Administrative Plan for the Hazard Mitigation Grant Program-May 2011, Attachment C.) Based on the evaluation and funding availability, a list of recommended projects will be submitted to the WEM Administrator for further consideration. Based on State priorities, non-structural projects such as acquisition, demolition, relocation and floodproofing receive the highest ranking and the greatest consideration for funding. Some projects may be referred to other agencies through the WHMT for appropriate funding. In addition, WEM will work with the WHMT, and where applicable, the WRTF, to "package" funding for projects where possible to maximize the funding that is available. Proposed projects are evaluated based on project type, site vulnerability, project benefits, and other considerations.

Items considered in evaluating proposed projects:

1. Type of project (structural versus non-structural)
2. Site vulnerability
   - Frequency of event

- Does the project involve removing structures from the hazard area
- Does the project address multi-hazards

3. Project Benefits
   - Alleviate or reduce the need for emergency services during disasters
   - Alleviate or reduce damages to improved structures
   - Beneficial impact on more than one community or is it multi-jurisdictional
   - Solve a problem independently or is it part of another solution with assurance that the project will be completed
   - Long-term solution to a repetitive or imminently dangerous situation
   - Directly prevents death and injury by reducing a person's vulnerability to the hazard
   - Substantially reduces future disaster costs
   - Reduces the cost of repairing repetitive damages
   - Restores floodplains and/or wetlands
   - Multiple objectives such as damage reduction, environmental enhancement and economic recovery
   - Promotes economic growth and community development
   - Promotes development of recreational areas/historic areas
   - Provides flood protection beyond the 100-year flood event

The following additional criteria is considered on projects that meet State priorities particularly when there is insufficient funding and there is a need to prioritize projects among multiple jurisdictions (State priorities are listed on p. 7-37):

- In a declared disaster area
- Number of times in a declared disaster area.
- If RLP or SRL properties are included in the project.
- Status of mitigation plan
- Involves use of innovative approaches to mitigation
- Project submitted previously
- Other agencies willing to provide funds towards the proposed project
- Community willing to put funds towards the project over and above the required local match
- Funds available to fund the entire project
- Future maintenance requirements for the project
- Community participates in the Community Rating System

For the Flood Mitigation Assistance Program, that the proposed project must address mitigating a NFIP insured property with repetitive loss or severe repetitive loss properties receiving priority. For the Repetitive Flood Claims (RFC) and Severe Repetitive Loss (SRL) programs, specific criteria are listed as well.

As stated in the above criteria, projects have to be cost-effective. Only projects with a benefit-cost ratio of at least 1 to 1 will be forwarded to FEMA for approval. WEM mitigation staff have been performing and completing the benefit-cost analyses since 1997 for the federal hazard mitigation grant programs. The staff has developed expertise in performing this function by attending benefit-cost analysis training when it is offered by FEMA, as well as utilizing the FEMA Mitigation BCA Toolkit.

Although the state mitigation staff completes the benefit-cost analysis, they depend on information in the application provided by the community. To help communities develop mitigation projects that are as cost-effective as possible, and that have a benefit of one dollar for each dollar of cost, the mitigation staff developed the Property Data Worksheet and the Damage Assessment Worksheet. The information requested on the worksheets provides staff with the data necessary for an accurate and complete benefit-cost analysis. (The worksheets can be found in Appendix G, Administrative Plan for the HMGP, Attachment D.) WEM also hosted a Benefit-Costs Analysis Workshop in October 2007, June 2009 and June 2011 for local officials to understand the software and the type of data required. The workshops were all very well attended. The training provided a clear understanding to the local government representatives attending of the required documentation for the BCA and why the information was needed. The State Hazard Mitigation Officers from Wisconsin and Minnesota presented a short BCA training session at the Minnesota Association of Floodplain Managers and the Wisconsin Association for Floodplain, Stormwater and Coastal Managers Combined Annual Conference in October 2009.

Mitigation staff uses the FEMA-approved benefit-cost modules in performing benefit-cost analyses for proposed mitigation projects, which are based on criteria established in OMB Circular A-94, Guidelines and Discount Rates for Benefit-Cost Analysis of Federal Programs. (See the following section for more information regarding benefit-cost analyses.)

Although the results of the benefit-cost analysis are a factor in determining project eligibility, it is not the only factor considered. Again, the project needs to meet federal and state priorities and criteria. Funding availability is also a consideration.

7.4 PROGRAM MANAGEMENT CAPABILITY

October 2000 through February 2006, a Memorandum of Understanding had existed between FEMA and WEM recognizing the state as a Hazard Mitigation Grant Program Managing State. The MOU was developed to build a FEMA-State collaborative partnership for the implementation of the HMGP. The agreement defined the roles and responsibilities of each agency. Under the arrangement, responsibility for eligibility reviews for each project application was shifted to WEM with FEMA reviewing the project summaries provided by the WEM for compliance with program requirements. In addition, FEMA would conclude the environmental review. The changes in the roles

and responsibilities resulted in a faster approval of projects, in most cases less than 30 days after submission from the State to FEMA. Per the agreement WEM agreed to:

- Perform eligibility reviews for full project applications
- Apply streamlined procedures for certain project types as identified in the MOU
- Determine cost-effectiveness for all projects using standard benefit-cost methodology and provide documentation
- Undertake environmental review tasks and complete the Record of Environmental Review (RER) for FEMA's signature
- Provide complete project applications to FEMA within 18 months (now one year) for each project that WEM selects for funding and submit through NEMIS

The MOU was terminated in a letter from FEMA, Region V, dated February 15, 2006, as 44 CFR 201 states; "Management state means a state to which FEMA has delegated the authority to administer and manage the HMGP under the criteria established by FEMA. . . ." Since FEMA has yet to develop the "managing state" criteria, the MOA was terminated by the Region. However, WEM continues to perform the state's roles and responsibilities identified in the MOA.

The mitigation staff's management ability to manage hazard mitigation programs effectively is demonstrated by their success in the first year of the Pre-Disaster Mitigation Competitive Program funding cycle. The State submitted twelve applications in the national competition via the new e-grants system, five planning, six project and the state management costs for a total of $4,166,386 ($3,142,441 federal share). The state was advised that all of the projects were successful through the evaluation process.

Another example of the State mitigation staffs' ability to management the program was demonstrated in the fall of 2002. As part of the federal disaster declared after the devastating Ladysmith tornado that occurred on September 2, 2002, funding estimates for the Hazard Mitigation Grant Program were established at the beginning of the declaration based on damage figures from the Preliminary Damage Assessment. The estimates for the HMGP are then reviewed 90 days after the declaration and are adjusted upwards or downwards based on current projections. In this case, the estimate was going to be greatly reduced. Therefore, State mitigation staff recognized the large amount of money that could be utilized for projects if they could be submitted and approved by the Federal Emergency Management Agency by December 10, 2002, or before the 90-day estimate was established.

This was an arduous task for not only the State and FEMA to accomplish, but also the applicants who were responsible for providing all of the required information for the application process. State Mitigation staff worked extensively with State agency partners to obtain and expedite the concurrence that was necessary for the

environmental review. Application packages were submitted to FEMA in a very short period of time. In turn, FEMA completed project review, environmental review and fully allocated and obligated all funds. This entire process approved and funded ten projects for $1,089,584. Without this fast-track approach the State would have only been funded $529,072. This is a substantial difference, and would not have been accomplished without the efforts of local, State, and FEMA staff.

However, the State mitigation staffs' greatest test (in the ability to manage the program) was the administration of HMGP from the 2008 June floods. The State's HMGP allocation was nearly $30.8 million for FEMA-1768-DR-WI declared on June 14, 2008. DR-1768 and is by and far the worst disaster Wisconsin has faced. The HMGP is the largest in State history; double the previous amount from the 1993 Midwest Floods. The State's priority was acquisition and demolition of substantially damaged properties with priority given to primary residences. Applications for the acquisition and demolition of 214 properties were approved for funding along with the elevation of one property.

The State Administrative Plan for the Hazard Mitigation Grant Program (Appendix F) details how the State mitigation staff administers the hazard mitigation grant programs. Although there is not a specific administrative plan for the Flood Mitigation Assistance, the Pre-Disaster Mitigation, the Repetitive Flood Claims, or the Severe Repetitive Loss Program, the same basic procedures are used for these programs as those for the HMGP. How the mitigation staff handles the notification of hazard mitigation grant funds and the application process are summarized below from the administrative plan:

- As soon as possible following the notice from FEMA on the availability of mitigation funds, the State solicits applications statewide. Included is information on funding availability, eligibility criteria, State's priorities, application deadlines, and other pertinent information. At a minimum, applications notices are distributed to all the County Emergency Management offices statewide, the Regional Planning Commissions, tribal government organizations, and if post-disaster to all of the Public Assistance applicants in the declared area, communities with ongoing mitigation funding needs, as well as the Wisconsin Hazard Mitigation Team. The mitigation staff maintains an ongoing list of communities interested in applying for mitigation funds as they come available, and they are also mailed information on the application process and information is posted to WEM's website. In the post-disaster situation, applications are also mailed to potential applicants outside of the disaster area.
- Other potential applicants are identified through information gathered in the Preliminary Damage Assessment, community site visits, through communication with the WHMT, and information provided by the Public Assistance Officer based on information provided through contacts in that program.
- In the post disaster situation, a detailed overview of the HMGP and now planning requirements is presented at the Applicants Briefings for the Public Assistance Program.

- In the post disaster situation, an overview of the mitigation programs and planning requirements is also presented at Substantial Damage Determination Workshops, if held.
- Pre-applications are solicited for the HMGP. Each pre-application is reviewed, scored and ranked. Based on the ranking, state priorities and funding availability, full application packets are mailed to selected communities. The full application can be found in Appendix F, Attachment D. Communities will normally have 60 days to complete the application and submit to WEM.
- For all five federal mitigation programs, i.e., HMGP, FMA, PDM, RFC, and SRL applicants are required to provide extensive information on proposed projects:
    - Primary and secondary contact persons for the project, i.e., designation of applicant's agent
    - Project cost estimate
    - Identification of source for local match requirements
    - Project title and detailed description
    - Information on direct and indirect damages and other impacts. This information is for the benefit-cost analysis (see section below for more details on preparing and submitting accurate BCA)
    - Project location including appropriate maps
    - Pictures of the project site
    - Required future maintenance for the project
    - Work schedule including milestones and estimated completion date
    - Cost breakdown for the project
    - Considered alternatives (at least two besides the proposed project)
    - Environmental considerations (see section below for more details on preparing and submitting accurate environmental reviews)
    - Mitigation Plan status
    - NFIP Status
    - Assurances for construction and non-construction projects
- Additional requirements for acquisition projects:
    - Statement of Assurances for Property Acquisition projects with attached warranty deed restrictions.
    - Signed Notice of Voluntary Interest Forms.
    - BCA Property Data Worksheet.
    - Signed FEMA Form 90-96B, Declaration of Release, if needed.
- Signed Acknowledgement of Conditions of Projects in a Special Flood Hazard Area, if applicable.
- State mitigation staff provides technical assistance to assist applicants in completing applications and provides guidance. On a side note, after the June 2008 Floods, mitigation staff conducted a "Buyout Workshop" for all communities interested in the acquisition/demolition of flood damaged

structures. The workshop was very well attended and staff is considering conducting a course similar to it in the future.

- Once received, mitigation staff reviews each application for completeness and ensure that adequate information has been provided and that the project meets minimum eligibility requirements. Staff will contact the applicant to obtain additional information as necessary and involve appropriate members of the WHMT in the review process.
- If the application is complete and the project meets eligibility requirements, mitigation staff will perform a BCA for the proposed project.
- Mitigation staff will complete the required environmental review process on eligible projects with a positive BCA.
- For the HMGP, based on funding availability the SHMO will make a recommendation to the WEM Administrator who will make the final decision regarding the selection of projects to forward to FEMA for final approval. Applications will be submitted to FEMA as soon as possible after the disaster but no later than 12 months of the declaration (or 18 months with approved extensions.)
- For the HMA program, complete applications that meet the minimum program requirements will be prioritized and forwarded to FEMA for funding consideration. WEM will submit the grantee and subgrantee applications within the allocated timeframe established by FEMA.

7.4.1 Preparing and Submitting Accurate Environmental Reviews

WEM:

1. Coordinates with the FEMA Regional Environmental Officer (REO), Project Officer and other sate and federal agencies during the project development process to address environmental issues.
2. Completes formal consultation required specifically of federal agencies under federal environmental laws and NEPA (National Environmental Protection Act) including, but not limited to, formal endangered species consultation or historic preservation MOUs and Programmatic Agreements.
3. Undertakes environmental review tasks (including tasks related to the National Historic Preservation Act); gathers necessary environmental data through the applicant, past studies, and informal consultation with state and other federal agencies; recommends level of review under the NEPA.
4. Completes and submits the Record of Environmental Consideration (REC) and all supporting documentation with submission of the project application.
5. Ensures that the required public notices are completed.

FEMA:

1. Provides WEM with the current REC.
2. Reviews WEM's REC, supporting documentation and recommendation for level of review and makes a final decision on level of NEPA review.
3. Coordinates with WEM to complete the preparation of an Environmental Assessment (EA) or Environmental Impact Statement (EIS) for projects that do not clearly fall under the categorical exclusion (CATEX) category.
4. Prepares and/or reviews appropriate NEPA and other environmental documents. Approve or request additional information with 30 business days of receipt of a project summary from WEM.
5. Coordinates with WEM if there is a need to utilize a technical contractor.

Below is a list of regulations that WEM reviews to ensure compliance with applicable historic and environmental protections laws and regulations:

- Historic and Archaeological Resources (PL 96-515, Section 106)
- Floodplain Management - Presidential Executive Order 11988 (44 CFR Part 9)
- Protection of Wetlands – Executive Order 11990 (44 CFR Part 9)
- Environmental Justice - Presidential Executive Order 12898 (59 Fed.Reg. 7629-7633)
- Endangered Species Act (16 USC Section 1531)
- Fish and Wildlife Coordination Act (16 USC Section 661)
- Wild and Scenic Rivers Act (16 USC Section 271)
- Rivers and Harbors Act (Section 10)
- Wilderness Act (16 USC)
- Farmlands Protection Policy Act (16 USC)
- Coastal Zone Management Act (16 USC, Section 1451)
- Coastal Barrier Resources Act (16 USC)
- Clean Air Act (16 USC)
- Clean Water Act (Section 404) (16 USC)
- Hazardous Material and Hazardous Waste (determine if project site involved in a Superfund site, has above or underground storage tanks, or other potential contaminants)

Appendix F, Administrative Plan for the HMGP, page 12 and Attachment E, include the procedures for preparing and completing accurate environmental reviews. The same procedures apply for the HMA Programs.

7.4.2 Preparing and Submitting Accurate Benefit-Cost Analysis

As previously stated projects have to be cost-effective. Only projects with a benefit-cost ratio of at least 1 to 1 are forwarded to FEMA for approval. WEM mitigation staff have been performing and completing the benefit-cost analyses since 1997 for the federal hazard mitigation grant programs, and have developed expertise in performing this function.

To assist communities develop mitigation projects that are as cost-effective as possible, and that have a benefit of one dollar for each dollar of cost, the mitigation staff developed worksheets as part of the applications for HMGP and HMA programs. The information to be included on the Property Data and the Damage Assessment Worksheets provides staff with the data necessary to complete an accurate and complete benefit-cost analysis. (The worksheets can be found in Appendix F, Administrative Plan for the HMGP, Attachment D.)

Mitigation staff uses the FEMA-approved benefit-cost modules in performing benefit-cost analyses for proposed mitigation projects, which are based on criteria established in OMB Circular A-94, Guidelines and Discount Rates for Benefit-Cost Analysis of Federal Programs. In addition, the FEMA Mitigation BCA Toolkit is extensively utilized in documenting eligible costs for completing an accurate BCA.

WEM also hosted a Benefit-Costs Analysis Workshops in October 2007, June 2009 and June 2011 for local officials to understand the software and the type of data required. WEM hopes to host future classes.

Although the results of the benefit-cost analysis are a factor in determining project eligibility, it is not the only factor considered. Again, the project needs to meet federal and state priorities and criteria as previously identified in this plan. Funding availability is also a major consideration.

Basic information that must be obtained before a BCA can be performed includes, but not limited to:

1. First Floor Elevation
2. Building replacement value
3. Building area (square footage)
4. Flood Hazard Data (flood elevation and discharge data) from the Flood Insurance Study or Hydrology and Hydraulics (H&H) study for the flooding source including the summary of discharges and flood profiles that reflect the flood stage for the property locations
5. Flood Frequency data (Flood Insurance Study or H&H) or historical records of flood frequencies for past storm events with the date of the event; recorded flood depth; damage amounts; stream gauge data; rain gage data; newspaper clippings; or detailed engineering calculations

6. Building contents data
7. Displacement costs
8. Well documented cost-estimate for the project
9. Useful life of the project
10. Pre-mitigation damage data
11. Post-mitigation damage data
12. Loss of function for roads, bridges, etc.
13. Function of the facility
14. Associated future maintenance costs

Based on the type of project and information provided in the application, will determine which benefit cost analysis module will be used to determine the project's cost effectiveness.

Benefit cost analysis is used for all projects to determine cost-effectiveness. The BCA determines whether the cost of investing in a project today, will result in sufficiently reduced damages in the future to justify spending the money on the project. If the benefit is greater than the cost, then the project is cost-effective. The BCA for each project is basically the same, the difference is the type of data used in the calculations.

1. Cost effectiveness is determined by comparing the project cost to the value of damages prevented after the mitigation measure.
2. If the dollar-value of the benefits exceeds the cost of funding the project, the project is cost-effective. To arrive at a ratio, the benefits are divided by the costs, resulting in a benefit-cost ratio (BCR). The BCR simply states whether the benefits exceed the project costs, and by how much.
3. To arrive at a BCR, divide the benefits by the cost. If the result is 1.0 or greater, then the project is cost-effective. If it is less then 1.0, it is not cost-effective.

WEM:

1. Determines cost-effectiveness of projects using standard benefit-cost methodology. (FEMA's standard methodology is recommended, however, WEM may use any standard methodology including narrative mutually agreed to by FEMA and WEM.) WEM has the option of the six FEMA computer BCA modules based on the type of project and availability of appropriate and accurate data:
   - Flood
   - Hurricane Wind
   - Tornado Safe Room
   - Earthquake
   - Wildfire

- Damage Frequency Assessment

2. Documents the BCA fully, including explanations of assumptions, data derivations and analytical techniques.
3. Attaches the BCA report along with supporting documentation and Data Documentation Templates to project application packages for FEMA review.
4. Utilizes a technical contractor if the need arises.

FEMA:

1. Provides BCA module software, accompanying technical manuals and training.
2. Reviews benefit-cost analysis and Data Documentation Template before approving projects.
3. If the BCA is determined to be unacceptable, provide a written explanation of the problems and (where possible) propose solutions to those problems.

A narrative analysis is used when the benefits of a project cannot be easily quantified into specific categories and do not conform to any of the modules or formats. This analysis allows for a subjective, broad-based approach to quantify the benefits of a project so that all benefits of the project can be recorded and the project objectively assessed. This type of analysis is used normally in the HMGP 5% State Initiative projects.

The results of the BCA will determine if the project is cost-effective. If the project is cost-effective, it is still under consideration by WEM for further funding consideration. At this step in the review process, WEM would start the environmental review process for the project. If the project was not cost-effective, mitigation staff would attempt to obtain additional information from the applicant to arrive at a positive BCA. If there is no additional credible data available or all available data has been utilized, and the project is still not cost-effective, the project is rejected.

7.4.3 Submitting Complete and Accurate Quarterly Progress and Financial Reports

Wisconsin Emergency Management mitigation staff has an excellent record of submitting timely, complete, and accurate comprehensive quarterly progress and financial reports on for the HMA programs. The following summarizes the process that the mitigation staff follows in meeting quarterly reporting requirements. This information can also be found in the HMGP Administrative Plan, Appendix F. (WEM does not have a separate administrative plan for HMA, though the same procedures as for the HMGP are adhered to.)

Upon project approval, a State/Local Hazard Mitigation Assistance Agreement is signed by both WEM and the subgrantee. The agreement requires the subgrantee to submit quarterly status reports within 15 days of the end of the quarter. Due dates are January

15, April 15, July 15 and October 15. Quarterly reports contain information such as grant amount spent to date, anticipated completion date, anticipated cost overruns (or underruns), problems in implementing the project, and other information pertinent to the project. For acquisitions, demolitions, relocations and/or floodproofing additional information is required such as the number of properties acquired and/or demolished, appraisals completed, closings to date, estimated additional closings and demolitions for the next quarter, etc. (See Appendix F, Attachments J and K.) Approximately two weeks before the end of the quarter, WEM sends out a reminder to all subgrantees that the quarterly report is due on the 15th of the following month. A second reminder is sent prior to the 15th. If no report is submitted a notice is sent advising the subgrantee that the quarterly report is overdue and that per the Agreement they are required to submit a quarterly report.

Using the subgrantee quarterly reports, the mitigation staff prepares its quarterly report for the mitigation programs. The quarterly report consists of a letter with narrative information regarding each open disaster declaration, open non-disaster grants, as well as information on other activities that the mitigation staff has been involved in with for the quarter. In addition, a spreadsheet is completed for each program and each grant (see Appendix F, Attachment K.) Information included on the spreadsheet includes:

- Project number and subgrantee name
- Type of project
- Grant approval date
- Grant performance period and any approved extensions
- Project Status
- Federal, state and local shares
- Grant amount including management costs dispersed to date and amount remaining
- General comments

The WEM Financial Management Officer (FMO) prepares and submits timely, accurate financial reports. Both the financial and progress reports are submitted within 30 days of the end of the quarter (January 30, April 30, July 30, October 30.) On rare occasions, an extension may be requested in submitting the reports due to extensive workload and/or disaster operations, and the reports are always submitted within two weeks of the due date. WEM mitigation staff has been praised by FEMA Region V for its comprehensive quarterly reports.

7.4.4 Completing Projects

WEM mitigation staff has a very good record of closing out hazard mitigation grants and HMGP programs within required timeframes. The following summarizes the process that the mitigation staff follows in monitoring approved grants, completing project and declaration closeouts within established performance periods including financial reconciliation. This information can also be found in the HMGP Administrative Plan, Appendix F. (WEM does not have a separate administrative plan for HMA though the same procedures as for the HMGP are adhered to.)

The State/Local Hazard Mitigation Assistance Agreement that is signed by both WEM and the subgrantee requires the subgrantee to begin the project within 90 days of the grant approval and complete the project per the schedule submitted with the application (not to exceed three years from project obligation date.) In addition, they are required to submit a final report covering all aspects of the project within 30 days after project completion. If the subgrantee cannot complete the project within the identified performance period per the grant agreement, a request for a time extension must be submitted to WEM 60 days prior to the end of the performance period. Requests for time extensions needs to explain why the completion date cannot be met, how much of the project work remains, and an estimated date for completion. If an extension request for any project means that the activity period will go beyond the State's performance period (or close date for disasters), the SHMO will request up to a one-year time performance extension. This request will be submitted to the Region 60 days prior to the end of the performance period.

Upon completion of all work on a project, the SHMO will certify to FEMA that costs incurred in the performance of eligible work are allowable, that the approved work was completed, and that the mitigation measure is in compliance with the Federal-State Agreement (for the HMGP) and the State/Local Assistance Agreement. WEM mitigation staff will prepare a project closeout worksheet providing a complete assessment of the project, which is submitted to FEMA Region V along with a request to close the grant (see Appendix F, Attachment L.) The Environmental Closeout Declaration (Appendix F, Attachment E, page E-12) is included with the project closeout worksheet.

When all projects are completed within the disaster declaration, the SHMO will prepare the Declaration Closeout Letter and Worksheet for the HMGP and forward to FEMA along with the request to close the declaration (see Appendix F, Attachment M.) The FMO will close out the HMGP financially by submitting a final SF 425, certifying project completion. All valid expenditures for the declaration will be liquidated within 90 days of the end of the performance period. There are cases where unspent funds from one project will need to be deobligated so the can be reobligated to another project with a cost overrun. In some cases this causes the declaration closeout to go beyond the 90 days. However, state staff works closely with FEMA Region V staff to close the declarations as soon as possible. The SHMO also prepares a final report for completed projects for the FMA and PDM program and submits to FEMA along with a request to close the project. Again, the FMO is responsible for submitting the final financial reports. All expenditures are liquidated within 90 days of the end of the performance periods for each program. Appendix C includes a listing of completed mitigation projects.

The subgrantee and grantee closeout reports are valuable for not only historical purposes and in monitoring projects for adherence to certain grant agreements such as open space deed restrictions, but they are also valuable in documenting loss avoidance and developing success stories. The closeout reports including those properties that have been acquired are shared with the Department of Natural Resources Floodplain Management staff. This information is useful by floodplain management staff during

community assistance contacts and visits. In addition, during these visits floodplain management staff can monitor the acquired sites to ensure that the subgrants have adhered to the required deed restrictions. WEM will also use this information in the development of Loss Avoidance studies commissioned after the 2008 floods.

As of June 30, 2011, the State has closed the HMGP for 16 of 21 disasters since 1990 for which it received grant funding. One declaration is under a time extension until September 25, 2012. The remaining four declarations are still within their original performance periods. The FMA programs have all been closed except for federal fiscal years 2009 and 2010 which are still within the original performance period. For the PDM, FFY02 and FFY03 (non-competitive) grants are closed. Work has been completed on all projects for FFY 2003 (competitive grant), 05, 06, and 08 and closeout is in progress. Closeouts on grants are done upon project completion.

7.4.5 Past Performance of State

In October 2000, FEMA and WEM signed a MOU for HMGP Managing State. On January 23, 2002, FEMA Region V and WEM participated in an evaluation of the performance of both agencies under the terms of the Managing State MOU. The performance evaluation was approved by the FEMA Community Mitigation Branch Chief and WEM Disaster Resources Section Supervisor. The evaluation stated “WEM implementation of the HMGP meets or exceeds all FEMA requirements and standards. Older disasters are being managed in an exemplary fashion as well; WEM has returned minimal funds during the project closeout to process and quarterly reports are received within the region on time and include comprehensive program narratives. The State has excellent tracking procedures in place and submits them to FEMA regularly in accordance with the MOU.” In addition, the State's "enhanced plan" was approved on December 14, 2005 and on June 15, 2009. Reaching this status in itself demonstrates the State's ability and performance in administering and implementing a successful mitigation program.

7.5 ASSESSMENT OF MITIGATION ACTIONS

An important component of mitigation is to celebrate our successes. It has been estimated that for every $1 spent on mitigation, $4 is saved in future disaster losses ($5 for flooding losses). One of the activities is to demonstrate this by documenting the success and economic benefits of the mitigation measures implemented through the mitigation programs.

Since 1991, nearly $100 million in HMGP funds have been or are currently being administered in Wisconsin. In addition to the HMGP, FMA funds of $1.7 million and PDM funds of over $12 million have been or are currently being administered. That totals more than $113 million in mitigation funds awarded to the State for mitigation activities. The funding for each grant program is broken down by project in Appendix C.

As stated previously, the priority for mitigation is acquisition and demolition, relocation and floodproofing of hazard-prone structures. Table 7.5-1[1] below identifies the number of structures that have been mitigated as such through HMGP, FMA, and PDM (see Appendix C for project descriptions by grant program and community). Most of the commercial structures that have been floodproofed were in the historic district in the City of Darlington and thus required special consideration as historic structures in a floodplain.

The totals in Table 7.5-1 do not reflect the mitigation efforts undertaken by other agencies and local governments.

TABLE 7.5-1 STRUCTURES MITIGATED IN WISCONSIN WITH HMGP, FMA, AND PDM FUNDS

Project Type	Residential	Commercial	Other	TOTAL
Acquisition/Demolition	574	31	31	636
Floodproofing	62	22	-	84
Relocation	1	-	1	2
Total	**637**	**53**	**32**	**722**

Source: WEM, 2011.

Figure 7.5-1 on the following page shows the location of mitigation projects statewide.

7.5.1 Measuring Success: Loss Avoidance

An important component of mitigation is to acknowledge and quantify successes. The quantification of mitigation successes validates the work of WEM, FEMA, and other state and federal agencies. As stated above, it has been estimated that for every $1 spent on flood mitigation, $5 is saved in future flood losses. For every $1 spent mitigating other hazards, an estimated $4 is saved in future disaster losses. Loss avoidance studies are one type of activity that WEM and FEMA undertake to document their successes and quantify the economic benefits of mitigation measures implemented through mitigation programs. These studies use a methodology developed by FEMA to quantitatively evaluate the effectiveness of mitigation projects using actual post-mitigation hazard events in the calculation. The loss avoidance studies can be found on the WEM website at http://emergencymanagement.wi.gov/mitigation/stories.asp.

[1] The figures in Table 7.5-1 include grant projects that have been completed and those that have been approved by FEMA as of June 30, 2011, but are not yet completed.

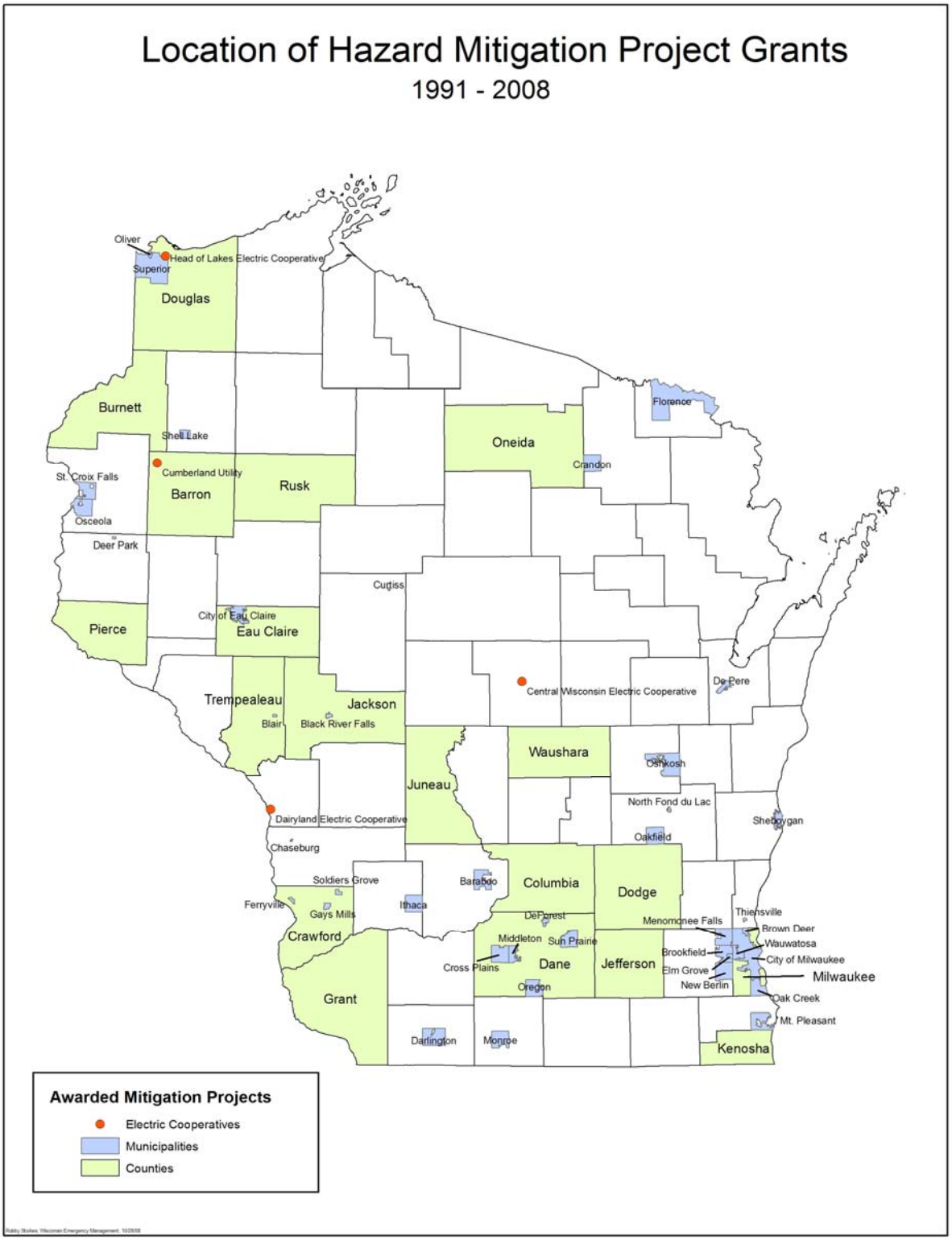


Figure 7.5-1 Hazard Mitigation Projects Statewide

Kenosha, Jefferson, and Crawford Counties

In 2009, a loss avoidance study of mitigation efforts was completed for three frequently flooded rivers in Wisconsin: the Fox River in Kenosha County, the Rock River in Jefferson County, and the Kickapoo River in Crawford County. Each county had acquired flood-prone structures after previous significant flood events. To calculate losses avoided through mitigation actions, a formula was used based on actual flood events that occurred after the acquisitions and previous flood damages including physical losses, losses of function, and emergency management costs. The return on investment (ROI) was calculated using the losses avoided and the project costs. The results were encouraging.

The Fox River floods at least once a year and sometimes two or three times in a year. Between 1993 and 2003, five local emergency declarations were issued for the Fox River Floodplain. With the emergency declaration of May, 2004, when the Fox River again overflowed its banks, many fewer homes and residents were at risk because over that ten year period, 56 property owners had participated in the Fox River Flood Mitigation Program, administered by the Kenosha County Housing Authority, with staff support provided by the Southeastern Wisconsin Regional Planning Commission. Damages were averted where mitigation measures had been undertaken. By 2008, 75 flood-prone properties had been acquired along the Fox River using HMGP, FMA, PDM, and CDBG funds. Between 1996 and 2009, the ROI for the acquisitions was 102%.

Blackhawk Island, at the mouth of the Rock River, in Jefferson County is another area that is plagued with annual flooding. The Island is a peninsula and is surrounded on either side by Lake Koshkonong and Mud Lake. When the lakes swell, the two bodies of water merge into one, covering the low-lying areas of the peninsula. The road on the Island becomes submerged, and as the water rises it flows into homes. After the Great Flood of 1993, the County applied for and received a HMGP grant to implement their Flood Mitigation Buyout Program. Along with HMGP, the County has utilized FMA funds, CDBG funds, and grant funds from the Department of Natural Resources to continue to acquire structures on and near Blackhawk Island. By 2008, 35 properties had been acquired and demolished. Between 1993 and 2009, the ROI for Jefferson County's program was 107%. Since the area experiences flooding annually, the ROI has certainly increased since 2008 and will continue to do so in the future.

Crawford County has also been active in flood mitigation. The Kickapoo River floods regularly and has caused damage to numerous buildings in several different Crawford County villages. Of particular concern to County officials was the Crawford County Highway Shop. Whenever the Shop flooded, the staff could not access equipment. This was a significant problem because the staff performs many duties during flood events including the following: floodwater rescues, closing roads, building temporary dikes, and constructing safety devices. In 2002, Crawford County utilized HMGP funds to relocate the facility to higher ground. Although it was an expensive project, the ROI was calculated to be 592% after only two flood events (2007 and 2008.) This mitigation project can certainly be considered a success.

Milwaukee County

In 2010, a loss avoidance study of acquisition projects in Milwaukee County was compiled. WEM requested a report with a methodology that could easily be replicated. The study included properties mitigated in Wauwatosa, Milwaukee, Brown Deer, and Oak Creek. FEMA used their HAZUS and BCA[1] software programs to determine losses avoided due to mitigation actions.

In 1998 and 1999, the City of Wauwatosa, using HMGP and CDBG funds, acquired and demolished 23 floodway structures in the Valley Park area along the Menomonee River. Calculated for individual properties, the ROIs ranged from 35% to 143% with an average of 77%. This may seem low, but the computations were done for only one potential flood event. The Menomonee River at Wauwatosa has experienced five historic crests since August 1998. Clearly, considerable losses have been avoided as a result of this project.

The Lincoln Creek area in the City of Milwaukee experienced over 4,000 flood events between 1960 and 1997. It was targeted for mitigation activity prior to the June 1997 flood. Using HMGP funds from the 1997 flood, WEM and the City of Milwaukee worked together to acquire and demolish 21 properties. The Milwaukee Metropolitan Sewerage District (MMSD) also completed a flood mitigation project in the area involving two detention basins and channel modifications. The area was remapped after the MMSD project, so only six of the mitigated properties remained in the floodplain. The ROIs for these six properties ranged from 28.7% to 35.0% with an average of 31.7%. These figures were again calculated for only one potential flood event.

After Root River flooding in May and July, 2000, a repetitive loss property in the City of Oak Creek was determined to be uninhabitable. Without mitigation, the property would continue to incur damages and have flood insurance claims paid. WEM and the City used HMGP funds to purchase and demolish the structure. The ROI calculated by FEMA for one potential flood event was 61%. Data from the National Climatic Data Center indicates that the property actually would have flooded three or more times since the acquisition.

After the devastating floods of 1997 and 1998, the Village of Brown Deer initiated an acquisition and demolition project for nine repetitive loss properties along South Branch Creek using HMGP and CDBG funds. The ROIs for the properties ranged from 42.0% to 52.4% with an average of 45.8%. Again, the ROIs were calculated for only one flood event and would be much greater if several events occurred. After the project was completed, MMSD used the acquired properties to create a detention basin along the South Branch Creek which has helped mitigate flood damage in much of the County. The benefits from the detention basin are not included in the loss avoidance calculation.

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[1] HAZUS, short for HAZards United States, is a geographic information system-based program for estimating losses from natural hazards; BCA stands for Benefit-Cost Analysis.

Evaluation of the benefits of a mitigation project really cannot be documented until the area of the project is impacted by another similar disaster. The following method will be used after an event has occurred:

- Identify if a previous mitigation project has been implemented in the affected area. This could include mitigation measures such as acquisition and demolition, elevation and floodproofing, reinforcement of structures, storm shelters or safe rooms, protection of utilities, retention and detention ponds, stormwater projects, or other structural measures to protect property and infrastructure.
- If yes, contact local officials to solicit information about the effectiveness of the mitigation measures and the impact of the event in the project area.
- Identify what data is available to support a loss avoidance study or best practices story. This could include pictures, newspaper articles, flood levels, damages to mitigated and unmitigated structures, etc.
- Using the above documentation as well as information on mitigated properties such as past damages, information from the benefit-cost analysis, and other available information begin to identify if there is sufficient data to complete a loss avoidance study.

For acquisition projects the following is one method that can be utilized to document loss avoidance if there is adequate data available:

Phase 1: Data Collection

- Evaluate available data for inclusion in the study.
  - Address
  - Structure and content values
  - Project Costs
  - FIS Reports – specific event data
  - Acquisition date
  - Stream Gauge Date – depth and/or stream flow
  - Insurance payout data

Phase 2: Analysis

- Establish the values of structure and contents potentially at risk during an event.
- Establish what events occurring after the completion of an acquisition project would affect the acquisition properties.
- Establish the level of damages associated with the events above.
- HAZUS-MH Analysis
  - Used in the event of incomplete or inadequate data for either the events or property. Using the current state provided flood boundary a HAZUS-MH model can be ran for a typical 100-year flood event. This process will produce an estimated damage projection for each property.

Phase 3: Reporting

- The reporting phase involves taking the damage curves established in the analysis phase and applying them to the values established.
- Values established represent loss avoided which when applied to the cost of acquisition can be used to determine a return on investment.
- Additional reporting in the presence of location maps for properties and stream gauges if available offers background to support conclusions.

If there is not sufficient data to support a loss avoidance study, best practices or success stories could be developed that would encourage communities and individuals to develop hazard mitigation strategies and implement mitigation measures to reduce or eliminate future disaster losses.

7.5.2 Other Mitigation Successes

Many mitigation projects in Wisconsin have been profiled by FEMA as "best practices." Below are descriptions of several best practices projects that represent a variety of mitigation actions. Following the descriptions is a table of other mitigation best practices projects in Wisconsin. The full-length best practices articles can be found on WEM's website at http://emergencymanagement.wi.gov/mitigation/stories.asp or on FEMA's website at http://www.fema.gov/mitigationbp/. Success stories will continue to be developed for future events to demonstrate the success and economic benefits of effective mitigation measures.

Pierce County

Trenton Island is located in the unincorporated area of Trenton Township, Pierce County and is in the middle of the Mississippi River. For years the residents of Trenton Island suffered severe and repetitive flood damage. Major floods in 1952, 1965, 1969, 1993, and 1997 devastated the community, damaging homes, businesses, and island infrastructure. The Island also incurred minor flooding in 1967, 1975, and 1986. The 1993 flood hit Trenton Island hard. County officials and Island residents faced some difficult choices. To prevent the suffering, damage, and expense wrought by repetitive flooding, County officials applied for and received HMGP and CDBG funds to implement a buyout program.

Over the next several years, owners of 59 Trenton Island properties participated in the program. Another seven sold to the Red Wing Area Fund, a local conservation group. In all, 68 or 65% of Island properties were purchased and returned to open space. Floods in 1997 and 2001 demonstrated the benefits of the buyout program. In 1997, the river crest was almost 2 feet higher than in 1993 and in 2001 it was 2.5 feet higher. The extensive losses on Trenton Island caused by the Great Flood of 1993 would have been dwarfed by the losses in the 1997 and 2001 floods if the mitigation project had not been implemented.

Milwaukee County

In addition to acquisitions and floodproofing, other types of mitigation projects have been implemented using HMGP funds in Wisconsin. After the June 1997 flood that caused $78 million in damages, the Milwaukee County Emergency Management staff wanted to educate homeowners about preventing flooding and sewer backup damages. The County was awarded a grant for the development of a flood mitigation video and accompanying brochure. The video and brochure were aimed at property owners and included information about flood protection.

The timing of the video helped it succeed in a rather unfortunate way. The video debuted in 1998 after the county experienced its second 100-year flood event within two years. It was distributed to all the public libraries in the county. Over 10,000 brochures were printed and distributed. Newspaper stories and local home improvement television programs provided other avenues of distribution. Though developed for Milwaukee County, the information in the video and brochure is valid for all Wisconsin residents.

Village of Oakfield

Another unique project involved the wind retrofit of a school. In 1996, the Oakfield Middle School was one of 180 structures damaged or destroyed as a result of a tornado. The school district utilized HMGP funds to incorporate wind resistant techniques into the construction when rebuilding the school. The school can now withstand 150 mph winds and can serve as a community storm shelter.
Techniques included “hardening” the interior walls, and placement of reinforcing steel in the masonry walls. The roof structure was changed from steel to masonry pre-cast concrete. It was then welded to plates embedded in the walls, placed twice as close together as usual, to connect the roof to the structure more securely. The additional expense was relatively minor compared with the overall construction costs and resulted in increased protection for the students, faculty, and others living in the area.

Head of Lakes Electric Cooperative

During a July 1999 storm, wind and lightning storms caused severe damage to overhead power lines, equipment, and facilities owned by the Head of Lakes Electric Cooperative. Over half of the Cooperative’s customer base was affected. Through the HMGP, the Cooperative replaced 6.3 miles of existing overhead power lines with underground lines. The underground lines will accomplish the following: improve reliability to consumers; reduce losses in revenue; improve safety by reducing line contact possibilities and by increasing communication availability; reduce forest fire danger; and significantly reduce the probability of catastrophic failure in the event of a future severe storm. As a result of the success of the Cooperative’s project, a HMGP grant was awarded to the Cumberland Municipal Utility after a storm event in 2000 to replace 2.2 miles of overhead power lines with underground lines.

Juneau County

Between 1982 and 2010, Juneau County has been hit with over 200 severe storms resulting in two deaths and multiple injuries. The County applied for and received a HMGP grant to purchase and install 31 fiberglass underground storm shelters. The shelters are designed for short-term use during severe weather and can each hold up to 12 people. Shelters have been installed near vulnerable structures such as day care centers, mobile homes, and homes without basements. During severe weather they are open to anyone in the area that needs to take shelter.

City of Darlington

One of the State's most successful mitigation programs is in the City of Darlington. Buildings were deteriorating and drastically reducing property values as a result of repetitive flooding. After the 1990 and 1993 floods, the City aggressively began attacking its flooding problems. The City had the first flood mitigation plan approved in the state. The plan identified 1) acquisition and demolition of businesses adjacent to the river; 2) floodproofing down businesses to the highest protection possible; and 3) floodproofing downtown business district while maintaining their historic character. The third goal was the most difficult to implement. Success in reaching the City's goals depended on forming an interagency coalition and promoting cooperation among local, state and federal agencies and the City's business community. The city worked to secure grants to supplement their local share of all costs involved in this unique and highly successful mitigation effort. As a result, 19 commercial properties have been floodproofed while preserving the historic storefronts. The City acquired and demolished 13 commercial properties and developed a 33-acre business park outside of the floodplain for relocated businesses and new businesses. The vacated land near the river was turned into a riverside park with a lighted 1.2 mile trail, campground and green space. Approximately 55 homes were floodproofed. Utilities at the fairgrounds were elevated above the flood stage, and the wastewater treatment plant as well as the fire department was relocated outside of the floodplain. The City was honored with an Achievement Award from the Wisconsin State Historical Society. In addition, portions of the movie, "Public Enemy" were filmed in the restored historic city. During the two most recent events in August 2007 and June 2008, the City was "armored and ready" for Mother Nature. Members of the Long Term Planning Committee from Gays Mills visited the City to see first hand the successful mitigation that the City has implemented over the years.

TABLE 7.5.2-1 WISCONSIN MITIGATION BEST PRACTICES ARTICLES

Year	Project Type	Municipality	County	Title
1978-1983	Flood Control; Floodproofing; Relocation	Soldiers Grove, Village	Crawford	Village Locals Reflect: Moving Was Best Flood Protection
1978-	Flood Control;	Soldiers Grove,	Crawford	Small Wisconsin Village Leads

TABLE 7.5.2-1 WISCONSIN MITIGATION BEST PRACTICES ARTICLES				
Year	**Project Type**	**Municipality**	**County**	**Title**
1983	Floodproofing; Relocation	Village		the Nation: Rebuilds Above Floodwaters
1993-ongoing	Acquisition/Buyouts; Flood Control; Retrofitting, Structural	Darlington, City	Lafayette	Multiple Mitigation Measures Give Darlington and Elevating Experience
1994-97	Acquisition/Buyouts; Elevation, Structural; Flood Control	Black River Falls, City	Jackson	Freeboard Saves Town from Additional Flood Losses
1993-ongoing	Floodproofing	Darlington, City of	Lafayette	Mitigation Leadsd to Preservation and Economic Recovery for One Community
1994-98	Acquisition/Buyouts	Eau Claire, City	Eau Claire	City of Eau Claire: Acquisition
1994-98	Acquisition/Buyouts	Eau Claire, City	Eau Claire	City of Eau Claire Acquisition
1994-ongoing	Acquisition/Buyouts; Building Codes	Kenosha County	Kenosha	Moving People Out of Harm's Way
1994-ongoing	Acquisition/Buyouts	Kenosha County	Kenosha	Fighting Floods, Saving Property and Protecting Lives in Kenosha
1994-ongoing	Acquisition/Buyouts	Jefferson County	Jefferson	Program Cooperation Alleviates Repetitive Flooding Burden
1994-1997	Acquisition/Buyouts	Trenton Island	Pierce	Mitigation Success, Trenton Island
1996-97	Acquisition/Buyouts	Trenton Island	Pierce	Floodways and Wetlands of the Mighty Mississippi: Trenton Island, Wisconsin
1996-97	Education/Outreach/ Public Awareness; Land Use/Planning	Wisconsin State	All	Wisconsin Mitigation Video: An Education and Training Tool
1996-98	Acquisition/Buyouts	Oakfield, Village	Fond du Lac	New School Building Hardened Against the Wind
1997-ongoing	Education/Outreach/ Public Awareness	Milwaukee County	Milwaukee	The Dry Facts: Protecting Homes From Damage
1997-ongoing	Acquisition/Buyouts; Floodproofing; Land Use/Planning	Darlington, City	Lafayette	City of Darlington Honored: Acquisition and Floodproofing
1998-2001	Acquisition/Buyouts; Flood Control	Brown Deer, Village	Milwaukee	Detention Ponds, Not Homes, Played Host to Recent Flood Event

TABLE 7.5.2-1 WISCONSIN MITIGATION BEST PRACTICES ARTICLES				
Year	**Project Type**	**Municipality**	**County**	**Title**
1998-2001	Acquisition/Buyouts	Wauwatosa, City	Milwaukee	Acquisition Project Proves Beneficial as Safety Measure and Recreational Avenue
1999-2006	Acquisition/Buyouts; Elevation, Structural; Flood Control	Elm Grove, Village	Waukesha	Small Village Executes Large Mitigation Project
2001	Education/Outreach/ Public Awareness	Milwaukee County	Milwaukee	Community Outreach: Milwaukee County at the Wisconsin State Fair
2001-03	Flood Control; Floodproofing; Relocation	Crawford County	Crawford	Moving Highway Shop Improves Disaster Response
2003	Warning Systems	Portage County	Portage	Enabling Residents to Hear and Heed Severe Weather Warnings
2005	Flood Control	Cambria, Village	Columbia	Mitigation Project Reunites a Town Divided
2005-ongoing	Flood Control	Monroe, City	Green	Pulling the Plug on Monroe's Water Problems
2005-ongoing	HAZUS-MH	Wisconsin State	All	Wisconsin Emergency Management-HAZUS Used to Evaluate Flood Risk and Losses
2006-10	Flood Control	Thiensville, Village	Ozaukee	Village of Thiensville Channelization Project
2007-08	Elevation, Structural	Gays Mills, Village	Crawford	Higher and Drier in Wisconsin
2008-10	Mitigation Planning	Clark County	Clark	Teamwork Gives Rise to a Comprehensive All Hazards Mitigation Plan

In a large event or an event where there could be many potential success stories, based on present staffing, WEM may be required to request the assistance of FEMA through the use of Disaster Assistance Employees or through State Management Costs to assist in documenting and completing success stories.

7.5.3 Mitigation Efforts of Other Agencies

The totals in the table above do not reflect the mitigation efforts undertaken by other agencies and local governments. The Department of Commerce (now the Department of Administration) through Community Development Block Grant (CDBG) funds has

provided mitigation assistance to several communities by acquiring and demolishing numerous floodplain properties (see Appendix C). Notable mitigation successes using this funding strategy include Kenosha and Jefferson Counties.

Kenosha County has purchased or is in the process of purchasing 109 properties along the Fox River in the Towns of Salem and Wheatland and in the Village of Silver Lake. These acquisitions were made using CDBG funds as well as HMGP, FMA, and PDM funds. The County's mitigation goal is to acquire and demolish up to 160 flood-prone properties, as funds become available.

Another example of successful flood mitigation is the Rock River/Lake Koshkonong area in Jefferson County. In addition to CDBG, HMGP, and FMA funds, the county received Urban Rivers Grant Program funds through the Department of Natural Resources. These funds combined have enabled the county to purchase 68 properties, many of which were in the floodway. The county would like to purchase up to 85 properties in the area. Both counties continue to apply for funding to reach their mitigation goals.

There are also mitigation projects occurring in Wisconsin through local initiatives using mostly local funding. The Milwaukee Metropolitan Sewerage District (MMSD) has been implementing a floodplain and stormwater management strategy for over ten years. Their strategy involves engineered flood management structures and acquisition to protect structures that are vulnerable to a 1% probability flood according to flood hazard models. MMSD has spent $200 million since 1998 to protect 2,300 flood-prone properties in Milwaukee County. Another 700 will be protected or acquired by 2010.

Projects include $12 million in Valley Park along the Menomonee River for a flood wall, million-gallon underground storage tank, and pumping station; $120 million for channel improvements, detention basins, and property acquisitions along Lincoln Creek; and $4 million along the Southbranch Creek in Milwaukee and Brown Deer. Large acquisition projects have also been implemented in the area. Along the Root River approximately 76 structures have been acquired with the largest number in the City of Greenfield (43). Along the Menomonee River approximately 80 structures have been acquired with the largest number in the City of Wauwatosa (73).

In addition, after severe flooding in 1997 and 1998, MMSD constructed a detention basin in the Village of Brown Deer along South Branch Creek to protect neighboring and downstream properties. The detention basin worked as designed alleviating flood damages to structures. The system was tested in May of 2004 after nearly two weeks of rain. The Village Manager reported there was no overland flooding and stated that the nearby structures definitely would have had water in their basements if the project had not been completed.

One of the more well known mitigation projects was the relocation of Soldiers Grove. The Village experienced flooding in 1907, 1912, 1917, 1935, 1951, and the "big one" in 1978 and lesser floods after that. The August 2007 and June 2008 floods were some of

the biggest floods to hit the Village. The Village began to debate about what to do about the flooding in the mid-60's when the construction of a dam was considered. In 1975 a relocation coordinator was hired, and in 1976 the Village passed a resolution that supported relocation to avoid future flood damages. After the 1978 flood Village officials convinced state and federal officials that moving the town was the best floodproofing. By 1983 the project costing $6 million in public funds was completed. The Soldiers Grove central riverside municipal park and campgrounds stand where the downtown once stood. The park received little damage in 2007, however, was substantially damaged in the 2008 event. It is not hard to imagine the devastation that would have occurred if the downtown had not relocated. The Solar Village uphill was unscathed. At the time of the Soldiers Grove relocation, there were no FEMA mitigation programs available. The relocation was completed through various funding sources and from several state and federal agencies all working together in a partnership over a period of years. As a result of the 2007 disaster, the Village received HMGP funds and elevated four structures and acquired another.

7.6 EFFECTIVE USE OF AVAILABLE MITIGATION FUNDING

The State of Wisconsin continues to effectively implement mitigation programs towards achieving its goals as identified in this plan:

1. Minimize human, economic and environmental disruption from natural hazards.
2. Enhance public education about disaster preparedness and resistance, and expand public awareness of natural hazards.
3. Encourage hazard mitigation planning.
4. Support intergovernmental coordination and cooperation among federal, state and local authorities regarding hazard mitigation activities.
5. Improve the disaster resistance of buildings, structures, and infrastructure whether new construction, expansion or renovation.

The mitigation programs utilized in implementing mitigation measures throughout the state are primarily federally funded, however, are state administered. These include the HMA programs (HMGP, FMA, PDM, RFC and SRL.) The projects that have been approved and funded through these programs support the State's hazard mitigation goals as well as meet the priorities and criteria as outlined in Section 7.3. This section describes the history of the State's mitigation programs and demonstrates the state's ability to effectively use and administer all available mitigation funding through both federal and state mitigation programs. Appendix B provides information on the history of the State's federal declarations including the HMGP. Appendix C identifies mitigation projects funded and completed to date throughout the State.

In addition to the five HMA programs, there are several programs at the state level that support the goals and are utilized in advancing mitigation statewide:

- NR 116 Local and State Floodplain Standards prohibits construction in floodways and requires elevation and dry-land access in flood fringe areas. Limits improvements to non-conforming structures and requires compensatory storage in flood storage areas.
- Comprehensive Planning requires local governments to have a comprehensive plan for making good land use decisions. It is a synergetic companion to mitigation planning and has added momentum to the mitigation movement by incorporating mitigation into the Comprehensive plans.
- The Home Safety Act requires the state's Uniform Dwelling Code be enforced throughout the state. This includes the necessity to have all new construction inspected for compliance with the UDC. The new law will improve the construction of homes, by requiring implementation of safety standards. The effect will be a reduction in loss of property and injury from all types of natural hazards.
- The Municipal Flood Control and Riparian Restoration Program provide grants for the mitigation of flood-prone property, restoration of riparian areas and the construction of flood control projects.
- Community Development Block Grant, Housing and Public Facilities Programs, can provides grants to communities for implementing mitigation activities.

These programs as well as others are described and evaluated in Section 4.2 and Table 4.2-1.

Since 1991, $74 million in HMGP funds has been administered. The HMGP allocation for FEMA-1933-DR-WI and 1944-dr declared August 11, 2011 and October 21, 2011 is $22 million. This will bring the total for HMGP funds to $96 million for the history of the program. FMA funds in the amount of $1,708,114 have been administered, and PDM funds in the amount of $12,668,653. Between the three programs over $110 million in funds has been provided to communities for mitigation planning and project implementation. To date the number of structures that have been mitigated through HMGP, FMA and PDM by acquisition/demolition, floodproofing or relocation is 722 with many more in the process. Additionally, WEM has provided support to local governments in the development of all hazard mitigation plans through the issuance of guidance, education through planning workshops, and planning grants. As a result of the PDM funds that have been made available to the State, 84 all-hazards mitigation plans are complete or under development (48 original countywide plans, 22 countywide plan updates, ten single jurisdictions plans or updates, two tribal plans, and two university plans). In addition, five tribal governments have received PDM grants directly from FEMA. As stated previously, the DMA2K also authorized 7% of HMGP funds to be available to states to be used for developing mitigation plans. As a result of that authorization, another 36 plans (14 new county plans, 15 county plan updates, six single jurisdiction plans, and the state's first regional plan involving four counties) have been funded and nine counties and one tribal government have planning grant applications currently submitted to FEMA. Two more countywide plans have been

developed under the Project Impact initiative. One countywide plan is being developed without a grant. Total planning efforts involve 68 counties,[1] 37 plan updates, 11 single jurisdictions, six tribal governments, and two universities for a total of 119 plans, with ten more planning grants applied for. The federal, state, local, and tribal investment in this planning effort is over $5.5 million.

As stated in Section 7.4, a Memorandum of Understanding had existed between FEMA and WEM recognizing the state as a Hazard Mitigation Grant Program Managing State, but since has been rescinded. Although the MOA is no longer in place, WEM continues with the roles and responsibilities identified in the MOA.

The mitigation staff makes every attempt to fully utilize all available funding within the mitigation programs. For HMGP, unspent funds in projects are reobligated to projects that have cost overruns. In addition, eligible projects over above the allocation are submitted in the event funds become available. The goal is to spend as much funds as possible and returning as little as possible at the end of the performance period.

The mitigation staff has successfully administered over 277 hazard mitigation grants, including those identified in Appendix C, and has effectively managed the HMGP for over 21 years. These activities as well as those described above and throughout the plan demonstrate that Wisconsin effectively uses existing mitigation programs to achieve its mitigation goals.

7.7 STATE COMMITMENT TO A COMPREHENSIVE MITIGATION PROGRAM

The Wisconsin Emergency Management is the lead agency for the development of and promoting a statewide comprehensive mitigation program. In doing so, WEM works with other state, federal and local agencies in implementing the goals and mitigation strategy of the State of Wisconsin Hazard Mitigation Plan. The Wisconsin Hazard Mitigation Team (WHMT) led by WEM is made up of representatives from state and federal agencies, as well as several other interested groups. Key elements of the State's comprehensive mitigation program includes the development of the State of Wisconsin Hazard Mitigation Plan, financial and technical assistance to local governments as they develop their hazard mitigation plans and implement mitigation measures as well as training sessions and workshops for state and local officials. The following provides examples of the State's ongoing commitment to a comprehensive mitigation program.

7.7.1 Support Local Mitigation Planning

Both FEMA and the State agree that in order to be truly effective in mitigation at the local level, there needs to be a local mitigation planning process. The biggest challenge for the State has been convincing communities at risk from natural hazards to complete the mitigation planning process. Before 2002, the only federal mitigation planning grant

[1] Menominee County's planning efforts were undertaken under the Menominee tribal government which applied for funds directly to FEMA, so the county does have a plan, but it is counted under tribal plans instead of county plans.

funds available were for flood mitigation planning through the FMA program. The all-hazards mitigation planning requirements prove to be difficult for local governments to meet, particularly small communities with limited or no staff. Most of the communities developing mitigation plans have contracted with their local Regional Planning Commission or hired a private consultant.

Using PDM funds and the authorized 7% of HMGP funds, 69 of the 72 counties in Wisconsin have completed or are developing all-hazards mitigation plans as of June 30, 2011. Additionally, 7 single jurisdictions and 7 tribal governments have completed or are developing plans with PDM or HMGP funds. Local plans are required to be updated every five years. PDM and HMGP funds have been used to complete 18 plan updates and 35 more are in the process of being updated. For more information about local hazard mitigation planning efforts in Wisconsin, see Section 5.

Local hazard mitigation plans are required to be updated and reapproved by FEMA every five years in order to remain eligible for FEMA mitigation funds. If a community's plan lapses, they are no longer eligible for mitigation funds until the plan is updated and approved by FEMA. This presented another challenge for State mitigation staff. The majority of approved plans statewide are countywide, multi-jurisdictional plans. To ensure that plans do not expire, state mitigation staff have closely monitored expiration dates of local mitigation plans and notifies the counties with plans due to expire within two years of the requirement to update the plan and inform them of the availability of planning grant funds.

The WEM Mitigation staff has worked with counties and local jurisdictions to encourage and support hazard mitigation planning prior to and since publication of the federal planning regulations. (Section 5 describes in more detail the coordination of local mitigation planning.) Some of the activities that support mitigation planning are summarized below.

- Prior to federal planning requirements, WEM required subgrants of HMGP to develop a mitigation plan.
- Encouraged development of Flood Mitigations Plans.
- In 1995, Wisconsin Department of Natural Resources developed the *Wisconsin Community* Flood *Mitigation Planning Guidebook.* WEM developed additional planning guidance to meet FMA planning requirements. WEM and WDNR conducted several flood mitigation planning workshops throughout the State.
- WEM contracted with the Council of Regional Planning Organizations (an organization consisting of the Regional Planning Commissions) to develop planning guidance for meeting the requirements of 44 CFR Parts 201. The result was the *Resource Guide to All Hazards Mitigation Planning in Wisconsin*.
- Wisconsin's Comprehensive Planning and Smart Growth Legislation require all local governments to develop and adopt a comprehensive land-use plan

by 2010. A list of the nine planning elements and some ideas on how to integrate all hazards mitigation planning concepts into them are included in the *Resource Guide to All Hazards Mitigation Planning in Wisconsin.* In addition, where to integrate the comprehensive planning elements into the all hazards mitigation plan are also described in the guidance.

- WEM Mitigation staff has conducted fourteen All Hazard Mitigation Planning Workshops to communities and consultants developing hazard mitigation plans as well as for those interested in finding out more regarding the overall planning process. Three workshops were held in 2002, one each in 2003, 2004, 2005, 2006, 2007, 2008, 2009, 2011 and two in 2010, In addition, a workshop was held in the fall of 2004 for the Great Lakes Inter-Tribal Council which consists of representation from the eleven recognized Tribal governments in the State. Over 400 people have attended the workshops. At a minimum one planning workshop is held annually. Information presented and distributed at the workshops is put on a CD and is provided to each individual attending the training and posted to WEM's website.
- Provided written and oral guidance. All communities developing mitigation plans have been provided a copy of the *Resource Guide to All Hazards Mitigation Planning,* the FEMA State and Local Hazard Mitigation Planning How-to-Guides developed to date, the *Multi-Hazard Mitigation Planning Guidance Under the DMA2K* (dated March 2004) and the Final Hazard Mitigation Planning Guidance issued in July 2008.
- Provide technical assistance through reviewing sections of plans under development and providing feedback.
- Identifying information sources with web links available through state and federal agencies, locally and nationally.
- Providing information via WEM's website. The website provides a "Local Hazard Mitigation Planning" link where local governments can find the resource guides and tools for developing local all hazard mitigation plans. In addition, there is an interactive map where you can click on a particular county and it will take you to that county's hazard mitigation plan. In addition there is a link to the State Hazard Mitigation Plan
- WEM hosted a four-day HAZUS class in 2006 conducted by FEMA contractors.
- As part of the 2008 update to the State Plan, WEM completed a statewide HAZUS flood risk assessment. With support from the University of Indiana Purdue-POLIS Center, the University of Wisconsin-Land Information and Computer Graphics Facility (LICGF) a statewide flood risk assessment was completed. The results can be found in Section 3.7. The county assessments were provided to the counties to assist them in development or update of the county all hazard mitigation plans. An interactive map is available on WEM's website to view and download the county HAZUS flood risk assessment.

- Provides information on repetitive loss properties and NFIP claim information as well as other disaster payments.
- Developed a Household Natural Hazards Preparedness Questionnaire that local governments could utilize and/or modify to fit their needs. The survey was utilized in the two previous updates of the plan.
- Reviews draft plans utilizing the FEMA Local Hazard Mitigation Plan Review Crosswalk and provides comments on required and recommended revisions. Submits final plans to FEMA for review and approval.
- Information on all hazards mitigation planning is provided at other WEM training such as the New Directors Series, Introduction to Emergency Management, Disaster Response and Recovery Course, Public Assistance Briefings, and Substantial Damage Workshops. Information is also provided at local damage assessment classes.
- Information on all hazards mitigation program and planning is provided to the Wisconsin Association of Floodplain, Stormwater and Coastal Managers through their newsletter and annual conference.
- The All Hazards Mitigation Planning Workshop is part of WEM's Certified Emergency Managers (CEM) Program.

7.7.2 State Legislation Supporting Mitigation

A statewide hazard mitigation program is under development, which will include legislative initiatives, formation of new and continuation of existing partnerships, as well as other executive actions that promote hazard mitigation.

Wisconsin has numerous legislative rules, administrative codes, and executive orders that support the mitigation process statewide. Below is a list of key legislation which is covered in more detail in Section 4, Mitigation Strategy.

- Chapter 323, Emergency Management
- Wisconsin Commercial Building Code, Comm. 61 to 66.
- Wisconsin Uniform Dwelling Code, Comm 20 and 25.
- 2007 Wisconsin Act 63, Regulation of Electricians, Electrical Contractors, and Electrical Inspectors and Electrical Wiring
- 2007 Wisconsin Act 205, Installation of Carbon Monoxide Detectors
- Administrative Code NR 116, Floodplain Management
- Administrative Code NR 115, Shoreland Protection Program
- Administrative Code NR 117, Shoreland-Wetland Protection
- Administrative Code NR 335, Dam Safety

- Administrative Code NR 333, Large Dam Standards and Emergency Action Plans
- Executive Order 67, State must follow wetland, floodplain, erosion and shoreland standards
- Executive Order 73, Flood mitigation for state-owned facilities
- Chapter 30, Standards for Navigable Waters
- Administrative Code NR 199, Municipal Flood Control and Riparian Restoration Program
- Chapter 917, 1997 Wisconsin Act 27, Fire Protection Grant Program
- Wisconsin Acts 16, 33, 233, 307, Wisconsin Comprehensive Planning Law
- Chapter 92, ATCP 50, Soil and Water Resources Management
- Chapter 88, ATCP 48, Operation and Maintenance of Drainage Districts
- Chapter 86.34, Flood Damage Aids Program
- Chapter 84.18, Trans 213 Local Bridge Improvement Assistance Program
- Chapter 85.026, Transportation Enhancement Program

7.7.3 Interagency Disaster Recovery Group

A significant development for the state following the record-breaking 1993 floods was the creation of Wisconsin's Interagency Disaster Recovery Group (IDRG). Additional funding for the state made available through HR 2667 gave rise to the need for a mitigation strategy and coordination of long-term recovery efforts. The IDRG, consisting of individuals from a core group of agencies, met weekly to act as a clearinghouse for proposed long-term recovery projects.

The IDRG included members from the following agencies (* denotes charter member):

- FEMA*
- WEM*
- Wisconsin Economic Development Association*
- Wisconsin Department of Administration (DOA)*
- Wisconsin Department of Commerce (Comm) (formerly the Department of Development)*
- Wisconsin Department of Natural Resources (WDNR)*
- Wisconsin Historical Society (WHS)*
- Farmers Home Administration (FmHA)
- US Department of Agriculture Natural Resources Conservation Service (NRCS)

- Wisconsin Department of Workforce Development (DWD) (formerly the Department of Industry, Labor and Human Relations)
- Wisconsin Department of Transportation (WisDOT)
- Regional Planning Commissions (RPCs) from around the state

The mission of the IDRG was "to develop a cooperative federal and state disaster recovery effort that can assist communities and regional agencies in utilizing all available funding sources to recover from and mitigate the future effects associated with the damages from natural hazards."
The following objectives were laid out by the IDRG to achieve their mission:

- Serve as a clearinghouse for tracking and status reporting of disaster recovery project applications;
- Encourage and assist funding submissions from communities for recovery and hazard mitigation projects;
- Assure full utilization of all available and applicable funding sources for recovery and mitigation projects;
- Encourage the enhancement of recovery projects with hazard mitigation measures; and
- Assist in the avoidance of funding duplication for recovery and mitigation efforts.

In addition to the IDRG, FEMA established the Wisconsin Interagency Hazard Mitigation Recovery Office (WIHRO). This office, located in WEM headquarters, was staffed with a full-time FEMA employee who worked closely with WEM and the IDRG. The WIHRO monitored the status of all mitigation project submissions. The WIHRO added another staff member before long and played a vital role in implementing mitigation projects within the state until 1996.

FEMA's policy was to focus on projects that reduced future disaster losses through the acquisition or relocation of properties that were most prone to flood damages. Although many other types of projects were funded through the various agencies, the IDRG also established priority funding for projects consisting of acquisition and demolition, relocation, and/or floodproofing of floodprone properties.

In keeping with their objectives, the IDRG identified and funded as many mitigation projects as possible. In numerous instances, several agencies provided funding on the same project to ensure implementation. The IDRG worked to "package" funding for communities so that even local match requirements would be covered. Agencies on the IDRG also provided technical assistance for projects on such topics as relocation assistance, floodplain management community compliance, environmental contamination, treatment of historic sites, building reviews and permits, and the Americans with Disabilities Act.

The success of the IDRG during the recovery from the Great Flood of 1993 demonstrated the value of the group to communities around the state. Therefore, the IDRG remained in place to coordinate long-term recovery efforts following every disaster declaration. In 2003, the IDRG merged with the State Hazard Mitigation Team to form the Wisconsin Hazard Mitigation Team.

7.7.4 State Hazard Mitigation Officer

In addition to forming the IDRG, WEM realized that they would benefit from hiring a full-time State Hazard Mitigation Officer (SHMO). The SHMO was hired in August 1994. An Assistant SHMO was added in 1998, and a Disaster Response and Recovery Planner in 2003, increasing the WEM hazard mitigation staff to three full-time employees.

7.7.5 Wisconsin Hazard Mitigation Team

The successes of the IDRG made it clear the need to formalize a group and designate a permanent State Hazard Mitigation Team which was an expansion of the IDRG with policy-making authority. In April 2000 the State Hazard Mitigation Team (SHMT) was formed. Agencies with responsibilities in the areas of natural resources, environmental regulation, planning and zoning, building codes, infrastructure regulation and construction, insurance, public information/education, economic development, and historic preservation were included on the Team. Several agencies that had multiple facets that needed to be included in the plan had more than one representative on the Team. Many of the members of the IDRG were also members of the SHMT.

In December 2003, the Interagency Disaster Recovery Group and the State Hazard Mitigation Team merged to form the Wisconsin Hazard Mitigation Team (WHMT). Additional members from State agencies include the team; the Department of Administration, Intergovernmental Relations, Comprehensive Planning Program and Division of Sate Facilities; and Department of Commerce, Division of Safety and Buildings (now the Department of Safety and Professional Services.) In addition, a representative from the Wisconsin Association of Floodplain, Stormwater, and Coastal Managers (WAFSCM); the Executive Director from the Mississippi River Regional Planning Commission, representative from the Wisconsin Emergency Management Association, the Volunteer Organizations Active in Disasters, Cooperative Network and the National Weather Service also joined the Team. This brings the total of the Team to 41 members representing 11 state agencies and 7 federal agencies along with WAFSCM, Council of Regional Planning Organizations, WEMA, Cooperative Network and VOAD (see Appendix E for a the team membership.). The Team is active in updating the State Plan, but also assist in disaster recovery activities and played an integral role in establishing the Wisconsin Recovery Task Force after the devastating floods of 2008.

The WHMT has established a set of five State Hazard Mitigation Goals which were revised in 2010 for this plan update:

1. Minimize human, economic and environmental disruption and reduce the potential for injury and loss of life from natural hazards.
2. Enhance public education about disaster preparedness and resilience, and expand public awareness of natural hazards.
3. Encourage and promote continued comprehensive hazard mitigation planning and implementation of the plan.
4. Support coordination and collaboration among federal, state, and local authorities, and non-governmental organizations regarding hazard mitigation activities.
5. Improve the disaster resistance of buildings, structures, and infrastructure whether new construction, expansion or renovation.

7.7.6 Wisconsin Recovery Task Force

It was obvious early in the administration of the 2008 flood declaration that additional outside resources would be required to assist the State and its communities in the recovery. Upon direction of Governor Doyle, WEM created the Wisconsin Recovery Task Force (WRTF) to assist individuals, businesses, and communities to recover quickly, safely, and with more resistance to future disasters. Six subcommittees were formed with a focus on mitigation, agriculture, business, housing, human needs, and infrastructure. The Task Force is comprised of many state and federal agencies. The primary goal of the WRTF is to identify the unmet needs of the communities and citizens of Wisconsin. The Task Force met bi-weekly. One of the outcomes from the report submitted to the Governor was that the Task Force be a standing task force and meet semi-annually to ensure preparedness and facilitate effective operational readiness following a disaster.

The Wisconsin Hazard Mitigation Team (WHMT) played an integral part in identifying the key players that comprise the Wisconsin Recovery Task Force. Many of the WHMT members are actively participating and leading WRTF subgroups. Without the Wisconsin Hazard Mitigation Team, it is very likely that the Wisconsin Recovery Task Force would not have been created and activated as quickly as it was.

The State Hazard Mitigation Officer was assigned as Chair of the Mitigation Committee. The Committee consisted of 11 State agencies (all which are members of the WHMT); 7 federal agencies (5 of which are members of the WHMT); and 5 other organizations (4 of which are members of the WHMT.) The mission of the committee is to "Assist communities during the recovery process to make their communities more disaster resistant." The goals of the committee are based on the goals of the State of Wisconsin Hazard Mitigation Plan and were identified as:

1. Minimize human, economic, and environmental disruption from natural hazards.
2. Improve the disaster resistance of buildings, structures, and infrastructure, whether new construction, expansion or renovation.

3. Support and assist the intergovernmental coordination and cooperation among the federal, state, and local agencies regarding hazard mitigation activities.

The Committee identified challenges, issues and roadblocks that the State and communities are facing during the recovery process. They included:

1. Communities lack capability (resources and staff) to develop and implement long-term mitigation solutions to reduce future flooding.
2. Sanctioned and non-participating communities are not eligible for FEMA mitigation funding.
3. Lack of funding to complete identified mitigation and recovery needs particularly funds for local match required for various grants.
4. Lack of resources to develop good, well-thought out project applications to obtain federal and state funding to implement viable and necessary mitigation and recovery projects.
5. Potential contamination of project sites will delay the actual implementation and funding of projects.

In addition, FEMA activated Emergency Support Function (ESF) 14 for the declaration. ESF 14 provided support for to the State for long term recovery by assisting the WRTF, and in developing a Long Term Recovery Plan for the Village of Gays Mills. In addition, they worked with the Village of Rock Springs and developed the Rock Springs Flood Recovery Report to address recovery issues in that community. The information gathered from these planning efforts also assisted with the recovery in other impacted communities.

Two additional reports were completed (Hydrogeological and NFIP Interpretations of Terrace Flooding Northwest of Spring Green, Wisconsin and Possible Mitigation; and Flooding Conditions at Clark Creek and Possible Mitigation) were completed to address flooding in the Towns of Spring Green and Greenfield in Sauk County.

The US Geological Survey developed flood-peak inundation maps and water-surface profiles for nine communities along the Baraboo, Kickapoo, Crawfish and Rock Rivers in GIS by combining flood high-water marks with available 1-10-meter resolution digital-elevation-model data. The high-water marks were those surveyed during the flood by communities, counties and federal agencies and hundreds of additional marks surveyed by the USGS. The flood maps and profiles outline the extent and depth of flooding through the communities and are being used in recovery efforts. The information will also help to document future loss avoidance studies in Gays Mills and Jefferson County.

The Committee worked together to identify needs and match the needs with the appropriate agency and funding source/s. In addition, it worked together to try and package funding where possible. As a result of this Committee and the Wisconsin Hazard Mitigation Team, the Department of Commerce committed Community

Development Block Grant funds to cover the 12.5% local match to the Hazard Mitigation Grant Program grants. This provided 100% funding to those communities implementing buyout and elevation projects.

7.7.7 Municipal Flood Control Program

The Municipal Flood Control Grant Program administered by the State Department of Natural Resources provides grants to cities, villages, towns, Indian Tribes, and metropolitan sewerage districts concerned with municipal flood control management. The program assists local governments to minimize flooding and flood-related damages by acquiring property, floodproofing structures, creating open space flood storage areas, constructing flood control structures and restoring the flood-carrying capacity and natural and beneficial function of watercourses. The grants are 70% state funded with a 30% local match.

The program priorities are:

1. Acquisition and removal of structures which, due to zoning restrictions, cannot be rebuilt or repaired.
2. Acquisition and removal of structures in the 100-year floodplain.
3. Acquisition and removal of repetitive loss or substantially damaged structures.
4. Acquisition and removal of other flood damaged structures.
5. Floodproofing and elevation of structures.
6. Riparian restoration projects, including removal of dams and artificial obstructions, restoration of fish and native plan habitat, erosion control and stream bank restoration projects.
7. Acquisition of vacant land, or perpetual conservation or flowage easements to provide additional flood storage or to facilitate natural or more efficient flood flows.
8. Construction of structures for the collection, detention, retention, storage and transmission of stormwater and groundwater for flood control and riparian restoration projects.
9. Preparation of flood insurance studies and other flood mapping projects.

Similar to the HMGP acquisition/demolition requirements, the Municipal Flood Control Grant Program requires the removal of a structure on the property to be acquired for the development of permanent open space for flood storage or flood water flowage to a watercourse.

Appendix C highlights the projects completed through the Municipal Flood Control Grant Program.

7.7.8 EDA Disaster Recovery Collaboration

As discussed in 7.1.2 as a result of the 2008 flood disaster, the Economic Development Administration (EDA) provided grants to the Regional Planning Commissions in the disaster area for the development of Flood Recovery Strategies. To accomplish the tasks assigned, the Department of Commerce as the lead coordinated the effort that was referred to as the EDA Disaster Recovery Collaboration. This group met monthly up through August 2011. WEM mitigation staff participated in the collaboration by attending the meetings and providing input. One of the outcomes of the group, again with the Department of Commerce as the lead, was the development of a Community Economic Recovery Guidebook to assist economic development organizations, businesses and community leaders in preparation of economic recovery from a disaster. A link to the guidebook was placed on WEM's website and can be downloaded at http://emergencymanagement.wi.gov/recovery/busienss.asp.

7.7.9 Coastal Hazards Work Group

WEM participates on the Coastal Hazards Work Group. This group was formed to provide technical assistance and coordinate state resources addressing coastal hazards. The Work Group meets bimonthly or as needed. The group also meets with representatives of the three coastal regional planning commissions and representatives of local governments as needed. The 2006 – 2010 Needs Assessment and Strategy, the work plan for Natural Hazards included:

- Expansion of technical tools and technology transfer
- Education and outreach
- Coordination with municipalities and agencies

Technical tools were expanded through several projects:

- Complete the final phase of an effort to characterize bluff conditions on Lake Superior to assist communicates to create defensible setbacks.
- Partners used enhancement funds to take and geolocate oblique photographs of Wisconsin's coasts and develop a detailed GIS database to compare the new photographs to a set from the 1970s.
- The University of Wisconsin-Madison completed projects investigating the effect of lakebed down cutting on long-term bluff recession.
- The project led by UW-Madison "Education and Outreach of Bluff and Beach Profile in Response to Coastal Structures in Ozaukee County" will result in new technology.
- Bayfield County is seeking funds to incorporate LIDAR data into is building setback requirements.

Education and outreach include:

- Develop a final report "Managing Coastal Hazards Risks in Wisconsin's Changing Climate.
- Bay-Lakes Regional Planning Commission Completed "A Guide to Hazard Mitigation Planning for Coastal Communities in Wisconsin."
- The UW-Madison's project "Education and Outreach of Bluff and Beach Profile in Response to Coastal Structures in Ozaukee County" involves training students to evaluate the impacts of shore protection systems.

Coordination with municipalities and agencies:

- Efforts in Bayfield County involving partners assisting a community. Partners met with community planners and regional planning commission staff in developing the Coastal Hazards Risks report described above.
- UW-Madison met with Ozaukee County staff and Concordia University staff in developing its projects, leading to an improved relationship between all three entities.

The agencies represented on the group include University of Wisconsin – Sea Grant Institute, State Department of Natural Resources, Wisconsin Coastal Management Program as well as WEM. The representative from the Wisconsin Coastal Management Program is also on the Wisconsin Hazard Mitigation Team. A link to Mitigation programs on WEM's website is linked on the Wisconsin Coastal Management Program website.

7.7.10 State Agency Resource Working Group

The State Agency Resource Working Group (SARWG) was a statutory funded group of the Wisconsin Land Council administered through the Department of Administration, Division of Intergovernmental Relations. The Division is responsible for administering the Comprehensive Planning Grant Program for the State. Representatives are from various state agencies participated in promoting and cooperating on land use issues. As a mitigation action, WEM participated on the group to promote mitigation planning as part of the comprehensive planning process. The DOA representative on the SARWG also participates on the WHMT. With the sunset of the Wisconsin Land Council there is no statutory requirement or funding for the group. However, members continue to communicate and share information via e-mail to promote comprehensive and mitigation planning.

7.7.11 Homeland Security Council

In March 2003, Governor Doyle created the Homeland Security Council to help coordinate the state’s terrorism preparedness efforts. The Governor has named Major General Donald Dunbar, Adjutant General of the Wisconsin National Guard, as the Governor’s Homeland Security Advisor. Other agencies on the Council are Wisconsin Emergency Management, Department of Justice, Division of Criminal Investigation;

Department of Health Services; Department of Administration, Division of Enterprise Technology; Wisconsin Chief of Police Association; Badger State Sheriffs Association; Department of Natural Resources; Department of Agriculture, Trade, and Consumer Protection; Department of Administration, Division of Capitol Police; Office of Justice Assistance; and the Wisconsin State Patrol.

Specifically, the Council is charged with the following responsibilities:

- Coordinate the efforts of state and local agencies that have responsibility over homeland security efforts.
- Coordinate state efforts with the U.S. Department of Homeland Security, FEMA, FBI and other local and federal agencies.
- Coordinate law enforcement and intelligence gathering efforts of local and state agencies.
- Advise local governments as the Council becomes aware of heightened threat assessments, and assist the public in understanding what these often complex security designations mean.
- Serve as a resource to assist local governments in developing plans to identify and protect critical assets in their communities.
- Make recommendations to the Governor and to local governments on what additional steps are necessary to further enhance Wisconsin's homeland security.

The Council meets regularly and in response to elevated threat levels.

The Interagency Working Group is chaired by Wisconsin Emergency Management and comprised of representatives of the Departments of Administration, Agriculture, Health and Family Services, Justice, Natural Resources, and Transportation, as well as the Office of Justice Assistance, National Guard and University of Wisconsin Police. The Group was formed in the late 90's with its original focus on terrorism preparedness. Since that time, its mission has evolved to cover all hazards and all phases of emergency management. The Group meets monthly or more often if dictated by current events and acts as a support group to the Governor's Homeland Security Council.

7.7.12 Wisconsin Voluntary Organizations Active in Disasters

Wisconsin Voluntary Organizations Active in Disasters (WIVOAD) is a humanitarian association of independent voluntary organizations who may be active in all phases of disaster. Its mission is to foster efficient, streamlined service delivery to people affected by disaster, while eliminating unnecessary duplication of effort, through cooperation in the four phases of disaster: preparation, response, recovery, and mitigation. Staff from WEM provides coordination and assistance to WIVOAD members. WIVOAD has taken a lead role in long-term recovery and sponsors Long Term Recovery Committees. These committees, using WIVOAD's 501(c)(3) tax exempt status, focus on fundraising,

reaching out to individual/families with unmet disaster needs and providing services to them through a uniform case management process.

In response to and beginning with 1768-DR, WEM is utilizing the Aidmatrix Network to match donations with the Long Term Recovery Committees. Aidmatrix allows VOAD and the Long Term Recovery Committees to view donations and post specific needs. This will assist in meeting the unmet needs of Wisconsin disaster victims.

7.7.13 Public/Private Partnerships

In addition to working with the agencies on the WHMT, for the past several years WEM staff provided information on hazard mitigation programs and the planning process to groups and individuals through a variety of means. This included making presentations to certain groups such as the Wisconsin Emergency Management Association, Wisconsin Manufactured Housing Association, Wisconsin Land Information Association, American Planners Association, Wisconsin Utilities Association, the State Bar of Wisconsin, Council of Regional Planning Organizations, Great Lakes Inter-Tribal Council, Wisconsin Claims Council, University of Wisconsin-Madison Student Planning Association, Wisconsin Chapter of the Public Risk Managers Association, Wisconsin Association for Floodplain, Stormwater, and Coastal Managers, and the LaFollette School of Public Affairs, and Southwest Building Inspectors Group. In addition, information was provided to communities receiving Community Development Block Grants and how they can incorporate mitigation into rehabilitation of housing stock. Presentations on hazard mitigation planning and its link to comprehensive planning and smart growth were made to the State Agency Resource Working Group of the Wisconsin Land Council, at a workshop for local officials on Complying with Comprehensive Planning and State Agency Resources, and to a Department of Administration and several members of the Wisconsin Land Council.

WEM and DNR staff was contacted in early 2011 by the Environmental Law Institute (ELI) and the University of North Carolina (UNC) at Chapel Hill regarding collaborating together on a workshop on Wetlands, Wildlife Habitat and Flood Hazards in the Rock River Basin. The workshop was held May 13, 2011, and was designed to facilitate a greater collaboration between emergency managers and wetland and wildlife conservation managers to strengthen protection of vital wetlands and floodplains. Wisconsin Wetlands Association was a sponsor in addition to the ELI and UNC. The workshop explored how different agencies and organization can work together to meet multiple goals and identify the information needed and funding sources available for joint projects. Both WEM and DNR made presentations at the workshop. Based on the workshop results the ELI, UNC and Wisconsin Wetlands Association are working on developing a guidebook for the region on the obstacles and opportunities for collaboration.

7.7.14 Public Education and Outreach

One of the challenges that WEM has faced has been keeping citizens, local officials, and emergency management staff informed about the importance of and need for hazard mitigation. Educating the public and local governments on topics like household preparedness, flood insurance, and federal assistance opportunities is an ongoing process. Since the Midwest Flood of 1993 and the 2008 floods, officials in the state have become much more alert to the probability of disaster striking and the need for mitigation to reduce future loss of life and economic damages.

WEM uses numerous strategies to disseminate mitigation information:

- Incorporating mitigation information in annual winter weather, tornado and severe weather, and flood awareness campaigns.
- Publishing mitigation information on the WEM website.
- Including mitigation articles in the Department of Natural Resources and Wisconsin Association for Floodplain, Stormwater and Coastal Mangers newsletters.
- Integrating mitigation elements in all county-level Damage Assessment Workshops as well as the Introduction to Emergency Management, Disaster Response and Recovery, and New Directors' Orientation courses conducted yearly. The later there training is part of the Emergency Management Certification Program.
- Conducting an All-Hazards Mitigation Planning Workshop annually to educate local officials, emergency management staff, planners, consultants, and others about the mitigation planning process and plan components. The workshop again is part of the Emergency Management Certification program.
- Displaying the traveling mitigation display at mitigation training functions including the Annual Governor's Conference on Emergency Management and Homeland Security, Wisconsin Association for Floodplain, Stormwater and Coastal Managers, and the Wisconsin Emergency Management Association.
- Sponsor training such as Benefit-Cost Analysis and HAZUS-MH
- Creating timely workshops, such as a Project Application Development Course, Buyout Workshop, etc., for communities in need of training following a disaster event.

In addition, when a disaster strikes, WEM educates local governments and the public about their options and what help is being offered by different agencies, including FEMA. Mitigation staff attends the Public Officials Briefings and presents information regarding mitigation opportunities and funding. WEM participates in Substantial Damage Workshops conducted by FEMA and DNR providing information on the mitigation programs and how they can provide assistance to property owners whose properties are determined substantially damaged. Both WEM and DNR staff attend community meetings throughout the declared area. Their focus is to discuss the

National Floodplain Insurance Program (NFIP) and the Hazard Mitigation Grant Program (HMGP) and other recovery issues.

In the development of the first Wisconsin Hazard Mitigation Plan and the subsequent three-year update, mitigation staff utilized a Household Natural Hazards Preparedness Questionnaire. The questionnaire was developed from a survey developed by the Oregon Natural Hazards Workgroup at the University of Oregon's Community Service Center. The questionnaire included the State Plan's mitigation goals and asks the individual completing the questionnaire to provide their opinion of the goals as to their importance. The questionnaire had general questions designed to help gauge household preparedness and the individual's knowledge of mitigation tools that may be available. The questionnaire was interactive and could be completed on WEM's website. In addition, the survey was distributed at various WEM training sessions, speaking engagements that mitigation staff attends, as well as at the Annual Governor's Conference on Emergency Management. On p. 2-10 and 2-11, there are comparison charts of responses provided from 2005 through 2008.

7.7.15 Non-Federal Match for HMGP

The FEMA mitigation programs all require a 75/25 cost-share with the exception of the Repetitive Flood Claims program. Since 1990 the State has provided half of the non-federal match for the HMGP grants. The federal, state and local mitigation dollars exemplified below represent the commitment to the HMGP. Through the coordination with the WHMT, other state agencies funded the local match requirements for many projects particularly when they involve acquisition and demolition, or funded projects in their entirety. After the 2008 floods, the Department of Commerce committed Community Development Block Grants to fund the entire local match for the HMGP grants that involved acquisition and demolition and/or elevation.

TABLE 7.7.15-1 HAZARD MITIGATION GRANT PROGRAM FUNDING HISTORY, 1991-2011

Disaster Number	Federal Share	State Share	Local Share	Total
912[1]	$54,342	$27,171	$27,171	$108,684
959[1]	$19,434	$9,717	$9,717	$38,868
963[1]	$188,187	$94,093	$94,093	$376,374
964[1]	$195,537	$97,768	$97,768	$391,074
994	$10,503,362	$1,750,521	$1,750,521	$14,004,403
1131	$258,395	$43,066	$43,066	$344,527
1180	$4,698,752	$783,125	$783,125	$6,265,003

TABLE 7.7.15-1 HAZARD MITIGATION GRANT PROGRAM FUNDING HISTORY, 1991-2011

Disaster Number	Federal Share	State Share	Local Share	Total
1236	$1,471,849	$245,308	$245,308	$1,962,465
1238	$3,337,816	$556,302	$556,302	$4,450,421
1284	$609,044	$101,529	$101,529	$812,059
1332	$3,318,014	$553,003	$553,003	$4,424,019
1369	$3,292,556	$548,760	$548,759	$4,390,075
1429	$496,952	$82,826	$82,825	$662,603
1432	$817,188	$136,198	$136,198	$1,089,584
1526[2]	$1,385,315	$230,886	$230,885	$1,847,086
1719[3]	$4,164,059	$694,010	$694,010	$5,552,079
1768[3]	$23,156,913	$3,859,486	$3,859,485	$30,875,884
1933[3,4]	$16,003,899	$2,667,317	$2,667,316	$21,338,532
1944[3,4]	$787,696	$131,283	$131,282	$1,050,261
1966[3,5]				
Total	**$74,759,310**	**$12,612,369**	**$12,612,363**	**$99,984,042**
Average	**$3,934,700**	**$663,809**	**$663,809**	**$ 5,262,318**

1. Cost share was 50% federal/25% State/25% local. HMGP was 10% of Public Assistance permanent repairs only.
2. HMPG is 7.5% of Individual and Public Assistance Programs.
3. HMGP is 20% of Individual and Public Assistance Programs.
4. Based on six-month lock-in
5. Have not received six-month estimate

7.7.16 Construction Standards

Wisconsin has adopted commercial building codes. The Wisconsin Commercial Building Code includes Comm. 61 through 66 and the adopted provisions of the International Code Council codes: International Building Code, International Energy Conservation Code, International Mechanical Code, International Fuel Gas Code and International Existing Building Code. The commercial code protects the health, safety and welfare of the public and employees by establishing minimum standards for the design, construction, maintenance and inspection of public buildings, including multi-family dwellings, and places of employment.

In addition to the commercial codes, Wisconsin has adopted the Uniform Dwelling Code (UDC) for one and two-family dwellings (Comm. 20 through 25.) The UDC provides

construction and remodeling requirements built after June 1, 1980. Beginning January 1, 2005, all municipalities have enforcement requirement of the code. Enforcement involves submitting building plans to obtain a building permit, and having electrical, construction, plumbing and HVAC inspections during construction. (Previously municipalities with a population of 2500 or less were required to follow the code, however, were not required to perform inspections.)

The State Department of Safety and Professional Services reviews plans prior to construction for compliance with state statutes and building codes. The Department administers and issues certification licenses and registrations for approximately 44,000 individuals in 64 categories for specific trades. Annual continuing education classes are conducted for building codes used for design, construction and inspection.

7.7.17 State Facilities, Infrastructure and Critical Facilities

The State has identified approximately 6,500 State-owned and -operated facilities statewide. Based on the limited data available on State-owned buildings WEM reviewed the inventory and, to the best of their ability, identified those buildings that could be considered critical facilities. In determining if a building or structure potentially was a critical facility, WEM looked at its purpose and function and whether the facility's operation was critical to state operations, or to protecting the public health and safety of the citizens and property during a disaster. The structures identified fell into the following categories:

1. A facility or structure related to communications. This included radio and television facilities for EAS, communications towers, etc.
2. A facility or structure that generated electrical power, provided heating, wastewater treatment, or water sources.
3. Hospitals, homes and other medical type facilities.
4. Correctional facilities.
5. Major state government facilities that house key state operations.
6. Critical military facilities.
7. Emergency response facilities related to law enforcement, security, fire, etc.

Based on this methodology, WEM identified an initial list of 452 critical facilities. In the original and updated versions of the Plan, the State Risk Assessment (Section 3) includes a very basic and general analysis of vulnerability and loss estimation at the state level for State-owned and -operated buildings, critical facilities, and infrastructure.

To determine which State-owned and -operated buildings, critical facilities, and infrastructure is at most risk from the identified hazards, site-specific information is required. As stated above, there are nearly 6,500 structures included on the State Facility Database. The information included on the database includes:

- Building name and number
- State agency

- Bid date
- Type of construction
- Condition of the structure
- Number of floors above and below ground
- Gross square footage
- Replacement value
- Completion date for some buildings, but not all
- County and municipality
- Institution name
- Address
- Indication if the structure is located in a floodplain

To get an accurate risk assessment there needs to be site-specific information. The information in the State Facility Database is a good start, but additional information is required to determine the hazard vulnerability for each building and to further develop a strategy to mitigate the losses from identified hazards. Section 3.17 identifies the strategy for improving this data for the updates of the State of Wisconsin Hazard Mitigation Plan.

WEM applied for and received a PDM state planning grant to begin a Risk Assessment of state-owned buildings. A partnership was formed among the State Department of Administration, Division of State Facilities, and WEM. They developed a Wisconsin Risk Assessment Data Collection Worksheet that is the basis for collecting information on each building. The worksheet, which can be found in Appendix H, covers everything from general information such as location, to more detailed questions involving construction materials. The Department of Corrections was the pilot for gathering the data. To date, WEM has received structure information on 370 buildings within the Department of Corrections. The information was entered into a database. The data was analyzed to establish a risk factor for flood and wind/tornado. Mitigation staff members are now working with to gather the data and identify risk for each building. Staff members are also working with the University of Wisconsin-Madison on the structure inventory. The University is presently developing a hazard mitigation plan. Staff will continue to work with the state agencies to complete the structure inventory.

7.7.18 Repetitive Loss Properties

Section 7.3 identifies the State's priorities for mitigation funding. The two highest priorities are acquisition and demolition of properties substantially damaged and acquisition, demolition or relocation of repetitive loss properties (RLP) and severe repetitive loss properties (SRL.) Repetitive loss structures are those structures that have had two or more flood insurance claims of at least $1,000 each in the last ten years.

A summary of Wisconsin's Repetitive Loss Report dated December 2010 is presented in Appendix D. The state makes every attempt to mitigate repetitive loss properties

through the HMA programs. As the State works to mitigate repetitive loss properties, additional properties are identified in subsequent flooding events.

The report showed that 112 of the repetitive loss properties (19.34%) have been mitigated, whether by removal or elevation. Of the 112 properties, 83 (14.34% of all RLP) were acquired and 24 (4.14% of all RLP) were removed or floodproofed. In addition there were 5 properties (0.86%) in the process of flood mitigation. There were 467 properties (80.66%) that remained floodprone and 97 NFIP communities with repetitive loss properties.

Acquisition was the most common choice of mitigation by the majority of communities. The success of acquisitions is most evident in communities with widespread damage such as Kenosha County, Jefferson County, City of Darlington, the City of Wauwatosa and the Village of Brown Deer. In these communities acquisitions eliminated a majority of the repetitive loss properties and reduced the risk of future loss.

The RLP report is used as a resource to prioritize mitigation projects for mitigation grants. The report provides the state with a resource to identify the properties with the most repetitive losses and to prioritize specific mitigation recommendations for those properties. The state utilizes the Repetitive Loss Report statistics from past and current mitigation projects to provide guidance for future mitigation projects and reduce flood losses. Repetitive loss information is a consideration of the funding criteria for mitigation projects and planning grants. RLP information is also provided to local governments to address and include in development and update of the All-Hazard Mitigation Plans.

7.7.19 Severe Repetitive Loss Properties

Section 7.2.11 describes the Severe Repetitive Loss program. “Severe repetitive loss properties” are defined as NFIP-insured residential properties that (a) have at least 4 or more NFIP claim payments over $5,000 each, when at least two such claims have occurred within any 10-year period, and the cumulative amount of such claims payments exceeds $20,000; or (b) for which at least two separate claims payments have been made with the cumulative amount of such claims exceeding the value of the property.

As of June 1, 2011, Wisconsin had eleven (11) identified properties that met the SRL definition. Four of the properties identified have been "validated" by FEMA as a SRL property. One of the four properties has been recently included in a HMGP application. Two properties are "validated uninsured." One of those properties has been mitigated through HMGP. Five of the properties are "pending uninsured." Of those five, two have been mitigated again through HMGP, and one of the properties cannot be located due to insufficient data. That brings the number of potential SRL properties down to six statewide. (In the previous update of this plan, there had been a SRL property identified in Jefferson County. The County has since acquired and demolished the identified structure utilizing HMGP funds.)

7.7.20 Post Disaster Recovery Operations

Hazard Mitigation is an integral part of Wisconsin's post-disaster recovery operations. WEM mitigation staff participates in the Preliminary Damage Assessment process to identify potential mitigation opportunities. In addition, staff assists in the preparation of documentation for the Governor's request letter for a federal disaster declaration. State mitigation staff coordinates with the state and federal agencies on the Wisconsin Hazard Mitigation Team and the Wisconsin Recovery Task Force that may have technical or funding assistance available to communities during the recovery process. State mitigation staff co-locates with federal mitigation and NFIP staff at the Joint Field Operations as soon as it opens. State and federal mitigation and NFIP staff works cooperatively to develop a post-event mitigation strategy/action plan. The strategy/action plan identifies mitigation activities such as community mitigation education and outreach, coordination with other disaster assistance programs, mitigation project development, and National Flood Insurance Program mitigation opportunities and promotion. State mitigation staff attends and participates in the Public Officials Briefings and provides information regarding hazard mitigation programs including hazard mitigation opportunities through the Public Assistance Program (section 406.) State mitigation staff also attends and participates in Substantial Damage Determination training workshops for zoning and local officials. Provides information regarding mitigation opportunities for properties determined to be substantially damaged. State staff works closely with Public Assistance staff to ensure that all possible 406 hazard mitigation opportunities are pursued and funded. State mitigation staff provides technical assistance to all respective grant applicants on project development techniques and proper documentation for environmental and cost effectiveness reviews. (See Section 7.4.1 and 7.4.2, and Appendix F, State Administrative Plan for HMGP.)

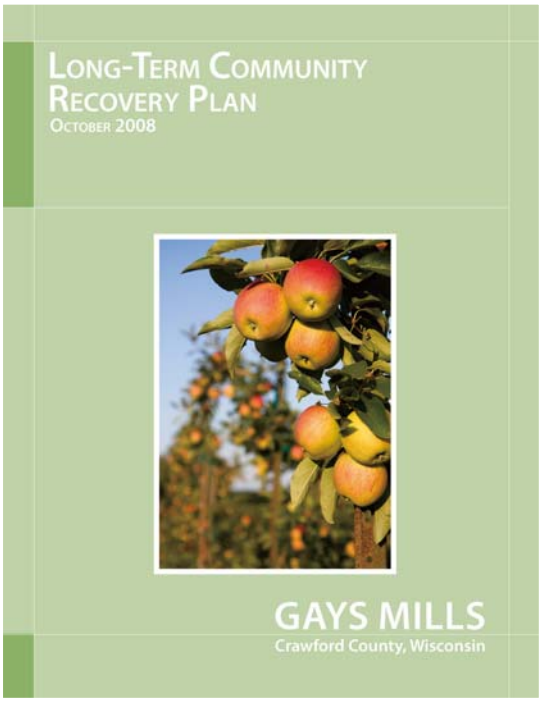
7.7.21 Gays Mills Recovery Efforts

In August 2007 and June 2008, the Village of Gays Mills was struck with two back-to-back floods. Both events were greater than the 500 year flood and caused substantial damage to the Village's residential and business districts. The Village of Gays Mills resides in a valley surrounded by steep bluffs and hills. The Village is located within the non-glaciated region of southwest Wisconsin and the Kickapoo River winds through the valley.

After the first flood hit in 2007, Wisconsin Emergency Management worked with the community to help them in recovery process. The Village was unsure if it should consider relocation of the town at that time. The Village did decide to proceed with the acquisition/demolition of those structures closest to the River and the most severely damaged, and elevation of other substantially damaged structures. The State Hazard Mitigation Officer attended many community meetings to discuss the HMGP and other grant funding opportunities.

The Village did not have time to catch its breath before the next flood came in June 2008, less than 10 months from the previous flood. The HMGP projects of acquisition/demolition and elevation had not commenced and the structures were again flooded. In addition to those homes and business that were flooded in 2007, additional structures were affected in 2008. Many homeowners that were considering elevations of structures decided they did not want to go through another flood in their presence location. Many homeowners that chose elevation wanted to switch to acquisition/demolition, which required the 1719 HMGP application to be amended.

The Village also had several other hard choices to make after the 2008 flood. The 2008 flood forced village officials and citizens to seriously consider relocation of their town. The State requested FEMA assistance through ESF-14: Long Term Community Recovery. The Long Term Community Recovery team developed a Long Term Flood Recovery Plan for the Village.



The Recovery Plan process involved a series of meetings and workshops for the community. It was incredibly important for state and federal partners to attend the recovery events because ultimately, it is the responsibly of the State, with the help of the federal and other agencies, to assist in the implementation of the plan. Two planning charettes were held on August 20 and 21, 2008 and WEM Mitigation staff along with representatives from USDA-Rural Development and the Mississippi River Regional Planning Commission attended the two day session. On September 18 and 19, 2008 a community meeting and design charette were held, respectively. The State Hazard Mitigation Officer attended the meeting and the charette along with representatives from USDA-Rural Development and FEMA. On October 20, 2008, the ESF-14 team made a presentation of the draft plan to the community. At that meeting, priorities were discussed and representatives from WEM, the Mississippi River Regional Planning Commission, USDA-Rural Development were present. The final plan was presented to the community on October 31, 2008.

However, the interagency cooperation and effort did not end when the ESF-14 Team left. WEM coordinated two strategy meetings on November 19, 2008 and December 2, 2008 with several member of the WHMT/WRTF. The Department of Commerce, USDA-Rural Development, the Mississippi River Regional Planning Commission, FEMA, EDA, HUD WHEDA, Coulee CAP and WEM attended the meeting and reviewed all of the projects identified in the Flood Recovery Plan. Through discussion, the agencies identified which projects were possibly fundable by their programs and which

were not. Ultimately, the task of the group was to package funding to assist in as many projects as possible.

On December 15, 2008, all of the agencies met with the Gays Mills Long Range Planning Committee and other interested citizens to discuss the funding options available. The State Hazard Mitigation Officer led the meeting and discussed which agencies could potentially fund which projects. It was a very productive meeting which provided direction and hope for the community.

Two relocation sites just north of the existing downtown were purchased by the Village. The site known as North Mills will be used for mixed use of residential housing and businesses. Two five-unit townhouses and several residential structures have been completed. Construction of a mercantile center for businesses and the Community Commerce Center which will house Village Hall, library and a community kitchen are all under construction. Future plans for the second site are to include a small health clinic, assisted living facility, EMS and Fire Department, Public Works building, and additional businesses. FEMA, WEM, EDA, USDA-Rural Development, State Department of Commerce, State Department of Transportation, State Department of Health Services as well as private investors have all been sources of funding.

Gays Mills Mercantile Center

Gays Mills is an excellent example of the State of Wisconsin's commitment to a comprehensive mitigation program but not the only community that the State is working to assist in flood recovery. Throughout the recovery process, the state and federal agencies have coordinated and integrates mitigation into its post-disaster recovery operations.

Gays Mills Community Commerce Center

7.7.22 National Efforts

State mitigation staff provides input and participates on panels, workgroups, committees, etc. as requested by FEMA regional or headquarters offices. Staff has served in FEMA's HMA national evaluation every year. The SHMO participated on the National Review Panel for the State of Maryland, Washington and Florida to review their enhanced plans. In addition, another mitigation staff sat on the panel that reviewed the second update of the State of Washington's enhanced plan. The SHMO participated on the Enhanced Plan Review Procedures Workgroup and the External Stakeholder Workgroup for Mitigation Plan Review Process. Wisconsin is committed to work with FEMA in the future to improve and streamline programs, policies and procedures.

SECTION 8: CONCLUSION

Hazard mitigation reduces the vulnerability of the citizens of the State of Wisconsin to natural hazards. The state has made a commitment to hazard mitigation, with floods as its top priority. Floods are the most costly natural hazard in the state. Acquisition of flood-prone structures is an effective way to prevent flood damage and to minimize human suffering associated with flood damage. Since 1990, Wisconsin has acquired and removed approximately 636 residential and commercial structures from flood prone areas and has floodproofed approximately 84 more using Hazard Mitigation Assistance programs. There have been a variety of other flood mitigation projects in the last 20 years as well. Communities, using state, federal, and local hazard mitigation program funds, have also conducted flood awareness programs, repaired dams and levees, and constructed storm sewers and detention ponds to reduce the likelihood of future damage.

Wisconsin is subject to other hazards besides floods. Tornadoes, high winds, hail, thunderstorms, wildfires, and extreme temperatures are natural hazards that have caused significant loss of life and property. While not as many Wisconsin agency programs are focused on these hazards as floods, the resources are significant. For many of these other hazards, prevention is the biggest part of mitigation. Through strong building codes, inspection and code enforcement, severe damage and loss of life as a result of building failure is minimized. Likewise, weather warning systems, hazard awareness programs, insurance, and public health advisories can reduce loss of life and property by giving the public access to information that can help them take protective measures. Finally, careful consideration of potential hazards when building facilities for utilities, health care, and public use ensures that government and public facilities are truly long-term investments. Together with the many flood mitigation programs, these are Wisconsin's core strengths for reducing the public's vulnerability to natural hazards.

State agency programs that address hazards through mitigation have matured under the trying circumstances of the Great Midwest Flood of 1993 and the subsequent major flooding of 2008. No doubt the mitigation efforts of the last 20 years have saved millions of dollars in damages from the Wisconsin floods of 2007 and 2008. Many challenges have been met, yet many challenges remain. With respect to flooding, many people in Wisconsin are subject to basement flooding and sewer back up. Too few people have flood insurance or understand it. Stormwater flooding is common and becoming more common as development increases. With respect to tornadoes and windstorms, many communities would benefit from performing a shelter assessment, especially for schools and health care facilities, to evaluate their capability to shelter people sufficiently during high winds.

Although the top priority for mitigation will remain the acquisition and demolition of flood vulnerable structures, with a focus on repetitive loss and severe repetitive loss properties, other mitigation and hazard awareness issues need to be addressed. The long-term challenge for public planning, development, public safety, and emergency management

professionals at every level of government is making disaster resistance in Wisconsin a way of life and getting individuals to recognize their true risk.

This Plan update demonstrates that state agencies are willing to take a leadership role to promote hazard mitigation, disaster prevention, and hazard resistant communities. However, ultimately all mitigation is local. Participation in state and federal mitigation programs is at the discretion of each community and its citizens. Therefore, the State will continue to encourage local mitigation planning so local problems will have local solutions.

Wisconsin Emergency Management and our state agency partners have updated this State of Wisconsin Hazard Mitigation Plan, as a state disaster-prevention planning tool, to help the state and all its citizens understand and combat the effects of natural disasters. This Plan update is also designed to fulfill the requirements of 44 CFR Parts 201.4 and 201.5. Ultimately, the Plan shows a solid history of hazard mitigation in Wisconsin, an appraisal of concerns, and the commitment of state agencies to adopt policies and take actions that will address these concerns.

APPENDIX A: NATURAL DISASTER SUMMARY

TABLE A-1 DISASTER DECLARATIONS AND REQUESTED DECLARATIONS BY COUNTY, 1990-2011

County	FEMA Disaster Number or Year of Non-Declared Event (ND																													Total
	874	877	912	959	963	964	994	1994 ND	1996 ND	1131	1180	1998 ND	1236	1238	1998 ND	1284	1332	2000 ND	3163	1369	1429	1432	1526	2005 ND	1719	3285	1768	1933	1944	1966	
Adams							X	X									X				X		X				X				**6**
Ashland																X	X														**2**
Barron																	X			X		X									**3**
Bayfield																X				X											**2**
Brown	X						X																X								**3**
Buffalo						X	X						X							X									X		**5**
Burnett																	X			X		X									**3**
Calumet	X						X													X			X				X	X			**6**
Chippewa							X											X				X	X								**4**
Clark							X						X								X	X	X						X		**6**
Columbia							X		X			X					X		X				X				X				**7**
Crawford	X					X	X					X	X				X			X			X		X		X				**10**
Dane	X		X		X		X					X					X		X				X	X		X	X			X	**12**
Dodge							X		X			X					X						X			X	X			X	**8**
Door															X				X												**2**
Douglas																X				X											**2**
Dunn							X					X	X								X	X									**5**
Eau Claire							X					X						X					X								**4**
Florence																X															**1**
Fond du Lac							X		X	X		X											X				X				**6**
Forest																	X														**1**
Grant	X						X						X				X			X			X				X	X		X	**9**
Green	X						X		X	X							X		X				X			X	X			X	**10**
Green Lake							X																X				X				**3**
Iowa	X						X										X						X				X			X	**6**

TABLE A-1 CONTINUED

County	FEMA Disaster Number or Year of Non-Declared Event (ND																														Total
	874	877	912	959	963	964	994	1994 ND	1996 ND	1131	1180	1998 ND	1236	1238	1998 ND	1284	1332	2000 ND	3163	1369	1429	1432	1526	2005 ND	1719	3285	1768	1933	1944	1966	
Iron																X	X														2
Jackson						X	X						X				X						X						X		6
Jefferson			X				X		X														X			X	X				6
Juneau	X					X	X										X						X				X		X		7
Kenosha							X										X		X				X			X	X			X	7
Kewaunee	X																		X												2
La Crosse							X						X							X			X		X		X				6
Lafayette	X						X					X					X						X				X			X	7
Langlade																						X									1
Lincoln							X															X									2
Manitowoc	X																		X												2
Marathon							X														X	X	X						X		5
Marinette																					X										1
Marquette							X																X				X				3
Menominee							X																								1
Milwaukee							X				X			X			X		X				X			X	X	X		X	10
Monroe		X	X				X						X				X						X				X				7
Oconto																															0
Oneida																X	X														2
Outagamie	X						X													X			X								4
Ozaukee			X								X	X							X				X				X				6
Pepin						X	X						X							X											4
Pierce						X	X						X							X											4
Polk																	X					X									2
Portage							X														X	X	X						X		5
Price							X									X						X									3
Racine							X							X			X		X				X			X	X			X	8

TABLE A-1 CONTINUED

County	FEMA Disaster Number or Year of Non-Declared Event (ND																														Total
	874	877	912	959	963	964	994	1994 ND	1996 ND	1131	1180	1998 ND	1236	1238	1998 ND	1284	1332	2000 ND	3163	1369	1429	1432	1526	2005 ND	1719	3285	1768	1933	1944	1966	
Richland	X					X	X						X				X						X		X		X				8
Rock	X						X		X					X					X				X			X	X				8
Rusk							X									X	X			X		X									5
Sauk	X					X	X		X			X					X						X		X		X				9
Sawyer																X	X					X									3
Shawano							X															X	X								3
Sheboygan												X		X					X				X				X				5
St. Croix							X						X							X		X									4
Taylor																						X	X						X		3
Trempealeau						X	X						X							X			X						X		6
Vernon	X					X	X						X				X			X			X		X		X				9
Vilas																X															1
Walworth									X								X		X				X			X	X			X	7
Washburn																	X			X		X									3
Washington			X								X	X											X			X	X			X	7
Waukesha			X								X	X		X			X		X				X			X	X				9
Waupaca							X															X	X								3
Waushara				X			X														X		X								4
Winnebago	X						X													X			X				X				5
Wood							X														X	X	X						X		5
Total	**17**	**1**	**6**	**1**	**1**	**10**	**47**	**1**	**8**	**2**	**4**	**13**	**14**	**5**	**1**	**10**	**30**	**2**	**14**	**18**	**8**	**19**	**44**	**1**	**5**	**11**	**30**	**3**	**9**	**11**	

TABLE A-2 NATURAL DISASTER DAMAGES IN WISCONSIN, 1990-2011

Year	Disaster Number	Event	Number of Counties	ESTIMATED DAMAGES			STATE AND FEDERAL MONEY RECEIVED		
				Public or Government Property & Facilities	Individual Property, Crops, & Facilities	Total	Public or Government Assistance	Private or Individual Assistance	Total
2011	1966*	Blizzard	11	$9,819,137	N/A	$9,819,137	$9,187,805	N/A	$9,187,805
2010	1944*	Storms, Flooding	9	$7,302,617	$8,975,482	$16,278,099	$4,663,697	$0	$4,663,697
2010	1933*	Storms, Flooding	3	$12,215,085	$27,295,750	$39,510,835	$27,688,267	$58,336,391	$86,024,658
2008	1768*	Storms, Tornadoes, Flooding	31	$125,681,689	$637,937,171	$763,618,860	$95,775,642	$56,679,490	$152,455,132
2008	3285	Snow Emergency	11	N/A	N/A	N/A	$10,029,658	N/A	$10,029,658
2007	1719*	Storms, Tornadoes, Flooding	14	$21,098,700	$94,313,300	$115,412,000	$16,673,293	$8,012,384	$24,685,677
2005	-	Storms, Tornadoes	3	$3,680,725	$23,588,700	$27,269,425	$0	$4,207,000	$4,207,000
2005	3249	Katrina Evacuees	72	N/A	N/A	N/A	$1,442,303	N/A	$1,442,303
2004	1526*	Storms, Tornadoes, Flooding	44	$9,908,728	$77,123,432	$87,032,160	$13,871,519	$6,568,870	$20,440,389
2002	1432	Storms, Tornadoes	19	$3,610,925	$24,129,080	$27,740,005	$3,273,959	$665,759	$3,939,718
2002	1429	Storms, Flooding	8	$7,094,978	$7,226,700	$14,321,678	$4,746,013	$0	$4,746,013
2001	1369	Storms, Tornadoes, Flooding	32	$47,725,550	$56,158,600	$103,884,150	$27,043,512	$22,375,528	$49,419,040
2001	3163	Snow Emergency	14	N/A	N/A	N/A	$6,277,619	N/A	$6,277,619
2000	-	Heavy Rains, Storms, Flooding	2	$1,626,500	$1,845,850	$3,472,350	$0	$1,547,000	$1,547,000
2000	1332	Heavy Rains, Storms, Flooding	30	$37,556,388	$25,242,248	$62,798,636	$16,772,892	$18,742,906	$35,515,798
2000	-	Storms, Hail, Tornadoes	4	$2,056,228	$120,562,423	$122,618,651	$0	$7,251,900	$7,251,900
1999	1284	Heavy Rains, Storms, Flooding	10	$6,500,000	$1,500,000	$8,000,000	$5,548,182	$0	$5,548,182
1998	-	Storms, Tornadoes	1	$15,500	$6,509,030	$6,524,530	$0	$0	$0
1998	1238	Storms, Flooding	5	$10,687,346	$44,025,738	$54,713,084	$11,023,053	$26,518,256	$37,541,309
1998	1236	High Winds, Severe Storms	14	$11,115,989	$36,806,899	$47,922,888	$10,481,638		$10,481,638
1998	-	High Winds, Severe Storms	16	$5,832,845	$47,892,964	$53,725,809	$0	$0	$0
1997	1180	Heavy Rains, Storms, Flooding	4	$17,064,946	$70,667,000	$87,731,946	$17,160,019	$37,620,733	$54,780,752
1996	1131	Storms, Tornadoes, Flooding	2	$11,366,650	$49,748,000	$61,114,650	$2,450,546		$2,450,546
1996	-	Flooding	15	$4,689,700	$194,336,539	$199,026,239	$0	$0	$0

TABLE A-2 CONTINUED

Year	Disaster Number	Event	Number of Counties	ESTIMATED DAMAGES			STATE AND FEDERAL MONEY RECEIVED		
				Public or Government Property & Facilities	Individual Property, Crops, & Facilities	Total	Public or Government Assistance	Private or Individual Assistance	Total
1994	-	Storms, Tornadoes	2	$1,195,750	$8,508,290	$9,704,040	$0	$0	$0
1993	994	Heavy Rains, Storms, Tornadoes, Flooding	47	$47,000,000	$700,000,000	$747,000,000	$26,683,822	$271,761,899	$298,445,721
1992	964	Flooding	10	$1,917,000	$15,838,286	$17,755,286	$3,143,715	$126,402	$3,270,117
1992	963	Tornadoes	1	$1,800,000	$8,301,900	$10,101,900	$945,138	$391,881	$1,337,019
1992	959	Tornadoes	1	$5,362,500	$9,020,000	$14,382,500	$3,054,759	$0	$3,054,759
1991	912	High Winds, Severe Storms	5	$3,696,000	$23,001,283	$26,697,283	$3,850,598	$0	$3,850,598
1990	877	Flooding	1	$2,245,206	$3,984,532	$6,229,738	$0	$1,369,602	$1,369,602
1990	874	Storms, Tornadoes, Flooding	17	$4,600,000	$16,524,222	$21,124,222	$6,471,321	$7,340,689	$13,812,010
Total				**$424,466,682**	**$2,341,063,419**	**$2,765,530,101**	**$328,258,969**	**$529,516,690**	**$857,775,659**

*These amounts might still change: HMGP for 1933, 1944, and 1966 is not fully obligated yet; HMGP for 1719 and 1768 is not closed yet; PA for 1526, 1719, 1768, 1933, 1944, and 1966 is not closed yet.

APPENDIX B: HISTORY OF THE STATE'S FEDERAL DISASTER DECLARATIONS

This appendix will present a discussion of how Wisconsin's Hazard Mitigation Grant Program evolved in the course of the state's declared disaster history from 1991 to 2011.

FEMA-912-DR-WI

On August 6, 1991, the President declared a major disaster for the counties of Dane, Jefferson, Ozaukee, Washington and Waukesha as a result of high winds and severe storms that occurred July 7, 1991.

Severe storms in south central and southeastern Wisconsin on July 7 ranged from 60 to 80 miles per hour and hail as large as one inch in diameter fell in northeastern Dane County. Wind and hail caused crop damage and damage to farm buildings. In urban areas, trees were split and uprooted, damaging property and blocking streets as well as causing significant damages to private and public utility power lines. High winds also caused damage to 400 homes. A state owned hanger at the Dane County Regional Airport was completely destroyed damaging two state airplanes.

Total estimated damages for the disaster were $26.7 million. The costs incurred by government were estimated to be $3.7 million with individual property and agricultural losses at $23 million. The declaration was granted for Public Assistance only as the majority of the private sector damages were covered by insurance. The Public Assistance Program provided $3,283,562 to 79 community and county applicants. The Farmers Home Administration Emergency Loan Program also was made available to farmers who were affected by the storm.

The Hazard Mitigation Team Report prepared for FEMA-912-DR-WI identified mitigation opportunities in the following areas: 1) Use of local forestry program standards in the removal of damaged and hazardous trees and branches; 2) Identification and utilization of wind resistant building construction and repair standards, and the incorporation of mitigation provisions in local inspectors' training and certification programs; and 3) Provision of warning sirens. The issues raised remain concerns today and are being addressed by the State Hazard Mitigation Team through the planning process. Some require additional research and will require legislative action. Others will have opposition to implementation from various parties.

As a result of the declaration, the five counties were also eligible for the Section 404-Hazard Mitigation Grant Program (HMGP). HMGP funds available totaled $108,684 with the federal share representing 50% or $54,342, state share 25% or $27,171 with a local match of 25% or $27,171. Due to the small amount of funds available, the state had a difficult time in identifying an eligible project that would meet all of FEMA's program criteria and the funds remained unobligated for some time.

After the Midwest Flood in 1993, the state received a HMGP application from Jefferson County for acquisition and demolition of structures in the floodway on Blackhawk Island located in the Towns of Sumner and Koshkonong. Major floods occurred on the island in 1929, 1959, 1979 and 1993 with 1929 the worst recorded flood. Lesser flooding occurs almost annually, affecting many of the island's low to moderate-income level families and secondary residences. In 1993, the water came up to less than 10 inches from the all-time high and nearly every resident was evacuated for more than seven weeks. The repeated flooding caused structures on the island to show signs of disrepair. Septic systems and holding tanks were poor to substandard quality and presented an environment threat. In addition to the damages that occurred to the structures, there were continued expenses for the towns and county in emergency response and road repairs on the island.

As a result of the flooding in 1993, the county received grants from the Department of Administration (Community Development Block Grant in the amount of $500,000) and the Department of Natural Resources (Urban Rivers Grant Program in the amount of $611,000) for acquisition and demolition. To further the county's efforts, the state requested and FEMA approved a HMGP grant under 912-DR in the amount of $108,684 for Jefferson County. The funds were applied to the acquisition and demolition of three properties located on Blackhawk Island. The county received additional HMGP funds under declaration FEMA-994-DR-WI as well as the Flood Mitigation Assistance Program (FMA) to further their efforts of acquisition and demolition on Blackhawk Island. To date the county has acquired and demolished 30 structures utilizing the various funding sources. In addition, the county received a FMA Planning Grant to develop a comprehensive flood mitigation plan. There are about 60 structures remaining on the island. The acquisition and demolition of structures on Blackhawk Island remains a high priority with the county.

FEMA-959-DR-WI

On September 2, 1992, the President declared a major disaster for Waushara County for severe storms and tornadoes that occurred on August 29. During the evening of August 29, two tornadoes occurred. The first, an F1, occurred in Adams County and was on the ground for 4.5 miles. No injuries were reported and there was only minor damage. The second tornado ripped through Waushara County killing two individuals (one from a heart attack) and injuring 30 others. The tornado, rated F3 (158-206 mph) was on the ground for approximately 30 miles. The City of Wautoma sustained the heaviest damage with debris being a major concern.

The storms destroyed mobile homes, severely damaged a migrant worker camp and decimated thousands of trees. Forty-eight homes were destroyed, 95 received major damage, 289 received minor damage and 100 were affected to a lesser degree. Twenty-eight businesses were also damaged as well as many farm buildings. Two private, non-profit organizations were destroyed: One employed handicapped individuals and the other was a senior citizen center. On alternate weekends the senior citizen center hosted a Bingo Night. Fortunately, it was empty the night of the tornado

or there could have been up to 200 people in the center at the time the tornado struck. The number of deaths and injuries could have been much higher.

Debris was widespread in both urban and rural areas. There were massive tracts of downed timber posing a serious problem on both public and private lands. About 953 acres of commercial and state forested lands were critically affected. Waushara County is known as the Christmas tree capitol of the world. Christmas tree farms were severely impacted by this event. Metal debris from destroyed mobile homes was also a problem and was scattered throughout forests and agricultural fields.

The costs incurred by government were estimated to be $1.8 million with individual property and agricultural losses at $8.3 million. The estimated damages totaled $10.1 million. Disaster assistance through the Public Assistance Program was provided to 18 applicants and totaled $807,648. Assistance through the Individual and Family Grant program and through Crisis Counseling totaled $391,881. In addition, Disaster Housing Grants, Small Business Administration low-interest loans and unemployment assistance were provided. Waushara County and the contiguous counties of Adams, Green Lake, Marquette, Portage, Waupaca and Winnebago were eligible for physical and production loss loans through the Farmers Home Administration.

The Hazard Mitigation Team Report prepared for FEMA-959-DR-WI identified 12 mitigation recommendations in the following areas: Alert and Warning (3), Severe Weather Protection Shelters (1), Training and Education (3), Building Codes and Standards (4) and Economic Development (1). Several of the recommendations remain concerns today and are being addressed by the State Hazard Mitigation Team through the planning process for this document. Some require additional research and will require legislative action.

As a result of the declaration, the communities within the county were eligible for Section 404-Hazard Mitigation Grant Program funds. HMGP funds available totaled $38,868 with the federal share representing 50% or $19,434, a state share of 25% or $9,717 with a local match of 25% or $9,717. Waushara County applied for an HMGP grant for a weather information system that would create a forecasting system for all hazards that would greatly enhance the ability of local responders to preplan their responses based on past, current and predictable future weather conditions. This application was related to mitigation recommendation 3 of the Hazard Mitigation Team Report.

FEMA denied the application stating that the proposal was considered an enhancement to the county's preparedness capability and was not mitigation. They further referred to FEMA's policy dated February 7, 1992, regarding the funding of warning systems and other similar equipment. The policy states that HMGP cannot fund the purchase of warning systems, enhanced computer hardware and similar equipment. However, 44 CFR Section 206.434, states that "development or improvement of warning systems" are eligible under HMGP. The state submitted a formal appeal to the decision on behalf of the county and was denied. Working with FEMA and this office, the county submitted

another application for the development and implementation of a geographic information system (GIS) application that received approval. The project consisted of verifying digitized floodplain maps, using a global positioning system (GPS) to identify the location of structures in the 100-year floodplain of the Pine River, determine the lowest adjacent and first floor elevations and incorporate the information into the county's GIS system. The information would be used in emergency situations and for mitigation planning efforts. The project covered 12.7 miles of the Pine River and involved investigation of 124 structures. In addition to the HMGP awarded to the county, a basement was constructed in the rebuilding of the senior center to be used as a community shelter utilizing Section 406 funds.

FEMA-963-DR-WI

On September 18, 1992, the President declared a major disaster for Dane County as a result of severe storms and tornadoes that occurred on June 17. The Governor had requested a disaster declaration for Dane County on June 22, but was denied on the basis that the majority of damage occurred to insured structures. An appeal submitted on July 27 cited the tremendous burden already placed on the state by the numerous natural disasters that had already taken place during the year. Subsequently the President granted a disaster declaration for Public Assistance and Hazard Mitigation.

On June 17, 1992, a tornado touched down in southern Dane County just ten miles south of Madison. The F3 tornado touched down in the City of Fitchburg at the State of Wisconsin Oakhill Correctional Institute causing heavy to total destruction of the various buildings and equipment. More than 12 buildings at the prison farm were totally destroyed and two others sustained a 50% loss. Total damages, including inventory, livestock and machinery/equipment were set at more than $5.2 million. The tornado continued to travel northeast, destroying businesses and residences in its path. The storm damaged almost 200 homes, including 48 that were totally destroyed. The majority of homes destroyed and damaged were located in the Waubesa Heights subdivision within the Town of Dunn. Other private sector damages included damages to barns, outbuildings and sheds. Debris removal was also a concern.

Between 20 and 30 persons were injured, but fortunately there were no deaths. Contemplating the magnitude of the storm, it is significant that there were few injuries and no deaths. This was attributed to the fact that the storm occurred during the day and that there was adequate warning.

The costs incurred by government were estimated at $5.4 million with damages to individual property and agricultural losses at $9 million for total estimated damages of $14.4 million. Disaster assistance through the Public Assistance Program was provided to 12 applicants and totaled $2,600,142.

The Hazard Mitigation Survey Team Report prepared for FEMA-963-DR-WI identified 4 recommendations. Again, one of the recommendations dealt with building codes and standards similar to those identified in the previous report for FEMA-959-DR-WI. Several of the recommendations remain concerns today and are being addressed by

the State Hazard Mitigation Team through the planning process for this document. Some require additional research and will require legislative action. Others have opposition from various parties to implementation.

As a result of the declaration, the communities within the county were eligible for Section 404-Hazard Mitigation Grant Program funds. HMGP funds available totaled $376,374 with the federal share representing 50% or $188,187, a state share of 25% or $94,093.50 with a local match of 25% or $94,093.50. The state received 12 pre-applications from six communities totaling $836,405. Grants were awarded to the City of Sun Prairie and the Villages of Cross Plains and Deforest. The City of Sun Prairie received HMGP funds in the amount of $137,340. Fifty percent or $68,670 represented the federal share with the state providing 25% or $34,335. The city provided the remaining 25% plus additional funds in the amount of $91,021. The City of Sun Prairie received an initial grant for the development of a stormwater management plan. A subsequent award was then granted to implement one of the recommendations identified in the stormwater management plan. The Village of Cross Plains received a grant in the amount of $37,000 ($18,500 federal share, $9,250 state and local shares) for a clearwater infiltration abatement project. Finally, the Village of Deforest received a grant in the amount of $202,034 ($101,017 federal share, $50,508.50 state and local shares) for the development of a detention basin. In addition to HMGP, funds for construction of the basin were provided through a Community Development Block Grant in the amount of $200,049. Both the City of Sun Prairie and the Village of Deforest reported that these projects reduced damages during the flooding that occurred in May-June 2000. It is also worth mentioning that the City of Sun Prairie completed an all-hazards mitigation plan subsequent to receiving mitigation funds.

FEMA-964-DR-WI

On September 30, 1992, the President declared a major disaster for severe storms and flooding that occurred between September 14-24. This was the third federal disaster declaration granted for the state in less than two months. The declaration made Buffalo, Crawford, Jackson, Juneau, Pepin, Pierce, Richland, Sauk, Trempealeau and Vernon Counties eligible for Public and Individual Assistance as well as the Hazard Mitigation Grant Program.

The majority of the rain fell between September 14 and 18 with the heaviest rainfall occurring on the 16th. Precipitation reports showed a wide area across the central portion of the state received rainfall greater than 4 inches. Two areas recorded rainfall greater than 7 inches, one located in upper Buffalo and Trempealeau Counties and the other near Hillsboro just east of the Kickapoo Valley. Within these areas, there were isolated reports of 9 to 13 inches. A few farmers in the LaValle-Hillsboro region reported three-day amounts of 14-17 inches. Four rivers, the Pine River in Richland County, the Trempealeau River in Trempealeau County, the Baraboo River in Sauk County and the Kickapoo River in Crawford and Vernon Counties rose quickly. Many of the rivers crested at record levels, and some equaled or exceeded the 100-year flood elevation. Arcadia, Richland Center, Rock Springs, Viola and Gays Mills were evacuated as flood waters inundated or surrounded residences. The flooding forced

early closure of Farm Progress Days, which was a serious blow to the economy of the region.

Dozens of state, county and local roads were closed when swollen rivers and run-off flooded them. Numerous bridges were damaged or destroyed. A levee in Arcadia was greatly stressed and in danger of breaching. The Wisconsin National Guard assisted emergency officials and volunteers with sandbagging efforts. There was considerable damage in the City of Richland Center. Approximately 120 buildings were flooded. Due to previous mitigation, 50 to 70 residences were protected and suffered no damage. Damage assessment indicated that 19 homes received major damage, 174 minor and 132 were affected to a lesser degree.

The damages to and costs incurred by government were estimated at $1.9 million with damages to individual property and agricultural losses at almost $16 million for total estimated damages of $17.9 million. Disaster assistance through the Public Assistance Program was provided to 145 applicants in the amount of $2,821,355. Individual assistance was provided through the Individual and Family Grant Program in the amount of $126,402. In addition, Disaster Housing Grants and Small Business Administration low-interest loans provided assistance.

The Interagency Hazard Mitigation Team Report for FEMA-964-DR-WI identified 9 mitigation recommendations in the following areas: Flood Planning (2), Stream Maintenance (1) and Alert and Warning (6) as well as 19 site specific recommendations.

As a result of the declaration, the communities within the ten counties were eligible for Section 404-Hazard Mitigation Grant Program funds. HMGP funds available totaled $391,074 with the federal share representing 50% or $195,537, state share 25% or $97,768 with a local match of 25% or $97,768. The state received 25 pre-applications totaling $1,732,163. Based on a review of the submitted pre-applications, 8 applicants were asked to participate in the formal application process. Grants were awarded to the Cities of Blair (Trempealeau County) and Black River Falls (Jackson County). The City of Blair was approved for a HMGP grant in the amount of $109,144 for a dam improvement project on Lake Henry. Fifty percent or $54,572 represented the federal share, with the state and city providing 25% each in the amount of $27,286. In addition, the city received a Community Development Block Grant in the amount of $109,173, and a grant from the Department of Natural Resources in the amount of $43,460 for this project. The City of Black River Falls was awarded a grant in the amount of $281,930 for constructing storm sewers to alleviate flooding problems. The federal share represented 50% or $140,965 with the state and local shares of 25% or $70,482 each. In addition, the city also received a Community Development Block Grant in the amount of $43,971 to complete this project.

FEMA-994-DR-WI

Wisconsin experienced above normal precipitation across much of Wisconsin during April and May of 1993. Initially this began with prolonged periods of rain and heavy late season snowfalls, then as showers and thunderstorms. In early June, a weather pattern

developed that was characterized by a strong low-pressure system over the western United States and a large high-pressure system in the southeast. The jetstream dipped south in the western states and flowed northeasterly across the upper Midwest. The southeastern high blocked the eastward movement of storms, thus creating a convergence zone between the warm, moist flow from the Gulf of Mexico and the much cooler and drier air from Canada, which resulted in thunderstorms. As a result, the upper Midwest within this zone was deluged with rain through most of June and July. The persistence of this weather pattern caused unusually large amounts of rain to fall over the upper Midwest. These large accumulations and the wetter-than-usual spring produced flooding throughout the upper Mississippi River basin. Cumulative totals of 20-40 inches for the first seven months of the year were typical; putting totals 150-200% above normal.

This event would become known as the Great Midwest Flood, with nine states including Wisconsin declared a federal disaster area. The magnitude of the Great Midwest Flood to people, property, business, agriculture, tourism, and the environment, was unmatched by any other flood in the history of the country. Damages exceeded $12 billion with $747 million in Wisconsin. The Mississippi and Missouri Rivers would be closed to shipping and millions of acres of farmland were severely impacted.

The state incurred $800 million in agricultural-related damages. Cool, wet weather in 1992 combined with over $125 million in winterkill losses and a very wet spring made this one of the most disastrous periods in the state agricultural history. It was estimated that 804,800 acres of farmland suffered severe erosion due to the flooding. It would cost $11 million to implement all the land treatment practices needed to correct erosion damage. At least 4,700 homes were damaged and 2,500 people evacuated. Private business losses exceeded $31 million, most of it related to business shutdowns and damages to goods and supplies. Public damages reached $43.6 million. The state lost millions in tourism revenue and incurred costs for additional staff for public health services, unemployment claims for displaced workers and extensive use of National Guard and Conservation Corps services.

In Wisconsin, the disaster started with one of its wettest and most stormy months of June in memory. The first bout of severe weather occurred on June 7 and 8 when heavy rains and severe thunderstorms developed in the southern two-thirds of the state. The most damaging weather occurred in east central Wisconsin where tornadoes ripped through Green Lake and surrounding communities. Statewide the rains continued and were followed by an outbreak of tornadoes that occurred on June 17. That storm affected a band of counties extending from Grant County northeastward to central and east central counties. In addition to the damages caused by the high winds and tornadoes, rainfall of two to seven inches throughout the southern and western part of the state caused even greater problems on rivers and streams that were bank-full and soils that were still saturated from spring snowmelt and record precipitation during the month of May. Flooding occurred along the following rivers and tributaries: Black, Buffalo, Chippewa, Eau Claire, Fox, Kickapoo, Trempealeau, Wolf, Wisconsin and Mississippi. The National Weather Service issued flood watches and warnings almost

continuously. Several dams and levees failed, hundreds were evacuated and hundreds of millions of dollars in damages resulted.

Evacuations occurred in Jackson, Columbia, Trempealeau, Adams and several other counties as rivers made islands of residential and business areas. Both individual and municipal water supplies were contaminated along with collapsed mound and/or septic systems.

Significant structural damage to residences occurred in the Grove subdivision in the City of Black River Falls when the levee along the Black River failed. Approximately 90 structures were substantially damaged. The municipal sewer and water systems were also severely damaged. The city with a population of 3,500 received $45 million in damages. Damages to utilities were estimated at $6.5 million.

Over 250 members of the Wisconsin National Guard were on duty in the City of Black River Falls beginning on June 20. They assisted with flood fighting efforts, security and evacuation. On June 28 another 25 Guard members were activated to assist in sandbagging operations in the City of Prairie du Chien in Crawford County. Guard members and/or equipment such as water buffaloes and tankers were also used in numerous other communities. Guard helicopters assisted with overflights in assessing the severity of the situation throughout the area. Hundreds of volunteers also assisted in sandbagging efforts in the most critical areas around the state.

Literally hundreds of state, county and town roads were closed when swollen rivers and runoff flooded them. Local police, fire, public works and emergency management officials worked around the clock for more than a week monitoring dams and levees and taking emergency protective actions.

The preliminary damage assessment identified almost 1,600 homes that were affected by the flooding. In addition, emergency protective measures and damage to roads and bridges were confirmed at nearly $5 million.

On June 29 the Governor requested federal disaster assistance for 30 counties. Initial damage assessment figures compiled by the county emergency management offices indicated that disaster-related costs were $30 million in private damage, $20 million in public damages and $124 million in agricultural losses for a total in excess of $174 million.

On July 2,1993, the President declared a major disaster for 17 of the 30 counties as a result of flash flooding, heavy rains, severe storms and tornadoes that began on June 7. The counties included in the declaration included Calumet, Clark, Eau Claire, Green Lake, Jackson, Marquette and Trempealeau for both Public and Individual Assistance, and the Counties of Columbia, Dunn, Fond du Lac, Outagamie, Portage, Sauk, Waupaca, Waushara, Winnebago and Wood for Individual Assistance only.

Subsequent rainfalls in late June and July again caused serious damages this time in the basins of the Pecatonica and Yahara Rivers. An extreme example of localized flooding occurred on July 17-18 as a flash flood at the Baraboo River and Devils Lake. Over 12 inches of rain fell in a three-hour time period and exceeded the 100-year precipitation event by 3.6 inches. The flash flood washed away cars, roads, bridges and buildings, and resulted in the death of a twelve-year old when the car he was riding in was overturned and he was carried downstream. The Baraboo River rose ten feet in five hours, 6.75 feet above flood stage. Three of the City of Baraboo's wells were disabled, numerous highways closed and more than 2,300 campers evacuated. There was three to five feet of standing water throughout Baraboo. Damage to a major industry in the city was estimated at $1.5 million. Devils Lake State Park incurred significant damages and was closed for the first time in its history.

Working together, the Wisconsin National Guard, Wisconsin Conservation Corps and the Department of Corrections provided over 1,110 personnel for 4,340 man-days along with 125 vehicles and heavy equipment for over 10,770 hours in assisting on 62 projects in 14 counties.

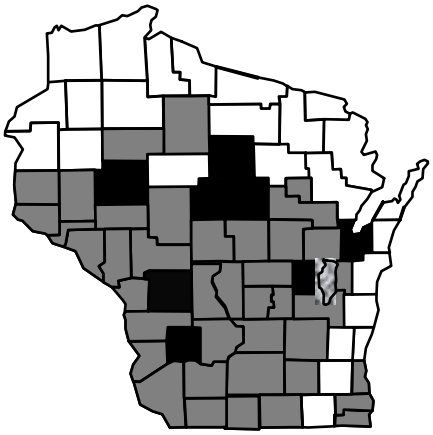
By August, the stalled weather pattern began to revert to more normal conditions. Finally, floodwaters receded around the state with the exception of the lower Rock River (Some of the above information was provided from the report on "The Floods of 1993: The Wisconsin Experience," prepared by the Wisconsin Department of Natural Resources).

On July 30, the Governor requested that FEMA waive the 25% state and local match for the Public Assistance Program, the 50% state and local match for the Hazard Mitigation Grant Program and the 25% state match for the Individual and Family Grant Program because of the duration, magnitude and severity of the 1993 flood disaster. Damages had been estimated at $175 million in total disaster-related costs in the Governor's initial request for disaster assistance June 29. Disaster losses were now estimated at $47 million in public and $700 million in private losses for a total of $747 million, with that amount increasing with each passing day. It would take the state years to recover. This disaster was unlike any the state had ever experienced. The request to waive the match requirements for the HMGP and IFGP were denied as the cost sharing requirements for both programs are set by law, therefore, they could not be adjusted. However, eventually FEMA increased the federal cost share for the Public Assistance Program for the nine states impacted by the Midwest Floods to 90% requiring only a 10% state and local match. This not only increased the amount of federal funding for eligible applicants of the Public Assistance Program, but also increased the amount of HMGP funds that would be available since the funding allocation was based on 10% of the amount of federal funds approved in the Public Assistance Program.

By the end of summer, 47 counties would be included in the declaration and made eligible for federal disaster assistance. Forty counties were declared for both Public and Individual Assistance, while another seven were eligible for Individual Assistance only.

All 47 counties were eligible for the Hazard Mitigation Grant Program. The incident period extended from June 7 to August 25.

Disaster Declaration
FEMA DR 994



Individual & Public Assistance
Adams, Buffalo, Calumet, Clark, Columbia, Crawford, Dane, Dodge, Dunn, Eau Claire, Fond du Lac, Grant, Green, Green Lake, Iowa, Jackson, Jefferson, Juneau, Kenosha, La Crosse, Lafayette, Marquette, Menominee, Milwaukee, Outagamie, Pepin, Pierce, Portage, Price, Racine, Rock, Rusk, Sauk, Shawano, St. Croix, Trempealeau, Vernon, Waupaca, Waushara, and Wood.

Individual Assistance Only
Brown, Chippewa, Lincoln, Marathon, Monroe, Richland, and Winnebago.

The Interagency Hazard Mitigation Team Report for FEMA-994-DR-WI dated July 23, 1993, identified 36 mitigation recommendations for 42 of the 47 counties in the following categories: Alerts and Warning (3), Education (7), Flood Planning (2), River/Stream Maintenance (1), site specific recommendations (21) and Technical Assistance (2).

Due to the magnitude of the Great Midwest Flood, on August 6, Congress approved HR 2667, a bill to provide $5.3 billion in supplemental disaster appropriations to federal agencies to assist state and local governments respond and recover from the widespread flooding. Eleven federal agencies would receive supplemental funds from this bill. FEMA received $2 billion. In addition, $200 million was awarded to the Department of Housing and Urban Development for Community Development Block Grants and $200 million to the Economic Development Administration for economic recovery and public works grants. These programs in particular would play an important role in the state's recovery from the devastating floods.

To ensure that the flood recovery would be rapid and well coordinated among the various agencies responsible for implementing recovery programs, a meeting was held with federal and state agencies on August 18 in conjunction with the Annual Governor's Conference on Emergency Management. Eighteen federal and state agencies were represented at the meeting. State agencies were required to provide weekly updates to WEM regarding status of the various recovery activities. Reports were consolidated and forwarded to the Governor's Office. WEM was the primary coordinating agency with FEMA.

On August 26 and 27, the Midwest Flood Disaster Workshop was held in Des Moines, Iowa to provide a forum for federal, state and local officials to discuss the short and long term needs and to begin to develop flood recovery plans. Representatives from WEM and the Department of Administration attended this workshop. The goals of the session were to:

- Devise a relief system to deliver the highest level of assistance and service to the maximum number of victims;
- Provide a quick response to the questions and technical needs of the providers of housing relief services; and
- Assess federal programs in light of the current situation.

To coordinate recovery efforts at the state level, FEMA and WEM conducted a meeting with various federal and state agencies and Regional Planning Commissions on September 19 to discuss a strategy for dealing with mitigation and long-term recovery. At the meeting it was determined that a core group of agencies would meet on a weekly basis to act as a clearinghouse for communities proposing long-term recovery projects. Other agencies were brought into the process as needed. The core group consisted of FEMA, WEM, the Economic Development Administration, the Department of Natural Resources, the Department of Administration, the Department of Development (Commerce) and the State Historical Society. The Farmers Home Administration, Natural Resources Conservation Service and the State Departments of Transportation and Industry, Labor and Human Relations (Workforce Development) would later join the group. The group would become known as the Wisconsin Interagency Disaster Recovery Group (IDRG) which continues to meet today in response to disaster declarations. The IDRG identified as its mission: "To develop a cooperative federal and state disaster recovery effort that can assist communities and regional agencies in utilizing all available funding sources to recovery from and mitigate the future effects associated with the damages from natural hazards." The objectives of the IDRG to achieve the mission were to:

- Serve as a clearinghouse for tracking and status reporting of disaster recovery project applications;
- Encourage and assist funding submissions from communities for recovery and hazard mitigation projects;
- Assure full utilization of all available and applicable funding sources for recovery and mitigation projects;
- Encourage the enhancement of recovery projects with hazard mitigation measures; and
- Assist in the avoidance of funding duplication for recovery and mitigation efforts.

Significant to the state's recovery was FEMA's establishment of the Wisconsin Interagency Hazard Mitigation Recovery Office (WIHRO). This office was set up in WEM headquarters and was staffed with a full-time FEMA staff person who worked closely with WEM staff and supported the efforts of the core group. Projects submitted to the core group were entered into a database developed and maintained by the WIHRO. The database acted as a central source of information and provided the status on all projects submitted to the agencies. The WIHRO staff grew to two and continued

to be staffed until 1996. It played a vital role in implementing mitigation projects within the state.

The Regional Planning Commissions (RPCs) in Wisconsin played an integral part in the recovery process. The Economic Development Administration funded Flood Recovery Coordinators in the RPCs to assist communities in developing grant applications for the various funding sources available, and to prepare Regional Flood Recovery Plans. In addition, FEMA provided technical assistance funds to supplement EDA's efforts with the RPCs. The RPCs worked with communities and agencies to clarify and/or obtain additional information on specific projects.

FEMA's priority was to fund projects that reduced future disaster losses through acquisition or relocation of properties most prone to flood damages. Although many other types of projects were funded through the various agencies on the IDRG, the group's priority also became acquisition, demolition, relocation and floodproofing of flood damaged property.

The Great Midwest Flood was a turning point for mitigation and in particular the Hazard Mitigation Grant Program. On December 3, 1993, the President signed the Hazard Mitigation and Relocation Assistance Act. This significantly increased funding in the HMGP in two ways. First, it increased the amount of funding for grants from 50% federal share to 75%. Second, allocation funding was increased from 10% of the federal share of the funds spent in the Public Assistance Program to 15% of the total estimated federal grant assistance provided under the Stafford Act (i.e., Individual and Public Assistance Programs). This would raise the amount of HMGP funds available in this declaration from an estimate of $2 million to over $14 million.

The database developed by WIHRO included 136 projects totaling $70 million that were reviewed by the IDRG. WEM received over 90 pre-applications for HMGP totaling $30 million. To assist the communities in their recovery efforts, the IDRG packaged several funding sources so that the community did not have to fund the required local match. The required local match was provided with CDBG funds through the Departments of Development (Commerce) and Administration. Following the priorities of the IDRG, HMGP grants were awarded to the following communities:

TABLE B-1 HMGP APPLICANTS FOR FEMA 994-DR

Applicant	County	Amount
Darlington, City of	Lafayette	$4,175,790
Eau Claire, City of	Eau Claire	$2,152,831
Eau Claire County	Eau Claire	$1,217,227
Jefferson County	Jefferson	$ 458,635
Pierce County	Pierce	$6,000,000
TOTAL		**$14,004,483**

This was the first declaration that acquisition/demolition and floodproofing projects were implemented utilizing HMGP funds, and it was not an easy task. The WEM had no prior experience with these types of projects, therefore, policies and procedures had to be established. In addition, several of the projects particularly in the City of Darlington had significant issues that had to be resolved prior to funding and implementation. This included issues involving relocation assistance per state law, environmental contamination, floodplain management compliance, historical and ADA (Americans with Disabilities Act) requirements. With the persistence, patience and coordination of the agencies involved and the applicants, these "roadblocks" were eventually overcome and the projects proceeded. As a result, 179 properties were mitigated; 156 properties (12 commercial) acquired and demolished and another 23 properties (21 commercial most of which were historic) floodproofed. Additional properties were mitigated utilizing CDBG funds provided through the Department of Administration. Through the Department of Commerce, CDBG funds were provided to many communities to implement mitigation measures to repair and reconstruct public facilities.

As stated previously, on June 20 an earthen levee that protected a portion of the City of Black River Falls referred to as the Grove subdivision failed. Floodwaters reached the ceiling of the first floor of many structures causing significant damage. As a result of the levee failure, the city received funds to reconstruct the levee to current standards for adequate protection in future events. Funds in the amount of $2,014,625 were provided in Section 406 mitigation funding through the Public Assistance Program to reconstruct the levee south of Highway 54 in the residential area referred to as the Grove. Additional funds from the Economic Development Administration and the State Department of Commerce (CDBG) provided for the construction of the levee north of Highway 54 protecting the downtown business area. The excellent cooperation and coordination among the state and federal agencies made this project possible.

The City of Darlington's mitigation program is a prime example of what can be achieved by long-term planning and cooperation of city officials, local business owners and concerned citizens as well as federal and state agencies. In the last 50 years, four major flood events occurred on the Pecatonica River causing substantial damage to homes and businesses, most recently in 1990 and 1993. After the 1990 flood, attention focused on alternatives to prevent future damage such as relocation, floodproofing and elevating structures. The city had developed a Master Plan in 1984. After the 1990 flood, the city updated the Master Plan to include flood mitigation strategies. The city completed a comprehensive flood mitigation plan with a grant provided by FEMA through WEM. Goals of both plans were to implement an extensive flood mitigation effort that would include historic preservation, economic development, downtown revitalization, recreation and tourism. The revised Darlington Master Plan was barely a year old and the Darlington Flood Mitigation Plan was in draft when the 1993 flood hit the city. The flood provided the impetus and a sense of urgency to finalize the flood mitigation plan.

Repeated flooding over time led to deterioration of many of the downtown buildings. City officials, citizens and business owners determined that they could no longer sit by

and let nature decide the future of their community. The city finalized the Flood Mitigation Plan that included not only floodproofing residential properties and acquisition and demolition of commercial floodplain properties (some with contamination), but also a downtown rehabilitation and mitigation project. Instead of moving the downtown businesses, the project included in-place floodproofing and rehabilitation of buildings. The city was the first community in the state to have a FEMA-approved mitigation plan. The first step was to inventory and collect survey data for structures in the floodplain. The Corps of Engineers, Natural Resources Conservation Service and WDNR all worked together to provide the flood data needed to estimate flood damages for the economic analysis. Next, the State Historical Society nominated Darlington's historic Main Street Central Business District to the National Register of Historic Places. The District includes 51 buildings within a six-block area. Next, a study was completed to identify flood mitigation measures for 41 buildings.

The approach taken in Darlington is characterized as innovative and unique. The approach in Darlington was to find a way for the government agencies, building and business owners and the city to arrive at a consensus on how to accomplish four major objectives: 1) preserve the historic downtown business district; 2) restore the downtown economic base; 3) develop an urban river open space park and recreation area; and 4) eliminate or substantially reduce flood damage in the future. With the assistance of many federal and state agencies the following mitigation measures were implemented:

- 12 commercial buildings were acquired and demolished adjacent to the river and the land used for riverfront park and recreation area. A 33-acre parcel on higher ground was developed as a business park for the relocated businesses;
- 52 residential structures were mitigated with some structures elevated and others had floodwalls constructed where raising the structure was not possible;
- 6 downtown businesses that could not be floodproofed or elevated were afforded as much flood protection as possible by raising or floodproofing building mechanics, electrical and plumbing;
- 13 historic downtown buildings were refurbished and floodproofed while maintaining their historic character; and
- A new wastewater treatment plant was constructed outside of the floodplain.

Benefits resulting from implementation of the mitigation recommendations are the significant reduction of future flood damages, quicker recovery following floods, capital improvements, economic development and revitalization of the downtown business community.

The city worked continuously and aggressively to implement their mitigation program. The city applied for and received over $10 million in various state and federal grants and loans to accomplish their goals. As a result of their efforts, the city has reduced the number of repetitive loss properties in the city from 11 to 2 (one rejected a mitigation

offer). The city was honored with a State Historical Society of Wisconsin Historic Preservation Achievement Award on May 9, 1998, and the architectural and engineering firm hired for the downtown floodproofing project received a state award for special categories through the Association of Building Contractors. The city continues to pursue funding to further their mitigation efforts. They have received additional grants and acquired and demolished a repetitive loss property as well as relocated the fire department outside of the floodplain. The City of Darlington is an example of what a small community can do with long-term planning and determination.

Another significant result of the declaration was that mitigation would take a more important role in emergency management. WEM created a position and hired a full-time hazard mitigation officer in August of 1994.

As a result of the declaration, almost $300 million in disaster relief was provided through the various state and federal programs. More than 4,500 individuals received disaster assistance through the FEMA programs making it the largest Individual Assistance Program in the state up to that point in time. More than 600 state and local governments and non-profits received disaster assistance through the Public Assistance Program. To date, this disaster generated the most funding for the state's Public Assistance and Hazard Mitigation Grant Programs.

TABLE B-2 SOURCES OF FEDERAL ASSISTANCE FOR FEMA 994-DR

Program	Amount
Agricultural Programs	$230,742,262
SBA Disaster Loan Program (individuals and businesses)	$ 10,394,929
Disaster Housing Grants	$ 3,944,158
Individual and Family Grant	$ 1,492,267
Public Assistance Program	$ 22,297,456
Hazard Mitigation Grant Program	$ 14,427,340
Community Development Block Grants	$ 5,008,911
Community Services Grants	$ 1,525,000
Federal Highway Administration	$ 1,019,309

FEMA-1131-DR-WI

On August 2, 1996, the President declared a major disaster for Fond du Lac and Green Counties as a result of tornadoes and flooding that occurred on July 17 and 18. The Governor requested both Public and Individual Assistance. However, the declaration was granted for Public Assistance only, as the majority of private sector damages were covered by insurance. Hazard Mitigation was also granted as part of the declaration. The Governor appealed the decision for Individual Assistance that again was denied. However, Green County was declared eligible for low-interest loans from the Small Business Administration.

In 1996 following a wet spring, a weather front stalled over southern Wisconsin and northern Illinois. This front produced torrential record rains along the state border on the evening of July 17 with Green County receiving eleven inches of rain in five hours. The heavy rain caused riverine flooding, flash flooding and sewer backup. Dozens of roads were damaged with many bridges destroyed.

The stalled weather system also generated a line of severe thunderstorms that moved through east central Wisconsin during the late afternoon and evening on July 18. Shortly after 7 p.m., a tornado touched down in the Village of Oakfield and the Towns of Oakfield and Byron in Fond du Lac County. The twister was classified as an F5 storm and left a path of destruction about one quarter mile wide and 15 miles long. There were nineteen injuries and more than 360 homes and businesses damaged or destroyed. Destroyed were two churches, a private school, a middle school and a major business. Thousands of trees were uprooted as well.

The costs and losses incurred by government were estimated to be $11.4 million with damages to individual property and agricultural losses at $49.7 million for total estimated damages of $61.1 million. Disaster assistance through the Public Assistance Program was provided to 33 communities and totaled $2,140,156.

The Hazard Mitigation Early Implementation Strategy Report dated August 14, 1996 outlined a four-phase approach for identifying and implementing appropriate mitigation strategies. The first phase was to reconvene the Wisconsin Interagency Disaster Recovery Group (IDRG) to assist the local governments during the recovery phase. This was done to provide technical assistance when possible; prevent duplication of efforts and funding; identify and prioritize mitigation measures and projects; and identify funding options for implementing mitigation measures whether through the individual agencies or by “packaging” various funding programs. Phase II included conducting briefings/meetings with local officials. This was done to discuss mitigation and various options available, introduce local officials to mitigation planning, and make them aware of potential funding programs. Phase III was to solicit pre-applications for the Hazard Mitigation Grant Program. Phase IV entailed a thorough review of the pre-applications submitted and selecting those projects for the HMGP formal application process.

In administering the declaration, greater effort was made to fund Section 406 mitigation opportunities through the Public Assistance Program. To further this effort, a federal mitigation staff person was assigned to be a liaison with Public Assistance (Infrastructure) staff and provide technical support. This liaison reviewed Damage Survey Reports (DSRs) for mitigation opportunities and provided the required benefit-cost analysis for the 406 mitigation projects.

A Recovery Information Center opened for one day in the Village of Oakfield and two Construction Information Workshops were held designed to inform local homeowners and building professionals of wind resistant construction practices. A document, Building to Resist Strong Winds, was developed by the mitigation staff and distributed at the workshops. In addition, a display demonstrating connectors along with catalogs and

installation guides were provided. It was estimated that 35 to 40 homeowners and 10 building professionals attended the workshops.

As a result of the declaration, the communities within Fond du Lac and Green Counties were eligible for the Section 404-Hazard Mitigation Grant Program funds. HMGP funds available totaled $344,527 with the federal share representing 75% or $258,395, a state share of 12.5% or $43,066 with a local match of the same amount. The state received eight pre-applications (three from Fond du Lac County and five from Green County) totaling $1,070,729. Grants were awarded to the City of Monroe and the Village of Oakfield. The City of Monroe received HMGP funds in the amount of $142,311 ($106,733 federal, $17,789 state and local shares) for the construction of a detention pond. Another grant was awarded to the Oakfield School District in the amount of $202,216 ($151,662 federal and $25,277 state share).

The Oakfield Middle School was destroyed in the tornado that struck the community on July 18. If school had been in session at the time of the tornado, there may have been many injuries and possibly deaths. The School District had the foresight to apply for HMGP funds to harden the new facility by strengthening and reinforcing the walls. Funds were provided to construct the interior and exterior bearing walls with reinforced masonry; construct the roof system with precast flat slabs on the low room areas; upper roof over the gymnasium/stage area was precast double trees; with the complete roof system tied into the masonry bearing walls with reinforcing steel and welded plate inserts. The hardened facility will not only reduce future damages, but will also provide protection to the students, faculty and others in the community during severe weather. The increased cost of construction over the original design was $233,000. The cost for the added protection was relatively small compared to the benefits that cannot be measured. This was the first time the state funded this type of project with HMGP funds.

FEMA-1180-DR-WI

On July 7, 1997, the President declared a Major Disaster for Milwaukee, Ozaukee, Washington and Waukesha Counties as a result of flooding that occurred on June 21-23. The declaration was granted for Public and Individual Assistance as well as Hazard Mitigation.

During the night of June 20 and the morning of June 21, 1997, a storm system passed through the southeastern portion of Wisconsin in the area of Ozaukee, Milwaukee, Washington and Waukesha Counties. This storm system generated torrential rains throughout this four-county area with rainfall ranging from five to nearly ten inches in a thirty-hour period beginning at 6:00 AM on Friday, June 20 and ending on June 21 at noon. Information from the “Rainfall Frequency Atlas of the Midwest” indicated that this was greater than a 100-year rainfall for this area. The most intense rainfall was centered in northern Milwaukee County and covered a 13 mile-wide, 18 mile-long band which included the extreme southern portion of Ozaukee County, southeastern Washington County and northeastern Waukesha County.

Between 3:00 and 11:00 AM on June 21, Flash Flood and Flood Warnings were issued for portions of the four counties. The Milwaukee County EOC set up a flood information hotline which received over 900 calls between Saturday morning and the following Monday (June 23).

The flooding was made worse by existing high-moisture conditions. Prior to the flooding rains, moderate rainfall amounts of from 1.5 to 2.0 inches were reported across the region in a 24-hour period on June 15-16. This earlier rain saturated the area soils. When the intense rainfalls of June 20-21 occurred, the ability of the soil to absorb rainfall was reduced and the amount of runoff was increased.

The torrential rain coupled with heavy urban runoff caused the drainage ditches, sewer systems, creeks and rivers to rise rapidly. Most of the larger rivers in the area reached and surpassed flood stage by midmorning on June 21. The Milwaukee, Menomonee, Fox and Sheboygan Rivers and Lincoln and Oak Creeks reported flooding levels during the morning. With the storm sewer system overloaded, sanitary sewers began to back up into residences throughout the area. Areas with significant damage included Mequon and Thiensville in Ozaukee County, Germantown in Washington County, New Berlin, Brookfield, Menomonee Falls and Sussex in Waukesha County and Brown Deer, Glendale and Wauwatosa in Milwaukee County. The Piggsville and Lincoln Creek areas in the City of Milwaukee were among the hardest hit. Milwaukee County received extensive damages to its parks and golf courses.

Thousands of homes were damaged due to overland flooding, stormwater drainage problems and sanitary sewer backups. Water was filling basements and in some cases reaching the first floor of the house. Hundreds of businesses along waterways and drainage creeks sustained damages and had to close for some time. Several roads were closed and electricity was lost as the storms passed through the area.

Initial damage assessments reported $71 million in damage to private property and $17 million to public property for a total of $87 million. As a result of the declaration, $6,164,209 was provided through the Public Assistance Program to 57 communities, state agencies and eligible private non-profit organizations. More than 14,000 individuals applied for Individual Assistance totaling over $37 million. This represents the largest Individual Assistance Program ever administered in the state. In addition, the declared counties received a special HUD (Housing and Urban Development) CDBG award in the amount of $4.1 million for unmet needs.

As in the previous disaster, greater effort was made to fund eligible mitigation measures through the Individual and Public Assistance Programs. For the first time, a Memorandum of Understanding (MOU) was developed for the declaration for implementing Section 406 mitigation opportunities. The MOU outlined the process and procedures that would be implemented in the declaration to ensure that all eligible mitigation opportunities were explored and funded through the program. The MOU was signed by Federal and State Hazard Mitigation and Public Assistance Officers as well as the State and Federal Coordinating Officers and the Deputy FCO for Mitigation.

For the first time, Hazard Mitigation Grant Program funds were eligible statewide. Available HMGP funds for the declaration totaled $6,265,003 with the federal share representing 75% or $4,698,752, a state share of 12.5% or $783,125 with a local match of the same amount. The state received over 60 pre-applications totaling $60 million. After discussion with the Wisconsin IDRG, the decision was made that projects consisting of acquisition and floodproofing would receive the highest priority for further funding consideration. Each pre-application was reviewed, scored and ranked based on the state's priorities. Nine communities were requested to participate in the formal application process, along with Milwaukee County for an educational project. After review of the formal applications, benefit-cost analyses and environmental review, the following applications were submitted to FEMA for approval:

TABLE B-3 HMGP APPLICANTS FOR FEMA 1180-DR

Applicant	County	Amount
Brookfield, City of	Waukesha	$ 222,075
Menomonee Falls, Village of	Waukesha	$1,886,927
Milwaukee, City of	Milwaukee	$1,613,000
Milwaukee County	Milwaukee	$ 40,000
Wauwatosa, City of	Milwaukee	$2,388,661
West Allis, City of	Milwaukee	$ 114,340
TOTAL		**$6,265,003**

All of the projects involved acquisition of flood damaged properties with the following exceptions. The City of Milwaukee's grant included some floodproofing in the Menomonee Valley area, and Milwaukee County's project was for the production of a mitigation video and brochure targeted at homeowners.

In August 1998, the applications were at FEMA Region V awaiting approval and obligation of funds when Milwaukee and Waukesha Counties again incurred significant damages from flooding. Many of the same structures damaged in the previous flood were flooded again, making some of them uninhabitable and substantially damaged. Subsequent to this second flood the above applicants received grant approval.

As projects were completed, unspent funds were reallocated to other projects. The City of West Allis' project involved the acquisition and demolition of one property. The property owner declined an offer, therefore, grant funds were withdrawn. Unspent funds from the Cities of West Allis and Wauwatosa were reobligated to Eau Claire County for the acquisition and demolition of a property that was substantially damaged as a result of flooding that occurred in September of 2000. Unspent funds from the Cities of Milwaukee and West Allis were reobligated to Milwaukee County to further their educational efforts. The County purchased a portable display booth that was used at the Wisconsin State Fair and Bay Shore Safety Days. In addition, unspent funds from the Cities of Wauwatosa and West Allis were reobligated to the City of Oak Creek for

the acquisition and demolition of one repetitive loss property that was substantially damaged as result of flooding that occurred in June 2000. The allocation for the declaration and funds approved totaled $6,265,003 with actual expenditures of $6,148,173. Appendix C identifies the projects and actual amounts awarded for the declaration.

FEMA-1236-DR-WI

On July 24, 1998, the President declared a major disaster for Buffalo, Clark, Crawford, Dunn, Grant, Jackson, LaCrosse, Monroe, Pepin, Pierce, Richland, St. Croix, Trempealeau and Vernon Counties as a result of high winds and severe storms that occurred on June 18-30. The Governor's request added Chippewa, Eau Claire and Rock Counties and included both Public and Individual Assistance. However, the declaration was granted only for Public Assistance for the above fourteen counties (initially Richland County was denied, but after appeal was included). Individual Assistance was denied on the basis that most of the private sector losses were covered by insurance. The Governor appealed the decision that denied Public Assistance for Chippewa, Eau Claire, Richland and Rock Counties, and Individual Assistance for all seventeen counties. The Governor also requested that Juneau, Sauk and Wood Counties be added for Public Assistance. The only request that was successful was the addition of Richland County for Public Assistance. All other requests were denied.

The disaster was the result of an extraordinary siege of severe weather during the period of June 18 through 30. Warmer than normal temperatures and high humidity levels, combined with a strong, relatively stationary jet stream, resulted in downburst winds, tornadoes, heavy rain and flash flooding. The Severe Storms Prediction Center issued 17 severe weather watches (12 for thunderstorms and 5 for tornadoes) during this time period. The average number of watches issued annually in the state is 38. In addition, the Wisconsin National Weather Service offices issued an equally significant number of severe thunderstorm and tornado warnings and flash flood watches and warnings, with that number equaling 60% of those issued annually in the state. The state was still reeling from the damages suffered in storms that occurred May 31. Thus, the severity of these later weather events amplified the difficulty of the situation and slowed recovery even more.

Hundreds of homes and farm structures sustained damage. Thousands of acres of trees on both public and private lands were blown down, creating a serious problem with debris. Power outages were as widespread as those experienced subsequent to the 1976 ice storm, with some areas without power for four to five days. Local utility crews from other states helped to restore service. Particularly hard hit were the numerous private non-profit rural electric cooperatives that serve the west central area of the state. They sustained millions of dollars of damage and needed many months to fully restore service to its pre-disaster status.

Heavy rainfall caused many streams and rivers to reach or exceed flood stage and forced the closure of numerous roads. A few rivers even exceeded the levels they rose to in the record 1993 floods. Many farm fields were flooded and some crops, such as

corn and soybeans were damaged in crucial stages of development. The basements of dozens of homes were flooded resulting in damage to furnaces and water heaters, and in some cases structural damage.

Initial damage assessments estimated there were $37 million in private and agricultural losses and $11 million to public property for a total of $48 million in damages. Public Assistance grants totaling $8,360,750 were awarded to 214 communities and private non-profit organizations.

The Mitigation Strategy Report, dated August 7, 1998, focused on coordination with other disaster assistance programs, mitigation project development and promotion of the NFIP's mitigation opportunities.

HMGP funds available for this declaration were $1,962,465 with the 75% federal share oF $1,471,849, a state share of 12.5% or $245,308 with the local match the same. The state received 24 pre-applications totaling $1.4 million. Each pre-application was reviewed, scored and ranked based on the state's priorities. The state convened the IDRG to discuss the pre-applications and establish priorities for HMGP funding.

As federal and state staff were administering the disaster assistance programs out of the Disaster Field Office located in La Crosse, significant flooding was occurring in the east central and southeast part of the state. As a result of those events, the state received a second Major Disaster Declaration in August for Milwaukee, Racine, Rock, Sheboygan and Waukesha Counties. A decision was made to pool the HMGP funds available from both declarations to be used to fund projects submitted under either declaration that met the state's priority (i.e., acquisition of flood damaged properties with those determined to be substantially damaged receiving the highest priority). None of the pre-applications submitted under declaration 1236-DR met the criteria. Therefore, pre-applications submitted under the second declaration that met these criteria received further consideration. Ten communities were asked to participate in the formal application process with eight of the ten returning applications. After review of the formal applications, benefit-cost analyses and environmental review, the following applications were submitted to FEMA and subsequently approved:

TABLE B-4 HMGP APPLICANTS FOR FEMA 1236-DR

Applicant	County	Amount
Brookfield, City of	Waukesha	$ 180,725
Elm Grove, Village of	Waukesha	$ 869,048
Menomonee Falls, Village of	Waukesha	$ 502,782
Milwaukee, City of	Milwaukee	$ 170,000
New Berlin, City of	Waukesha	$ 136,325
State Management Costs	WEM	$ 103,585
TOTAL		**$1,962,465**

All of the projects involved the acquisition of substantially damaged properties except for the Village of Menomonee Falls. The village identified sixteen properties for acquisition and had received an approved HMGP grant as a result of the previous year's declaration, however, there were not enough funds awarded to purchase all the properties. Therefore, the funds awarded under declaration 1236-DR were to supplement the previous grant award.

As projects were completed, unspent funds were reallocated to other projects. Unspent funds from the Cities of New Berlin and Milwaukee were used to fund construction of a retention pond in the Village of Thiensville. Funds allocated for the declaration and approved totaled $1,962,465 with actual expenditures of $1,767,681. Appendix C identifies the projects and actual amounts awarded for the declaration.

FEMA-1238-DR-WI

On August 12, 1998, the President declared a Major Disaster for Milwaukee, Rock, Sheboygan and Waukesha Counties for both Public and Individual Assistance as a result of severe storms and flooding that occurred August 5-7. Racine County was later added for Individual Assistance but was denied Public Assistance. In addition, the Hazard Mitigation Grant Program was made eligible statewide.

The disaster was the result of an extremely active severe weather pattern during the period of August 4 through 7 in the southern part of the state. The storms caused flash flooding and urban/small stream flooding, the majority of which occurred on August 5 and 6. A series of slow-moving thunderstorms affected the area over several days and dumped from five to ten inches of rain in a three to five hour period. The most severely impacted areas were the Cities of Sheboygan and Kohler in Sheboygan County, the eastern portion of Waukesha County, the northwest half of Milwaukee County, much of Rock County and the Town of Waterford in Racine County. Observed rainfall amounts in the City of Sheboygan were at least 10.7 inches, anywhere from 6 to 10 inches in Waukesha and Milwaukee Counties and 6 to 9 inches in Rock County.

The state was still in the recovery phase as a result of damages suffered in a May 31 severe weather (request for federal disaster assistance denied) and the June 18-30 storms. The severity of this event just amplified the situation making the recovery even slower.

The rain came so rapidly and intensely that sandbagging and pumping were ineffective. Creeks and rivers rose rapidly. Storm and sanitary sewers were overwhelmed by the intense rainfall. Tragically, two boys lost their lives in the Village of Elm Grove in Waukesha County as they were swept into a culvert and drowned in the drainage system. Another youngster in Rock County was pulled from a river and was in critical condition. Dozens of others were injured in the clean-up effort. Emergency response personnel were busy rescuing persons from stranded vehicles and evacuating homes and institutions.

Thousands of homes were damaged to one extent or another, hundreds of which had water above the first floor. Many of those sustained structural damage with basement walls bowing or collapsing. In the City of Sheboygan, which was particularly hard hit, an apartment complex was structurally damaged causing the long-term displacement of more than 100 residents. The flooding also affected hundreds of businesses, many of which sustained major damage and several of which permanently went out of business. Some of the same areas that had been hard hit the previous summer were again damaged in this event, making many structures substantially damaged.

Initial damage assessment figures reported $44 million in private losses and $11 million in public damages for a total of $55 million in disaster damages. $3,357,975 was awarded to 54 applicants for Public Assistance. A total of $26,518,526 was made available as Individual Assistance from the following sources: Loans from the Small Business Administration ($12,479,500); Disaster Housing Grants ($8,824,255); Individual and Family Grants ($5,147,127); the Disaster Unemployment Assistance Program ($3,253); and the Crisis Counseling Program ($64,121). The declared counties also received a Community Development Block Grant for $3,462,000 to address serious unmet needs.

The Mitigation Strategy Report dated August 21, 1998, identified activities to be implemented in the following areas: Community mitigation education and outreach; Coordination with other disaster assistance programs; Mitigation project development; and NFIP mitigation opportunities and promotion.

Hazard mitigation (HMGP) funds available for the declaration amounted to $4,450,421 with $3,337,816 representing the 75% federal share with the state and local match of $556,302 each. Recognizing that some of the hardest hit areas within Waukesha and Milwaukee Counties were the same areas affected by flooding the previous summer, mitigation staff knew there would be structures that would meet the criteria of substantially damaged under local floodplain zoning. Therefore, federal and state staff including DNR worked with local officials to make substantial damage determinations. This included having FEMA provide a training session for local officials, state WEM and DNR staff meeting with communities and DNR sending letters to each of communities requesting them to identify the substantially damaged structures. This information became the basis for project development for the HMGP.

The state received 45 pre-applications totaling over $50 million. Each pre-application was reviewed, scored and ranked. The IDRG reconvened and discussed the pre-applications and established HMGP funding priorities. FEMA and WEM staff was now faced with administering two declarations at the same time. The IDRG sought to fund those projects that included acquisition of flood damaged properties, with acquisitions of property determined to be substantially damaged under local floodplain zoning given the highest priority. In addition, the decision was made to pool the HMGP funds available from both declarations (1236 and 1238) to be used to fund projects that met the state's priority. None of the pre-applications submitted under 1236-DR met the criteria. Of the pre-applications submitted under 1238-DR, 16 were for acquisition and totaled $35

million. Ten communities were asked to participate in the formal application process with eight of the ten returning applications. After review of the formal applications, benefit-cost analyses and environmental review, the following applications were submitted to FEMA and subsequently approved.

TABLE B-5 HMGP APPLICANTS FOR FEMA 1238-DR

Applicant	County	Amount
Brown Deer, Village of	Milwaukee	$1,304,650
Darlington, City of	Lafayette	$ 196,841
Kenosha County	Kenosha	$ 885,000
Menomonee Falls, Village of	Waukesha	$ 117,705
Sheboygan, City of	Sheboygan	$1,850,000
State Management Costs	WEM	$ 117,705
TOTAL		**$4,450,421**

The grants in the Village of Brown Deer and the City of Sheboygan involved the acquisition of substantially damaged properties. Again, the grant for the Village of Menomonee Falls was awarded to supplement previous grants to enable the Village to complete the acquisition of sixteen properties. The City of Darlington's grant was also awarded to supplement a previous grant so that they could complete the extensive mitigation project underway in that community since 1993. Since the 1993 flood, Kenosha County has aggressively pursued funding for mitigation efforts along the Fox River. As a result, the county was awarded a grant for acquisition and demolition of structures along the Fox River that have repeatedly received flood damages.

As the projects were completed, any unspent funds were obligated to other projects incurring funding shortfalls, as well as to new projects identified in subsequent events.
As a result, a grant was awarded to the Village of North Fond du Lac for the acquisition and demolition of two properties one which was a repetitive loss site. In addition, additional funds were awarded to the Village of Thiensville for the construction of a retention pond. Funds allocated for the declaration and approved totaled $4,450,421 with actual expenditures of $4,392,207. Appendix C identifies the projects and actual amounts awarded to date for the declaration.

FEMA-1284-DR-WI

On August 16, 1999, the President declared a major disaster for Ashland, Bayfield, Douglas, Florence, Iron, Oneida, Price, Rusk, Sawyer and Vilas Counties as a result of severe storms, straight-line winds and flooding that occurred July 4-31 for Public Assistance. The Hazard Mitigation Grant Program was made eligible statewide.

On July 4 and 5 a strong thunderstorm accompanied by high winds dumped torrential rains and caused flash flooding in Bayfield County. More than four inches of rain fell in a very short time in various parts of the county, seriously impairing road systems.

Another incident occurred on July 8 when strong thunderstorms dumped more than two inches of rain in Rusk County. The next major episode affected Florence County. Several parts of the county received over seven inches of rain over a six-hour period on July 15 and an additional two inches on July 16. The combined rains and resulting flash flooding had a devastating impact on the affected townships and residents.

On July 23, Rusk and Sawyer Counties were struck by strong early morning thunderstorms. Significant rainfall occurred and straight-line winds caused power outages. A combination of weather systems on July 25 led to continually redeveloping storms for several hours, which affected an even larger area of the state. Heavy rains and high winds occurred once again in Rusk, Sawyer and Bayfield Counties, but with an even more severe effect on Douglas County. Reports of four and five inches of rain were common and the resulting flash floods washed out roads, bridges and culverts. Several small communities such as Solon Springs in Douglas County waited nervously for the storms and rain to subside as homes and businesses were put at risk by the sudden downpour.

The final episode was on July 30. Thunderstorms produced strong wind gusts of more than 75 miles per hour and rainfall averaging one to two inches over a widespread area. Many of the areas hit were the same counties that were ravaged by the previous episodes of severe weather. In Rusk, Douglas and Sawyer Counties downed trees and power lines and washed out roads were once again very common. The storms' intensity persisted as they traveled eastward and wrecked further havoc in Oneida, Vilas and Florence Counties. Tragically, this storm killed three people and inflicted dozens of injuries as trees fell on people and homes.

The collective impact of the series of storms was tremendous especially to the infrastructure of the very sparsely populated, poor, rural communities in these counties. Roads were severely damaged with washouts, scouring, culverts washed away and bridges destroyed. Getting the main roads passable was a tremendous burden on towns that often had a one or two person road crew. Because of the multiple storms, some roads or sections of road were repeatedly damaged, with crews just completing repairs only to have them washed out again several days later. Many persons were forced to take alternate routes of travel driving literally hundreds of miles out of their way to get to their destinations.

High winds and tornadoes also blocked roads with debris. In Oneida and Vilas Counties especially, debris was just shoved to the side of the major roads so as to provide emergency access. It was many weeks before the debris along the right of way was totally removed. Even after cleanup of the roads and right of ways, there remained hundreds of acres of downed timber on private land and local, county, state and national forests. This downed timber created a danger for forest fires that continued into 2000. In light of the fact that it was prime camping season, the state was very fortunate that more campers and park users were not killed or injured. The high winds also took their toll on rural electric cooperatives. There were many downed power lines and utility lines.

Dozens of homes were also affected by the severe weather. In some counties such as Douglas and Florence many residents reported basement flooding. Others experienced water in living areas. In Solon Springs in Douglas County, the St. Croix Lake was so high that homes were surrounded by water. Another problem was contamination of water supply wells due to flooding. Falling trees and high winds damaged dozens of homes and farm buildings. Thousands of residents and businesses were affected by the widespread power outages. Initial damage assessment figures reported $1.5 million in losses to private property and $6.5 million on public damages for a total of $8 million. A total of $5,158,534 in Public Assistance grants were awarded to 167 applicants.

The Mitigation Strategy Report dated August 24 identified activities to be implemented in the following areas: Community mitigation education and outreach; Coordination with other disaster assistance programs; Mitigation project development; and NFIP mitigation opportunities and promotion.

HMGP funds available for the declaration amounted to $812,059 with $609,044 representing the 75% federal share and a state and local match of $101,529 each. The state received twenty pre-applications totaling $4,438,999. Each pre-application was reviewed, scored and ranked. The IDRG reconvened and discussed the pre-applications and established HMGP funding priorities. After discussion with the IDRG, a decision was made to ask eight applicants (thirteen applications) to participate in the formal application process. Two applicants withdrew. After review of the applications and benefit-cost analyses, the recommendation was made to fund projects as follows:

TABLE B-6 HMGP APPLICANTS FOR FEMA 1284-DR

Applicant	County	Amount
Florence, Town of	Florence	$250,240
Head of the Lakes Electric Coop.	Douglas	$235,760
Superior, City of	Douglas	$320,000
State Management Costs	WEM	$ 6,059
TOTAL		**$812,059**

Based on the funding available and project costs, the applicants are providing greater than the required 12.5% local match. The Town of Florence received a grant for the purpose of a constructing a new municipal well; the Head of Lakes Electric Cooperative replaced 6.3 miles of existing overhead power lines to underground; and the City of Superior for costs of construction of a 700-foot storm water interceptor sewer to connect to the existing storm sewer. In addition, two of the applications (Village of North Fond du Lac in Fond du Lac County and Village of Thiensville in Ozaukee County) were funded under declarations 1236 and 1238 with unspent funds from other projects. Funds allocated for the declaration and approved totaled $812,059 with actual expenditures of $806,041. Appendix C identifies the projects and actual amounts awarded to date for the declaration.

FEMA-1332-DR-WI

On June 23, 2000, the President declared a major disaster for 12 counties as a result of severe storms, straight-line winds and flooding that began on May 26. By the end of the incident period (July 19), thirty counties had been included in the declaration: Thirteen counties for both Public and Individual Assistance (Columbia, Crawford, Dane, Grant, Iowa, Juneau, Kenosha, Lafayette, Milwaukee, Richland, Sauk, Vernon and Walworth); Fourteen for Public Assistance only (Adams, Ashland, Barron, Burnett, Forest, Green, Iron, Jackson, Monroe, Oneida, Polk, Rusk, Sawyer and Washburn); and another three (Dodge, Racine and Waukesha) for Individual Assistance. The Hazard Mitigation Grant Program was made eligible statewide.

The disaster started after a very wet month of May. The National Weather Service indicated that it was the wettest month ever for most locations in southern Wisconsin going back through the weather books to 1870. Generally, 8 to 11 inches were measured, with some locations in eastern Iowa and Dane Counties unofficially receiving between 16 and 18 inches. The wet, rainy weather culminated in a series of severe thunderstorms and heavy rains that began May 26 and continued into early June.

The storms produced record rainfalls, tornadoes and hurricane force winds. From 9:00 p.m. on May 29 through 8:00 p.m. on June 2, between 8 and 10 inches of rain fell along a line from southern Vernon County through northern Richland County to central Sauk County, over northwest Iowa County into northwest Dane County and over northern Lafayette County. Because soils were already saturated, the heavy rains pushed most mainstream rivers over flood stage and caused severe and widespread flooding.

Three tornadoes were documented on June 1, in Dodge, Juneau and Monroe Counties. The one in Dodge County, an F2, occurred just after 6:00 p.m. and was on the ground for more than 16 miles. The tornado destroyed or did major damage to several dozen homes in Iron Ridge, a small community of 800 in Dodge County. Elsewhere, there were notable downbursts or wind gusts in the 75 to 100 mph range, accompanied by hail as large as golf balls. Rains reappeared on June 3-4 and added another one to two inches to already saturated soils.

The collective impact of these series of storms was tremendous, especially to the infrastructure of the counties. For many of the communities, roads were severely damaged with washouts, scouring, culverts washed away and bridges destroyed. Just getting the main roads passable was a tremendous burden on the towns, which sometime have a one or two person road crew. Because of multiple storms, some roads or sections of road were damaged repeatedly, with crews just effecting repairs, only to have them washed out again several days later.

High winds and tornadoes also blocked roads with debris and downed power and utility lines. In Juneau and Monroe Counties especially, debris was just shoved to the side of the major roads so as to provide access for emergency vehicles and power crews. It was weeks before debris along the right-of-way was totally removed. This was of great concern to local officials and residents, as many of the roads were nothing more than

narrow fire lanes, and the debris made the roadways even narrower. Even after the cleanup, there remained acres of downed timber and debris on private land and in local, county and state forests.

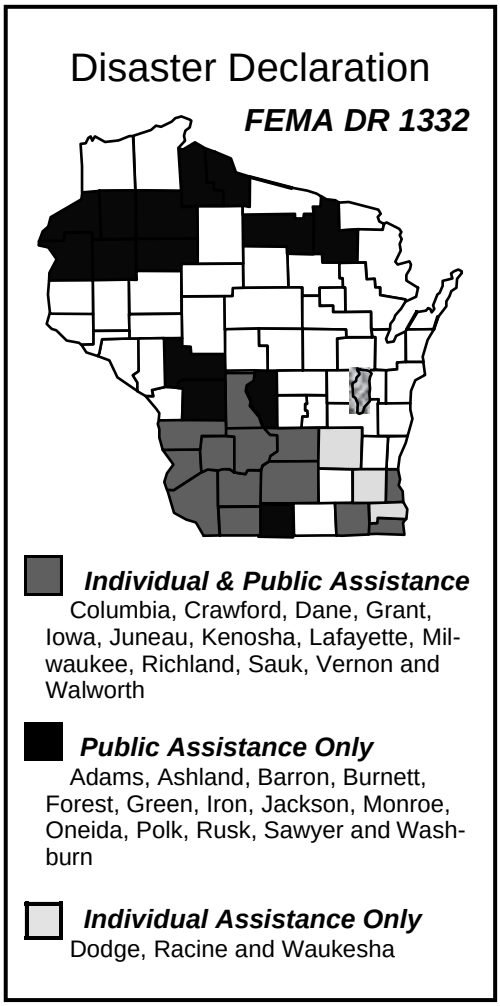
The high winds and flooding also impaired electrical service and took their toll on the rural electric cooperatives. Power crews did a commendable job of restoring service, considering the multiple events, the widespread area of impact and the condition of the roadways. Phone service was also affected, mostly by the rain, and it took at least 2 weeks to have all service fully restored.

Dozens of homes were also affected by the flooding and severe winds. In the majority of the counties, basement flooding was common, jeopardizing furnaces and water heaters. Grant County reported a dozen or more homes that had major damage or were destroyed. Several communities reported sewer back up in residences. Still others had access problems, as roads were either blocked with debris, inundated with water or had bridges washed away. Private well contamination and septic tank problems were reported. Thousands of residences and businesses were affected by the widespread power outages and even those citizens whose structures sustained no physical damage, had to deal with spoiled food or commodities. Shelters were opened, as necessary, in the affected areas to accommodate those displaced from their homes or to serve as relief stations for those involved with the cleanup.

Initial damages assessment figures reported $11.4 million in private property and $17.3 million in public damages for a total of $28.7 million. A preliminary damage assessment was completed for sixteen counties. On June 13, the state requested that Public Assistance be made available to sixteen counties and Individual Assistance for ten of the counties plus contiguous counties.

Another major storm system moved across southeastern corner of the state on June 12 and 13. Kenosha and Walworth Counties received 3 to 5 inches of rain on already heavily saturated soils. Since the Governor's original request, rains continued to fall across southern Wisconsin. In Kenosha, damages were countywide and the County Executive declared a State of Emergency. At one point, more than 100 roads were closed due to high water with 41 county roads remaining closed for several days. Property owners reported losses due to basement flooding, sewer backup and backed up wells. A boating unit assisted with evacuations of a mobile home park in Pleasant Prairie and homes in the Town of Somers. Several communities in Walworth County were also impacted. One village evacuated 100 residences bordering a rapidly rising retention pond. The request included Public Assistance for all three counties, and Individual Assistance for Kenosha and Walworth. The Governor amended his request on June 14 to include the Counties of Jackson, Kenosha, and Walworth.

On June 23, the President declared twelve counties from the Governor's original request eligible for Public Assistance only. On June 28, FEMA advised that Individual Assistance was not granted, as it was determined that the impacts to individuals were not beyond state and local capabilities.



The Governor appealed the above decision on June 30, as additional damages were uncovered in several counties, including Dane, Grant, and Kenosha. The appeal requested that FEMA re-evaluate the information and make Individual Assistance available to the twelve counties and all contiguous counties.

On June 30, the disaster declaration was amended to add Columbia, Kenosha, Jackson, and Walworth Counties for Public Assistance only. Subsequent to the Governor's appeal, on July 11 Crawford, Dane, Grant, Kenosha, Milwaukee, Vernon and Walworth Counties were all declared eligible for Individual Assistance.

On July 2, storms roared through southeastern Wisconsin. Strong winds and heavy rains (4 to 6.5 inches) with the subsequent loss of power caused water and sewage to backup in nearly 7,000 homes. That storm also spawned a F1 tornado that affected the City of Oak Creek and portions of northern Racine County. On July 10, the WEM Division Administrator on behalf of the Governor asked that both Public and Individual Assistance be extended to Milwaukee County, and Public Assistance in Racine County. In addition, he requested that the incident period be extended to July 5. Ironically, the incident period was closed effective July 5. However, on July 8 and 9 the state once again experienced another 4 to 10 inches of rain that resulted in flash flooding in many of the same areas already included in the declaration. In Sauk, Vernon and Crawford Counties, roads affected in the earlier storms were once again damaged, in some cases more severely. With soils saturated and rivers and lakes at or near flood stage, most of the southern half of the state remained at risk with damages occurring with each storm event. More damages were reported in Barron, Burnett, Forest, Oneida, Polk, Rusk, Sawyer and Washburn. On July 12 the Governor requested that the incident period be reopened.

On July 13, Public Assistance was extended to Milwaukee County. This would be the third presidential disaster declaration in four years for the county. On July 13, the WEM Division Administrator requested that in addition to Public Assistance, that Individual Assistance also be granted to Racine County. Effective July 18, Racine County was made eligible for Individual Assistance, but denied Public Assistance. In addition, the Counties of Richland and Sauk were also made eligible for Individual Assistance as a result of the Division Administrator's request the day before.

As a result of the storms that occurred over the weekend of the 10th, ten sparsely populated counties in the northern half of the state were seriously impacted, sustaining almost $2 million in Public Assistance costs with almost $1 million in road damages. Therefore, on July 17, the Division Administrator requested that Ashland, Barron, Burnett, Forest, Iron, Oneida, Polk, Rusk, Sawyer and Washburn Counties be included in the declaration for Public Assistance. On July 18 the request was granted and the incident period was closed effective July 19.

Based on calls received on the FEMA teleregistration number, on July 21 the State Coordinating Officer requested that Individual Assistance be granted to Columbia, Iowa, Juneau and Waukesha Counties, and on August 8 for Juneau County. The requests were granted on July 26 and August 9. As a result of the severe weather extending from May 26 through July 19, the final count was 30 counties included in the federal declaration. Thirteen counties were declared for both Public and Individual Assistance, fourteen for Public Assistance only, and three counties for Individual Assistance only.

Under the Disaster Housing Program, 4,139 individuals were eligible for assistance with more than $6 million disbursed. In the Individual and Family Grant Program, 4,033 applications have been approved for the program with over $4.5 million issued to disaster victims making it the second largest IFG program in terms of dollars for the state. The Public Assistance Program received 447 applications for disaster assistance totaling to date $13,857,393.

The Mitigation Strategy Report dated July 17, 2000, identified activities to be implemented in the following areas: Community mitigation education and outreach, coordination with other disaster assistance programs, mitigation project development and National Flood Insurance Program mitigation opportunities and promotion.

Hazard Mitigation (HMGP) funds available for the declaration are $4,424,019 with $3,318,014 representing the 75% federal share with the state and local match of $553,002.50 each. Pre-applications for the program were mailed to potential applicants on September 5 with a due date of October 9. The state received 89 pre-applications totaling $29.8 million. The pre-applications were categorized as follows:

TABLE B-7 HMGP PRE-APPLICATIONS FOR FEMA 1332-DR BY TYPE

Number	Type	Amount
13	Acquisition	$14,225,523
17	Detention	$ 8,327,638
7	Sewer	$ 1,658,966
7	Drainage	$ 2,310,000
32	Road Related	$ 1,244,790
12	Miscellaneous	$ 2,014,120
1	Ineligible	$ 1,800
89	**TOTAL**	**$29,782,837**

Each pre-application was reviewed, scored and ranked. Based on the funding priorities previously established by the Interagency Disaster Recovery Group, those communities that applied for acquisition were requested to participate in the formal application process. Formal applications have been forwarded to 9 additional communities with proposed projects that were feasible and addressed state mitigation priorities. A total of 16 completed formal applications were returned. After review of the applications and benefit-cost analyses, the recommendation was made to fund the projects as follows.

TABLE B-8 HMGP APPLICANTS FOR FEMA 1332-DR

Applicant	County	Amount
Baraboo, City of	Sauk	$ 150,000
Crandon, City of	Forest	$ 110,000
Cumberland, City Municipal	Barron	$ 380,520
Dane Co. Emergency Mgmt.	Dane	$ 33,000
Eau Claire, City of	Eau Claire	$1,488,562
Elm Grove, Village of	Waukesha	$ 943,638
Jefferson County	Jefferson	$ 555,743
Kenosha County	Kenosha	$ 643,997
Shell Lake, City of	Washburn	$ 50,000
Sun Prairie, City of	Dane	$ 30,000
State Management Costs	WEM	$ 38,559
TOTAL		**$4,424,019**

Four applications involved acquisition and demolition, one demolition only, one relocation/floodproofing, three retrofit projects, one structural and one planning grant. The Jefferson and Kenosha Counties and the Village of Elm Grove used the grant funds to further their ongoing acquisition programs. The City of Eau Claire incurred significant damages from storms and flooding that occurred in September 2000. The State requested and was denied a federal disaster declaration. However, the State was able to award HMGP funds to the City for the acquisition of ten homes that suffered major damages. Other projects involved burying overhead power lines, construction of a storm sewer, relocating a picnic shelter, installing back flow valves and installing surge protectors on warning sirens. Funds allocated for the declaration and approved totaled $4,424,019 with actual expenditures of $4,045,602. Appendix C identifies the projects and actual amounts awarded to date for the declaration.

FEMA-3163-EM-WI

On January 24, 2001, the President declared a state of emergency in the State of Wisconsin. The declaration was based on emergency measures performed to save lives and protect public health and safety resulting from record/near record snow on December 11-31, 2000. Dane, Door, Green, Kenosha, Kewaunee, Manitowoc, Milwaukee, Racine, Rock, Sheboygan and Walworth Counties for emergency protective

measures (Category B) under the Public Assistance program for a period of 48 hours. Later Columbia, Ozaukee and Waukesha counties were added to the emergency.

FEMA-1369-DR-WI

On May 11, 2001, the President declared a major disaster for 17 counties as a result of flooding and severe storms that began on April 10th. By the time the incident period would close on July 6th an additional 15 counties would be added to the declaration for a total of 32 counties. Eighteen Counties would be declared for both Individual and Public Assistance, and another 14 for Public Assistance only.

Heavy December snowfalls contributed to spring flooding. In mid-April, rain and snowmelt caused the Mississippi River and many of its tributaries to flood. Floodwaters along the Mississippi River from Alma to Prairie du Chien rose to the highest levels since 1965. Spring snowmelt flood outlooks issued by the National Weather Service in March indicated that minor to moderate flooding could be expected along the Mississippi River, assuming normal precipitation and temperatures. However, a cooler than normal spring was not conducive to a gradual snowmelt in the northern reaches o the river basin. Warmer weather in early April resulted in a sudden melt and combined with persistent rainfalls, the Mississippi River began to swell. Early in the week of April 8th, the NWS issued statements indicating the gravity of the situation and communities all along the River began an intense flood-fighting effort.

The River crested at near record stages in most Wisconsin locations during the week of April 15th and then slowly began to recede. The recession was short-lived, however, when additional heavy rains and snowfall in the northern reaches of the river basin caused the River to rise gain. It crested for the second time in most locations during the last week in April, and remained above flood stage for weeks.

In northern Wisconsin, snowmelt flooding saturated the sandy soils and water tables rose. Persistent showers during the first weeks in April kept those levels high and then heavy rains, from 3 to 5 inches, snow and ice the weekend of April 21 and 22 brought the situation to disastrous proportions. Rivers and creeks quickly exceeded flood stager and lakes overflowed.

The prolonged flood fighting efforts took their toll, not only financially, but also emotionally on the affected communities and individuals. Millions of dollars were spent on emergency protective measures to protect property and save lives. Damage to infrastructure was significant as was the damages to municipal, county, and state parks, forests and recreational areas. Two of the State's historical properties, Villa Louis in Prairie du Chien and Stonefield in Cassville, sustained damage.

More than 2,000 residences were damaged with varying levels of water in them. More than 200 businesses were impacted, including 100 that closed due to the flooding. Even those businesses that did not sustain physical damage suffered economic loss with the closure of the Mississippi River to all traffic. The same was true of the affected

communities, most of which thrive on the commerce provided by the River and the tourism industry.

The scope of the disaster expanded when severe storms hit the west-central and east-central areas of the State on June 11 with hurricane-force winds, several tornados, golf and baseball size hail and heavy rains. More than 30 counties reported damage totaling more than $11 million. One week later on June 18th, a F3 tornado hit Burnett and Washburn Counties. This tornado touched down near Grantsburg and continued traveling east for over 25 miles to an area just outside of Spooner. There was extensive damage and destruction along the tornado's path. The tornado destroyed much of the small community of Siren with a population of 874. Damage was concentrated in a six-block wide where numerous homes and businesses were completely leveled, 3 people killed and 16 people injured.

Under the Housing Program over $1.6 million was distributed to almost 1,100 households. A total of $707,028 was distributed to 250 applicants under the Individual and Family Grant Program. WEM received 518 applications from local governments for Public Assistance and distributed $25,854,670 through the program making it the largest Public Assistance Program to date. The Small Business Administration provided more than $20 million in low-interest home repair loans, business damage loans and business economic recovery injury loans.

The Mitigation Strategy dated June 2, 2001, identified activities that included identifying and cataloging mitigation opportunities in the impacted communities; implementing acquisition, relocation, demolition, and/or floodproofing mitigation measures; maximizing financial resources for mitigation opportunities; and ensuring long-term mitigation through comprehensive floodplain management and local building practices.

For the first time, there was an opportunity to document the benefits of past mitigation efforts. Pierce County received a HMGP grant after the 1993 flood to acquire fifty-nine properties located on Trenton Island, which is located in the middle of the Mississippi River. Another 7 properties sold to the Red Wing Area Fund, a local conservation group. A flood that occurred in 1997 as well as the flooding in 2001 illustrated the benefits of the buyout program. The extensive losses caused in 1993 would have been multiplied in the 1997 and 2001 floods and in future floods if the homes and businesses participating in the buyout program had remained on the island. To demonstrate the benefits of the program, a success story was developed on the Trenton Island project. The story, as well as other success stories, can be found on WEM's website at http://emergencymanagement.wi.gov and FEMA Region V's website at www.fema.gov/mitigationbp/sstoryfind.do.

Hazard Mitigation (HMGP) funds available for the declaration were $4,390,075 with $3,292,556 representing the 75% federal share with the state and local match of $548,759.50 each. WEM received 74 pre-applications for project grant funds totaling over $25 million. The pre-applications were categorized as follows:

TABLE B-9 HMGP PRE-APPLICATIONS FOR FEMA 1369-DR BY TYPE		
Number	**Type**	**Amount**
12	Acquisition	$ 6,730,357
6	Floodproofing-Elevation	$ 457,417
11	Drainage/Detention	$ 5,476,171
9	Sewer	$ 6,116,196
9	Miscellaneous	$ 646,668
20	Road Related	$ 2,221,770
7	5% Special Projects	$ 3,467,370
74	**TOTAL**	**$25,115,949**

After reviewing, scoring and ranking the applications, 19 communities were requested to participate in the formal application process. Upon review of the applications and completion of the benefit-cost analyses the following applications were submitted to FEMA and approved for funding.

TABLE B-10 HMGP PROJECT GRANT APPLICANTS FOR FEMA 1369-DR		
Applicant	**County**	**Amount**
Burnett County	Burnett	$ 29,425
Crawford County	Crawford	$ 713,548
Dairyland Electric Power Coop.	Vernon	$ 12,000
Douglas County	Douglas	$ 93,600
Grant County	Grant	$ 471,850
Grant County	Grant	$ 20,770
Jefferson County	Jefferson	$ 336,845
Juneau County	Juneau	$ 169,436
Kenosha County	Kenosha	$ 414,500
Dept. of Natural Resources	State	$ 96,450
Shell Lake, City of	Washburn	$ 250,000
Superior, City of	Douglas	$ 86,317
Trempealeau County	Trempealeau	$1,059,000
State Management Costs	WEM	$ 333,811
TOTAL		**$4,087,552**

This was the first declaration that communities were eligible to apply for funds for the development of an all hazards mitigation plan. Based on 7% of the HMGP funds planning grants were awarded as follows:

TABLE B-11 HMGP PLANNING GRANT APPLICANTS FOR FEMA 1369-DR		
Applicant	**County**	**Amount**
Burnett County	Burnett	$ 60,000
Dane County	Dane	$ 40,000
Douglas County	Douglas	$ 53,333
Grant County	Grant	$ 50,000
Juneau County	Juneau	$ 20,000
Shell Lake, City of	Washburn	$ 19,000
Superior, City of	Douglas	$ 55,000
Sun Prairie, City of	Dane	$ 5,190
TOTAL		**$302,523**

Funds allocated for the declaration and approved totaled $4,390,075 with actual expenditures of $4,009,852. Appendix C identifies the projects and actual amounts awarded to date for the declaration.

FEMA-1429-DR-WI

On July 19, 2002, the President declared a major disaster for Adams, Clark, Dunn, Marathon, Marinette, Portage, Waushara, and Wood Counties for Public Assistance as a result of heavy rains, flooding and severe storms that took place June 21-25.

Severe weather began on June 21 with tremendous rainfall in central Wisconsin caused by a nearly stationary warm front. Heavy and persistent rains continued into June 22, with totals being reported anywhere from 5 to 15 inches. Intermittent rainfalls occurred over the next several days further saturating soils and keeping river levels and water tables high. The National Weather Service issued numerous flash flood watches and warnings throughout the period. On June 23, a cold front associated with the weather pattern triggered another bout of severe weather, including heavy rains and a tornado. Marinette County was hardest hit by this event, with flash flooding doing substantial damage to the infrastructure in the City of Marinette and the Village of Crivitz. Homes and businesses also sustained various degrees of damage. On June 25, another storm occurred with high winds and heavy rains. In Clark County, the City of Abbotsford was particularly impacted, with several businesses and homes sustaining tornado damage. Numerous trees were downed and two minor injuries were reported. Dunn County was also affected with numerous trees down and the Rural Electric Cooperative sustaining damage.

The impact of the storms was tremendous to the public, private and agricultural sectors. More than 350 residences incurred minor damage with basement flooding and sewer backup. A number of individuals were evacuated from their homes during the height of the flooding, oftentimes because access was totally cut-off. Detours caused others to drive many miles out of their way to get to their homes or places of business. Local emergency crews and volunteers helped sandbag around residences and businesses in

an attempt to minimize damages. Private well contamination and septic tank problems were also reported.

The agricultural sector in the impacted counties reported damage to cranberries, potatoes, sweet corn, peas, snap beans, corn, soybeans, oats, barley, ginseng and alfalfa. In some cases it was too late to replant. The storms took their greatest toll on the public sector. Roads were severely damaged with washouts, scouring, culverts washed away and bridges. In Clark and Dunn counties high winds and tornadoes blocked roads with debris and downed power and utility lines. In the City of Marinette storm sewers were damaged or collapsed with damages to infrastructure at more than $500,000. Similar situations were experienced in numerous other communities in the eight affected counties.

WEM received 104 applications from local governments for Public Assistance and distributed $4,495,653 million through the program. The Farm Service Agency made emergency loans available to farmers in 30 counties (the original 8 plus 22 contiguous counties).

Hazard Mitigation (HMGP) funds available for the declaration were $662,603 with $496,952 representing the 75% federal share with the state and local match of $82,825.50 each. WEM received 38 pre-applications totaling $7.5 million. The pre-applications included 8 for acquisitions, 13 structural, 6 road and culverts, 2 educational, 4 power related, and 4 other.

Disaster declaration 1429-DR was followed by 1432-DR declared September 10th. The amount of HMGP funds available combined from both disasters was less than $2 million. Since the declarations were so close together and the amount of funds was limited, the decision was made to pool the HMGP funds available from both declarations and use to fund projects that met the state's priority. Upon review of the formal applications and completion of the benefit-cost analyses the following applications were submitted to FEMA and approved for funding.

TABLE B-12 HMGP APPLICANTS FOR FEMA 1429-DR

Applicant	County	Amount
Crandon, City of	Forest	$ 21,000
Curtis, Village of	Clark	$ 60,000
Elm Grove, Village of	Waukesha	$208,401
Oliver, Village of	Douglas	$255,100
Portage County	Portage	$ 40,849
State Management Costs	WEM	$ 77,253
TOTAL		**$662,603**

Three applications included acquisition with the other two for the development of all hazard mitigation plans. Funds allocated for the declaration and approved totaled

$662,603 with actual expenditures of $607,609. Appendix C identifies the projects and actual amounts awarded to date for the declaration.

FEMA 1432-DRI-WI

On September 10, 2002, the President declared a major disaster for Polk, Rusk and Taylor Counties for Individual and Public Assistance along with 16 contiguous counties for Individual Assistance as a result of severe storms, tornadoes and flooding that occurred September 2-6, 2002.

Severe weather began early in the morning on September 2, 2002. Heavy rains occurred in the far western counties of the State. In Polk County Village of Osceola the rains caused an old mill dam to breach and floodwaters crashed through a mobile home park. The torrent continued downstream, overtopping a second dam and causing extensive road damage. Other townships in the county were also affected by almost 5 inches of rain. The storms continued to intensify as the day progressed, prompting the National Weather Service to issue Severe Thunderstorm or Tornado Watches for much of the northern half of the State. The National Weather Service confirmed a total of six tornadoes, two each in Marathon and Fond du Lac Counties and one each in the Taylor and Rusk Counties.

The initial thunderstorms that developed in Burnett and Polk Counties intensified into supercells as they entered into Rusk and Sawyer Counties around 4:30 p.m. and produced a F3 tornado that destroyed homes and businesses in Ladysmith in Rusk County. Forty minutes later another supercell thunderstorm moved across southwest Taylor County and spawned a tornado that moved through the Town of Gilman where it blew the roof off the high school. The same storm system moved east into Marathon County and produced a F0 tornado near Athens and a F1 tornado in the northern suburbs of Wausau.

The tornado in Taylor and Rusk Counties was the most devastating, particularly in Rusk County. It touched down at approximately 4:20 p.m. about one and one-half miles west-southwest of downtown Ladysmith and remained on the ground for approximately 30 minutes. It traveled at about 30 mph. It left a path of destruction 15 miles long and one-quarter mile wide. For part of its track in downtown Ladysmith it was rated an F3 on the Fujita scale, the rest of the track was F2 intensity. Once outside Ladysmith the tornado dissipated to an F1 level. The tornado in Taylor County, F2 intensity, touched down at 5:11 p.m. near Gilman and lifted at 5:50 p.m. west of Medford.

The impact of the tornadoes and storms was tremendous to the public and private sectors. More than 200 residences incurred various degrees of damage. In Ladysmith, population just under 4,000, more than 32 homes were destroyed, 71 incurred major damage and 110 minor damage. Twenty-four businesses were destroyed and 11 incurred major damage. Those businesses employed about 160 individuals either full or part time. The economic impact of the event in Ladysmith was estimated at $29.5 million.

Under the Housing Program over $125,000 was distributed to 95 households. A total of $250,635 was distributed to 66 applicants under the Individual and Family Grant Program. WEM received 52 applications from local governments for Public Assistance and distributed over $2,743,600 through the program.

Utilizing FEMA HMTAP (Hazard Mitigation Technical Assistance Program) funds, the report *Bracing for the Future: Construction Techniques to Protect against Future Wind Damage in Ladysmith* was developed in partnership with FEMA, WEM and the City of Ladysmith. The report identified the different types of damages sustained to both residential and commercial structures as well as the Gilman High School along with explanation as to the cause. The report further outlined wind-damage reduction techniques along with relative costs. The mitigation strategies in the report focused on construction enhancements that would allow a building or structure to resist winds above the current building code. The report can be found on WEM's website at http://emergencymanagement.wi.gov.

Hazard Mitigation (HMGP) funds available for the declaration were $1,089,584 with $817,188 representing the 75% federal share with the state and local match of $136,198 each. WEM received 25 pre-applications totaling $7.5 million. Several of the pre-applications were also submitted under 1429-DR. The pre-applications included 7 for acquisitions and 11 structural measures.

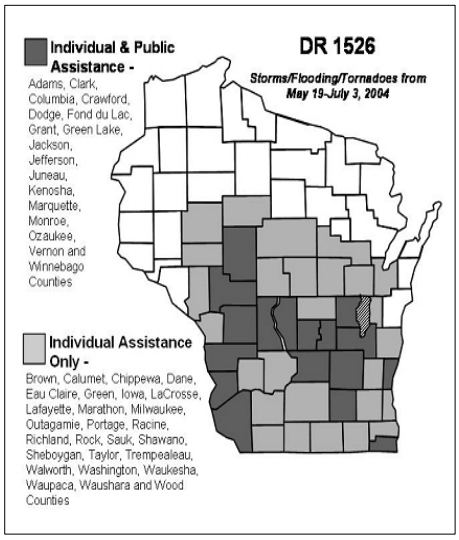
As stated previously, since declarations 1429-DR and 1432-DR were so close together and the amount of funds was limited, the decision was made to pool the HMGP funds available from both declarations and use to fund projects that met the state's priority. Upon review of formal applications and completion of the benefit-cost analyses the following applications were submitted to FEMA and approved for funding.

TABLE B-13 HMGP APPLICANTS FOR FEMA 1432-DR

Applicant	County	Amount
Ferryville, Village of	Crawford	$ 74,500
Oliver, Village of	Douglas	$ 150,600
Osceola, Village of	Polk	$ 543,140
Polk County	Polk	$ 60,000
Portage County	Portage	$ 6,800
Rusk County	Rusk	$ 29,250
Rusk County	Rusk	$ 29,856
St. Croix Falls, City of	Polk	$ 84,950
State Management Costs	WEM	$ 110,488
TOTAL		**$1,089,584**

The applications included 4 acquisitions, 2 purchase and distribution of weather alert radios, and 2 for the development of all hazard mitigation plans. Funds allocated for the

declaration and approved totaled $1,089,584 with actual expenditures of $755,243. Appendix C identifies the projects and actual amounts awarded to date for the declaration.



FEMA 1526-DR-WI

On June 18, 2004, the President declared a major disaster as a result of severe storms and flooding that began on May 19th. The following counties were declared for the Public Assistance Program: Clark, Columbia, Crawford, Dodge, Fond du Lac, Grant, Green Lake, Kenosha, Ozaukee, Vernon, and Winnebago Counties. Individual Assistance was declared for Columbia, Dodge, Fond du Lac, Jefferson, Kenosha, Ozaukee, and Winnebago. On July 2, 2004, 6 more counties were added for Public Assistance and 37 for Individual Assistance bringing the total number of counties to 44 (17 for Public Assistance and 44 for Individual Assistance.) This would be the greatest number of declared counties in one summer since 1993 when 47 counties received federal aid. The declaration initially covered damages that occurred between May 19 and July 3, 2004. On October 8th, based on a request by the Governor submitted on July 8th, the incident period was reopened to cover damages that occurred beginning May 7 through July 3, 2004.

Rainfall during early May left soils saturated and rivers and stream banks near full. This set the stage for the overland and riverine flooding that occurred in the latter half of the month when a second period of record precipitation occurred. According to the National Weather Service, at some official observation sites in southern Wisconsin, new all-time May precipitation records were set. In some cases, new all-time monthly records were broken. Repeated rains persisted over the southern half of Wisconsin during most of May and through June. Repeated rounds of thunderstorms with heavy rains caused record or near record flooding along the Fox, Rock, Crawfish, Kickapoo and Fond du Lac Rivers, among many others. In the latter part of June, subsequent to the original declaration, severe storms, flooding and tornadoes occurred in additional counties.

Columbia and Dodge Counties reported damages to roads, homes and businesses as a result of heavy rains that occurred over a 24-hour period on June 9-10 when up to 9 inches of rain fell. Especially hard hit was the small community of Randolph. Over 250 homes and 15 businesses reported basement or first floor flooding. Heavy rains caused damage to the Cambria Dam, washing out a major state highway. The City of Fond du Lac and the Village of North Fond du Lac also incurred significant damages in addition to evacuating approximately 300 homes.

Damage to private residences and businesses was tremendous. The Preliminary Damage Assessment (PDA) reports indicated that more than 5,000 primary residences were damaged to varying degrees. Some had water in them for weeks. Many had collapsed, cracked or bulging basement walls and foundations. The PDA indicated that

about 62% of those affected are low to moderate income and that almost all of the structures sustaining damage were uninsured. Tourism was also significantly impacted. Many parks and trails were damaged and/or destroyed. Several dams were threatened and incurred damages.

The agricultural sector also sustained considerable damage. This is very significant in that most of the affected counties have economies dependent on agriculture. Many early plantings of crops were washed out by the torrential rains.

Then on the evening of June 23rd severe thunderstorms swept across the State spawning 16 confirmed tornados, killing one person and causing millions in damages. The date ranks fourth in the number of tornadoes striking Wisconsin on a single day. The storm created a path three miles wide by nine miles long in Adams County causing significant damages in the Towns of Easton and New Chester. A tornado touched down in a campground in Warrens in Monroe County injuring 6 people. An F3 tornado in Markesan, Green Lake County, caused extensive tree and building damage. One person was killed when the tornado destroyed his home. Tornados touched down in Dane, Green Lake, Dodge, Fond du Lac, Marquette, Outagamie, and Portage counties. The tornadoes ranged in strength from F0 to F3.

Over 8,000 people applied for federal assistance with close to 2,978 households approved for $5,100,075 under the Housing Assistance Program. Over 1,975 were approved for $1,468,795 million in Other Needs Assistance. Over 2,000 people have applied for Disaster Unemployment Assistance, with 224 claims approved in the amount of $156,041. The Small Business Administration received over 1,300 applications for low-interest loans with 349 approved for $9.9 million. 386 communities have applied to the Public Assistance Program with grants approved in the amount of $14,245,186.

During the Disaster Field Operations, a data collection effort was conducted in Jefferson (Blackhawk Island area) and Kenosha Counties (Fox River area.) Damaged structures were inventoried and information collected for potential mitigation opportunities. Both Counties have been implementing buyout programs since the 1993 floods and indicated their intent to apply for additional HMGP funds. The structure inventory will assist the counties in determining which properties should be considered for mitigation as well as assist in completing the HMGP application. In addition, success stories were documented and completed for both counties on past mitigation efforts. The stories, as well as other success stories, can be found on WEM's website at http://emergencymanagement.wi.gov and FEMA's website at http://www.fema.gov/mitigationbp/sstoryfind.do.

The potential for substantially damaged structures in the floodplain was high. Therefore, FEMA, WDNR and WEM staff conducted Substantial Damage Training Workshops in Madison, Oshkosh, Waukesha, and Portage. The training will assist those officials responsible for determining structures that may be substantially damaged in accordance with their local floodplain ordinance. FEMA and WDNR staff provided additional technical assistance to several communities.

This was the first declaration where the program received 7.5% of the Individual and Public Assistance Programs, versus 15%. WEM received 73 pre-applications totaling $15.6 million. Pre-applications were reviewed, scored and ranked. Projects that met State priorities and made the biggest impact on reducing future disaster costs were considered for funding.

TABLE B-14 HMGP PRE-APPLICATIONS FOR FEMA 1526-DR BY TYPE

Number	Type	Amount
9	Acquisition	$ 4,978,500
1	Floodproofing	$ 24,950
4	Studies	$ 791,000
4	Warning systems	$ 197,790
9	Hazard Mitigation Plans	$ 328,000
10	Roadwork	$ 739,919
5	Sewer	$ 2,218,000
22	Structural	$ 2,194,150
9	Miscellaneous	$ 4,168,563
73	**TOTAL**	**$15,640,872**

The HMGP allocation for the disaster was $1,847,086. Three planning grants under the 7% allocation were funded; 3 projects under the 5% allocation for the purchase and distribution of NOAA weather radios; and 4 projects for acquisition and demolition of floodprone properties. The following projects were funded.

TABLE B-15 HMGP APPLICANTS FOR FEMA 1526-DR

Applicant	County	Amount
Columbia County	Columbia	$ 45,000
Dodge County	Dodge	$ 50,000
Eau Claire County	Eau Claire	$ 30,000
Oshkosh, City of	Winnebago	$ 411,050
Oneida County	Oneida	$ 25,000
Kenosha County	Kenosha	$ 798,470
Jackson County	Jackson	$ 6,080
Grant County	Grant	$ 286,470
Ferryville, Village	Crawford	$ 45,811
Dodge County	Dodge	$ 34,508
State Management Costs	All	$ 114,697
TOTAL		**$1,847,086**

Funds allocated for the declaration and approved totaled $1,847,086 with actual expenditures of $1,648,364. Appendix C identifies the projects and actual amounts awarded to date for the declaration.

FEMA-3249-EM-WI

In response to Hurricane Katrina, the State Emergency Operations Centers (EOC) was activated from September 6-20, 2005. Through the EOC WEM processed requests from the Gulf States for assistance through the Emergency Management Assistance Compact (EMAC). Over 50 individuals traveled to the Gulf States through the EMAC. On September 8, 2005, Governor Doyle requested the President declare an emergency declaration for the State of Wisconsin as a result of Hurricane Katrina that occurred on August 29, 2005. The emergency declaration was requested to cover 100% of the costs associated with providing emergency shelter and mass care for he evacuees that were arriving in the State from the Gulf States. The emergency declaration was granted on September 13th. WEM was responsible for administering the emergency declaration. In addition to the evacuees arriving from Hurricane Katrina, costs associated with evacuees from Hurricane Rita were also later included.

On September 6th, the Governor advised FEMA that Wisconsin was prepared to provide shelter for up to 1,150 evacuees at the Tommy G. Thompson Youth Center (950) at Wisconsin State Fair Park and the South Milwaukee Community Center (250.) The Tommy G. Thompson Youth Center was designated as the shelter to receive evacuees from Hurricanes Katrina and Rita. The shelter was managed by the American Red Cross and the Salvation Army. On September 8th, 170 evacuees, along with 26 animals, arrived via two FEMA-charted flights. The shelter which closed November 1, 2005, housed 365 evacuees, including some who self-evacuated. Most evacuees were placed in housing with some going to hotels. The American Red Cross served 827 cases. The highest number of households registered with FEMA identifying that they were in Wisconsin was 1,994 on October 26, 2005.

Under the emergency declaration issued by the President eligible costs would be reimbursed 100% through the Public Assistance Program. This included costs incurred by State agencies and local governments in response to Hurricanes Katrina and Rita. Those costs included shelter and transitional housing costs for evacuees. Cost incurred in the emergency declaration totaled $1,120,372.

FEMA 1719-DR-WI

On August 26, 2007, President Bush declared a major disaster as a result of severe storms and flooding that began on August 18th. The following counties were declared eligible for the Individual Assistance Program (IA): Crawford, La Crosse, Richland, Sauk and Vernon. The Hazard Mitigation Grant Program was declared eligible statewide. On August 31, the Governor requested that the following counties be declared for IA: Columbia, Dane, Grant, Green, Iowa, Jefferson, Kenosha, Racine and Rock. The Governor also requested a Public Assistance (PA) request for Crawford, Dane, La Crosse, Richland, Sauk, and Vernon counties. Amendment 2 to the disaster declaration included 9 additional counties for IA (Columbia, Dane, Grant, Green, Iowa, Jefferson,

Kenosha, Racine and Rock) and 5 counties (Crawford, La Crosse, Richland, Sauk and Vernon) for PA.

Heavy rainfall began on August 18 and continued through the week. Soils became saturated and rivers and streams overflowed their banks. At some official observation sites in southern Wisconsin, new all-time August 24-hour precipitation records were set, Gays Mills (7.41 inches), Prairie du Chien (6.52 inches) and Viroqua (9.23 inches), and in La Crosse County and a new all-time monthly records were set for any month of the year with 17.00 inches of rainfall, according to the National Weather Service. The cause of the storms and record precipitation was an unusually stagnant weather pattern that persisted over the southwestern half of Wisconsin from August 18 to 31. Repeated rounds of thunderstorms with heavy rains caused record or near record flooding along the Kickapoo (crested 6 feet above flood stage), Pine, Fox, Rock and Crawfish Rivers, among many others.

Damage to private residences and businesses was tremendous. Some residences had water in them for days. Many residences had cracked or bulging basement walls and foundations. Many affected residents were low to moderate income and almost all of them sustaining damage were uninsured. Many businesses were also affected.

The agricultural sector sustained considerable damage. This is very significant in that most of the declared counties have economies dependent on agriculture. The Wisconsin Farm Services Office had requested an Administrator's Designation for physical loans.

Over 4,000 people applied for federal assistance with 2,902 households approved for $7,495,433 under the Housing Assistance Program. Another 651 were approved for $499,236 in Other Needs Assistance. The Small Business Administration approved 234 low-interest loans for over $6 million. The Public Assistance Program approved 144 grants to state and local governments, and eligible private non-profit organizations for a total of $12,828,586.

TABLE B-16 HMGP PRE-APPLICATIONS FOR FEMA 1719-DR BY TYPE

Number	Type	Amount
8	Acquisition	$12,534,493
2	Floodproofing	$ 255,250
7	Warning systems	$ 395,121
13	Hazard Mitigation Plans	$ 405,927
5	Roadwork	$ 131,088
4	Sewer	$ 588,475
6	Structural	$ 316,096
1	Miscellaneous	$ 5,664
46	**TOTAL**	**$14,632,114**

Pre-applications were reviewed, scored and ranked. Projects that met the State priorities and make the biggest impact on reducing future disaster costs were considered for funding. Wisconsin has an approved "enhanced" state mitigation plan, therefore, eligible for 20% of the Public and Individual Assistance Programs. This declaration would be the first for the State to receive the additional HMGP funding. The HMGP allocation for the disaster would be $5,552,079. Three planning grants (2 for plan updates to meet the 5-year plan requirement) under the 7% allocation were funded; 2 projects for elevation; and 5 projects for acquisition and demolition of floodprone properties. Funding was approved for a project under the 5% allocation for an automated, high water warning system for dams in Vernon County. The following projects were approved:

TABLE B-17 HMGP APPLICANTS FOR FEMA 1719-DR

Applicant	County	Amount
Chaseburg, Village of	Crawford	$1,806,675
Crawford County	Crawford	$ 40,000
Gays Mills, Village of	Crawford	$1,429,866
Kenosha County	Kenosha	$1,392,414
Mount Pleasant, Village of	Racine	$ 263,400
Oregon, Village	Dane	$ 105,920
Richland County	Richland	$ 36,000
Soldiers Grove, Village of	Crawford	$ 152,781
Vernon County	Vernon	$ 40,000
Vernon County	Vernon	$ 114,000
State Management	All	$ 171,023
Total		**$5,552,079**

Projects are still underway with most nearing completion. Funds allocated for the declaration and approved totaled $5,552,079. As projects are completed, any unspent funds are reallocated to those with a cost overrun. As of June 30, 2011, expenditures on the approved grants totaled $4,105,711.

FEMA-3285-EM-WI

A major snowfall began on February 5 and continued through February 7, 2008. The event included heavy snowfall, strong gusty winds out of the north and even thunder. The heavy snow fell at the rate of one to three inches per hour in some of the hardest hit areas. Several locations in Rock, Walworth, Jefferson and Ozaukee counties reported the highest amounts of 20 to 21 inches. Numerous locations in the 13 counties (Dane, Dodge, Green, Jefferson, Kenosha, Lafayette, Milwaukee, Ozaukee, Racine, Rock, Walworth, Washington and Waukesha) included in this request reported amounts between 12 and 19 inches. Wind speeds between 15 to 25 mph, with gusts up to 35 mph and isolated gusts reported at 60 mph, created near blizzard or white out

conditions especially in rural areas. Visibilities of less than ¼ mile were common and drifts of 2 to 4 feet made travel extremely dangerous.

It is important to note that the February 5 – 7 event is just one of many snowfalls that occurred in southern Wisconsin since December 1, 2007. In fact, Madison received more than 100 inches of snow this season, making it the snowiest winter on record (previous record was 76.1 inches). The Madison area received measurable snowfall on more than 50 days since December 1, 2007.

The repeated snowfalls, and particularly the February 5-7 storm, inflicted hardships on many Wisconsin communities and totally depleted snow removal budgets. Schools across much of southern Wisconsin have been closed on more than one occasion. The storms also forced the cancellation of numerous air flights from the Milwaukee and Dane County airports. The snow also curtailed shopping activity at retail establishments and malls have been closed due to treacherous travel conditions.

Snow depths in many areas were at record levels. These snow depths made it increasingly difficult to find places to put the snow. It was piled high at street intersections and around fire hydrants, increasing the risk to public safety from traffic accidents and residential fires. The unusual depths also made it difficult for homeowners and businesses to keep sidewalks cleared, increased the hazards for pedestrian traffic, especially school children and the disabled.

On March 19, 2008, the President declared a snow emergency in the State of Wisconsin. This declaration was based on emergency measures performed to save lives and protect public health and safety resulting from record snow and near record snow during the period of February 5-6, 2008. The counties declared were Dane, Dodge, Green, Jefferson, Milwaukee, Rock, Walworth and Washington counties for emergency protective measures (Category B) under the Public Assistance program for any continuous 48-hour period during or proximate to the incident period. On April 18, 2008, the FEMA-State Agreement was amended to included Kenosha, Racine and Waukesha counties to the snow emergency. Funding was provided to 475 eligible applicants totaling $11,291,568.

FEMA 1768-DR-WI

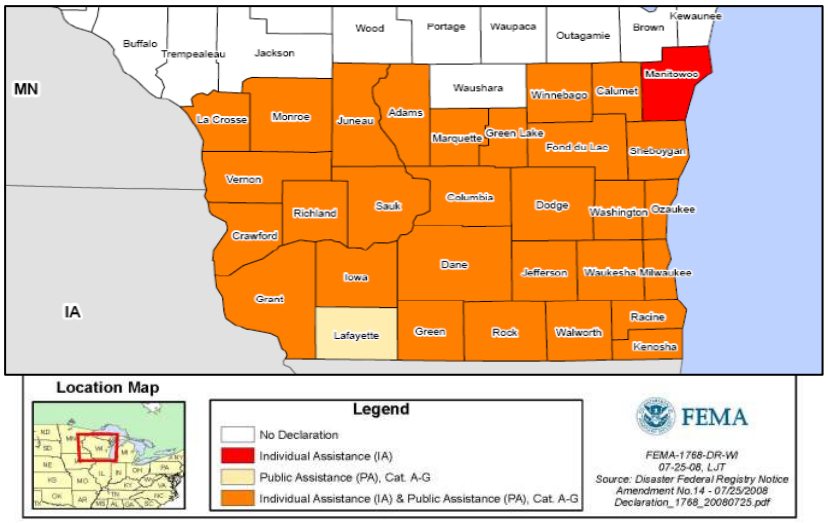
Severe weather began on June 5, 2008 with dozens of thunderstorms and tornado watches and warnings issued. Heavy rainfall, hail, damaging winds and several tornadoes were reported. Next, a warm weather front tracked from west to east across Wisconsin on Saturday, June 7. This event coincided with a moist and unstable air mass moving northward triggering an outbreak of severe weather and heavy rains throughout the afternoon and continuing into the next morning. Numerous super cell thunderstorms developed over the state spawning tornadoes, funnel clouds, rotating wall clouds and flash flooding over all of southern Wisconsin. On Sunday, June 8, the warm, moist air lingered in the state when a cold front tracked east out of the northern plains. A line of thunderstorms tracked across the state ahead of the front producing severe thunderstorms and heavy rains. The rains combined with the already saturated

soils worsened the flooding conditions necessitating rescues, evacuations, road closures and sandbagging. The continuing weather pattern persisted on Monday, Tuesday, and Wednesday (June 9-11.) On Thursday, June 12, a slow moving cold front combined with warm moist air again passed through the state producing tornadoes, severe thunderstorms, and heavy rainfall. Collectively amounts ranged from 6 to over 15 inches. The greatest amount was 15.35 inches south of Portage in Columbia County. Depending on location, 24-hour and monthly rainfall records were established. All of this rain fell on top of a ground that was saturated due to all-time record winter snowfalls of 70 to 122 inches across southern Wisconsin which were roughly double normal amounts. At least 38 river gauge sites set new all-time record-high crests; in some cases exceeding flood stage by 6 to over 11 feet. The Baraboo River in Baraboo crested at 11.48 feet over floodstage. In some cases, rivers remained in flood stage into late July, and many low spots in farm fields still had standing water into September. From June 7 to 13, there were 20 tornadoes reported where the average number in a year for Wisconsin is 21.

The State EOC was activated 24/7 from June 7-24. Interstates and hundreds of roads were closed making travel very difficult. WEM provided over 700,000 sandbags to communities in the impacted area. Thirty-five shelters were open and served 2,623 people. Over 77,000 meals were served. Over 160 waster water treatment plans diverted 90 million gallons of sewage. There were three confirmed deaths. Damages were in excess of $926 million.

Small rural and urban communities alike were devastated by the repeated flooding and storms. Tens of thousands of homes, businesses and farms were damaged or destroyed. Damage to public facilities is in the tens of millions of dollars. Both the agriculture and tourism industries, representing the heart of state and local economies, will suffer significantly. The worst flooding occurred on the Baraboo, Kickapoo, Rock, Fox (northern and southeastern) and Crawfish Rivers. Many of the communities are still recovering from flooding that occurred ten months ago resulting in federal disaster declaration 1719-DR-WI. In some cases, the June 2008 flooding was worse than the 1993 flooding.

On June 9, Governor Jim Doyle declared a State of Emergency for 30 counties. On June 13, the Governor requested a presidential declaration for 6 counties. On June 14, President Bush declared the following counties eligible for the Individual Assistance (IA) Program: Columbia, Crawford, Milwaukee, Sauk and Vernon. Subsequently, the following 26 counties were added to the declaration: Adams, Calumet, Dane, Dodge, Fond du Lac, Grant, Green, Green Lake, Iowa, Jefferson, Juneau, Kenosha, La Crosse, LaFayette, Marquette, Manitowoc, Monroe, Ozaukee, Racine, Richland, Rock, Sheboygan, Walworth, Washington, Waukesha, and Winnebago. Twenty-nine communities were declared for both Public and Individual Assistance. Manitowoc County was declared for Individual Assistance only and Lafayette County for Public Assistance bringing the total to 31 counties. The incident period was June 5 through July 25, 2008.



Over 40,000 people applied for Individual Assistance with over 20,000 households receiving housing assistance totaling over $50 million with over 9,000 households approved for Other Needs Assistance totaling $6.5 million. The Small Business Administration has approved nearly 2,000 low-interest loans for individuals and businesses totaling over $46 million. Nearly 1,400 flood insurance claims were paid totaling over $12 million. Nearly 10,000 people visited a Disaster Recovery Center. A total of 858 communities are eligible for funding through the Public Assistance Program. To date, over $77 million has been approved in Public Assistance Program. This disaster is proving to be the largest ever in the State.

Due to the extensive damages, Governor Doyle created the Wisconsin Recovery Task Force (WRTF). This Task Force was instructed to focus on mitigation, agriculture, business, housing, human needs, and infrastructure concerns. The Task Force was comprised of many state and federal agencies. Ultimately, the mission of the WRTF was to assist individuals, businesses, and communities to recover quickly, safely, and with more resistance to future disasters. The primary goal of the WRTF was to identify the unmet needs of the communities and citizens of Wisconsin and assist them during the recovery. A WRTF report was presented to the Governor in November 2008 and can be downloaded at www.emergencymanagement.wi.gov/recovery/process_long-term.asp. The WRTF continued to meet to implement the recommendations of the report and to support long term recovery efforts in hardest impacted communities.

The Wisconsin Hazard Mitigation Team (WHMT) played an integral part in identifying the key players that comprise the Wisconsin Recovery Task Force. Members of the WHMT are members of the Mitigation Subcommittee. Without the Wisconsin Hazard Mitigation Team, it is very likely that the Wisconsin Recovery Task Force would not have been created as quickly as it was.

This disaster was considered an "incident of national significance." As a result FEMA activated ESF-14, Long Term Recovery, for the first time in the state. ESF-14 provided 5 FEMA employees and 8 contractors for long-term recovery. The Village of Gays Mills

was flooded in the 2007 disaster and again flooded in June 2008. Both events were greater than the 500 year flood and caused substantial damage to the Village's residential and business district. The Village received HMGP assistance as a result of the 2007 flood when it was hit with the second flood. The Village was unsure if it should consider relocation of the town. The Team worked with the community of Gays Mills in developing a long term recovery plan that identified potential relocation sites and potential funding sources. In addition, they worked with Rock Springs to address recovery issues. Information gathered from these planning efforts assisted with recovery in other impacted communities.

The Recovery Plan process for Gays Mills involved a series of meeting and workshops for the community. On October 20, 2008, the ESF-14 team made a presentation of the draft plan to the community. At that meeting, priorities were discussed and representatives from WEM, the Mississippi River Regional Planning Commission, USDA-Rural Development were present. The final plan was presented to the community on October 31, 2008.

However, the interagency cooperation and effort did not end when the ESF-14 Team left. WEM coordinated two strategy meetings on November 19, 2008 and December 2, 2008 with several member of the WHMT/WRTF. The Department of Commerce, USDA-Rural Development, the Mississippi River Regional Planning Commission, FEMA, EDA, HUD WHEDA, Coulee CAP and WEM attended the meeting and reviewed all of the projects identified in the Flood Recovery Plan. Through discussion, the agencies identified which projects were possibly fundable by their programs and which were not. Ultimately, the task of the group was to package funding to assist in as many projects as possible.

On December 15, 2008, all of the agencies met with the Gays Mills Long Range Planning Committee and other interested citizens to discuss the funding options available. The State Hazard Mitigation Officer led the meeting and discussed which agencies could potentially fund which projects. It was a very productive meeting which provided direction and hope for the community.

Two relocation sites just north of the existing downtown were purchased by the Village. The site known as North Mills will be used for mixed use of residential housing and businesses. Two five-unit townhouses and several residential structures have been completed. Construction of a mercantile center for businesses and the Community Commerce Center which will house Village Hall, library and a community kitchen are all under construction. Future plans for the second site are to include a small health clinic, assisted living facility, EMS and Fire Department, Public Works building, and additional businesses. FEMA, WEM, EDA, USDA-Rural Development, State Department of Commerce, State Department of Transportation, State Department of Health Services as well as private investors have all been sources of funding.

Mercantile Center

In addition to activating ESF-14, FEMA deployed the Mitigation Assessment Team (MAT) to conduct engineering analyses to determine causes of failures and successes of structures within the declared area. A report was completed that contained recommendations that the state, communities, and organizations/agencies could take to reduce future damages and protect lives and property.

All counties in the State of Wisconsin are eligible to apply for assistance under the Hazard Mitigation Grant Program (HMGP). WEM received 118 pre-applications totaling $40 million. Based on the number of destroyed homes, the priority of acquisition and demolition of substantially damaged structures was established early after the disaster. The State received 18 buyout applications for over 230 properties totaling nearly $35 million.

Since Wisconsin has an approved "enhanced" state hazard mitigation plan, it was eligible for 20% of the Public and Individual Assistance Programs. The HMGP allocation for the disaster was $30,875,884. Ten planning grants (7 for plan updates to meet the five-year plan requirement) were funded. The remaining funding was awarded to 17 communities for acquisition and demolition of flood damaged structures with majority substantially damaged and uninhabitable. The following communities received approved project grants:

TABLE B-18 HMGP PROJECT GRANT APPLICANTS FOR FEMA 1768-DR		
Applicant	**County**	**Amount**
Elroy, City of	Juneau	$ 572,000
Excelsior, Town of	Sauk	$ 121,800
Fond du Lac, City of	Fond du Lac	$1,642,410
Gays Mills, Village of	Crawford	$1,098,006
Grant County	Grant	$ 467,300
Janesville, City of	Rock	$1,244,750
Jefferson County	Jefferson	$8,087,673
Jefferson, City of	Jefferson	$ 499,830
Kenosha County	Kenosha	$2,488,118
LaFarge, Village of	Vernon	$1,195,674
Paddock Lake, Village of	Kenosha	$ 688,610
Reedsburg, City of	Sauk	$2,602,770
Richland Center, City of	Richland	$ 113,500
Rock County	Rock	$1,172,709
Rock Springs, Village of	Sauk	$2,512,786
Spring Green, Town of	Sauk	$5,377,624
Sugar Creek, Town of	Walworth	$ 722,513
TOTAL		**$30,608,072**

In addition the following received planning grants:

TABLE B-19 HMGP PLANNING GRANT APPLICANTS FOR FEMA 1719-DR		
Applicant	**County**	**Amount**
Avoca, Village of	Iowa	$ 28,560
Burnett County	Burnett	$ 30,000
Green County	Green	$ 9,270
Green Lake County	Green Lake	$ 36,000
Iowa County	Iowa	$ 48,360
Juneau County	Juneau	$ 14,857
Kenosha County	Kenosha	$ 40,000
Milwaukee County	Milwaukee	$ 11,510
Rock County	Rock	$ 30,000
Sauk County	Sauk	$ 19,245
TOTAL		**$267,802**

Projects are still underway with most nearing completion. Funds allocated for the declaration and approved totaled $30,875,884. As projects are completed, any unspent funds are reallocated to those with a cost overrun. As of June 30, 2011, expenditures on the approved grants totaled $21,029,865.

FEMA-1933-DR-WI

During the afternoon and into the evening hours on July 22, 2010, a persistent band of strong to severe thunderstorms developed and moved through the south central and southeastern portions of the state. Individual storms within the system moved quite fast, however the line containing these storms did not, resulting in the storms repeatedly training or moving over the same area. Reports of 3 to 4 inches of rain were widespread along and on either side of the I-94 corridor, with locally higher amounts of 5 to 8 inches. The heaviest rainfall occurred in Milwaukee County, where hourly rainfall amounts of 2 to 4 inches were reported. One local television station on the northeast side of the City of Milwaukee measured 7 inches of rain in approximately 2.5 hours. Mitchell Field recorded 5.61 inches of rain for the day, which is a record for that date. This also is the second highest daily rainfall total on record for Milwaukee.

It was this same frontal boundary that affected Grant County in southwestern Wisconsin from July 22 through 24. During the morning of July 22 widespread rainfall totals of 1 to 2 inches occurred. The next system moved into the southwest part of the state in the afternoon and early evening hours of the 22nd and dumped between 8 and 10 inches of rain in the southern third of Grant County. The final round of heavy rain occurred from the evening hours of the July 23 through the morning hours of July 24 and produced another 2 to 4 inches of rain on areas already saturated. The resulting flash flooding was devastating for Grant County, which is a sparsely populated rural area.

On July 23, Governor Jim Doyle declared a State of Emergency for Milwaukee County. On July 31, the Governor requested a presidential declaration for Grant, Milwaukee and Waukesha Counties. On August 11, the President declared Grant and Milwaukee Counties eligible for the Public Assistance (PA) program. On September 7, 2010, Calumet County, which was also heavily impacted by the storm system, was added on to the Public Assistance declaration. September 18, 2010, the counties of Milwaukee and Grant were declared eligible for FEMA's Individual Assistance (IA) programs.

Over 33,000 people applied for Individual Assistance with over 16,000 households receiving housing assistance totaling over $45 million and nearly 15,000 households approved for Other Needs Assistance totaling $13 million. A total of 92 communities are eligible for funding through the Public Assistance Program. To date, over $31 million has been approved in Public Assistance Program.

All counties in the State of Wisconsin are eligible to apply for assistance under the Hazard Mitigation Grant Program (HMGP). After review, scoring and ranking the pre-applications formal applications were sent to 52 communities totaling $29,348,299.

Since Wisconsin has an approved "enhanced" state hazard mitigation plan, it was eligible for 20% of the Public and Individual Assistance Programs. The HMGP allocation for the disaster was $21,338,532.

WEM is still processing the applications. The following grants have been approved to date:

TABLE B-20 HMGP PLANNING GRANT APPLICANTS FOR FEMA 1933-DR

Applicant	County	Amount
Grant County	Grant	$ 51,972
Iron County	Iron	$ 27,340
Lincoln County	Lincoln	$ 35,000
Northwest Region (Rusk, Sawyer, Taylor, Price Counties)	Rusk	$159,910
Ozaukee County	Ozaukee	$ 32,800
Portage County	Portage	$ 42,027
TOTAL		**$349,049**

Planning grant applications for eleven counties have been submitted and are pending approval totaling $417,440. In addition, three project applications, two for acquisition and demolition and one for a storm shelter, have been submitted and are pending approval in the amount of $2,147,986.

FEMA-1944-DR-WI

A potent, early-fall storm system brought waves of very heavy rain to western into central Wisconsin starting late on Wednesday, September 23, 2010 and continued into early Friday, September 24, 2010. This was due to an unusually moist air mass over the Central Plains and a stationary front that aligned just south of Interstate 90. This rain strengthened the stationary front over the area, locking in the trigger for prolonged rain and thunderstorms Wednesday night. By morning on September 24, a band of 4 to 8 inches of rain had fallen with many reports of flooding. Rain continued, but lightened throughout the day on Thursday, September 23. The National Weather Service stated the precipitation that fell during this period was 300-700% above he normal that typically falls in late September.

The rains caused river levels to rise rapidly, with record or near record crests on the Black and Trempealeau Rivers. The Yellow River at Babcock, in Wood County, crested at the highest level ever recorded at the site, reaching 6.4 feet above flood stage. The larger or main rivers, including the Chippewa, Black, Trempealeau, Wisconsin, Mississippi and Kickapoo were all impacted. The situation was exacerbated by the fact that Wisconsin experienced an abnormally we summer, soils were already saturated and many rivers were at relatively high levels prior to the onset of the storms.

On September 23, Governor Jim Doyle declared a State of Emergency for Trempealeau, Jackson and Clark Counties. It was subsequently amended to include Buffalo, Columbia, Marathon, Portage and Wood Counties. On October 14, the Governor requested a presidential declaration as a result of flooding and severe storms beginning on September 22 and continued through October 9 for Buffalo, Clark, Jackson, Juneau, LaCrosse, Marathon, Portage, Taylor, Trempealeau and Wood Counties for the Public Assistance (PA) program.

A federal declaration for PA was granted on October 21 for the requested counties with the exception of LaCrosse County. All counties in the State of Wisconsin are eligible to apply for assistance under the Hazard Mitigation Grant Program (HMGP).

A total of 201 communities are eligible for funding through the Public Assistance Program. To date, $5.8 million has been approved in Public Assistance Program.

All counties in the State of Wisconsin are eligible to apply for assistance under the Hazard Mitigation Grant Program (HMGP). WEM received nine applications totaling $1,553,052. Since Wisconsin has an approved "enhanced" state hazard mitigation plan, it was eligible for 20% of the Public Assistance Programs. The HMGP allocation for the disaster was $1,050,261.

WEM is still processing the applications. Two grants have been approved totaling $349,049, with an additional project submitted to FEMA and pending approval in the amount of $21,150.

FEMA-1966-DR-WI

During the overnight hours of February 1- 2, 2011, a powerful low pressure center passing south of Wisconsin produced blizzard conditions across much of southern Wisconsin. Snow associated with the system began in the mid-afternoon hours in far southern Wisconsin and pushed northward into the state through the evening. The snowstorm was accompanied by winds of 40 to 50 miles per hour with localized gusts of up to 60 miles per hour. This excessive wind caused blizzard conditions from early on the evening of February 1, 2011, through the early morning hours of February 2, 2011. In addition to the blizzard, several inches of snow fell on January 31, 2011, with light lake effect snow in the eastern half of the area throughout the day on February 1, 2011.

Snowfall totals in Milwaukee broke the one-day record on February 2, 2011, with 9.1 inches falling and an accumulation of 19.6 inches in 48 hours. Madison similarly experienced snowfall totals breaking the one-day record at 8.1 inches and a three-day accumulation of 18.7 inches. Twelve to 16 inches of snow fell along Highway 29 between Green Bay and Wausau.

As a result of this storm, many county and local roads were deemed impassible, as well as portions of Interstates 94 and 43. The Wisconsin National Guard and Department of Natural Resources were activated to look for any stranded motorists. The blizzard conditions also caused the closure of Milwaukee's Mitchell Field Airport.

On April 5, 2011, a Major Presidential Disaster Declaration was granted, resulting in federal assistance to eligible applicants in 10 counties designated for FEMA Public Assistance for winter storm and snowstorm damage that occurred between January 31 and February 3, 2011, and hazard mitigation throughout the state. The declared Counties included: Dane, Dodge, Grant, Iowa, Kenosha, Lafayette, Milwaukee, Racine, Walworth, and Washington.

A total of 472 communities are eligible for funding through the Public Assistance Program. To date, nearly $11 million has been approved in Public Assistance Program.

All counties in the State of Wisconsin are eligible to apply for assistance under the Hazard Mitigation Grant Program (HMGP). The State is waiting for the six-month HMGP allocation. Since Wisconsin has an approved "enhanced" state hazard mitigation plan, it was eligible for 20% of the Public Assistance Programs.

Disaster 1966-DR was the 32nd Presidential Declaration in Wisconsin since 1971, and the 22nd disaster since 1990. The state had multiple declarations in 1990, 1992, 1998, 2002, and 2010. Declarations have been granted in every year since 1990 except for 1994, 1995, 2003, 2005, 2006, and 2009. In the last 25 years, all but one of the State's 72 counties, Oconto, has been directly affected by disaster declarations. Additionally, in the years since 1990, 6 requests for declarations have been denied. The unprecedented frequency and severity of natural disasters established in the last decade has continued into the present one.

HMGP Funding History 1991- 2011

DISASTER	AMOUNT ALLOCATED/ APPROVED	TOTAL EXPENDED
912-DR-WI	$108,684	$ 108,684
959-DR-WI	$38,868	$ 38,868
963-DR-WI	$376,374	$ 376,374
964-DR-WI	$391,074	$ 391,074
994-DR-WI	$14,004,403	$14,004,403
1131-DR-WI	$344,527	$ 344,527
1180-DR-WI	$6,265,003	$ 6,148,173
1236-DR-WI	$1,962,465	$ 1,767,681
1238-DR-WI	$4,450,421	$ 4,392,207
1284-DR-WI	$812,059	$ 806,041
1332-DR-WI	$4,424,019	$ 4,045,602
1369-DR-WI	$4,390,075	$ 4,009,852
1429-DR-WI	$662,603	$ 607,609
1432-DR-WI	$1,089,584	$ 755,243
1526-DR-WI	$1,847,086	$ 1,648,364
Total	**$41,167,245**	**$39,444,702**

TABLE B-21 HMGP FUNDING HISTORY, 1991-2011		
Disaster	**Amount Allocated/Approved**	**Total Expended**
912-DR-WI	$108,684	$ 108,684
959-DR-WI	$38,868	$ 38,868
963-DR-WI	$376,374	$ 376,374
964-DR-WI	$391,074	$ 391,074
994-DR-WI	$14,004,403	$14,004,403
1131-DR-WI	$344,527	$ 344,527
1180-DR-WI	$6,265,003	$ 6,148,173
1236-DR-WI	$1,962,465	$ 1,767,681
1238-DR-WI	$4,450,421	$ 4,392,207
1284-DR-WI	$812,059	$ 806,041
1332-DR-WI	$4,424,019	$ 4,045,602
1369-DR-WI	$4,390,075	$ 4,009,852
1429-DR-WI	$662,603	$ 607,609
1432-DR-WI	$1,089,584	$ 755,243
1526-DR-WI	$1,847,086	$ 1,648,364
TOTAL	**$41,167,245**	**$39,444,702**

Disasters 1719, 1768, 1933, 1944, and 1966 are still open declarations, therefore, final expenditures are presently unknown.

It is a goal of WEM to never return HMGP funds to FEMA if at all possible. To that end, as projects are completed, any unspent funds are obligated to other projects incurring funding shortfalls. Appendix C identifies the projects and actual amounts awarded to date for the declarations.

APPENDIX C: STATE MITIGATION GRANTS

TABLE C-1 HAZARD MITIGATION GRANT PROGRAM (HMGP) PROJECTS FUNDED IN THE STATE

Disaster Number	Year	Community	County	Cost HMGP Funds	Project Description	Comments
DR-874	1990	Darlington, City	Lafayette	$605,572	Part of a larger project funded under DR-994; acquisition of 12 commercial structures; floodproofing of 19 commercial structures	Additional $178,608 provided locally (used for match in DR-994); local match was purchase of land for business park
DR-874	1990	DePere, City	Brown	$95,160	Storm sewer project	Additional $42,301 provided locally
DR-912	1991	Jefferson County	Jefferson	$108,684	Acquisition of 3 residential structures	Local match provided by HUD & DNR
DR-959	1992	Waushara County	Waushara	$38,868	Geographic Information System (GIS) mapping of an area of the 100 year floodplain of the Pine River	
DR-963	1992	Cross Plains, Village	Dane	$37,000	Clearwater infiltration abatement project	
DR-963	1992	DeForest, Village	Dane	$202,034	Construction of the Linde Detention Basin	Additional $67,394 provided locally; CDBG provided $485,000 to construct Halsor Street Detention Basin and a storm sewer leading to the basins
DR-963	1992	Sun Prairie, City	Dane	$137,340	Development of a stormwater management plan and improvement of a storm sewer	Additional $91,021 provided locally
DR-964	1992	Black River Falls, City	Jackson	$281,929	Construction of storm sewers	$43,971 provided by CDBG
DR-964	1992	Blair, City	Trempealeau	$109,144	Modification of the Lake Henry Dam	$109,173 provided by CDBG; $43,460 provided by DNR
DR-994	1993	Darlington, City	Lafayette	$4,175,790	Acquisition of 12 commercial structures; floodproofing of 19 commercial structures	$178,608 local match for purchase of business park; $282,084 provided by CDBG; $187,744 provided by DNR
DR-994	1993	Eau Claire, City	Eau Claire	$2,152,831	Acquisition of 45 residential structures and 5 vacant parcels; floodproofing of 1 commercial structure	$461,000 provided by CDBG for local match
DR-994	1993	Eau Claire County	Eau Claire	$1,217,227	Acquisition of 16 residential structures and 1 commercial structure; floodproofing of 2 residential structures	$265,250 provided by CDBG for local match
DR-994	1993	Jefferson County	Jefferson	$458,635	Acquisition of 7 structures	Part of a larger project with the FMA program that included $500,000 CDBG funds and $611,000 DNR funds
DR-994	1993	Pierce County	Pierce	$6,000,000	Acquisition of 67 residential structures, 3 commercial structures, and 3 vacant parcels	Local match provided by CDBG; additional $187,989 provided by program revenue
DR-1131	1996	Monroe, City	Green	$143,311	Construction of a detention pond	Additional $36,218 provided locally
DR-1131	1996	Oakfield School Dist.	Fond du Lac	$202,216	Reinforcement of walls in new school	
DR-1180	1997	Brookfield, City	Waukesha	$139,203	Acquisition of 1 residential structure	

TABLE C-1 CONTINUED

Disaster Number	Year	Community	County	Cost HMGP Funds	Project Description	Comments
DR-1180	1997	Eau Claire County	Eau Claire	$143,090	Acquisition of 1 residential structure	
DR-1180	1997	Menomonee Falls, Vil.	Waukesha	$1,969,799	Acquisition of 11 residential structures	
DR-1180	1997	Milwaukee, City	Milwaukee	$1,545,412	Acquisition of 19 residential structures; floodproofing of 35 residential structures	
DR-1180	1997	Milwaukee County	Milwaukee	$70,117	Production of flood mitigation video and corresponding brochure; creation of a mitigation educational display for State Fair	
DR-1180	1997	Oak Creek, City	Milwaukee	$112,182	Acquisition of 1 substantially damaged (SD) residential structure in Root River floodway	
DR-1180	1997	Wauwatosa, City	Milwaukee	$2,168,097	Acquisition of 22 residential structures, 1 commercial structure, and 2 vacant parcels	$831,325 provided by HUD Disaster Recovery; $59,735 provided by CDBG; $222,170 provided by DNR
DR-1180	1997	West Allis, City	Milwaukee	$273	Proposed acquisition of 1 residential structure	Owner refused to sell after prolonged effort by City
DR-1236	1998	Brookfield, City	Waukesha	$140,060	Acquisition of 1 residential structure	
DR-1236	1998	Elm Grove, Village	Waukesha	$921,601	Acquisition of 1 residential structure and 1 commercial structure	
DR-1236	1998	Menomonee Falls, Vil	Waukesha	$397,396	Acquisition of 2 residential structures	Continuation of the DR-1180 project for Menomonee Falls
DR-1236	1998	Milwaukee, City	Milwaukee	$91,630	Acquisition of 2 residential structures	Continuation of the DR-1180 project for Milwaukee
DR-1236	1998	New Berlin, City	Waukesha	$93,947	Acquisition of 1 residential structure	
DR-1236	1998	Thiensville, Village	Ozaukee	$123,047	Construction of a detention pond	
DR-1238	1998	Brown Deer, Village	Milwaukee	$1,018,831	Acquisition of 9 residential structures	Local match provided by CDBG
DR-1238	1998	Darlington, City	Lafayette	$117,478	Floodproofing of 1 commercial structure	Partially funded by program revenue from Pierce County DR-994 project
DR-1238	1998	Kenosha County	Kenosha	$1,094,835	Acquisition of 18 residential structures in the Fox River floodway	Local match provided by CDBG
DR-1238	1998	N. Fond du Lac, Vil.	Fond du Lac	$228,063	Acquisition of 2 residential structures	
DR-1238	1998	Sheboygan, City	Sheboygan	$1,873,000	Acquisition of 16 residential structures	
DR-1238	1998	Thiensville, Village	Ozaukee	$60,000	Construction of a detention pond	Supplements for project under 1236-DR
DR-1284	1999	Florence, Town	Florence	$321,884	Closing of a well and opening of a new one	
DR-1284	1999	Head of Lakes Elec.	Douglas	$164,157	Burying of overhead electrical lines	
DR-1284	1999	Superior, City	Douglas	$320,000	Storm sewer project	
DR-1332	2000	Baraboo, City	Sauk	$136,254	Partial demolition of commercial structure	
DR-1332	2000	Crandon, City	Forest	$145,753	Construction of a storm sewer	

TABLE C-1 CONTINUED

Disaster Number	Year	Community	County	Cost HMGP Funds	Project Description	Comments
DR-1332	2000	Cumberland Utility	Vernon	$417,053	Burying of overhead electrical lines	
DR-1332	2000	Dane County EM	Dane	$32,670	Installation of surge protectors on all county sirens	
DR-1332	2000	Eau Claire, City	Eau Claire	$1,537,882	Acquisition of 9 residential structures	
DR-1332	2000	Elm Grove, Village	Waukesha	$721,319	Acquisition of 2 apartment buildings	
DR-1332	2000	Jefferson County	Jefferson	$226,378	Acquisition of 5 residential structures	
DR-1332	2000	Kenosha County	Kenosha	$736,294	Acquisition of 9 residential structures	Local match provided by CDBG
DR-1332	2000	Shell Lake, City	Washburn	$52,036	Relocation of community shelter	
DR-1332	2000	Sun Prairie, City	Dane	$23,171	Providing backflow valves to city residents	
DR-1369	2001	Burnett County	Burnett	$44,265	Purchase/distribution of weather alert radios	
DR-1369	2001	Crawford County	Crawford	$589,503	Acquisition of County Highway maintenance shop	
DR-1369	2001	Dairyland Electric	Vernon	$10,938	Implementation of Hazard Tree Training	
DR-1369	2001	DNR	Richland	$84,390	Acquisition of 1 residential property	
DR-1369	2001	Douglas County	Douglas	$101,202	Acquisition of 1 SD residential property	
DR-1369	2001	Grant County	Grant	$420,966	Acquisition of 3 residential structures	
DR-1369	2001	Grant County	Grant	$32,770	Floodproofing of 1 residential structure	
DR-1369	2001	Jefferson County	Jefferson	$646,232	Acquisition of 4 residential structures	Continuation of Rock River project
DR-1369	2001	Juneau County	Juneau	$164,300	Purchase/installation of 33 tornado shelters	
DR-1369	2001	Kenosha County	Kenosha	$631,323	Acquisition of 5 residential structures	Continuation of Fox River project
DR-1369	2001	Shell Lake, City	Washburn	$250,000	Completion of engineering study for water diversion project	
DR-1369	2001	Superior, City	Douglas	$72,742	Acquisition of 1 residential structure	
DR-1369	2001	Trempealeau County	Trempealeau	$653,916	Acquisition of 7 residential structures and 1 commercial structure	
DR-1429	2002	Curtiss, Village	Clark	$44,194	Acquisition of 1 residential structure	
DR-1429	2002	Curtiss, Village	Clark	$19,621	Completion of engineering study for drainage area	
DR-1429	2002	Elm Grove, Village	Waukesha	$281,351	Acquisition of 1 commercial structure	
DR-1429	2002	Oliver, Village	Superior	$197,568	Acquisition of 2 residential structures	
DR-1432	2002	Ferryville, Village	Crawford	$65,028	Acquisition of 1 residential structure	
DR-1432	2002	Oliver, Village	Superior	$120,895	Acquisition of 1 residential structure	
DR-1432	2002	Osceola, Village	Polk	$408,016	Acquisition of 9 mobile homes and 1 cabin	
DR-1432	2002	Portage County	Portage	$6,800	Purchase/distribution of weather radios	

TABLE C-1 CONTINUED

Disaster Number	Year	Community	County	Cost HMGP Funds	Project Description	Comments
DR-1432	2002	Rusk County	Rusk	$29,244	Purchase/distribution of weather radios	
DR-1432	2002	St. Croix Falls, City	Polk	$84,950	Acquisition of 1 residential structure	
DR-1526	2004	Dodge County	Dodge	$34,508	Purchase/distribution of weather radios	
DR-1526	2004	Ferryville, Village	Crawford	$45,811	Acquisition of 1 residential structure	
DR-1526	2004	Grant County	Grant	$216,346	Acquisition of 3 residential structures	
DR-1526	2004	Jackson County	Jackson	$6,080	Purchase/distribution of weather radios	
DR-1526	2004	Kenosha County	Kenosha	$832,164	Acquisition of 26 residential structures	
DR-1526	2004	Oneida County	Oneida	$25,000	Purchase/distribution of weather radios	
DR-1526	2004	Oshkosh, City	Winnebago	$394,654	Acquisition of 2 residential structures	
DR-1719	2007	Chaseburg, Village	Vernon	$418,813	Acquisition of 9 SD residential properties	
DR-1719	2007	Chaseburg, Village	Vernon	$855,900	Acquisition of 4 commercial properties (2 SD)	
DR-1719	2007	Gays Mills, Village	Crawford	$1,204,314	Acquisition of 19 residential structures and 1 commercial structure	
DR-1719	2007	Gays Mills, Village	Crawford	$225,552	Acquisition of 1 residential structure and elevation of 6 residential structures (7 SD)	
DR-1719	2007	Kenosha County	Kenosha	$1,492,414	Acquisition of 23 residential structures (3 SD)	Requested $3,293,949; also applied to PDM program
DR-1719	2007	Mt. Pleasant, Village	Racine	$241,494	Acquisition of 2 SD residential structures	
DR-1719	2007	Oregon, Village	Dane	$105,920	Acquisition of 1 SD residential structure	
DR-1719	2007	Soldier's Grove, Vil.	Crawford	$173,781	Acquisition of 1 residential property (2 mobile homes); elevation of 4 residential structures	
DR-1719	2007	Vernon County LCD	Vernon	$125,139	Installation of automated high water warning system for 11 dams	
DR-1768	2008	Elroy, City	Juneau	$572,000	Acquisition of 5 SD residential structures	
DR-1768	2008	Excelsior, Town	Sauk	$96,922	Acquisition of 1 SD residential structure	
DR-1768	2008	Fond du Lac, City	Fond du Lac	$1,342,410	Acquisition of 14 SD residential structures	
DR-1768	2008	Gays Mills, Village	Crawford	$1,098,006	Acquisition of 9 SD residential structures, 2 SD commercial structures, and 1 SD publicly-owned building; elevation of 1 SD residential structure	
DR-1768	2008	Grant County	Grant	$467,300	Acquisition of 5 residential structures (2 SD)	
DR-1768	2008	Janesville, City	Rock	$1,244,750	Acquisition of 8 SD residential structures	
DR-1768	2008	Jefferson, City	Jefferson	$499,830	Acquisition of 3 SD residential structures	

TABLE C-1 CONTINUED

Disaster Number	Year	Community	County	Cost HMGP Funds	Project Description	Comments
DR-1768	2008	Jefferson County	Jefferson	$8,774,643	Acquisition of 45 residential structures (35 SD) and 1 SD commercial structure	
DR-1768	2008	Kenosha County	Kenosha	$2,488,118	Acquisition of 16 residential structures (8 SD)	
DR-1768	2008	LaFarge, Village	Vernon	$1,195,675	Acquisition of 14 SD residential structures	
DR-1768	2008	Reedsburg, City	Sauk	$2,602,770	Acquisition of 20 residential structures (17 SD)	
DR-1768	2008	Richland Center, City	Richland	$83,346	Acquisition of 1 residential structure	
DR-1768	2008	Rock County	Rock	$1,075,745	Acquisition of 6 SD residential structures	
DR-1768	2008	Rock Springs, Village	Sauk	$1,376,192	Acquisition of 20 SD residential structures	
DR-1768	2008	Spring Green, Town	Sauk	$4,819,814	Acquisition of 28 residential structures	
DR-1768	2008	Sugar Creek, Town	Walworth	$840,991	Acquisition of 5 SD residential structures	
TOTAL				**$73,045,269**	**104 mitigation projects**	

TABLE C-2 HMGP PLANS FUNDED IN THE STATE

Disaster Number	Year	Community	County	Cost HMGP Funds	New Plan or 5-Year Update	Plan Status
DR-1332	2000	Baraboo, City	Sauk	$16,792	New	Plan is approved
DR-1369	2001	Burnett County	Burnett	$55,947	New	Plan is approved
DR-1369	2001	Dane County	Dane	$40,000	New	Plan is approved
DR-1369	2001	Douglas County	Douglas	$55,314	New	Plan is approved
DR-1369	2001	Grant County	Grant	$57,440	New	Plan is approved
DR-1369	2001	Juneau County	Juneau	$17,311	New	Plan is approved
DR-1369	2001	Shell Lake, City	Washburn	$19,847	New	Plan is approved
DR-1369	2001	Sun Prairie, City	Dane	$2,180	New	Plan is approved
DR-1369	2001	Superior, City	Douglas	$59,266	New	Plan is approved
DR-1429	2002	Crandon, City	Forest	$21,000	New	Plan is approved
DR-1429	2002	Portage County	Portage	$43,875	New	Plan is approved
DR-1432	2002	Polk County	Polk	$40,310	New	Plan is approved
DR-1526	2004	Columbia County	Columbia	$45,000	New	Plan is approved
DR-1526	2004	Dodge County	Dodge	$19,894	New	Plan is approved
DR-1526	2004	Eau Claire County	Eau Claire	$28,907	New	Plan is approved
DR-1719	2007	Crawford County	Crawford	$40,000	Update	

TABLE C-2 CONTINUED

Disaster Number	Year	Community	County	Cost HMGP Funds	New Plan or 5-Year Update	Plan Status
DR-1719	2007	Richland County	Richland	$36,000	New	Plan is approved
DR-1719	2007	Vernon County	Vernon	$40,000	Update	
DR-1768	2008	Avoca, City	Iowa	$28,560	New	
DR-1768	2008	Burnett County	Burnett	$30,000	Update	Meets requirements
DR-1768	2008	Green County	Green	$9,270	Update	Meets requirements
DR-1768	2008	Green Lake County	Green Lake	$36,000	New	
DR-1768	2008	Iowa County	Iowa	$48,360	New	
DR-1768	2008	Juneau County	Juneau	$14,857	Update	Meets requirements
DR-1768	2008	Kenosha County	Kenosha	$40,000	Update	Plan is approved
DR-1768	2008	Milwaukee County	Milwaukee	$11,510	Update	
DR-1768	2008	Rock County	Rock	$30,000	Update	Plan is approved
DR-1768	2008	Sauk County	Sauk	$19,245	Update	
DR-1933	2010	Grant County	Grant	$51,972	Update	
DR-1933	2010	Lincoln County	Lincoln	$35,000	Update	
DR-1933	2010	Northwest Region	Price, Rusk, Sawyer, Taylor	$159,910	New	
DR-1933	2010	Ozaukee County	Ozaukee	$32,800	Update	
DR-1933	2010	Portage County	Portage	$42,027	Update	
TOTAL				**$1,228,594**	**33 local plans**	

$74,273,863 in HMGP project and planning funds have been spent in or allocated to the State, as of June 30, 2011.

TABLE C-3 FLOOD MITIGATION ASSISTANCE (FMA) PROJECTS FUNDED IN THE STATE

Year	Community	County	Cost FMA Funds	Project Description	Comments
1997	Darlington, City	Lafayette	$156,133	Acquisition of 1 commercial structure	
1998	Darlington, City	Lafayette	$420,001	Floodproofing of 1 commercial structure and partial funding for acquisition of 1 repetitive loss commercial structure	Supplemented by FMA 2000 funds; local match provided by global match funds under DR-994
1998	Jefferson County	Jefferson	$115,332	Acquisition of 2 residential structures	Local match provided by global match funds under DR-912 and 994
1999	Kenosha County	Kenosha	$166,800	Acquisition of 2 residential structures	Local match provided by global match funds under DR-1238
2000	Brookfield, City	Waukesha	$46,267	Acquisition of 1 repetitive loss property	Supplemented by FMA 2001 funds
2000	Darlington, City	Lafayette	$151,213	See 1998, Darlington, City above	Local match provided by DNR Urban Rivers Grant
2001	Brookfield, City	Waukesha	$140,219	See 2000, Brookfield, City above	
2001	Kenosha County	Kenosha	$53,448	Acquisition of 1 residential structure	Continuation of Fox River project
2002	Darlington, City	Lafayette	$152,167	Acquisition of Darlington Firehouse	Located in the Pecatonica River floodplain
2003	N. Fond du Lac, Vil.	Fond du Lac	$119,132	Acquisition of 1 residential structure	
2003	WEM	All	$16,320	Technical support for applicants	Personnel, travel, supplies
2005	Jefferson County	Jefferson	$143,349	Acquisition of 1 residential structure	
2005	WEM	All	$11,464	Technical assistance to subgrantees	Personnel, travel, supplies
2006	Kenosha County	Kenosha	$ -	Acquisition of 1 residential structure	Grant funds returned because negotiations with property owner failed
2007	Kenosha County	Kenosha	$124,767	Acquisition of 1 residential structure	
2007	WEM	All	$4,020	Technical assistance to subgrantees	Personnel, travel, supplies
2009	Darlington, City	Lafayette	$153,000	Acquisition of 1 commercial structure	
2010	Monona, City	Dane	$134,348	Elevation of 1 residential structure	
2010	WEM	All	$8,994	Technical assistance to subgrantees	Personnel, travel, supplies
TOTAL			**$2,116,974**	**19 mitigation projects**	

TABLE C-4 FMA PLANS FUNDED IN THE STATE

Year	Community	County	Cost FMA Funds	Plan Status
1996/1997	Kenosha County	Kenosha	$6,000	Plan is approved
1996/1997	Ozaukee County	Ozaukee	$9,733	Plan is approved
1998	Crawford County	Crawford	$17,333	Plan is approved
1998	Eau Claire County	Eau Claire	$8,433	Plan is approved
1998	Jefferson County	Jefferson	$15,239	Plan is approved
1999	Milwaukee, City	Milwaukee	$5,000	Plan is approved
1999	Brookfield, City	Waukesha	$10,000	Plan is approved
2000	N. Fond du Lac, Vil	Fond du Lac	$12,743	Plan is approved
2000	Oak Creek, City	Milwaukee	$5,000	Plan is approved
2001	Eau Claire, City	Eau Claire	$19,009	Plan is approved
2002	Dane County	Dane	$18,400	Plan is approved
2005	La Crosse, City	LaCrosse	$13,399	Part of County plan, plan is approved
2006	Clark County	Clark	$12,139	Part of County plan, plan is approved
TOTAL			**$152,428**	**13 local flood mitigation plans**

FMA planning grants can only be used for flood mitigation plans or plan sections. Because most counties in the state now use all-hazards mitigation plans which include flood hazards, planning funds that can only be used for flood mitigation plans are no longer applied for.

$2,021,058 in FMA project and planning funds have been spent in or allocated to the State as of June 30, 2011.

TABLE C-5 PRE-DISASTER MITIGATION (PDM) PROJECTS FUNDED IN THE STATE

Year	Community	County	Cost PDM Funds	Project Description	Comments
2002	WEM	All	$15,520	Technical assistance	Personnel, travel, and supplies
2002	Mississippi River RPC	All	$50,000	Creation of local all-hazards mitigation planning guidance	
2003	WEM	All	$32,834	Technical assistance	Personnel, travel, and supplies
2003C	Barron County	Barron	$138,600	Burying of power lines	
2003C	Deer Park, Village	St. Croix	$109,880	Acquisition of 1 residential structure	90% federally funded because community was designated impoverished
2003C	Kenosha County	Kenosha	$390,073	Acquisition of 3 residential structures and 5 vacant parcels	
2003C	Middleton, City	Dane	$17,212	Drainage remediation	
2003C	Portage County	Portage	$787,653	Burying of power lines	
2003C	Thiensville, Village	Ozaukee	$2,308,620	Channelization of flood area	
2003C	WEM	All	$176,812	Technical assistance	Personnel, travel, and supplies
2005C	Darlington, City	Lafayette	$ -	Acquisition of 1 residential structure	Project owner rejected offer; funds returned
2005C	Monona, City	Dane	$91,600	Installation of two lift stations	
2005C	State of Wisconsin	All	$182,010	Development of structure inventory database	
2005C	WEM	All	$88,480	Technical assistance	Personnel, travel, and supplies
2006C	Darlington, City	Lafayette	$65,000	Acquisition of 1 residential structure	
2006C	WEM	All	$22,141	Technical assistance	Personnel, travel, and supplies
2007C	Dunn, Town	Dane	$650,500	Construction of community storm shelter	
2007C	WEM	All	$70,092	Technical assistance	Personnel, travel, and supplies
2008C	WEM	All	$23,897	Technical assistance	Personnel, travel, and supplies
2008C	Stanley, City		$238,344	Installation of sirens and generator	Legislative PDM (LPDM) grant
2008C	WEM		$18,906	Technical assistance	LPDM; personnel, travel, and supplies
2009C	WEM	All	$25,579	Technical assistance	Personnel, travel, and supplies
2009C	Clark County	Clark	$229,883	Installation of sirens	LPDM
2009C	Clark County	Clark	$169,500	Installation of generator	LPDM
2009C	WEM	Clark	$17,026	Technical assistance	LPDM; personnel, travel, and supplies
2010C	UW - River Falls		$93,593	Construction of 2 safe rooms	
2010C	WEM	All	$47,859	Technical assistance	Personnel, travel, and supplies
TOTAL			**$5,970,014**	**11 technical assistance grants; 15 mitigation projects**	

TABLE C-6 PDM PLANS FUNDED IN THE STATE					
Year	Community	County	Cost PDM Funds	New Plan or 5-Year Update	Plan Status
2002	Adams County	Adams	$40,398	New	Plan is approved
2002	Bayfield County	Bayfield	$44,000	New	Plan is approved
2002	Chippewa County	Chippewa	$38,596	New	Plan is approved
2002	Clark County	Clark	$20,736	New	Plan is approved
2002	Crawford County	Crawford	$40,000	New	Plan is approved
2002	Darlington, City	Lafayette	$14,700	New	Plan is approved
2002	Elm Grove, Village	Waukesha	$4,369	New	Plan is approved
2002	Fond du Lac County	Fond du Lac	$73,154	New	Plan is approved
2002	Green County	Green	$10,406	New	Plan is approved
2002	Kenosha County	Kenosha	$24,200	New	Plan is approved
2002	Milwaukee, City	Milwaukee	$23,000	New	Plan is approved
2002	N. Fond du Lac, Vil	Fond du Lac	$13,027	New	Plan is approved
2002	Oneida County	Oneida	$28,465	New	Plan is approved
2002	Rock County	Rock	$17,600	New	Plan is approved
2002	Sheboygan, City	Sheboygan	$30,156	New	Plan is approved
2002	Trempealeau County	Trempealeau	$64,000	New	Plan is approved
2002	Vernon County	Vernon	$63,256	New	Plan is approved
2002	Winnebago County	Winnebago	$58,849	New	Plan is approved
2003	Barron County	Barron	$31,619	New	Plan is approved
2003	Lincoln County	Lincoln	$25,000	New	Plan is approved
2003	Marathon County	Marathon	$67,283	New	Plan is approved
2003	Milwaukee County	Milwaukee	$27,927	New	Plan is approved
2003	Pierce County	Pierce	$48,000	New	Plan is approved
2003	Sauk County	Sauk	$12,750	New	Plan is approved
2003	Wood County	Wood	$44,000	New	Plan is approved
2003C	Calumet County	Calumet	$30,000	New	Plan is approved
2003C	Florence County	Florence	$45,000	New	Plan is approved
2003C	Ho-Chunk Nation	Tribal	$71,850	New	Plan is approved; Ho-Chunk provided 31.08% of cost
2003C	Kewaunee County	Kewaunee	$36,000	New	Plan is approved
2003C	Lac du Flambeau	Tribal	$34,817	New	Plan is approved

TABLE C-6 CONTINUED					
Year	Community	County	Cost PDM Funds	New Plan or 5-Year Update	Plan Status
2005C	Brown County	Brown	$99,268	New	Plan is approved
2005C	Buffalo County	Buffalo	$60,000	New	Plan is approved
2005C	Dunn County	Dunn	$31,000	New	Plan is approved
2005C	Forest County	Forest	$30,000	New	Plan is approved
2005C	Iron County	Iron	$27,573	New	Plan is approved
2005C	Jackson County	Jackson	$59,627	New	Plan is approved
2005C	Jefferson County	Jefferson	$58,900	New	Plan is approved
2005C	Lacrosse County	Lacrosse	$80,000	New	Plan is approved
2005C	Lafayette County	Lafayette	$14,000	New	Never completed, funds returned
2005C	Langlade County	Langlade	$30,000	New	Plan is approved
2005C	Manitowoc County	Manitowoc	$95,133	New	Plan is approved
2005C	Marinette County	Marinette	$50,000	New	Plan is approved
2005C	Ozaukee County	Ozaukee	$50,000	New	Plan is approved
2005C	Sheboygan County	Sheboygan	$53,000	New	Plan is approved
2005C	Waupaca County	Waupaca	$ -	New	County withdrew
2005C	Waushara County	Waushara	$37,000	New	Plan is approved
2006C	St. Croix County	St. Croix	$42,799	New	Plan is approved
2006C	Washburn County	Washburn	$44,000	New	Plan is approved
2006C	Shawano County	Shawano	$69,613	New	At FEMA for review
2007C	Dane County	Dane	$195,331	Update	Update is approved
2007C	Marquette County	Marquette	$34,028	New	Plan is approved
2007C	Monona, City	Dane	$47,560	New	Incorporated into Dane County's plan
2007C	Oconto County	Oconto	$79,641	New	Plan is approved
2007C	Outagamie	Outagamie	$95,720	New	In planning process
2007C	UW River Falls	Pierce	$24,990	New	Plan is approved
2007C	Walworth County	Walworth	$41,878	New	Plan is approved
2007C	Waukesha	Waukesha	$63,977	New	Plan is approved
2007C	WEM	All	$402,574	Update	Agreement with UW for HAZUS flood risk assessment
2008C	Adams County	Adams	$40,000	Update	Update is approved
2008C	Clark County	Clark	$31,895	Update	Update is approved

TABLE C-6 CONTINUED					
Year	**Community**	**County**	**Cost PDM Funds**	**New Plan or 5-Year Update**	**Plan Status**
2008C	Darlington, City	Lafayette	$19,597	Update	Update is approved
2008C	Fond du Lac County	Fond du Lac	$42,324	Update	Update is approved
2008C	Oneida County	Oneida	$40,000	Update	Update is approved
2008C	Racine County	Racine	$40,000	Update	Update is approved
2008C	Winnebago County	Winnebago	$21,290	Update	Update is approved
2009C	Barron County	Barron	$29,976	Update	In planning process
2009C	Douglas County	Douglas	$31,122	Update	In planning process
2009C	Eau Claire, City	Eau Claire, Chippewa	$29,990	New	In planning process
2009C	Marathon County	Marathon	$79,918	Update	In planning process
2009C	Pepin County	Pepin	$70,965	New	In planning process
2009C	Polk County	Polk	$34,250	Update	In planning process
2009C	Superior, City	Douglas	$37,148	Update	In planning process
2009C	Trempealeau County	Trempealeau	$40,000	Update	In planning process
2010C	Ashland County	Ashland	$51,020	New	In planning process
2010C	Chippewa County	Chippewa	$32,640	Update	In planning process
2010C	Dodge County	Dodge	$22,976	Update	In planning process
2010C	Kewaunee County	Kewaunee	$23,038	Update	In planning process
2010C	Milwaukee, City	Milwaukee	$40,000	Update	In planning process
2010C	Pierce County	Pierce	$22,373	Update	In planning process
2010C	Sheboygan, City	Sheboygan	$31,772	Update	In planning process
2010C	UW - Madison	Dane	$346,707	New	In planning process
2010C	Wood County	Wood	$22,847	Update	In planning process
TOTAL			**$4,182,618**	**82 local plans**	

$10,152,632 in PDM project and planning funds have been spent in or allocated to the State as of June 30, 2011.

TABLE C-7 COMMUNITY DEVELOPMENT BLOCK GRANT (CDBG) PUBLIC FACILITIES (PF) PROJECTS

Contract	Applicant	County	Award	Project Description
FY94-0096	Adams County	Adams	$255,000	Construct storm sewer to serve Front, Main, North, and Roberts Streets
FY94-0075	Appleton, City	Outagamie	$15,225	Relocate main sewer and stabilize slope to prevent mudslide in Allicia Park
FY94-0081	Black River Falls, City	Jackson	$623,063	Reconstruct levee and add floodwall to dam
FY94-0085	Lake Delton, Village	Sauk	$6,331	Dredge Lake Delton and stabilize slope in a ravine (administration only)
FY95-0035	Augusta, City	Eau Claire	$59,555	Install storm sewer
FY95-0027	Baraboo, City	Sauk	$339,797	Stabilize slope, install storm sewers, reconstruct well, and install pump house controls
FY95-0022	Baraboo, Town	Sauk	$172,000	Stabilize slopes where flood-induced erosion threatens homes
FY95-0030	Black River Falls, City	Jackson	$500,000	Install supplemental levee, replace infrastructure
FY95-0037	Darlington, City	Lafayette	$355,584	Provide professional project management for business relocation, acquisition and demolition; floodproof 41 downtown businesses
FY95-0039	Deforest, Village	Dane	$495,000	Install storm sewer, expand detention ponds
FY95-0040	Lyndon Station, Village	Juneau	$277,500	Install storm sewer
FY95-0032	Portage County	Portage	$181,000	Provide homeowner assistance, street repairs, and repair of Jordan Dam
FY95-0041	Prairie du Chien, City	Crawford	$266,175	Perform acquisition and relocation and other housing projects
FY97-0005	Blair, City	Trempealeau	$109,173	Carry out flood mitigation project
FY97-0291	Oakfield, Village	Fond du Lac	$72,000	Purchase and demolish Oakfield Middle School destroyed in 7/18/96 tornado, construct stormwater detention basin and park in its place
FY99-0504	Menomonee Falls, Vil.	Waukesha	$171,261	Acquire two of ten floodplain properties (land and buildings)
FY04-10234	Shell Lake, City	Washburn	$750,000	Construct a drainage pipe to lower lake levels to relieve the flooding
TOTAL			**$4,648,664**	

TABLE C-8 CDBG EMERGENCY ASSISTANCE PROGRAM (EAP) PROJECTS

Contract/ EAP #	Grantee Name	County	Award Amount	Project Description
87039	Fond du Lac County	Fond du Lac	$500,000	Rehabilitation of damaged housing units, demolition and clearance of uninhabitable housing units, and construction of replacement housing units
87195.02	Germantown, Village	Washington	$453,750	Rehabilitation of damaged housing units, demolition and clearance of uninhabitable housing units, and construction of replacement housing units
87195.26	Rock County	Rock	$495,000	Rehabilitation of damaged housing units, replacement of wells/septic systems and water/sewer lines, demolition and clearance of hazardous structures, and acquisition/relocation
88195.01	Door County	Door	$495,000	Rehabilitation of damaged housing units, replacement of wells and septic systems, and construction of replacement housing units

TABLE C-8 CONTINUED				
Contract/ EAP #	Grantee Name	County	Award Amount	Project Description
88195.02	Sheboygan County	Sheboygan	$495,000	Rehabilitation of damaged housing units, replacement of wells/septic systems and water/sewer lines, demolition and clearance of hazardous structures
89195.01	Wheatland, Town	Kenosha	$500,000	Acquire/demolish homes/hazardous structures and provide relocation assistance to homeowners
89195.02	Kenosha County	Kenosha	$648,000	Acquire/demolish homes/hazardous structures and provide relocation assistance to homeowners
89195.03	Oregon, Village	Dane	$500,000	Acquire/demolish homes/hazardous structures and provide relocation assistance to homeowners
89195.04	Florence County	Florence	$352,000	Rehabilitation of damaged housing units
89195.05	Ashland County	Ashland	$500,000	Rehabilitation of damaged housing units, replacement of wells and septic systems, demolition and clearance of hazardous structures, construction of replacement housing units OR acquisition/relocation
80195.01	Manitowoc County	Manitowoc	$249,700	Rehabilitation of damaged housing units, replacement of wells/septic systems and water/sewer lines, construction of replacement housing units, demolition and clearance of hazardous structures, and acquisition/relocation
80195.02	Baraboo, City	Sauk	$137,500	Rehabilitation of damaged housing units and replacement of wells/septic systems and water/sewer lines
80195.03	Grant County	Grant	$363,000	Rehabilitation of damaged housing units, replacement of wells/septic systems and water/sewer lines, construction of replacement housing units, demolition and clearance of hazardous structures, and acquisition/relocation
80195.04	Kenosha County	Kenosha	$250,000	Acquisition/relocation and demolition and clearance of hazardous structures
80195.05	Vernon County	Vernon	$220,000	Rehabilitation of damaged housing units, replacement of wells/septic systems and water/sewer lines, construction of replacement housing units, demolition and clearance of hazardous structures, and acquisition/relocation
80195.06	Chippewa County	Chippewa	$110,000	Rehabilitation of damaged housing units and replacement of wells/septic systems and water/sewer lines
81195.01	Prairie du Chien, City	Crawford	$335,000	Rehabilitation of damaged housing units, replacement of wells/septic systems and water/sewer lines, construction of replacement housing units, demolition and clearance of hazardous structures, and acquisition/relocation
81195.02	Burnett County	Burnett	$750,000	Rehabilitation of damaged housing units, replacement of wells/septic systems and water/sewer lines, construction of replacement housing units, demolition and clearance of hazardous structures, and acquisition/relocation
81195.03	Washburn County	Washburn	$250,000	Rehabilitation of damaged housing units, replacement of wells/septic systems and water/sewer lines, construction of replacement housing units, demolition and clearance of hazardous structures, and acquisition/relocation
81195.04	Siren, Village	Burnett	$250,000	Rehabilitation of damaged housing units, replacement of wells/septic systems and water/sewer lines, construction of replacement housing units, demolition and clearance of hazardous structures, and acquisition/relocation
81195.05	Rusk County	Rusk	$720,000	Rehabilitation of damaged housing units, replacement of wells/septic systems and water/sewer lines, construction of replacement housing units, demolition and clearance of hazardous structures, and acquisition/relocation
81195.06	Trempealeau County	Trempealeau	$41,375	Acquisition/relocation and demolition and clearance of hazardous structures

TABLE C-8 CONTINUED				
Contract/ EAP #	Grantee Name	County	Award Amount	Project Description
83011.01	Kronenwetter, Town	Marathon	$110,000	Rehabilitation of damaged housing units, replacement of wells/septic systems and water/sewer lines, construction of replacement housing units, demolition and clearance of hazardous structures, and acquisition/relocation
83011.02	Marinette County	Marinette	$220,000	Rehabilitation of damaged housing units, replacement of wells/septic systems and water/sewer lines, construction of replacement housing units, demolition and clearance of hazardous structures, and acquisition/relocation
83011.03	Portage County	Portage	$110,000	Rehabilitation of damaged housing units, replacement of wells/septic systems and water/sewer lines, construction of replacement housing units, demolition and clearance of hazardous structures, and acquisition/relocation
83001.04	Ladysmith, City	Rusk	$500,000	Rehabilitation of damaged housing units, replacement of wells/septic systems and water/sewer lines, construction of replacement housing units, demolition and clearance of hazardous structures, and acquisition/relocation
83011.05	Taylor County	Taylor	$120,438	Rehabilitation of damaged housing units, replacement of wells/septic systems and water/sewer lines, construction of replacement housing units, demolition and clearance of hazardous structures, and acquisition/relocation
83011.06	Osceola, Village	Polk	$187,000	Acquisition/relocation and demolition and clearance of hazardous structures
Pending	Shell Lake, City	Washburn		Acquisition/relocation and demolition and clearance of hazardous structures
EAP #04-01	Marinette County	Marinette	$220,000	Rehabilitation of damaged housing units, replacement of wells/septic systems and water/sewer lines, construction of replacement housing units, demolition and clearance of hazardous structures, and acquisition/relocation
EAP #04-01	Two Rivers, City	Manitowoc	$110,000	Rehabilitation of homes damaged by sewer back-up caused by broken water main
EAP #04-02	Antigo, City	Langlade	$165,000	Rehabilitation of damaged housing units, replacement of wells/septic systems and water/sewer lines, construction of replacement housing units, demolition and clearance of hazardous structures, and acquisition/relocation
EAP #05-01	Randolph, Village	Columbia, Dodge	$385,000	Rehabilitation of damaged housing units, replacement of wells/septic systems and water/sewer lines, construction of replacement housing units, demolition and clearance of hazardous structures, and acquisition/relocation
EAP #05-03	Berlin, City	Green Lake, Waushara	$356,314	Rehabilitation of damaged housing units, replacement of wells/septic systems and water/sewer lines, construction of replacement housing units, demolition and clearance of hazardous structures, and acquisition/relocation
EAP #05-04	Green Lake County	Green Lake	$275,000	Rehabilitation of damaged housing units, replacement of wells/septic systems and water/sewer lines, construction of replacement housing units, demolition and clearance of hazardous structures, and acquisition/relocation
EAP #05-05	Grant County	Grant	$297,000	Rehabilitation of damaged housing units, replacement of wells/septic systems and water/sewer lines, construction of replacement housing units, demolition and clearance of hazardous structures, and acquisition/relocation

TABLE C-8 CONTINUED				
Contract/ EAP #	Grantee Name	County	Award Amount	Project Description
EAP #05-06	Kenosha County	Kenosha	$109,000	Rehabilitation of damaged housing units, replacement of wells/septic systems and water/sewer lines, construction of replacement housing units, demolition and clearance of hazardous structures, and acquisition/relocation
EAP #06-01	Adams County	Adams	$220,000	Rehabilitation of damaged housing units, replacement of wells/septic systems and water/sewer lines, construction of replacement housing units, demolition and clearance of hazardous structures, and acquisition/relocation
EAP #06-02	Richland/Vernon Counties	Richland, Vernon	$821,810	Rehabilitation of damaged housing units, replacement of wells/septic systems and water/sewer lines, construction of replacement housing units, demolition and clearance of hazardous structures, and acquisition/relocation
EAP #06-03	Columbia County	Columbia	$75,000	Rehabilitation of damaged housing units, replacement of wells/septic systems and water/sewer lines, construction of replacement housing units, demolition and clearance of hazardous structures, and acquisition/relocation
FY06-12097	Viola, Village	Richland	$600,000	Rehabilitation of damaged housing units, replacement of wells/septic systems and water/sewer lines, construction of replacement housing units, demolition and clearance of hazardous structures, and acquisition/relocation
EAP #07-01	Langlade County Housing	Langlade	$110,000	Rehabilitation of damaged housing units, replacement of wells/septic systems and water/sewer lines, construction of replacement housing units, demolition and clearance of hazardous structures, and acquisition/relocation
EAP #07-02	Town of Riverview Housing	Oconto	$466,620	Rehabilitation of damaged housing units, replacement of wells/septic systems and water/sewer lines, construction of replacement housing units, demolition and clearance of hazardous structures, and acquisition/relocation
EAP #07-03	Grant County (Bagley)	Grant	$1,011,500	Rehabilitation of damaged housing units, replacement of wells/septic systems and water/sewer lines, construction of replacement housing units, demolition and clearance of hazardous structures, acquisition/ relocation, and LiDAR
EAP #07-04	La Crosse County	La Crosse	$644,500	Rehabilitation of damaged housing units, replacement of wells/septic systems and water/sewer lines, construction of replacement housing units, demolition and clearance of hazardous structures, and acquisition/relocation
EAP #07-05	Vernon County	Vernon	$10,911,363	Rehabilitation of damaged housing units, replacement of wells/septic systems and water/sewer lines, construction of replacement housing units, demolition and clearance of hazardous structures, acquisition/ relocation, dam repairs, lake dredging, LiDAR
EAP #07-06	Richland County	Richland	$467,500	Rehabilitation of damaged housing units, replacement of wells/septic systems and water/sewer lines, construction of replacement housing units, demolition and clearance of hazardous structures, and acquisition/relocation
EAP #07-07	Village of Gays Mills	Crawford	$3,586,900	Rehabilitation of damaged housing units, replacement of wells/septic systems and water/sewer lines, construction of replacement housing units, demolition and clearance of hazardous structures, and acquisition/relocation

TABLE C-8 CONTINUED				
Contract/ EAP #	Grantee Name	County	Award Amount	Project Description
EAP #07-08	Crawford County	Crawford	$700,000	Rehabilitation of damaged housing units, replacement of wells/septic systems and water/sewer lines, construction of replacement housing units, demolition and clearance of hazardous structures, acquisition/ relocation, Kickapoo River mitigation, LiDAR
EAP #07-09	Village of Chaseburg	Vernon	$432,000	Rehabilitation of damaged housing units, replacement of wells/septic systems and water/sewer lines, construction of replacement housing units, demolition and clearance of hazardous structures, and acquisition/relocation
EAP #07-10	Green County	Green	$646,760	Rehabilitation of damaged housing units, replacement of wells/septic systems and water/sewer lines, construction of replacement housing units, demolition and clearance of hazardous structures, acquisition/ relocation, and LiDAR
EAP #07-11	Kenosha County	Kenosha	$900,108	Rehabilitation of damaged housing units, acquisition/demolition/relocation, LiDAR
FY07-18182	Town of Riverview Fire	Oconto	$180,407	Rehabilitation of damaged housing units, replacement of wells/septic systems and water/sewer lines, construction of replacement housing units, demolition and clearance of hazardous structures, and acquisition/relocation
EAP #08-01	Columbia County	Columbia	$2,831,535	Rehabilitation of damaged housing units, replacement of wells/septic systems and water/sewer lines, construction of replacement housing units, demolition and clearance of hazardous structures, acquisition/ relocation, dam and erosion assistance, LiDAR
EAP #08-02	Marquette County	Marquette	$275,000	Rehabilitation of damaged housing units
EAP #08-03	Adams County	Adams	$198,000	Rehabilitation of damaged housing units
EAP #08-04	Fond du Lac County	Fond du Lac	$700,000	Rehabilitation of damaged housing units, LiDAR
EAP #08-05	Juneau County	Juneau	$851,912	Rehabilitation of damaged housing units, LiDAR
EAP #08-06	Sauk County	Sauk	$9,154,551	Rehabilitation of damaged housing units, acquisition and demolition, public facilities river clean-up, flood studies and mitigation, LiDAR
EAP #08-07	Dodge County	Dodge	$665,000	Rehabilitation of damaged housing units
EAP #08-08	Green Lake County	Green Lake	$275,000	Rehabilitation of damaged housing units
EAP #08-09	Racine County	Racine	$277,000	Rehabilitation of damaged housing units, LiDAR
EAP #08-10	Rock County	Rock	$1,490,942	Rehabilitation of damaged housing units, acquisition/demolition/relocation, LiDAR
EAP #08-11	Iowa County	Iowa	$1,027,992	Rehabilitation of damaged housing units, LiDAR
EAP #08-12	Manitowoc County	Manitowoc	$302,500	Rehabilitation of damaged housing units, sewers, public facilities
EAP #08-13	Walworth County	Walworth	$474,000	Rehabilitation of damaged housing units, acquisition and demolition
EAP #08-14	Jefferson County	Jefferson	$2,309,000	Commercial property acquisition and relocation, lift station, LiDAR
EAP #08-15	Lake Delton, Village	Sauk	$883,262	River dredging, dam, utilities, ravine
EAP #08-16	La Farge, Village	Vernon	$523,000	Rehabilitation of damaged housing units, acquisition and demolition
EAP #08-17	Spring Green, Village	Sauk	$2,070,237	Drainage, acquisition and demolition

TABLE C-8 CONTINUED				
Contract/ EAP #	Grantee Name	County	Award Amount	Project Description
EAP #08-18	Bayside, Village	Milwaukee, Ozaukee	$59,200	Storm sewer
EAP #08-19	Janesville, City	Rock	$2,475,887	Rehabilitation of damaged housig units, acquisition/demolition/relocation, storm sewer relocation, public facilities library and senior center
EAP #08-20	West Allis, City	Milwaukee	$6,227,000	Rehabilitation of damaged housing units, acquisition/demolition/relocation, public facilities, catch basin, relief sewer
EAP #08-21	Beloit, City	Rock	$45,000	Lift station repairs
EAP #08-22	Rock Springs, Village	Sauk	$1,412,900	Acquisition and demolition, sewer repairs
EAP #08-23	Mauston, City	Juneau	$1,321,000	Storm sewers, detention basin, riverbank flood mitigation
EAP #08-24	Sheboygan, City	Sheboygan	$402,000	Storm sewer
EAP #08-25	Waukesha County	Waukesha	$3,533,120	Rehabilitation of damaged housing units, stormwater management, dam repairs, detention pond, LiDAR
EAP #08-28	Jefferson, City	Jefferson	$2,161,927	Wastewater treatment, commercial acquisition, flood mitigation, floodproofing, acquisition and demolition
EAP #08-29	Reedsburg, City	Sauk	$2,467,681	Acquisition and demolition, public facilities storm sewers and wells
EAP #08-30	Fond du Lac, City	Fond du Lac	$208,300	Acquisition and demolition
EAP #08-31	Beaver Dam, City	Dodge	$1,857,000	Mitigation
EAP #08-32	Wisconsin Dells, City	Sauk	$1,000,000	Lift station
EAP #08-34	Fox Point, Village	Milwaukee	$75,000	Public facilities channel and storm grate installation
EAP #08-35	Dane County	Dane	$1,908,790	Acquisition/demolition/relocation, public facilities, LiDAR
EAP #08-36	Adams County	Adams	$262,600	LiDAR
EAP #08-37	Lafayette County	Lafayette	$247,920	LiDAR
EAP #08-38	Milwaukee County	Milwaukee	$94,380	LiDAR
EAP #08-39	Monroe County	Monroe	$658,390	Rehabilitation of damaged housing units, replacement of wells/septic systems and water/sewer lines, construction of replacement housing units, demolition and clearance of hazardous structures, and acquisition/relocation, LiDAR
EAP #08-41	Avoca, Village	Grant, Iowa	$1,700,000	Public facilities drainage swale, flood control
EAP #08-42	Elroy, City	Juneau	$166,500	Public facilities protection of power plant, acquisition and demolition
EAP #08-43	Neshkoro, Village	Dodge	$200,000	Mitigation
EAP #08-44	Oshkosh, City	Winnebago	$1,000,000	Detention pond
EAP #08-45	Waterford, Village	Racine	$1,108,200	Public facilities pump station
EAP #08-46	Viola, Village	Richland	$573,092	Lift station repairs, floodproofing, backwater shutoff valve
EAP #08-50	Kendall, Village	Monroe	$740,000	Lift station replacement
EAP #08-51	Milwaukee, City	Milwaukee	$8,450,000	Rehabilitation of damaged housing units, acquisition and demolition, flood mitigation

TABLE C-8 CONTINUED				
Contract/ EAP #	**Grantee Name**	**County**	**Award Amount**	**Project Description**
EAP #08-52	La Valle, Village	Sauk	$210,000	Storm sewer and street repairs
EAP #08-57	Fall River, Village	Columbia	$1,297,000	Relocation of lift station, dam repairs
EAP #08-58	Westfield, Village	Marquette	$500,000	Sewer and lift station upgrades
EAP #08-60	Richland Center, City	Richland	$179,000	Senior center, flood warning system
EAP #08-62	Hustisford, Village	Dodge	$57,584	Dam and embankment repairs
EAP #08-63	Waterloo, City	Jefferson	$370,000	Acquisition/demolition/relocation
EAP #08-64	Jefferson, Town	Monroe	$14,868	Public facilities
EAP #08-67	Thiensville, Village	Ozaukee	$505,000	Detention pond improvements
EAP #08-68	Pleasant Prairie, Village	Kenosha	$794,300	Rehabilitation of damaged housing units, stormwater management
EAP #08-71	Port Washington, City	Ozaukee	$206,000	Drainage improvements
EAP #08-74	Richland County	Richland	$2,712,500	Rehabilitation of damaged housing units, elevation, acquisition and demolition, LiDAR, mitigation study
TOTAL			**$105,065,615**	

Approximately $109,714,279 in CDBG funds for projects with mitigation components has been spent in or allocated to the State as of June 30, 2011. This list is only an estimate for two reasons: First, some of the award amounts listed include non-mitigation projects, but the amount spent on mitigation projects was inextricable so the entire amount is listed; Second, some projects were omitted from the list because the mitigation component was relatively small.

Table D.7 lists the CDBG-PF funds only through 2004 because relevant PF project awards are added into the EAP award amounts for all subsequent years.

LiDAR stands for Light Detection and Ranging and is used to create accurate floodplain and other topographical maps.

TABLE C-9 MUNICIPAL FLOOD CONTROL GRANT PROGRAM PROJECTS, 2002-2011					
Year	Grant Number	Community	County	Funds	Description
2002-03	MFC-70266-A-02	Oshkosh, City	Winnebago	$125,315.00	1 vacant land acquisition
2002-03	MFC-65282-A-02	Shell Lake, City	Washburn	$116,921.30	2 acquisitions
2002-03	MFC-66181-A-02	Slinger, Village	Washington	$69,707.19	1 vacant land acquisition
2004-05	MFC-54106-04	Bruce, Village	Rusk	$283,423.90	Flood control structure
2004-05	MFC-22111-04	Cassville, Village	Grant	$50,135.40	Flood control structure
2004-05	MFC-23251-04-30th	Monroe, City	Green	$369,442.50	3 acquistions; construction of flood control basin
2004-05	MFC-23251-04-Villa	Monroe, City	Green	$68,180.00	Acquisition of vacant land and construction of detention basin
2004-05	MFC-51008-04	Mt. Pleasant, Town	Green	$394,040.00	12 acquisitions, 1 easement, 1 channel
2004-05	MFC-70266-04-Anch	Oshkosh, City	Winnebago	$800,000.00	Channel restoration project
2004-05	MFC-70266-04-Saw	Oshkosh, City	Winnebago	$0.00	FEMA to fund entire project
2006-07	MFC-53206-06	Beloit, City	Rock	$800,000.00	Parking deck
2006-07	MFC-33216-06	Darlington, City	Lafayette	$1,715.00	Property acquisition
2006-07	MFC-67206-06	Brookfield, City	Waukesha	$207,922.50	Dam removal, channel restoration
2006-07	MFC-22026-05	Jamestown, Town	Grant	$0.00	Property acquisition - negotiations with property owner failed
2006-07	MFC-67261-06	New Berlin, City	Waukesha	$129,317.06	Property acquisition
2006-07	MFC-22046-05	Paris, Town	Kenosha	$43,584.80	Property acquisition
2006-07	MFC-47271-06	Prescott, City	Pierce	$171,998.30	Elevations, property owner died, not completed
2006-07	MFC-40291-06	Wauwatosa, City	Milwaukee	$800,000.00	Work started late, grant still open
2006-07	MFC-30016-06	Wheatland, Town	Kenosha	$0.00	Fox River mitigation - negotiations with property owner failed
2008-09	MFC-30016-08	Wheatland, Town	Kenosha	$546,985.10	2 acquisitions
2008-09	MFC-62111-08	Chaseburg, Village	Vernon	$247,292.92	2 acquisitions
2008-09	MFC-12131-08	Gays Mills, Village	Crawford	$128,590.00	2 acquisitions
2008-09	MFC-32246-08	LaCrosse, City	La Crosse	$439,553.00	1 acquisition
2008-09	MFC-13165-08	Oregon, Village	Dane	$474,497.30	4 acquisitions
2008-09	MFC-09211-08	Chippewa Falls, City	Chippewa	$200,000.00	3 commercial acquisitions
2008-09	MFC-08201-08	Appleton, City	Outagamie	$200,000.00	Floodplain lowering, channel restoration
2008-09	MFC-51151-08	Mt. Pleasant, Village	Racine	$200,000.00	River restoration
2008-09	MFC-22153-08	Muscoda, Village		$167,665.42	Dam removal
2008-09	MFC-53012-08	Fulton, Town		$0.00	Vacant land acquisition - withdrawn
2008-09	MFC-70266-08	Oshkosh, City	Winnebago	$200,000.00	Basin drainage improvements

2008-09	MFC-49191-08	Whiting, Village		$125,000.00	Drainage improvements
2010-11	MFC-13050-10	Roxbury, Town		$650,000.00	Up to 8 acquisitions
2010-11	MFC-12131-10	Gays Mills, Village	Crawford	$305,600.00	3 acquisitions
2010-11	MFC-13111-10	Cambridge, Village	Dane	$226,247.00	Reclamation project
2010-11	MFC-M40702-10	MMSD	Milwaukee	$595,000.00	8 acquisitions
2010-11	MFC-63146-10	La Farge, Village	Vernon	$160,755.00	5 acquisitions
2010-11	MFC-32246-10	LaCrosse, City	La Crosse	$262,710.00	2 acquisitions
2010-11	MFC-13028-10	Dunn, Town	Dane	$98,939.96	1 acquisition
2010-11	MFC-68261-10	New Berlin, City	Waukesha	$160,020.00	1 acquisition
2010-11	MFC-68206-10	Brookfield, City	Waukesha	$197,305.50	Flood control project
2010-11	MFC-12131B-10	Gays Mills, Village	Crawford	$71,946.00	Flood proofing
2010-11	MFC-63146B-10	Village of La Farge	Vernon	$53,900.00	Elevation
2010-11	MFC-33216-10	Darlington, City	Lafayette	$542,360.00	Flood proofing
TOTAL				**$10,686,070.15**	**43 mitigation projects**

$10,686,070.15 has been spent in or allocated in the state for flood mitigation projects by the Municipal Flood Control grant program as of June 30, 2011. The Municipal Flood Control program is run by the Wisconsin Department of Natural Resources.

The dollar amounts in red signify grant award amounts. The grants are still open, so the final expense amount is not yet known. The dollar amounts in black are final expense amounts.

APPENDIX D: REPETITIVE LOSS REPORT

State of Wisconsin Repetitive Loss Report

December 2010

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EXECUTIVE SUMMARY

FEMA Region V provided the Wisconsin Emergency Management (WEM) with an updated copy of the August 2010 Federal Emergency Management Agency (FEMA) Repetitive Loss Database for Wisconsin. During the federal disaster declaration FEMA-1933-DR-WI, FEMA hazard mitigation staff conducted field inspections in 16 Counties to produce the most accurate depiction of the current status of repetitive loss properties in Wisconsin.

The State of Wisconsin Repetitive Loss Report was developed to serve as a written summary of the communities with repetitively flooded properties and to use as an attachment to the Wisconsin State Hazard Mitigation Plan. Sixteen communities with a repetitive loss property were visited and visual inspections were performed at each property indicated as a repetitive loss property in the most current database. In addition, the repetitive loss information collected during 1768-DR-WI was reviewed and included in this report. The database findings include a brief discussion of the 579 repetitive loss properties, the repetitive loss communities and the success of the mitigation projects through the Hazard Mitigation Grant Program (HMGP), the Flood Mitigation Assistance (FMA) program, the Pre-disaster Mitigation Program (PDM) and other state and local hazard mitigation efforts.

The August 2010 database showed that 65 of the repetitive loss properties (11.23%) have been removed or protected from the threat of flooding by acquisition, elevation, floodproofing, levees or other structural measures. After staff conducted field inspections it was determined that there are now 112 (19.34%) properties that have been mitigated. Of these 112 properties, 83 (14.34% of all RLP) were acquired, 24 (4.14% of all RLP) were floodproofed, and 5 (0.86%) are in the process of being removed or floodproofed. There are 467 properties (80.66%) that remain floodprone and 97 NFIP communities with repetitive loss properties. Staff was not able to visit every repetitive loss property and as a result, there are 55 properties (9.50%) with no picture or latitude/longitude information. Of these 55, 14 (2.42%) were listed as mitigated in the national database, via information obtained from the work done during DR-1768-WI, or from correspondence with the State Hazard Mitigation Officer. Since those properties were included on the list, they were considered as part of the NFIP communities, and the 41 that were not indicated as mitigated where assumed to still be floodprone.

Acquisition was the most common choice of mitigation by the majority of communities. The success of acquisitions is most evident in communities with widespread damage such as Kenosha County, the City of Wauwatosa and the Village of Brown Deer. In these communities acquisitions eliminated a majority of the repetitive loss properties and reduced the risk of future loss. The implementation summary states the updated database will be a resource for the state in prioritizing future mitigation projects. Per the State of Wisconsin Hazard Mitigation Plan, mitigating repetitive loss properties and severe repetitive loss properties is the second highest priority behind acquisition and demolition of substantially damaged properties.

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Table 6. List of Communities with Repetitive Loss Properties..... D-14

ACRONYMS

FEMA	Federal Emergency Management Agency
FIA	Federal Insurance Administration
FMA	Flood Mitigation Assistance Program
HMGP	Hazard Mitigation Grant Program
NFIP	National Flood Insurance Program
PDM	Pre-Disaster Mitigation Program
PIN	Parcel Identification Number
RFC	Repetitive Flood Claims Program
RLP	Repetitive Loss Property
RLR	Repetitive Loss Report
SRL	Severe Repetitive Loss Property
WEM	Wisconsin Emergency Management

I. INTRODUCTION

A. Purpose

The Wisconsin Hazard Mitigation Repetitive Loss Report, referred to as the Repetitive Loss Report (RLR), is intended to serve as an attachment to the State of Wisconsin Hazard Mitigation Plan. The RLR provides information, by community, on the status of repetitive loss properties in Wisconsin. The report can be used as a floodplain management tool and to provide information to communities for flood mitigation grants administered by WEM.

B. Framework

FEMA, through the Federal Insurance Administration (FIA), collects data on each property in the United States when a flood insurance claim is made. When more than one flood insurance claim of at least $1,000 is made within a ten-year period, the property is classified as a repetitive loss property. Information on these repetitive loss properties is collected for each state and compiled in the FEMA repetitive loss database. However, the information collected by FIA is not standardized and has errors that require correction through the methodology described in Section II.

C. Intent

Under federal disaster declaration FEMA-1933-DR-WI, staff was provided by FEMA to update the existing FEMA repetitive loss database with accurate information on each of the 579 properties listed and to assist the state in identifying those communities that warrant implementation of mitigation measures. The updated repetitive loss database is the source of information for this report. The RLR can serve as a statewide plan for addressing repetitive loss properties. Identifying communities, which have the highest repetitive loss, allows WEM to rank the repetitive loss properties and make conclusive funding decisions for mitigation projects. The success of these projects reduces the financial strain placed on local, state and federal resources by eliminating future flood losses.

II. METHODOLOGY

A. Organization

The methodology used for data collection consisted of conducting site visits to as many properties in the database as possible. At each property, staff took a picture and recorded the latitude and longitude. During 1933-DR-WI, staff visited 16 counties where no previous information had been collected and verified information in another 5 counties. The information collected during these site visits was input into a data sheet format that the State has been using to record information about properties within the repetitive loss database.

B. Data Collection

Data collection was accomplished by physically visiting each property and by reviewing information previously collected during 1768-DR-WI. The following information was recorded and stored in an excel worksheet for each property: County, Community

Name, Repetitive Loss Number, Community Number, Address, Latitude, Longitude, Description, Comments, and AW-501 Actions Needed.

III. DATA COLLECTION FINDINGS

A. Number of Repetitive Loss Properties and Duplicate Properties

The hard copy of the FEMA database used in this report was printed in August 2010 and identified 579 repetitive loss properties statewide in Wisconsin.

B. Repetitive Loss Property Building Status

The Wisconsin database identified that 65 (11.22%) of the 579 statewide repetitive loss properties have been mitigated, whether by removal or elevation. Based on the inspections and reviews of previous work, there are an additional 47 properties that have been mitigated, whether by removal or elevation. Therefore, 112 repetitive loss properties (19.34%) are not or will no longer be vulnerable to flooding by the end of 2010. Generally, acquisition is preferred over floodproofing because acquisition completely removes structures from the floodplain, eliminating flood risk to the property and its owners and eliminates the need for emergency response activities. Floodproofing reduces the risk to repetitive loss structures while allowing the structures to stay in place. This alternative is preferable in some circumstances involving historical or cultural reasons, but is only possible if the property is protected above the 100-year flood elevation.

Table 1. Repetitive Loss Property Building Status

Building Status Description	**Number of Properties**	**Percent of Total**
Bought Out (acquired)/Demolished	83	14.33%
Elevated or Floodproofed	24	4.15%
In Progress	5	0.86%
Floodprone	467	80.66%
Total	579	100.00%

There are 467 (80.66%) repetitive loss properties where flood mitigation has not taken place. These properties are presumed to remain floodprone.

There are 41 (7.08%) properties that were not physically visited and did not have any previous information associated with them. This was usually due to incomplete or inadequate addresses and owner's names that were two or more decades old. These two factors made it virtually impossible for staff to locate them.

C. Repetitive Loss Communities

The Wisconsin database identifies 97 communities with repetitive loss properties.

The updated list of communities with repetitive loss properties yields the following data. Most communities with repetitive loss properties in Wisconsin have five or less repetitive

loss properties, as displayed in Table 3. The ten communities with the most repetitive loss properties and the status of those properties are described in Table 4.

Table 2. Repetitive Loss Communities
Grouped by Number of Repetitive Loss Properties

Number of Repetitive Loss Properties	Number of Communities	Percent of Communities
1-5	82	84.54%
6-10	6	6.19%
11-20	5	5.15%
21-50	3	3.09%
51+	1	1.03%
Total	97	100.00%

Table 3. Top Ten Communities
with Highest Number of Repetitive Loss Properties (RLP)

Rank	Community Name	Total RLP	Acquired/ Demolished/ Mitigated	Elevated	Floodprone	Not Field Verified
1	Milwaukee, City	220	8		211	1
2	Jefferson County	36	10	6	16	4
3	Kenosha County	31	10		21	
4	Wauwatosa, City of	23	20		3	5
5	Gays Mills, Village of	20	3	4	13	
6	Mequon, City of	12		1	11	
7	Thiensville, Village of	11			11	
8	Darlington, City of	11	9		1	
9	Brookfield, City of	11	2		9	
10	Pierce County	10	2		4	4

D. Success of Post-Disaster Acquisitions

After the Midwest Flood of 1993 (FEMA-DR-994-WI), the HMGP had new resolve to address repetitive flood losses and unprecedented funding to accomplish the task. Although some acquisitions were planned prior to 1993, the size of the 1993 disaster guided future acquisition projects by refining Wisconsin's implementation policies and procedures for acquisition grants, specifically the HMGP. The success of the post-1993 acquisitions can be seen by an impressive reduction in repetitive losses.

Table 4. Success of Acquisition in Reducing Repetitive Losses

Community	**Repetitive Loss Properties (RLP)**	**Number & (%) of Local RLP Acquired**	**Number of RLP Remaining**	**Flood Risk of RLP Remaining**	
				Mitigated or in Process	**Flood Prone**
Brown Deer, Village	9	8 (88.88%)	1	0	1
Kenosha County	31	10 (32.26%)	21	0	21
Wauwatosa, City	21	7 (33.3%)	14	11	3
Darlington, City	11	9 (81.8%)	2	0	2

The Village of Brown Deer and Kenosha County are two communities where acquisition projects have eliminated the majority of local repetitive loss properties. The Village of Brown Deer acquired 88.88 percent of its repetitive loss properties while Kenosha County acquired 32.26 percent. The City of Wauwatosa and the City of Darlington are two communities that have embraced flood mitigation through floodproofing as well as acquisition.

IV. IMPLEMENTATION SUMMARY

A. Funding Sources

The primary source of mitigation funds is the Section 404 Hazard Mitigation Grant Program (HMGP). The HMGP can provide local communities 87.5 percent (75 percent federal, 12.5 percent state) of the funds to implement immediate and long-term hazard mitigation measures following a federal disaster declaration. Communities must provide a non-Federal match of 12.5 percent either through a state agency or through a local funding source. HMGP projects are scored and selected by WEM on a variety of criteria that favor permanent and cost effective mitigation of flood damaged structures. Repetitive loss structures are excellent candidates and are a high priority for mitigation with HMGP funds.

Another source of flood mitigation funds is the Flood Mitigation Assistance (FMA) program. FMA is state-administered through WEM and is a cost-share program (75% federal, 25% local match) through which states and communities can receive grants for flood mitigation planning, technical assistance and mitigation projects. The overall goal of the FMA is to fund cost-effective measures that reduce or eliminate the long-term risk of flood damage to buildings, manufactured homes and other NIFP-insured structures. Other goals are to: Reduce the number of repetitively or substantially damaged structures and the associated claims on the NFIP; Encourage long-term, comprehensive mitigation planning; Respond to the needs of communities participating in the NFIP; and Complement other federal and state mitigation programs with similar

goals. There are three requirements to receive mitigation project funds under FMA. Local communities need to develop an All Hazards Mitigation Plan that identifies those structures that are vulnerable to flood damage, establish mitigation priorities and include an action plan to reduce flood vulnerability. Structures with repetitive losses are likely to be highly vulnerable. A successful hazard mitigation plan will identify any repetitive loss properties and will show how the community plans to mitigate those properties. The State receives an annual allocation based on the number of flood insurance policies and the number of repetitive loss properties in the State. Anything above the allocation is based on a national competition.

The Repetitive Floods Claims (RFC) Program provides funds to mitigate NFIP-insured residential or commercial properties that have received one or more NFIP paid insurance claim. An application may be submitted for RFC funding if neither the applicant nor the subapplicant can currently meet the FMA non-federal share requirement. For this program, the federal share may be up to 100 percent of the project cost. The application and the subapplication must include a certification (e.g., signed letter from an authorized local government official) explaining why the FMA cost-sharing requirement cannot be met. RFC grants are available on a nationally competitive basis.

The Bunning-Bereuter-Blumenauer Flood Insurance Reform Act of 2004 was signed into law on June 30, 2004. The Act includes measures to address those properties that result in a disproportionate amount of claims on to the NFIP. The Act created a program for mitigation of severe repetitive loss properties. “Severe repetitive loss properties” are defined as a NFIP-insured residential property that meet one of two triggers: four or more claims over $5,000 (including building and contents) each, and the cumulative amount of such claims payments exceed $20,000; or at least two claims with cumulative amount exceeding the value of the building. For both, at least two of the claims must have occurred within any ten-year period and must be greater than ten days apart. Grants under the program the non-federal match is 25%, however, if the state's approved State Hazard Mitigation Plan includes a strategy to reduce the number of repetitive loss and severe repetitive loss properties, than the non-federal share is reduced to 10%. Wisconsin's plan includes such a strategy. If the owner of a severe repetitive loss property refuses an offer made under the program, the flood insurance premium will increase to 150%. At no time can the premium be more than the actuarial rate. Any eligible mitigation proposal for properties that fit this criteria in Wisconsin would be an extremely high priority for mitigation funding at WEM. FEMA has identified eleven potential SRL properties in Wisconsin. Four of the properties identified have been "validated" by FEMA as a SRL property. One of the four properties has been recently included in a HMGP application. Two properties are "validated uninsured." One of those properties has been mitigated through HMGP. Five of the properties are "pending uninsured." Of those five, two have been mitigated again through HMGP, and one of the properties cannot be located due to insufficient data. That brings the number of potential SRL properties down to six statewide.

Table 5. Severe Repetitive Loss Communities

Community	Severe Repetitive Loss Properties	Comment
Crawford County	1	Cannot be located due to insufficient data
Jefferson County	1	Mitigated
Kenosha County	1	Has been included in a pending HMGP application
Milwaukee, City of	3	1 validated uninsured; 2 pending uninsured
Prescott, City of	1	Validated
Trempealeau County	1	Mitigated
Washington County	2	Validated; no hazard mitigation plan
Wauwatosa, City of	1	Mitigated
Total	**11**	

The Pre-Disaster Mitigation Program (PDM) is another source of mitigation funds. PDM's main objective is to reduce overall risk to the population and structures, while also reducing reliance on funding from actual disaster declarations. The State administers the program through the National Pre-Disaster Mitigation fund, which is allocated yearly from Congress. Grants are awarded on a nationally competitive basis. An approved Standard State Mitigation Plan is required for the State to remain eligible for to receive the money and local governments applying to the program must have an approved all-hazard mitigation plan. All flood projects funded through PDM must be located physically in a participating NFIP community and the 75% Federal/ 25% Local cost share still applies.

The significant difference between HMGP and the other four mitigation programs (FMA, RFC, SRL and PDM) are that they are not tied to a federal disaster declaration. The other four mitigation programs are available annually on a national competitive basis. The state does receive a small allocation for FMA, but anything above that allocation is on a nationally competitive basis. FMA, RFC, and SRL funding is limited to only flood mitigation for NFIP-insured structures. The three programs along with PDM are also generally smaller in magnitude compared to the HMGP funding. As a result, the four non-disaster mitigation programs are often used to supplement HMGP projects.

B. Mitigation Recommendations and Projects

The Plan of Action provides the state with a resource to identify the properties with the most repetitive losses and to prioritize specific mitigation recommendations for those properties. The state utilizes the Repetitive Loss Report statistics from past and current mitigation projects to provide guidance for future mitigation projects and reduce flood losses. Repetitive loss information is a consideration of the funding criteria for future mitigation projects. When a community submits an application for mitigation funding, the state refers to the Repetitive Loss Report to determine if the repetitive loss properties are identified on the application. If they are not identified and the properties fit within the

original scope of the project, the state should recommend that the repetitive loss properties become part of the project. RLP information is also provided to local governments to address and include in development of Flood and/or All-Hazard Mitigation Plans.

C. Standardized Information

Since some of the repetitive loss properties were unidentified due to poor location information, it is suggested that FEMA standardize their method of data collection for the repetitive loss properties. The consistent use of PINs on the flood insurance application would be one method of such standardization.

D. Updates

The Repetitive Loss Report will remain an addendum to the State of Wisconsin Hazard Mitigation Plan. Updates of the Repetitive Loss Report will be accomplished every year or two as new claim information is available from the NFIP and as remaining repetitive loss properties are mitigated through state programs.

ATTACHMENT A

Table 6. List of Communities with Repetitive Loss Properties

NFIP Community	CID#	Total	Acquired	Floodproofed	In Process	Remaining
ALMA, CITY OF	555540	1				1
BAYSIDE, VILLAGE OF	550270	2				2
BERLIN, CITY OF	550166	5				5
BLACK EARTH, VILLAGE OF	550079	1				1
BLAIR, CITY OF	550440	2				2
BROOKFIELD, CITY OF	550478	11	2			9
BROWN COUNTY	550020	1				1
BROWN DEER, VILLAGE OF	550271	9	8			1
BUTLER, VILLAGE OF	550536	2		2		0
CHASEBURG, VILLAGE OF	550451	1	1			0
CHIPPEWA FALLS, CITY OF	550044	2	2			1
CLARK COUNTY	550048	1	1			0
COLUMBIA COUNTY	550581	3				3
CRAWFORD COUNTY	555551	2		1		1
DANE COUNTY	550077	5		1		4
DARLINGTON, CITY OF	550228	11	3	6		2
DELAFIELD, CITY OF	550479	1				1
DOOR COUNTY	550109	1	1			0
DUNN COUNTY	550118	1				1
DURAND, CITY OF	550320	2				2
EAU CLAIRE, CITY OF	550128	1				1
ELM GROVE, VILLAGE OF	550578	2	1			1
FOND DU LAC COUNTY	550131	2				2
FOND DU LAC, CITY OF	550136	2	1			1
FORT ATKINSON, CITY OF	555554	2				2
FOUNTAIN CITY, CITY OF	555555	1				1
GAYS MILLS, VILLAGE OF	550071	20		4	3	13
GLENDALE, CITY OF	550275	9				9
GRANT COUNTY	555557	4	2			2
HILLSBORO,CITY OF	550455	2	1			1
HOWARD, VILLAGE OF	550023	2				2
JANESVILLE, CITY OF	555560	3				3
JEFFERSON COUNTY	550191	36	10	6		20
JEFFERSON, CITY OF	555561	1				1
KENOSHA COUNTY	550523	31	10			21
KENOSHA, CITY OF	550209	1	1			0
LA CROSSE COUNTY	550217	6				6

NFIP Community	CID#	Total	Acquired	Floodproofed	In Process	Remaining
LA FARGE, VILLAGE OF	550456	2	1			1
LAFAYETTE COUNTY	550223	1				1
LOYAL, CITY OF	550052	1				1
MADISON, CITY OF	550083	1				1
MARATHON CITY, VILLAGE OF	550252	1				1
MARATHON COUNTY	550245	1				1
MARQUETTE COUNTY	550601	2				2
MAZOMANIE, VILLAGE OF	550085	1				1
MEQUON, CITY OF	555564	12			1	11
MILWAUKEE, CITY OF	550278	220	8			211
MONONA, CITY OF	550088	2				2
MONTELLO, CITY OF	550266	1				1
MONTICELLO, VILLAGE OF	550163	1				1
MUSKEGO, CITY OF	550486	1				1
NEILLSVILLE, CITY OF	550053	2				2
NEW BERLIN, CITY OF	550487	3	1			2
NORTH FOND DU LAC, VILLAGE OF	550138	1				1
OAK CREEK, CITY OF	550279	1	1			0
OCONTO COUNTY	550294	2				2
OCONTO, CITY OF	550297	2	2			0
OREGON, VILLAGE OF	550089	3	2	1		0
OSHKOSH, CITY OF	550511	3		1		2
OZAUKEE COUNTY	550310	1				1
PEPIN COUNTY	555570	6				6
PIERCE COUNTY	555571	10	2			8
PORT WASHINGTON, CITY OF	550316	1				1
PORTAGE, CITY OF	550063	2				2
PRAIRIE DU CHIEN, CITY OF	555573	3		2		1
PRESCOTT, CITY OF	555574	5				5
PRINCETON, CITY OF	550171	1				1
RACINE COUNTY	550347	2				2
RACINE, CITY OF	555575	2				2
REEDSBURG, CITY OF	550402	2				2
RICHLAND CENTER, CITY OF	555576	2				2
RICHLAND COUNTY	550356	3				3
RIPON, CITY OF	550140	1				1
RIVER HILLS, VILLAGE OF	550280	2				2
ROCK COUNTY	550363	4				4
ROCK SPRINGS, VILLAGE OF	550403	1				1

NFIP Community	CID#	Total	Acquired	Floodproofed	In Process	Remaining
RUSK COUNTY	550602	2				2
SAUK COUNTY	550391	2				2
SHEBOYGAN, CITY OF	550430	1				1
SILVER LAKE, VILLAGE OF	550210	4				4
SOLDIERS GROVE, VILLAGE OF	550074	3				3
ST. CROIX COUNTY	555578	2				2
STEUBEN, VILLAGE OF	555580	3				3
STURGEON BAY, CITY OF	550111	1				1
THIENSVILLE, VILLAGE OF	550318	11				11
TOMAH, CITY OF	550291	2				2
TREMPEALEAU COUNTY	555585	5	1			4
TREMPEALEAU, VILLAGE OF	555584	1				1
VERNON COUNTY	550450	3				3
VIOLA, VILLAGE OF	550460	1				1
WASHBURN COUNTY	550606	1				1
WASHINGTON COUNTY	550471	4				4
WAUKESHA COUNTY	550476	4				4
WAUKESHA, CITY OF	550491	2			1	1
WAUSAU, CITY OF	550258	1	1			0
WAUWATOSA, CITY OF	550284	23	20			3
WEST ALLIS, CITY OF	550285	2				2
Total		579	83	24	5	467
Percent			14.34%	4.14%	0.86%	80.66%

APPENDIX E: WISCONSIN HAZARD MITIGATION TEAM

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APPENDIX F: STATE ADMINISTRATIVE PLAN FOR HMGP

STATE OF WISCONSIN

ADMINISTRATIVE PLAN

for the

HAZARD MITIGATION GRANT PROGRAM

Section 404

PL 100-707
The Robert T. Stafford Disaster Relief
and
Emergency Assistance Act

Division of Emergency Management

Department of Military Affairs
May 2, 2011

STATE OF WISCONSIN
HAZARD MITIGATION GRANT PROGRAM
ADMINISTRATIVE PLAN

I. PURPOSE

The purpose of this Plan is to establish the organization, staffing, and process to be used by the State of Wisconsin, Division of Emergency Management, in administering and managing the Section 404 Hazard Mitigation Grant Program. It also explains how the State will meet All Hazards Mitigation planning requirements.

The Hazard Mitigation Grant Program (HMGP) was created in November 1988, by Section 404 of the Robert T. Stafford Disaster Relief and Emergency Assistance Act. The HMGP assists the State and its local governments in implementing long-term hazard mitigation measures following a major disaster declaration. In December 1993, the President signed the Hazard Mitigation and Relocation Assistance Act that amends Section 404 to increase federal funding of HMGP projects to 75 percent of a project's total eligible costs. The HMGP funding base was also amended to 15% of the projected obligated grants made under the Stafford Act Disaster Assistance Programs. In 1997 Section 404 was again amended so that HMGP funds are now available in all counties within the affected State following a major disaster declaration by the President. An interim final rule was published on February 26, 2002 for 44 CFR Parts 201 and 206 that increased HMGP funding base to 20% if the State has an approved Enhanced State Mitigation Plan. The objectives of the HMGP are as follows:

- To prevent future losses of lives and property damage due to disasters;
- To implement the State and local All Hazards Mitigation Plans;
- To enable mitigation measures to be implemented during recovery from a disaster; and
- To provide funding for previously identified mitigation measures.

As implied above, the HMGP is closely tied to the State All Hazards Mitigation Plan required in Disaster Mitigation Act of 2000 (DMA2K) and is implemented subsequent to a Presidential Disaster Declaration. Section 404, Hazard Mitigation Grant Program (HMGP), in combination with Flood Mitigation Assistance (FMA), Pre-Disaster Mitigation (PDM), Repetitive Flood Claims (RFC) and Severe Repetitive Loss (SRL) as well as ongoing programs at the county and State levels, comprise an overall pre- and post-disaster hazard mitigation strategy for the State of Wisconsin. This strategy will be further detailed and State agencies responsibilities, both pre- and post-disaster, further defined in the State of Wisconsin Hazard Mitigation Plan approved December 9, 2008.

II. AUTHORITIES AND REFERENCES

A. Public Law 93-288, as amended by PL 100-707
B. FEMA Regulations, 44 CFR, Part 206, Subparts M and N
C. FEMA Regulations, 44 CFR Part 207
D. FEMA Regulations, 44 CFR Part 80
E. FEMA Regulations, 44 CFR, Part 10.8 Determination of Requirement for Environmental Review
F. FEMA Regulations, 44 CFR, Part 13, Uniform Administrative Requirements for Grants and Cooperative Agreements to State and Local Governments
G. FEMA Regulations, 44 CFR, Part 14, Administration of Grants, Audits of State and Local Governments
H. HMGP and FMA Financial Grants Management Resource Guide
I. Hazard Mitigation Assistance Unified Guidance, June 1, 2010
J. OMB Circular A-21 Cost Principles for Educational Institutions
K. OMB Circular A-87 Cost Principles for State and Local Governments
L. OMB Circular A-102 Uniform Administrative Requirements for Grants and Cooperative Agreements
M. OMB Circular A-122 Cost Principles for Non-Profit Organizations
N. OMB Circular A-133 Audits of States, Local Governments, and Non-Profit Organizations
O. Executive Order 11988, Floodplain Management
P. Executive Order 11990, Protection of Wetlands
Q. Executive Order 12612, Federalism
R. Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Families
S. Wisconsin Statutes, Chapter 323
T. Wisconsin Statutes, Chapter 87.30
U. Wisconsin Administrative Code NR116
V. State of Wisconsin Administrative Plan for the Public Assistance Program
W. Wisconsin Emergency Operations Plan
X. Wisconsin State Statue, Chapter 32; Administrative Code 202-Wisconsin Relocation Law

III. DEFINITIONS

"Act" refers to PL 93-288, the Disaster Relief Act of 1974 as amended by PL 100-707, The Robert T. Stafford Disaster Relief and Emergency Assistance Act and as further amended by the Hazard Mitigation and Relocation Assistance Act of 1993.

"Applicant" means a State agency, local government, Indian tribal government, or eligible private nonprofit organization, as defined in Subpart N of 44 CFR, Part 206, submitting an application to the grantee for assistance under the Hazard Mitigation Grant Program.

"Application" means the initial request for HMGP funding to be submitted to FEMA by the State (as outlined in 206.436 of 44 CFR).

"Base Flood" means the flood having a 1% chance of being equaled or exceeded in any given year also referred to as the 100 year flood.

"Benefit Costs Analysis" (BCA) is an analysis to demonstrate that a project is cost-effective and will not cost more than the anticipated value of the reduction in both direct damages and subsequent negative impacts to the area if future disasters were to occur. Costs and benefits are computed on a net present value basis.

"Building" means a walled and roofed structure, other than a gas or liquid storage tank, that is principally above ground and affixed to a permanent site as well as a manufactured home on a permanent foundation.

"Categorical Exclusion" means the categories of actions that normally would not require an Environmental Impact Statement or Environmental Assessment. 44 CFR Part 10.8 identifies the categorical exclusion of actions that have no significant effect on the human environment.

"Community" means any State or area or political subdivision thereof, or any Indian tribe or authorized tribal organization that has authority to adopt and enforce floodplain management regulations for the areas within its jurisdiction.

"Community Rating System" (CRS) recognizes community efforts beyond the minimum NFIP standards by reducing flood insurance premiums for property owners.

"Contractor" means any individual, partnership, corporation, agency or other entity (other than an organization engaged in the business of insurance) performing work by contract for the Federal Government or a State or local agency.

"Designated Area" means any emergency or major disaster-affected portion of a State that has been determined eligible for federal assistance.

"Disaster Recovery Center" (DRC) is the center that is strategically located in a disaster area and that is opened after a Presidential Disaster Declaration. Federal, State and local agencies with disaster assistance programs temporarily locate in the

DRC's to assist individuals in completing their applications and answer questions of individual disaster victims. Mitigation information is also made available at the DRC's.

"Disaster Mitigation Act of 2000 (DMAK2)" is the Act that created All Hazards planning requirements for the states and local communities as a condition for receiving federal disaster assistance. It also created the Pre-Disaster Mitigation Program.

"Emergency" means any occasion or instance for which, in the determination of the President, Federal assistance is needed to supplement State and local efforts and capabilities to save lives and to protect property and public health and safety, or to lessen or avert the threat of a catastrophe in any part of the United States.

"Enhanced State Hazard Mitigation Plan" is the hazard mitigation plan approved under 44 CFR part 201.5 as a condition of receiving increased funding under the HMGP.

"Environmental Assessment" (EA) is an assessment prepared when a project does not qualify for a categorical exclusion and serves to determine whether an Environmental Impact Statement is needed.

"Environmental Impact Statement" (EIS) is a report prepared for all actions significantly affecting the environment.

"Estimated Ceiling" is the maximum amount of HMGP funds available in a particular disaster (15% of other FEMA assistance programs or 20% of other FEMA assistance programs if the State has an approved Enhanced State Mitigation Plan).

"Federal Coordinating Officer" (FCO) means the person appointed by the FEMA Regional Administrator, or in his absence the Deputy Regional Administrator, to coordinate Federal Assistance in an emergency or major disaster.

"Federal Hazard Mitigation Officer" (FHMO) is the FEMA employee responsible for carrying out the overall responsibilities for hazard mitigation and for Subparts M and N of 44 CFR, including coordinating post-disaster hazard mitigation actions with other agencies of government at all levels.

"FEMA-State Agreement" is an agreement that states the understandings, commitments, and conditions for assistance under which FEMA disaster assistance shall be provided in a Presidential Disaster Declaration. This agreement imposes binding obligations on FEMA, states, and their local governments in the form of conditions for assistance that are legally enforceable.

"Finding of No Significant Impact" (FONSI) is a determination that an action will have no significant impact on the environment.

"Flood Mitigation Assistance" (FMA) is a pre-disaster grant program that provides assistance to state and local governments for developing flood hazard mitigation

plans, implementation of mitigation projects, and technical assistance in reducing or eliminating flood hazards for insurable structures under the NFIP and to address repetitive loss claims.

"Governor's Authorized Representative" (GAR) is the person empowered by the Governor to execute, on behalf of the State, all necessary documents for disaster assistance.

"Grant" means an award of financial assistance. The total HMGP grant award for the State shall not exceed 15 percent (20 percent with an approved Enhanced State Hazard Mitigation Plan) of the estimated total eligible federal share of assistance provided under the Stafford Act.

"Grantee" means the government to which a grant is awarded and which is accountable for the use of the funds provided. The Grantee is the entire legal entity even if only a particular component of the entity is designated in the grant award document. For purposes of this regulation the State of Wisconsin is the grantee.

"Hazard Mitigation" means any action taken to reduce or eliminate the long-term risk to human life and property from natural hazards.

"Hazard Mitigation Grant Program" (HMGP) means the program authorized under Section 404 of the Stafford Act that provides funding for certain mitigation measures and that are in conformance with the State Hazard Mitigation Plan.

"Hazard Mitigation Strategy" is a report developed by the State Hazard Mitigation Officer (SHMO), the Federal Hazard Mitigation Officer (FHMO), FEMA National Flood Insurance Program (NFIP) personnel, and WI Department of Natural Resources (DNR) after a Presidential Disaster is declared. This report will identify mitigation opportunities and issues to be addressed for the declaration.

"Human Services Officer" is the federal/state person designated to administer the Individuals and Households Program for a particular disaster declaration.

"Individuals and Households Program" is the supplementary federal assistance provided under the Stafford Act to individuals and families adversely affected by a major disaster or emergency.

"Joint Field Office" (JFO) functions as the focal point for directing and coordinating disaster operations after a declaration.

"Local Government" means any county, city, village, town, district or other political subdivision of any state; any Indian tribe or authorized tribal organization; and includes any rural community, unincorporated town, or other public entity for which an application for assistance is made by the State or a political subdivision thereof.

"Lock-In Ceiling" is the guaranteed level of hazard mitigation funding in a particular disaster. It is the estimated ceiling at an established date after which point the amount of HMGP funds can only increase, not decrease.

"Major Disaster" is any natural catastrophe (including any hurricane, tornado, storm, high water, wind driven water, tidal wave, tsunami, earthquake, volcanic eruption, landslide, mudslide, snowstorm, or drought) or, regardless of cause, any fire, flood or explosion, in any part of the United States, which in the determination of the President causes damage of sufficient severity and magnitude to warrant major disaster assistance under the Stafford Act to supplement the efforts and available resources of states, local governments and disaster relief organizations in alleviating the damage, loss, hardship or suffering thereby.

"Management Costs" are any indirect costs, administrative expenses, and any other expenses not directly chargeable to a specific project that are reasonably incurred by a grantee or subgrantee in administering and managing the HMGP grant award.

"Market Value" is generally defined as the amount of cash, or on terms reasonably equivalent to cash, for which in all probability the property would have sold on the effective date of the evaluation, after a reasonable exposure time on the open competitive market, from a willing and reasonably knowledgeable seller to a willing and reasonably knowledgeable buyer, with neither acting under the any compulsion to buy or sell, giving due consideration to all available economic uses of the property at the time of the valuation.

"Measure" means any mitigation measure, project, or action proposed to reduce the risk of future damage, hardship, loss or suffering from disasters.

"National Environmental Policy Act" (NEPA) is the act which requires that actions affecting the environment comply with specific policies and procedures.

"National Flood Insurance Program" (NFIP) means the program authorized by 42 U.S.C. 4001-4128.

"Pre-Disaster Mitigation Program" (PDM) is a program authorized by section 203 of the Stafford Act, 42 U.S.C. 5133, as amended by section 102 of the Disaster Mitigation Act of 2000 (DMA), Pub. L. 106-390, 114 Stat. 1552, to assist States and communities to implement a sustained pre-disaster natural hazard mitigation program to reduce overall risk to the population and structures while also reducing reliance on funding from actual disaster declarations.

"Preliminary Damage Assessment" (PDA) is a joint federal/state assessment effort conducted within 3 to 5 days of a disaster to refine, or correct, previous damages estimates for both the public and private sectors, that are used in the Governor's decision on whether or not a federal disaster assistance request is in order, and whose figures are then utilized to substantiate any such request.

“Private Nonprofit Facility” means any private nonprofit educational, utility, emergency, medical or custodial care facility, including a facility for the aged or disabled, and other facility providing essential governmental type services to the general public, and such facilities on Indian reservations. Further definition can be found in the State of Wisconsin Public Assistance Program Administrative Plan and 44 CFR 206.220.

“Program Income” means gross income received by the grantee or subgrantee directly generated by a grant-supported activity, or earned only as a result of the grant agreement during the grant period.

“Project” means any mitigation measure, project, or action proposed to reduce risk of future damage, hardship, loss or suffering from disasters. The term “project” is used interchangeably with the term “measure” in the federal hazard mitigation regulations.

“Project Worksheet” is a report of damages to publicly owned facilities caused by a major disaster or emergency including location, description, and estimate of required work.

“Public Assistance” means federal financial assistance provided to state and local governments or to eligible private nonprofit organizations for eligible disaster-related costs.

“Public Assistance Officer” (PAO) is the federal/state person designated to administer the Public Assistance Program for a particular disaster declaration.

“Public Assistance Permanent Work” is the restorative work that must be done, through repairs or replacement, to restore an eligible facility on the basis of its pre-disaster design and in conformity with current applicable codes, specifications, and standards.

“Public Entity” means an organization formed for a public purpose whose direction and funding are provided by one or more political subdivisions of the State.

“Public Facility” means the following facilities owned by the State or local government: A flood control, navigation, irrigation, reclamation, public power, sewage treatment and collection, water supply and distribution, watershed development, or airport facility, any non-federal aid street, road, or highway; and any other public building, structure or system, including those for educational, recreational or cultural purposes; or any park.

"Purchase Offer" is the initial value assigned to the property, which is later adjusted by applicable additions and deductions, resulting in a final offer amount to a property owner.

"Qualified Alien" mans a person within the meaning of the term as defined at 8 U.S.C. 1641.

"Qualified conservation organization" means a qualified organization with conservation purpose pursuant to 26 CFR 1.170A-14 and applicable implementing regulations, that is such as organization at the time it acquires the property interest and that was such an organization at the time of the major disaster declaration, of at least 2 years prior to the opening of the grant application period.

“Regional Administrator” is a director of a FEMA Regional Office, or his/her designated representative. As used in this Plan, Regional Administrator also means the Federal Coordinating Officer (FCO) who has been appointed to exercise the authority of the Regional Administrator for a particular emergency or major disaster.

“Repetitive Flood Claims” (RFC) grant program was authorized by the Bunning-Bereuter-Blumenauer Flood Insurance Reform Act of 2004 (P.O. 108-264). Up to $10 million is available annually for FEMA to provide RFC funds to assist States and communities reduce flood damages to insured properties that have had one or more claims to the National Flood Insurance Program (NFIP).

“Section 404” of the Stafford Act authorizes the Hazard Mitigation Grant Program that provides funding for cost-effective hazard mitigation measures.

“Section 406” of the Stafford Act authorizes Public Assistance grants to repair, restore, or replace damaged facilities belonging to public and private nonprofit entities, and other associated expenses, including emergency protective measures and debris removal.

“Severe Repetitive Loss (SRL)” Program was authorized by the Bunning-Bereuter-Blumenauer Flood Insurance Reform Act of 2004 to provide funding to reduce or eliminate the long-term risk of flood damage to severe repetitive loss (SRL) structures insured under the National Flood Insurance Program (NFIP)/

“SF 424” (Standard Form 424) is the Application for Federal Assistance to be included as part of the State Hazard Mitigation Application.

“Special Flood Hazard Area” means an area having special flood, mudslide, and/or flood-related erosion hazards, as shown on the hazard identification maps published by the National Flood Insurance Program (NFIP).

“Stafford Act” is the Robert T. Stafford Disaster Relief and Emergency Assistance Act, PL 100-707, signed into law November 23, 1988, which amended the Disaster Relief Act of 1974, PL 93-288 and which was further amended in 1993 by the Hazard Mitigation and Relocation Assistance Act.

“Standard Flood Insurance Policy” means the flood insurance policy issued by the Federal Insurance Administrator or an insurer pursuant to an arrangement with the Administrator pursuant to Federal statutes and regulations, known as a Write Your Own Company.

“Standards” means codes, specifications or standards for the construction of facilities.

“State Administrative Plan for the HMGP” means the plan developed by the State to describe the procedures for administration of the HMGP.

“State All Hazards Mitigation Plan” a requirement of DMA2K, is the State plan that includes a systematic evaluation of the nature and extent of vulnerability to the effects of natural hazards and identifies the actions needed to minimize future vulnerability to hazards. The Plan further delineates State agency responsibilities both pre- and post-disaster in implementing the State All Hazards Mitigation Program. This plan is approved under 44 CFR part 201, as a condition of receiving Stafford Act Assistance as outlined in 201.4. This plan is reviewed and revised every three years. If it is warranted and time permits, it will also be revised after each Presidentially Declared Disaster.

"State Coordinating Officer" (SCO) is the person appointed by the Governor to act in cooperation with the Federal Coordinating Officer (FCO) to manage disaster recovery efforts.

“State Financial Management Officer” (SFMO) is the representative of the State government who is responsible for managing the HMGP accounts, processing payment requests, developing financial procedures, and maintaining financial records.

“State Hazard Mitigation Officer” (SHMO) is the representative of the State government who is the primary point of contact with FEMA, other state and federal agencies, and local units of government in the planning and implementation of pre- and post-disaster mitigation programs and activities required under the Stafford Act. The SHMO is also appointed as one of the Alternate GAR’s.

“State Hazard Mitigation Plan Update” refers to the review and revision of the State Hazard Mitigation Plan that is completed every three years. This plan may also be reviewed and revised after a federal disaster declaration but this revision is not required.

“State Management Costs” are the indirect costs, administrative expenses, and any other expenses not directly chargeable to a specific project that are reasonably incurred by the grantee or subgrantee in administering and managing a HMGP Grant.

“Subgrant” means an award of financial assistance under a grant by a grantee to an eligible subgrantee.

“Subgrantee” means the government or other legal entity to which a subgrant is awarded and which is accountable to the grantee for the use of the funds provided. Subgrantees can be a State agency, local government, private nonprofit organization, or Indian tribe as outlined in 206.433 of 44 CFR.

“Supplement” means an amendment to a Hazard Mitigation Grant.

"Wisconsin Hazard Mitigation Team" (WHMT) (formally the Interagency Disaster Recovery Group and State Hazard Mitigation Team) is coordinated by Wisconsin Emergency Management and is composed of key Federal and State agency representatives and other public or private sector bodies or agencies. The purpose of the Team, which functions both pre- and post-disaster, is to evaluate hazards, identify strategies, coordinate resources, and implement measures that will reduce the vulnerability of people and property to damage from hazards. This group is also responsible for updating the State of Wisconsin Hazard Mitigation Plan.

IV. PROGRAM MANAGEMENT AND ADMINISTRATION RESPONSIBILITY

The Governor of the State of Wisconsin has designated the Department of Military Affairs (DMA), Division of Wisconsin Emergency Management (WEM), as the State agency responsible for management and administration of the HMGP, PDM, FMA, RFC, and SRL programs. The Administrator of the Division is the official who has overall management responsibility for the program. The responsibility for program coordination, implementation, and administration is delegated to Roxanne K. Gray, the Division's State Hazard Mitigation Officer (SHMO). The SHMO complies with federal requirements and involves appropriate State and local governments in the pre- and post-disaster hazard mitigation program.

The SHMO maintains close coordination with the Department of Natural Resources (DNR), Bureau of Watershed Management, Dam/Floodplain Section. As the State's lead floodplain management agency, DNR plays a key role in providing technical assistance for the mitigation programs and in developing the Hazard Mitigation Action Plan in flood disasters.

V. STAFFING AND ASSIGNMENT OF RESPONSIBILITIES

A. Staffing

The staffing pattern for administering the HMGP will be flexible and capable of expansion, depending upon the estimated number of applicants for the Program and upon the type of disaster. At a minimum, it will consist of the State Hazard Mitigation Officer (SHMO), an Assistant State Hazard Mitigation Officer, Disaster Response and Recovery Planner, the Financial Management Officer, and appropriate members of the Wisconsin Hazard Mitigation Team (WHMT).

If necessary, the GAR/SCO will employ temporary hires to assist the SHMO and provide program support. The need for such hires will be determined by the SHMO and will serve as the basis for determining State Management Costs. The State Management Cost Project Narrative will be submitted to the Regional Administrator for approval.

B. Responsibilities

1. Governor's Authorized Representative/State Coordinating Officer GAR/SCO

The Administrator of the Division of Emergency Management, the Bureau Director of Response and Recovery, or the Recovery Section Supervisor serves as the GAR/SCO and as such has overall management responsibility for the program. He/she is the State official who is ultimately responsible for ensuring that the State properly carries out the HMGP and Hazard Mitigation Planning responsibilities on a day-to-day basis and subsequent to a Presidential Disaster Declaration. In this regard, the GAR/SCO will monitor the activities of the SHMO and the WHMT. The GAR/SCO will do the following:

a. Ensure an Administrative Plan is developed, outlining how the State will administer the Hazard Mitigation Grant Program.
b. Ensure that a process exists for identifying potential hazard mitigation projects and for prioritizing among those projects.
c. Ensure that all potential applicants are notified of the program and receive the assistance to which they are entitled.
d. Ensure that a proper initial application and any necessary supplemental applications, including Standard Form 424 (SF 424), are submitted in a timely fashion to the Regional Administrator.
e. Ensure that technical assistance is provided to potential applicants and/or eligible subgrantees.
f. Ensure that adequate procedures are developed for the timely distribution of financial assistance to eligible subgrantees.
g. Ensure that a system is developed to monitor completion of approved projects within federally required timeframes.
h. Ensure that a system exists to monitor subgrantee accounting systems to ensure compliance with 44 CFR parts 13 and 14.
i. Ensure that appropriate State agencies are on the WHMT and assist in the development or updating of the State All Hazards Mitigation Plan.
j. Ensure that DMA2K requirements, including development or updating of the State All Hazards Mitigation Plan are met and closely tied to administration of the HMGP.
k. Ensure participation of the appropriate local agencies in the administration and implementation of the HMGP and All Hazards Mitigation planning requirements.

2. State Hazard Mitigation Officer (SHMO)/Alternate Governor's Authorized Representative (GAR).

   The State Hazard Mitigation Officer is responsible for program coordination, implementation and administration and also serves as an Alternate GAR. The SHMO will accomplish the necessary program work required of the State to deliver the HMGP to eligible subgrantees and to meet the planning requirements of DMA2K. The SHMO or the Assistant SHMO will do the following:

   a. Update the Administrative Plan that outlines how the State will administer the HMGP and implement the Plan in a Presidential Disaster Declaration.
   b. Implement a process for identifying potential hazard mitigation projects and for prioritizing among those projects.
   c. Coordinate with the FHMO in estimating the amount of FEMA money available for the HMGP, and in administering the program, including submitting required reports to FEMA.
   d. Coordinate with State/Federal Public Assistance Officers (PAO) Officer to ensure that all eligible mitigation opportunities are explored and funded through the program.
   e. Coordinate with the FCO/SCO, FHMO, Human Services staff and local officials in establishing mitigation requirements at the DRC's.
   f. Submit to FEMA Regional Administrator a request for State Management Costs along with a Management Cost Project Narrative.
   g. Notify potential applicants of the program and brief them, with appropriate handout materials, on elements of the program.
   h. Coordinate with the FHMO in developing the Hazard Mitigation Strategy after a declaration.
   i. Provide technical assistance to potential applicants and/or eligible subgrantees in developing and submitting applications.
   j. Conduct the required benefit cost analyses using FEMA's BCA computer model on proposed HMGP projects.
   k. Complete the NEPA review process for proposed projects. This will include the following tasks: Coordinate with the FEMA Regional Environmental Officer (REO), Project Officer, and other State and Federal agencies during the project development process to address environmental issues; Complete formal consultation required specifically of Federal agencies under Federal environmental laws other than NEPA including, but not limited to, formal endangered species consultation or historic preservation Memorandums of Agreement and Programmatic Agreements; Undertake environmental review tasks (including tasks related to the National Historic Preservation Act); gather necessary environmental data through the applicant, past studies, and informal consultation with State and other Federal agencies; recommend level of

review under the National Environmental Policy ACT (NEPA); Complete and submit the Record of Environmental Consideration (REC) and all supporting documentation at the same time, or prior to, the submission of the project application. Ensure that the required public notices are completed and that the Environmental Closeout Declaration is completed and signed by the Subgrantee.

l. Prepare and submit the initial Hazard Mitigation Grant Program application and any supplemental applications per federal requirements.
m. Develop and implement a system for monitoring the status of approved projects, for processing time extension requests and appeals, and for closing out completed projects.
n. Coordinate with the State Financial Management Officer (FMO) in monitoring subgrantee accounting systems to meet requirements of 44 CFR Parts 13 and 14.
o. Review and revise the State Hazard Mitigation Plan according to planning requirements ensuring coordination as required and appropriate with administration of the HMGP.
p. Involve and coordinate with appropriate State agencies through the WHMT in meeting HMGP and planning requirements. In a Presidential Disaster Declaration, this includes identifying potential projects and providing technical assistance to subgrantees.
q. Involve the appropriate local agencies and the County Emergency Government Director in the administration of the HMGP and planning requirements. This includes development of county/local hazard mitigation plans, participation in developing the Hazard Mitigation Plan or plan amendment, and monitoring the status of projects.
r. Follow-up with State agencies and local governments to ensure that appropriate hazard mitigation actions are taken subsequent to a disaster. This involves coordination of plans and actions of local governments to assure that they are not in conflict with each other or State plans.
s. Ensure that the activities, programs and policies of State agencies related to hazard evaluation, vulnerability, and mitigation, are coordinated and contribute to the overall lessening or avoiding of vulnerability to natural hazards.

3. Financial Management Officer (FMO)

The State Financial Management Officer is the Budget and Policy Analyst and will do the following:

a. Manage the accounts that are opened specifically for the HMGP including performing financial disbursements and financial revisions, processing payment requests, closing out the program accounts (deobligations) and processing bills for collection, if any.

b. Process payment requests and enter disbursements into the State financial management system.
c. Develop financial procedures for implementing the provisions of the Single Audit Act.
d. Receive subgrantee single audits and review for compliance.
e. Maintain financial records of all disbursements to subgrantees and prepare fiscal documents for processing the final claim, process the final State payment, and close the file (account).
f. Maintain records of State management costs eligible for reimbursement as provided for in FEMA regulations.
g. Maintain proper accountability of records related to the procurement of property and services under the Hazard Mitigation Grant Program.

4. Wisconsin Hazard Mitigation Team (WHMT)

The WHMT functions on both a day-to-day and disaster basis. Its members include representatives of the following State agencies: The Departments of Military Affairs, Administration, Commerce, State Historical Society, Natural Resources, Transportation, Human Services, Agriculture, Trade and Consumer Protection, the Public Service Commission, Office of Commissioner of Insurance, University of Wisconsin Extension and other agencies as deemed appropriate. In addition, a representative from the Regional Planning Commissions; the Wisconsin Association of Floodplain, Stormwater and Coastal Managers; Wisconsin Emergency Management Association; and Volunteer Organizations Active in Disasters also participate. The following federal agencies are included in the Group: U.S. Department of Agriculture, Economic Development Administration, Federal Emergency Management Agency, U.S. Geological Survey, U. S. Army Corps of Engineers, and the Department of Housing and Urban Development. Different personnel from the agencies may be involved depending upon whether the activity is pre- or post-disaster and upon the nature of the disaster and the type of damage it has generated. The purpose and goal of the WHMT is to assist the local governments in the recovery phase, provide technical assistance when possible, prevent duplication of efforts and funding, identify and prioritize mitigation projects, and identify funding options for implementing mitigation projects, whether through the individual agencies or by “packaging” various funding programs. This group is also responsible for reviewing and revising the State Hazard Mitigation Plan per planning requirements.

When a disaster occurs, the SHMO will convene the WHMT to brief them on the situation and any actions that have been taken to date. The agencies will provide an update on any funding sources and/or technical assistance they may be able to provide during the recovery phase. The WHMT will assist the

SHMO in implementing the HMGP and in fulfilling Hazard Mitigation planning requirements. The WHMT will assist the SHMO in identifying potential hazard mitigation projects and providing technical assistance to eligible subgrantees. The WHMT will meet on a regular basis after a declaration, even weekly if necessary, to coordinate recovery efforts. The SHMO is responsible for making meeting arrangements and developing the agenda as well as chairing the meetings. In addition to the above activities, the WHMT will review pre-applications to identify funding sources and establish funding priority as well as prevent any duplication of programs. The WHMT will work to package funding where possible to ensure implementation of mitigation projects.

Agency participation in post-disaster hazard mitigation activities is authorized under Chapter 323 of the Wisconsin Statutes, specifically under the Governor's Declaration of an Emergency. Such a gubernatorial proclamation directs appropriate State agencies to contribute whatever resources are at their disposal, including personnel, to the response and recovery effort and to make their involvement an agency priority.

5. Local Hazard Mitigation Officer/Team (LHMO)(LHMT)

   The County Emergency Management Director (or his/her designee) will act as the LHMO. The LHMO will call upon other local agencies to act as members on the Local Hazard Mitigation Team (LHMT) and participate, as necessary, in implementing the HMGP. The LHMO will be the point of contact for projects within his/her jurisdiction determined eligible for HMGP funding and will provide information and reports to the SHMO as requested. The LHMO will coordinate with HMGP subgrantees in administration of the HMGP. In addition, the LHMO will coordinate with the SHMO in supporting the efforts of reviewing and revising the All Hazards Mitigation Plan.

VI. ALL HAZARDS MITIGATION PLANNING REQUIREMENTS

A. Immediately following the declaration of a disaster, the SHMO will meet with as many affected local governments as feasible for the purpose of surveying the damaged area. The survey is intended, among other things, to identify the following:

   1. The prevalent hazard or type of hazard which resulted in damage, the type and extent of that damage, and possible mitigation measures that could be considered in the recovery process.

   2. Possible measures for funding under the Hazard Mitigation Grant Program or under other Federal or State mitigation, disaster assistance or financial assistance programs.

3. The FHMO and SHMO will contact appropriate Federal and State agencies for participation in the surveys as required. In flood disasters DNR, because of its technical expertise, will be asked to take a key role in the survey. Further, they will determine which counties/communities will be evaluated, based upon the extent of the damages and their repeated occurrence. Every effort will be made to survey each of the counties included in the declaration. If an actual on-site survey cannot be done, then a phone survey will be done with the County Emergency Management Director to identify specific mitigation problems or concerns.

B. All Hazards Mitigation Planning

1. WEM has primary responsibility for preparation of the State of Wisconsin Hazard Mitigation Plan, which is a requirement to receive assistance under the Stafford Act. At the time of a declaration of a major disaster, the State will make every effort to review and revise this Plan to take into account special needs identified for that particular declaration. (CFR 201.4)

2. At a minimum, the plan will be adopted by the State and will contain the following:

   a. Documentation of the planning process to include coordination among agencies and integration with other planning efforts.
   b. An evaluation of the natural hazards in the State and/or in the designated disaster area to include a vulnerability analysis and risk assessment.
   c. A description and analysis of State and local hazard management policies, programs, and capabilities already in place or available to mitigate the hazards.
   d. Hazard mitigation goals and objectives and proposed strategies, programs, and actions to reduce or avoid long-term vulnerability to hazards.
   e. A description of how the State will coordinate with local mitigation planning efforts.
   f. A method of how the State will provide funding or technical assistance to local governments.
   g. A description of how the State will prioritize jurisdictions that will receive mitigation planning and project grants and other State assistance.
   h. A method of implementing, monitoring, evaluating, and updating the mitigation plan. At a minimum, this will occur every three years to ensure that implementation occurs as planned, and to ensure that the plan remains current.

3. The purpose of the plan is to assist the State and local governments in developing hazard mitigation capabilities and programs as part of their day-to-day or normal operations. The plan will also be modified or expanded to take into account special needs identified in declared declarations areas within the State.
4. The State WEM is responsible for monitoring and evaluating implementation of the Hazard Mitigation Plan and for updating and resubmitting the Plan to FEMA for approval every 3 years.

VII. SECTION 404 HMGP ELIGIBILITY

A. Applicant Eligibility - The following are eligible to apply for the Hazard Mitigation Grant Program.

1. State and local governments (For project grants, they must have an approved All Hazards Mitigation Plan with the proposed measure listed in their plan. If they do not have an approved plan, they may apply for a Planning Grant.)

2. Certain private nonprofit organizations or institutions that own or operate a private nonprofit facility as defined in 44 CFR 206.221(e) and further clarified in the Federal Register/Vol. 68, No. 120/ Monday, June 23, 2003/Notices. (To be eligible, they must have participated in a local hazard mitigation plan and the proposed measure listed in the plan.)

3. Indian tribes or authorized tribal organizations (For project grants, they must have an approved All Hazards Mitigation Plan with the proposed measure listed in their plan. If they do not have an approved plan, they may apply for a Planning Grant.)

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B. Project Eligibility - To be eligible for the Hazard Mitigation Grant Program, a project must meet the federal minimum project criteria listed below. In addition to the federal criteria, the State of Wisconsin may consider other basic criteria when evaluating potential HMGP projects, including the applicant's compliance with NFIP, State, and local floodplain regulations and participation in the Community Rating System. (It should be noted that the HMGP cannot retroactively fund projects.)

1. Be in conformance with the State and Local Hazard Mitigation Plan.

2. Have a beneficial impact upon the project area.

3. Be in conformance with 44 CFR Part 9, Floodplain Management and Protection of Wetlands and 44 CFR Part 10, Environmental Considerations.

4. Solve a problem independently or constitute a functional portion of a solution where there is assurance that the project as a whole will be completed. (Projects that merely identify or analyze hazards or problems without a funded, scheduled implementation program, are not eligible.)

5. Be cost-effective and substantially reduce the risk of future damage, hardship, loss, or suffering resulting from a major disaster. The State, in applying for the grant, must demonstrate this by documenting that the project does the following: (Note, the cost-effective assessment must include both a numerical evaluation of benefits and costs and an accompanying narrative statement.)

    a. Addresses a problem that has been repetitive, or a problem that poses a significant risk if left unsolved (*i.e.* evaluating the hazard in terms of the frequency and intensity of expected occurrences).
    b. Will not cost more than the anticipated value of the reduction in both direct damages (property) and subsequent negative impacts (loss of function, deaths, injuries) to the area if future disasters were to occur. Both costs and benefits will be computed on a net present value basis (*i.e.* obtaining expected damage estimates as a function of hazard intensity).
    c. Has been determined to be the most practical, effective, and environmentally sound alternative after consideration of a range of options, including the “no action” alternative.
    d. Contributes, to the extent practicable, to a long-term solution to the problem it is intended to address.
    e. Considers long-term changes to the areas and entities it protects, and has manageable future maintenance and modification requirements.

C. <u>Types of Projects</u> - Projects may be of any nature that will result in protection to public or private property. Eligible projects include, but are not limited to, the following:

1. Acquisition and/or relocation of structures from hazard-prone areas.

2. Retrofitting of facilities, such as elevation or floodproofing to protect structures from future damage.

3. Development of State or local mitigation standards to protect new and substantially improved structures from disaster damage.

4. Structural hazard control or protection projects, such as debris basins or small floodwalls.

5. Construction activities that will result in protection from hazards.

6. Development of comprehensive Hazard Mitigation programs with implementation as an essential component.

7. Development or improvement of warning systems such as the purchase and distribution of NOAA weather radios.

8. Development or update of an All Hazards Mitigation Plan (7% set aside)

D. Funding

1. Federal - FEMA will make Hazard Mitigation Grant Program funds available to the State of Wisconsin in accordance with the following federal regulations:

   a. The total federal funds provided shall not exceed 15 percent (twenty percent if the State has an approved Enhanced State Hazard Mitigation Plan) of the estimated total eligible federal funds spent on the Public and Individual Assistance Programs for each disaster declared under the Stafford Act.
   b. The federal funds provided will be based on the cost-sharing provisions outlined in the FEMA-State Agreement. The federal share of hazard mitigation projects may not exceed 75% of the eligible cost of those projects.
   c. HMGP funds cannot be used as a substitute or replacement to fund projects or programs that are available under other federal authorities, nor can they be used as a match for other federal funds. (Regulations explaining the cost-share requirements can be found at 44 CFR 13 Subpart C.)
   d. A set-aside of up to 5% of the total HMGP funds for each declaration is available for the State to use at its discretion for mitigation measures. Projects or activities eligible under the set-aside are those projects that are difficult to evaluate against traditional program cost-effectiveness and eligibility criteria but are generally recognized to provide a benefit in reducing potential losses from a future disaster. In-lieu of the traditional cost-benefit analysis, WEM will include a narrative that identifies the mitigation benefits and indicates that there is a reasonable expectation that future damage or loss of life or injury will be reduced or prevented. Set-aside projects still have to be reviewed for compliance with environmental laws.
   e. A set-aside of up to 7% of the total HMGP funds for each disaster is available to the State for State, local and or tribal planning efforts.

2. State - State funding for HMGP projects is authorized under Chapter 323, Wis. Statues and will be made available when a Presidential declaration is received. The non-federal share will be split evenly between the State and the subgrantee.

3. Subgrantee – The non-federal share is split evenly between the State and the subgrantee and can come from any funding source (state, local, or private) provided it is not federal funds. The non-federal share does not need to be cash; in-kind services or materials may be used. Funds in excess of the cost-share requirement may be provided from a combination of other federal, state, local or private funding sources.

4. Lock-in Ceiling The lock-in ceiling is the guaranteed level of HMGP funding for a particular disaster. Within 30-35 days of the disaster declaration an HMGP a preliminary lock-in is established. The estimated ceiling is maintained at that same amount for the first six months at which point the first ceiling review is completed and a revised lock-in ceiling is established. The estimate is reevaluated based upon 15% (20%) of other grants under the declaration. If it results in an increase in the estimate, the lock-in ceiling will reflect the increase and vice versus for a decrease. Only at the time of the first HMGP ceiling review shall a decrease in available funds be incorporated into the lock-in. Therefore, the first lock-in ceiling represents the minimum amount of HMGP funds available for a given disaster. The first review for the lock-in ceiling will remain at that amount until 12 months after the disaster declaration at which point the final review will take place. If the resulting estimate amount has increased, the final lock-in ceiling amount will reflect the increase. The HMGP ceiling timeline is:

30-35 days:	Initial establishment of the HMGP estimated ceiling.
6 months:	Ceiling is reviewed and the lock-in ceiling is adjusted upward or downward if necessary.
12 months:	Final lock-in ceiling is established.

VIII. IDENTIFICATION AND NOTIFICATION OF APPLICANTS

A. Identification - It is the GAR/SCO's responsibility to ensure that potential applicants for the HMGP are identified. This is primarily accomplished by the SHMO through the following means:

1. Identifying those communities that have adopted a FEMA approved All Hazards Mitigation Plan.

2. Information acquired during the Preliminary Damage Assessment (PDA), and through the community visits conducted after the declaration is granted.

3. A review of the State Hazard Mitigation Plan, especially that portion of the plan that contains an inventory of projects previously identified for funding should it become available.

4. Consultation between the SHMO and FHMO.

5. Through the activities of the WHMT.

6. Information provided by the Public Assistance Officer on possible projects based on information from approved Project Worksheets or through contacts with applicants for the Public Assistance Program.

B. Notification - The GAR/SCO is also responsible for ensuring that potential applicants are notified of the availability of HMGP funding and of program requirements. This will be accomplished by the SHMO as follows:

1. At the Applicants Briefing for the Public Assistance Program, the SHMO and the SPAO will coordinate as to the nature of the HMGP Program information and presentation to be made at the briefing. An overview of the program, to include the eligibility requirements, will be presented at the briefing(s). The intent will be to create an early awareness of the existence of the program and to indicate that more detailed information will be provided, as necessary, at a later date.

2. A letter will be mailed to all potential applicants within the declaration area, at a minimum, advising of the availability of the HMGP funds. Accompanying the letter will be a HMGP Pre-Application Form that interested applicants must return to the SHMO. In addition communities outside the declared disaster area may apply to the program. A pre-application will be mailed to communities with previously identified projects and/or previous contacts as well as the County Emergency Directors in non-declared counties. In addition the Pre-Application and information is posted on WEM's website.

3. The HMGP Pre-Application Form is intended to assist the State in making an initial determination on project eligibility prior to the subgrantee completing a formal application package. A Ranking and Scoring Pre-Application worksheet is completed by the SHMO and the results are presented to the WHMT. The full project application package will be sent to those applicants with the highest priority ranking and whose proposed projects are most viable

and have the greatest potential for funding. (See Section IX.D. on reviewing, ranking and selecting projects.) Letters will be mailed to applicants whose projects are denied.

4. The SHMO may meet with communities completing the full application package to assist them in the application process. County Emergency Management Directors will also be invited. The briefing will include the following: general program overview; eligibility; application process; selection process; project management; and technical assistance.

5. At the discretion of the SHMO and FHMO, a press release describing the program may be developed and issued.

IX. PROGRAM ADMINISTRATION

A. Initial Application Process

1. Within 60 days of the disaster declaration the State will notify FEMA in writing of its intent to participate or not participate in the Hazard Mitigation Grant Program. This is actually done twice, in that the Governor requests the HMGP in his request for a Presidential Disaster Declaration and the SCO/SHMO sends a letter to the Regional Administrator that the State intends to participate in the Hazard Mitigation Grant Program. As needed, the SHMO will call upon FEMA Region V for technical assistance on program administration or management.

2. The SHMO is responsible for ensuring that HMGP Application Packages are distributed to all potential applicants. Potential applicants are those who have already gone through the pre-application process and whose projects have been selected for further funding consideration.

3. Applicants for HMGP funding must submit a completed application package within the timeframe specified by the SHMO. Submittal of applications for mitigation projects are encouraged as soon as possible after the disaster occurs so that mitigation opportunities are not lost during reconstruction.

   The application package will include a completed HMGP Disaster Application form, Assurances, Statement of Assurances for Property Acquisitions Projects with warranty deed restrictions attached, budget worksheet, BCA Property Data Worksheet, Damage Assessment Worksheet, Notice of Voluntary Interest, Model Acknowledgements of Conditions for Mitigation of Property in a SFHA for elevation projects, appropriate maps and any other

documents to support the project. The SHMO will use the information provided to run the Benefit Cost Analysis (BCA) and to assess the environmental effects of the proposed project.

4. The subgrantee is required to have a FEMA approved All Hazards Mitigation Plan to be eligible for project funds. A subgrantee who does not meet this requirement can apply for Hazard Mitigation Grant Program planning funds to develop a plan. The plan would have to be completed and approved within one year from the declaration date, and prior to receiving a project grant.

B. Special Considerations for Property Acquisition/Relocation Projects

Because of heir unique nature, special considerations are required in the administration of acquisition and relocation projects. Subgrantees must comply with the special considerations found in 44 CFR 206.434(e); and Part 80, Property Acquisition and Relocation for Open Space; and any other related guidance. Section X covers the requirements for property acquisition and relocation in detail.

In general, properties eligible for acquisition include those where:

- The property will be acquired from a willing, voluntary seller.
- Property contains an at-risk structure, including those that are damaged or destroyed due to an event. In some cases, undeveloped, at-risk land adjacent to an eligible property with existing structures may be eligible.
- All incompatible easements or encumbrances can be extinguished.
- The property is not contaminated with hazardous materials at the time of acquisition, other than incidental demolition or household waste.
- If the structure on the property is to be relocated, the relocated structure must be placed on a site located outside of the 100-year floodplain, outside of any regulatory erosion zones, and in conformance with any other applicable state or local land use regulations.
- The property cannot be part of an intended, planned or designated project area for which the land is to be acquired by a certain date, and or where there is an intention to use the property for any public or private future use inconsistent with the open space deed restrictions and FEMA acquisition requirements (examples includes roads and flood control levees); and
- The property will not be subdivided prior to acquisition, except for portions outside the identified hazard area, such as the Special Flood Hazard Area or any risk zone identified by FEMA.

As part of the project application, subgrantees must attach the Statement of Assurances for Property Acquisition Projects along with the attached Model Statement of Voluntary Participation and Warranty Deed Restrictions. In addition, the subgrantee must include with the application, the completed and signed Notice of Voluntary Interest, either Sample 1 or 2 for each property owner that will participate in the project. The project application will also include the Benefit-Coast Analysis Property Data Worksheet for each property, and a Budget Cost Worksheet. (See Attachment D.)

Every three years the State will contact the communities that have purchased land with HMGP monies and have them verify in writing that the land requirements (open space, public ownership, etc.) are being adhered to.

C. Special Considerations for Projects in Special Flood Hazard Aras (SFHA)

For projects related to mitigation of properties in SFHA (e.g., elevation and floodproofing), each participating Property Owner's signed acknowledgement of conditions for having a property in a SFHA mitigated with FEMA grant funds must be provided to the Grantee and FEMA prior to award. The acknowledgement addresses the information identified on the Model Acknowledgement of Conditions for Mitigation of Property in a SFHA with FEMA Grant Funds (Attachment D), and have equivalent effect.

D. Reviewing, Ranking, and Selecting Projects

1. The SHMO and other mitigation staff will review the pre-applications submitted for HMGP funding. The eligibility of the applicants will be verified. The review of the pre-applications may reveal that eligible projects are competing for limited HMGP funding. The SHMO and staff will score, rank and prioritize the project based on FEMA and the State's criteria and based on information provided in the pre-application and gathered from site visits or community meetings.

2. The SHMO will convene the WHMT to discuss the pre-applications and identify potential funding sources for projects as well as make sure there is no duplication of efforts among the agencies involved. Projects that are eligible for technical or financial assistance through other state or federal agencies will be referred to those agencies.

3. Based on the recommendations of the WHMT and the State's priority, the SHMO will make a formal recommendation to the GAR/SCO as to which projects should be selected for further HMGP funding consideration.

4. The GAR/SCO will make the final decision regarding the selection of projects for potential funding. Formal HMGP application packages will be sent to those communities selected for further grant consideration.

5. It should be noted that since 1993, FEMA has placed the acquisition of floodplain property as the first priority for HMGP funding; and since 1998 FEMA has further designated the acquisition of repetitive loss structures as their top priority. The following has been adopted as the State's priority for HMGP funds:

   a. Acquisition and demolition of floodplain properties determined to be substantially damaged per a community's floodplain zoning ordinance;
   b. Acquisition and demolition of repetitive loss structures that meet FEMA's BCA;
   c. Acquisition and demolition of damaged floodplain properties that meet FEMA's BCA;
   d. Acquisition and demolition of floodplain properties that meet FEMA's BCA;
   e. Acquisition and demolition of flood damaged properties not in the floodplain that meet FEMA's BCA;
   f. Elevation or floodproofing or retrofitting flood damaged structures in the floodplain that meet FEMA's BCA;
   g. Elevation or Floodproofing or retrofitting flood damaged structures not in the floodplain that meet FEMA's BCA;
   h. Other hazard reduction projects (such as community storm shelters, detention ponds, storm sewer improvements, protection of utilities, drainage, etc.) that meet FEMA's BCA.

   Additional criteria:

   a. Mitigation activities that fit within an overall plan for development in the community, disaster area, or state.
   b. Mitigation activities that if not taken will have a severe detrimental impact on the community such as the loss of life, loss of essential services, damage to critical facilities, or economic hardship.
   c. Mitigation activities that have the greatest potential for reducing future disaster losses.
   d. Mitigation activities that are designed to accomplish multiple objectives, including damage reduction, environmental enhancement, historical preservation, recreational opportunities, and economic recovery.
   e. The community's level of interest and demonstrated degree of commitment to mitigation programs and activities.

6. The SHMO will review the formal HMGP applications to ensure that adequate information has been provided and the project meets all the minimum eligibility requirements. The SHMO will contact the community to obtain any necessary additional information and for involving appropriate members of the WHMT in the review process.

E. Submission of State Application for HMGP Funding

1. Following completion of the applications and as soon as possible after the Presidential Disaster Declaration, the SHMO will submit them to FEMA, Region V Administrator. This will be accomplished within 12 months of the declaration. If necessary, two 90-day requests may be made to extend the application period. All funds will be obligated within two years of the declaration, whenever possible.

2. The SHMO will forward to FEMA the application package that will contain the following:

   a. DMA Form 139 (Section 404-HMGP Disaster Application) that includes:

      Name of the subgrantee and its assigned FIPS and DUNS number
      Primary and secondary contact person for the project
      Project cost estimate
      Project title and description
      Project location (including maps)
      Detailed description of the project
      Pictures of project
      Work schedule and estimated completion dates
      Cost breakdown for the project
      Considered alternatives

   b. DMA Form 1017A (Assurances)
   c. Statement of Assurances for Property Acquisition Projects (if applicable) with attached warranty deed restrictions.
   d. Signed Notice of Voluntary Interest Forms (if applicable)
   e. Summary of the completed BCA along with documentation and a narrative consistent with HMGP regulations.
   f. Environmental review (Record of Environmental Consideration-REC) consistent with 44 CFR Part 10.)

3. The SHMO will enter into NEMIS all appropriate information for each application

4. E-mail will be sent to FEMA informing them that an application package has been forwarded to their office.

F. Project Approval

1. After FEMA's mitigation staff approves an application over $1 million, they will forward a draft press release to Region V External Affairs Officer (EAO). The EAO will notify the appropriate congressional members and the SHMO. The project approval and announcement is considered "close hold" information, not to be shared until the congressional member is about to make the announcement.

If the congressional member chooses not to make the announcement, the EAO will coordinate with the state's Public Affairs Officer and the SHMO on the use of a joint federal/state release.

2. If the project has been approved, the SHMO will initiate a State/Local Hazard Mitigation Grant Program Assistance Agreement that will be signed by WEM and the subgrantee before the project can commence.

3. After the State/Local Hazard Mitigation Grant Program Assistance Agreement has been signed, the applicants will be directed to commence work on the project. The SHMO will provide the applicant with appropriate information on HMGP requirements, including how to request reimbursement of funds, the requirement to submit quarterly progress reports, requests for extensions of time, etc.

G. Project Management

1. WEM will be the grantee for project management and accountability of funds in accordance with 44 CFR Parts 13. Approved applicants for HMGP funding are considered subgrantees and as such are accountable to WEM (the grantee) for funds awarded to them.

2. The WEM Financial Management Officer (FMO) will manage the accounts funded by FEMA for approved projects under HMGP. The FMO will not draw federal funds from the account until advised by the SHMO and FEMA has obligated funds for this purpose. The FMO and SHMO will be jointly responsible for ensuring that all procurements using HMGP funds will follow the policies and procedures outlined in 44 CFR 13.36. By signing the Assurances that are part of the grant application, the subgrantee is so agreeing.

3. The SHMO and the subgrantee will implement a record keeping and financial system for each project based upon the approved work schedule.

4. Subgrantees will submit Quarterly Status Reports to the SHMO. The due dates for these reports are January 15, April 15, July 15, and October 15. The SHMO in turn will submit a quarterly progress report to FEMA indicating the status and completion date for projects in all open disaster declarations. Any problems or circumstances affecting completion dates, scope of work, or project costs which are expected to result in noncompliance with the approved grant conditions will also be described in the report. The FMO is responsible for submitting the financial quarterly report to FEMA.

5. Upon completion of the grant, the SHMO will certify to FEMA that costs incurred in the performance of eligible work are allowable, that the approved work was completed, and that the mitigation measure is in compliance with the Federal-State Agreement and the State/Local HMGP Assistance Agreement. A project closeout worksheet providing a complete assessment of project accomplishment will also be prepared by the SHMO and submitted to FEMA. The FMO is responsible for submitting the final financial report to FEMA.
6. Subgrantees will maintain financial records and receipts necessary to document all their expenditures relative to their projects. Such records may include specifications, bid tabulations, contract awards, invoices, receipts, checks, job orders, equipment usage, payroll information, and any other necessary documentation that would be required for an audit. A sample spreadsheet will be provided to each subgrantee.

7. The SHMO will monitor and evaluate project accomplishments, and adherence to the work schedule. Problems will be reported immediately to the GAR/SCO and Region V. If a subgrantee is found to be non-compliant with any of the agreed upon terms of the HMGP, the SHMO will take actions appropriate for the circumstances and as outlined in 44 CFR 13.43. Except as provided for in 44 CFR 13.43, awards may also be terminated for convenience by the SHMO as per procedures outlined in 44 CFR 13.44.

8. The SHMO will review requests for reimbursement of expenditures, time extension requests, cost overruns, and appeals.

    a. Reimbursement of Funds

        1) The reimbursement of funds will be based on expenditures already incurred and within the dollar amount of the approved project.

        2) Advancement of funds may be made in some extraordinary situations upon prior approval of the State. The subgranttee will be advised to deposit any advance HMGP funds into a separate non-interest bearing bank account. If any interest is generated, the subgranttee will be instructed that those funds shall be expended for project administrative purposes before any additional project funds are drawn down. Subgrantees should reconcile earned interest each calendar quarter. If earned-and-expended interest exceeds $100 at any time during the calendar year, all interest in excess of $100 shall be returned to the U.S. Treasury.

3) A request for funds during project implementation must be submitted in writing to the SHMO. The request must be accompanied by adequate supporting documentation for both project and any in-kind match (44 CFR 13.24). The retention period begins at the time the subgrantee's closing report has been accepted by the State. (44 CFR 13.42)

4) When the request is approved, disbursement documentation will be prepared and forwarded to the FMO for processing. When the reimbursement check is received, the SHMO will forward it, along with a cover letter, to the applicant.

5) If the request is denied, the applicant will be so advised, in writing, and given the reason for the denial.

b. Time Limits and Extensions

1) Time Limits - Generally, projects must begin within 90 days of grant approval and be completed per the approved work schedule (no later than 3 years from the date funds were obligated for their project). The specific time schedule for each project will be detailed in the approved project application. Exceptions may be granted for certain types of projects and/or special circumstances.

2) Time Extensions - If an applicant is unable to complete a project by the time specified in the project application, he/she must immediately notify the SHMO in writing and request a time extension. The request should explain why the completion deadline will not be met, what project work remains, and a probable date for project completion. After reviewing the time extension request, the SHMO will notify the applicant of the decision.

If the extension request means that their activity period will go beyond the disaster close date, the SHMO will request up to a one-year disaster period of performance extension. The SHMO will make this request to Region V 60 days prior to the close of the disaster. If at the end of the 1-year extension another extension is requested by the subgrantee, the SHMO again will submit the request to Region V 60 days prior to the "new" disaster close date. The disaster period of performance cannot exceed 7 years.

c. Cost Overruns

1) Subapplicants will be required to notify the SHMO in writing as soon as they determine that they will have a cost overrun. The letter should include the dollar amount of the overrun, the reason for the overrun, and provide appropriate justification and documentation (invoices, copies of contracts, pictures, etc.) to support the additional costs.

2) The SHMO will evaluate each cost overrun. If the evaluation indicates that the cost overrun is justified, and if HMGP funds are available for a supplement to the grant, the SHMO will submit a request, along with supporting documentation, to the FHMO for approval.

3) The subgrantee will be notified in writing of the FHMO's decision on the overrun.

d. Appeals

1) An applicant may elect to appeal any decision made by the SHMO or FEMA on its project.

2) Such appeals must be in writing to the SHMO and contain new or additional information that justifies reconsideration.

3) The applicant appeal must be submitted to the SHMO within 60 days of the date of the letter notifying the applicant of the action being appealed.

4) Upon receipt of an appeal from a subgrantee, the SHMO will review the material submitted and forward the appeal with a written recommendation to the Regional Administrator within 60 days.

5) The FEMA Regional Administrator has 90 days to make a determination on the appeal or to request additional information from the State.

6) If the FEMA Regional Administrator denies the appeal, the subgrantee may appeal again through the SHMO and FEMA Regional Administrator. This second appeal is sent to the FEMA Assistant Administrator for the Mitigation Directorate within within

60 days of the Regional Administrator's denial. The Assistant Administrator for the Mitigation Directorate's appeal determination within 90 days will be the Agency's final administrative decision on the matter.

9. Program Income

   Certain types of hazard mitigation projects will allow the subgrantee to earn income in the course of implementing the project (i.e. through salvage of property prior to demolition, etc.) Program income shall be applied to the project or deducted, in accordance with 44 CFR 13.25, from outlays which may be both federal and non-federal, as outlined in 44 CFR 13.25 (g), unless the federal agency regulations or the grant agreement specify another alternative

   If any interest is generated on advancement of funds (they will be advised to use non-interest bearing accounts), the subgrantee will be instructed that the interest funds shall be expended for project administrative purposes before any additional project funds are drawn down. They will also be instructed to reconcile earned interest each calendar quarter. If earned-and-expended interest exceeds $100 at any time during the calendar year, they will be told to return the excess of $100 to the U.S. Treasury.

10. Project Completion and Closeout

    a. Within 30 days of project completion, the applicant will notify the SHMO in writing. The written closeout letter and notification will include a final report along with documentation for final reimbursement and a signed copy of the environmental closeout declaration if appropriate.
    b. The SHMO will review the documentation to ensure that all claims and costs are eligible and that work performed is in compliance with the approved project application.
    c. The SHMO will authorize final payment of the federal and state shares of the grant. In addition, the SHMO will also authorize payment of allowable subgrantee management costs, in accord with FEMA regulations and the State Administrative Plan. Such expenses will be listed separately from actual project-related expenditures.
    d. A site visit will be made to do a final inspection.
    e. Upon completion of a project, the SHMO will prepare a Project Closeout Worksheet and submit it to FEMA for their approval and signature. In addition, the SHMO will request FEMA to complete the grant closeout process.

f. When all projects under a single disaster have been completed, the SHMO will prepare the Declaration Closeout Letter and Worksheet for the HMGP and forward it to FEMA for their approval and signature requesting that the declaration for HMGP be closed. The FMO will close out the HMGP Program financially by submitting a FFR 425, certifying project completion. All valid expenditures made in the performance period will be liquidated within 90 days following the expiration of the period of performance.

11. Audits

a. The Division of Emergency Management and each subgrantee expending $500,000 or more in federal financial assistance shall ensure that audits are conducted in accordance with 44 CFR Part 14.
b. The FMO will review audits for the grantee and subgrantee and report any problems to the SHMO and FEMA. The SHMO or FMO will take appropriate or required action.
c. If there is evidence of noncompliance, the FMO will take appropriate corrective action within six months.
d. If FEMA elects to conduct a federal audit of the HMGP, the grantee and subgrantee will cooperate as necessary.

12. Technical Assistance

If an applicant requires technical assistance in the course of applying for and/or implementing a Hazard Mitigation Project, he/she should contact the SHMO. The SHMO will call upon appropriate agencies from the WHMT or coordinate with other state or federal agencies, in addition to the regional planning commissions to provide such assistance.

13. Management Costs

In accordance with 44 CFR Part 207, the State can request FEMA provide a grant equal to 4.89% of the federal share of the estimated eligible program costs for the HMGP for the declaration. The grant is awarded after the State provides adequate documentation to FEMA that supports the costs and activities for which funding will be used. Management costs can include indirect costs, administrative expenses, and any other expenses not directly chargeable to a specific project that are reasonably incurred by the grantee or subgrantee in administering and managing the HMGP program and grant awards.

a. State Management Costs cover the cost to support activities and administer the HMGP. State Management Costs generally represent regular and overtime time salaries and associated fringe benefits of state personnel administering the HMGP and may include personnel costs for State staff housed in departments other than the Emergency Management agency. Eligible staff costs include the State's cost of regular full-time or part-time contractual personnel dedicated to the HMGP, and personnel with whom the State has contracted for specific tasks necessary for management and administration of the HMGP program such as certified review appraisers. The costs for goods and services, equipment, travel, per diem, lodging, financial transactions fees associated with project payments, subscription to the State's Historical Society database to conduct historical and archaeological reviews also are components of the State's management costs.

b. In addition, the State may pass through to subgrantees management costs for their costs associated with the administration of their approved HMGP grant. Costs can include those incurred for requesting, obtaining, and administering the grant. This includes the costs for submitting quarterly reports, preparing requests for reimbursements, conducting inspections, completing closeout documents, and any required audits. Subgrantee management costs up to 1% (one percent) of the final net eligible costs in the FEMA approved HMGP grant.

   Additional funds may be requested in extraordinary situations with adequate documentation and if management cost funds are available.

   The subgrantee must maintain documentation on management cost expenses. The subgrantee is not required to provide documentation to the State, but must maintain records for minimum of three years after closeout of the grant. Activities and costs that can be charged directly to the HMGP grant with proper documentation are not eligible for management cost funding and should be charged as project costs.

   The State will track funds expended for subgrantee management costs for each subgrantee on its disbursement spreadsheet as well as cumulatively for all subgrantees for the disaster.

c. Determination of Management Cost Funding

   1) Between 30 and 35 days after the declaration date, FEMA will provide the State with the preliminary lock-in amount for management costs

based on projections at the time of the federal share for the disaster. If requested by the State, FEMA will obligate up to 25% of the estimated state management cost lock-in amount at this time.

2) At 6 months after the date of declaration, FEMA will revise the preliminary lock-in amount for management costs based on the projections at that time of the federal share for the disaster. FEMA may obligate interim amounts to the state.
3) At 12 months after the date of the declaration, FEMA will determine the final lock-in amount for management costs based on the projections at that time of the federal share for the disaster. FEMA will obligate the remainder of the lock-in amounts to the state.

d. Requesting Management Cost Funding

Following notification from FEMA of the preliminary lock-in amount and within 120 days from the declaration date, the Division will submit a HMGP project narrative that describes the activities, projected personnel requirements, subgrantee management costs, and other costs related to the management of the program for that disaster. In extraordinary circumstances FEMA may approve a request by the state for an extension to submit the project narrative. Documentation to the support the management cost request will include:

1) The State's plan for expending and monitoring the funds and ensuring sufficient funds are budgeted for grant closeout.
2) An estimate of the percentage of pass-through fund that the State will make available to subgrantees.

FEMA will approve or reject the HMGP project narrative on management costs within 30 days of its receipt. If FEMA rejects the narrative, it will provide the State definitive reasons for the denial as well as clearly identify the additional documentation required for approval. He State will have 30 days to submit a revised narrative for consideration and approval.

At 6 months after the declaration date, the State may request an additional obligation of 10% of the management cost funds if needed, based on the revised 6 month preliminary lock-in amount. This request for additional funds will include documentation to support the request.

At 12 months after the declaration date, FEMA will notify the State of the final lock-in amount. The State will submit a final funding request, based upon the final lock-in amount, to the FEMA Regional Administrator. The

final funding request will include any necessary revisions to the required supporting documentation. FEMA will obligate the remaining funds upon approval of the final request.

The State's quarterly reports will include HMGP grantee and subgrantee management cost expenses.

The performance period for HMGP management costs will be 8 years from the date of the declaration, or 6 months following the latest performance period date of a subgrantee project, whichever is sooner.

X. SPECIAL CONSIDERATIONS FOR PROPERTY ACQUISITION/RELOCATION PROJECTS

Because of their unique nature, special considerations are required in the administration of acquisition and relocation projects. Subgrantees must comply with the special considerations, 44 CFR 206.434(e); Part 80, Property Acquisition and Relocation for Open Space; and Hazard Mitigation Assistance Unified Guidance, Part IX.A., any other related guidance.

A. State Roles and Responsibilities

1. Serve as the point of contact by coordinating with the subgrantees and with FEMA to ensure that the project is implemented per regulations.

2. Provide technical assistance to the subgrantees

3. Ensure that projects are not framed in a manner that has the effect of circumventing federal regulations.

4. Ensure that the proposed activity complies with federal regulations including that the property acquisition activities remain voluntary in nature, and that the subgrantee and property owners are aware of said requirement.

5. Submit subapplications in accordance to program schedules and requirements with all required information for FEMA to determine eligibility, technical feasibility, cost effectiveness, and environmental compliance.

6. Review any proposals for subsequent transfer of property interest and obtaining FEMA approval and ensure that uses are compatible with open space requirements.

7. Review any proposals for leases or easements on property interest and obtaining FEMA approval and ensure the uses are compatible with open space requirements.

8. Make no applications for or provide federal disaster assistance or other FEMA assistance for the property or any open-space related improvements after the property is acquired.

9. Ensure that acquired properties remain in open space and use in perpetuity.

10. Report on property compliance with the open space requirements after grant award every three years. This will be done every three years by sending a letter on May 1st to all past subgrantees and requesting signed certification that will be due July 1st.

B. Subgrantee Roles and Responsibilities

1. Coordinate with the State and with property owners to ensure that the project is implemented in compliance with federal regulations

2. Submit subapplications in accordance to program schedules and requirements with all required information for the State and FEMA to determine eligibility, technical feasibility, cost effectiveness, and environmental compliance.

3. Ensure that projects are not framed in a manner that has the effect of circumventing federal regulations.

4. Coordinate with the property owners to ensure that they understand the benefits and responsibilities of the project and that participation in the program is voluntary.

5. Develop the project application and implement the project in accordance with federal regulations ensuring that all terms of the required deed restrictions and grant award are enforced.

6. Consult with the U. S. Corps of Engineers and the State Department of Transportation to ensure that no future planned improvements, projects or enhancements are under consideration that will affect the properties.

7. Ensure that there are fair procedures and processes to compensate property owners and tenants such as determining property values and/or the amount of the mitigation offer, and reviewing property owner disputes regarding such offers.

8. Make no application for federal disaster assistance, flood insurance, or other FEMA benefits for the property or any open-space related improvements after the property is acquired.

9. Take and retain full ownership or if transferring or leasing the property, obtaining State and FEMA approval.

10. Submit to the State and FEMA proposed uses on the property for open space compatibility determinations.

11. Monitor and report on property compliance after the grant is awarded.

C. Pre-Award Requirements

1. FEMA may fund eligible pre-award project costs at its discretion and as funds are available. Grantees and subgrantees may be reimbursed for eligible pre-award costs for activities directly related to the development of the project proposal. The costs can only be incurred during the open application period. Costs incurred prior to grant award that are associated with actual implementation of the project are not eligible.

D. Post-Award Requirements

1. Project Implementation

   a. The subgrantee will not acquire property contaminated with hazardous materials. A contaminated property must be certified clean prior to acquisition. This excludes disposal of incidental demolition and household hazardous wastes. Grant funds cannot be used for clean-up or remediation of contaminated properties.

   b. The subgrantee will obtain a title insurance policy to ensure that it acquires property with clear title. The property interest generally must transfer by a general warranty deed. Any incompatible easements or other encumbrances to the property must be extinguished before acquisition.

   c. The offer to purchase is based on the current fair market value of the property or the "pre-event" market value for the major disaster under which funds are available. When multiple disasters have affected the same property, the State and subgrantee shall determine which is the relevant event.

d. A property owner who did not own the property at the time of the event, or who is not a National of the United States or qualified alien, is not eligible for an offer to purchase based on pre-event market value for the property. Subgrantees will ask each participating property owner to certify that they meet the requirement prior to offering pre-event market value. If they are unable or unwilling to certify, they may be offered no more than the post-flood fair market value. If the property is under foreclosure, the offer to the bank will be post-flood fair market value or the remaining balance on the mortgage whichever is less.

e. Certain tenants who must relocate as a result of the project are entitled to relocation benefits under the Uniform Relocation Assistance and Real Property Acquisition Policies Act (such as moving expenses, replacement housing rental payments and relocation assistance advisory services.) They are also entitled to relocation assistance under the State's Relocation Assistance Law, StateStutute 32, Comm Code 202.

f. If an offer to purchase for a residential property is less than the cost of the home-owner occupant to purchase a comparable replacement dwelling outside of the floodplain in the same community, the subgrantee may make available a supplemental payment to the property owner in accordance with criteria determined by the Administrator.

g. The subgrantee must notify each property owner in writing of what it considers the fair market value of the property. The market value will be determined by an appraisal completed by a State certified and licensed appraiser. The State will hire a Review Appraiser who will review and approve the appraisals. The offer will clearly state that the property owner's participation in the project is voluntary. At the time the offer to purchase is presented, the property owner will be requested to sign the Statement of Voluntary Participation. If the property owner disagrees with the appraisal, they may get their own appraisal at their own expense and submit to the state for review.

h. Structures on the acquired property must be demolished or relocated within 90 days of acquisition by the community. The FEMA Regional Administrator may grant an exception to this deadline only for a particular property based on written justification if extenuating circumstances exist, but a final date for removal must be specified.

i. The subgrantee, upon settlement of the property, shall record the required warranty deed restrictions.

2. Land Use and Oversight

   a. Acquired property shall be dedicated and maintained in perpetuity as open space for the conservation of natural and floodplain functions. These may includes parks for outdoor recreational activities, wetlands management, nature reserves, cultivation, grazing, camping (except where adequate warning time is not available to allow for evacuation), unimproved unpaved parking lots; buffer zones, and other uses FEMA determines compatible with open space uses.

   b. Allowable uses generally do not include walled building levees, dikes, or floodwalls, paved roads, highways, bridges, cemeteries, landfills, storage of hazardous or toxic materials, above or below ground pumping and switching stations, above or below ground storage tanks, paved parking, off-site fill or other uses that obstruct the natural and beneficial functions of the floodplain.

   c. No new structures or improvements will be built on the property except those listed below and will be floodproofed or elevated to at least 2 feet above the base flood elevation:
      1) A public facility that is open on all sides and functionally related to a designed open space or recreational use.
      2) Public restroom.
      3) A structure that is compatible with open space and conserves the natural function of the floodplain which the Administrator approves in writing before the construction of the structure begins.

   d. Any improvements shall be in accordance with proper floodplain management regulations, policies and practices.

   e. No federal entity or source may provide disaster assistance for any purpose nor may any application for such assistance be made to any federal entity or source for the acquired property.

   f. The property is not eligible for flood insurance coverage for damage to structures after the property is acquired except for pre-existing structures being relocated off the property as a result of the project.

   g. After acquisition of the property, the subgrantee shall convey any interest in the property only if the FEMA Regional Administrator, through the State gives prior written approval in accordance with federal regulations.

1) The request must include a signed statement from the proposed transferee that it acknowledges and agrees to be bound by terms of the federal regulations, and documents its status as a qualified conservation organization if applicable.
2) Subgrantee may convey the property only to another public entity or a qualified conservation organization.
3) Subgrantee may convey an easement or lease to a private individual or entity for purposes compatible with the uses described above with prior approval of the FEMA Regional Administrator.
4) Conveyance of any property must reference and incorporate the original deed restrictions, and include a provision for the property to revert to the subgrantee or State in the event that the transferee ceases to exist or loses it eligible status.

h. FEMA and the State have the right to enter upon the property, at reasonable times and with reasonable notice, to inspect the property to ensure compliance.

i. Every 3 years the subgrantee will provide a report to FEMA Regional Administrator, through the State, certifying that they have inspected the property within the proceeding month and that the property continues to be maintained consistent with the federal open space requirements and the grant award.

j. The subgrantee, Sate and FEMA are responsible for taking measures to bring the property back into compliance if the property is not maintained according to federal regulations.
   1) The State will notify the subgrantee and any holder of the property in writing and advise them that they have 60 days to correct the violation.
   2) If the subgrantee or any current holder of the property fails to demonstrate a good faith effort to correct the violation within the 60-day period, the State shall enforce the terms of the grant by taking measures it deems appropriate.
   3) FEMA may take measures it deems appropriate including, but not limited to withholding FEMA mitigation awards and assistance from the Sate and subgrantee; requiring transfer of title, brining an action at law or inequity in a court of competent jurisdiction against the State, subgrantee and/or respective successors.

E. Close-out Requirements

Upon closeout of the grant, the subgrantee, through the State, shall provide FEMA the following:

1. A copy of the recorded warranty deed for each property with the FEMA required deed restrictions included.

2. A photo of each property that was acquired after project completion.

3. The latitude and longitude coordinates for each property acquired.

4. Identification of each property as a repetitive loss property, if applicable.

5. Other information as deemed appropriate by the Administrator and the State.

XI. PLAN REVIEW AND UPDATING

A. This Administrative Plan will be reviewed annually to ensure compliance with law, implementing regulations, and state policies. It will be updated as needed to reflect regulatory or policy changes, or to improve program administration. Upon update, it will be submitted to FEMA Region V for review and approval.

   The FEMA Regional Administrator shall acknowledge receipt of the plan in writing to WEM and the SHMO. Written comments from FEMA shall state whether the plan is approved, shall detail any shortcomings and shall include a suggested method and timeline for correction, if necessary.

B. Following a Presidential Disaster Declaration, the SHMO will prepare any updates, amendments, or revisions to the plan that are required in order to meet current policy guidance or changes in the administration of the Hazard Mitigation Grant Program within 30 days of the declaration. The plan will be submitted to FEMA Region V for approval.

XII. ATTACHMENTS

A. State Notification Letter of Intent to Participate in the HMGP

B. HMGP Pre-Application (DMA Form 141) and Cover Letter

C. Ranking and Scoring Pre-Applications and Pre-Application Ranking (DMA Form 140)

D. HMGP Formal Application Package

   Cover Letter Acquisition and Elevation
   Instructions for Applicants
   Environmental Assessment Requirements

Section 404-HMGP Disaster Application (DMA Form 139A) for Acquisition/Relocation/Floodproofing
Assurances (DMA Form 1017A)
Statement of Assurances for Property Acquisition Projects
- Exhibit A – Model Warranty Deed Restrictions

Budget Cost Worksheet for Acquisition/Relocation Projects
Property Data Worksheets for Acquisition/Relocation/Elevation Projects
FEMA Form 90-69B, Declaration and Release
Notice of Voluntary Interest – Sample 1
Notice of Voluntary Interest – Sample 2
Model Statement of Voluntary Participation
Budget Cost Worksheet for Elevation Projects
Model Acknowledgement of Conditions for Mitigation of Property in SFHA with FEMA Grant Funds
Cover Letter Structural Projects
Section 404-HMGP Disaster Application (DMA Form 139) for Structural or Other Types of Projects
Damage Assessment Worksheet
HMGP Planning Application
HMGP Planning Application Instructions

E. National Environmental Policy Act

Request Letter for Categorical Exclusion Information
Concurrence Form
Record of Environmental Consideration
Public Notice Procedures
Final Public Notice
Environmental Closeout Declaration

F. Notification Letter of Grant Approval

G. State/Local HMGP Assistance Agreement (Acquisition)
State/Local HMGP Assistance Agreement (Elevation)
State/Local HMGP Assistance Agreement (Non-Acquisition)
State/Local HMGP Assistance Agreement (Planning)

H. Request for Reimbursement of Funds (DMA Form 167)

I. Sample Spreadsheet for Documenting Expenses

J. Subgrantee Quarterly Status Report

K. Grantee Quarterly Report

L. Sample Project Closeout Letter
WEM Project Closeout Worksheet
WEM Planning Closeout Worksheet
WEM State Management Closeout Worksheet

M. Sample Declaration Closeout Letter
WEM Declaration Closeout Worksheet (DMA Form 142)

N. Land Use Requirements Letter
Land Use Requirements Form
Warranty Deed Restrictions

O. State Management Cost Project Narrative

Date

Regional Administrator
Federal Emergency Management Agency
536 South Clark Street, 6th Floor
Chicago IL 60605

Dear _____:

I would like to inform you of the State's intention to apply for the Section 404, Hazard Mitigation Grant Program under declaration FEMA-____-DR-WI.

Pre-applications for the Hazard Mitigation Grant Program will be sent to the communities in the designated disaster area in the near future as well as other areas throughout the state. My staff has also started coordination with the WI Department of Natural Resources.

If you have any questions, please call the State Hazard Mitigation Officer, at (608) 242-3211.

Sincerely,

State Coordinating Officer
Wisconsin Emergency Management

cc: Director of Mitigation Division, Region V

DATE:

TO: Local Officials and Zoning Administrators in communities included in Federal Disaster Declaration FEMA- -DR-WI
County Emergency Management Directors
County Board Chairperesons
Local Officials of other selected communities

FROM: Diane Kleiboer, State Coordinating Officer/Deputy Administrator

SUBJECT: PRE-APPLICATION FOR THE SECTION 404-HAZARD MITIGATION GRANT PROGRAM

As a result of Presidential Disaster Declaration FEMA- -DR-WI funding is available for mitigation activities through the Section 404-Hazard Mitigation Grant Program. The counties that were included in the declaration as a result of (disaster type) between (dates) are (list counties).

The Hazard Mitigation Grant Program (HMGP) provides grants to state and local governments, eligible private non-profit organizations, and Indian tribes to fund long-term, permanent mitigation measures following a major disaster declaration. These grants are available statewide and are 75% federally funded through the Federal Emergency Management Agency (FEMA), 12.5% state funded through Wisconsin Emergency Management (WEM) and 12.5% is the required local match. The local match can be provided by other funding sources as long as it is not federal dollars. It can be a soft or in-kind match. In addition, the local match can be greater than 12.5%. The funds available for the HMGP for this declaration are estimated at $_____ and are based on 15% (20%) of the federal funds spent on the Public Assistance and Individual Assistance Programs for the declaration.

The objective of the program is to eliminate or reduce future disaster damages to improved property. Grants can be used to fund projects on public or private property. Eligible projects include, but are not limited to, the acquisition and relocation of flood prone properties, floodproofing or retrofitting measures including elevation, wind resistant retrofitting or construction, and construction of safe rooms and storm shelters. Other fundable projects include the development of mitigation standards to protect structures from disaster damages and small structural control projects such as detention ponds, stormwater improvements are also fundable. In addition, funds are available for developing local all hazard mitigation plans as well as updating existing plans. A project can be considered for funding even if damages did not occur during this event if the application shows that past damages have occurred and that the project can reduce future damages. Mitigation for hazards other than flooding can be considered as long as the program criteria can be met. The program cannot fund costs to make disaster repairs, purchase equipment, pay for plans and studies that merely analyzes a situation, or pay for projects that are already started or completed.

To be eligible for HMGP funding, specific criteria must be met:

1. The community must be participating and be in good standing in the National Flood

Insurance Program if a special flood hazard area has been identified by FEMA.

2. The proposed project must be cost-effective and show that the benefits of the project will outweigh the cost. It must pass the Benefit Cost Analysis, which is the most difficult requirement for project approval.

3. The project must be environmentally sound and will require environmental documentation prior to funding.

4. The applicant will have to show that other alternatives (2 at a minimum) were considered and that the alternative selected is the most feasible and will solve the problem. The applicant will have to demonstrate that the proposed project will eliminate or substantially reduce future disaster damages.

5. The applicant must have a FEMA approved all hazard mitigation plan. The proposed mitigation measure must be in conformance with the goals and objectives of the local hazard mitigation plan as well as the State Hazard Mitigation Plan. Those communities without a FEMA approved plan may apply for HMGP funds for the development of such a plan. The Plan would have to be completed, adopted and approved by FEMA within one year of the declaration prior to receiving any project grant funds. In addition, those communities that have an approved mitigation plan may apply for HMGP funds to revise or update their existing plan to meet the five-year plan update requirement. Wisconsin Emergency Management encourages the development of countywide hazard mitigation plans.

HMGP funds are available statewide. Communities in the declared area will receive priority consideration and are strongly encouraged to apply for this program. For each proposed project complete the enclosed Pre-Application Form attaching any pertinent information that will support the project. Submit it to this office no later than (date).

WEM staff will review, score, rank and prioritize for funding consideration. Projects that will have the greatest impact for preventing or reducing future disaster damages and meet the program requirements will receive HMGP grant approval based on grant dollars available. Those applicants whose proposed projects have the greatest potential for funding approval will be asked to submit a detailed formal application.

Both the FEMA's and the State's priority for HMGP projects focus on the acquisition, demolition, relocation, and floodproofing or elevation of floodplain properties. Pre-applications that match these priorities will receive priority consideration with the mitigation of substantially damaged structures receiving the highest priority. Substantially damaged properties are those structures that have incurred damages that exceed 50% of the equalized assessed value. HMGP funds can be used to fund structural projects if the project will eliminate or substantially reduce damages to improved property.

Pre-applications that do not receive further consideration for HMGP funding will be referred to the Wisconsin Hazard Mitigation Team members for funding under other programs that may be available through the agencies represented on the group.

Mitigation projects not funded through the HMGP under this declaration may be considered under

other FEMA mitigation programs such as the Pre-Disaster Mitigation, Flood Mitigation Assistance, Repetitive Flood Claims or the Severe Repetitive Loss Programs. These programs have annual funding cycles. The application period for these programs is from June 19, 2008 until December 19, 2008. The Hazard Mitigation Assistance (HMA) Unified Program Guidance can be found at: www.fema.gov/government/grant/hma/index.shtm and http://emergencymanagement.wi.gov/wemftp/WEM/Documents/PDF/FY%202011%20Hazard%20Mitigation%20Assistance%20(HMA)%20Unified%20Guidance.pdf.

If you have any questions, please feel free to call Roxanne Gray, State Hazard Mitigation Officer, at 608-242-3211, Susan Boldt, Assistant State Hazard Mitigation Officer, at 608-242-3214, or Lynsey Kawski, Disaster Response and Recovery Planner, at 608-242-3222.

Enclosures:

Pre-Application, Section 404-Hazard Mitigation Grant Program, DMA Form 141
Hazard Mitigation Grant Program

cc: Wisconsin Regional Emergency Management Directors
Wisconsin Hazard Mitigation Team

STATE OF WISCONSIN
DPARTMENTOF MILITARY AFFAIRS
DIVISION OF EMERGENCY MANAGEMENT
P.O. BOX 7865
MADISON, WI 53707-7865
608-242-3232

DMA Form 141 (05/11)
P.L. 93-288 as amended

STATE OF WISCONSIN
WISCONSIN DIVISION OF EMERGENCY MANAGEMENT
Pre-Application Form
Section 404-Hazard Mitigation Grant Program
FEMA- -DR-WI

1. NAME OF APPLICANT:_____ COUNTY: _____

2. PRIMARY CONTACT PERSON:_____

   TITLE:_____

   ADDRESS:_____CITY:_____

   ZIP:_____ TELEPHONE:_____FAX:_____

   E-MAIL ADDRESS_____

3. ALTERNATE CONTACT PERSON:_____

   TITLE:_____

   TELEPHONE:_____FAX:_____

   E-MAIL ADDRESS_____

4. TYPE OF PROJECT

   _____ Acquisition and Demolition
   _____ Relocation
   _____ Structural Hazard Control (detention ponds, stormwater, etc.)
   _____ Education
   _____ Development or update of All Hazard Mitigation Plan
   _____ Floodproofing/Elevation
   _____ Wind resistant retrofit or construction
   _____ Community Storm Shelters
   _____ Education
   _____ Other

5. MITIGATION PLANNING
   Name of All Hazard Mitigation plan: _____
   Date Plan Approved: _____
   Location of project/mitigation action in Plan (attach copy): Page Number _____

6. LOCATION OF PROJECT (Road or street address, geographic landmarks, legal description, etc. Include legible maps/drawings of the location. Provide a map showing the range and section for the project area.)

   _____

   _____

   _____

7. IS PROJECT LOCATED IN A 100-YEAR FLOODPLAIN? (If yes, attach a FIRM map with the location)

   _____Yes _____No _____Floodway_____Floodfringe

8. BRIEF DESCRIPTION OF PROJECT (If acquisition, what are the plans for the “open land”):

_____

_____

_____

_____

9. BRIEF DESCRIPTION OF THE PROBLEM:

_____

_____

_____

_____

10. BRIEF DESCRIPTION OF DAMAGES AND THE REDUCTION IN FUTURE DAMAGES (include damages to improved property, infrastructure, public safety costs, economic impact, etc.):

_____

_____

_____

_____

11. FREQUENCY THAT DAMAGES OCCUR (Number of times or the years that the event has occurred causing damages, etc.)

_____

_____

_____

_____

12. HOW DOES THE PROPOSED PROJECT ELIMINATE OR REDUCE FUTURE DAMAGES?

_____

_____

_____

13. OTHER ALTERNATIVES CONSIDERED FOR SOLVING THE PROBLEM: (List at least 2. One alternative can be "do nothing.")

_____

_____

_____

14. TOTAL ESTIMATED COST OF THE PROJECT (Attach any supporting documentation available such as preliminary designs, estimated costs from contractors, studies or reports, pictures, etc.):

_____

_____

_____

_____

15. SOURCE OF FUNDING FOR APPLICANT SHARE (12.5%):

_____

_____

_____

_____

ATTACH ANY ADDITIONAL INFORMATION THAT IS PERTINENT TO THE PROPOSED PROJECT AND WILL SUPPORT THE APPLICATION.

RETURN COMPLETED PRE-APPLICATION FORM NO LATER THAN OCTOBER 15, 2010 TO:

STATE OF WISCONSIN
DEPARTMENT OF MILITARY AFFAIRS
WISCONSIN DIVISION OF EMERGENCY MANAGEMENT
2400 WRIGHT STREET
P.O. BOX 7865
MADISON, WI 53707

STATE OF WISCONSIN
HAZARD MITIGATION GRANT PROGRAM
FEMA- -DR-WI

RANKING AND SCORING PRE-APPLICATIONS

Introduction: It is the responsibility of the State to identify and select hazard mitigation projects to be recommended to the Federal Emergency Management Agency (FEMA) for final approval and funding of the Hazard Mitigation Grant Program (HMGP) under the Robert T. Stafford Disaster Relief and Emergency Assistance Act of 1988.

In order to do this, the Division of Emergency Management established the Wisconsin Interagency Disaster Recovery Group (IDRG) now referred to as the Wisconsin Hazard Mitigation Team (WHMT) after the 1993 mid-west floods. WEM will review, evaluate, and rank eligible pre-applications and present the findings to the WHMT for further review and discussion of funding options among the programs available through the various agencies represented. The WHMT members include representatives of the following State agencies: The Departments of Military Affairs, Administration, Commerce, State Historical Society, Natural Resources, Transportation, Human Services, Agriculture, Trade and Consumer Protection, the Public Service Commission, Office of Commissioner of Insurance and other agencies as deemed appropriate. In addition, a representative from the Regional Planning Commissions, the WI Association of Floodplain, Stormwater and Coastal Managers, Wisconsin Emergency Management Association, Volunteer Organizations Active in Disasters and the University of WI Extension also participate. The following federal agencies are included in the Group: U.S. Department of Agriculture, Economic Development Administration, Federal Emergency Management Agency, U. S. Geologic Service, U. S. Army Corps of Engineers, and the Department of Housing and Urban Development.

Before an applicant will be considered for HMGP funding, it must meet minimum criteria set by FEMA and the State. This criteria includes:

1. The proposed project must conform with the goals of the local and State Hazard Mitigation Plans.

2. The proposed project must not encourage development in Special Flood Hazard Areas.

3. Communities that have mapped flood hazard areas must participate in the National Flood Insurance Program and be in good standing.

4. The proposed project must be in conformance with the community's comprehensive land use plan, or capital improvements program where such plans and programs exist and listed in their All-Hazard Mitigation plan.

Procedures: The WEM Mitigation staff will review HMGP pre-applications and ensure that the proposed projects are eligible, meet the minimum above criteria, and rank the pre-applications. After discussion with the Wisconsin Hazard Mitigation Team a list of recommended projects based on ranking and funding availability will be submitted to WEM Administrator for approval. Some projects may be referred to other agencies for appropriate funding. In addition, the WHMT will “package” funding for projects where possible to maximize the funding that is available. Those proposed projects with the highest priority and based on funding availability would be invited to complete the formal application for HMGP funding.

Priority/Ranking System: Proposed projects will be evaluated based on Project Type, Site Vulnerability, Project Benefits, and other considerations. Non-Structural projects will receive top priority for funding and include projects that involve acquisition, relocation, and elevation. All projects of this type will receive the highest ranking and the greatest consideration for funding.

STATE OF WISCONSIN
HAZARD MITIGATION GRANT PROGRAM
FEMA- -DR-WI

PRE-APPLICATION RANKING

APPLICANT:_____ COUNTY: _____
AMOUNT REQUESTED: $_____ SCORE: _____ RANK: _____

PROJECT TYPE	**POINTS**
Non-Structural Mitigation:	
Acquisition	
Residential	35
Critical Facility	35
Commercial	25
Relocation	
Residential	30
Critical Facility	30
Commercial	20
Elevation	
Residential	25
Critical Facility	25
Commercial	15
Planning (with implementation)	10
Development and implementation of zoning and building code ordinances, etc.	15
Educational Programs for public officials and citizens	15
Structural Mitigation:	
Storm Water Drainage Improvements	10
Detention/Retention Ponds	
Storm Sewer Improvements	
Other	
Storm Wind/Tornado Protection	
Retrofitting Existing Facility	10
Residential Safe Rooms	15
Community Storm Shelter	20
Bluff Stabilization	5
Channelization	5

Construction of small levees/berms for critical facilities	5
Erosion and sediment control	5
Other	5
Ineligible Activities: Warning Systems, Purchase of Equipment, dams, levees, large floodwalls/berms, planning without Implementation	0
Project Type Section Sub-Total (35 points possible)	
SITE VULNERABILITY	
Flood Event Frequency 5+ 4 3 2 1 0	 25 20 15 10 5 0
Does the Project involve removing structures from: Floodway Flood Fringe	 10 5
Does the project involve mitigating repetitive loss or severe repetitive loss properties?	15 20
Does the project mitigate substantially damaged properties?	20
Does the project address multiple hazards?	10
Site Vulnerability Section Sub-Total (85 points possible)	
PROJECT BENEFITS	
Does the project alleviate or reduce the need for emergency services during disasters?	5
Does the project alleviate or reduce damages to improved structures?	10
Does the project have a beneficial impact on more than one community or is it multi-jurisdictional?	10
Does the project solve a problem independently or is it part of another solution with assurance that the project will be completed?	5
Is the project a long-term solution to a repetitive or imminently dangerous situation?	10
Does the project directly prevent death and injury by reducing a person's vulnerability to the hazard?	5
Does the project substantially reduce future disaster costs?	0-10
Does the project reduce the cost of repairing repetitive damages?	0-10
Does the project restore floodplains and/or wetlands?	5

Does the project have multiple objectives such as damage reduction, environmental enhancement and economic recovery?	0-10
Does the project promote economic growth and community development?	0-10
Does the project promote development of recreational areas/historic areas?	0-10
Does the project provide flood protection beyond the 100-year flood event?	10
Project Benefits Section Sub-Total (110 points possible)	
OTHER ITEMS TO CONSIDER	
Is the project in the declared area?	10
Mitigation Plan Approved All-Hazards=10 Development or Update of All-Hazards =5	10
Does the proposed project involve the use of innovative approaches to mitigation or mitigation measures?	5
Has the applicant submitted the project under a previous disaster?	5
Are other agencies willing to provide funds towards funding the project?	10
Is the applicant willing to put funds towards the project over and above the 12.5% local match?	10
Are there funds available to fund the entire project?	5
Is there future maintenance required on the project?	-10
Has the community successfully implemented previous mitigation grants?	10
Does the community participate in the CRS?	5
Other Items to Consider Section Sub-Total (70 points possible)	
TOTAL SCORE: (300 total points possible) **PROJECT RANK:**	

Date

Authorized Representative
Subgrantee
Address
City, State Zip

Dear _____:

As a result of federal disaster declaration FEMA-____-DR-WI declared (date), funding was made available through the Hazard Mitigation Grant Program (HMGP) to provide grants to local governments to fund long-term permanent mitigation measures following a major disaster declaration. The grants are 75% federally funded through the Federal Emergency Management Agency (FEMA), 12.5% state funded through this Division, and the remaining 12.5% is the local match. The local match can be greater than the 12.5%. The objective of the program is to prevent or reduce future disaster damages and grants can be used to fund projects on either public or private property.

The amount of federal funds available for the HMGP is based on 15% (20% if State has an approved Enhanced State Mitigation Plan) of the federal funds spent on the Individuals and Households Program and the Public Assistance Program for the declaration. It is estimated that there will be approximately $_____ in HMGP funds available for this declaration. This office received __ pre-applications for the program exceeding $_____. As you can see, the demand for mitigation dollars far outweighs the amount of funding available.

The Wisconsin Division of Emergency Management has completed a thorough review of the pre-applications. As advised in the letter you received with the pre-application, those projects involving acquisition, demolition, relocation, and floodproofing or elevation of floodplain properties will still remain the State's highest priority for HMGP projects. Projects that will make the biggest impact for preventing or reducing future disaster damages and have the potential for receiving grant approval are requested to participate in the formal application process for further grant consideration.

_____ submitted a pre-application for the acquisition and demolition of __ properties located along _____ in the amount of $_____. Based on WEM's review of this proposal and program criteria, _____ is invited to participate in the formal application process for further grant consideration.

Enclosed is the HMGP application packet that includes the application (DMA Form 139A), Assurances for Non-Construction (DMA Form 1017A), Statement of Assurances for Property Acquisition Projects, general instructions and environmental assessment requirements, as well as worksheets to assist you in gathering the information and data required for the application. **Please read the instructions carefully, and be as thorough and accurate as possible in completing the forms.** The answers to questions 4 and 5 of the application should be documented as thoroughly as possible. **<u>This information is critical in determining the cost effectiveness for the proposed project.</u>**

The application requests detailed information that is needed for this office to complete the necessary reviews, including the cost/benefit analysis and environmental considerations. Where actual data or information is not available, you should provide the most accurate estimates. You may have to survey the property owners to get the information required. Based on the limited HMGP funds available, I am requesting that the application include prioritizing the properties in the order they would be acquired. You may want to start with primary residences and with properties that incur the most flood damages. **Due to the competitiveness of the program, it is important that you answer all the questions as completely as possible. An incomplete application cannot be processed.**

There are specific criteria that must be met by applicants in order to be eligible for funding:

1. The community must be participating, and be in good standing with the National Flood Insurance Program. The Department of Natural Resources may conduct a site visit during the application review process to determine if a community is compliant.

2. The proposed project must be in conformance with the goals and objectives of the community's All-Hazard Mitigation Plan.

3. The proposed project must be cost-effective. This means that the project will have to show the benefits of the project outweigh the cost. **In order to demonstrate this, the application must contain the necessary detail.** Only those projects that meet the cost/benefit requirement will receive further consideration for HMGP funding.

4. The project must be environmentally sound. Some HMGP projects may receive a categorical exclusion from an environmental assessment. The applicant will have to demonstrate that the proposed project will not have any associated "extraordinary circumstances" within the project area. Presence of extraordinary circumstances will require an environmental assessment or environmental impact statement. WEM will be preparing the required documents, although applicants will be required to provide the basic information required. FEMA has the responsibility for making sure that all projects meet the requirements of the National Environmental Protection Act (NEPA).

5. Applicants will have to show that other alternatives (the "do nothing" and one other) were considered, and that the proposed project is the most feasible and will actually solve a problem.

In addition to the above criteria, below are certain other program requirements that you should be aware of for proposed acquisition projects:

- Property owners must **voluntarily** elect to participate in the program.

- The acquired property will be deed restricted requiring that it will be maintained as open space in perpetuity, and that no future federal disaster assistance will be made available at the site.

- Replacement housing for those whose properties are acquired cannot be in another 100-year floodplain.

- Property will be purchased based on the fair market value as determined by an appraisal. The cost for appraisals is an eligible project cost. (Appraisals do not need to be completed for the HMGP application. It is suggested that you arrive at an estimated FMV based on tax assessments, recent sales in the area, etc.)

- Projects involving more than one property will need to conform to the Uniform Relocation Assistance and Real Property Acquisition Policies Act (URA) and the State's Relocation Law for tenants.

For additional information regarding the Hazard Mitigation Grant Program visit http://www.fema.gov/government/grant/hmgp/index.shtm.

For information and guidance regarding acquisition project requirements review the Hazard Mitigation Assistance (HMA) Unified Guidance, Section IX.A., **Property Acquisition and Structure Demolition or Relocation for Open Space**, www.fema.gov/government/grant/hma.

The application is due in this office **no later than (date).** If (applicant) completes the application prior to the above date, it should be submitted to this office so that we can begin to review the application and complete the required cost/benefit analysis.

A thorough review will be completed on all formal applications received for HMGP funding. Formal applications will be considered on __ projects totaling $_____. Based on the limited funds available, the program will be very competitive and only those projects that meet the benefit-cost requirement and make the biggest impact in reducing future disaster damages will receive further consideration for grant funding. Therefore, it is imperative that all the questions in the applications be answered completely and accurately.

If you have any questions or need additional information or would like to schedule a meeting, please do not hesitate to contact me at 608-242-3211; Susan Boldt, Assistant Hazard Mitigation Officer, at 608-242-3214; or Lynsey Kawski, Disaster Response and Recovery Planner, at 608-242-3222.

Sincerely,

ROXANNE K. GRAY
State Hazard Mitigation Coordinator
Wisconsin Emergency Management

cc Regional Emergency Management Director
County Emergency Management Director
Department of Natural Resources

STATE OF WISCONSIN
Department of Military Affairs
Division of Emergency Management
2400 Wright Street
P.O. Box 7865
Madison, WI 53707
608-242-3232, 608-242-3248 fax

HAZARD MITIGATION GRANT PROGRAM (HMGP)
INSTRUCTIONS FOR APPLICANTS

The Hazard Mitigation Grant Program (HMGP)

The HMGP is a federal program administered in the State by the Wisconsin Division of Emergency Management (WEM). The program's objective is to reduce repetitive losses from natural disasters. This is accomplished by funding cost-effective projects intended to eliminate/reduce future disaster expenditures for the repair/replacement of public and private property, and for the relief of personal loss, hardship, and suffering. *Note: Projects cannot be retroactively funded through HMGP. Therefore, projects already in progress or completed will not be considered.*

Minimum Project Criteria

To be eligible for HMGP funding, a project must meet the following minimum criteria:

1. Conform with the State and Local Hazard Mitigation Plan.

2. Have a beneficial impact upon the designated disaster area, whether or not located in the disaster area.

3. Conform with 44 CFR Part 9, Floodplain Management and Protection of Wetlands, and 44 CFR Part 10, Environmental Considerations. (Refer to the attached Environmental Assessment Requirements.)

4. Solve a problem independently or constitute a functional portion of a solution where there is assurance that the project as a whole will be completed. Projects that merely identify or analyze hazards or problems are not eligible.

5. The project must be cost-effective and substantially reduce the risk of further damages, hardship, loss, or suffering resulting from a major disaster. Wisconsin Emergency Management, using data and information supplied by the applicant, will have to demonstrate this to FEMA by documenting that the project:

    A. Addresses a problem that has been repetitive, or a problem that possesses a significant risk if left unsolved.

B. Will not cost more than the anticipated value of the reduction in both direct damages and subsequent negative impacts to the area if future disasters were to occur. Cost-benefit analyses will be conducted on applications submitted to determine cost effectiveness of the proposed project.

C. Has been determined to be the most practical, effective, and environmentally sound alternative after considering a number of options.

D. Contributes, to the extent practicable, to a long-term solution to the problem it is intended to address.

E. Considers long-term changes to the areas and entities it protects, and has manageable future maintenance and modification requirements.

F. In conformance with the goals and objectives of the community's all hazard mitigation plan.

Additional Criteria

In addition to the above federal criteria, must have a FEMA approved hazard mitigation plan to be eligible for project funds. Subgrantees that do not have an All Hazard Mitigation Plan will be required to develop a plan and have the plan approved within 12 months of the declaration to be considered for funding.

Instructions for Completing the Application for HMGP

Eligible applicants must apply for the HMGP through the Wisconsin Emergency Management (WEM). The HMGP application will be reviewed and evaluated by WEM and the Federal Emergency Management Agency (FEMA) before a final decision regarding project approval is made. No projects will be retroactively funded through the HMGP.

1. Read and review all of the attached documents carefully.

2. Complete the Disaster Application for Section 404-Hazard Mitigation Grant Program Funding (DMA Form 139 or 139A) as thoroughly and accurately as possible. Be sure to sign and date the application.

3. Sign and date the Assurances (DMA 1017A).

4. For acquisition and demolition projects, sign and date the Statement of Assurances for Property Acquisition Projects.

5. Send two copies of the signed and completed application and any supporting documentation along with the assurances to the address provided on the application.

6. Along with the hard copy, submit the application and supporting documentation on disk in Word, Excel, PDF or Access format, if possible.

Applicants will be notified by letter of the approval/disapproval of their application. This will be done after thorough review at the earliest possible date.

Questions regarding the application process or program administration should be directed to Roxanne Gray, State Hazard Mitigation Officer, at 608-242-3211, (Roxanne.gray@wisconsin.gov); Susan Boldt, Assistant Hazard Mitigation Officer, at 608-242-3214 (susan.boldt@wisconsin.gov); or Lynsey Kawski, Disaster Response and Recovery Planner at 608-242-3222 (lynsey.kawski@wisconsn.gov)

STATE OF WISCONSIN
Division of Emergency Management

Hazard Mitigation Grant Program (HMGP)
Environmental Assessment Requirements

The National Environmental Policy Act (NEPA) of 1969, Public Law 91-190, as amended requires that environmental information be available to public officials and citizens before decisions are made and actions are taken. This information is consolidated and analyzed in environmental documents, either Environmental Assessments or Environmental Impact Statements. It is FEMA's responsibility to prepare the environmental document, although the project applicant will be required to provide much of the basic information, including any special studies that need to be performed. Coordination with all appropriate agencies and individuals is very important. The environmental assessment must be completed before FEMA can make a funding determination. Depending on the project, this process can be quite time consuming.

Certain projects funded under HMGP may be categorically excluded from an environmental assessment. There are 18 categories of projects that may be excluded from an extensive environmental review. Projects that fit within one of the categories do not receive a blanket exclusion. The applicant must still demonstrate that the project will not have any associated "extraordinary circumstances" within the project area. Presence of extraordinary circumstances will require an environmental assessment or environmental impact statement.

Authority: Projects funded under the HMGP must comply with all appropriate environmental requirements. This includes compliance with the National Environmental Policy Act (NEPA) of 1969, PL 91-190, as amended; Executive Order 11988, Floodplain Management; and Executive Order 11990, Protection of Wetlands. Detailed guidance for implementing NEPA can be found in FEMA regulations at 44 CFR Part 10. 44 CFR Part 9 addresses compliance with Executive Orders 11988 and 11990. Other environmental legislation that may be applicable in this process includes: Section 7 of the Endangered Species Act of 1973, Section 106 of the Historic Preservation Act of 1966, Section 40 (b) (1) of the Clean Water Act of 1977, and Section 10 of the Rivers and Harbors Act of 1899.

Further information regarding the Environmental Assessment requirements that must be met for a particular (potential) HMGP project will be forwarded by WEM to the applicant, as appropriate.

STATE OF WISCONSIN
DEPARTMENT OF MILITARY AFFAIRS
DIVISION OF EMERGENCY MANAGEMENT
P.O. BOX 7865
MADISON, WI 53707-7865
608-242-3232

SECTION 404-HAZARD MITIGATION GRANT PROGRAM
DISASTER APPLICATION FOR
ACQUISTION/RELOCATION/FLOODPROOFING

Disaster Declaration #: FEMA-_____-DR-WI **Declaration Date:** _____

Applicant: _____
(Political Subdivision, Quasi-Government, Non-Profit Organization)

FIPS Code: _____ **D-U-N-S Number**_____**EIN Number**_____
_____

Street/PO Box:_____

City: _____ **Zip Code:** _____ **County:** _____

Primary Contact Person:_____

Title:_____

E-Mail Address: _____

Phone: _____ **Fax #:**_____

Secondary Contact Person:_____

Title:_____

Phone: _____ **Fax #:**_____

E-Mail Address:_____

The undersigned hereby submits this application for financial assistance under the Hazard Mitigation Grant Program and hereby certifies that the applicant will fulfill all requirements of the program contained in federal and/or state program guidelines including the submission of all appropriate forms. The project will meet all applicable local codes and standards as well as other appropriate state and federal requirements.

I do hereby certify, as the Chief Executive Officer, that the funding and/or resources which will be dedicated to support the 12.5% local share of the project are available and will be utilized to support the undertaking of the project during the specified performance period. Evidence of this commitment will be made available to the state and/or federal governments upon request.

I certify, to the best of my knowledge and belief, that information in this application and supporting documentation is true and correct, and that it has been duly authorized by the governing body of the applicant.

Typed Name and Title: _____

Applicant's Signature: _____

Date Signed: _____

STATE OF WISCONSIN
DEPARTMENT OF MILITARY AFFAIRS
DIVISION OF EMERGENCY MANAGEMENT
P.O. BOX 7865
MADISON, WI 53707-7865
608-242-3232

NOTE: *If your project is approved, work must begin within 90 days of the obligation of funds.*

STATE OF WISCONSIN
DEPARTMENT OF MILITARY AFFAIRS
DIVISION OF EMERGENCY MANAGEMENT
P.O. BOX 7865
MADISON, WI 53707-7865
608-242-3232

All questions must be answered completely and accurately. WEM and FEMA staff reviewing the application will not be familiar with your community, the specific project area and the need for the proposed project. Therefore, it is the responsibility of the applicants to ensure that their application addresses all of the required items. This is particularly important given the competitive nature of the grant program. If you are unsure as to the meaning of a particular question, contact WEM prior to attempting to answer that question.

1. PROJECT COST ESTIMATE

Section 404-HMGP Funds Requested:

Total	$_____
Federal Share (75%)	$_____
State Share (12.5%)	$_____
Applicant Share (12.5%)	$_____
Other Funding Sources:	$_____

2. PROJECT TITLE AND DESCRIPTON

3. PROJECT LOCATION (Include maps)

Road or street address, geographic landmarks, longitude/latitude, legal description, etc. Include a copy of the Parcel Map (Tax Map, Property Identification Map, etc.) with each property in the project clearly marked on the map. Include legible map/drawings of the location. Include a current locally adopted floodway map or flood insurance rate map (FIRM) indicating the project location. FIRMs are typically available from your local floodplain administrator who may be located in the planning, zoning, or engineering office. For more information about FIRMs and Flood Insurance Studies, contact your local agencies or visit the FEMA Map Service Center at http://msc.fema.gov.

4. DETAILED DESCRIPTION OF PROPOSED PROJECT

For a proposed **Non-Structural Project** (i.e., acquisition, relocation, demolition, elevation, floodproofing) complete the enclosed **Property Data Worksheet** for each structure in the project. In addition, you should complete and attach with supporting documentation the Data Documentation Template (DDT.) NOTE: Property owners must be willing to participate voluntarily. Interested property owners must sign a "Notice of Voluntary Interest." Attached are two samples that may be utilized to fulfill this requirement.

5. INDIRECT DAMAGES AND OTHER IMPACTS

A. For the project area, list government response costs incurred in this event as well as all past events (including Presidentially declared disasters and non-declared events) and when they occurred (i.e. fire, police, public works, social services, infrastructure etc.) which would potentially be reduced or eliminated by the proposed project.

B. Other negative impacts on the community from events such as interruption to local business, persons unemployed due to the event, losses of public services, etc.

NOTE: Information provided in questions 4 and 5 are critical to the calculation of a benefit-cost analysis and must be provided.

6. INDEPENDENT SOLUTION

Will the proposed project solve the problem independently or is it part of a larger solution? If part of a larger solution, indicate whether the project as a whole will be completed.

7. POSITIVE IMPACTS

Describe positive impacts besides reducing damages that the proposed project will provide.

8. WORK SCHEDULE AND ESTIMATED COMPLETION DATES

Include a work schedule for the proposed project. The schedule should indicate major milestones or phases of the project and the expected completion date of each phase. Phases of a project for acquiring property would consist of the following activities: Survey property owners for interest in the program and extent of damages incurred; prioritizing structures to be acquired based on funding availability; development of program procedures/policies; development of relocation assistance plan; title searches; appraisals; closings; demolition; site clean-up; and project close-out. Phases for a project involving elevation would include: Survey property owners for interest in the program and extent of damages incurred; prioritizing structures to be elevated based on funding availability; development of program procedures/policies; development of relocation assistance plan, if required; preliminary design and cost estimates; final design; construction; inspection; and project close-out.

9. COST BREAKDOWN

Provide a breakdown of cost elements (see the attached Budget Cost Worksheet).

10. CONSIDERED ALTERNATIVES

Describe other options or alternatives that have been considered to deal with the problem, the estimated cost, and explain why they were rejected or eliminated from consideration. In addition to the proposed project, you must provide at least one other alternative besides “do nothing”. Provide justification for the selection of the proposed project over the alternatives. The reason may be monetary, environmental, physical, degree of effectiveness, maintenance costs, other reasonable cause or a combination of these factors.

11. ENVIROMENTAL CONSIDERATIONS

An environmental assessment is required for certain projects before the grant can be approved. It is FEMA’s responsibility to prepare the environmental document, although the applicant will be required to provide much of the information, including any special studies that need to be performed. Describe the type of land use (rural, residential, commercial, urban, etc.) Identify all of the following that may apply to the proposed project:

_____ Threatened or endangered species in the area
_____ Location is on or within 100 feet of wetlands
_____ Obtaining permits
_____ Building/site is a historical landmark
_____ Area contains known archeological artifacts
_____ Toxic or hazardous materials located in the area

_____ Area contains a wildlife or habitat refuge
_____ Located in a designated floodplain
_____ Involves incorporating unproven technology with unknown risks
_____ Project does not impact environment at all

12. LAND USE PLAN

For acquisition or relocation projects, summarize the land-use plan for use of the property following acquisition. [Property acquired through the HMGP must remain in open space uses per 44 CFR 206.434(e) and per 44 CFR 80.19.]

13. HAZARD MITIGATION PLAN

Hazard Mitigation projects must be in conformance with the goals and objectives of the local approved all hazard mitigation plan.

- Provide the name of the Local Hazard Mitigation Plan and date approved.
- Provide a copy of the goals/objectives and the mitigation strategy/action item that references the proposed project from the approved hazard mitigation plan.

14. MATCH COMMITMENT LETTER

Attach a letter from the chief elected official or resolution that the community is committed to providing the required 12.5% local match.

15. ADDITIONAL COMMENTS/INFORMATION

Include any additional information that will support the proposed project, which you feel is appropriate for use in reviewing this application.

MAIL THE COMPLETED APPLICATION TO:

State of Wisconsin
Department of Military Affairs
Division of Emergency Management
2400 Wright Street
P.O. Box 7865
Madison, WI 53707-7865

ASSURANCES
NON-CONSTRUCTION PROJECTS

As the duly authorized representative of the applicant, I certify that the applicant:

1. Has the legal authority to apply for federal assistance, and the institutional, managerial and financial capability (including funds sufficient to pay the non-federal share of project costs) to ensure proper planning, management and completion of the project described in this application.

2. Will give the awarding agency, the Comptroller General of the United States, and if appropriate, the State, through any authorized representative, access to and the right to examine all records, books, papers, or documents related to the award; and will establish a proper accounting system in accordance with generally accepted accounting standards or agency directives.

3. Will establish safeguards to prohibit employees from using their positions for a purpose that constitutes or presents the appearance of personal or organizational conflict of interest, or personal gain.

4. Will initiate and complete the work within the applicable time frame after receipt of approval of the awarding agency.

5. Will comply with the Intergovernmental Personnel Act of l970 [42 U.S.C. (4728-4763)] relating to prescribed standards for merit systems for programs funded under one of the nineteen statutes or regulations specified in Appendix A of OPM's Standards for a Merit System of Personnel Administration (5 CFR 900, Subpart F).

6. Will comply with all federal statutes relating to non-discrimination. These include but are not limited to:

   (a) Title VI of the Civil Rights Act of 1964 (P.L. 88-352) which prohibits discrimination on the basis of race, color, or national origin;

   (b) Title IX of the Education Amendments of 1972, as amended [20 U.S.C. (1681-1683, and 1685-1686)] which prohibits discrimination on the basis of sex;

   (c) Section 504 of the Rehabilitation Act of 1973, as amended [29 U.S.C. (794)] which prohibits discrimination on the basis of handicaps;

   (d) The Age Discrimination Act of 1975 as amended [42 U.S.C. (6101-6107)] which prohibits discrimination on the basis of age;

   (e) The Drug Abuse Office and Treatment Act of 1972 (P.L. 93-255), as amended,

relating to non-discrimination on the basis of drug abuse;

(f) The Comprehensive Alcohol Abuse and Alcoholism Prevention, Treatment and Rehabilitation Act of 1970 (P.L. 91-616), as amended, relating to non-discrimination on the basis of alcohol abuse or alcoholism;

(g) 523 and 527 of the Public Health Service Act of 1912 (42 U.S.C. 290 dd-3 and 290 ee-3), as amended relating to confidentiality of alcohol and drug abuse patient records;

(h) Title VIII of the Civil Rights Act of 1968 [42 U.S.C. (3601 et seq.)], as amended relating to non-discrimination in the sale, rental or financing of housing;

(i) Any other non-discrimination provisions in the specific statute(s) under which application for federal assistance is being made, and

(j) The requirements on any other non-discrimination Statute(s) which may apply to the application.

7. Will comply, or has already complied, with the requirements of Titles II and III of the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 (P.L. 91-646) which provides for fair and equitable treatment of persons displaced or whose property is acquired as a result of federal and federally assisted programs. These requirements apply to all interests in real property acquired for project purposes regardless of federal participation in purchases.

8. Will comply, as applicable, with the provisions of the Hatch Act [5 U.S.C. (1501-1508 and 7324-7328)] which limit the political activities of employees whose principal employment activities are funded in whole or in part with federal funds.

9. Will comply, <u>as applicable</u>, with the provisions of the Davis-Bacon Act [40 U.S.C. (276a to 276a-7)], the Copeland Act [40 U.S.C. (276c) and 18 U.S.C. (874)], the Contract Work Hours and Safety Standards Act [40 U.S.C. (327-333)] regarding labor standards for federally assisted construction subagreements (construction projects).

10. Will comply with the Flood Insurance purchase requirements of Section 102(a) of the Flood Disaster Protection Act of 1973 (P.L. 93-234) which requires recipients in a special flood hazard area to participate in the program and to purchase flood insurance if the total cost of insurable construction and acquisition is $10,000 or more.

11. Will comply with environmental standards which may be prescribed pursuant to the following:

    (a) Institution of environmental quality control measures under the National Environmental Policy Act of 1969 (P.L. 91-190) and Executive Order (EO) 11514;

    (b) Notification of violating facilities pursuant to EO 11738;

    (c) Protection of wetlands pursuant to EO 11990;

    (d) Evaluation of flood hazards in floodplains in accordance with EO 11988;

    (e) Assurance of project consistency with the approved State management program developed under the Coastal Zone Management Act of 1972 [16 U.S.C. (1451 et seq.)];

    (f) Conformity of federal actions to state (Clean Air) Implementation Plans under Section 176c of the Clean Air Act of 1955, as amended [42 U.S.C. (7401 et seq.)];

    (g) Protection of underground sources of drinking water under the Safe Drinking Water Act of 1974, as amended, (P.L. 93-523); and

    (h) Protection of endangered species under the Endangered Species Act of 1973, as amended, (P.L. 93-250).

12. Will comply with the Wild and Scenic Rivers Act of 1968 [16 U.S.C. (1271 et seq.)] related to protecting components or potential components of the national wild and scenic rivers system.

13. Will assist the awarding agency in assuring compliance with Section 106 of the National Historic Preservation Act of 1966, as amended [16 U.S.C. (470)], EO 11593 (identification and preservation of historic properties), and the Archaeological and Historic Preservation Act of 1974 [16 U.S.C. (469a-1 et seq.)].

14. Will comply with PL 93-348 regarding the protection of human subjects involved in research, development, and related activities supported by this award of assistance.

15. Will comply with the Laboratory Animal Welfare Act of 1966 (PL 89-544, as amended, 7 USC 2131 et seq.) pertaining to the care, handling, treatment of warm blooded animals held research, teaching, or other activities supported by this award of assistance.

16. Will comply with the Lead-Based Paint Poisoning Prevention Act [42 U.S.C. (4801 et seq.)] which prohibits the use of lead based paint in construction or rehabilitation of residence structures.

17. Will cause to be performed required financial and compliance audits in accordance with the Single Audit Act of 1996 and OMB Circular No. A-133 Audits of States and Local Governments, and Nonprofit Organizations.

18. In accordance with the provisions of Section 319 of P.L. 101-121, and implementing regulations at 44 CFR Part 18, the subgrantee shall submit to the Department of Military Affairs, Division of Emergency Management, a "Certification Regarding Lobbying" and "Disclosure of Lobbying Activities" (Form SF-LLL) for Public Assistance awards of $100,000 or more. The subgrantee shall require that the language of this certification be included in all award documents for all subawards of $100,000 or more at all tiers (including subcontracts, subgrants, and contracts under grants) and that all subgrantees shall certify and disclose accordingly. "Certifications Regarding Lobbying" and Forms SF-LLL must be submitted to the Department of Military Affairs with the subgrantee's request for final reimbursement.

19. Project will be implemented in accordance with 44 CFR Part 13, Uniform Administrative Requirements for Grants and Cooperative Agreements to State and Local Governments.

20. Will comply with all applicable requirements of all other federal laws, executive orders, regulations and policies governing this program.

21. It will comply with the minimum wage and maximum hours provisions of the Federal Fair Labor Standards Act (29 USC Section 201), as they apply to employees of institutions of higher education, hospitals, and other non-profit organizations.

ASSURANCES
CONSTRUCTION PROJECTS

In addition to the assurances for non-construction projects, the following assurances apply to construction projects.

1. Will not dispose of, modify the use of, or change the terms of the real property title, or other interest in the site and facilities without permission and instructions from the awarding agency. Will record the Federal interest in the title of real property in accordance with awarding agency directives and will include a covenant in the title of real property acquired in whole or in part with Federal assistance funds to assure nondiscrimination during the useful life of the project.

2. Will provide and maintain competent and adequate engineering supervision at the construction sit to ensure that the complete work conforms with the approved plans and specifications and will furnish progress reports and such other information as may be required by the assistance awarding agency or state.

3. It will obtain approval by the appropriate Federal agency of the final working drawings and specifications before the project is advertised or placed on the market for bidding; that it will construct the project, or cause it to be constructed, to final completion in accordance with the application and approved plans and specifications; that it will submit to the appropriate Federal agency for prior approval changes that alter the cost o the project, use of space, or functional layout, that it will not enter into a construction contract(s) for the project or undertake other activities until the conditions of the construction grant program(s) have been met.

4. It will operate and maintain the facility in accordance with the minimum standards as may be required or prescribed by the applicable Federal, State, and local agencies for the maintenance and operation of such facilities.

5. It will require the facility to be designed to comply with the "American Standard Specification for Making Buildings and Facilities Accessible to, and usable by, the Physically Handicapped." Number A117.-1961, as modified (41 CFR 101-17.703). The applicant will be responsible for conducting inspections to ensure compliance with these specifications by the contractor.

6. If any real property or structure thereon is provided or improved with the aid of Federal financial assistance extended to the applicant, this assurances shall obligate the applicant, or in the case of any transfer of such property, any transfer, for the period during which real property, or structure is used for a purpose for which the Federal financial assistance is extended or for another purpose involving the provision of similar services or benefits.

7. In making subgrants with nonprofit institutions under the Comprehensive Cooperative Agreement, it agrees that such grants will be subject to OMB Circular A-122, "Cost Principles for Nonprofit Organizations" included in Vol. 49, Federal Register, pages 18260 through 18277 (April 27, 1984.)

FEDERAL AUDIT REQUIREMENTS

For subgrantees who are state (includes Indian tribes) or local governments:

If the subgrantee expends total direct and indirect federal assistance of:

** $500,000 or more per year, the subgrantee agrees to obtain a financial and compliance audit made in accordance with the Single Audit Act of 1996 (P.L. 104-156) and the federal Office of Management and Budget (OMB) Circular A-128. The law and circular provide that the audit shall cover the entire operations of the subgrantee government or, at the option of the subgrantee government, it may cover departments, agencies or establishments that received, expended, or otherwise administered federal financial assistance during the year.

Audits shall be made annually unless the state or local government has, by January 1, 1987, a constitutional or statutory requirement for less frequent audits. For those governments, the cognizant agency shall permit biennial audits, covering both years, if the government so requests. It shall also honor requests for biennial audits by governments that have an administrative policy calling for audits less frequent than annual, but only for fiscal years beginning before January 1, 1987.

For subgrantees who are institutions of higher education, hospitals, or other nonprofit organizations:

If the subgrantee receives total direct and indirect federal assistance of $300,000 or more per fiscal year, the subgrantee agrees to obtain a financial and compliance audit made in accordance with OMB Circular A-133 (or a federal law or OMB Circular that supersedes Circular A-133). The audit shall cover either the entire organization or all federal funds of the organization. The audit must determine whether the subgrantee spent federal assistance funds in accordance with applicable laws and regulations.

Audits shall usually be made annually, but not less frequently than every two years.

The audit shall be made by an independent auditor. An independent auditor is a state or local government auditor or a public accountant who meets the independence standards specified in the General Accounting Office's Standards for Audit of Governmental Organizations, Programs, Activities, and Functions.

The audit report shall state that the audit was performed in accordance with the provisions of OMB Circular A-128 (or A-133 as applicable.)

The reporting requirements for audit reports shall be in accordance with the American Institute of Certified Public Accountant's (AICPA) audit guide, "Audits of State and Local Governmental Units" issued in 1986. The federal government has approved the use of the audit guide.

In addition to the audit report, the subgrantee shall provide comments on the findings and recommendations in the report, including a plan for corrective action taken or planned and comments on the status of corrective action taken on prior findings. If corrective action is not necessary a statement describing the reason it is not should accompany the audit report.

The subgrantee agrees that the grantor, the Legislative Auditor, the State Auditor and any independent auditor designated by the grantor shall have such access to subgrantee's records and financial statements as may be necessary for the grantor to comply with the Single Audit Act the OMB Circular A-128.

Grantees of federal financial assistance from subgrantees are also required to comply with the Single Audit Act and the OMB Circular A-128.

The subgrantee agrees to retain documentation to support the schedule of federal assistance.

Required audit reports must be filed with the State Legislative Audit Bureau and with the Department of Military Affairs within six months of the subgrantee's fiscal year end. If a federal cognizant audit agency has been assigned for the subgrantee, copies of the required audit reports will be filed with that agency also.

The Department of Military Affairs' audit report should be addressed to:

Wisconsin Department of Military Affairs
Division of Emergency Management
2400 Wright Street
P.O. Box 7865
Madison, WI 53707-7865

STATE ASSURANCES OF DISASTER APPLICATION SUBGRANTEES

In accordance with the State Department of Military Affairs, Division of Emergency Management, State Administrative Plan, as a subgrantee I agree to the following:

1. Subgrantee's Duties

   The subgrantee shall perform the tasks specified in the State Administrative Plan and shall complete the tasks therein during the period specified in the Federal/State Agreement dated _____.

2. Terms for Reimbursement

   a. The Department of Military Affairs, Wisconsin Division of Emergency Management, shall reimburse the subgrantee their eligible costs incurred by the subgrantee in accordance with the Hazard Mitigation Grant Program. This reimbursement will be made from funds made available through the Federal Emergency Management Agency (P.L. 93-288 as amended by P.L. 100-707) and the State Legislature. The subgrantee shall be reimbursed only for those costs specified in the approved Hazard Mitigation Grant and supplements thereto.

   b. The Department of Military Affairs, Division of Emergency Management, shall reimburse the federal and state shares to the subgrantee in accordance with the requirements specified in the Federal/State Agreement.

   c. All claims for reimbursement shall be supported by written documentation including receipts, invoices.

d. Reimbursement for costs will not be paid on any encumbrance made by the subgrantee prior to the dates as specified in an approved grant unless approved in the grant.

3. Records and Documentation

a. The subgrantee shall be responsible for keeping records that fully disclose the amount and disposition of funds and the total costs of each project for which the funds are provided. The accounting procedures utilized by the subgrantee shall provide for the accurate and timely recording of the receipt of funds and expenditures.

b. The books, records, documents and accounting procedures and practices of the subgrantee relevant to this agreement are subject to examination by the Department of Military Affairs, by either the legislative auditor or state auditor as appropriate, and by the federal government.

c. Subgrantee shall obtain an annual (or biennial covering both years) financial and compliance audit, made by an independent auditor, in accordance with the Single Audit Act of 1996 (P.L. 104-156) and Office of Management and Budget Circular A-128, (or Circular A-133), as applicable. See assurance 17.

d. All accounts and records shall be retained by the subgrantee for a period of three years after completion of the final audit or until all litigation, claims, or audit findings involving the records have been resolved, whichever is later.

e. The subgrantee shall provide written quarterly progress reports on a form prescribed by the Department of Military Affairs, Division of Emergency Management.

4. Miscellaneous

a. When the Department of Military Affairs, Division of Emergency Management, finds that there has been a failure to comply with the provisions of this agreement or with provisions of the Hazard Mitigation Grant Program, or that the purposes for the funds have not been, or will not be fulfilled, notwithstanding any other provisions of this agreement to the contrary, The Department of Military Affairs, Division of Emergency Management may take such action as it deems necessary and appropriate to protect the interest of the federal government and State of Wisconsin, including the refusal to disburse additional funds and requiring the repayment of any funds already disbursed.

b. The State of Wisconsin and the Department of Military Affairs, Division of Emergency Management, its agents and employees shall not be liable to the Subgrantee, or to any individuals or entities with whom the Subgrantee contracts for any direct, indirect, incidental, consequential or other damages sustained or incurred as a result of activities, actions or inactions on the part of the Grantee for services rendered pursuant to the Grant Agreement. The subgrantee agrees to indemnify and save and hold the Department of Military Affairs, Division of Emergency Management, its agents and employees harmless from all claims or causes of action arising from the performance of this grant by the subgrantee or subgrantee's agent or employees.

c. The Department of Military Affairs' authorized agent for the purposes of this contract is Jeff Whittow, Administrative Officer, Division of Emergency Management.

_____

Signature of Authorized Certifying Official Title

_____

Applicant Organization Date

WISCONSIN DIVISION OF EMERGENCY MANAGEMENT
State-Local Hazard Mitigation Grant Program
Statement of Assurances for Property Acquisition Projects

SEND THIS STATEMENT OF ASSURANCES ATTACHED WITH THE PROJECT APPLICATION, OR SEND OT THE ADDRESS PROVIDED BY THE SPONSORING AGENCY AT THE TIME OF APPLICATION.

NOTE: If you have questions regarding any of these assurances, please consult the program guidance and contact the sponsoring agency.

Name of Project Sub-Applicant:_____
State: _____

As the duly authorized representative of the sub-applicant, I certify that the sub-grantee:

1. The Sub-applicant hereby assures and certifies that the project will comply with the property acquisition and relocation requirements per 44 CFR Part 206.434(e) and Part 80, and related federal and state guidance.

2. Will ensure that participation by property owners is voluntary. The prospective participants have been informed in writing that participation in the program is voluntary and that the sub-applicant will not use its eminent domain authority to acquire the property should negotiations fail.

3. Will ensure each property owner will be informed, in writing, of what the sub-applicant considers to be the fair market value of the property. The sub-applicant will use the Statement of Voluntary Transaction to document this and will provide a copy for each property after grant award.

4. Will ensure that each participating property owner certifies that they are a National of the United States or qualified alien before the property owner can receive a pre-event value for the property pursuant to 44 CFR, Part 80.17(c)(4). Participants who refuse to certify, or who are not Nationals of the United States or qualified aliens, will receive no more than the appraised current market value for their property.

5. Will accept all of the requirements of the FEMA grant and the deed restriction governing the use of the land, as restricted in perpetuity to open-space uses. The sub-applicant will apply and record a deed restriction on each property in accordance with the language in the **attached** FEMA Model Deed Restriction. The community will seek FEMA approval for any changes in language differing from the Model Deed Restriction.

6. Will ensure that the land will be unavailable for the construction of flood damage reduction levees and other incompatible purposes, and it not part of an intended, planned, or designated project area for which the land is to be acquired by a certain date.

7. Will demonstrate that it has consulted with the U.S. Corps of Engineers regarding the subject land's potential future use for the construction of a levee system, and will reject future consideration of such use if it accepts FEMA assistance to convert the property to permanent open space.

8. Will demonstrate that it has coordinated with the State Department of Transportation to ensure that no future, planned improvements or enhancements to the federal aid systems are under consideration that will affect the subject property.

9. Will remove existing structures within 90 days of settlement.

10. Post grant award, will ensure that a property interested is conveyed only with the prior approval of the FEMA Regional Administrator and only to another public entity or to a qualified conservation organization pursuant to 26 CFR 1.170A-14.

11. Will submit every three years to the grantee, who will then submit to the FEMA Regional Administrator, a report certifying that it has inspected the subject property within the month preceding the report, and that the property continues to be maintained consistent with the provisions of the grant. If the subject property is not maintained according to the terms of the grant, the grantee and FEMA, its representatives, and designated authorities, and assigns are responsible for taking measures to bring the property back into compliance.

12. Will not seek or accept the provision, after settlement, disaster assistance for any purpose from any federal entity with respect to the property, and FEMA will not distribute flood insurance benefits for that property for claims related to damage occurring after the date of the property settlement.

As duly authorized representative of the sub-applicant, I hereby certify that the subgrantee will comply with the identified assurances and certifications.

SIGNATURE OF SUB-APPLICANT'S AUTHORIZED AGENT:

_____

Date Signed

Name Typed _____Title _____

Sub-applicant Jurisdiction _____

FEMA MODEL DEED RESTRICTIONS

Exhibit A is FEMA's Model Deed Restrictions that support 44 CFR Part 80 requirements. Applications requesting mitigation assistance to acquire properties for open space purposes must include a copy of the deed restriction language proposed to meet these requirements. The deed conveying the property to the locality must reference and incorporate Exhibit A (or equivalent name). Any variation from the model deed restriction can only be made with prior approval from FEMA's Office of Chief Counsel. Such requests should be made to the FEMA Regional Administrator through the relevant State or Tribal Office. Exhibit A shall be attached to the deed when recorded.

Exhibit A

In reference to the property or properties ("Property") conveyed by the Deed between [property owner] participating in the federally-assisted acquisition project ("the Grantor") and the [the local government], ("the Grantee"), its successors and assigns:

WHEREAS, The Robert T. Stafford Disaster Relief and Emergency Assistance Act, ("The Stafford Act"), 42 U.S.C. § 5121 et seq., identifies the use of Disaster Relief Funds under § 5170, **Hazard Mitigation Grant Program Section 404 ("HMGP")**, including the acquisition and relocation of structures in the floodplain;

WHEREAS, the mitigation grant program provides a process for a local government, through the State, to apply for federal funds for mitigation assistance to acquire interests in property, including the purchase of structures in the floodplain, to demolish and/or remove the structures, and to maintain the use of the Property as open space in perpetuity;

WHEREAS, [State or Tribe] has applied for and been awarded such funding from the Department of Homeland Security, Federal Emergency Management Agency ("FEMA"), and has entered into a mitigation grant program Grant Agreement dated [date] with FEMA and herein incorporated by reference; making it a mitigation grant program grantee.

WHEREAS, the Property is located in [Village/City/County], [Village/City/County] participates in the National Flood Insurance Program ("NFIP") and is in good standing with NFIP as of the date of the Deed;

WHEREAS, the [local government], acting by and through the [local government Board], has applied for and been awarded federal funds pursuant to an agreement with [State] dated [date] ("State-Local Agreement") and herein incorporated by reference, making it a mitigation grant program subgrantee;

WHEREAS, the terms of the mitigation grant program statutory authorities, Federal program requirements consistent with 44 C.F.R. Part 80, the Grant Agreement, and the State-local Agreement require that the Grantee agree to conditions that restrict the use of the land to open space in perpetuity in order to protect and preserve natural floodplain values;

NOW, therefore, the grant is made subject to the following terms and conditions:

1. Terms. Pursuant to the terms of the [select mitigation grant program] statutory authorities, Federal program requirements consistent with 44 C.F.R. Part 80, the Grant Agreement, and the State-local Agreement, the following conditions and restrictions shall apply in perpetuity to the Property described in the attached deed and acquired by the Grantee pursuant to FEMA program requirements concerning the acquisition of property for open space:

   a. Compatible uses. The Property shall be dedicated and maintained in perpetuity as open space for conservation of natural floodplain functions. Such uses may include: parks for outdoor recreational activities; wetlands management; nature reserves; cultivation; grazing; camping (except where adequate warning time is not available to allow evacuation); unimproved unpaved parking lots; buffer zones; and other uses consistent with FEMA guidance for open space acquisition, Hazard Mitigation Assistance, Requirements for Property Acquisition and Relocation for Open Space.
   b. Structures. No new structures or improvements shall be erected on the Property other than:
      i. A public facility that is open on all sides and functionally related to a designated open space or recreational use;
      ii. A public rest room; or
      iii. A structure that is compatible with open space and conserves the natural function of the floodplain, including the uses described in Paragraph 1.a., above, and approved by the FEMA Administrator in writing before construction of the structure begins.

      Any improvements on the property shall be in accordance with proper floodplain management policies and practices. Structures built on the Property according to paragraph b. of this section shall be floodproofed or elevated to at least the base flood level plus two foot of freeboard, or greater, if required by FEMA, or if required by any State, Tribal, or local ordinance, and in accordance with criteria established by the FEMA Administrator.
   c. Disaster Assistance and Flood Insurance. No federal entity or source may provide disaster assistance for any purpose with respect to the Property, nor may any application for such assistance be made by any Federal entity or source. The Property is not eligible for coverage under the NFIP for damage to structures on the property occurring after the date of the

property settlement, except for pre-existing structures being relocated off the property as a result of the project.

d. Transfer. The Grantee, including successors in interest, shall convey any interest in the Property only if the FEMA Regional Administrator, through the State, gives prior written approval of the transferee in accordance with this paragraph.

i. The request by the Grantee, through the State, to the FEMA Regional Administrator must include a signed statement from the proposed transferee that it acknowledges and agrees to be bound by the terms of this section, and documentation of its status as a qualified conservation organization if applicable.

ii. The Grantee may convey a property interest only to a public entity or to a qualified conservation organization. However, the Grantee may convey an easement or lease to a private individual or entity for purposes compatible with the uses described in paragraph (a), of this section, with the prior approval of the FEMA Regional Administrator, and so long as the conveyance does not include authority to control and enforce the terms and conditions of this section.

iii. If title to the Property is transferred to a public entity other than one with a conservation mission, it must be conveyed subject to a Conservation Easement that shall be recorded with the deed and shall incorporate all terms and conditions set forth in this section, including the easement holder's responsibility to enforce the easement. This shall be accomplished by one of the following means:

a. The Grantee shall convey, in accordance with this paragraph, a conservation easement to an entity other than the title holder, which shall be recorded with the deed, or

b. At the time of title transfer, the Grantee shall retain such conservation easement, and record it with the deed.

iv. Conveyance of any property interest must reference and incorporate the original deed restrictions providing notice of the conditions in this section and must incorporate a provision for the property interest to revert to the State, Tribe, or local government in the event that the transferee ceases to exist or loses it eligible status under this section.

2. Inspection. FEMA, its representatives, and assigns, including the State or

Tribe shall have the right to enter upon the Property, at reasonable times and with reasonable notice, for the purpose of inspecting the Property to ensure compliance with the terms of this part, the Property conveyance and of the grant award.

3. Monitoring and Reporting. Every three years on [Date], the Grantee (mitigation grant program grantee), in coordination with any current successor in interest, shall submit through the State to the FEMA Regional Administrator a report certifying
that the Grantee has inspected the Property within the month preceding the report, and that the Property continues to be maintained consistent with the provisions of 44 CFR Part 80, the property conveyance, and the grant award.

4. Enforcement. The Grantee (mitigation grant program subgrantee), the State, FEMA, and their respective representatives, successors and assigns, are responsible for taking measures to bring the Property back into compliance if the Property is not maintained according to the terms of 44 CFR Part 80, the property conveyance, and the grant award. The relative rights and responsibilities of FEMA, the State, the Grantee, and subsequent holders of the property interest at the time of enforcement, shall include the following:

   a. The State will notify the Grantee and any current holder of the property interest in writing and advise them that they have 60 days to correct the violation.
      i. If the Grantee or any current holder of the property interest fails to demonstrate a good faith effort to come into compliance with the terms of the grant within the 60-day period, the State shall enforce the terms of the grant by taking any measures it deems appropriate, including but not limited to bringing an action of law or in equity in a court of competent jurisdiction.

      ii. FEMA, its representatives, and assignees may enforce the terms of the grant by taking any measures, it deems appropriate, including but not limited to 1 or more of the following:

         a) Withholding FEMA mitigation awards or assistance from the State or Tribe, and Grantee; and current holder of the property interest.

         b) Requiring transfer of title. The Grantee or the current holder of the property interest shall bear the costs of brining the Property back into compliance with the terms of the grant; or

         c) Bringing an action at law or in equity in a court of competent jurisdiction against any or all of the following parties; the

State, the Tribe, the local community, and their respective successors.

5. Amendment. This agreement may be amended upon signatures of FEMA, the State, and the Grantee only to the extent that such amendment does not affect the fundamental and statutory purposes underlying the agreement.

6. Severability. Should any provision of this grant or the application thereof to any person or circumstance be found to be invalid or unenforceable, the rest and remainder of the provisions of this grant and their application shall not be affected and shall remain valid and enforceable.

[Signed by Grantor(s) and Grantee, witnesses and notarization in accordance with local law.]

Grantor's Signature _____

Date _____

Name (printed or typed) _____

Grantee's Signature _____

Date _____

Grantee's Name _____

Grantee's Title _____

HAZARD MITIGATION ASSISTANCE PROGRAMS
BUDGET COST WORKSHEET
ACQUISITION/RELOCATION PROJECTS

ADDRESS	TYPE*	ESTIMATED FMV	TITLE SEARCHES	APPRAISALS	ABSTRACTS/ TITLE INSURANCE	LEGAL FEES	SURVEYS (if required)	CLOSING COSTS	RELOCATION ASSISTANCE COSTS***	DEMOLITION/ SITE RESTORATION	OTHER COSTS**	TOTAL
TOTALS												

*TYPE: Unimproved Land (vacant), Primary Residence, Secondary or recreational property, rental property (2-4 family), rental property (multi-family 5 or more units), Mobile Home, Commercial, Public or other (specify)

**OTHER COSTS: Include costs for project management, relocation specialist, and other costs associated with implementing the project. In addition, "supplemental housing" payments if meets requirements. See guidance.

***Tenants are entitled to relocation assistance as required by the Uniform Relocation Assistance and Real Property Acquisition Polices Act of 1970 (URA) as well as State Relocation Law, State Chapter 32.19-32.27, Commerce Code Chapter 202, whichever pays more more.

ACQUISITION/RELOCATION/ELEVATION PROJECTS
BENEFIT-COST ANALYSIS PROPERTY DATA WORKSHEET

PROPERTY OWNER (List all Property Owners):_____

PROPERTY ADDRESS:_____

CITY: _____ **STATE:** WI **ZIP:**_____

PARCEL/TAX NUMBER:_____**RANGE/TOWN SECTION** _____**COUNTY**_____

LATITUDE_____**LONGITUDE**_____**(needs to be 6 digits)**

***LOCATED IN FLOODPLAIN:** Floodway _____Floodfringe_____ Regional Flood Elevation_____
First Floor Elevation_____Lowest Finished Floor Elevation _____ Ground Elevation_____
Vertical Datum: _____NGVD29 or _____NAVD88

FLOOD INSURANCE: No____ Yes____ Policy # _____Policy Provider_____

SUBSTANTIALLY DAMAGED_____ If yes, attach substantial damage determination from local floodplain manager or building inspector.

***BUILDING TYPE:**1-story w/o basement____2-story w/o basement_____Split-level w/o basement____
Split level with basement___1-story with basement___2-story with basement__ Manufactured home___

***BASEMENT:** Total square footage of basement _____ Square footage of finished portion of basement _____ Elevation of finished basement _____

***FOUNDATION TYPE:** Basement _____ Crawlspace _____ Elevated on Posts, Piers or Columns ____
Slab on grade ____ Other _____

***BUILDING USE:** Primary Residence___ Secondary Residence___Rental Property____2-4 Family ____
Multi-Family (5-more units)____Commercial Property____ Public Building____ Other (explain)_____

RENTAL PROPERTY: Provide the following information:
Number of renters per unit _____
Current rental Payments _____
Cost of Eligible Relocation (URA/State) _____

***APPROXIMATE YEAR OF CONSTRUCTION** _____**SQUARE FOOTAGE OF LIVING SPACE** _____

***AVERAGE SQ FT PER MONTH RENTAL HOUSING FOR PROJECT AREA**_____

***AVERAGE SQ FT REPLACEMENT COST FOR HOUSING IN THE PROJECT AREA**_____

ANY KNOWN ENVIRONMENTAL HAZARDS (hazardous materials, contamination, past spills, etc.):
_____
_____
_____

*Please attach as much documentation as possible for these starred items. (i.e. tax records, appraisals, letters from homeowners, photographs, elevation certificate, surveys, letter from construction or contracting firm, letter from local building inspection department, photocopy of page or pages from standard cost reference manuals, rental costs from realtors, leasing agents or newspapers etc).

DAMAGES (list for each occurrence)

DATE (month/year): _____ Presidential Disaster Declaration (if applicable)_____
FLOOD DEPTH: Feet in basement_____ Feet over first floor_____ For how long_____
STRUCTURAL DAMAGES:$_____ DAMAGE TO CONTENTS: $_____
WAS THE STRUCTURE UNINHABITABLE: _____ For how long_____
FREQUENCY OF EVENT (if known): _____5 _____10 _____25 _____50 _____100 year _____other
OTHER INFORMATION:

DATE (month/year): _____ Presidential Disaster Declaration (if applicable)_____
FLOOD DEPTH: Feet in basement_____ Feet over first floor_____ For how long_____
STRUCTURAL DAMAGES:$_____ DAMAGE TO CONTENTS: $_____
WAS THE STRUCTURE UNINHABITABLE: _____ For how long_____
FREQUENCY OF EVENT (if known): _____5 _____10 _____25 _____50 _____100 year _____other
OTHER INFORMATION:

DATE (month/year): _____ Presidential Disaster Declaration (if applicable)_____
FLOOD DEPTH: Feet in basement_____ Feet over first floor_____ For how long_____
STRUCTURAL DAMAGES:$_____ DAMAGE TO CONTENTS: $_____
WAS THE STRUCTURE UNINHABITABLE: _____ For how long_____
FREQUENCY OF EVENT (if known): _____5 _____10 _____25 _____50 _____100 year _____other
OTHER INFORMATION:

For floodplain properties, the following information must be provided and needs to be as accurate as possible as it is critical for the FEMA cost/benefit analysis which is very sensitive to this data.

FLOOD HAZARD DATA (FROM THE COMMUNITY'S FLOOD INSURANCE STUDY)

FLOOD FREQUENCY (YEARS)	DISCHARGE (CFS)	ELEVATION (FEET)
10		
50		
100		
500		

STREAMBED ELEVATION: _____ NGVD29 _____ or NAVD88 _____

FIRM MAP NUMBER: _____

FLOOD SOURCE: Riverine __ Closed Basin ____ Stormwater Runoff ___Coastal Basin __Other _____

PHOTOGRAPHS: Attach three or more color photographs (2 copies of each) showing a front view, a side view, and a back view of each structure to be acquired. Attach photographs to the worksheet for that property.

FEMA Form 90-69B: The property owner/s sign and attach form.

Estimated Costs for Acquisition/Demolition/Relocation Projects:

Fair Market Value: **Relocation Assistance (tenants):** **Appraisal:**

Title Work/Insurance: **Legal Fees:** **Surveys:** **Closing Costs:**

Demolition: **Comparable Housing (if applicable):** **Other Costs (list):**

TOTAL ESTIMATE $

<u>Estimated Costs for Floodproofing Projects:</u>

Design Fees: **Permit/Inspection Fees:** **Construction:** **Other Costs (list):**

TOTAL ESTIMATE $

If Elevating – How many feet is the FFE being raised?

Describe the Floodproofing Method to be Used:_____

_____

_____

_____

DEPARTMENT OF HOMELAND SECURITY
FEDERAL EMERGENCY MANAGEMENT AGENCY

DECLARATION AND RELEASE

O.M.B. No. 1660-0002
Expires August 31, 2013

DECLARATON AND RELEASE

In order to be eligible to receive FEMA Disaster Assistance, a member of the household must be a citizen, non-citizen national or qualified alien of the United States. **Please read the form carefully, sign the sheet and return it to the Inspector, and show him/her a current form of photo identification.** Please feel free to consult with an attorney or other immigration expert if you have any questions.

I hereby declare, under penalty of perjury that (check one):

☐ I am a citizen or non-citizen national of the United States.

☐ I am a qualified alien of the United States.

☐ Print full name and age of minor child:I am the parent or guardian of a minor child who resides with me and who is a citizen, non-citizen national or qualified alien of the United States. Print full name and age of minor child: _____

By my signature I certify that:

* Only one application has been submitted for my household.
* All information I have provided regarding my application for FEMA disaster assistance is true and correct to the best of my knowledge.
* I will return any disaster aid money I received from FEMA or the State if I receive insurance or other money for the same loss, or if I do not use FEMA disaster aid money for the purpose for which it was intended.

I understand that, if I intentionally make false statements or conceal any information in an attempt to obtain disaster aid, it is a violation of federal and State laws, which carry severe criminal and civil penalties, including a fine up to $250,000, imprisonment, or both (18 U.S.C. §§ 287, 1001, and 3571).

I understand that the information provided regarding my application for FEMA disaster assistance may be subject to sharing within the Department of Homeland Security (DHS) including, but not limited to, the Bureau of Immigration and Custom Enforcement.

I authorize FEMA to verify all information given by me about my property/place of residence, income, employment and dependents in order to determine my eligibility for disaster assistance; and

I authorize all custodians of records of my insurance, employer, any public or private entity, bank financial or credit data service to release information to FEMA and/or the State upon request.

NAME *(print)*	SIGNATURE	DATE OF BIRTH	DATE SIGNED

INSPECTOR ID NO.	FEMA APPLICATION NO.	DISASTER NO.

ADDRESS OF DAMAGED PROPERTY	CITY	STATE	ZIP CODE

PRIVACY ACT STATEMENT

AUTHORITY: The Robert T. Stafford Disaster Relief and Emergency Assistance Act as amended, 42 U.S.C. § 5121-5207 and Reorganization Plan No. 3 of 1978; 4 U.S.C. §§ 2904 and 2906; 4 C.F.R. § 206.2(a)(27); the Personal Responsibility and Work Opportunity Reconciliation Act of 1996 (Pub. L. 104-193) and Executive Order 13411. DHS asks for your SSN pursuant to the Debt Collection Improvement Act of 1996, 31 U.S.C. § 3325(d) and § 7701(c)(1).

PRINCIPAL PURPOSE(S): This information is being collected for the primary purpose of determining eligibility and administrating financial assistance under a Presidentially-declared disaster. Additionally, information may be reviewed internally within FEMA for quality control purposes.

ROUTINE USE(S): The information on this form may be disclosed as generally permitted under 5 U.S.C. § 552a(b) of the Privacy Act of 1974, as amended. This includes using this information as necessary and authorized by routine uses published in DHS/FEMA-008 Disaster Recovery Assistance Files System of Records (September 24, 2009, 74 FR 48763) and upon written request, by agreement, or as required by law.

DISCLOSURE: The disclosure of information on this form is voluntary; however, failure to provide the information requested may delay or prevent the individual from receiving disaster assistance.

PAPERWORK BURDEN DISCLOSURE NOTICE

Public reporting burden for this form is estimated to average 2 minutes per response. The burden estimate includes the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and submitting the form. This collection of information is required to obtain or retain benefits. You are not required to complete this collection of information unless a valid O.M.B. control number is displayed on this form. Send comments regarding the accuracy of the burden and estimate and any suggestions for reducing the burden to: Information Collections Management , Department of Homeland Security, Federal Emergency Management Agency, 1800 South Bell Street, Arlington, VA 20598-3005, Paperwork Reduction Project (1660-0002). **NOTE: Do not send your completed form to this address.**

SAMPLE 1

NOTICE OF VOLUNTARY INTEREST

(Name of Community), WISCONISN
Floodprone Property Acquisition Project
(Town, Village, City, County) Hall Meeting, (Date)

Homeowner Interest Sign-Up Sheet and Voluntary Notice

FEMA requires the local government t inform all prospective participants of the following:

NOTICE: Participation in this project for open-space acquisition is *voluntary.* Neither the *State* nor the *Local Government* will use its eminent domain authority t o acquire the property for open-space purposes if you choose not to participate in a Hazard Mitigation Assistance grant program, or if negotiations fail. Signing this does not commit you to any action.

Property Address	Owner(s) Mailing Address	Owner(s) Name and Phone #	Owner(s) Signature	Interested Yes or No

SAMPLE 2

NOTICE OF VOLUNTARY INTEREST

(Name of Community), WISCONSIN
Floodprone Property Acquisition Project

Homeowner Interest Sign-up Sheet and Voluntary Interest Notice

Please complete this form if you are interested in exploring further your options for reducing your flood losses. Signing this does not commit you to any action.

Property Address:

Owner(s) Mailing Address:

Owner(s) Name(s):

Contact Phone Number:

The local government is required by FEMA to inform you that your participation in this project for open-space acquisition is *voluntary.* Neither the *State* nor the *Local Government* will use its eminent domain authority to acquire the property for open-space purposes if you choose not to participate in a Hazard Mitigation Assistance grant program, or if negotiations fail.

_____ _____
Owner's Signature Date

_____ _____
Owner's Signature Date

_____ _____
Owner's Signature Date

Statement of Voluntary Participation for
Acquisition of Property for Purpose of Open Space
FEMA's Hazard Mitigation Assistance Programs

THIS AGREEMENT is made and entered into this on _____ (date), by and between _____(name of Subgrantee), hereinafter referred to as "Subgrantee," and (property owner) _____, hereinafter referred to as "Seller." The parties agree as follows:

1. Seller affirms that I/we own the property located at _____(legal address), hereinafter referred to as "property."

2. Subgrantee has notified Seller that the Subgrantee may wish to purchase the referenced property, and, if Seller agrees to sell, Seller must permanently relocate from property.

3. Subgrantee has identified that the purchase offer valuation on the property as of _____ (date) is $_____ as determined by appropriate valuation procedures implemented by Subgrantee and based on FEMA acquisition requirements provided in 44 CFR Part 80, and relevant program guidance as documented below (e.g., Pre-Disaster Mitigaton Program, Hazard Mitigaton Grant Program, Flood Mitigation Assistance Program.)

   _____

   _____

4. Subgrantee has notified the Seller that **neither the State nor the local government will use its eminent domain authority to acquire the property for open space purpose if the Seller chooses not to participate or if negotiations fail.**

5. Subgrantee has notified Seller that if Seller agrees to sell property to Subgrantee, the transaction is voluntary and the Seller is not entitled to relocation benefits provided by the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, which are available to property owners who must sell their properties involuntarily.

6. Subgrantee affirms that it has provided the notifications and explained the information described in the preceding paragraphs to seller, and the property identified above is not a part of an intended, planned, or designated project area where all or substantially all of the property within the area is to be acquired within specific time limits.

7. This Agreement shall expire on _____(date of closing), unless Seller has voluntarily sold property to Subgrantee by that date.

_____ Date_____
Property Owner Signature

_____ Date_____
Property Owner Signature

_____ Date_____
Subgrantee's Authorized Agent Signature

HAZARD MITIGATION GRANT PROGRAM
BUDGET COST WORKSHEET
FLOODPROOFING-ELEVATION PROJECTS

ADDRESS	TYPE*	RECLOCATION ASSISTANCE (if required)	DESIGN FEES	PERMIT/INSPECTION COSTS	CONSTRUCTION COSTS	OTHER COSTS**	TOTAL
TOTALS							

*TYPE: Primary Residence, Secondary or Recreational Property, rental (2-4 family), rental property (multi-family 5 or more unites), Mobile Home; Commercial, Public or other (specify)
**OTHER COSTS: Include costs for project management, and other costs associated with implementing the project.

MODEL ACKNOWLEDGEMENT OF CONDITIONS FOR MITIGATION OF PROPERTY IN A SPECIAL FLOOD HAZARD ARESA (SFHA) WITH FEMA GRANT FUNDS

Property Owner _____

Street Address_____

City, State Zip Code _____

Deed dated _____, Recorded _____

Tax Map _____, block _____, parcel _____

Base Flood Elevation at the site is _____ fee (NGVD)

Map Panel Number _____, effective date _____

As a recipient of Federally funded hazard mitigation assistance under the Hazard Mitigation Grant Program, as authorized by 42 U.S.C. §5170c, the property owner accepts the following conditions:

1. That the Property Owner has insured all structures that will **not** be demolished or relocated out of the SFHA for the above-mentioned property to an amount at least equal to the project cost or to the maximum limit of coverage made available with respect to the particular property, whichever is less, through the National Flood Insurance Program (NFIP), as authorized by 42 U.S.C. §4001 *et seq.,* as long as the Property Owner holds title to the property as required by 42 U.S.C. §4012a.

2. The Property Owner will maintain all structures on the above-mentioned property in accordance with the floodplain management criteria set forth in Title 44 of the Code of Federal Regulations (CFR) Part 60.3 and City/County Ordinance as long as the Property Owner holds title to the property. The criteria below meets the requirements of the local Ordinance, <u>which are more restrictive and supersede those set forth in Title 44 of the CFR Part 60.3</u> as outlined in Attachment A, FEMA Model Acknowledgement of Conditions. These criteria include, but are not limited to, the following measures:

    i. Lowest floor of structure must be elevated on compacted fill at or above the Flood Protection Elevation (Base flood elevation plus two feet.);

    ii. Dryland access shall be provided to the elevated structure. If existing street are below the Regional Flood Elevation, the community may only approve the project if one of the following options is implemented;

The community has an adequate natural disaster plan which has been approved by Wisconsin Emergency Management and the Wisconsin Department of Natural Resources; or

Local police, fire and ambulance services have provided written assurances that wheeled vehicles can access the affected properties during a regional flood event.

iii. No mechanical, electrical, plumbing devices, or appurtenant will be installed below the Flood Protection Elevation; and

For a complete, detailed list of these criteria, see City/County Ordinance attached to this document.

3. The above conditions are binding for the life of the property. To provide notice to subsequent purchasers of these conditions, the Property Owner agrees that the City/County will legally record with the county or appropriate jurisdiction's land records a notice that includes the name of the current property owner (including book/page reference to record of current title, if readily available), a legal description of the property, and the following notice of flood insurance requirements:

"This property has received Federal hazard mitigation assistance. Federal law requires that flood insurance coverage on this property must be maintained during the life of the property regardless of transfer of ownership of such property. Pursuant to 42 U.S.C. §5154a, failure to maintain flood insurance on this property may prohibit the owner from receiving Federal disaster assistance with respect to this property in the event of a flood disaster. The Property Owner is also required to maintain this property in accordance with the floodplain management criteria of Title 44 of the Code of Federal Regulations Part 60.3 and City/County Ordinance."

4. Failure to abide by the above conditions may prohibit the Property Owner and/or any subsequent purchasers from receiving Federal disaster assistance with respect to this property in the event of any future flood disasters. If the above conditions are not met, FEMA may recoup the amount of the grant award with respect to the subject property, and the Property Owner may be liable to repay such amounts.

This agreement shall be binding upon the respective parties' heirs, successors, personal representatives, and assignees.

THE CITY/COUNTY OF _____

A _____ municipal corporation

By:_____

[Name, Title]

Of the City/County of _____

&

_____
[Name of Property Owner]

WITNESSED BY:

_____
[Name of Witness]

[Seal]

Notary Public

FEMA

ATTACHMENT A

Model Acknowledgement of Conditions For Mitigation of Property in a Special Flood Hazard Area With FEMA Grant Funds

Property Owner _____

Street Address _____

City , State Zip Code _____

Deed dated _____, Recorded _____

Tax map _____, block _____, parcel _____

Base Flood Elevation at the site is _____ feet (NGVD).

Map Panel Number _____, effective date _____

As a recipient of Federally-funded hazard mitigation assistance under the Hazard Mitigation Grant Program, as authorized by 42 U.S.C. §5170c / Pre-Disaster Mitigation Program, as authorized by 42 U.S.C. §5133 / Flood Mitigation Assistance Program, as authorized by 42 U.S.C. §4104c / Severe Repetitive Loss, as authorized by 42 U.S.C. §4102a, the Property Owner accepts the following conditions:

1. That the Property Owner has insured all structures that will **not** be demolished or relocated out of the SFHA for the above-mentioned property to an amount at least equal to the project cost or to the maximum limit of coverage made available with respect to the particular property, whichever is less, through the National Flood Insurance Program (NFIP), as authorized by 42 U.S.C. §4001 *et seq.*, as long as the Property Owner holds title to the property as required by 42 U.S.C. §4012a.

2. That the Property Owner will maintain all structures on the above-mentioned property in accordance with the flood plain management criteria set forth in Title 44 of the Code of Federal Regulations (CFR) Part 60.3 and City/County Ordinance as long as the Property Owner holds title to the property. These criteria include, but are not limited to, the following measures:

   i. Enclosed areas below the Base Flood Elevation will only be used for parking of vehicles, limited storage, or access to the building;

   ii. All interior walls and floors below the Base Flood Elevation will be unfinished or constructed of flood resistant materials;

iii. No mechanical, electrical, or plumbing devices will be installed below the Base Flood Elevation; and

iv. All enclosed areas below Base Flood Elevation must be equipped with vents permitting the automatic entry and exit of flood water.

For a complete, detailed list of these criteria, see City/County Ordinance attached to this document.

3. The above conditions are binding for the life of the property. To provide notice to subsequent purchasers of these conditions, the Property Owner agrees that the City/County will legally record with the county or appropriate jurisdiction's land records a notice that includes the name of the current property owner (including book/page reference to record of current title, if readily available), a legal description of the property, and the following notice of flood insurance requirements:

"This property has received Federal hazard mitigation assistance. Federal law requires that flood insurance coverage on this property must be maintained during the life of the property regardless of transfer of ownership of such property. Pursuant to 42 U.S.C. §5154a, failure to maintain flood insurance on this property may prohibit the owner from receiving Federal disaster assistance with respect to this property in the event of a flood disaster. The Property Owner is also required to maintain this property in accordance with the flood plain management criteria of Title 44 of the Code of Federal Regulations Part 60.3 and City/County Ordinance."

4. Failure to abide by the above conditions may prohibit the Property Owner and/or any subsequent purchasers from receiving Federal disaster assistance with respect to this property in the event of any future flood disasters. If the above conditions are not met, FEMA may recoup the amount of the grant award with respect to the subject property, and the Property Owner may be liable to repay such amounts.

This Agreement shall be binding upon the respective parties' heirs, successors, personal representatives, and assignees.

THE CITY/COUNTY OF _____

A _____ municipal corporation

By: _____

[Name, Title]

of the City/County of _____

&

_____

[Name of Property Owner]

WITNESSED BY:

_____

[Name of Witness]

[SEAL]

Notary Public

Date

Applicant
Address
City, State Zip

Dear _____:

As a result of federal disaster declaration FEMA-_____DR-WI declared (date), funding was made available through the Hazard Mitigation Grant Program (HMGP) to provide grants to local governments to fund long-term permanent mitigation measures following a major disaster declaration. The grants are 75% federally funded through the Federal Emergency Management Agency (FEMA), 12.5% state funded through this Division, and the remaining 12.5% is the local match. The local match can be greater than the 12.5%. The objective of the program is to prevent or reduce future disaster damages and grants can be used to fund projects on either public or private property.

The amount of federal funds available for the HMGP is based on 15% (20%) of the federal funds spent on the Individuals and Households and Public Assistance Programs for the declaration. It is estimated that there will be approximately $_____ in HMGP funds available for this declaration. This office received __ pre-applications exceeding $_____. As you can see, the demand for mitigation dollars far outweighs the amount of funding available.

The Wisconsin Division of Emergency Management has completed a thorough review of the pre-applications. As advised in the letter you received with the pre-application, those projects involving acquisition, demolition, relocation, and floodproofing or elevation of floodplain properties will still remain the State's highest priority for HMGP projects. Projects that will make the biggest impact for preventing or reducing future disaster damages and have the potential for receiving grant approval are requested to participate in the formal application process for further grant consideration.

Applicant submitted a pre-application for (type of project) in the amount of $_____. Based on WEM's review of this proposal and program criteria, applicant is invited to participate in the formal application process for further grant consideration.

Enclosed is the HMGP application packet that includes the application (DMA Form 139), Assurances (DMA Form 1017A), general instructions and environmental assessment requirements. **Please read the instructions carefully, and be as thorough and accurate as possible in completing the forms.** The answers to questions 4, 5, and 6 of the application should be documented as thoroughly as possible. **<u>This information is critical in determining the cost effectiveness for the proposed project.</u>**

The application requests detailed information that is needed for this office to complete the necessary reviews, including the cost/benefit analysis and environmental considerations. Where actual data or information is not available, you should provide the most accurate estimates. **Due to the competitiveness of the program, it is important that you answer all the questions as completely as possible.**

There are specific criteria that must be met by applicants in order to be eligible for funding:

1. The community must be participating, and be in good standing with the National Flood Insurance Program. The Department of Natural Resources may conduct a site visit during the application review process to determine if a community is compliant.

2. The proposed project must be in conformance with the goals and objectives of the community's All-Hazard Mitigation Plan.

3. The proposed project must be cost-effective. This means that the project will have to show the benefits of the project outweigh the cost. **In order to demonstrate this, the application must contain the necessary detail.** Only those projects that meet the cost/benefit requirement will receive further consideration for HMGP funding.

4. The project must be environmentally sound. Some HMGP projects may receive a categorical exclusion from an environmental assessment. The applicant will have to demonstrate that the proposed project will not have any associated "extraordinary circumstances" within the project area. Presence of extraordinary circumstances will require an environmental assessment or environmental impact statement. WEM will be preparing the required documents, although applicants will be required to provide the basic information required. FEMA has the responsibility for making sure that all projects meet the requirements of the National Environmental Protection Act (NEPA).

5. Applicants will have to show that other alternatives (the "do nothing" and one other) were considered, and that the proposed project is the most feasible and will actually solve a problem.

A thorough review will be completed on all formal applications received for HMGP funding. There will be (number) formal applications totaling $_____ under consideration. Based on the limited funds available, the program will be very competitive and only those projects that meet the benefit-cost requirement and make the biggest impact in reducing future disaster damages will receive further consideration for grant funding. Therefore, it is imperative that all the questions in the applications be answered completely and accurately.

For additional information regarding the Hazard Mitigation Grant Program visit http://www.fema.gov/government/grant/hmgp/index.shtm.

The application is due in this office **no later than (date).** If (applicant) completes the application prior to the above date, it should be submitted to this office so that we can begin to review the application and complete the required cost/benefit analysis.

If you have any questions or need additional information or would like to schedule a meeting, please do not hesitate to contact me at 608-242-3211; Susan Boldt, Assistant Hazard Mitigation Officer, at 608-242-3214; or Lynsey Kawski, Disaster Response and Recovery Planner, at 608-242-3222.

Sincerely,

ROXANNE K. GRAY
State Hazard Mitigation Officer
Wisconsin Emergency Management

cc Regional Emergency Management Director
County Emergency Manager
Department of Natural Resources

STATE OF WISCONSIN
DEPARTMENT OF MILITARY AFFAIRS
DIVISION OF EMERGENCY MANAGEMENT
P.O. BOX 7865
MADISON, WI 53707-7865
608-242-3232

DISASTER APPLICATION FOR SECTION 404
HAZARD MITIGATION GRANT PROGRAM

Disaster Declaration #: FEMA-____-DR-WI **Declaration Date**: _____

Applicant: _____ _____
(Political Subdivision, Quasi-Government, Non-Profit Organization)

FIPS Code: _____ **D-U-N-S Number**_____**EIN Number**_____

Street/PO Box: _____

City: _____**Zip Code:** _____**County:**_____

Primary Contact Person:_____

Title:_____

Phone:_____**Fax #**_____

E-Mail Address_____

Secondary Contact Person: _____

Title:_____

Phone:_____**Fax #:**_____

E-Mail Address:_____

The undersigned hereby submits this application for financial assistance under the Hazard Mitigation Grant Program and hereby certifies that the applicant will fulfill all requirements of the program contained in federal and/or state program guidelines including the submission of all appropriate forms. The project will meet all applicable local codes and standards as well as other appropriate state and federal requirements.

I do hereby certify, as the Chief Executive Officer, that the funding and/or resources which will be dedicated to support the 12.5% local share of the project are available and will be utilized to support the undertaking of the project during the specified performance period. Evidence of this commitment will be made available to the state and/or federal governments upon request.

I certify, to the best of my knowledge and belief, that information in this application and supporting documentation is true and correct, and that it has been duly authorized by the governing body of the applicant.

Typed Name and Title:_____

Applicant's Signature:_____

Date Signed: _____

Note: *If your project is approved, work must begin within 90 days of the obligation of funds.*

All questions must be answered completely and accurately. WEM and FEMA staff reviewing the application will not be familiar with your community, the specific project area and the need for the proposed project. Therefore, it is the responsibility of the applicants to ensure that their application addresses all of the required items. This is particularly important given the competitive nature of the grant program. If you are unsure as to the meaning of a particular question, contact WEM prior to attempting to answer that question.

1. PROJECT COST ESTIMATE

Section 404-HMGP Funds Requested:

Total		$_____
Federal Share	(75%)	$_____
State Share	(12.5%)	$_____
Applicant Share	(12.5%)	$_____
Other Funding Sources:		$_____

2. PROJECT TITLE AND DESCRIPTON

3. PROJECT LOCATION (Include maps and photographs)

Road or street address, geographic landmarks, legal description, etc. Provide a map showing the range and town sections for the project area. Indicate the project site on this map. Include a current locally adopted floodway map or flood insurance rate map (FIRM) indicating the project location. FIRMs are typically available from your local floodplain administrator who may be located in the planning, zoning, or engineering office. For more information about FIRMs and Flood Insurance Studies, contact your local agencies for visit the FEMA Map Service Center at http://msc.fema.gov. Include several photographs of the location for the proposed project site.

4. DETAILED DESCRIPTION OF PROPOSED PROJECT

Provide a detailed description of the problem to be solved and damages to be reduced or eliminated as a direct result of the proposed project. Indicate whether the problem is repetitive. You should take into account damage to public and private property, both residential and commercial, threats to public health and safety, and government response costs (fire, police, public works, social services). Include the total number of persons and structures including both residential and commercial that will benefit from this project. Also, include infrastructure that may be protected as a result of the project.

5. HAZARDS TO BE MITIGATED/LEVEL OF PROTECTION

a. Select the type of hazards the proposed project will mitigate:

Flood_____ Wind_____ Other_____

b. Fill in the level of protection the proposed project will provide (e.g. 23 structures protected against the 100-year [1%] flood). List data in flood levels (10, 25, 50, 100) and/or mph winds.

_____structures protected against the_____
_____structures protected against the_____
_____structures protected against the_____
_____structures protected against the_____

6. COST EFFECTIVENESS OF THE PROPOSED PROJECT

Answer the following questions as completely and accurately as possible and provide as much detail as possible for each question. **The information provided is critical to the calculation of a benefit-cost analysis and must be provided. Where actual data is not available, use your most accurate estimates.**

a. What is the project life in years (permanent or long-term as opposed to temporary or short-term)?

b. Damages (dollar amount) from this event as well as all past events including Presidentially declared disasters and non-declared events. Indicate damage history including the month and year of each occurrence, storm event (10, 20, 50 year, etc.), a description of the event and damage/costs associated with the event. Indicate the actual or estimated dollar losses for each event including government response costs (fire, police, public works, human services), damages (including contents) to residential and commercial structures, damages (including contents) to critical facilities (schools, hospitals, etc.), damages to infrastructure (roads, sewer, public buildings, parks, etc.), as well as any other facilities affected. (Use the enclosed Damage Assessment Worksheet.)

   Actual dollar losses for all the above categories are essential to calculate the benefit-cost analysis.

   Also include other negative impacts on the community from the events such as economic, persons unemployed due to the event, essential services disrupted including interruption to local businesses, threats to public safety, etc.

c. Indicate the frequency at which damages begin if the proposed project is not implemented, as well as the frequency to which the project would provide protection, i.e., 5, 10, 15, 50 or 100 year storm, etc.

d. Describe any other positive impacts besides reducing damages that the proposed project will provide.

7. INDEPENDENT SOLUTION

Will the proposed project solve the problem independently or is it part of a larger solution? If part of a larger solution, indicate when the project as a whole will be completed.

8. WORK SCHEDULE AND ESTIMATED COMPLETION DATES

Include a work schedule for the proposed project. The schedule should indicate major milestones or phases of the project and the expected completion date of each phase. (i.e., engineering, design, permit process, project management, construction, etc.)

9. COST BREAKDOWN

Provide a breakdown of cost elements such as engineering and design, project management, construction, etc.

10. ROUTINE MAINTENANCE

If the project will require routine maintenance, include who will provide that maintenance following completion of the project and a maintenance schedule through the life of the project including yearly costs.
Applicants are responsible for any and all future maintenance costs on an approved project.

11. CONSIDERED ALTERNATIVES

Describe in detail other options or alternatives that have been considered to deal with the problem, the estimated cost, and explain why they were rejected or eliminated from consideration. In addition to the proposed project, **you must provide at least one other alternative besides "do nothing".** Describe the impacts on the project area if no action is taken. Provide justification for the selection of the proposed project over the alternatives. Factors may be monetary, environmental, physical, degree of effectiveness, maintenance costs, other reasonable cause or a combination of these factors.

12. ENVIROMENTAL CONSIDERATIONS

An environmental assessment is required for certain projects before the grant can be approved. It is FEMA's responsibility to prepare the environmental document, although the applicant will be required to provide much of the information, including any special studies that need to be performed. Describe the type of land use (rural, residential, commercial, urban, etc.) Identify all of the following which may apply to the proposed project:

_____ Threatened or endangered species in the area
_____ Location is on or within 100 feet of wetlands
_____ Obtaining permits
_____ Building/site is a historical landmark
_____ Area contains known archeological artifacts
_____ There are toxic or hazardous materials located in the area
_____ Area contains a wildlife or habitat refuge
_____ Located in a designated floodplain
_____ Involves incorporating unproven technology with unknown risks
_____ Project does not impact environment at all

13. HAZARD MITIGATION PLAN

Hazard Mitigation projects must be in conformance with the goals and objectives of the local approved all hazard mitigation plan.

- Provide the name of the Local Hazard Mitigation Plan and date approved.
- Provide a copy of the goals/objectives and the mitigation strategy/action item that references the proposed project from the approved hazard mitigation plan.

14. MATCH COMMITMENT LETTER

Attach a letter from the chief elected official or resolution that the community is committed to providing the required 12.5% local match.

15. ADDITIONAL COMMENTS/INFORMATION

Include any additional information that will support the proposed project, which you feel is appropriate for use in reviewing this application.

MAIL THE COMPLETED APPLICATION TO:

State of Wisconsin
Department of Military Affairs
Division of Emergency Management
2400 Wright Street
P.O. Box 7865
Madison, WI 53707-7865

DAMAGE ASSESSMENT WORKSHEET

EVENT (description) (Presidentially declared disaster or non-declared disaster)	**DATE** (month & year)	**STORM EVENT** (10, 20, 50 year, etc.)	**GOVERNMENT RESPONSE COSTS** (fire, police, public works, human services)	**ESSENTIAL SERVICES DISRUPTED** (water, sewer, electrical, etc.)	**DAMAGES TO STRUCTURES INCLUDING CONTENTS** (residential & commercial)	**DAMAGES TO CRITICAL FACILITIES INCLUDING CONTENTS** (schools, hospitals, etc.)	**DAMAGES TO INFRASTRUCTURE** (roads, sewer, public buildings parks)
			$		$	$	$
			$		$	$	$
			$		$	$	$
			$		$	$	$
			$		$	$	$
			$		$	$	$
			$		$	$	$
			$		$	$	$
			$		$	$	$

ATTACH SUPPORTING DOCUMENTATION

STATE OF WISCONSIN
Department of Military Affairs
Division of Emergency Management
2400 Wright Street
P.O. Box 7865
Madison, WI 53707
608-242-3232, 608-242-3248 fax

HAZARD MITIGATION GRANT PROGRAM (HMGP) PLANNING GRANT APPLICATION INSTRUCTIONS

The Hazard Mitigation Grant Program (HMGP)

The HMGP is a federal program administered in the State by the Wisconsin Division of Emergency Management (WEM). The program's objective is to reduce repetitive losses from natural disasters. This is accomplished by funding all hazard mitigation plan development and cost-effective projects intended to eliminate/reduce future disaster expenditures for the repair/replacement of public and private property, and for the relief of personal loss, hardship, and suffering. *Note: Projects cannot be retroactively funded through HMGP. Therefore, projects already in progress or completed will not be considered.*

The purpose of a HMGP planning grant is to assist communities develop and update comprehensive All-Hazard Mitigation Plans. The funds may be used to develop and update local mitigation plans which meet the planning criteria outlined in 44CFR Part 201 pursuant to Section 322 of the Stafford Act. A local government must have an approved All-Hazard Mitigation Plan to receive HMGP project grant funds after November 1, 2004. Countywide or multi-jurisdictional plans are encouraged for a comprehensive approach to hazard identification, evaluation and mitigation.

The Federal Emergency Management Agency (FEMA) will contribute up to 75% of the eligible costs with the WEM providing 12.5%. A 12.5% local match must be provided by a non-federal source. The local match can be supplied through cash, contributions, or in-kind services.

Minimum Planning Grant Criteria

The applicant will use an all-hazards mitigation planning process that consists of the following activities:

- Planning process that involves the public
- Coordination with other communities, agencies and organizations
- Identification of all hazards within the community
- Risk assessment based on the identified hazards
- Development of a mitigation Strategy
- Setting goals
- Review of possible mitigation actions

- Drafting an action plan
- Adopting the plan
- Implementing, evaluating and revising the plan

Attached is a sample Scope of Work. Applications that do not include adequate description of the planning activities will be less competitive.

Eligible activities under a HMGP planning grant include conducting local planning discussions, paying for salaries/hiring a planner, surveying structures at risk and assessing losses.

HMGP funds may be used to develop tribal and local all-hazard mitigation plans which meet the planning criteria outlined in 44 CFR Part 201. See attached Summary of Section 201.6 or 201.7 regulations, for local and tribal mitigation plan requirements.

Instructions for Completing the Application for HMGP

Applicants must apply for the HMGP planning grant through WEM. WEM will review and evaluate the grant applications and forward them to FEMA for approval. To apply:

1. Complete the HMGP Planning Grant application (DMA Form 117). Sign and date the application.

2. Sign and date the Assurances (DMA Form 1017A).

3. Also, submit the application and supporting documentation on disk in Word, Excel, Access or PDF format, if possible.

4. Send the completed application and assurances **by** _____, to: Wisconsin Emergency Management, 2400 Wright Street, P.O. Box 53707-7865, Madison, WI.53707-7865. Attention: Roxanne Gray

Applicants will be notified by letter of the approval/disapproval of their applications.

Questions regarding the application process or program administration should be directed to Roxanne Gray, State Hazard Mitigation Officer, at 608-242-3211 or by e-mail at Roxanne.gray@wisconsin.gov, Susan Streich-Boldt, at 608-242-3214 or susan.boldt@wisconsin.gov, or Lynsey Kawski, Disaster Response and Recovery Planner, at 608-242-3222 or Lynsey.kawski@wisconsin.gov.

HAZARD MITIGATION GRANT PROGRAM
PLANNING GRANT APPLICATION

Disaster Declaration: FEMA- -DR-WI **Application Date: _____**

Applicant: _____ **FIPS Code: _____**
(Political Subdivision, Quasi-Government, Non-Profit Organization) **DUNS Number:_____**

Street/PO Box: _____

City: _____ **Zip Code: _____** **County: _____**

Primary Contact Person: _____

Title: _____ **Phone: _____Fax:_____**

E-mail Address: _____

Secondary Contact Person: _____

Title: _____ **Phone: _____Fax:_____**

E-mail Address: _____

I certify, to the best of my knowledge and belief, that information in this application and supporting documentation is true and correct, and that it has been duly authorized by the governing body of the applicant. It is also understood that no billable work will begin until the grant is approved and a subgrantee agreement is executed with the grantee.

Typed Name and Title: _____

Applicant's Signature: _____

Date Signed: _____

All questions must be answered completely and accurately. If necessary, attach additional pages and reference the question number. Type (or print clearly) your response.

1A. ALL-HAZARDS MITIGATION PLAN COST ESTIMATE

Type of Plan: ____ New Plan ____Update of Existing Plan

HMGP funds requested:

Total:	$_____
Federal Share (75%):	$_____
State Share (12.5%):	$_____
Applicant Share (12.5%):	$_____
Other Funding Sources:	$_____

Has the applicant (local) share been committed or secured through resolution, as a budget item, or from another funding source? If yes, attach the supporting documentation. If not, describe the actions that will be taken to secure the local share.

_____
_____
_____
_____

1B. Estimated Budget

Salaries (who, hourly salary, estimated number of hours, etc.)	$_____
Fringe Benefits (describe what's included in rate)	$_____
Contractual (i.e., consultant, attach bid proposal)	$_____
Supplies (describe)	$_____
Printing	$_____
Postage	$_____
Equipment (describe)	$_____
Travel (estimated trips, miles per trip, rate per mile-roundtrip)	$_____
Public Meetings (Number of meetings, cost per meeting i.e. room rental)	$_____
In-Kind (describe) (Number of local officials x estimated hours x estimated cost)	$_____
Other	$_____

2. AREAS TO BE COVERED BY THE ALL-HAZARDS MITIGATION PLAN

☐ County/Multi-jurisdictional ☐ City, Village or Town ☐ Indian Tribe or Authorized Tribal Organization

Describe the **geographic and political areas** that will be addressed in the All-Hazards Mitigation Plan and include appropriate reference maps for these areas. Please provide the populations of the communities that will participate in the plan development.

_____
_____
_____

3A. DESCRIPTION OF THE LOCAL HAZARDS

Provide a brief description of the hazards (Section 201.6 c (2) or Section 201.7 c (2)).

_____
_____
_____
_____

3B. DESCRIPTION OF THE PROBLEM

Provide a brief description of the damages incurred during storm events. Factor in damage to public and private property, threats to public health and safety, to infrastructure, and government response costs (fire, police, public works, social services).

_____
_____
_____
_____

4A. DESCRIPTION OF PLANNING PROCESS / APPROACH

Describe the basic planning process that will be used (201.6 (3)(b) or 201.7 c (1)). (See sample Scope of Work)

_____
_____
_____
_____
_____

4B. COMMUNITY PLANNING INITIATIVES

Is the jurisdiction participating in planning initiatives such as Flood Mitigation Plan, stormwater plan, Smart Growth Comprehensive Planning Grants or other plan development processes? Please identify the initiative and how it would relate to and/or support the All-Hazards Mitigation Plan.

_____
_____
_____
_____

4C. PUBLIC PARTICIPATION

Outline the strategy to include the public in both plan formation and review (for example team formation, committees, etc.)—Outreach methods, targeted audience, geographic representation and estimated number of meetings needed to accomplish this task.

_____
_____
_____
_____
_____

4D. EXPECTED BENEFITS AND OUTCOMES OF THE PLANNING PROCESS

Describe how the planning grant and planning process will benefit the community.

_____
_____
_____
_____
_____

5. WORK SCHEDULE AND ESTIMATED COMPLETION DATES

Provide a work schedule for developing the All-Hazards Mitigation Plan, including major milestones (see below) for the planning process and the anticipated completion date. (Note: A draft plan must be submitted within 18 months and with the final plan approved by FEMA within 36 months.)

_____
_____
_____
_____

Develop Planning Team	_____
Kickoff Meeting	_____
Public Participation	_____
Develop Community Profiles	_____
Identify and Describe Hazards	_____
Risk and Vulnerability Assessments	_____
Development of Goals and Objectives	_____
Development of Mitigation Actions	_____
Development of Plan Maintenance Process	_____
Submit Draft Plan	_____
Revise Plan based on State Review	_____
Submit to FEMA for review	_____
Formal Adoption	_____
Submit Adoptions to FEMA for Final Plan for Approval	_____

6. ADDITIONAL COMMENTS / INFORMATION

Provide any additional information that will support your proposed project and would be helpful when reviewing this application.

_____
_____
_____
_____

Date

WDNR Environmental Review Coordinator
Southeast Regional Headquarters
Department of Natural Resources
PO Box 12436
Milwaukee WI 53212-0436

Subject: Categorical Exclusion
Project

Dear Mr. :

The Wisconsin Division of Emergency Management is in the process of evaluating a Hazard Mitigation Project Grant application for **the project and location.** This application is the result of the presidential disaster declaration for flooding which occurred on **date**, in _____Counties. The structures are in the Fox River floodway and floodplain. These properties are located on the National Flood Insurance Rate Maps FIRM B and are located at _____.

The Federal Emergency Management Agency (FEMA) and our office are considering the use of a Categorical Exclusion for the environmental review as defined in 44 CFR 10.8(d)(2)(vii) to meet the requirements of the National Environmental Policy Act. Please review the enclosed to ensure that the proposed project does not violate regulatory authorities under your jurisdiction. Indicate, on the enclosed concurrence form, that the demolition of these properties does not have the potential to impact wetlands, floodplains, rare, threatened or endangered species, a wildlife refuge, wilderness area, or a wild and scenic river. Also, that there will not be a negative impact on wetlands, the floodplain or the air quality at this site.

I ask that you please reply as soon as possible but no later than **date**. Your efforts in this matter are greatly appreciated. If you have any questions concerning this request, please call me at 608-242-3214 or Roxanne Gray at 608-242-3211.

Sincerely,

SUSAN STREICH-BOLDT
Assistant State Hazard Mitigation Officer
Wisconsin Emergency Management

Enclosure **(use general concurrence form)**

LOCATION
FEMA-____-DR-WI
HAZARD MITIGATION GRANT PROGRAM
Consideration for Categorical Exclusion as defined in 44CFR 10.8 (d)(2)(vii)**(change if appropriate)**

CONCURRENCE

DESCRIPTION: **Project and location**. This residence is in the floodplain of _____.(Sec. Town & Range).

I have reviewed the above description for the proposed project pursuant to regulations and authorities of this agency, and concur that the project will not cause a negative impact to the environment.

_____
Name Title Date

_____
Agency

I have reviewed the above description for the proposed project pursuant to the regulations and authority of this agency, and have determined that the project will or may cause a potential negative impact on the environment, and further investigation is warranted. Potential negative impacts are (explain and attach any documents as required):

_____

_____

_____

_____
Name Title Date

_____
Agency

Please fax to:
Susan Streich-Boldt, Assistant SHMO
Wisconsin Division of Emergency Management
608-242-3248, 3247
or
Mail to:
2400 Wright Street, P.O. Box 7865
Madison, WI 53707-7865

PLEASE RESPOND ASAP BUT NO LATER THAN *DATE*

Record of Environmental Consideration

See 44 Code of Federal Regulation Part 10.

Project Name/Number:

Project Location:

Project Description:

Documentation Requirements

☐ No Documentation Required **(Review Concluded)**

☐ **(Short version)** All consultation and agreements implemented to comply with the National Historic Preservation Act, Endangered Species Act, and Executive Orders 11988, 11990 and 12898 are completed and no other laws apply. **(Review Concluded)**

☐ **(Long version)** All applicable laws and executive orders were reviewed. Additional information for compliance is attached to this REC.

National Environmental Policy Act (NEPA) Determination

☐ Statutorily excluded from NEPA review. (**Review Concluded)**
☐ Categorical Exclusion - Category Type Single Project
- ☐ No Extraordinary Circumstances exist.
  Are project conditions required? ☐ Yes (see section V) ☐ No **(Review Concluded)**
- ☐ Extraordinary Circumstances exist (See Section IV).
  - ☐ Extraordinary Circumstances mitigated. (See Section IV comments)
    Are project conditions required? ☐ Yes (see section V) ☐ No **(Review Concluded)**
  - ☐ Environmental Assessment required. See FONSI for determination, conditions and approval.

☐ Environmental Assessment required. See FONSI for determination, conditions and approval.

Comments:

Reviewer and Approvals

Environmental Review prepared by:
Name:

Signature_____. Date _____.

FEMA Regional Environmental Officer or delegated approving official.
Name:

Signature_____. Date _____.

I. Compliance Review for Environmental Laws (other than NEPA)

A. National Historic Preservation Act

☐ Not type of activity with potential to affect historic properties. **(Review Concluded)**
☐ Applicable executed Programmatic Agreement . (insert date) Otherwise, conduct standard Section 106 review.
☐ Activity meets Programmatic Allowance # _____
Are project conditions required? ☐ Yes (see section V) ☐ No **(Review Concluded)**

HISTORIC BUILDINGS AND STRUCTURES

☐ No historic properties 50 years or older in project area. **(Review Concluded)**
☐ Building or structure 50 years or older in project area and activity not exempt from review.
☐ Determination of No Historic Properties Affected (FEMA finding/SHPO/THPO concurrence on file)
Are project conditions required? ☐ Yes (see section V) ☐ No **(Review Concluded)**
☐ Determination of Historic Properties Affected (FEMA finding/SHPO/THPO concurrence on file)
☐ Property a National Historic Landmark and National Park Service was provided early notification during the consultation process. If not, explain in comments
☐ No Adverse Effect Determination (FEMA finding/SHPO/THPO concurrence on file).
Are project conditions required? ☐ Yes (see section V) ☐ No **(Review Concluded)**
☐ Adverse Effect Determination (FEMA finding/SHPO/THPO concurrence on file)
☐ Resolution of Adverse Effect completed. (MOA on file)
Are project conditions required ☐ Yes (see section V) ☐ No **(Review Concluded)**

ARCHEOLOGICAL RESOURCES

☐ Project affects only previously disturbed ground. **(Review Concluded)**
☐ Project affects undisturbed ground.
☐ Project area has no potential for presence of archeological resources
☐ Determination of no historic properties affected (FEMA finding/SHPO/THPO concurrence or consultation on file). **(Review Concluded)**
☐ Project area has potential for presence of archeological resources
☐ Determination of no historic properties affected (FEMA finding/SHPO/THPO concurrence on file)
Are project conditions required ☐ Yes (see section V) ☐ No **(Review Concluded)**
☐ Determination of historic properties affected
☐ NR eligible resources not present (FEMA finding/SHPO/THPO concurrence on file).
Are project conditions required☐Yes (see section V) ☐ No **(Review Concluded)**
☐ NR eligible resources present in project area. (FEMA finding/ SHPO/THPO concurrence on file)
☐ No Adverse Effect Determination. (FEMA finding/ SHPO/THPO concurrence on file)
Are project conditions required? ☐ Yes (see section V) ☐ No **(Review Concluded)**
☐ Adverse Effect Determination . (FEMA finding/ SHPO/THPO concurrence on file)
☐ Resolution of Adverse Effect completed. (MOA on file)
Are project conditions required? ☐ Yes (see section V) ☐ No **(Review Concluded)**

Comments:
Correspondence/Consultation/References:

B. Endangered Species Act

☐ No listed species and/or designated critical habitat present in the action area. **(Review Concluded)**
☐ Listed species and/or designated critical habitat present in the action area.
☐ No effect to species or designated critical habitat**.** (See comments for justification) **(Review Concluded)**
☐ May affect, but not likely to adversely affect species or designated critical habitat (FEMA determination/USFWS/NMFS concurrence on file) **(Review Concluded)**
☐ Likely to adversely affect species or designated critical habitat

☐ Formal consultation concluded. (Biological Assessment and Biological Opinion on file)
Are project conditions required? ☐ YES (see section V) ☐ NO **(Review Concluded)**

Comments:
Correspondence/Consultation/References:

C. Coastal Barrier Resources Act

☐ Project is not located in Coastal Barriers Resource System or Otherwise Protected Area.
☐ Project does not affect a coastal barrier within the COBRA System (regardless of in or out) **(Review Concluded)**
☐ Project is located in a coastal barrier system and/or affects a coastal barrier. (FEMA determination/USFWS consultation on file)
- ☐ Proposed action an exception under Section 3505.a.6? **(Review Concluded)**
- ☐ Proposed action not excepted under Section 3505.a.6.
  Are project conditions required? ☐ YES (see section V) ☐ NO **(Review Concluded)**

Comments:
Correspondence/Consultation/References:

D. Clean Water Act

☐ Project site located outside of and would not affect any waters of the U.S. **(Review Concluded)**
☐ Project site located in or would affect waters, including wetlands, of the U.S.
- ☐ Project exempted as in kind replacement or other exemption. **(Review Concluded)**
- ☐ Project requires Section 404/401/10 permit, including qualification under Nationwide Permits.
  Are project conditions required? ☐ YES (see section V) ☐ NO **(Review Concluded)**

Comments:
Correspondence/Consultation/References:

E. Coastal Zone Management Act

☐ Project does not affect a coastal zone area (regardless of in or out)- (**Review concluded)**
☐ Project is not located in a coastal zone area – **(Review concluded)**
☐ Project is located in a coastal zone area and/or affects the coastal zone
- ☐ State administering agency does not require consistency review. **(Review Concluded)**.
- ☐ State administering agency requires consistency review.
  Are project conditions required? ☐ YES (see section V) ☐ NO **(Review Concluded)**

Comments:
Correspondence/Consultation/References:

F. Fish and Wildlife Coordination Act

☐ Project is not located in or affects a waterway/body of water**.** **(Review Concluded)**
☐ Project affects, controls or modifies a waterway/body of water.
- ☐ Coordination with USFWS conducted
  - ☐ No Recommendations offered by USFWS. **(Review Concluded)**
  - ☐ Recommendations provided by USFWS.
    Are project conditions required? ☐ YES (see section V) ☐ NO **(Review Concluded)**

Comments:
Correspondence/Consultation/References:

G. Clean Air Act

☐ Project will not result in permanent air emissions. **(Review Concluded)**
☐ Project is located in an attainment area. **(Review Concluded)**
☐ Project is located in a non-attainment area.
☐ Coordination required with applicable state administering agency..
Are project conditions required? ☐ YES (see section V) ☐ NO **(Review Concluded)**

Comments:
Correspondence/Consultation/References:

H. Farmlands Protection Policy Act

☐ Project does not affect prime or unique farmland. **(Review Concluded)**
☐ Project causes unnecessary or irreversible conversion of prime or unique farmland.
☐ Coordination with Natural Resource Conservation Commission required.
☐ Farmland Conversion Impact Rating, Form AD-1006, completed.
Are project conditions required? ☐ YES (see section V) ☐ NO **(Review Concluded)**

Comments:
Correspondence/Consultation/References:

I. Migratory Bird Treaty Act

☐ Project not located within a flyway zone. **(Review Concluded)**
☐ Project located within a flyway zone.
☐ Project does not have potential to take migratory birds. **(Review Concluded)**
☐ Project has potential to take migratory birds.
☐ Contact made with USFWS
Are project conditions required? ☐ YES (see section V) ☐ NO **(Review Concluded)**

Comments:
Correspondence/Consultation/References:

J. Magnuson-Stevens Fishery Conservation and Management Act

☐ Project not located in or near Essential Fish Habitat. **(Review Concluded)**
☐ Project located in or near Essential Fish Habitat.
☐ Project does not adversely affect Essential Fish Habitat. **(Review Concluded)**
☐ Project adversely affects Essential Fish Habitat (FEMA determination/USFWS/NMFS concurrence on file)
☐ NOAA Fisheries provided no recommendation(s) **(Review Concluded).**
☐ NOAA Fisheries provided recommendation(s)
☐ Written reply to NOAA Fisheries recommendations completed.
Are project conditions required? ☐ YES (see section V) ☐ NO **(Review Concluded)**

Comments:
Correspondence/Consultation/References:

K. Wild and Scenic Rivers Act

☐ Project is not along and does not affect Wild or Scenic River - **(Review Concluded)**
☐ Project is along or affects Wild or Scenic River

☐ Project adversely affects WSR as determined by NPS/USFS. **FEMA cannot fund the action**. (NPS/USFS/USFWS/BLM consultation on file)
☐ Project does not adversely affect WSR. (NPS/USFS/USFWS/BLM consultation on file)
Are project conditions required? ☐ YES (see section V) ☐ NO **(Review Concluded)**

Comments:
Correspondence/Consultation/References:

L. Other Relevant Laws and Environmental Regulations

Identify relevant law or regulations, resolution and any consultation/references

II. Compliance Review for Executive Orders

A. E.O. 11988 - Floodplains

☐ Outside Floodplain and No Effect on Floodplains/Flood levels - **(Review Concluded)**
☐ Located in Floodplain or Effects on Floodplains/Flood levels
- ☐ No adverse effect on floodplain or can be adversely affected by the floodplain. **(Review Concluded)**,
- ☐ Beneficial Effect on Floodplain Occupancy/Values **(Review Concluded).**
- ☐ Possible adverse effects associated with investment in floodplain, occupancy or modification of floodplain environment
  - ☐ 8 Step Process Complete - documentation on file
    Are project conditions required? ☐ YES (see section V) ☐ NO **(Review Concluded)**

Comments:
Correspondence/Consultation/References:

B. E.O. 11990 - Wetlands

☐ Outside Wetland and No Effect on Wetland(s) - **(Review Concluded)**
☐ Located in Wetland or effects Wetland(s)
- ☐ Beneficial Effect on Wetland - **(Review Concluded)**
- ☐ Possible adverse effect associated with constructing in or near wetland
  - ☐ Review completed as part of floodplain review
  - ☐ 8 Step Process Complete - documentation on file
    Are project conditions required? ☐ YES (see section V) ☐ NO **(Review Concluded)**

Comments:
Correspondence/Consultation/References:

C. E.O. 12898 - Environmental Justice For Low Income and Minority Populations

☐ No Low income or minority population in, near or affected by the project - **(Review Concluded)**
☐ Low income or minority population in or near project area
- ☐ No disproportionately high and adverse impact on low income or minority population- **(Review Concluded)**
- ☐ Disproportionately high or adverse effects on low income or minority population
  Are project conditions required? ☐ YES (see section V) ☐ NO **(Review Concluded)**

Comments:
Correspondence/Consultation/References:

III. Other Environmental Issues

Identify other potential environmental concerns in the comment box not clearly falling under a law or executive order (see environmental concerns scoping checklist for guidance).

Comments:
Correspondence/Consultation/References:

IV. Extraordinary Circumstances

Based on the review of compliance with other environmental laws and Executive Orders, and in consideration of other environmental factors, review the project for extraordinary circumstances.

* A "Yes" under any circumstance may require an Environmental Assessment (EA) with the exception of (ii) which should be applied in conjunction with controversy on an environmental issue. If the circumstance can be mitigated, please explain in comments. If no, leave blank.

Yes

- ☐ (i) Greater scope or size than normally experienced for a particular category of action
- ☐ (ii) Actions with a high level of public controversy
- ☐ (iii) Potential for degradation, even though slight, of already existing poor environmental conditions;
- ☐ (iv) Employment of unproven technology with potential adverse effects or actions involving unique or unknown environmental risks;
- ☐ (v) Presence of endangered or threatened species or their critical habitat, or archaeological, cultural, historical or other protected resources;
- ☐ (vi) Presence of hazardous or toxic substances at levels which exceed Federal, state or local regulations or standards requiring action or attention;
- ☐ (vii) Actions with the potential to affect special status areas adversely or other critical resources such as wetlands, coastal zones, wildlife refuge and wilderness areas, wild and scenic rivers, sole or principal drinking water aquifers;
- ☐ (viii) Potential for adverse effects on health or safety; and
- ☐ (ix) Potential to violate a federal, state, local or tribal law or requirement imposed for the protection of the environment.
- ☐ (x) Potential for significant cumulative impact when the proposed action is combined with other past, present and reasonably foreseeable future actions, even though the impacts of the proposed action may not be significant by themselves.

Comments:

V. Environmental Review Project Conditions

General comments:

Project Conditions:

Monitoring Requirements:

PUBLIC NOTICE PROCEDURES
for
FEMA Region V Environmental Assessments
August 31, 2007

NEPA is a planning and disclosure process. Therefore both NEPA and EOs 11988 require notification of the public:

(A) when a project and its alternatives are initially being developed and scoped and;
(B) after the completion of the final draft environmental assessment, and before the signing of the *Finding of No Significant Impacts (FONSI)* and any action taken.

The requirements of (A), which is referred to as a **NOTICE OF INTENT,** can usually be met by:

1. FEMA's *General Notice for a Presidential Declaration* that is published at the beginning of each disaster. This issues notification that funds will be provided under the Stafford Act to undertake projects or;
2. FEMA or the applicant (usually the applicant) publishing a **NOTICE of INTENT** in a local newspaper to undertake a project, providing the alternatives, and then giving the public 15 days to respond, or;
3. FEMA or the applicant holding one or more public meetings on the project to solicit public comments.

Exactly which of the above vehicles used to meet the requirements of (A) will usually be determined by the scope of the proposed project, agency coordination, and previous notification and scooping work performed by the applicant. Any comments received during this phase of notification should be addressed in the EA.

The requirements of (B), which is referred to as a **FINAL NOTICE**, can usually be met by:

1. Publishing a **FINAL NOTICE** in a local newspaper and then giving the public 15 days to respond.
2. If no comments are received, then the FONSI can be signed and the project can proceed.
3. If comments are received they can be addressed individually and/or in a rewrite of the EA.
4. If significant negative comments are received, then the project should be put on hold until the issues are resolved.

SPECIAL NOTE

The above requirements are to also be applied to a project that will be categorically excluded (CATEXed) from the preparation of an environmental assessment, but involves EO 11988 (floodplains) and/or EO 11990 (wetlands) and/or potentially or existing contentious issues.

SAMPLE
OF A
FINAL PUBLIC NOTICE

PUBLIC NOTICE OF A PROJECT PENDING FUNDING BY THE FEDERAL EMERGENCY MANAGEMENT AGENCY (FEMA)

Notification is hereby given of the Federal Emergency Management Agency's (FEMA) pending intent to provide Hazard Mitigation Funding for the (name community) to (short description of project). Funds will be provided in accordance with the Robert T. Stafford Disaster Relief and Emergency Assistance Act, Public Law 93-288, as amended.

Under the National Environmental Policy Act (NEPA) and EO 11988, FEMA is required to provide public notice of any proposed actions in or affecting floodplains or wetlands.

The (Community, County and State) proposes to (detailed description of project, its location and its impact on the floodplain and/or wetlands and why it is the best and/or only solution to the problem).

FEMA's review has determined that no significant impact to the existing floodplain would result from this project.

Within 15 days, interested persons may submit comments, obtain more detailed information about the action or request a copy of the findings by contacting FEMA's Region V office which is located at 536 S. Clark, Chicago, IL 60605. Requests can also be made to (local program person-phone number-e-mail address) or to Amanda Ratliff, Regional Environmental Officer at (312) 408-5540 or Amanda.Ratliff@ dhs.gov.

When describing the project, do not use addresses or names, as this would violate the privacy act.

ENVIRONMENTAL CLOSEOUT DECLARATION

It is the Federal Emergency Management Agency's (FEMA) responsibility to comply and verify that environmental laws and executive orders are met prior to approval of FEMA-funded grants. In order to comply with this responsibility it is necessary to ensure that the requirements of the environmental documents have been met prior to grant closeout.

The applicant or applicant's agent must verify that the conditions stated in the Record of Environmental Consideration, FONSI or Environmental Assessment, or any other environmental approval documentation were met. They must provide copies of all permits or other required documentation to the State, which are available if requested by FEMA at time of closeout.

Funding will be jeopardized if the environmental conditions contained in the project approval documents were not followed and required permits were not obtained.

List project conditions

This is to be completed and signed after project completion and submitted as part of the grant closeout documentation.

Program Grant _____

Disaster Related _____

Project Number _____

Project Title _____

I attest that all conditions listed in the environmental documentation were followed and the appropriate permit and supporting documents are attached. I further attest than none of the issues listed under the Project Conditions section of the Record of Environmental Consideration, FONSI or Environmental Assessment were encountered that would have required further environmental coordination with FEMA.

_____ _____
Signature of Applicant or Applicant's Agent Date

_____ _____
Signature of State Program Manager Date

_____ _____
Signature of Regional Environmental Officer Date
FEMA-Region V

Date

Authorized Representative
Community
Address
City, State Zip

Dear

I am pleased to inform you that the Federal Emergency Management Agency (FEMA) has approved funding for the applicant's name Hazard Mitigation Grant application submitted under Disaster Declaration FEMA- -DR-WI declared _____. The grant is approved in the amount of $_____ for the type of project.

The Federal Emergency Management Agency provides 75% of the funding or $_____, Wisconsin Emergency Management (WEM) provides 12.5% or $_____, and the remaining $_____ is the community's required 12.5% local match. The community may also receive management costs up to 1% (one percent) of the grant or $_____. The management cost is provided to cover the costs you will incur for administering the grant including costs for audits if required.

Enclosed are two originals of the State-Local Hazard Mitigation Grant Program (HMGP) Assistance Agreement. Please carefully review the agreement and sign both copies. Keep one for your files and return the other to this office. This agreement must be signed before funds can be drawn on the grant.

Per the agreement your are required to submit Quarterly Status Reports, DMA Form 168 (enclosed) within 15 days following the end of the quarter (October 15, January 15, April 15 and July 15), and a final report covering all aspects of the project 30 days after project completion.

In order to receive reimbursement of expenses you will need to complete and submit to this office a Request for Reimbursement of Expenses, DMA Form 167 (enclosed) along with supporting documentation (invoices and copies of payments). Advancement of funds requires prior approval from this office and will only be made in extraordinary circumstances. The final request for reimbursement is due 30 days after completion of the project.

Management costs of up to $_____ may be reimbursed as requested on DMA Form 167. All documentation for management costs must be kept at the local level for three years commencing on the date of the closeout for the grant.

You should refer to the signed **Assurances for Construction and Non-Construction Projects**, DMA Form 1017A, and the **State-Local Hazard Mitigation Grant Program State of Assurances for Property Acquisition Projects**, which was signed and submitted with the

application for other state and federal laws and program requirements relating to the grant which are to be adhered to.

Under HMGP, acquisition projects must meet the following criteria:

- Property owner must voluntarily elect to participate in the program. The Village will need to provide the **Statement of Voluntary Participation** signed by the property owner and the community based on the fair market value of the property as determined by the approved appraisal.
- The acquired property will be deed restricted requiring that it be maintained as open space in perpetuity, and that no future disaster assistance will be made available at those sites. The deed conveying the property to the community must reference and incorporate **Exhibit A, Model Deed Restrictions**, attached to the signed State-Local HMGP Statement of Assurances for Property Acquisition Projects.
- Replacement housing for those whose properties are acquired cannot be in another 100-year floodplain.
- The properties will be purchased based on the fair market value as determined by an appraisal. Pre or post-flood FMV may be used. If utilizing pre-flood FMV, the offer to purchase will need to take into consideration any duplication of benefits (DOB.)
- The project will have to conform to the Uniform Relocation Assistance and Real Property Acquisition Policies Act (URA) and the State Relocation Law (State Statute 32.19-32.27, Commerce Code 202) for tenants only. If you have any questions regarding the State Relocation Law, please contact Jack Sanderson, State Relocation Specialist at the Department of Commerce, 608-267-0317.

FEMA and this office provide grant funds and program guidance; however, the community is responsible for administering the grant and implementing the project. The community is not authorized to make an offer on the property until the appraisal has been completed and authorization has been granted by this office. Duplication of benefits (DOB) that may apply and that will have to be deducted from the offering price.

Substantially damaged properties that have a standard flood insurance policy at the time of flooding may be entitled to Increased Cost of Compliance (ICC) to bring the structure into compliance with local floodplain requirements. In the case of acquisition, ICC funds can be utilized for demolition costs up to $30,000. In addition, ICC funds can be applied towards the local match.

In completing the project, the community will need to adhere to the conditions indicated in the enclosed approval letter for the REC (Record of Environmental Consideration) dated _____.

After you have had time to review this letter and the attachments, please contact me so that we can schedule a meeting to further discuss program policies and procedures for grant administration and project implementation.

If you have any questions, please do not hesitate to call me at 608-242-3211; Susan Boldt, Assistant Hazard Mitigation Officer, at 608-242-3214; or Linda McDermott, Hazard Mitigation Specialist, at 608-242-3219.

Sincerely,

ROXANNE K. GRAY
State Hazard Mitigation Officer
Wisconsin Division of Emergency Management

Enclosures:

- State-Local Hazard Mitigation Grant Program Assistance Agreement
- Quarterly Status Report, DMA Form 168
- Request for Reimbursement Request, DMA Form 167
- Budget Summary Form
- Statement of Voluntary Participation
- Exhibit A, Model Deed Restrictions
- FEMA approval letter dated _____
- FEMA NEPA approval letter dated _____
- Record of Environmental Consideration signed _____

cc Regional Emergency Management Director
County Emergency Management Director

WISCONSIN DIVISION OF EMERGENCY MANAGEMENT
State-Local Hazard Mitigation Grant Program Assistance Agreement
(FEMA-DR-____-WI)
(Acquisition)

This Grant Agreement between the Wisconsin Division of Emergency Management (the WEM/Grantee) and the _____ (the Subgrantee) shall be effective on the date signed by the WEM and the Subgrantee. It shall apply to all Hazard Mitigation Grant Program (HMGP) assistance provided by or through WEM to the Subgrantee as a result of the Presidentially declared disaster occurring in Wisconsin (FEMA-DR-____-WI).

The purpose of this agreement is to formally recognize the goals of the HMGP and to establish guidelines by which HMGP funds are to be used. This agreement is in addition to the requirements outlined in the DMA Form 1017A, Assurances Construction and Non-Construction Projects, and the State-Local Hazard Mitigation Grant Program Statement of Assurances for Property Acquisition Projects that was signed by the above mentioned Subgrantee and submitted with the HMGP application.

Be it resolved by the Subgrantee, that the individual named below:

_____
(Name and Title)

has the legal authority and is hereby authorized to execute documents for and on behalf of the Subgrantee. The individual and this designation is to be the authorized representative for obtaining HMGP funds.

The Subgrantee hereby assures and certifies that the project will comply with the applicable State of Wisconsin and FEMA regulations. Also, the Subgrantee gives assurance and certifies with respect to and as a condition for the grant that as a minimum:

1. This Grant Agreement in the amount of $_____ will serve as the contract between WEM and the Subgrantee for the purpose of acquisition and demolition of _____ properties located in the floodplain of the _____. Seventy-five percent or $_____ represents the Federal share funded through FEMA, and 12.5 percent or $_____ represents the State share funded through WEM. The remaining 12.5 percent or $_____ is a local program match (Can not be match dollars for any other federal grants i.e. EMPG, EPCRA). The Subgrantee will be reimbursed for management costs applied to the total amount of the project up to 1% (one percent) or $_____. If there is a cost under-run for the project, final reimbursement for the federal and state share of the project costs and management costs will be adjusted based on actual costs of the project. If costs exceed the amount approved, the Subgrantee is responsible for the costs in excess of the approved grant.

2. The Subgrantee will adhere to the special conditions as identified in the approval letter for the REC (Record of Environmental Consideration) dated _____, in completing the project.

   - The subgrantee must follow all applicable local, state and federal laws, regulations, and requirements for the abatements and disposal of lead, asbestos, and other routinely encountered hazardous substances. If there is an unusual material encountered or there is an extraordinary amount of lead, asbestos, or other routinely encountered material, the subgrantee must also contact the relevant agency with authority for regulation of the material.
   - If ground-disturbing activities occur during implementation, the subgrantee will monitor excavation activity, and if any artifacts or human remains are found during excavation process all work is to cease, and the subgrantee will notify WEM, FEMA and the State Historic Preservation Officer (SHPO.)
   - If petroleum underground storage tanks or septic systems are present, they should be abandoned according to Wisconsin Department of Commerce requirement. Information is available at http://www.commerce.state.wi.us/ER/ER-BST-Closure.html and http://commerce.state.wi.us?SB/SB-DivPlanReview.html#priv.
   - If private water supply wells are present, they should be properly abandoned per NR812.26. All unused wells shall be properly filled and sealed before demolition work begins, and wells discovered during demolition work must also be properly filled and sealed in accordance with NR812.26. Submit Well Abandonment Report Forms (DNR Form #3300-5) to DNR.
   - A Notification of Demolition and/or Renovation and Application for Permit Exemption (NR 406, 410, and 447 Wis.Adm.Code) may be required. Contact DNR to request additional information and permit application materials.
   - Steel, concrete, and other demolition materials should be recycled to the extent possible. Waste that cannot be recycled must be characterized and managed properly.
   - During demolition of the structure, placement of equipment and stockpiling of structural debris, will be confined to the front and back of the structure; heavy equipment will, where possible, be kept on the driveway, the street or other hard surfaces.
   - No on-site disposal of demolition debris will be allowed; all debris resulting from the demolition must be deposited in an approved landfill area; no debris can be deposited in wetland or floodplain areas. A local or state permit may be necessary for construction in the floodplain and must be obtained prior to any construction on this project.
   - If demolition activities result in an area of disturbance of more than 10,000 square feet within 300 feet of the waterway, then a Chapter 30 permit approval will be required. Application can be found at http://dnr.wi.gov/org/water/fhp/waterway/grading.html. If dewatering is required, the dirty water removed should be pumped into a stilling basin before it is allowed to enter any waterway.

- No on-site granular material will be excavated or stripped to use for capping the foundation and/or for final landscaping.
- Best management practices will be applied to the property.
- Erosion control measures as defined by the WDNR must be used prior to and after any demolition activities are implemented.
- Secure erosion control permit under NR 216 if the property will impact more than one acre.
- Private septic tanks must be abandoned according to NR 812 and per Wisconsin Department of Commerce codes.
- If deviations from the proposed scope of work result in substantial design changes, the need for additional ground disturbance, additional removal of vegetation, or in any other unanticipated changes to the physical environment, the subgrantee must contact WEM immediately and a re-evaluation by FEMA under NEPA and other applicable environmental laws will be conducted by FEMA.

3. The prospective participants were provided and signed the written "Notice of Voluntary Statement", that participation in the program is voluntary and that the subgrant will not use its eminent domain authority to acquire the property should negotiations fail.

4. The subgrantee will provide the **Statement of Voluntary Participation** signed by the property owner and the subgrantee based on the fair market value of the property as determined by the approved appraisal for the property.

5. The subgrantee has consulted with the U.S. Crops of Engineers and that no plans exist for the property for the construction of flood damage reduction levees, has rejected consideration of such measures in the future in the project area, and instead has chosen to proceed with acquisition of permanent open space.

6. The subgrantee has coordinated with the State Department of Transportation to ensure that no future, planned improvements or enhancements are under consideration that will affect the property proposed for acquisition.

7. Provided certification that each participant who will receive pre-event fair market value is a National of the United States or qualified alien by asking all acquisition project participants (property owners) to certify that they are either a National of the United States or a qualified alien. Participants who refuse to certify, or who are not Nationals of the United States or qualified aliens, will receive no more than the appraised current market value for their property.

8. Existing structure will be removed within 90 days of acquisition. The Regional Administrator may approve a time extension in extenuating circumstances. Time extension requests must be submitted in a timely manner and prior to the 90 days.

9. Once this Grant Agreement is signed and returned to WEM, the subgrantee may begin the project and the authorized representative may request reimbursement of expenses as identified in the budget included in the approved application. The Subgrantee will need to complete and submit to WEM a Request for Reimbursement of Expenses with appropriate documentation in order to receive grant funds. Advancement of funds may be made in some extraordinary situations upon prior approval of the Grantee.

   COSTS INCURRED PRIOR TO FEMA APPROVAL OF THE GRANT, UNLESS PRE-AWARD COSTS WERE INCLUDED AND APPROVED IN THE APPLICATION, ARE NOT ALLOWABLE COSTS FOR THE GRANT.

   Management costs are calculated on a formula identified in the State of Wisconsin Administrative Plan. Requests for additional management costs above the allowed amount may be considered if funds are available. The purpose of the management costs is to reimburse the Subrantee for costs to prepare the applications, quarterly reports, audits, related field inspections, record keeping, and the filing of reimbursement claims to the Grantee. The Subgrantee shall maintain proper documentation of management costs (separate from documentation for Project expenditures) in order to be eligible for reimbursement. The management cost documentation does not have to be forwarded to the State but must be kept at the local level for three years after the grant close-out report has been accepted. Request for reimbursement of Administrative Costs may be included on DMA Form 167, Request for Reimbursement of Expenses.

   The Grantee may pursue all available remedies for the recoupment of any payments that have been inadequately documented or determined by the Grantee to have been improperly made or expended for any reason.

10. The authorized representative will be required to submit Quarterly Status Reports, to the State Hazard Migration Officer (SHMO) within fifteen days following the end of the quarter (January 15, April 15, July 15 and October 15). Said report will include the status of the project, anticipated completion date, and financial information.

11. The Subgrantee will meet the following timeline for completing this project:

    Start Date No later than (date)

    Completion Date Date

    If the Subgrantee is delayed in their completion of the project by an event beyond their control, a request for an extension must be received in writing 90 days prior to the completion date.

12. The grant performance period for the HMGP Project Grant will be date to date.

13. Final request for reimbursement and a final report covering all aspects of the project will be due 30 days after project completion. Project is considered complete after demolition of structures and restoration of all properties to open space uses. The final report will need to include:

    - Copies of signed Offer Agreement or Offer Decline
    - Signed Statement of Voluntary Participation by the property owner
    - Copies of Title Opinion or Title Insurance
    - Closing Settlement Statement
    - Transfer of Sale
    - A copy of the recorded warranty deed with the required FEMA deed restrictions.
    - A photo of the property site after project completion.
    - Copy of relocation plan approval letter and relocation assistance documents
    - Copies of permits and forms as identified in the approval letter for the Record of Environmental Considerations and in number 2 of this document.
    - Signed Environmental Closeout Declaration.
    - Other information as required.

14. Will comply with applicable provisions of the State's Relocation Law, Wisconsin Statutes Chapter 32, Section 32.19-32.27, (per Attorney General opinion dated January 12, 1979) and Wisconsin Administrative Code, ch. Comm 202 for tenants of rental property.

15. Will comply with Federal Uniform Relocation Assistance and Real Property Policies Act of 1970, as amended (49 CFR Part 24) for tenants of rental properties.

16. The HMGP funds requested for the project shall not duplicate benefits received from any other disaster assistance program.

17. Will comply with requirements of the Privacy Act. Information covered by the Privacy Act (i.e., names, addresses, award amounts, etc., of applicants) may be released to agencies for the sole purpose of preventing duplication of benefits. Information may not be used to conduct outreach, canvassing, referral or other similar programs. Information should not be provided to agencies not directly concerned with the acquisition program.

18. Any profits made from the sale, recycle, reuse, etc., of any properties acquired through the HMGP program will be used towards the mitigation project or deducted from the grant amount.

19. Property acquired through the HMGP program must be maintained in perpetuity for open space per 44 CFR Part 80.19, Land use and Oversight. The property cannot be used to construct flood damage reduction levees, transportation facilities, or other incompatible purposes. No new structure will be erected on the property other than a restroom or public facility that is open on all sides and functionally related to open space use. Any structure must be constructed in compliance with the state and local

floodplain management ordinances, meet NFIP minimum requirements, and are compatible with open space uses and floodplain management policy and practices. Allowable open space uses can include, but are not limited to, parks, nature preserves, cultivation, grazing, and unimproved pervious parking areas.

20. The deed conveying the property to the subgrantee must reference and incorporate Exhibit A, Model Deed Restrictions, attached to the State-Local HMGP Statement of Assurances for Property Acquisition Projects signed by the subgrantee on date.

21. The subgrantee must submit to the grantee every three years a report certifying that it has inspected the subject property within the month preceding the report, and that the property continues to be maintained consistent with the provisions of the grant. If the subject property is not maintained according to the terms of the grant, the grantee and FEMA, its representatives, and assignees will take measures to bring the property back into compliance.

22. The subgrantee is responsible for the continued maintenance of acquired property upon completion of the project, and is responsible for ensuring that the property is maintained in accordance with required land use restrictions.

23. Per 44 CFR Part 80.19(b) approval must be obtained from the grantee agency and the FEMA Regional Administrator before entering into a lease or easement, or conveying ownership of the property to any other party. The subgrantee may convey a property interest only to a public entity or to a qualified conservation organization. Conveyance of any property interest must reference and incorporate the original deed restrictions. If the grant period is still open, any income from sale or lease of the land must be deducted from the overall cost of the project.

24. No future disaster assistance for any purpose from any federal source will be sought or provided with respect to the acquired property.

25. The Subgrantee will use HMGP funds solely for the purpose for which these funds are provided.

26. Subgrantee shall maintain good standing with the National Flood Insurance Program (NFIP) and comply with local regulations pertaining to the NFIP**.**

27. The Subgrantee will update their floodplain ordinance to meet the current WI Department of Natural Resources requirements.

28. The Subgrantee will comply with all other policies and guidelines established by FEMA and WEM in administering the HMGP Program.

29. The Subgrantee will comply with all applicable federal, state and local codes and standards as pertain to this project.

30. The Subgrantee will follow Emergency Management and Assistance Regulations found in Title 44 CFR Code of Federal Regulations (CFR) Part 13, Uniform Administrative Requirements for Grants and Cooperative Agreements to State and Local Governments.

    - Follow requirements for budget revisions found in 44 CFR 13.30. Transfer of funds between budget cost categories in the approved budget shall receive the prior approval of FEMA when such cumulative transfers among those cost categories exceed 10% of the total budget.
    - Follow cost-sharing requirements mandated by program statute or regulations in compliance with 44 CFR 13.24.
    - Comply with 44 CFR 13.32 Equipment, 13.33 Supplies and 13.36 Procurement, and be in compliance with state and local laws and procedures.

31. The Subgrantee will follow the following OMB Circulars in administering the subgrant:

    - OMB Circular A-102 Uniform Administrative Requirements for Grants and Cooperative Agreements with State and Local Governments.
    - OMB Circular A-87 Cost Principles for State and Local Governments.
    - OMB Circular A-133 Audits of States, Local Governments and Non-Profit Organizations.

32. Any publication resulting from work performed under this agreement shall include an acknowledgement of FEMA financial support and a statement that the publication does not constitute an endorsement of FEMA or reflects FEMA views. The Grantee and FEMA are free to copyright any original work developed under this agreement, and reserves a royalty-free, nonexclusive and irrevocable right to reproduce, publish or otherwise use, and to authorize others to use the work for Government purposes.

33. The Subgrantee will not enter into cost-plus-percentage-of-cost contracts for completion of the HMGP project.

34. The Subgrantee will not enter into any contract with any party that is debarred or suspended from participating in Federal Assistance programs.

SIGNATURE OF SUBGRANTEE'S AUTHORIZED REPRESENTATIVE:

_____
Date Signed

Name Typed _____Title _____

Subgrantee Jurisdiction _____

SIGNATURES OF THE GRANTEE (WISCONSIN DIVISION OF EMERGENCY MANAGEMENT:

_____
State Hazard Mitigation Officer Date Signed

WISCONSIN DIVISION OF EMERGENCY MANAGEMENT
State-Local Hazard Mitigation Grant Program Assistance Agreement
(FEMA-DR-____-WI)
(Elevation)

This Grant Agreement between the Wisconsin Division of Emergency Management (the WEM/Grantee) and the _____ (the Subgrantee) shall be effective on the date signed by the WEM and the Subgrantee. It shall apply to all Hazard Mitigation Grant Program (HMGP) assistance provided by or through WEM to the Subgrantee as a result of the Presidentially declared disaster occurring in Wisconsin (FEMA-DR-____-WI).

The purpose of this agreement is to formally recognize the goals of the HMGP and to establish guidelines by which HMGP funds are to be used. This agreement is in addition to the requirements outlined in the DMA Form 1017A, Assurances Construction and Non-Construction Projects was signed by the above mentioned Subgrantee and submitted with the HMGP application.

Be it resolved by the Subgrantee, that the individual named below:

_____
(Name and Title)

has the legal authority and is hereby authorized to execute documents for and on behalf of the Subgrantee. The individual and this designation is to be the authorized representative for obtaining HMGP funds.

The Subgrantee hereby assures and certifies that the project will comply with the applicable State of Wisconsin and FEMA regulations. Also, the Subgrantee gives assurance and certifies with respect to and as a condition for the grant that as a minimum:

1. This Grant Agreement in the amount of $_____ will serve as the contract between WEM and the Subgrantee for the purpose of elevation of _____ properties located in the floodplain of the _____. Seventy-five percent or $_____ represents the Federal share funded through FEMA, and 12.5 percent or $_____ represents the State share funded through WEM. The remaining 12.5 percent or $_____ is a local program match (Can not be match dollars for any other federal grants i.e. EMPG, EPCRA). The Subgrantee will be reimbursed for management costs applied to the total amount of the project up to 1% (one percent) or $_____. If there is a cost under-run for the project, final reimbursement for the federal and state share of the project costs and management costs will be adjusted based on actual costs of the project. If costs exceed the amount approved, the Subgrantee is responsible for the costs in excess of the approved grant.

2. The Subgrantee will adhere to the special conditions as identified in the approval letter for the REC (Record of Environmental Consideration) dated _____, in completing the project.

   - Securing all permits per Wisconsin statutes and comply with regulatory standards.
   - If ground-disturbing activities occur during implementation, the subgrantee will monitor excavation activity, and if any artifacts or human remains are found during excavation process all work is to cease, and the subgrantee will notify WEM, FEMA and the State Historic Preservation Officer (SHPO.)
   - Steel, concrete, and other demolition materials should be recycled to the extent possible. Waste that cannot be recycled must be characterized and managed properly.
   - Best management practices will be applied to the property.
   - If deviations from the proposed scope of work result in the need for additional ground disturbance, additional removal of vegetation, or in any other unanticipated changes to the physical environment, the subgrantee must contact WEM immediately for a re-evaluation by FEMA for NEPA and other applicable environmental laws.

3. Property owners elevating their structures must voluntarily elect to participate in the program.

4. Property owners elevating their structures must sign the Model Acknowledgement of Conditions for Mitigation Property in a Special Flood Hazard Area **before** work begins.

5. Property owners elevating their structures must agree to maintain flood insurance on the structure to an amount at least equal to the project cost or to the maximum limit of coverage available for their particular property, whichever is less.

6. Property owners elevating their structures must agree that the community will legally record with the County Register of Deeds Office a notice of flood insurance requirements per the signed acknowledgement.

7. The community must adhere to the requirements of the local floodplain zoning ordinance to bring the structure into full conformance. This means that the structure will need to be elevated to the base flood elevation plus two feet.

8. An owner's agreement for elevation must be signed between the community and the property owner before work can commence on the property. The owner is responsible for any repairs or improvements to the structure. The grant will only cover eligible costs associated with the actual elevation of the structure.

9. Once this Grant Agreement is signed and returned to WEM, the subgrantee may begin the project and the authorized representative may request reimbursement of

expenses as identified in the budget included in the approved application. The Subgrantee will need to complete and submit to WEM a Request for Reimbursement of Expenses with appropriate documentation in order to receive grant funds. Advancement of funds may be made in some extraordinary situations upon prior approval of the Grantee.

COSTS INCURRED PRIOR TO FEMA APPROVAL OF THE GRANT, UNLESS PRE-AWARD COSTS WERE INCLUDED AND APPROVED IN THE APPLICATION, ARE NOT ALLOWABLE COSTS FOR THE GRANT.

Management costs are calculated on a formula identified in the State of Wisconsin Administrative Plan. The purpose of the management costs is to reimburse the Subgrantee for costs to prepare the applications, quarterly reports, audits, related field inspections, record keeping, and the filing of reimbursement claims to the Grantee. The Subgrantee shall maintain proper documentation of management costs (separate from documentation for Project expenditures) in order to be eligible for reimbursement. The management cost documentation does not have to be forwarded to the State but must be kept at the local level for three years after the grant close-out report has been accepted. Request for reimbursement of Administrative Costs may be included on DMA Form 167, Request for Reimbursement of Expenses.

The Grantee may pursue all available remedies for the recoupment of any payments that have been inadequately documented or determined by the Grantee to have been improperly made or expended for any reason.

10. The authorized representative will be required to submit Quarterly Status Reports, to the State Hazard Migration Officer (SHMO) within fifteen days following the end of the quarter (January 15, April 15, July 15 and October 15). Said report will include the status of the project, anticipated completion date, and financial information.

11. The Subgrantee will meet the following timeline for completing this project:

    Start Date No later than (date)

    Completion Date Date

    If the Subgrantee is delayed in their completion of the project by an event beyond their control, a request for an extension must be received in writing 90 days prior to the completion date.

12. The grant performance period for the HMGP Project Grant will be date to date.

13. Request for final reimbursement and a final report covering all aspects of the project will be due 30 days after project completion. Project is considered complete after elevation of structures. The final report will need to include:

- Copies of permits and forms as identified in the approval letter for the Record of Environmental Considerations and in number 2 of this document.
- A copy of the elevation certificate.
- Proof that the property owner has purchased the required flood insurance coverage.
- A copy of the required notice of flood insurance has been filed with the County Register of Deeds Office for each property that was elevated.
- A photo of each property site after project completion.
- The latitude and longitude coordinates for each property in the project.
- Identification of repetitive loss properties in the project.
- Other information as required.

14. Will comply with applicable provisions of the State's Relocation Law, Wisconsin Statutes Chapter 32, Section 32.19-32.27, (per Attorney General Opinion dated January 12, 1979) and Wisconsin Administrative Code, ch. Comm 202, and the Uniform Relocation Assistance and Real Property Acquisition Policies Act (URA.)

15. The HMGP funds requested for the project shall not duplicate benefits received from any other disaster assistance program.

16. Will comply with requirements of the Privacy Act. Information covered by the Privacy Act (i.e., names, addresses, award amounts, etc., of applicants) may be released to agencies for the sole purpose of preventing duplication of benefits. Information may not be used to conduct outreach, canvassing, referral or other similar programs. Information should not be provided to agencies not directly concerned with the project.

17. The Subgrantee will use HMGP funds solely for the purpose for which these funds are provided.

18. Subgrantee shall maintain good standing with the National Flood Insurance Program (NFIP) and comply with local regulations pertaining to the NFIP**.**

19. The Subgrantee will update their floodplain ordinance to meet the current WI Department of Natural Resources requirements.

20. The Subgrantee will comply with all other policies and guidelines established by FEMA and WEM in administering the HMGP Program.

21. The Subgrantee will comply with all applicable federal, state and local codes and standards as pertain to this project.

22. The Subgrantee will follow Emergency Management and Assistance Regulations found in Title 44 CFR Code of Federal Regulations (CFR) Part 13, Uniform

Administrative Requirements for Grants and Cooperative Agreements to State and Local Governments.

- Follow requirements for budget revisions found in 44 CFR 13.30. Transfer of funds between budget cost categories in the approved budget shall receive the prior approval of FEMA when such cumulative transfers among those cost categories exceed 10% of the total budget.
- Follow cost-sharing requirements mandated by program statute or regulations in compliance with 44 CFR 13.24.
- Comply with 44 CFR 13.32 Equipment, 13.33 Supplies and 13.36 Procurement, and be in compliance with state and local laws and procedures.

23. The Subgrantee will follow the following OMB Circulars in administering the subgrant:

    - OMB Circular A-102 Uniform Administrative Requirements for Grants and Cooperative Agreements with State and Local Governments.
    - OMB Circular A-87 Cost Principles for State and Local Governments.
    - OMB Circular A-133 Audits of States, Local Governments and Non-Profit Organizations.

24. Any publication resulting from work performed under this agreement shall include an acknowledgement of FEMA financial support and a statement that the publication does not constitute an endorsement of FEMA or reflects FEMA views. The Grantee and FEMA are free to copyright any original work developed under this agreement, and reserves a royalty-free, nonexclusive and irrevocable right to reproduce, publish or otherwise use, and to authorize others to use the work for Government purposes.

25. The Subgrantee will not enter into cost-plus-percentage-of-cost contracts for completion of the HMGP project.

26. The Subgrantee will not enter into any contract with any party that is debarred or suspended from participating in Federal Assistance programs.

SIGNATURE OF SUBGRANTEE'S AUTHORIZED REPRESENTATIVE:

_____
Date Signed

Name Typed _____Title _____

Subgrantee Jurisdiction _____

SIGNATURES OF THE GRANTEE (WISCONSIN DIVISION OF EMERGENCY MANAGEMENT:

_____
State Hazard Mitigation Officer Date Signed

WISCONSIN DIVISION OF EMERGENCY MANAGEMENT
State-Local Hazard Mitigation Grant Program Assistance Agreement
(FEMA-DR-____-WI)
(Non-Acquisition)

This Grant Agreement between the Wisconsin Division of Emergency Management (the WEM/Grantee) and the _____ (the Subgrantee) shall be effective on the date signed by the WEM and the Subgrantee. It shall apply to all Hazard Mitigation Grant Program (HMGP) assistance provided by or through WEM to the Subgrantee as a result of the Presidentially declared disaster occurring in Wisconsin (FEMA-DR-____-WI).

The purpose of this agreement is to formally recognize the goals of the HMGP and to establish guidelines by which HMGP funds are to be used. This agreement is in addition to the requirements outlined in the DMA Form 1017A, Assurances Construction and Non-Construction Projects, which was signed by the above mentioned Subgrantee and submitted with the HMGP application.

Be it resolved by the Subgrantee, that the individual named below:

_____
(Name and Title)

has the legal authority and is hereby authorized to execute documents for and on behalf of the Subgrantee. The individual and this designation is to be the authorized representative for obtaining HMGP funds.

The Subgrantee hereby assures and certifies that the project will comply with the applicable State of Wisconsin and FEMA regulations. Also, the Subgrantee gives assurance and certifies with respect to and as a condition for the grant that as a minimum:

1. This Grant Agreement in the amount of $_____ will serve as the contract between WEM and the Subgrantee for the purpose of _____. Seventy-five percent or $_____ represents the Federal share funded through FEMA, and 12.5 percent or $_____ represents the State share funded through WEM. The remaining 12.5 percent or $_____ is a local program match (Can not be match dollars for any other federal grants i.e. EMPG, EPCRA). The Subgrantee will be reimbursed for management costs applied to the total amount of the project up to 1% (one-percent) or $_____. If there is a cost under-run for the project, final reimbursement for the federal and state share of the project costs and management costs will be adjusted based on actual costs of the project. If costs exceed the amount approved, the Subgrantee is responsible for the costs in excess of the approved grant.

2. The Subgrantee will adhere to the special conditions as identified in the approval letter for the Environmental Assessment (EA) dated _____, in completing the project.

   - Securing all permits per Wisconsin statutes and comply with regulatory standards.
   - Follow all applicable local, state and federal laws (Clean Air Act, Clean Water Act, etc.), regulations, and requirements for the abatement and disposal of lead, asbestos, and other routinely encountered hazardous substances. If there is an unusual material encountered or there is an extraordinary amount of lead, asbestos, or other routinely encountered material, the subgrantee must contact the grantee and the relevant agency with authority for regulation of the material.
   - Secure erosion control permit under NR 216 if the property will impact more than one acre.
   - If deviations from the proposed scope of work result in the need for additional ground disturbance, additional removal of vegetation, or in any other unanticipated changes to the physical environment, the subgrantee must contact WEM immediately for a re-evaluation by FEMA for NEPA and other applicable environmental laws.
   - If any archaeological features, artifacts or human remains are encountered during implementation of this project, it will be necessary to stop and contact the grantee and the State Historic Preservation Officer (SHPO's) office to consult regarding the appropriate data recovery plan.

3. Once this Grant Agreement is signed and returned to WEM, the subgrantee may begin the project and the authorized representative may request reimbursement of expenses as identified in the budget included in the approved application. The Subgrantee will need to complete and submit to WEM a Request for Reimbursement of Expenses with appropriate documentation in order to receive grant funds. Advancement of funds may be made in some extraordinary situations upon prior approval of the Grantee.

   COSTS INCURRED PRIOR TO FEMA APPROVAL OF THE GRANT, UNLESS PRE-AWARD COSTS WERE INCLUDED AND APPROVED IN THE APPLICATION, ARE NOT ALLOWABLE COSTS FOR THE GRANT.

   Management costs are calculated on a formula identified in the State of Wisconsin Administrative Plan. The purpose of the management costs is to reimburse the Subgrantee for costs to prepare the applications, quarterly reports, audits, related field inspections, record keeping, and the filing of reimbursement claims to the Grantee. The Subgrantee shall maintain proper documentation of management costs (separate from documentation for Project expenditures) in order to be eligible for reimbursement. The management costs documentation does not have to be forwarded to the State but must be kept at the local level for three years after the grant close-out report has been accepted. Request for reimbursement of

management costs may be included on DMA Form 167, Request for Reimbursement of Expenses.

The Grantee may pursue all available remedies for the recoupment of any payments that have been inadequately documented or determined by the Grantee to have been improperly made or expended for any reason.

4. The authorized representative will be required to submit Quarterly Status Reports, to the State Hazard Migration Officer (SHMO) within fifteen days following the end of the quarter (January 15, April 15, July 15 and October 15). Said report will include the status of the project, anticipated completion date, and financial information.

5. The Subgrantee will meet the following timeline for completing this project:

   Start Date No later than (date)

   Completion Date Date

   If the Subgrantee is delayed in their completion of the project by an event beyond their control, a request for an extension must be received in writing 90 days prior to the completion date.

6.. The grant performance period for the HMGP Project Grant will be date to date.

7. Final request for reimbursement and a final report covering all aspects of the project will be due 30 days after project completion. The final report will need to include copies of all permits and forms as identified in the approval letter for the Environmental Assessment (EA) and pictures of the completed project.

8. The HMGP funds requested for the project shall not duplicate benefits received from any other disaster assistance program.

9. The Subgrantee will use HMGP funds solely for the purpose for which these funds are provided.

10. Subgrantee shall maintain good standing with the National Flood Insurance Program (NFIP) and comply with local regulations pertaining to the NFIP**.**

11. The Subgrantee will update their floodplain ordinance to meet the current WI Department of Natural Resources requirements.

12. The Subgrantee will comply with all other policies and guidelines established by FEMA and WEM in administering the HMGP Program.

13. The Subgrantee will comply with all applicable federal, state and local codes and standards as pertain to this project.

14. The Subgrantee will follow Emergency Management and Assistance Regulations found in Title 44 CFR Code of Federal Regulations (CFR) Part 13, Uniform Administrative Requirements for Grants and Cooperative Agreements to State and Local Governments.

    - Follow requirements for budget revisions found in 44 CFR 13.30. Transfer of funds between budget cost categories in the approved budget shall receive the prior approval of FEMA when such cumulative transfers among those cost categories exceed 10% of the total budget.
    - Follow cost-sharing requirements mandated by program statute or regulations in compliance with 44 CFR 13.24.
    - Comply with 44 CFR 13.32 Equipment, 13.33 Supplies and 13.36 Procurement, and be in compliance with state and local laws and procedures.

15. The Subgrantee will follow the following OMB Circulars in administering the subgrant:

    - OMB Circular A-102 Uniform Administrative Requirements for Grants and Cooperative Agreements with State and Local Governments.
    - OMB Circular A-87 Cost Principles for State and Local Governments.
    - OMB Circular A-133 Audits of States, Local Governments and Non-Profit Organizations.
    -

16. Any publication resulting from work performed under this agreement shall include an acknowledgement of FEMA financial support and a statement that the publication does not constitute an endorsement of FEMA or reflects FEMA views. The Grantee and FEMA are free to copyright any original work developed under this agreement, and reserves a royalty-free, nonexclusive and irrevocable right to reproduce, publish or otherwise use, and to authorize others to use the work for Government purposes.

17. The Subgrantee will not enter into cost-plus-percentage-of-cost contracts for completion of the HMGP project.

18. The Subgrantee will not enter into any contract with any party that is debarred or suspended from participating in Federal Assistance programs.

SIGNATURE OF SUBGRANTEE'S AUTHORIZED REPRESENTATIVE:

_____
Date Signed

Name Typed _____Title _____

Subgrantee Jurisdiction _____

SIGNATURES OF THE GRANTEE (WISCONSIN DIVISION OF EMERGENCY MANAGEMENT:

_____
State Hazard Mitigation Officer Date Signed

WISCONSIN DIVISION OF EMERGENCY MANAGEMENT
State-Local Hazard Mitigation Grant Program Assistance Agreement
(FEMA-DR-____-WI)
Planning Grant

This Grant Agreement between the Wisconsin Division of Emergency Management (the WEM/Grantee) and the _____ (the Subgrantee) shall be effective on the date signed by the WEM and the Subgrantee. It shall apply to all Hazard Mitigation Grant Program (HMGP) assistance provided by or through WEM to the Subgrantee as a result of the Presidentially declared disaster occurring in Wisconsin (FEMA-DR-____-WI).

The purpose of this agreement is to formally recognize the goals of the HMGP and to establish guidelines by which HMGP funds are to be used. This agreement is in addition to the requirements outlined in the DMA Form 1017A, Assurances Construction and Non-Construction Projects, which was signed by the above mentioned Subgrantee and submitted with the HMGP application.

Be it resolved by the Subgrantee, that the individual named below:

_____
(Name and Title)

has the legal authority and is hereby authorized to execute documents for and on behalf of the Subgrantee. The individual and this designation is to be the authorized representative for obtaining HMGP funds.

The Subgrantee hereby assures and certifies that the planning will comply with the applicable State of Wisconsin and FEMA regulations. Also, the Subgrantee gives assurance and certifies with respect to and as a condition for the grant that as a minimum:

1. This Grant Agreement in the amount of $_____ will serve as the contract between WEM and the Subgrantee for the purpose of developing (or update) an All-Hazards Mitigation Plan. Seventy-five percent or $_____ represents the Federal share funded through FEMA, and 12.5 percent or $_____ represents the State share funded through WEM. The remaining 12.5 percent or $_____ is a local program match (Can not be match dollars for any other federal grants i.e. EMPG, EPCRA). The Subgrantee will be reimbursed for management costs applied to the total amount of the project up to 1% (one percent) or $_____. If there is a cost under-run for the project, final reimbursement for the federal and state share of the project costs and management costs will be adjusted based on actual costs of the project. If costs exceed the amount approved, the Subgrantee is responsible for the costs in excess of the approved grant.

2. Once this Grant Agreement is signed and returned to WEM, the subgrantee may begin the planning process and the authorized representative may request reimbursement of expenses. The Subgrantee will need to complete and submit to WEM a Request for Reimbursement of Expenses with appropriate documentation in order to receive grant funds. Advancement of funds may be made in some extraordinary situations upon prior approval of the Grantee.

   The management costs are calculated on a formula identified in the State of Wisconsin Administrative Plan. The purpose of the management costs is to reimburse the Subgrantee for costs to prepare the applications, quarterly reports, audits, related field inspections, record keeping, and the filing of reimbursement claims to the Grantee. The Subgrantee shall maintain proper documentation of management costs (separate from documentation for Project expenditures) in order to be eligible for reimbursement. The management costs documentation does not have to be forwarded to the State but must be kept at the local level for three years after the grant close-out report has been accepted. Request for reimbursement of management costs may be included on DMA Form 167, Request for Reimbursement of Expenses.

   COSTS INCURRED PRIOR TO FEMA APPROVAL OF THE GRANT, UNLESS SPECIFICALLY AUTHORIZED BY THE GRANTEE, ARE NOT ALLOWABLE COSTS FOR THE GRANT.

   The Grantee may pursue all available remedies for the recoupment of any payments that have been inadequately documented or determined by the Grantee to have been improperly made or expended for any reason.

   The Subgrantee may request reimbursements of planning expenses up to 90% of the federal share of the grant or $_____ as work progresses on the development of the updated plan. The remaining funds will not be paid until the plan update is completed and approved, and adequate documentation for the total costs incurred for the grant has been submitted.

   FEMA will recoup mitigation planning grant funds for grants that do not meet the deliverable criteria of an adopted, FEMA-approved mitigation plan by the end of the performance period. The amount recouped will be based on the following guidelines:

   - Jurisdictions with plans that have been approved pending adoption by FEMA, but are not yet formally adopted (in accordance with FEMA regulations) by the end of the period of performance, must return a minimum of 10 percent of the grant award;
   - Jurisdictions with plans that have been reviewed by FEMA, but require changes in order to meet the minimum requirements, must return a minimum of 25 percent of the grant award if the required changes have not been made by the end of the period of performance; and

- Jurisdictions with plans that have not been submitted to FEMA for review by the end of the period of performance must return 100 percent of the grant award.

3. The authorized representative will be required to submit Quarterly Status Reports to the State Hazard Migration Officer (SHMO) within fifteen days following the end of the quarter (January 15, April 15, July 15 and October 15). Said report will include the status of the project, anticipated completion date, and financial information.

4. The subgrantee will submit a copy of their draft plan that meets the planning criteria as found in 44CFR Part 201.6 (or 201.7 for tribal plans) along with a completed Local Hazard Mitigation Review Crosswalk to WEM by date**,** for review. The final plan must be completed and approved by FEMA prior to date.

5. The grant performance period for the HMGP Planning Grant will be date to date. If the Subgrantee is delayed in their completion of the project by an event beyond their control, a request for an extension must be received in writing 90 days prior to the completion date.

6. The subgrantee will complete and submit the final request for reimbursement and a final report 30 days prior to expiration of the grant, or within 30 days after completion of the plan whichever is sooner.

7. The Subgrantee will use HMGP funds solely for the purpose for which these funds are provided.

8. Subgrantee shall maintain good standing with the National Flood Insurance Program (NFIP) and comply with local regulations pertaining to the NFIP**.**

9. The Subgrantee will comply with all other policies and guidelines established by FEMA and WEM in administering the HMGP Program.

10. The Subgrantee will comply with all applicable federal, state and local codes and standards as pertain to this project.

11. The Subgrantee will follow Emergency Management and Assistance Regulations found in Title 44 CFR Code of Federal Regulations (CFR) Part 13, Uniform Administrative Requirements for Grants and Cooperative Agreements to State and Local Governments.

    - Follow requirements for budget revisions found in 44 CFR 13.30. Transfer of funds between budget cost categories in the approved budget shall receive the prior approval of FEMA when such cumulative transfers among those cost categories exceed 10% of the total budget.
    - Follow cost-sharing requirements mandated by program statute or regulations in compliance with 44 CFR 13.24.

- Comply with 44 CFR 13.32 Equipment, 13.33 Supplies and 13.36 Procurement, and be in compliance with state and local laws and procedures.

12. The Subgrantee will follow the following OMB Circulars in administering the subgrant:

    - OMB Circular A-102 Uniform Administrative Requirements for Grants and Cooperative Agreements with State and Local Governments.
    - OMB Circular A-87 Cost Principles for State and Local Governments.
    - OMB Circular A-133 Audits of States, Local Governments and Non-Profit Organizations.

13. Any publication resulting from work performed under this agreement shall include an acknowledgement of FEMA financial support and a statement that the publication does not constitute an endorsement of FEMA or reflects FEMA views. The Grantee and FEMA are free to copyright any original work developed under this agreement, and reserves a royalty-free non exclusive and irrevocable right to reproduce, publish or otherwise use, and to authorize others to use the work for Government purposes.

14, The Subgrantee will not enter into cost-plus-percentage-of-cost contracts for completion of the HMGP All Hazards Plan.

15. The Subgrantee will not enter into any contract with any party that is debarred or suspended from participating in Federal Assistance programs.

GRANT CERTIFICATION

The undersigned do hereby certify that the subgrantee will fulfill all the requirements of the Hazard Mitigation Grant Program contained in Federal and/or State program guidelines including the submission of all appropriate forms. The governing body of the subgrantee has duly authorized this document.

SIGNATURE OF SUBGRANTEE'S AUTHORIZED REPRESENTATIVE:

_____

Date Signed

Name Typed _____Title _____

Subgrantee Jurisdiction _____

SIGNATURES OF THE GRANTEE (WISCONSIN DIVISION OF EMERGENCY MANAGEMENT:

_____

State Hazard Mitigation Officer Date Signed

STATE OF WISCONSIN
DEPARTMENT OF MILITARY AFFAIRS
DIVISION OF EMERGENCY MANAGEMENT
2400 Wright Street, P.O. Box 7865
Madison, WI 53707
608-242-3232

Section 404 Hazard Mitigation Grant Program
REQUEST FOR REIMBURSEMENT OF EXPENSES

DISASTER #FEMA-_____-DR-WI DATE OF REQUEST_____
SUBGRANTEE_____ COUNTY_____

Total of Approved Grant (Federal+State+Local) Local match can not be time charged to any other federal grants i.e. EMPG, EPCRA	Project or Plan$_____ Man Costs $_____
Amount Spent to Date (100%)	Project or Plan$_____ Man Costs $_____
Total Reimbursement to Date	Project or Plan$_____ Man Costs $_____
Amount Spent Since Last Request *(Attach supporting documentation for project/plan costs.)* *(Do not attach documentation for management costs but keep it at your office for three years after close of grant.)*	Project or Plan$_____ Man Costs $_____
Advance (Prior Approval Required) **Please see instructions on back of form.**	Project or Plan$_____
Requested Project Reimbursement (87.5% of amount spent since last request)	Project or Plan$_____
Requested Management Costs Reimbursement (Keep documentation for 3 years after close of grant.)	Man Costs $_____

_____
Signature - Subgrantee's Authorized Representative

REIMBURSEMENT APPROVED Project $_____ Admin Allow $_____

_____

Signature - State Mitigation Representative **Date**

When receiving funds in advance of spending them, the following must be adhered to:

1. If possible, funds should be expended within three days.
2. Deposit any advance HMGP funds into a separate **non-interest** bearing bank account.
3. If any interest is generated, those interest funds shall be reported to the State and must be spent for project administrative purposes before any additional project funds are drawn down.
4. Subgrantees should reconcile earned interest each calendar quarter. If earned-and-expended interest exceeds $100 at any time during the calendar year, all interest in excess of $100 shall be returned to the U.S. Treasury.

BUDGET SUMMARY FOR REIMBURSEMENT REQUEST
NAME OF SUBGRANTEE ACQUISITION PROJECT FEMA-____-DR-WI

	FMV	APPRAISALS	TITLE SEARCHES	ABSTRACTS/ TITLE INS.	LEGAL FEES	SURVEYS	CLOSING COSTS	RELOCATION ASSISTANCE	DEMOLITION SITE RESTORATION	OTHER COSTS	TOTAL	MGMT. COSTS
BUDGET												
REQUEST NO. 1												
BALANCE												
REQUEST NO. 2												
BALANCE												
REQUEST NO. 3												
BALANCE												
REQUEST NO. 4												
BALANCE												
REQUEST NO. 5												
BALANCE												
REQUEST NO. 6												
BALANCE												
REQUEST NO. 7												
BALANCE												
REQUEST NO. 8												
BALANCE												

Transfer of funds between budget cost categories in the approved budget shall receive the prior approval of FEMA when such cumulative transfers among those cost categories exceed 10% of the total budget.

STATE OF WISCONSIN
DEPARTMENT OF MILITARY AFFAIRS
DIVISION OF EMERGENCY MANAGEMENT
2400 Wright Street, P.O. Box 7865
Madison, WI 53707
608-242-3232

PROJECT QUARTERLY STATUS REPORT

Project / Plan
Contact and Program Information

Name (Last, First)	
Title	
Subgrantee	
Phone Number	
E-mail	
County	
Project Number	
Disaster # (HMGP)	FEMA- -DR-WI
Federal Fiscal Year (PDM & FMA)	
Quarterly Report Date	Jan 15th___ April 15th___ July 15th___ Oct 15th___ Year _____
Quarterly Report Submittal Date	

Funding Program	☐ Flood Mitigation Assistance (FMA)
	☐ Pre-Disaster Mitigation Competitive Project Grant (PDM)
	☐ Section 404 Hazard Mitigation Grant Program (HMGP)

Type of Project	☐ Acquisition/Floodproofing
	☐ Planning
	☐ Other (specify)….

Date Grant was Approved	
Start Date of Project/Plan	
Is the Project/Plan on Schedule (yes / no) (Circle One) If no, provide an explanation why and a new estimated completion date below.	
Estimated Project/Plan Completion Date	
Amount of Approved Grant (100%)	
Approximate Amount Spent to Date (100%)	
Anticipated (Overrun / Underrun) (Circle One)	

ACQUISITION

1. Number of properties to be acquired:	
2. Number of appraisals completed to date:	
3. Value of appraisals to date:	
4. Number of offers accepted to date:	
5. Number of closings to date:	
6. Estimated closings to be completed in the next quarter:	
7. Approximate Acquisition costs to date: (Include title insurance, legal fees, taxes, etc.)	
8. Approximate Relocation Benefits to date:	
9. Number of structures demolished to date:	
10. Estimated structures to be demolished in the next quarter:	
11. Total Acquisition Costs: (Total 7 and 8)	
12. Federal, State, or Local Permits required this past quarter:	Yes___Number____None___ (Attach copies of permits that were obtained this past quarter.)

FLOODPROOFING

1. Number of structures to be floodproofed:	
2. Number of structures floodproofed to date:	
3. Approximate Cost of floodproofing to date:	
4. Approximate Relocation Benefits to Date:	
5. Estimated # of structures to be floodproofed next quarter:	
6. Estimated floodproofing costs for next quarter:	
7. Federal, State, or Local Permits required this past quarter:	Yes___Number____None___ (Attach copies of permits that were obtained this past quarter.)

ADDITIONAL QUESTIONS OR COMMENTS

1. Other costs incurred to date:

Item	Amount

3. Narrative Summary of Progress on Project or Plan: (Attach additional sheets if necessary)

4. Problems Encountered and Assistance Needed:

5. Other Information Pertinent to the Overall Project or Plan:

SIGNATURES

_____ _____

SUBGRANTEE'S AUTHORIZED REPRESENTATIVE **DATE**

_____ _____

STATE HAZARD MITIGATION OFFICER **DATE**

WISCONSIN STATE HMGP QUARTERLY REPORT
QUARTER END DATE JULY 31, 2010

GRANT NO.	COMMUNITY	GRANT APPROVE	APPROVED COMP DATE	SUBGRANTEE COMP DATE	STATUS CODE	COST CODE	FEDERAL SHARE	STATE SHARE	LOCAL SHARE	TOTAL GRANT	AMOUNT DISPERSED	FEDERAL AMOUNT	AMOUNT REMAINING	AVAILABLE ADMIN	ADMIN DISPERSED	ADMIN REMAINING
PROJECTS																
1719.8-R	Chaseburg (Res Acq)	7/24/2008	7/24/2011	10/1/2010	On Schedule	Unchanged	$ 638,081.00	$ 106,347.00	$ 106,347.00	$ 850,775.00	$ 418,812.70	$ 314,109.53	$ 431,962.30	$ 18,074.00	$ 8,000.00	$ 10,074.00
1719.13-R	Chaseburg (Com Acq)	9/12/2008	9/12/2011	10/1/2010	On Schedule	Unchanged	$ 641,925.00	$ 106,988.00	$ 106,987.00	$ 855,900.00	$ 474,571.22	$ 355,928.42	$ 381,328.78	$ 9,993.00	$ 6,300.00	$ 3,693.00
1719.7-R	Gays Mills (Acq)	5/20/2008	5/20/2011	10/1/2010	On Schedule	Overrun	$ 903,236.00	$ 150,539.00	$ 150,539.00	$ 1,204,314.00	$ 663,051.02	$ 497,288.27	$ 541,262.98	$ 20,788.00	$ 4,750.00	$ 16,038.00
1719.6-R	Gays Mills (Elevation)	9/16/2008	9/16/2011	10/1/2010	On Schedule	Underrun	$ 169,164.00	$ 28,194.00	$ 28,194.00	$ 225,552.00	$ 199,890.05	$ 149,917.54	$ 25,661.95	$ 4,511.00	$ 2,500.00	$ 2,011.00
1719.12-R	Kenosha County	9/25/2008	9/25/2011	4/1/2011	On Schedule	Unchanged	$ 1,119,311.00	$ 186,552.00	$ 186,551.00	$ 1,492,414.00	$ 964,376.43	$ 723,282.32	$ 528,037.57	$ 25,924.00	$ 6,231.00	$ 19,693.00
1719.9-R	Mount Pleasant	5/21/2008	5/21/2011	8/21/2009	**Completed**	Unchanged	$ 181,121.00	$ 30,187.00	$ 30,186.00	$ 241,494.00	$ 241,494.46	$ 181,120.85	$ (0.46)	$ 5,800.00	$ 5,800.00	$ -
1719.5-R	Oregon	4/10/2008	4/10/2011	7/10/2009	**Completed**	Unchanged	$ 79,440.00	$ 13,240.00	$ 13,240.00	$ 105,920.00	$ 105,064.31	$ 78,798.23	$ 855.69	$ 3,118.00	$ 3,101.28	$ 16.72
1719.11-F	Vernon County	11/6/2008	11/6/2011	9/31/2010	Delayed	Unchanged	$ 85,500.00	$ 14,250.00	$ 14,250.00	$ 114,000.00	$ 114,000.00	$ 85,500.00	$ -	$ 2,880.00	$ 2,880.00	$ -
1719.10-R	Soldiers Grove	7/25/2008	7/25/2011	10/1/2010	**Completed**	Unchanged	$ 130,336.00	$ 21,723.00	$ 21,722.00	$ 173,781.00	$ 173,781.71	$ 130,336.28	$ (0.71)	$ 4,476.00	$ 4,476.00	$ -
PLANNING																
1719.3-P	Crawford County	3/14/2008	3/14/2011	8/1/2010	On Schedule	Unchanged	$ 30,000.00	$ 5,000.00	$ 5,000.00	$ 40,000.00	$ 30,393.05	$ 22,794.79	$ 9,606.95	$ 1,200.00		$ 1,200.00
1719.1-P	Richland County	2/22/2008	2/22/2011	6/30/2010	**Completed**	Unchanged	$ 27,000.00	$ 4,500.00	$ 4,500.00	$ 36,000.00	$ 27,637.10	$ 20,727.83	$ 8,362.90	$ 1,080.00		$ 1,080.00
1719.4-P	Vernon County	3/14/2008	3/14/2011	9/14/2010	On Schedule	Unchanged	$ 30,000.00	$ 5,000.00	$ 5,000.00	$ 40,000.00	$ 25,650.78	$ 19,238.09	$ 14,349.22	$ 1,200.00		$ 1,200.00
	LOCAL TOTALS						**$ 4,035,114.00**	**$ 672,520.00**	**$ 672,516.00**	**$ 5,380,150.00**	**$ 3,438,722.83**	**$ 2,579,042.12**	**$ 1,941,427.17**	**$ 99,044.00**	**$ 44,038.28**	**$ 55,005.72**
	State Management	3/27/2008					$ 128,267.00	$ 42,756.00		$ 171,023.00	$ 121,647.68	$ 91,235.76	$ 49,375.32			
1719	**GRAND TOTALS**						**$ 4,163,381.00**	**$ 715,276.00**	**$ 672,516.00**	**$ 5,551,173.00**	**$ 3,560,370.51**	**$ 2,670,277.88**	**$ 1,990,802.49**	**$ 99,044.00**	**$ 44,038.28**	**$ 55,005.72**
PROJECTS																
1768.18-R	Elroy, City	10/16/2009	10/16/2012	10/16/2012	On Schedule	Unchanged	$ 429,000.00	$ 71,500.00	$ 71,500.00	$ 572,000.00	$ 261,351.60	$ 196,013.70	$ 310,648.40	$ 5,720.00	$ 2,613.52	$ 3,106.48
1768.10-R	Excelsior, Town	5/29/2009	5/29/2012	5/29/2011	On Schedule	Unchanged	$ 91,350.00	$ 15,225.00	$ 15,225.00	$ 121,800.00	$ 96,921.68	$ 72,691.26	$ 24,878.32	$ 1,218.00	$ 969.22	$ 248.78
1768.16-R	Fond du Lac, City	9/24/2009	9/24/2012	9/24/2012	On Schedule	Unchanged	$ 1,231,808.00	$ 205,301.00	$ 205,301.00	$ 1,642,410.00	$ 706,829.55	$ 530,122.16	$ 935,580.45	$ 16,424.00	$ 6,932.37	$ 9,491.63
1768.22-R	Gays Mills	11/5/2009	11/5/2012	11/5/2012	On Schedule	Underrun	$ 823,505.00	$ 137,251.00	$ 137,250.00	$ 1,098,006.00	$ 494,875.00	$ 371,156.25	$ 603,131.00	$ 10,980.06	$ 5,000.00	$ 5,980.06
1768.17-R	Grant County	11/10/2009	11/10/2012	11/10/2012	On Schedule	Unchanged	$ 350,475.00	$ 58,413.00	$ 58,412.00	$ 467,300.00		$ -	$ 467,300.00	$ 4,673.00		$ 4,673.00
1768.13-R	Janesville, City	6/30/2009	6/30/2012	6/30/2012	On Schedule	Unchanged	$ 933,563.00	$ 155,594.00	$ 155,593.00	$ 1,244,750.00	$ 545,044.68	$ 408,783.51	$ 699,705.32	$ 12,447.00	$ 5,450.00	$ 6,997.00
1768.14-R	Jefferson, City	8/13/2009	8/13/2012	8/13/2012	On Schedule	Unchanged	$ 374,873.00	$ 62,479.00	$ 62,478.00	$ 499,830.00	$ 293,060.57	$ 219,795.43	$ 206,769.43	$ 4,998.00		$ 4,998.00
1768.23-R	Jefferson County	11/13/2009	11/13/2012	11/13/2012	On Schedule	Unchanged	$ 6,065,755.00	$ 1,010,959.00	$ 1,010,959.00	$ 8,087,673.00	$ 1,095,216.26	$ 821,412.20	$ 6,992,456.74	$ 59,779.00	$ 21,750.00	$ 38,029.00
1768.21-R	Kenosha County	12/4/2009	12/4/2012	12/4/2012	On Schedule	Unchanged	$ 1,866,089.00	$ 311,015.00	$ 311,014.00	$ 2,488,118.00		$ -	$ 2,488,118.00	$ 24,881.00		$ 24,881.00
1768.9-R	LaFarge, Village	6/16/2009	6/16/2012	6/16/2012	On Schedule	Unchanged	$ 896,756.00	$ 149,460.00	$ 149,459.00	$ 1,195,675.00	$ 625,930.48	$ 469,447.86	$ 569,744.52	$ 11,956.00	$ 8,000.00	$ 3,956.00
1768.19-R	Paddock Lake	9/3/2009	9/3/2012	9/3/2012	On Schedule	Unchanged	$ 516,458.00	$ 86,076.00	$ 86,076.00	$ 688,610.00		$ -	$ 688,610.00	$ 6,886.00		$ 6,886.00
1768.12-R	Reedsburg, City	7/14/2009	7/14/2012	7/14/2012	On Schedule	Unchanged	$ 1,952,078.00	$ 325,346.00	$ 325,346.00	$ 2,602,770.00	$ 1,804,232.70	$ 1,353,174.52	$ 798,537.30	$ 26,027.00		$ 26,027.00
1768.26-R	Richland Center	11/4/2009	11/4/2012	11/4/2012	On Schedule	Unchanged	$ 85,125.00	$ 14,188.00	$ 14,187.00	$ 113,500.00	$ 77,000.00	$ 57,750.00	$ 36,500.00	$ 1,135.00		$ 1,135.00
1768.15-R	Rock County	8/19/2009	8/19/2012	8/19/2012	On Schedule	Unchanged	$ 879,532.00	$ 146,589.00	$ 146,588.00	$ 1,172,709.00	$ 657,713.50	$ 493,285.13	$ 514,995.50	$ 11,726.00	$ 6,572.00	$ 5,154.00
1768.11-R	Rock Springs	8/24/2009	8/24/2012	8/24/2012	On Schedule	Unchanged	$ 1,884,590.00	$ 314,098.00	$ 314,098.00	$ 2,512,786.00	$ 1,026,068.49	$ 769,551.57	$ 1,486,717.51	$ 23,109.00	$ 6,408.00	$ 16,701.00
1768.8-R	Spring Green, Town	5/29/2009	5/29/2012	5/29/2011	On Schedule	Unchanged	$ 4,033,218.00	$ 672,203.00	$ 672,203.00	$ 5,377,624.00	$ 4,802,335.41	$ 3,601,751.56	$ 575,288.59	$ 53,776.00	$ 47,839.60	$ 5,936.40
1768.24-R	Sugar Creek, Town	10/26/2009	10/26/2012	10/26/2012	On Schedule	Unchanged	$ 541,885.00	$ 90,314.00	$ 90,314.00	$ 722,513.00	$ 456,412.54	$ 342,309.41	$ 266,100.46	$ 7,225.00		$ 7,225.00
PLANNING																
1768.27-P	Avoca, City	12/23/2009	12/23/2012	11-1-10 (draft)	On Schedule	Unchanged	$ 21,420.00	$ 3,570.00	$ 3,570.00	$ 28,560.00		$ -	$ 28,560.00	$ 286.00		$ 286.00
1768.6-P	Burnett County	5/7/2009	5/7/2012	07-01-10 (draft)	On Schedule	Unchanged	$ 22,500.00	$ 3,750.00	$ 3,750.00	$ 30,000.00	$ 16,166.67	$ 12,125.00	$ 13,833.33	$ 300.00	$ 200.00	$ 100.00
1768.5-P	Green County	5/7/2009	5/7/2012	09-01-10 (draft)	On Schedule	Unchanged	$ 6,953.00	$ 1,159.00	$ 1,159.00	$ 9,271.00	$ 4,966.29	$ 3,724.72	$ 4,304.71	$ 93.00	$ 51.31	$ 41.69
1768.2-P	Green Lake County	3/24/2009	3/24/2012	9-24-10 (draft)	On Schedule	Unchanged	$ 27,000.00	$ 4,500.00	$ 4,500.00	$ 36,000.00		$ -	$ 36,000.00	$ 270.00		$ 360.00
1768.25-P	Iowa County	11/16/2009	11/16/2012	2-16-12 (draft)	On Schedule	Unchanged	$ 36,270.00	$ 6,045.00	$ 6,045.00	$ 48,360.00		$ -	$ 48,360.00	$ 484.00		$ 484.00
1768.3-P	Juneau County	4/14/2009	4/14/2012	7-1-10 (draft)	On Schedule	Unchanged	$ 11,143.00	$ 1,857.00	$ 1,857.00	$ 14,857.00	$ 3,777.61	$ 2,833.21	$ 11,079.39	$ 149.00		$ 149.00
1768.1-P	Kenosha County	3/10/2009	3/10/2011	7-31-10 (draft)	On Schedule	Unchanged	$ 30,000.00	$ 5,000.00	$ 5,000.00	$ 40,000.00		$ -	$ 40,000.00	$ 400.00		$ 400.00
1768.28P	Milwaukee County	12/31/2009	12/31/2012	7-31-10 (draft)	On Schedule	Unchanged	$ 8,633.00	$ 1,439.00	$ 1,438.00	$ 11,510.00		$ -	$ 11,510.00	$ 115.00		$ 115.00
1768.4-P	Rock County	3/24/2009	3/24/2012	11/28/2010	On Schedule	Unchanged	$ 22,500.00	$ 3,750.00	$ 3,750.00	$ 30,000.00		$ -	$ 30,000.00	$ 300.00		$ 300.00
1768.20-P	Sauk County	9/14/2009	9/14/2012	5-31-10 (draft)	On Schedule	Unchanged	$ 14,434.00	$ 2,406.00	$ 2,405.00	$ 19,245.00	$ 7,621.74	$ 5,716.31	$ 11,623.25	$ 192.00	$ 133.36	$ 58.64
	LOCAL TOTALS						**$ 23,156,913.00**	**$ 3,859,487.00**	**$ 3,859,477.00**	**$ 30,875,877.00**	**$ 12,975,524.77**	**$ 9,731,643.78**	**$ 17,900,352.22**	**$ 285,549.06**	**$ 111,919.38**	**$ 173,719.68**
1768.7-M	State Management	5/20/2009	5/20/2014		On Schedule	Unchanged	$ 1,132,373.00		$ -	$ 1,132,373.00	$ 474,270.83	$ 474,270.83	$ 658,102.17			
1768	**GRAND TOTAL**						**$ 24,289,286.00**	**$ 3,859,487.00**	**$ 3,859,477.00**	**$ 32,008,250.00**	**$ 13,449,795.60**	**$ 10,205,914.61**	**$ 18,558,454.39**	**$ 285,549.06**	**$ 111,919.38**	**$ 173,719.68**

SAMPLE LETTER FOR PROJECT CLOSEOUT

Date

Chief, Hazard Mitigation Assistance Branch
Mitigation Division
Federal Emergency Management Agency
536 S. Clark Street, 6th Floor
Chicago, IL 60605

ATTENTION: Federal Hazard Mitigation Officer

Dear_____:

This is to request closeout of the following Hazard Mitigation Grant Program project under federal disaster declaration FEMA- -DR-WI:

Project Number Name of Project

Our records indicate that $ (project funds plus management coss) in federal funds has been disbursed to the subgrantee. In addition, $ was provided by the State (12.5%) with the subgrantee providing the remaining 12.5% match. All grant activities have been completed and documentation has been submitted to this office supporting the costs claimed.

If you have any questions, please feel free to call me at _____.

Sincerely,

State Hazard Mitigation Officer
Wisconsin Division of Emergency Management

WISCONSIN EMERGENCY MANAGEMENT
PROJECT CLOSE-OUT WORKSHEET

SUBGRANTEE:	**COUNTY:**
DECLARATION, PDM, FMA, RFS, SRL FY:	**PROJECT NO.:**
POINT OF CONTACT:	**PHONE:**

TOTAL HMGP/PDM/FMA/RFC/SRL FUNDS APPROVED:	**$**
FEDERAL:	**$**
STATE:	**$**
LOCAL:	**$**
MANAGEMENT COSTS:	**$**
OTHER:	**$**

Item #	Completed: (4)	Criteria:	Status / Date Completed:
1		Project Application	
2		Benefit-Cost Ratio	
3		Environmental Review *(National Environmental Policy Act)* *Signed Environmental Closeout Declaration*	
4		FEMA Approval / Obligation	
5		State Approval Letter	
6		Signed Assurances	
7		Signed State / Local HMGP Agreement	
8		Quarterly Reports	
9		Subgrantee Notified WEM of Project Completion	
10		Project Completed Within Approved Scope of Work	
11		12.5% Local Match Verified	
12		Overrun Documentation	
13		On-Site Project Inspection	
14		Environmental Closeout Declaration Signed/copies of permits provided	
15		Mitigation Plan Completed, Approved, and Adopted	
16		Final Payment Authorized and Issued *(including Subgrantee Administrative Allowance)*	

17		Bill For Collection *(if applicable)*	
18		WEM Notifies FEMA of Close-Out	
19		Deobligation (FEMA) (*if applicable)*	
21		Subgrantee Audit	
22		OPTIONAL Community Assistance Visit or Contact: Pre-Project Post-Project	
23		Other Issues	
COMMENTS:			

ACQUISITION PROJECTS

Item #	Completed: (4)	Criteria:	Status / Date Completed:
1		Final List of Properties Acquired	
2		Approved Relocation Plan	
3		Approved Acquisition Procedures	
4		Demolition Contracts Awarded and Underway	
5		Demolition Completed	
6		Total Parcels Acquired Improved Parcels Residential Commercial Vacant Parcels Development Rights Purchased	
7		Total Funds Expended on Acquisition *(incl. Relocation)* Improved Parcels Residential Commercial Vacant Parcels Development Rights Purchased	
8		Warranty Deeds with required restrictions	
9		GPS Coordinates Provided	
10		Pictures of acquired properties	
11		Form AW-501 completed (Required for flood insured structures.)	
COMMENTS:			

ELEVATION

Item #	Completed: (4)	Criteria:	Status / Date Completed:
1		Final List of Properties Elevated	
2		Case Files Complete *(WEM Floodproofing File Checklist Verified including permits, photos, elevation certificate, signed Property Owner's Acknowledgement of Conditions, proof of flood insurance, GPS coordinates, notice of flood insurance requirement on warranty)*	
3		Total Structures Floodproofed Commercial Residential	
4		Verification of Expenditures	
5		Total Funds Expended on Floodproofing *(including Relocation for Tenants)* Commercial Residential	
6		Form AW-501 completed (Required for flood insured structures. Completed in Squanet.)	
COMMENTS:			

CONSTRUCTION / OTHER PROJECTS

Item #	Completed: (4)	Criteria:	Status / Date Completed:
1		Bid Specifications and Bid Tabulation	
2		Contract Award	
3		Verification of Expenditures	
4		Total Funds Expended	
COMMENTS:			

REVIEWERS

SIGNATURE _____ **DATE** _____

State Hazard Mitigation Officer

SIGNATURE _____ **DATE** _____

FEMA Hazard Mitigation Specialist

WISCONSIN EMERGENCY MANAGEMENT
PLANNING CLOSE-OUT WORKSHEET

SUBGRANTEE:	**COUNTY:**
DECLARATION or FISCAL YEAR:	**GRANT NO.:**
POINT OF CONTACT:	**PHONE:**

TOTAL HMGP, PDM, OR FMA FUNDS APPROVED:	**$**
FEDERAL:	**$**
STATE:	**$**
LOCAL:	**$**
MANAGEMENT COSTS:	**$**
OTHER:	**$**

Item #	Completed: (4)	Criteria:	Status / Date Completed:
1		Project Application	
2		Environmental Review	
3		FEMA Approval / Obligation	
4		State Approval Letter	
5		Signed Assurances	
6		Signed State / Local HMGP Agreement	
7		Quarterly Reports	
8		Adopted Plan Approved by FEMA	
9		Subgrantee Notified WEM of Project Completion	
10		25% Local Match Verified	
11		Overrun Documentation	
12		Final Payment Authorized and Issued *(including Subgrantee Administrative Allowance)*	
13		Bill For Collection *(if applicable)*	
14		WEM Notifies FEMA of Close-Out	
15		Deobligation (FEMA) (*if applicable)*	
16		Subgrantee Audit *(if applicable*)	
17		Other Issues	

Page -2-

SUBGRANTEE:	**COUNTY:**
DECLARATION or FISCAL YEAR:	**GRANT NO.:**

COMMENTS:

REVIEWERS

SIGNATURE _____ **DATE** _____

State Hazard Mitigation Officer

SIGNATURE _____ **DATE** _____

FEMA Hazard Mitigation Specialist

WISCONSIN EMERGENCY MANAGEMENT
STATE MANAGEMENT CLOSE-OUT WORKSHEET
HAZARD MITIGATION GRANT PROGRAM

DECLARATION FEMA- -DR-WI	**DECLARED:**
COUNTIES: :	
POINT OF CONTACT:	**PHONE:**

HMGP ADMINISTRATIVE PLAN APPROVED **YES** ___X_____ **NO**_____

STANDARD ALL HAZARDS MITIGATION PLAN **YES** ___X_____ **NO**_____

ENHANCED ALL HAZARDS MITIGATION PLAN **YES** ___X____ **NO**_____

TOTAL HMGP FUNDS:	**OBLIGATED**	**EXPENDED**	**DEOBLIGATE**
	$		
FEDERAL FUNDS:	**$**		
STATE FUNDS:	**$**		

STATE MANAGEMENT COSTS

Item #	Completed: (4)	Criteria:	Status / Date Completed:
1		Time and attendance records held in State Files	
2		Salaries & benefits cost sheet verified & held in State Files	
3		Supplies and Equipment verified & complete forms	
4		Identify any federally owned property and complete form 20-18, Report of Government Property	
5		Identify any copyrights or patents awarded as a result of this grant	
6.		Closeout Request letter indicates amount of SMC funds were expended and How they were expended	
COMMENTS:			

REVIEWERS

SIGNATURE _____ **DATE** _____

State Hazard Mitigation Officer

SIGNATURE _____ **DATE** _____

FEMA Hazard Mitigation Specialist

SAMPLE LETTER FOR DECLARATION CLOSEOUT

Date

Chief, Hazard Mitigation Assistance Branch
Mitigation Division
Federal Emergency Management Agency
536 S. Clark Street, 6th Floor
Chicago, IL 60605

ATTENTION: Federal Hazard Mitigation Officer

Dear_____:

This is to request closeout of the Hazard Mitigation Grant Program under federal disaster declaration FEMA- -DR-WI.

(Number of projects) were approved for the (name municipalities), plus State Management Costs. All grant activities have been completed and documentation was submitted supporting the costs claimed.

Our records indicate the following funds were disbursed:

75% Federal Share	$
12.5% State Share	$
12.5% Local Share	$
Sub-Total	$
Grantee Management Costs	$
Subgrantee Management Costs	$
Sub-Total	$
TOTAL	$

Total federal funds disbursed for the declaration is $.

If you have any questions, please feel free to call me at _____.

Sincerely,

State Hazard Mitigation Officer
Wisconsin Division of Emergency Management

Cc: WEM Financial Specialist

WISCONSIN EMERGENCY MANAGEMENT
DECLARATION CLOSE-OUT WORKSHEET
HAZARD MITIGATION GRANT PROGRAM

DECLARATION FEMA -DR-WI	**DECLARED:**
COUNTIES:	
POINT OF CONTACT:	**PHONE:**

HMGP ADMINISTRATIVE PLAN APPROVED **YES** _____ **NO**_____

STANDARD ALL HAZARDS MITIGATION PLAN **YES** _____ **NO**_____

ENHANCED ALL HAZARDS MITIGATION PLAN **YES** _____ **NO**_____

TOTAL HMGP FUNDS:	**$**
FEDERAL:	**$**
STATE:	**$**
LOCAL:	**$**
MANAGEMENT COSTS:	**$**

Item #	Completed: (4)	Criteria:	Status / Date Completed:
1		Federal / State Agreement	
2		State Management Cost Narrative	
3		Project Application	
4		OMB Standard Form 424	
5		FEMA Obligation of Funds	
6		Quarterly Reports	
7		Quarterly Financial Status Reports	
8		State Notifies FEMA for Close-Out	
9		Final Financial Status Report FFR 425	
10		Other issues	
COMMENTS:			

STATE MANAGEMENT COSTS

Item #	Completed: (4)	Criteria:	Status / Date Completed:
1		State Management Cost Narrative	
2		Approval and Obligations along with Supplements: Dates Amounts	
COMMENTS:			

All projects under FEMA - _____ - DR - WI are completed and closed. WEM requests close-out of the Mitigation component of this disaster.

REVIEWERS

SIGNATURE _____ **DATE** _____

State Hazard Mitigation Officer

SIGNATURE _____ **DATE** _____

FEMA Hazard Mitigation Specialist

Date

Community

Dear :

The *Name of Community* received hazard mitigation assistance to acquire property that was susceptible to recurring damage. Per the State-Local Assistance Gant Agreement between the *Name of Community* and Wisconsin Emergency Management and per the warranty deed restrictions, property acquired must be maintained for open space, recreational, or wetlands practices in perpetuity. In addition to the open space land use restrictions, any new structure on the property other than a restroom must be open on all sides and functionally related to the open space use and be in compliance with federal and state floodplain management regulations and local floodplain ordinances.

The *Name of Community*is responsible for the continued maintenance of the acquired properties and for certifying that the property is maintained in accordance with the land use restrictions.

Applicable Regulations
44 CFR (Code of Federal Regulations) Part 80.19, Land Use and Oversight, apply as of December 3, 2007, to **all** property acquisitions funded through FEMA (Federal Emergency Management Agency) mitigation programs regardless of the date they were acquired (see attached.) Per 80.19(d), a report certifying that the properties continue to be maintained in perpetuity for uses compatible with open space practices consistent with the warranty deed restrictions needs to be submitted to this office every three years.

Certification Process
Properties have been acquired across the state by various communities and under different grants and at different times. In order to track the properties and to simplify the process, this office will send out a notice every three years to all communities that have completed property acquisitions. The notice will include a list of properties with the required certification. The certification will be required to be signed and returned to this office by July 1st. This office will send the required certification to FEMA, Region V.

Attached is a listing of properties in your jurisdiction that were acquired with FEMA mitigation funds. These properties are bound by the grant agreement and deed restrictions, and must comply with 44 CFR Part 80.19(d.) Please sign the certification form and return to this office no later than **July 1, 2010.**

If you have any questions, please contact me at 608-242-3211, or Joe Heinrich at 608-242-3216.

Sincerely,

ROXANNE K. GRAY
State Hazard Mitigation Officer
Wisconsin Emergency Management

Enclosures

cc Emergency Management Regional Director

44 CFR Part 80.19(d) - LAND USE AND OVERSIGHT CERTIFICATION

05/11

SUBGRANTEE:

Disaster Number/Program	Owner	Address	Tax ID

FEMA MODEL DEED RESTRICTIONS

Exhibit A is FEMA's Model Deed Restrictions that support 44 CFR Part 80 requirements. Applications requesting mitigation assistance to acquire properties for open space purposes must include a copy of the deed restriction language proposed to meet these requirements. The deed conveying the property to the locality must reference and incorporate Exhibit A (or equivalent name). Any variation from the model deed restriction can only be made with prior approval from FEMA's Office of Chief Counsel. Such requests should be made to the FEMA Regional Administrator through the relevant State or Tribal Office. Exhibit A shall be attached to the deed when recorded.

Exhibit A

In reference to the property or properties ("Property") conveyed by the Deed between [property owner] participating in the federally-assisted acquisition project ("the Grantor") and the [the local government], ("the Grantee"), its successors and assigns:

WHEREAS, The Robert T. Stafford Disaster Relief and Emergency Assistance Act, ("The Stafford Act"), 42 U.S.C. § 5121 et seq., identifies the use of Disaster Relief Funds under § 5170, **Hazard Mitigation Grant Program Section 404 ("HMGP")**, including the acquisition and relocation of structures in the floodplain;

WHEREAS, the mitigation grant program provides a process for a local government, through the State, to apply for federal funds for mitigation assistance to acquire interests in property, including the purchase of structures in the floodplain, to demolish and/or remove the structures, and to maintain the use of the Property as open space in perpetuity;

WHEREAS, [State or Tribe] has applied for and been awarded such funding from the Department of Homeland Security, Federal Emergency Management Agency ("FEMA"), and has entered into a mitigation grant program Grant Agreement dated [date] with FEMA and herein incorporated by reference; making it a mitigation grant program grantee.

WHEREAS, the Property is located in [Village/City/County], [Village/City/County] participates in the National Flood Insurance Program ("NFIP") and is in good standing with NFIP as of the date of the Deed;

WHEREAS, the [local government], acting by and through the [local government Board], has applied for and been awarded federal funds pursuant to an agreement with [State] dated [date] ("State-Local Agreement") and herein incorporated by reference, making it a mitigation grant program subgrantee;

WHEREAS, the terms of the mitigation grant program statutory authorities, Federal program requirements consistent with 44 C.F.R. Part 80, the Grant Agreement, and the State-local Agreement require that the Grantee agree to conditions that restrict the use of the land to open space in perpetuity in order to protect and preserve natural floodplain values;

NOW, therefore, the grant is made subject to the following terms and conditions:

1. Terms. Pursuant to the terms of the [select mitigation grant program] statutory authorities, Federal program requirements consistent with 44 C.F.R. Part 80, the Grant Agreement, and the State-local Agreement, the following conditions and restrictions shall apply in perpetuity to the Property described in the attached deed and acquired by the Grantee pursuant to FEMA program requirements concerning the acquisition of property for open space:
   a. Compatible uses. The Property shall be dedicated and maintained in perpetuity as open space for conservation of natural floodplain functions. Such uses may include: parks for outdoor recreational activities; wetlands management; nature reserves; cultivation; grazing; camping (except where adequate warning time is not available to allow evacuation); unimproved unpaved parking lots; buffer zones; and other uses consistent with FEMA guidance for open space acquisition, Hazard Mitigation Assistance, Requirements for Property Acquisition and Relocation for Open Space.
   b. Structures. No new structures or improvements shall be erected on the Property other than:
      i. A public facility that is open on all sides and functionally related to a designated open space or recreational use;
      ii. A public rest room; or
      iii. A structure that is compatible with open space and conserves the natural function of the floodplain, including the uses described in Paragraph 1.a., above, and approved by the FEMA Administrator in writing before construction of the structure begins.

      Any improvements on the property shall be in accordance with proper floodplain management policies and practices. Structures built on the Property according to paragraph b. of this section shall be floodproofed or elevated to at least the base flood level plus two foot of freeboard, or greater, if required by FEMA, or if required by any State, Tribal, or local ordinance, and in accordance with criteria established by the FEMA Administrator.
   c. Disaster Assistance and Flood Insurance. No federal entity or source may provide disaster assistance for any purpose with respect to the Property, nor may any application for such assistance be made by any Federal entity or source. The Property is not eligible for coverage under the NFIP for damage to structures on the property occurring after the date of the property settlement, except for pre-existing structures being relocated off the property as a result of the project.
   d. Transfer. The Grantee, including successors in interest, shall convey any interest in the Property only if the FEMA Regional Administrator, through the State, gives prior written approval of the transferee in accordance with this paragraph.

i. The request by the Grantee, through the State, to the FEMA Regional Administrator must include a signed statement from the proposed transferee that it acknowledges and agrees to be bound by the terms of this section, and documentation of its status as a qualified conservation organization if applicable.

ii. The Grantee may convey a property interest only to a public entity or to a qualified conservation organization. However, the Grantee may convey an easement or lease to a private individual or entity for purposes compatible with the uses described in paragraph (a), of this section, with the prior approval of the FEMA Regional Administrator, and so long as the conveyance does not include authority to control and enforce the terms and conditions of this section.

iii. If title to the Property is transferred to a public entity other than one with a conservation mission, it must be conveyed subject to a Conservation Easement that shall be recorded with the deed and shall incorporate all terms and conditions set forth in this section, including the easement holder's responsibility to enforce the easement. This shall be accomplished by one of the following means:

a. The Grantee shall convey, in accordance with this paragraph, a conservation easement to an entity other than the title holder, which shall be recorded with the deed, or

b. At the time of title transfer, the Grantee shall retain such conservation easement, and record it with the deed.

iv. Conveyance of any property interest must reference and incorporate the original deed restrictions providing notice of the conditions in this section and must incorporate a provision for the property interest to revert to the State, Tribe, or local government in the event that the transferee ceases to exist or loses it eligible status under this section.

2. Inspection. FEMA, its representatives, and assigns, including the State or Tribe shall have the right to enter upon the Property, at reasonable times and with reasonable notice, for the purpose of inspecting the Property to ensure compliance with the terms of this part, the Property conveyance and of the grant award.

3. Monitoring and Reporting. Every three years on [Date], the Grantee (mitigation grant program grantee), in coordination with any current successor in interest, shall submit through the State to the FEMA Regional Administrator a report certifying that the Grantee has inspected the Property within the month preceding the report, and that the Property continues to be maintained consistent with the provisions of

44 CFR Part 80, the property conveyance, and the grant award.

4. Enforcement. The Grantee (mitigation grant program subgrantee), the State, FEMA, and their respective representatives, successors and assigns, are responsible for taking measures to bring the Property back into compliance if the Property is not maintained according to the terms of 44 CFR Part 80, the property conveyance, and the grant award. The relative rights and responsibilities of FEMA, the State, the Grantee, and subsequent holders of the property interest at the time of enforcement, shall include the following:

   a. The State will notify the Grantee and any current holder of the property interest in writing and advise them that they have 60 days to correct the violation.
      i. If the Grantee or any current holder of the property interest fails to demonstrate a good faith effort to come into compliance with the terms of the grant within the 60-day period, the State shall enforce the terms of the grant by taking any measures it deems appropriate, including but not limited to bringing an action of law or in equity in a court of competent jurisdiction.

      ii. FEMA, its representatives, and assignees may enforce the terms of the grant by taking any measures, it deems appropriate, including but not limited to 1 or more of the following:

         a) Withholding FEMA mitigation awards or assistance from the State or Tribe, and Grantee; and current holder of the property interest.

         b) Requiring transfer of title. The Grantee or the current holder of the property interest shall bear the costs of brining the Property back into compliance with the terms of the grant; or

         c) Bringing an action at law or in equity in a court of competent jurisdiction against any or all of the following parties; the State, the Tribe, the local community, and their respective successors.

5. Amendment. This agreement may be amended upon signatures of FEMA, the State, and the Grantee only to the extent that such amendment does not affect the fundamental and statutory purposes underlying the agreement.

6. Severability. Should any provision of this grant or the application thereof to any person or circumstance be found to be invalid or unenforceable, the rest and remainder of the provisions of this grant and their application shall not be affected and shall remain valid and enforceable.

[Signed by Grantor(s) and Grantee, witnesses and notarization in accordance with local law.]

Grantor's Signature _____

Date _____

Name (printed or typed) _____

Grantee's Signature _____

Date _____

Grantee's Name _____

Grantee's Title _____

Date

Mitigation Division Director
Federal Emergency Management Agency
Region V
536 S. Clark Street, 6th Floor
Chicago, IL 60605

SUBJECT: Hazard Mitigation State Management Costs
FEMA-____-DR-WI

Dear Mr./Ms. _____:

Pursuant to 44 CFR 207.7(d), the State of Wisconsin hereby requests the approval and obligation of State Management Costs for administration and management of the Hazard Mitigation Grant Program (HMGP), under the following conditions:

1. The HMGP will be operated by the State for the above disaster in accordance with the State Administrative Plan dated _____ and approved _____.

2. State Management Costs will be funded 100% federal funds committed through the Division of Emergency Management.

3. Actual approved Management Costs are requested for administering the HMGP in the amount of $_____ (100%) in accordance with the enclosed State Management Cost Plan for FEMA-____-DR-WI.

4. The State Management Cost Plan Narrative provides for pass through management costs for the subgrantees at 1% of their total eligible project. If justified and funds area available, subgrantees may apply for additional management costs.

Please advise _____, State Hazard Mitigation Officer at (608) 242-3211 upon approval and obligation of these funds.

Sincerely,

State Coordinating Officer
Wisconsin Emergency Management

Enclosures

cc: SHMO
WEM Administrative Officer
Mitigation Specialist, FEMA Region V

HAZARD MITIGATION GRANT PROGRAM
STATE MANAGEMENT COST PLAN NARRATIVE
FEMA-____DR-WI
WISCONSIN

The purpose of this narrative is to document the Sate of Wisconsin's request for its State Management Cost Grant allowed under 44 CFR 207 for the Hazard Mitigation Grant Program for the _____ disaster, FEMA-____-DR. This request is designed to meet the documentation requirements of 44 CFR 207.7(d), Request Documentation.

This narrative describes the disaster event; the activities, personnel requirement and other costs for which the State (grantee) will use management cost funding; the pass-through funding the state will make available to subgrantees for their HMGP management costs; and the state's plan for monitoring HMGP management expenditures.

THE DISASTER

Description of the disaster is provided here.

The FEMA 30-day estimate for the federal HMGP award for this disaster is _____. Based on these figures, the current estimate of the HMGP Management Grant for this disaster is $_____.

HMGP GRANTEE MANAGEMENT ACTIVITIES

The State's Management of the ____-DR Hazard Mitigation Grant Program is fully described in the *State of Wisconsin Administrative Plan for the Hazard Mitigation Grant Program* dated September 2010.

The State's Hazard Mitigation staff consists of the following positions at Wisconsin Emergency Management: State Hazard Mitigation Officer, Assistant State Hazard Mitigation Officer, Response and Recovery Planner, and Hazard Mitigation Specialist. Additional Hazard Mitigation Specialist will be hired as needed to administer the declaration. Position descriptions for the various positions are attached.

The State Hazard Mitigation Officer serves as the Alternate GAR and is responsible for management and administration of the HMGP for this declaration. In addition, the SHMO leads the Wisconsin Hazard Mitigation Team. The Mitigation staff will assist the SHMO in the management and administration of the HMGP.

The ____-DR HMGP is managed simultaneously with the HMGP for the following open disasters _____. The State anticipates the HMGP for the open disasters will run concurrently through _____. The SHMO has the overall responsibility for management and administering the HMGP for the various disasters. In the event of

multiple disasters, other staff may be reassigned to assist in administering the program, or temporary hires may be used. Mitigation staff document time spent in working on disasters using time sheets. When multiple disasters are involved, Mitigation staff document hours worked on each disaster by identifying those hours by declaration number on the time sheets. The time is then charged to State Management Costs for the appropriate declaration.

The narrative that follows provides a synopsis of the grantee activities for the ____-DR HMGP to be funded by the management grant.

Project and Application Development and Review Process

The State received ___ pre-applications from subgrantees for project activities totaling $_____. Upon completion of review, ranking and scoring of the pre-applications, and based on State priorities and funding availability, formal applications were sent to __ subgrantees for further funding consideration. The application deadline for the formal applications is _____. Planning grant applications were made available with a _____ deadline. The State received __ planning grant applications.

In addition, State Mitigation Staff coordinates with members of the Wisconsin Hazard Mitigation Team to identify potential funding projects as well as package funding where possible.

State staff is available to provide technical assistance on an individual basis upon request of potential applicants; this may include visits to sites of potential mitigation projects. The goal of these activities is to help potential applicants improve the quality of their projects and grant applications, thereby increasing their chance of obtaining funding.

The State will provide training as needed. This could include Project Development, Planning, Buyout, and Benefit-Costs Analysis, or other workshops as required. This training will assist the subgrantees in developing viable project applications that will meet state and federal criteria.

Application Review

State staff reviews applications after submission to determine whether they are complete and the projects are cost-effective and environmentally sound. Application reviews may include site visits and completion of benefit-cost analyses. State staff will forward consultation letters to state and federal agencies to meet the NEPA requirements and prepare the Record of Environmental Consideration. Based on funding availability and State priorities, recommendations for funding are shared with the Wisconsin Hazard Mitigation Team and the Wisconsin Emergency Management Administrator. State mitigation staff assembles the required documentation and submits project and planning grant subapplications to FEMA for environmental and historic

preservation reviews and final approval. Throughout this process, state staff communicates with applicants regarding the status of their applications.

Project Implementation and Closeout

Project implementation begins at grant award with the development of the State-Local HMGP Assistance Agreement with subgrantees. Progress on projects is monitored by State staff through reviewing quarterly reports, processing requests for reimbursements for work completed, maintaining regular communications, and conducting site visits. Staff provides technical assistance on an as-needed basis to subgrantees. Mitigation staff prepares State quarterly reports to be submitted to FEMA, and provides other documentation as required by grant award documents and program requirements. Upon completion of the project, Mitigation Staff will conduct a final inspection on the project and prepares grant closeout documents per the State Administrative Plan. Upon completion and closeout of all projects, the staff prepares a HMGP declaration closeout report. The Financial Management Officer prepares the required financial closeout reports. Final inspections are completed to ensure that he project is implemented according to the scope of work in the approved project applications and per the grant agreement. For local mitigation planning grants, staff provide technical assistance, review and comment on draft plans, and submit final plans to FEMA for review and approval. In addition, Mitigation Staff conduct a planning workshop once a year.

SUBGRANTEE PASS-THROUGH

As described in the *State of Wisconsin Administrative Plan for the HMGP*, the state may pass-through to subgrantees management costs for costs associated with administration of the approved HMGP subgrant. Costs will include those incurred for requesting, obtaining, and administering the grant. This includes costs for submitting quarterly reports, preparing requests for reimbursements, conducting inspections, completing closeout documents, and any required audits. Subgrantee management costs are based on 1% (one percent) of the final net eligible costs in the FEMA approved HMGP grant. Additional funds may be requested in extraordinary situations with adequate documentation and if management cost funds are available. The Mitigation staff will track funds expended for subgrantee management costs for each subgrantee on its disbursement spreadsheet as well as cumulatively for all subgrantees for the disaster.

Based on the 30-day HMGP estimate, $_____ will be reserved for subgrantee pass-through to reimburse them for grant management costs at project/plan closeout.

MONITORING MANAGEMENT COST EXPENDITURES

The State will monitor management cost expenditures as outlined in the following sections of the *State of Wisconsin Administrative Plan for the HMGP*: Section IX-Program Administration, G-Project Management. The State will track management cost expenditures of each subgrantee as well as its own. Subgrantee management

expenditures will be monitored through quarterly and final reports, as well as final request for reimbursement. Subgrantees will be required to maintain documentation on all subgrantee management costs, but are not required to provide the documentation to the State.

MANAGEMENT COSTS

The State is Requesting Management Costs in the amount of $_____. Attached is a State Management Cost budget worksheet with supporting documentation to support the costs requested.

AUDITS

The Financial Management Officer reviews local government audits for program compliance and reports any problems to the SHMO and FEMA. The FMO will take appropriate action within six months if there is non-compliance.

APPLICATION ON BEHALF OF STATE:

_____ _____

Administrator Date
State Coordinating Officer

HAZARD MITIGATION-STATE MANAGEMENT COSTS
FEMA-____-DR-WI Project Cost Through XXXX

Hazard Mitigation Officer

	Year	Year	Year	Year
Salary	$	$	$	$
Fringe	$	$	$	$
Indirect	$	$	$	$
Total	$	$	$	$

(Assumes XXX, XXX, XXX hours respectively, and X% and X% increases in XXXX and XXXX)

Assistant Mitigation Officer

	Year	Year	Year	Year
Salary	$	$	$	$
Fringe	$	$	$	$
Indirect	$	$	$	$
Total	$	$	$	$

(Assumes XXX, XXX, XXX hours respectively, and X% and X% increases in XXXX and XXXX)

Response and Recovery Planner

	Year	Year	Year	Year
Salary	$	$	$	$
Fringe	$	$	$	$
Indirect	$	$	$	$
Total	$	$	$	$

(Assumes XXX, XXX, XXX hours respectively, and X% and X% increases in XXXX and XXXX)

Mitigation Specialist

	Year	Year	Year	Year
Salary	$	$	$	$
Fringe	$	$	$	$
Indirect	$	$	$	$
Total	$	$	$	$

Mitigation Specialist

	Year	Year	Year	Year
Salary	$	$	$	$
Fringe	$	$	$	$
Indirect	$	$	$	$
Total	$	$	$	$

REVIEW APPRAISER

	Year	Year	Year	Year
Private Sector	$	$	$	$

(Assume XXX appraisals at $XXX per appraisal)

EQUIPMENT & SUPPLIES

	Year	Year	Year	Year
	$	$	$	$

TRAVEL AND PER DIEM

	Year	Year	Year	Year
	$	$	$	$

ESTIMATED SUBGRANTEE MANAGEMENT COSTS

	Year	Year	Year	Year
	$	$	$	$

TOTAL STATE MANAGEMENT COSTS

	Year	Year	Year	Year
	$	$	$	$

TOTAL STATE MANAGEMENT COSTS $

TASKS ASSIGNMENTS AND ACTIVITIES
HAZARD MITIGATIN GRANT PROGRAM
STATE HAZARD MITIGATION OFFICER

This position is responsible for the day-to-day management and administration of the Section 404-Hazard Mitigation Grant Program (HMGP) made available as a result of Presidential Disaster Declaration FEMA-____-DR-WI

Duties will include the following:

1. Work with FEMA Mitigation staff in the Disaster Field Office following the disaster declaration.

2. Assist FEMA in the development of the hazard mitigation early implementation strategy report, and update as required.

3. Attend the applicants briefing for the Public Assistance Program and provide information on mitigation and the 404-HMGP.

4. Conduct briefings and meetings with potential applicants on the HMGP.

5. Solicit, accept and review pre-applications from municipalities interested in applying for hazard mitigation assistance.

6. Assist communities in completing formal applications for HMGP and provide technical assistance that may be required.

7. Prepare and submit the State's application for Section 404-HMGP funding for submission to FEMA through NEMIS.

8. Assist communities in implementing approved projects. Monitor subgrantee compliance with Section 404-HMGP requirements.

9. Monitor subgrantee progress in meeting project goals.

10. Coordinate with the Federal and State Public Assistance Officers on hazard mitigation projects that interface with the Public Assistance Program.

11. Answer written and oral inquiries regarding the 404-HMGP, attend and conduct meetings pertaining to HMGP, and coordinate with FEMA Region V staff on 404 issues requiring clarification, etc.

12. Update the 404-HMGP Administrative Plan as required.

13. Develop state guidance in administering the 404-HMGP, and issue to subgrantees.

14. Responsible for providing technical assistance and support to the Wisconsin Hazard Mitigation Team (WHMT).

15. Develop agendas and conduct the WHMT meetings.

16. Coordinate with members of the WHMT to facilitate their processing of applications and providing of assistance to municipalities.

17. Identify and coordinate with other federal and state agencies for funding of mitigation projects.

18. Coordinate with public Information staff on the development of press releases regarding mitigation activities.

19. Other disaster related assignments as directed by the State Coordinating Officer.

TASK ASSIGNMENTS AND ACTIVITIES
HAZARD MITIGATION GRANT PROGRAM
ASSISTANT STATE HAZARD MITIGATION OFFICER

This position will function under the supervision of the State Hazard Mitigation Officer (SHMO), and will assist in implementing the Section 404-Hazard Mitigation Grant Program (HMGP) made available as a result of Presidential Declaration FEMA-____-DR-WI.

Duties will include assisting the SHMO in the following:

1. Attend and participate in briefings and workshops for potential HMGP applicants.

2. Solicit and accept pre-applications from municipalities interested in applying for HMGP assistance.

3. Review pre-applications and at direction of SHMO, send formal applications to municipalities eligible for HMGP funding.

4. Assist communities as required in completing formal applications in funding.

5. Assist in preparing the state's application for HMGP funding for submission to FEMA including the environmental review for CATEX projects.

6. After funding is approved, assist communities as required in implementing approved projects. Monitor subgrantee compliance with Section 404-HMGP requirements, including time extensions and closeouts after projects are completed.

7. Issue payments to subgrantees based on completed work and monitor subgrantees progress in meeting project goals.

8. Coordinate with the Public Assistance Officer on hazard mitigation projects that interface with the Public Assistance Program under section 406.

9. Answer oral and written inquiries relating to the HMGP.

10. Attend meetings as required.

11. Compose correspondence to FEMA Region V, to obtain clarification of issues relating to 404 funding.

12. Assist in the development of state guidance in administering the 404-HMGP.

Assist the SHMO in conducting WHMT meetings by developing agendas, handout materials, and other information.

14. Attend and participate in WHMT meetings.

15. Coordinate with other federal and state agency WHMT members to facilitate their processing of applications and providing assistance to municipalities.

TASK ASSIGNMENTS AND ACTIVITIES
HAZARD MITIGATION GRANT PROGRAM
RESPONSE AND RECOVERY PLANNER

This position will function under the supervision of the State Hazard Mitigation Officer (SHMO), and will assist in implementing the Section 404-Hazard Mitigation Grant Program (HMGP) made available as a result of Presidential Declaration FEMA-____-DR-WI.

Duties will include assisting the SHMO in the following:

1. Attend and participate in briefings and workshops for potential HMGP applicants.

2. Solicit and accept pre-applications from municipalities interested in applying for HMGP assistance.

3. Review pre-applications and at direction of SHMO, send formal applications to municipalities eligible for HMGP funding.

4. Assist communities as required in completing formal applications in funding.

5. Assist in preparing the state's application for HMGP funding for submission to FEMA including the environmental review for CATEX projects.

6. After funding is approved, assist communities as required in implementing approved projects. Monitor subgrantee compliance with Section 404-HMGP requirements, including time extensions and closeouts after projects are completed.

7. Issue payments to subgrantees based on completed work and monitor subgrantees progress in meeting project goals.

8. Coordinate with the Public Assistance Officer on hazard mitigation projects that interface with the Public Assistance Program under section 406.

9. Answer oral and written inquiries relating to the HMGP.

10. Attend meetings as required.

11. Compose correspondence to FEMA Region V, to obtain clarification of issues relating to 404 funding.

12. Assist in the development of state guidance in administering the 404-HMGP.

13. Assist the SHMO in conducting WHMT meetings by developing agendas, handout materials, and other information.

14. Attend and participate in WHMT meetings.

15. Coordinate with other federal and state agency WHMT members to facilitate their processing of applications and providing assistance to municipalities.

TASK ASSIGNMENT AND ACTIVITIES
HAZARD MITIGATION GRANT PROGRAM
MITIGATION SPECIALIST (Permanent and Temporary Hire)

This position will provide support to Mitigation staff administering the Hazard Mitigation Grant Program made available as a result of Presidential Disaster Declaration FEMA-____-DR-WI.

Duties will include the following:

1. Solicit and accept pre-applications from municipalities interested in applying for HMGP assistance.

2. Review pre-applications and at direction of SHMO, send formal applications to municipalities eligible for HMGP funding.

3. Assist communities as required in completing formal applications in funding.

4. Perform benefit-cost analysis and environmental reviews on potential projects.

5. Assist in preparing the state's application for HMGP funding for submission to FEMA.

6. Answer oral and written inquiries relating to the HMGP.

7. Attend meetings as required.

8. Compose correspondence to FEMA Region V, to obtain clarification of issues relating to 404 funding.

9. Assist the SHMO in conducting WHMT meetings by developing agendas, handout materials, and other information.

10. Attend and participate in WHMT meetings.

11. Coordinate with other federal and state agency WHMT members to facilitate their processing of applications and providing assistance to municipalities.

APPENDIX G: RURAL ELECTRIC COOPERATIVE ANNEX

CHAPTER G.1: PLANNING AREA DESCRIPTION

Rural Electric Cooperatives are integral to the State of Wisconsin and its communities. It is imperative to mitigate damages to Rural Electric Cooperative infrastructure. This annex ensures that participating Rural Electric Cooperatives may apply for hazard mitigation funds to prevent loss of function and damage in rural Wisconsin.

G.1.1 INTRODUCTION

Rural Electric Cooperatives (RECs) are private, independent electric utilities, owned by the members they serve in rural America. Electric cooperatives operate much like a food cooperative or a credit union, where each organization is an independent utility owned by its customers. As democratically governed businesses, electric cooperatives are organized under the Cooperative or Rochdale Principles, affixing them in the communities they serve and ensuring close regulation by their customers. Utility rates are determined independently through a board elected by members of the cooperative. If annual revenues exceed costs, members may receive a pro-rated credit, which is distributed on a revolving schedule. Nationally, investor-owned utilities maintain about half of all electric distribution lines, publicly owned utilities maintain about 7 percent, and cooperatives maintain the remaining 43 percent.

Electric cooperatives are currently the only utilities in the country that rely on government and other loans to finance capital construction. Unlike municipal or investor owned utilities, they do not receive tax-exempt financing or revenue bonds nor do their rates, inclusive of debit obligations and other expenses, guarantee a specific rate of return on capital investments. Cooperatives repay loans monthly with interest.

G.1.2 HISTORY

Electric cooperatives across the nation emerged from the creation of the Rural Electrification Administration (REA), a Depression-era agency created in 1935. The REA administered an unemployment relief program that transformed into a low-interest government loan program with the mission of electrifying rural America. The REA was created with an expectation that investor-owned utilities would take advantage of the federal low-interest loans to expand their infrastructure to rural America. However, it was largely ordinary people coming together to form non-profit, member-owned and controlled cooperative utilities. The first electric cooperative in Wisconsin energized its system in the spring of 1937 and the last cooperative energized its system in 1945. Today, there are 25 electric cooperatives in Wisconsin that generate, transmit and distribute electric power.

G.1.3 WISCONSIN COOPERATIVES

The demographics of Wisconsin's electric cooperative service territories are significantly different from the state's investor-owned and municipal utilities due to their rural origins. In Wisconsin, electric cooperatives have far fewer services (customers) per mile of electric line, and proportionally have more line miles and larger service areas than nearly all other utilities operating in the state. Wisconsin's electric cooperatives collectively serve more than 267,000 consumers; maintain more than 49,000 miles of power lines, and have a line density of 5.8 customers per mile of line (excluding transmission)[1].

Due to the demographics of electric cooperative service territories, cooperative power infrastructure crosses vast geographies and is potentially susceptible to many natural disaster events conceivable for Wisconsin. To provide power to many of Wisconsin's rural residents and some smaller cities and villages, cooperative infrastructure crosses through national, state, local, and privately owned forests; the state's driftless area; agricultural lands; and on rare occasions, into our waterways to provide power to islands and other isolated areas.

G.1.4 PLAN PARTICIPANTS

Thirteen of the 25 Wisconsin Rural Electric Cooperatives have agreed to participate in the REC Hazard Mitigation Plan Annex. The following Table G.1.4-1 lists the participating cooperative, the counties in which they operate, the miles of distribution line and the number of services. Figure G.1.4-1 demonstrates the complexity of electrification in the State of Wisconsin.

TABLE G.1.4-1 RURAL ELECTRIC COOPERATIVE ANNEX PARTICIPANTS

Cooperative Name	Counties with Services	Miles of Distribution Line	Number of Services
Adams-Columbia Electric Cooperative	Adams	5,286	36,891
	Columbia		
	Dane		
	Dodge		
	Green Lake		
	Jefferson		
	Marquette		
	Portage		
	Sauk		
	Waupaca		
	Waushara		
	Wood		

[1] Wisconsin Electric Cooperative Association, *WECA Member Demographics*, 2008.

TABLE G.1.4-1 RURAL ELECTRIC COOPERATIVE ANNEX PARTICIPANTS			
Cooperative Name	**Counties with Services**	**Miles of Distribution Line**	**Number of Services**
Barron Electric Cooperative	Barron	3,068	17,749
	Washburn		
	Burnett		
	Chippewa		
	Dunn		
	Polk		
	Rusk		
	Sawyer		
Central Wisconsin Electric Cooperative	Waupaca	1,406	7,137
	Shawano		
	Marathon		
	Portage		
Clark Electric Cooperative	Clark	1,968	8,852
	Taylor		
	Marathon		
	Jackson		
	Wood		
	Chippewa		
East Central Energy	Burnett	996	4,941
	Douglas		
	Washburn		
Eau Claire Energy Cooperative	Eau Claire	1,617	10,347
	Chippewa		
	Dunn		
	Pepin		
	Buffalo		
	Trempealeau		
	Jackson		
Jackson Electric Cooperative	Jackson	1,409	6,137
	Monroe		
	La Crosse		
	Clark		
	Trempealeau		
	Eau Claire		
Jump River Electric Cooperative	Rusk	1,707	9,125
	Sawyer		
	Taylor		
	Chippewa		
	Barron		
	Price		

TABLE G.1.4-1 RURAL ELECTRIC COOPERATIVE ANNEX PARTICIPANTS			
Cooperative Name	**Counties with Services**	**Miles of Distribution Line**	**Number of Services**
Oakdale Electric Cooperative	Monroe	2,661	15,918
	Juneau		
	Jackson		
	Sauk		
	Wood		
Pierce Pepin Cooperative Services	Pierce	1,204	6,857
	Pepin		
	St. Croix		
	Buffalo		
Richland Electric Cooperative	Richland	957	3,276
	Crawford		
	Vernon		
	Sauk		
Riverland Energy Cooperative	Trempealeau	3,218	14,394
	Buffalo		
	La Crosse		
	Eau Claire		
	Pepin		
	Jackson		
Scenic Rivers Energy Cooperative	Grant	3,432	11,233
	Lafayette		
	Crawford		
	Green		
	Richland		
	Vernon		
	Iowa		

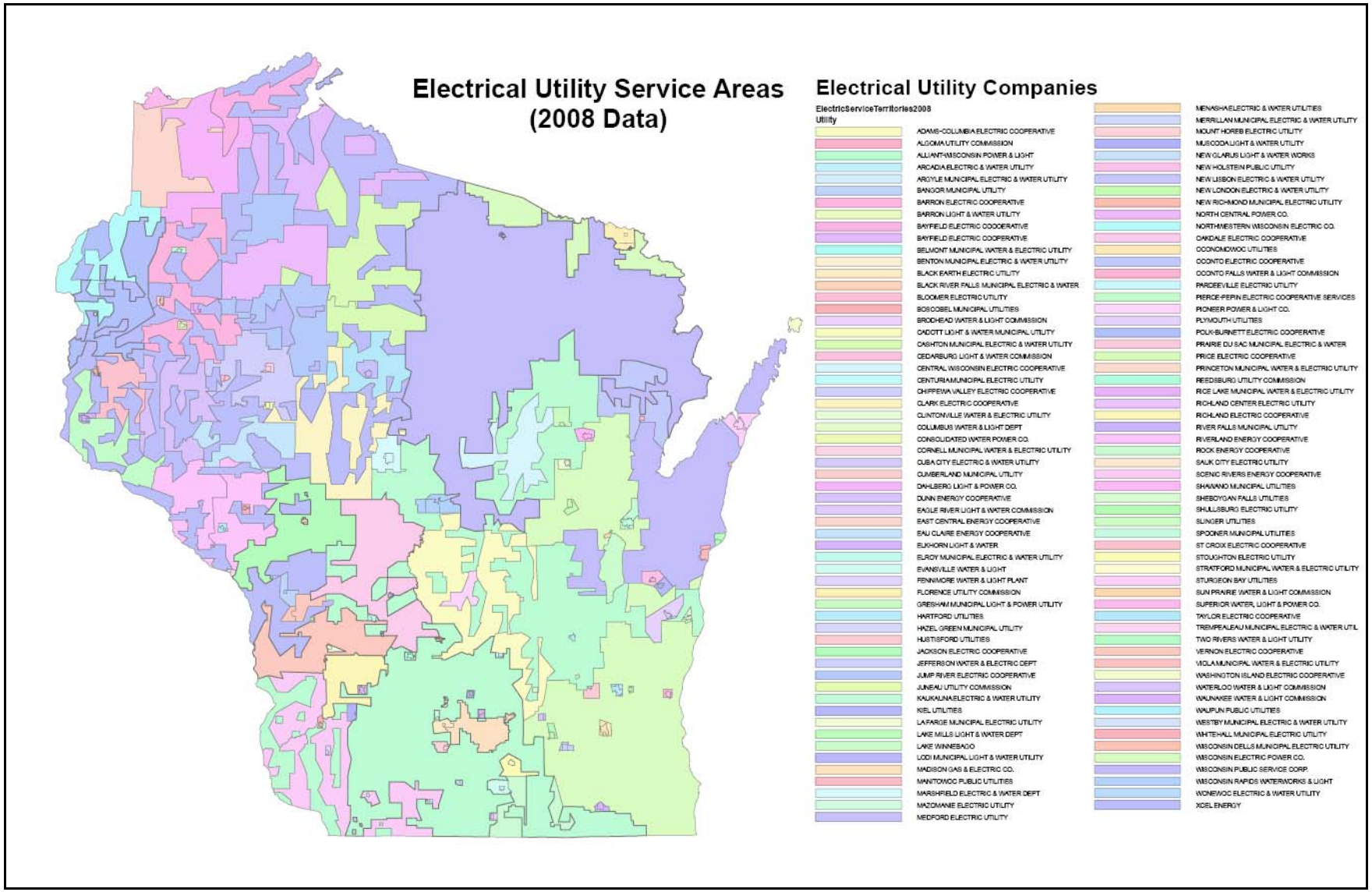

Figure G.1.4-1 Electrification in the State of Wisconsin
Source: WECA, 2009.

CHAPTER G.2: PLANNING PROCESS

G.2.1 PLAN DEVELOPMENT

The development of this plan was initiated by Wisconsin Emergency Management and the Cooperative Network. This annex is needed for many reasons which include:

- Rural Electric Cooperatives are allowed to apply for FEMA's Pre-Disaster Mitigation (PDM) Grant Program and Hazard Mitigation Grant Program (HMGP) as subapplicants with an approved Rural Electric Cooperative Annex to the State of Wisconsin Hazard Mitigation Plan.
- By establishing a formal hazard mitigation planning process for electric cooperatives, an emphasis is made on reducing the impact of natural disaster.
- Development of a hazard mitigation plan annex allow for RECs to develop a plan, even though the cooperative may be in a county that does not have a plan or is in the process of developing a county hazard mitigation plan.

The State of Wisconsin has been very active in mitigation planning over the last decade. Figure G.2.1-1, on the following page, identifies those counties and single jurisdictions hazard mitigation planning status in the State of Wisconsin. In comparing the maps in Figure G.1.4-1 (Electrification in the State of Wisconsin) and Figure G.2.1-1 (Hazard Mitigation Planning in the State of Wisconsin), it is easy to see that a Rural Electric Cooperative Hazard Mitigation Annex helps simplify the political jurisdiction complexities by focusing on the mitigation needs of the Rural Electric Cooperatives.

Initial discussions of development of an electric cooperative annex to the State of Wisconsin's Hazard Mitigation Plan began in late 2007. Several electric cooperatives in the State had been recipients of hazard mitigation funding. With the enactment of the of the Disaster Mitigation Act of 2000, future funding of cooperative hazard mitigation projects would be contingent upon the inclusion of these projects in an all-hazards mitigation plan. Wisconsin Emergency Management approached Cooperative Network (at that time Wisconsin Federation of Cooperatives) to gage the interest of the state's electric cooperatives in developing an electric cooperative annex to the State of Wisconsin Hazard Mitigation Plan.

Thirteen of the state's electric cooperatives have entered into a Memorandum of Understanding with Wisconsin Emergency Management that included the following:

- Joint development of an electric cooperative annex for the inclusion in the State of Wisconsin's Hazard Mitigation Plan

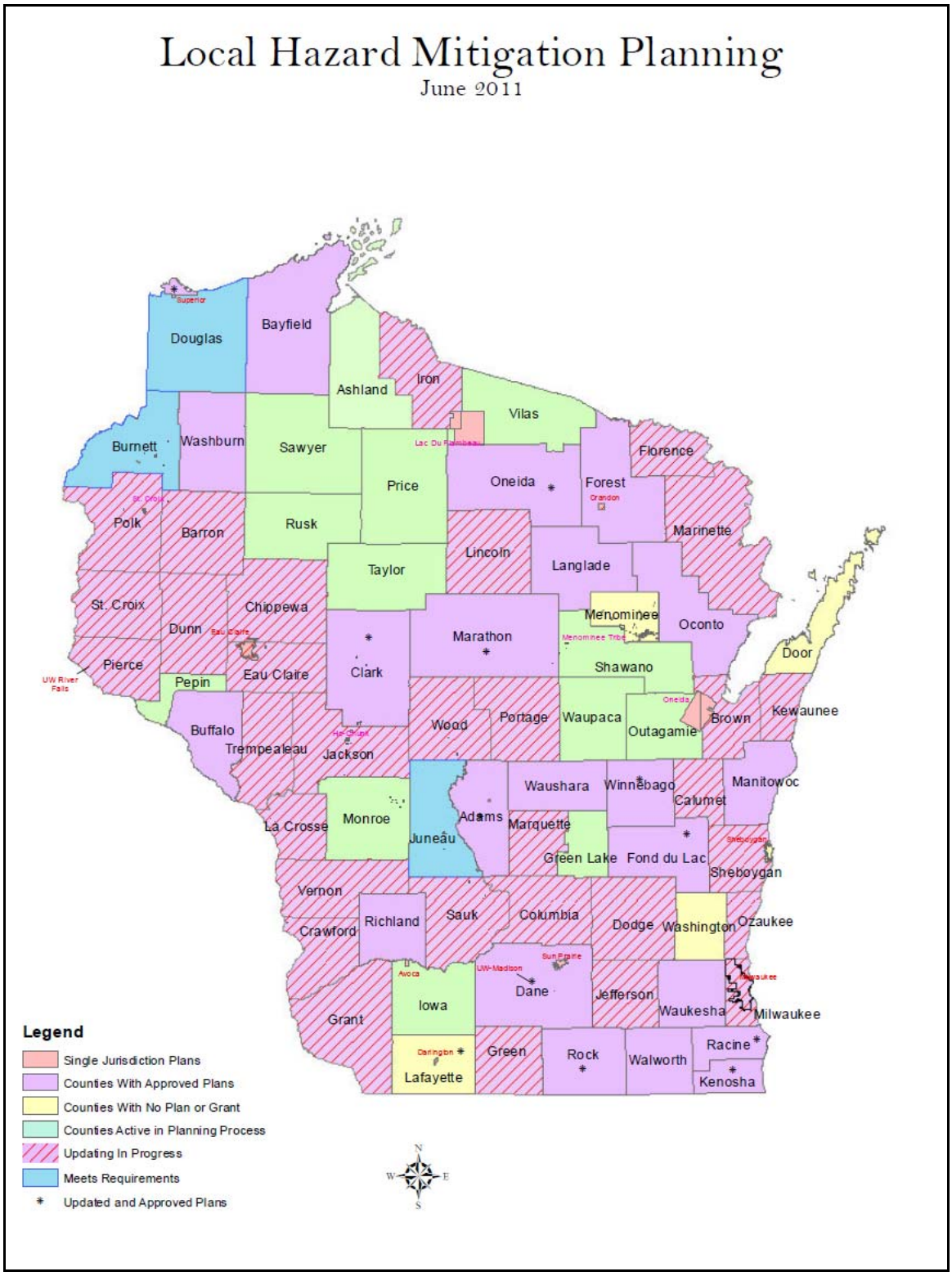

Figure G.2.1-1 Hazard Mitigation Planning in the State of Wisconsin
Source: WEM, 2011.

- Identification of natural hazards that have the potential of affecting an electric cooperative's infrastructure
- Conducting an assessment of vulnerabilities of the infrastructure to these hazards and mitigation measures to reduce these vulnerabilities
- Active participation in the periodic review, evaluation, and update of the electric cooperative annex.

Appendix A includes a copy of the Memorandum of Understanding between Wisconsin Electric Cooperative Association (WECA) and Wisconsin Emergency Management (WEM).

G.2.2 DISASTER MITIGATION ACT OF 2000

The development of an electric cooperative annex to the State of Wisconsin Hazard Mitigation is in response to the passage of the Disaster Mitigation Act of 2000 (DMA2K), which was signed into law by the U.S. Congress on October 30, 2000. The goal of the legislation includes reducing losses and future public and private expenditures, and improving response and recovery from disasters. Public Law 106-390 amended the Robert T. Stafford Relief and Emergency Assistance Act. The Act requires that local governments, tribal organizations, and states prepare an all-hazard mitigation plan in order to be eligible for funding from the FEMA Pre-Disaster Mitigation (PDM) Assistance Program, Hazard Mitigation Grant Program (HMGP), Flood Mitigation Assistance (FMA) Grant Program and the Severe Repetitive Loss (SRL) Grant Program. Subapplicants, such as electric cooperatives, are only eligible for funding provided their projects are included in a local or state all-hazards mitigation plan approved by the Federal Emergency Management Agency. The Act requires that natural hazards, such as flooding or severe weather, be addressed in the risk assessment and vulnerability analysis sections of the all-hazard mitigation plan.

G.2.3 BENEFITS OF HAZARD MITIGATION PLANNING

Hazard mitigation planning serves as a useful tool for electric cooperatives, county emergency management offices, and Wisconsin Emergency Management to develop consensus around a plan of action to reduce or eliminate the long-term risk to human life and property from natural hazards.

Specifically, the development of this plan is intended to:

- Increase awareness of risks and utility infrastructure vulnerabilities to natural hazards.
- Establish hazard mitigation goals.
- Identify strategies to help implement mitigation measures.

- Establish priorities for the use of cooperative and public resources to mitigate hazards.
- Enable cooperative, as subapplicants, to seek hazard mitigation funding from the Federal Emergency Management Agency.
- Improve recovery efforts related to natural disasters.
- Minimize public safety concerns and power supply disruptions to persons served by electric cooperatives.

G.2.4 PLANNING PROCESS

Planning Overview

Wisconsin Emergency Management began an outreach effort involving Cooperative Network, the state trade association representing Wisconsin's electric cooperatives and the state's electric cooperative managers. Following these early meetings, 13 RECs entered into an agreement with Wisconsin Emergency Management to begin the development of an electric cooperative annex to the State of Wisconsin Hazard Mitigation Plan. Development of the electric cooperative annex began in September 2008 with the creation of a subcommittee of the Wisconsin Rural Electric Cooperative Line Superintendents Association.

Following the creation of a draft electric cooperative annex in April 2011, local emergency management offices (with a REC or RECs in its county) were contacted and asked to provide feedback. In addition, it is the hope of Wisconsin Emergency Management that counties with RECs will include the cooperatives in the future updates of the county's hazard mitigation plan. The counties contacted include:

TABLE G.2.4-1 COUNTIES WITH ANNEX PARTICIPATING RECS

Adams	Dunn	Marathon	Sawyer
Barron	Eau Claire	Marquette	Shawano
Buffalo	Grant	Monroe	St. Croix
Burnett	Green	Pepin	Taylor
Chippewa	Green Lake	Pierce	Trempealeau
Clark	Iowa	Polk	Vernon
Columbia	Jackson	Portage	Washburn
Crawford	Jefferson	Price	Waupaca
Dane	Juneau	Richland	Waushara
Dodge	La Crosse	Rusk	Wood
Douglas	Lafayette	Sauk	

Hazard Mitigation Planning Committee

This annex was prepared under the guidance of the Wisconsin Rural Electric Cooperative Line Superintendents Association Hazard Mitigation Subcommittee. Members of the subcommittee include:

Name	Affiliation
Ken Miller	Adams-Columbia Electric Cooperative
Susan Dau	Barron Electric Cooperative
Richard Kelly	Jackson Electric Cooperative, Eau Claire Energy Cooperative, Riverland Energy Cooperative, and Oakdale Electric Cooperative
Dan Stelpflug	Scenic Rivers Energy Cooperative
Tim Clay	Cooperative Network

This group held meetings on:

Meeting Dates
October 9, 2007: WEM met with Wisconsin Electric Cooperative Managers, Spring Green, WI.
September 4, 2008: Subcommittee was formed by the WI Rural Electric Cooperative Line Superintendents Association.
September 24, 2009: Subcommittee met in Black River Falls, WI.

After the September 24, 2009 meeting, the subcommittee continued to collaborate (via email) in completing the risk assessment, identifying REC mitigation projects, and other tasks in support of the annex development. This group provided feedback throughout the process, established a uniform process for each cooperative to conduct a unique risk and vulnerability assessment, and provided guidance to electric cooperatives for identifying the prioritizing hazard mitigation projects. The group also helped define mitigation goals and was responsible for the overall development and submission of the final annex.

Stakeholder Involvement

On April 19, 2011, the draft cooperative annex was presented to WECA Managers Meeting for additional input and suggestions.

Several comments were received from counties, Regional Planning Commissions, and other interested parties. Those comments were incorporated into the Annex.

Public Involvement and Review Process

Two public meetings were conducted in May 2011 with the intent to have WEM and WECA staff available to answer questions and receive comments on the Rural Electric Cooperative Annex. The first meeting was held in northern Wisconsin on Thursday, May 26, 2011 at the United FCS Office, 611 South 32nd Ave., Wausau, Wisconsin. The second meeting was held on Tuesday, May 24, 2011 at the University of Wisconsin—Platteville, Markee Pioneer Student Center,

1 University Plaza, Platteville, Wisconsin. The locations of these meetings were strategically chosen in order to allow both northern and southern counties to comment on the plan without having to travel great distances to Madison. The meetings will publicly noticed in major state newspapers as well as noticed on WEM's website. In addition, a draft of the REC was posted to WEM's website on April 21, 2011 for public comment.

Plan Adoption

The final annex was submitted for approval and inclusion in the State of Wisconsin Hazard Mitigation Plan. The State of Wisconsin Hazard Mitigation was approved on _____. After the plan and annex were approved, each participating Rural Electric Cooperative adopted the annex. The adoptions can be found in Appendix 4.

Incorporated Plans, Studies, Reports and Technical Data

The following is a list of some primary references and data sources use for the preparation of this Annex:

- The State of Wisconsin Hazard Mitigation Plan
- Wisconsin's Electric Cooperatives 2009 Directory and Handbook
- The National Oceanic and Atmospheric Administration (NOAA) National Database of U.S. Storm Events
- Storm Data from National Weather Service, Milwaukee-Sullivan Office

CHAPTER G.3: HAZARD PROFILES

Note: For the purposes of future plan updates, the cut-off date for including new hazard events is December 31, 2010. The 2014 plan update will include new events from January 1, 2011-December 31, 2013.

G.3.1 DETERMINATION OF HAZARDS AND RELATIVE RISK

Methodology

Twelve of the electric cooperatives (with the exception of Clark Electric Cooperative) conducted a risk and vulnerability assessment using the IT Recovery Plan for Electric Cooperatives. This software was developed by the National Rural Cooperative Association and Cooperative Research Network and uses a logical and systematic process to identify natural disaster business risks and quantify vulnerability. Identification of natural disaster risks and a cooperative's vulnerability is based on a combination of existing knowledge, rational observations, and prior experience. The software uses six parameters to quantify the degree of risk for each natural disaster hazard including:

- Probability
- Speed of onset
- Forewarning
- Duration
- Economic impact
- Level of concern

$$\text{Relative Risk} = \frac{(\text{Probability x Economic Impact})\,(\text{Speed of onset} + \text{Forewarning} + \text{Duration})}{\text{Level of Concern}}$$

Each parameter is further classified by a list of criteria to establish significance and assign a numeric value to quantify its weight rating. When the relevance of each parameter has been determined for an identified natural disaster hazard, the software calculates a relative risk value and then rates it against all other natural disaster hazards identified. Each parameter is further defined as follows:

Probability: Probability is expressed as the chance of a particular event occurring within the next five years. The table below summarizes the numerical scoring system used. Natural threats assigned a value of zero were not evaluated any further.

Likelihood of event occurring within 5 years	Chance Measured in Percentages	Value Assigned
Event not applicable	0%	0
Minimal likelihood	1-5%	1
Minor likelihood	6-20%	2
Moderately likely	21-50%	3
Highly likely	51-75%	4
Almost certain	Greater than 75%	5

Speed of Onset: Quantifies how quickly a threat can start using the following table:

Criteria	Value Assigned
Onset of threat is slow	1
Onset of threat is fast	2

Forewarning: *Q*uantifies the amount of advanced notice to prepare for a threat and uses the following table:

Criteria	Value Assigned
Forewarning of threat is likely	1
Forewarning of threat is unlikely	2

Duration: Quantifies to impact of how long a threat is likely to last and uses the following table:

Criteria	Value Assigned
Duration of threat is short	1
Duration of threat is long	2

Economic Impact: Economic impact is weighted against the estimated loss or actual loss of a relevant experience, and the size of the electric cooperative determined by its population. Based on these criteria, a cooperative uses Table A if they have less than 10,000 members, or Table B if they have 10,000 to 40,000 members. There are no electric distribution cooperatives with more than 40,000 members in Wisconsin.

Table A

Economic Loss (Cooperatives With Less Than 10,000 Members)	Value Assigned
Less than $1,000	1
$1,000-$5,000	2
$5,001-$20,000	3
$20,001-$50,000	4
Greater than $50,000	5

Table B

Economic Loss (Cooperatives With 10,000 to 40,000 Members)	Value Assigned
Less than $1,000	1
$1,000-$5,000	2
$5,001-$20,000	3
$20,001-$50,000	4
Greater than $50,000	5

Level of Concern: Measures cooperative's overall ability to respond to a threat. The value is a composite of several considerations, including past experiences, capabilities, availability of resources, magnitude of the threat, and other unique considerations.

Criteria	Value Assigned
Not Concerned	5
Somewhat Concerned	4
Concerned	3
Very Concerned	2
Extremely Concerned	1

Clark Electric Cooperative used a vulnerability and risk assessment matrix called the Iowa Electric Cooperative Association Vulnerability Risk Assessment. This assessment tool incorporates a number of foreseeable natural and human actions that could significantly disrupt business functions.

Similar to the risk and vulnerability assessment software developed by the National Rural Cooperative Association and Cooperative Research Network, this model uses a number of anticipated scenarios that are either a result of human actions or natural occurrences. The assessment process is based on the identification of critical business facilities and the potential impact of their loss. Specifically, critical facilities are categorized as an asset that if lost would (1) result in significant loss of life, (2) impact public health, (3) impact a large number of services for an extended period of time, (4) have a detrimental impact on the reliability or operability of the energy grid, (5) or cause a financial stress that could jeopardize the cooperative's ability to function. This vulnerability and risk assessment method follows a six step process and includes:

1. Identification of critical facilities and loss impact.
2. Identification of existing controls for each critical asset.
3. Characterization of critical asset threats.
4. Assessment of critical asset vulnerabilities.
5. Determination of foreseeable risks and their weighted significance.
6. Identification of mitigation strategies, costs, and trade-offs.

Appendix 2 includes a summary page for each electric cooperative that lists the potential natural disaster hazards and associated relative risk as calculated using the software developed by the Cooperative Research Network. Appendix 3 contains a collective list of all natural hazards identified by the cooperatives and the average relative risk factor by disaster type. Appendix 3 does not include Clark Electric Cooperative's data since its risk assessment's methodology differs from the other REC participants. Information about Clark Electric Cooperative's hazards can be found in Appendix 2.

G.3.2 LOCATION OF RURAL ELECTRIC COOPERATIVES

Figure G.3.2-1 shows the service areas of the 24 rural electric cooperatives (Dairyland Power Cooperative's transmission assets not included) in the State of Wisconsin. Cooperative service territory in Wisconsin encompasses approximately 1/3 of the state's total surface area or approximately 18,000 square miles. Thirteen of the 25 electric cooperatives participated in the 2011 annex. In Figure G.3.2-1, the cooperatives include numbers 1 (Adams-Columbia Electric Cooperative), 2 (Barron Electric Cooperative), 4 (Central Wisconsin Electric Cooperative), 6 (Clark Electric Cooperative), 8 (East Central Energy), 9 (Eau Claire Energy Cooperative), 10 (Jackson Electric Cooperative), 11 (Jump River Electric Cooperative), 12 (Oakdale Electric Cooperative), 14 (Pierce Pepin Cooperative Services), 17 (Richland Electric Cooperative), 18 (Riverland Energy Cooperative), and 20 (Scenic Rivers Energy Cooperative).

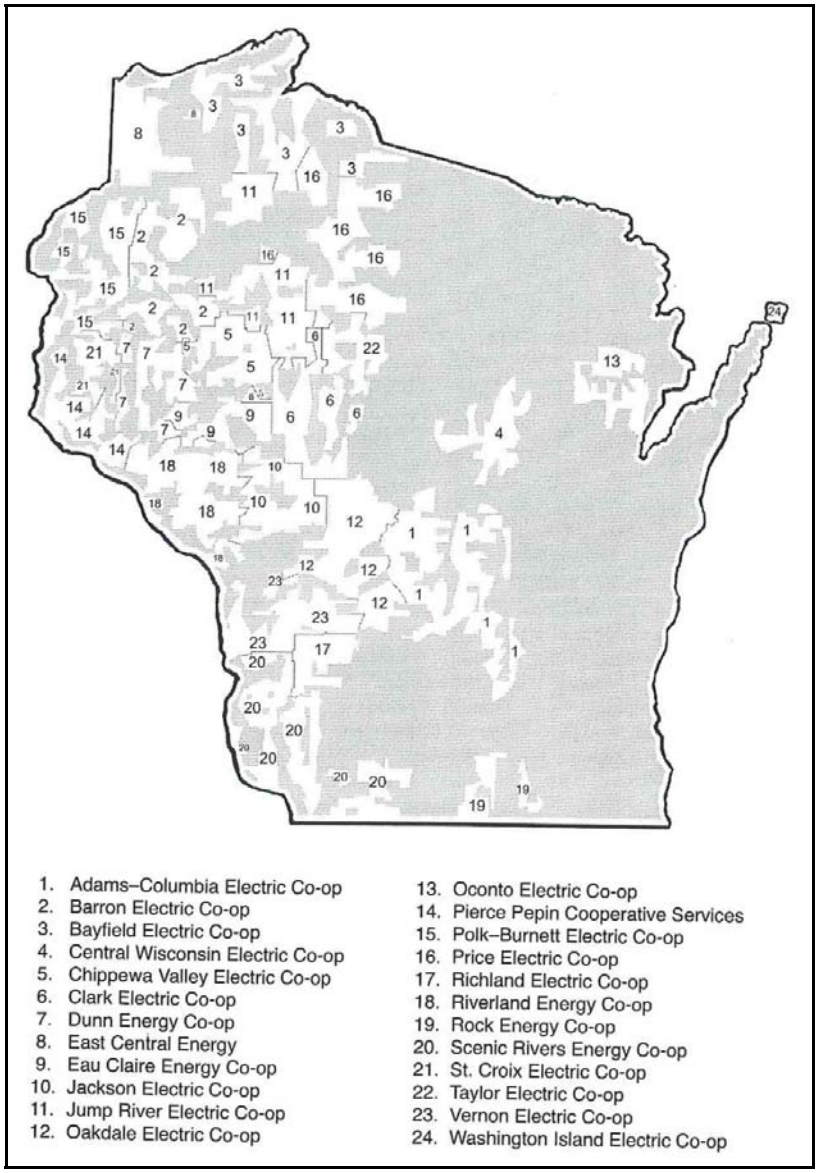

Figure G.3.2-1 Wisconsin Rural Electric Cooperative Service Areas

G.3.3 HAZARD PROFILES

The participating cooperatives have reviewed hazards affecting their geographic areas and through detailed threat analysis (Appendix 2 and 3) have identified six natural hazards posing the most risk to their jurisdictions. The hazards include winter storms, severe thunderstorms and high winds, tornadoes, lightening, hail and wildfire. Appendix 3 highlights the probability/likelihood of the hazard affecting a Rural Electric Cooperative.

G.3.3.1 Severe Winter Storms

Nature of the Hazard

Winter storms vary in size and strength and include heavy snowstorms, blizzards, freezing rain, sleet, ice storms, and considerable blowing and drifting snow conditions. Winter storm occurrences tend to be very disruptive to transportation and commerce.

A variety of weather phenomena and conditions can occur during winter storms. For clarification, the following are National Weather Service approved descriptions of winter storm elements:

- Heavy snowfall**:** Accumulation of six or more inches of snow in a 12-hour period or eight or more inches in a 24-hour period.
- Blizzard**:** An occurrence of sustained wind speeds, or frequent wind gusts, equal to or in excess of 35 mph accompanied by heavy snowfall or large amounts of blowing or drifting snow.
- Ice storm**:** An occurrence when rain falls from warmer upper layers of the atmosphere to the colder ground, freezing upon contact with the ground and exposed objects near the ground. Ice accumulations of ¼ inch or more within 12 hours constitutes an ice storm in Wisconsin.
- Freezing drizzle/freezing rain**:** Effect of drizzle or rain freezing upon impact on objects with a temperature of 32 degrees Fahrenheit or below.
- Sleet**:** Solid grains or pellets of ice formed by the freezing of raindrops or the refreezing of largely melted snowflakes. This ice does not cling to surfaces.

The map in Figure G.3.3.1-1, on the following page, shows the history of winter storm events for the counties of the REC's participating in this plan.

Significant Recent Winter Storm Events

December 2000 was one of the 10 coldest Decembers on record for most of Wisconsin. In addition to low temperatures, record or near-record snow depths of 15 to 34 inches occurred in much of the southern part of the State during December. As a result of record snowfalls, 13 counties received a Presidential Emergency Declaration.

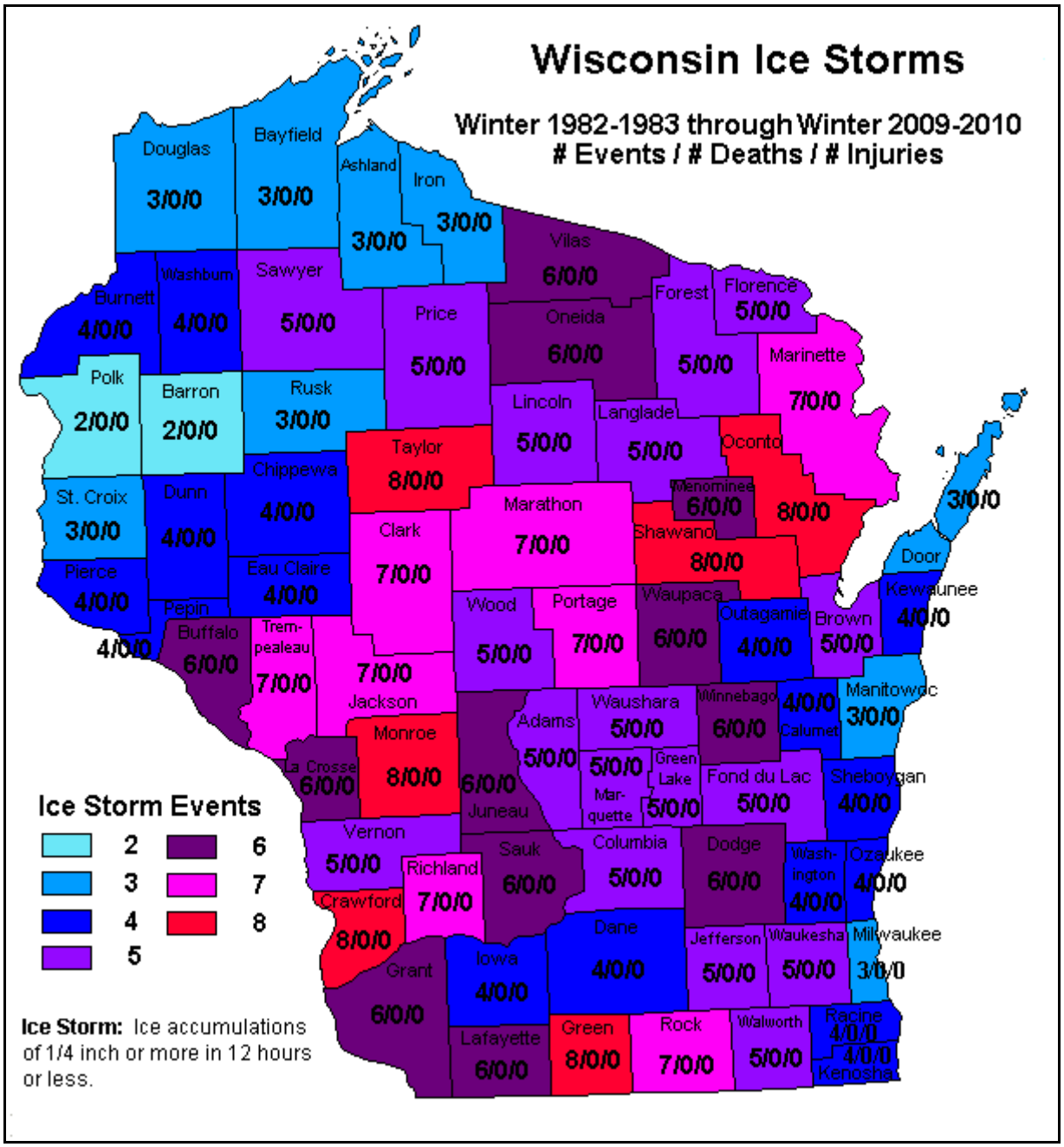

Figure G.3.3.1-1 Wisconsin Ice Storms, 1982-2010
Source: National Weather Service, 2011.

The 2007-08 winter season was “one-for-the-ages.” Numerous winter storms, including a couple blizzards and 4 ice storms, pounded the southern half of the state. Winter snowfall totals of 70 to 122 inches across the southern counties established new all-time winter snowfall records at many locations. These totals were roughly 200 to 240% of normal. The worst storm of the winter occurred on February 5-6, 2008 southeast of a line from Dubuque, Iowa to Madison to Sheboygan when 12 to 21 inches of snow combined with northeast winds of 20 to 30 mph and some gusts to 50 mph to create near-blizzard conditions. Major vehicle backups occurred in both southbound and

northbound lanes on Interstate 39/90 in Dane and Rock Counties after several trucks could not make it up hills during intense thunder snowfall rates of 1 to 2 inches per hour at the height of the storm. At least 1,548 vehicles and trucks were stranded for 10 to 20 hours thanks to snowfalls of 18 to 21 inches in that area.

G.3.3.2 Severe Thunderstorms / High Winds

Nature of the Hazard

Thunderstorm events are generated by instability in the atmosphere, sufficient moisture, and rising motion to form clouds and rain. They are characterized by precipitation in the form of rain, lightning, hail, downbursts, and tornadoes. On occasions, thunderstorms can occur in winter during heavy snow events. Typically, Wisconsin thunderstorms are approximately 15 miles across and last for about 30 minutes, but events of longer duration or with high rates of precipitation can lead to flooding. The National Weather Service (NWS) classifies a thunderstorm as severe if winds reach or exceed 58 mph; the storm produces a tornado or produces hail at least 3/4-inch in diameter.

Downburst winds are strong, high winds created by falling rain and associated sinking air. Typically, in severe storms, these winds can reach speeds of 60 to 100 mph. Micro-bursts, concentrated versions of downbursts, can have speeds up to 150 mph. Severe damage can result from downbursts and micro-bursts.

Thunderstorms and their associated severe weather can occur throughout Wisconsin during any month of the year, but their highest frequency is from May through September. They also occur most often between noon and 10:00 p.m. The peak hour for severe thunderstorms is typically 6 to 7 p.m. Wisconsin averages 30-45 days each year with thunderstorms.

Thunderstorms typically produce high winds. A county-by-county count of severe thunderstorm wind events can be seen in Figure G.3.3.2-1. Within each county are three numbers: the first number is the number of severe thunderstorm wind events in that county, followed by the number of directly-related fatalities and directly-related injuries. Southern Wisconsin has the greatest number of severe thunderstorm wind events. Larger counties will tend to have a greater number of events due to their size.

Significant Recent Wisconsin Thunderstorm Events

During the early morning hours of Sunday, May 31, 1998, south-central and southeast Wisconsin experienced a “derecho” (a widespread and long-lived, violent, convectively-induced windstorm that is associated with a fast-moving band of severe thunderstorms). Incredibly powerful, hurricane-force high winds, with peak gusts of 100 to 128 mph tore through 12 counties, while another 8 counties had peak gusts of 30 to 80 mph.

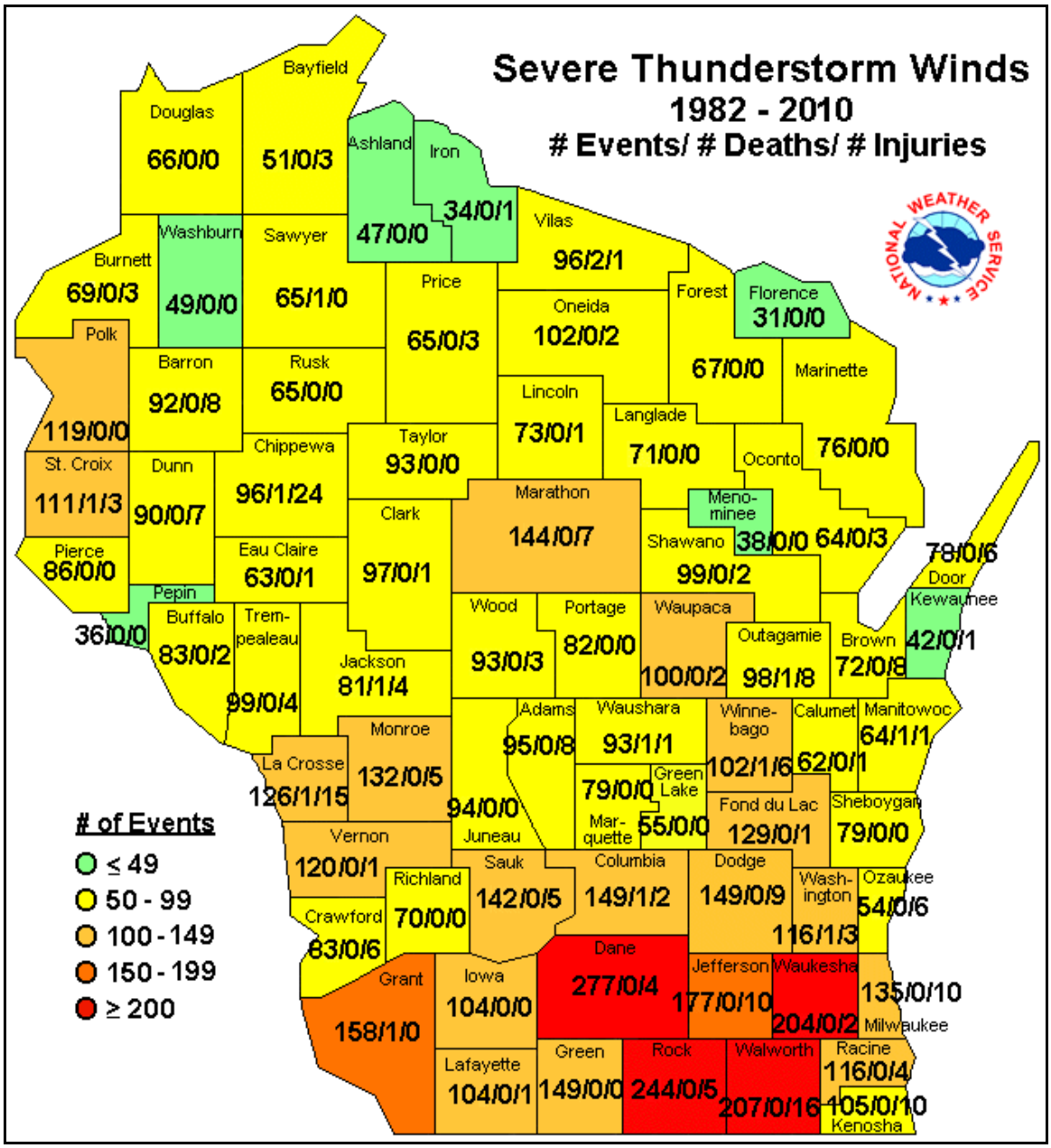

Figure G.3.3.2-1 Severe Thunderstorm Winds, 1982-2010
Source: National Weather Service, 2011.

Utility companies and Emergency Managers stated that the May 31st event was the most damaging, widespread, straight-line thunderstorm wind event to affect southern Wisconsin in the past 100 years. Estimated monetary damage for all 20 counties was $55.85 million for residential or mobile homes, businesses, utilities buildings, agriculture buildings, signs, street lights, billboards, campers, and boats. Hundreds of power poles were snapped or pushed over by the winds or falling trees/branches. At one time, approximately 60,000 customers in south-central Wisconsin and 170,000 in southeast Wisconsin were without electricity. Some residences and businesses were without power for as long as five or six days due to the deluge of utility repairs and a shortage of replacement power poles.

On August 13, 2007, a large swath of severe thunderstorm wind damage occurred from just west of New Richmond to the Glenwood City area. This swath of damage occurred within an approximately two to four mile width between these two cities. Some general reports include: 109 homes damaged or severely damaged, 48 barns damaged or severely damaged. Two barns were reported destroyed.. A house was also rendered uninhabitable. The entire village of Hammond and some outlying areas were without power for approximately 12 hours. Damage was over $35 million to properties and $10 million to crops.

G.3.3.3 Tornadoes

Nature of the Hazard

A tornado is a violently rotating column of air (vortex) extending from the base of a convective (usually cumulonimbus) cloud to the ground. Most tornadoes in the U.S. are weak (80% of them) and cause little to minor damage. However, the strong and violent tornadoes (the other 20%) can cause extensive, severe damage.

Tornado categories are now measured on an enhanced Fujita scale or EF Scale. The wind speed is determined based on 28 damage indicators such as building type, structures and trees. For each indicator, there are 8 degrees of damage ranging from the beginning of visible damage to complete destruction of the indicator. More detail is available at: www.erh.noaa.gov/rah/news/content/Enhanced.Fujita.Scale.Overview.html.

Table G.3.3.3-1 below compares the winds in the original F-scale and the operational EF-scale that is currently in use by the NWS.

TABLE G.3.3.3-1 ENHANCED FUJITA TORNADO SCALE

Category	F-Scale Wind Speed	EF-Scale Wind Speed
EF0 (weak)	40-72 mph	65-85
EF1 (weak)	73-112 mph	86-110
EF2 (strong)	113-157 mph	111-135
EF3 (strong)	158-206 mph	136-165
EF4 (violent)	207-260 mph	166-200
EF5 (violent)	261-318 mph	>200

Source: NWS Storm Prediction Center, Norman, OK.

Wisconsin lies along the northern edge of the nation's maximum frequency belt for tornadoes, called "tornado alley" by some, which extends northeastward from Oklahoma into Iowa and then across to Illinois and southern Wisconsin. Broadly speaking, the southern portions of Wisconsin have a higher frequency of tornadoes; however, every county in Wisconsin has had tornadoes and is susceptible to a tornado disaster.

History of Tornadoes in REC Counties

Several Rural Electric Co-op (REC) counties have had severe tornadoes. Some of these counties include Barron, Chippewa, Clark, Columbia, Dane, Dodge, Grant, Jefferson, Lafayette, Marathon, Polk, and Sauk. Dane, Dodge, Grant and Marathon Counties have had the most with 63, 56, 56, and 51 respectively. Figure G.3.3.3-1 shows the number of tornado events per REC County from 1982-2010.

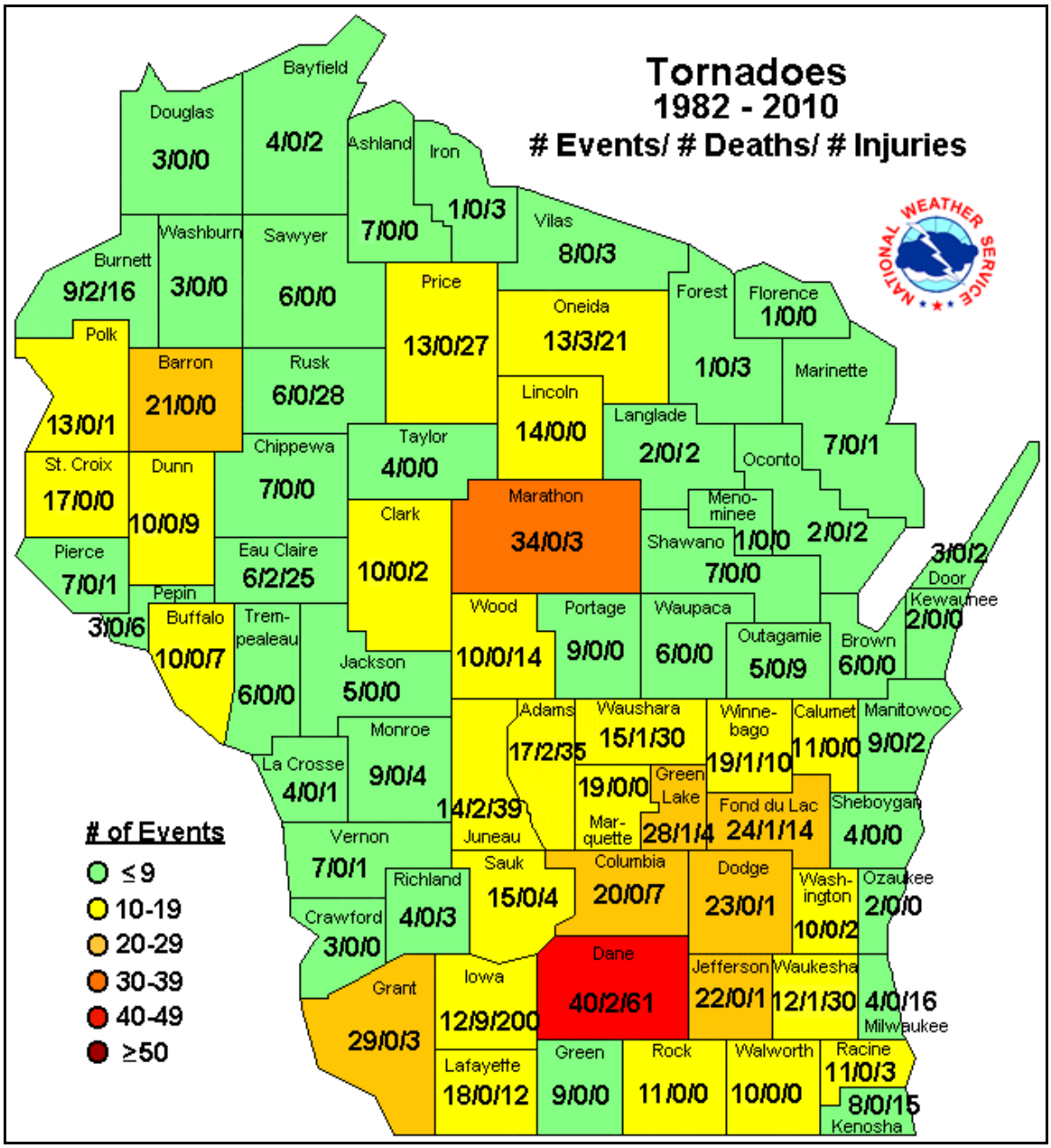

Figure G.3.3.3-1 Tornadoes, 1982-2010
Source: National Weather Service, 2011.

Significant Recent Wisconsin Tornado Events

On Jun 21, 2010, an EF2 tornado developed about 1.9 miles west-southwest of the Village of Eagle and moved east through the southern part of the Village and dissipated about on the northwest side of Mukwonago Park. Fifteen people sustained minor injuries. One hundred thirty-four homes received minor damage, 67 homes had major damage, and 8 homes were destroyed. Another 75 homes were minimally affected. One business received major damage, while 18 businesses had minor damage Tornado uprooted or damaged thousands of trees, and at least three dozen vehicles were damaged or totaled. At Old World Wisconsin, an outdoor museum operated by the Wisconsin Historical Society near Eagle, about 2500 tress were damaged at this site alone.

G.3.3.4 Lightning

Nature of the Hazard

Lightning typically occurs as a by-product of a thunderstorm. The action of rising and descending air in a thunderstorm separates positive and negative charges, with lightning the result of the buildup and discharge of energy between positive and negative charge areas. Water and ice particles may also affect the distribution of the electrical charge. In only a few millionths of a second, the air near a lightning strike is heated to 50,000°F, a temperature hotter than the surface of the sun. Thunder is the result of the very rapid heating and cooling of air near the lightning that causes a shock wave.

The hazard posed by lightning is significantly underrated. Lightning is the most dangerous and frequently encountered weather hazard that most people in the United States experience annually. High winds, rainfall, and a darkening cloud cover are the warning signs for possible cloud-to-ground lightning strikes. While many lightning casualties happen at the beginning of an approaching storm, more than half of lightning deaths occur after a thunderstorm has passed. The lightning threat diminishes after the last sound of thunder, but may persist for more than 30 minutes. When thunderstorms are in the area, but not overhead, the lightning threat can exist when skies are clear. Lightning has been known to strike more than 10 miles from the storm in an area with clear sky above.

According to the National Oceanic and Atmospheric Administration (NOAA), an average of 20 million cloud-to-ground flashes has been detected every year in the continental United States. About half of all flashes have more than one ground strike point, so at least 30 million points on the ground are struck on the average each year. (NOAA, July 7, 2003).

To the general public, lightning is often perceived as a minor hazard. However, lightning-caused damage, injuries and deaths establish lightning as a significant hazard

associated with any thunderstorm in any part of the state. Damage from lightning occurs in four ways:

(1) Electrocution/severe shock of humans and animals;
(2) Vaporization of materials along the path of the lightning strike;
(3) Fire caused by the high temperatures associated with lightning (10,000-60,000°F); and
(4) The sudden power surge that can damage electrical/electronic equipment.

Lightning History

Wisconsin has a high frequency of property losses due to lightning. Insurance statistics show that two out of every 100 farms are struck by lightning or have a fire that may have been lightning-caused each year. It is estimated that in northern Wisconsin there are between two and five lightning-caused fires per million acres of forested lands every year.

Figure G.3.3.4-1 shows the county-by-county lightening event count across Wisconsin for the period of 1982-2010. These numbers are undercounts since a number of lightning strikes and resultant fatalities, injuries, or fires are not reported in newspapers. In each county are three numbers: the first number is the number of lightning events that resulted in fires or fatalities or injuries as reported in newspapers or by Emergency Managers. The second number is the number of directly-related fatalities, and the third number is the number of directly-related injuries due to lightning. Larger and more populated counties tend to have more reported lightning events.

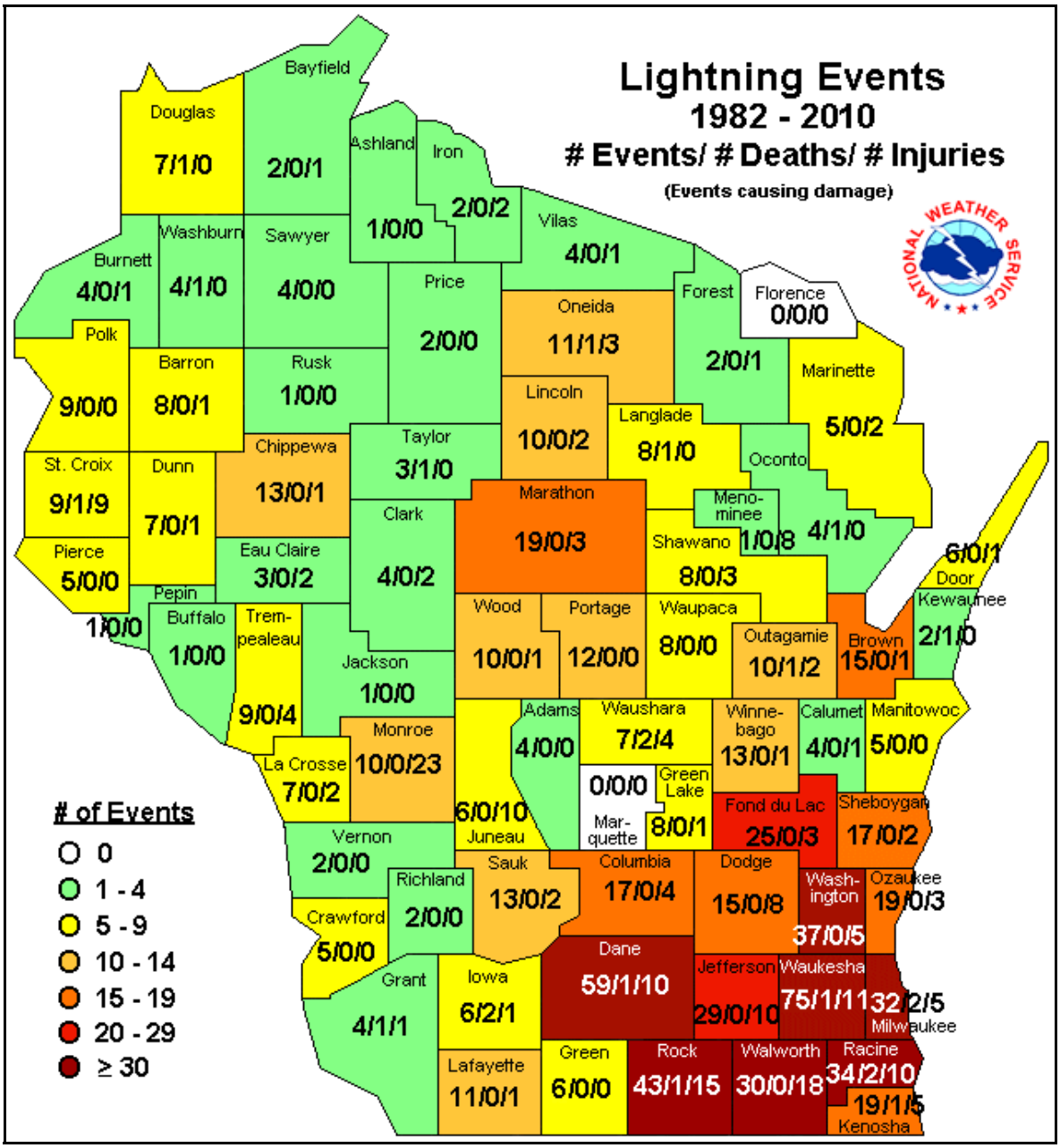

Figure G.3.3.4-1 Lightning Events, 1982-2010
Source: National Weather Service, 2011.

G.3.3.5 Hail

Nature of the Hazard

Hail can develop within thunderstorms when strong currents of rising air, known as updrafts, carry water droplets high within the storm. The cold air aloft causes the water droplets to freeze. As the frozen droplet begins to fall toward the ground, rising currents within the storm lifts the ice again. The hailstone gains an ice layer and grows

increasingly larger with each ascent. Eventually the hailstone becomes too heavy for the updraft to support, and it falls to the ground.

The size of hailstones varies and is a direct consequence of the severity and size of the thunderstorm. The higher the temperatures and the greater the amount of evaporated moisture in the air at the Earth's surface (i.e., the greater the instability of the atmosphere), the greater the strength of the updrafts. Stronger updrafts can keep hailstones suspended for longer periods of time, resulting in more up and down trips and assuring larger hailstones at ground level. Hailstones vary widely in size from ¼ inch to 4½ inches. Note that penny size hail (0.75 inch in diameter) or larger is considered severe.

Wisconsin experiences about one to three hail days per year across any given area. In general, central and southern Wisconsin have more days with hail, and parts of west-central have more days (2-3) with hail. The months of maximum hailstorm frequency are May through September, with approximately 85% of hailstorms occurring during this period. All counties of the participating REC's are at risk for hail damage.

Figure G.3.3.5-1 shows the number of hailstorm events (hailstone diameter of ¾ inch or larger) that occurred in each Wisconsin county from 1982 to 2007, including the number of deaths and injuries attributed to those large hail events. Fewer number of severe hail events are reported across the far northern and far eastern parts of the state – perhaps related to the fact that the cool lake breezes from Lake Michigan and Lake Superior dampen the energy level of thunderstorms.

Significant Recent Wisconsin Hail Events

Wisconsin's first-ever $100 million dollar hailstorm took place on May 12, 2000 when a single storm moved across the central part of the state from south of La Crosse through the Lake Winnebago area to Manitowoc and eventually to Lake Michigan. Ten counties were pounded with hailstones one to three inches in diameter during the morning hours. Damage to property and crops was estimated at $122 million.

On April 13, 2006, three hail-producing severe thunderstorms affected southern Wisconsin. Hail, up to 4.25 inches in diameter, fell across a large swath from Mineral Point (Iowa County) to north of Milwaukee. Based on insurance company information, the April 13, 2006, hailstorms resulted in total damage of about $420 million, making it the most costly hailstorm day in Wisconsin weather history.

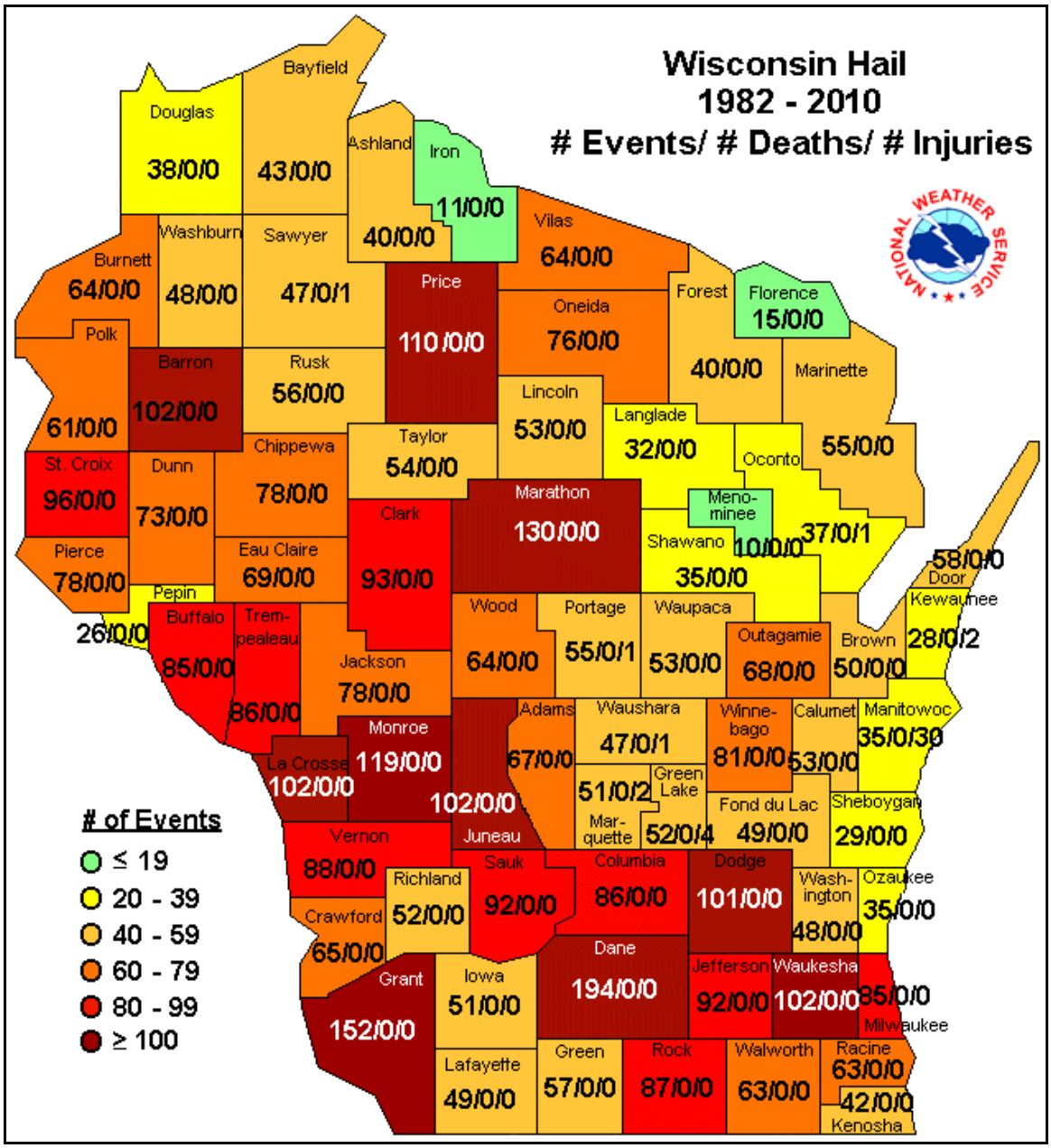

Figure G.3.3.5-1 Hail Events, 1982-2010
Source: National Weather Service, 2011.

G.3.3.6 Wildfire

Nature of the Hazard

Chapter 26.01(2) of Wisconsin State Statutes define forest fires as any "uncontrolled, wild or running fires burning in forest, marsh, field, cutover, or other lands or involving farm, city, or village property and improvements incidental to the uncontrolled, wild, or running fires occurring on forest, marsh, field, cutover, or other lands." These fires often begin unnoticed, can spread quickly, and are usually signaled by dense smoke that may fill the area for miles around. Wildfires in Wisconsin are primarily human-caused through

acts such as burning yard debris, arson, or campfires. They can also be caused by natural events such as lightning.

Every year, more than 2,500 wildfires occur in Wisconsin, causing thousands of dollars of damage to property, and destroying natural resources. Dozens of structures are damaged or destroyed and hundreds more are threatened. It can be surmised that there is a 100% probability that there will be at least one fire in Wisconsin every year.

Most Wisconsin wildfires occur in spring in the months of April and May, although under the right conditions, they can occur at any time of the year. The season length and peak months may vary from year to year. Land use, vegetation, amount of combustible materials present, and weather conditions such as wind, low humidity, and lack of precipitation are the chief factors determining the number of fires and acreage burned. Generally, fires are more likely when vegetation is dry from a winter with little snow and/or a spring and summer with sparse rainfall. Wildfires are capable of causing significant injury, death, and damage to property. A recent inventory showed that 46 percent of the state, 16 million acres is covered with forests. The potential for property damage from fire increases each year as more properties are developed on wooded land and more people use these areas.

Wisconsin Communities-at-Risk and Communities of Concern

The Wisconsin Department of Natural Resources (WIDNR) in cooperation with its federal and tribal partners has performed a state-wide assessment of wildfire vulnerability. The assessment was based on the National Association of State Foresters' "Field Guidance for Identifying and Prioritizing Communities-at-Risk."

In addition, the WIDNR incorporated a "Community of Concern" category to identify those towns that have portions of their town in high risk of wildfire, but were not otherwise included as a Community-at-Risk. Figure G.3.3.6-1 shows the areas of the state that are at risk and of concern for wildfire events.

Significant Recent Wisconsin Wildfire Events

1977
The entire state suffered two years of severe drought. Nearly 49,000 acres burned in 1977 alone. Over 170 structures were destroyed or damaged. Jackson, Washburn, Douglas and Wood Counties were the worst hit. Notable fires in 1977 were the Saratoga fire in Wisconsin Rapids, 6,159 acres and 90 buildings burned; the Brockway fire in the Black River Falls area, 17,590 acres burned; and the Five-mile fire in Washburn and Douglas counties, 13,375 acres and 83 buildings burned.

1980
Over two days in April, the Ekdall Church fire in Burnett County and the Oak lake fire in Washburn County burned over 16,000 acres and destroyed more than 200 buildings.

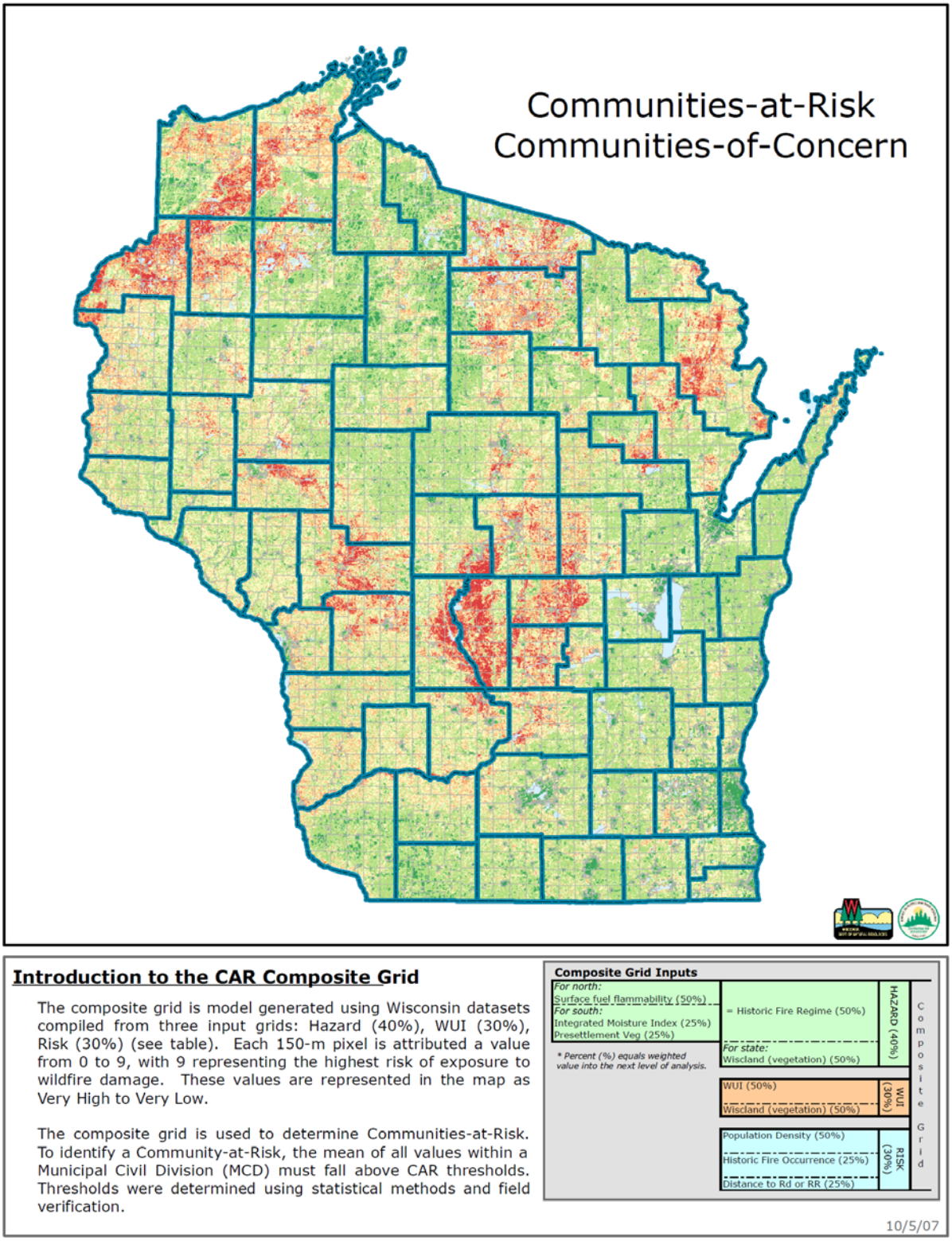

Figure G.3.3.6-1 Communities-at-Risk, Communities-of-Concern
Source: Department of Natural Resources, 2007.

2003
The Crystal Lake fire in Marquette and Waushara counties burned 572 acres. Several buildings were destroyed and nearly 200 were threatened.

2005
On May 5th, the Cottonville Fire burned a swath of one and one-half miles wide and seven miles long through the towns of Big Flats, Preston, and Colburn. There were nine year-round residences, 21 seasonal homes, and at least 60 outbuildings destroyed in the 3,410 acres fire.

CHAPTER G.4: MITIGATION GOALS AND STRATEGIES

G.4.1 MITIGATION GOALS

The mitigation goals are intended to provide direction to achieve the desired mitigation outcome and are to be used as guidelines by which mitigation activities are identified and impact is evaluated. The goals of the Rural Electric Cooperative (REC) Annex provide direction for determining the future and reflect the needs of the RECs as identified through the assessment of hazard conditions and profiles.

The participating RECs agreed on the following mitigation goals:

1. Increase awareness of risks and utility infrastructure vulnerabilities to natural hazards.
2. Improve recovery efforts related to natural disasters.
3. Minimize public safety concerns and power supply disruptions to persons served by electric cooperatives.
4. Enhance public education about disaster preparedness and resilience, and expand public awareness of natural hazards.
5. Support coordination and collaboration among federal, state, and local authorities, and non-governmental organizations regarding hazard mitigation activities.
6. Improve the disaster resistance of buildings, structures, and infrastructure whether new construction, expansion or renovation.

G.4.2 MITIGATION STRATEGY PRIORITIZATION PROCESS AND ACTION PLAN

The following mitigation action plan (Table G.4.2-1) includes implementation guidance for each strategy, including priority, key REC involved in implementation, and potential barriers. The relative priority (i.e., high, medium, low) is helpful in determining which projects to implement first from a mitigation perspective, but individual cooperatives may rate some of these strategies differently. The strategies were prioritized based on their importance to hazard mitigation, but some strategies have additional benefits which may have not been considered. These priorities are subject to change over time and new priorities may arise.

Each cooperative has identified at least one (1) hazard mitigation project that minimizes the economic impact of natural disasters to their infrastructure. Greater emphasis is given to projects:

- with a timeframe consistent with the planning objectives and budgetary considerations
- that address previous documented damages

- with a high frequency of natural disaster occurrences
- where a significant number of persons are affected
- that minimize the loss of service to emergency responders
- which significantly minimize the cost of power disruptions and/or the time it takes to restore services.

Before a project is implemented, a cost benefit review will be conducted to ensure that the benefits of a project outweigh the costs.

TABLE G.4.2-1 WISCONSIN ELECTRIC COOPERATIVES ALL-HAZARDS MITIGATION PLAN

Hazards of Concern	Mitigation Measures	Estimated Cost in Today's Dollars	Cooperative and County or Counties	Responsible Party for Implementation	Priority Ranking (H, M, L)	Projected Timetable
High winds, ice storm, blizzard, tornadoes	Badger West Substation Project--Install a new substation on a separate feed to strengthen system reliability. Circuit serves approximately 4,500 consumers.	$1,000,000	Adams-Columbia Electric Cooperative and Adams County	Adams-Columbia Electric Cooperative	High	2011
Lighting damage to equipment; loss of transmission infrastructure due to high winds, ice storms or tornadoes	Doylestown & Columbus Tie Project--interconnect two substations by installing 6.32 miles of three phase underground. Strengthen system reliability. Circuits serves 1,400 consumers	$635,000	Adams-Columbia Electric Cooperative and Columbia County	Adams-Columbia Electric Cooperative	Medium	2012
High winds, ice storms, blizzard, and tornadoes	Roslin & Lewiston Tie Project--convert 5.28 miles of single phase overhead distribution to three phase underground. Enhancement would provide an underground backup feeder between the substations. Circuits serve 2,350 consumers.	$530,000	Adams-Columbia Electric Cooperative and Columbia County	Adams-Columbia Electric Cooperative	High	2011
High winds, ice storms, blizzard, and tornadoes	Cambria & Roslin Tie Project--convert 5.28 miles of single phase overhead distribution to three phase underground. Enhancement would provide an underground backup feeder between the substations. Circuits serve 2,440 consumers.	$530,000	Adams-Columbia Electric Cooperative and Columbia County	Adams-Columbia Electric Cooperative	High	2011
High winds, ice storms, and tornadoes	Wicks Landing Project--bury 8.29 miles of single phase overhead line. Line has a history of wind-related outages and serves approximately 50 consumers.	$378,000	Adams-Columbia Electric Cooperative and Green Lake County	Adams-Columbia Electric Cooperative	High	2011
High winds, ice storms, and tornadoes	North Shore Drive Project--bury 1.0 miles of single phase overhead line. Line has a history of wind-related outages and serves approximately 50 consumers.	$45,000	Adams-Columbia Electric Cooperative and Marquette County	Adams-Columbia Electric Cooperative	High	2011
High winds, ice storms, forest fire, lightning, tornado, electrical storm, blizzard	Long Lake Project--bury 3.1 miles of single phase line along west side of lake. History of outages from weather events.	$310,992	Barron Electric Cooperative and Washburn County	Barron Electric Cooperative	High	2011-2013
High winds, ice storms, forest fire, lightning, tornado, electrical storm, blizzard	Cable Lake Project--bury 3.5 miles of single phase line around the lake. History of outages from weather events.	$351,120	Barron Electric Cooperative and Washburn County	Barron Electric Cooperative	High	2011-2013

TABLE G.4.2-1 WISCONSIN ELECTRIC COOPERATIVES ALL-HAZARDS MITIGATION PLAN

Hazards of Concern	Mitigation Measures	Estimated Cost in Today's Dollars	Cooperative and County or Counties	Responsible Party for Implementation	Priority Ranking (H, M, L)	Projected Timetable
High winds, ice storm, blizzard, tornadoes	T-V1 Replace overhead line with underground along various single phase lines. Subject to extended outages from wind and ice. History of outages due to weather events.	$75,000	Shawano County	Central Wisconsin Electric Cooperative	High	2011
High winds, ice storm, blizzard, tornadoes	A-2/A-3 Replace overhead line with underground along Moh He Con Nuck Road south. Subject to extended outages from wind and ice. History of outages due to weather events.	$450,450	Shawano County	Central Wisconsin Electric Cooperative	High	2011
High winds, ice storm, blizzard, tornadoes	T-4 Replace overhead line with underground along Two Mile Road. Subject to extended outages from wind and ice. History of outages due to weather events.	$41,580	Shawano County	Central Wisconsin Electric Cooperative	High	2011
High winds, ice storm, blizzard, tornadoes	T-5 Replace overhead line with underground along Comet Road. Subject to extended outages from wind and ice. History of outages due to weather events.	$136,800	Shawano County	Central Wisconsin Electric Cooperative	High	2011
High winds, ice storm, blizzard, tornadoes	R-1 Build one mile of 3-phase underground line to provide better reliability during wind and ice storms. History of outages from weather events.	$136,800	Shawano County and Waupaca Counties	Central Wisconsin Electric Cooperative	High	2011
High winds, ice storm, blizzard, tornadoes	T-7 Replace overhead line with underground along FTH 45 north. Subject to extended outages from wind and ice. History of outages from weather events.	$970,200	Shawano County	Central Wisconsin Electric Cooperative	Medium	2012
High winds, ice storm, blizzard, tornadoes	I-F4/F5 Replace overhead line with underground across private right-of-way. Subject to extended outages from wind and ice. History of outages from weather events.	$145,000	Waupaca County	Central Wisconsin Electric Cooperative	Low	2013
High winds, ice storm, blizzard, tornadoes	WBFC back feed circuit in Wittenberg substation to provide quicker restoration of service during extended outages. History of outages from weather event.	$68,000	Shawano County	Central Wisconsin Electric Cooperative	Low	2013
High winds, ice storm, blizzard, tornadoes	A-1 Replace overhead line with underground along Moh He Con Nuck Road North. Subject to extended outages from wind and ice. History of outages due to weather events.	$173,250	Shawano County	Central Wisconsin Electric Cooperative	Low	2013
High winds, ice storm, blizzard, tornadoes	G-1 Replace overhead line with underground along CTH J/Y. Subject to extended outages from wind and ice. History of outages from weather events.	$311,850	Marathon County	Central Wisconsin Electric Cooperative	Low	2013
High winds, ice storms, forest	Chequamegon-Nicolet Switch # 20--bury 3 miles of single-	$227,700	Clark Electric Cooperative	Clark Electric	Low	2013-2015

TABLE G.4.2-1 WISCONSIN ELECTRIC COOPERATIVES ALL-HAZARDS MITIGATION PLAN						
Hazards of Concern	**Mitigation Measures**	**Estimated Cost in Today's Dollars**	**Cooperative and County or Counties**	**Responsible Party for Implementation**	**Priority Ranking (H, M, L)**	**Projected Timetable**
fire, tornado	phase. History of outages and longer than average response times due to physical location and distance.		and Taylor County	Cooperative		
High winds, ice storms, forest fire, tornado	Chequamegon-Nicolet Switch # 240 bury 3.2 miles of single-phase. History of outages and longer than average response times due to physical location and distance.	$242,900	Clark Electric Cooperative and Taylor County	Clark Electric Cooperative	Medium	2011-2015
High winds, ice storms, forest fire, tornado	Chequamegon-Nicolet Switch #30 bury 3 miles of single-phase. History of outages and longer than average response times due to physical location and distance.	$227,700	Clark Electric Cooperative and Taylor County	Clark Electric Cooperative	Medium	2011-2015
High winds, ice storms, forest fire, tornado	Chequamegon-Nicolet Switch # 219 bury 2.5 miles of single-phase. History of outages and longer than average response times due to physical location and distance.	$189,750	Clark Electric Cooperative and Taylor County	Clark Electric Cooperative	Medium	2011-2015
High winds, ice storms, forest fire, tornado	Chequamegon-Nicolet Switch # 109 bury 2.5 miles of single-phase. History of outages and longer than average response times due to physical location and distance.	$189,750	Clark Electric Cooperative and Taylor County	Clark Electric Cooperative	Medium	2011-2015
High winds, ice storms, lightning, tornado, blizzard, forest fire	The replacement of 2.5 miles of 3 phase overhead with 3 phase underground. This project is due to Douglas County rebuilding this portion of County Road B.	$222,000	East Central Energy, Douglas County	East Central Energy	High	2011
High winds, ice storms, and tornadoes	Replace overhead power lines w/ underground, Interstate 94 Location: T27N-R10W-Sec.25; 600 ft. single phase	$12,620	Eau Claire Energy Cooperative, Eau Claire County	Eau Claire Energy Cooperative	High	2011-2015
High winds, ice storms, and tornadoes	Replace overhead power lines w/ underground, Interstate 94 Location: T26N-R9W-Sec.03; 900 ft. three phase	$55,260	Eau Claire Energy Cooperative, Eau Claire County	Eau Claire Energy Cooperative	High	2011-2015
High winds, ice storms, and tornadoes	Replace overhead power lines w/ underground, Interstate 94 Location: T26N-R08W-Sec.06; 500 ft. three phase	$34,705	Eau Claire Energy Cooperative, Eau Claire County	Eau Claire Energy Cooperative	Medium	2011-2015
High winds, ice storms, and tornadoes	Replace overhead power lines w/ underground, Interstate 94 Location: T26N-R08W-Sec.06; 640 ft. three phase	$39,283	Eau Claire Energy Cooperative, Eau Claire County	Eau Claire Energy Cooperative	Medium	2011-2015

TABLE G.4.2-1 WISCONSIN ELECTRIC COOPERATIVES ALL-HAZARDS MITIGATION PLAN						
Hazards of Concern	**Mitigation Measures**	**Estimated Cost in Today's Dollars**	**Cooperative and County or Counties**	**Responsible Party for Implementation**	**Priority Ranking (H, M, L)**	**Projected Timetable**
High winds, ice storms, and tornadoes	Replace overhead power lines w/ underground, Interstate 94 Location: T26N-R08W-Sec.07; 500 ft. single phase	$11,430	Eau Claire Energy Cooperative, Eau Claire County	Eau Claire Energy Cooperative	Low	2011-2015
High winds, ice storms, and tornadoes	Replace overhead power lines w/ underground, Interstate 94 Location: T26N-R08W-Sec.08; 550 ft.single phase	$12,025	Eau Claire Energy Cooperative, Eau Claire County	Eau Claire Energy Cooperative	Medium	2011-2015
High winds, ice storms, and tornadoes	Replace overhead power lines w/ underground, Interstate 94 Location: T26N-R08W-Sec.27; 500 ft. single phase	$11,430	Eau Claire Energy Cooperative, Eau Claire County	Eau Claire Energy Cooperative	Low	2011-2015
High winds, ice storms, and tornadoes	Replace overhead power lines w/ underground, Interstate 94 Location: T25N-R08W-Sec.03; 545 ft. single phase	$11,965	Eau Claire Energy Cooperative, Eau Claire County	Eau Claire Energy Cooperative	Low	2011-2015
High winds, ice storms, and tornadoes	Replace overhead power lines w/ underground, Interstate 94 Location: T25N-R08W-Sec.11; 400 ft. three phase	$32,210	Eau Claire Energy Cooperative, Eau Claire County	Eau Claire Energy Cooperative	High	2011-2015
High winds, ice storms, and tornadoes	Replace overhead power lines w/ underground, Interstate 94 Location: T25N-R08W-Sec.24; 550 ft. single phase	$12,025	Eau Claire Energy Cooperative, Eau Claire County	Eau Claire Energy Cooperative	Medium	2011-2015
High winds, ice storms, and tornadoes	Replace overhead power lines w/ underground, Interstate 94 Location: T27N-R10W-Sec.25; 600 ft. single phase	$12,620	Eau Claire Energy Cooperative, Eau Claire County	Eau Claire Energy Cooperative	Low	2011-2015
High winds, ice storms, and tornadoes	Replace overhead power lines w/ underground, Interstate 94 Location: T25N-R07W-Sec.19; 575 ft. single phase	$12,323	Eau Claire Energy Cooperative, Eau Claire County	Eau Claire Energy Cooperative	Medium	2011-2015
High winds, ice storms, and tornadoes	Replace overhead power lines w/ underground, Interstate 94 Location: T25N-R07W-Sec.29; 470 ft. three phase	$33,956	Eau Claire Energy Cooperative, Eau Claire County	Eau Claire Energy Cooperative	Medium	2011-2015

TABLE G.4.2-1 WISCONSIN ELECTRIC COOPERATIVES ALL-HAZARDS MITIGATION PLAN						
Hazards of Concern	**Mitigation Measures**	**Estimated Cost in Today's Dollars**	**Cooperative and County or Counties**	**Responsible Party for Implementation**	**Priority Ranking (H, M, L)**	**Projected Timetable**
High winds, ice storms, and tornadoes	Replace overhead power lines w/ underground, Interstate 94 Location: T24N-R06W-Sec.19; 700 ft. single phase	$13,810	Eau Claire Energy Cooperative, Jackson County	Eau Claire Energy Cooperative	High	2011-2015
High winds, ice storms, and tornadoes	Replace overhead power lines w/ underground, Interstate 94 Location: T24N-R06W-Sec.32; 650 ft. single phase	$13,215	Eau Claire Energy Cooperative, Jackson County	Eau Claire Energy Cooperative	High	2011-2015
High winds, ice storms, and tornadoes	Replace overhead power lines w/ underground, Interstate 94 Location: T24N-R07W-Sec.11; 500 ft. three phase	$40,580	Eau Claire Energy Cooperative, Trempealeau County	Eau Claire Energy Cooperative	High	2011-2015
Tornadoes, high winds, and ice storms	Replace overhead power lines w/ underground, Interstate 94 Location: 4C05; 1030 ft. single phase	$21,321	Jackson Electric Cooperative and Jackson County	Jackson Electric Cooperative	High	2011-2015
Tornadoes, high winds, and ice storms	Replace overhead power lines w/ underground, Interstate 94 Location: 4C04; 1090 ft. single phase	$21,942	Jackson Electric Cooperative and Jackson County	Jackson Electric Cooperative	High	2011-2015
Tornadoes, high winds, and ice storms	Replace overhead power lines w/ underground, Interstate 94 Location: 4C09; 890 ft. single phase	$18,423	Jackson Electric Cooperative and Jackson County	Jackson Electric Cooperative	High	2011-2015
Tornadoes, high winds, and ice storms	Replace overhead power lines w/ underground, Interstate 94 Location: 4C16; 1060 ft. three phase	$21,942	Jackson Electric Cooperative and Jackson County	Jackson Electric Cooperative	High	2011-2015
Tornadoes, high winds, and ice storms	Replace overhead power lines w/ underground, Interstate 94 Location: 4C22; 700 ft. single phase	$14,490	Jackson Electric Cooperative and Jackson County	Jackson Electric Cooperative	High	2011-2015
Tornadoes, high winds, and ice storms	Replace overhead power lines w/ underground, Interstate 94 Location: 5C01; 1300 ft. three phase	$26,910	Jackson Electric Cooperative and Jackson County	Jackson Electric Cooperative	High	2011-2015
Tornadoes, high winds, and ice storms	Replace overhead power lines w/ underground, Interstate 94 Location: 5C01; 870 ft. single phase	$18,009	Jackson Electric Cooperative and Jackson County	Jackson Electric Cooperative	High	2011-2015

TABLE G.4.2-1 WISCONSIN ELECTRIC COOPERATIVES ALL-HAZARDS MITIGATION PLAN						
Hazards of Concern	**Mitigation Measures**	**Estimated Cost in Today's Dollars**	**Cooperative and County or Counties**	**Responsible Party for Implementation**	**Priority Ranking (H, M, L)**	**Projected Timetable**
Tornadoes, high winds, and ice storms	Replace overhead power lines w/ underground, Interstate 94 Location: 5D07/08; 890 ft. single phase	$18,423	Jackson Electric Cooperative and Jackson County	Jackson Electric Cooperative	High	2011-2015
Tornadoes, high winds, and ice storms	Replace overhead power lines w/ underground, Interstate 94 Location: 5D27; 930 ft. three phase	$19,251	Jackson Electric Cooperative and Jackson County	Jackson Electric Cooperative	High	2011-2015
Tornadoes, high winds, and ice storms	Replace overhead power lines w/ underground, Interstate 94 Location: 5F27; 1000 ft. three phase	$20,700	Jackson Electric Cooperative and Jackson County	Jackson Electric Cooperative	High	2011-2015
Tornadoes, high winds, and ice storms	Replace overhead power lines w/ underground, Interstate 94 Location: 6E09; 860 ft. single phase	$17,802	Jackson Electric Cooperative and Jackson County	Jackson Electric Cooperative	High	2011-2015
Tornadoes, high winds, and ice storms	Replace overhead power lines w/ underground, Interstate 94 Location: 6E24; 1200 ft. three phase	$24,840	Jackson Electric Cooperative and Jackson County	Jackson Electric Cooperative	High	2011-2015
Tornadoes, high winds, and ice storms	Replace overhead power lines w/ underground, Interstate 94 Location: 7F02/03; 1100 ft. single phase	$22,770	Jackson Electric Cooperative and Jackson County	Jackson Electric Cooperative	High	2011-2015
Tornadoes, high winds, and ice storms	Replace overhead power lines w/ underground, Interstate 94 Location: 7G20; 900 ft. two phase	$18,630	Jackson Electric Cooperative and Jackson County	Jackson Electric Cooperative	High	2011-2015
Tornadoes, high winds, and ice storms	Replace overhead power lines w/ underground, Interstate 94 Location: 7G28; 1050 ft. single phase	$21,735	Jackson Electric Cooperative and Jackson County	Jackson Electric Cooperative	High	2011-2015
High winds, ice storms, tornadoes, forest fire	Barns Line Project--bury 2.22 miles of single phase overhead line. This line traverses terrian that is very difficult to access resulting in prolong response times.	$94,000	Jump River Electric Cooperative and Rusk County	Jump River Electric Cooperative	Medium	2011-2014
Cold wave, blizzard and forest fire	Moreland & Comstock Road Line Project--upgrade 0.64 miles of existing underground line that serves 50 customers. This line is susceptible to cold weather influences (heaves) and due to it location is very difficult to access.	$45,000	Jump River Electric Cooperative and Sawyer County	Jump River Electric Cooperative	Medium	2011-2014

TABLE G.4.2-1 WISCONSIN ELECTRIC COOPERATIVES ALL-HAZARDS MITIGATION PLAN

Hazards of Concern	Mitigation Measures	Estimated Cost in Today's Dollars	Cooperative and County or Counties	Responsible Party for Implementation	Priority Ranking (H, M, L)	Projected Timetable
High winds, ice storms, tornadoes, forest fire	Westboro Line Project (County Road O)--bury 1.15 miles of single phase overhead line. This line is located in portions of the Chequamegon National Forest and is in terrain that is very difficult to reach.	$50,000	Jump River Electric Cooperative and Taylor County	Jump River Electric Cooperative	High	2011--2013
Heavy rain and wind, and ice storms.	T 13 N - R 4 E Section 29. Relocate existing line in DNR wetlands area to the CTY road V right-of-way. Long outage times. Improve reliability for approximately 50 members.	$17,885	Oakdale Electric Cooperative and Sauk County	Oakdale Electric Cooperative	Medium	2011-2012
Ice, wind, tornado, tree hazards.	T 14 N - R 4 E Sections 31 & 32. Relocate line along road or install underground to improve reliability and access.	$53,200	Oakdale Electric Cooperative and Juneau County	Oakdale Electric Cooperative	Medium	2011-2012
Wind, ice, and rain.	T 14 N - R 4 E Sections 23 & 26. Replace 4,300 of overhead line with underground. History of extended outages and poor access to line.	$33,100	Oakdale Electric Cooperative and Juneau County	Oakdale Electric Cooperative	High	2011-2012
Ice, wind, tornado, interstate access.	T 17 N - R 1 W Section 18. Bury 400 feet of 3-phase line crossing interstate.	$14,900	Oakdale Electric Cooperative and Monroe County	Oakdale Electric Cooperative	Low	2011-2012
High winds, ice storm tornado, and interstate access.	T17N-R2W Section 13. Bury overhead line that crosses interstate and relocate form another direction.	$17,100	Oakdale Electric Cooperative and Monroe County	Oakdale Electric Cooperative	High	2011-2012
High winds, ice storm, tornado, and interstate access.	T17N-R1E Section 9. Relocate and bury 687 feet of double circuit line serving the village of Oakdale.	$63,000	Oakdale Electric Cooperative and Monroe County	Oakdale Electric Cooperative	Low	2011-2012
Wind rain ice storms, and tree hazards.	T16N-R3 Section 6/T17N-R3E Section 31. Relocate line parallel to road to remove existing lines from an are prone to flooding. Improve access and restoration of service.	$56,000	Oakdale Electric Cooperative and Juneau County	Oakdale Electric Cooperative	Low	2011-2012
High winds, ice storms, lightning, tornado, blizzard, forest fire	ELA-03 & LUA-01 project—bury 8.5 miles of 4/0 three phase line tying Lund and Ella substations together providing backfeed capabilities. Remote ROW makes access difficult at best. The Ella sub serves 614 residences, while Lund serves 755.	$794,631	Pierce Pepin Cooperative Services and Pepin County	Pierce Pepin Cooperative Services	High	2013-2015

TABLE G.4.2-1 WISCONSIN ELECTRIC COOPERATIVES ALL-HAZARDS MITIGATION PLAN						
Hazards of Concern	**Mitigation Measures**	**Estimated Cost in Today's Dollars**	**Cooperative and County or Counties**	**Responsible Party for Implementation**	**Priority Ranking (H, M, L)**	**Projected Timetable**
High winds, ice storms, lightning, tornado, blizzard, forest fire	ELA-02 project—bury 7.2 miles of 4/0 three phase serving a commercial and industrial park at the end of this circuit as well as residential accounts. Remote ROW makes access difficult at best. 156 accounts served on this circuit.	$673,099	Pierce Pepin Cooperative Services and Pepin County	Pierce Pepin Cooperative Services	Medium	2013-2015
High winds, ice storms, lightning, tornado, blizzard, forest fire	Highway 35 project phase II (ESA-06)—bury 1.5 miles of 4/0 three phase line tying Lund and Esdaile substations providing feedback capabilities. Remote, nearly inaccessible segment of line. 1,763 accounts are potentially affected by this project.	$140,229	Pierce Pepin Cooperative Services and Pepin County	Pierce Pepin Cooperative Services	High	2012-2015
High winds, ice storm, forest fire and tornadoes	Upper Byrds Creek Project (from County Road X)--bury 5.22 miles of single phase line. Line is an important tie for substation and has documented outages due to high winds	$208,800	Richland Electric Cooperative and Richland County	Richland Electric Cooperative	Medium	2011-2013
High winds, ice storm, lightning and tornadoes	Middle Byrds Creek Project (beginning at 2753)--bury 1.88 miles of single phase overhead line. Line serves 100 consumers and has a history high wind related outages.	$75,200	Richland Electric Cooperative and Richland County	Richland Electric Cooperative	Medium	2011-2013
High winds, ice storm, forest fire, lightning, torrential rains, and tornadoes	Eagle Cave Line Project--bury 4.23 miles of single phase overhead line that traverses a dense forest area. Line serves a campground, a tourist attraction, and others. Power in this area is espically important for notifying public of impending storms. Line has a history of outages.	$169,200	Richland Electric Cooperative and Richland County	Richland Electric Cooperative	Medium	2011-2013
High winds, ice storm, lightning, flooding and tornadoes	Dog Hollow and Upper Willow Watershed Line Project--bury 3.63 miles of single phase overhead line. History of outages related to high winds.	$145,200	Richland Electric Cooperative and Richland County	Richland Electric Cooperative	Medium	2011-2013
High winds, ice storm, forest fire and tornadoes	Gault Hollow Line Project--bury 3.2 miles of single phase overhead line. Line provides an alternate system tie in the event other sections of the system are damaged. History of outages related to high winds.	$128,000	Richland Electric Cooperative and Richland County	Richland Electric Cooperative	Medium	2011-2013
High winds, ice storm, forest fire and tornadoes	Replace 20 miles 8A Copperweld line	$840,000	Riverland Energy Cooperative, Buffalo, Eau Claire, Jackson, La Crosse, Trempealeau Counties	Riverland Energy Cooperative	Medium	2011-2014

TABLE G.4.2-1 WISCONSIN ELECTRIC COOPERATIVES ALL-HAZARDS MITIGATION PLAN

Hazards of Concern	Mitigation Measures	Estimated Cost in Today's Dollars	Cooperative and County or Counties	Responsible Party for Implementation	Priority Ranking (H, M, L)	Projected Timetable
High winds, ice storm, forest fire and tornadoes	Gilmanton Substation - North circuit. Two miles of overhead three-phase line in and near river bed. Washouts are a threat	$180,000	Riverland Energy Cooperative - Buffalo County	Riverland Energy Cooperative	High	2012
High winds, ice storm, forest fire and tornadoes	Strum, Pleasantville, Osseo Substations interconnection. Strum and Pleasantville circuits could be isolated. Interconnection with Osseo will backfeed both subs.	$140,000	Riverland Energy Cooperative - Trempealeau County	Riverland Energy Cooperative	Low	2012
High winds, ice storm, forest fire and tornadoes	Replace single-phase overhead power lines w/ underground, Interstate 94, I mile north of Osseo	$13,500	Riverland Energy Cooperative - Trempealeau County	Riverland Energy Cooperative	High	2012
High winds, ice storms, and forest fire	Sand Branch Road-Muscoda Project (G01-012)--construct 4.85 miles of new overhead line along an improved roadway to replace existing line. Existing line is inaccessible with mechanical equipment and has a history of outages related to weather events.	$224,000	Scenic Rivers Energy Cooperative and Grant County	Scenic Rivers Energy Cooperative	High	2013-2015
High winds, ice storms, flooding, and forest fire	Rockville Road--Harrison Township (G16-030)--bury 4.6 miles of single phase overhead line. Line is inaccessible with mechanical equipment and has had a history of outages.	$212,500	Scenic Rivers Energy Cooperative and Grant County	Scenic Rivers Energy Cooperative	High	2013-2015
High winds, ice storms, flooding, and forest fire	Wyalusing Area-Wyalusing Township Project (G53 and 54)--bury 6.62 miles of the C-phase and 2.32 miles of the A-phase. Lines are inaccessible with mechanical equipment and has had a history of outages.	$413,000	Scenic Rivers Energy Cooperative and Grant County	Scenic Rivers Energy Cooperative	High	2013-2015

CHAPTER G.5: MITIGATION ANNEX MAINTENANCE, MONITORING, AND APPROVAL

G.5.1 MITIGATION ANNEX MAINTENANCE

After each disaster, the annex (in coordination with the State of Wisconsin Hazard Mitigation Plan) will be reviewed. In addition, an update of the annex will coincide with the three-year plan update of the State of Wisconsin Hazard Mitigation Plan.

In the next annex update, additional Rural Electric Cooperatives may elect to participate. New Rural Electric Cooperatives will be required to complete a risk assessment and participate in the plan update process. Continuing Rural Electric Cooperatives will be required to reassess the risk assessment, review identified mitigation strategies for progress, and participate in the overall planning process.

G.5.2 MITIGATION ANNEX MONITORING

With the help of the Cooperative Network, the plan will be monitored by the Hazard Mitigation staff of Wisconsin Emergency Management. While Wisconsin Emergency Management will be the lead in monitoring this plan on a three-year cycle, it is of utmost importance that Rural Electric Cooperatives and the Cooperative Network provide progress reports of complete mitigation strategies.

G.5.3 MITIGATION ANNEX INCORPORATION INTO OTHER PLANNING MECHANISMS

It is the goal of Wisconsin Emergency Management that this annex be incorporated into the existing local (county and single jurisdiction) hazard mitigation plans. This annex serves as a link between local hazard mitigation planning and the State of Wisconsin Hazard Mitigation Plan. Wisconsin Emergency Management anticipates that local (county and single jurisdiction) plans take information directly from this plan and incorporate it into its own plan.

WEM would like to see RECs included in the local hazard mitigation planning process. Many counties and local jurisdictions are currently updating their plans and it would be best if RECs would participate in the plan update.

G.5.4 MITIGATION ANNEX FUTURE PUBLIC PARTICIPATION

In future updates of the State of Wisconsin Hazard Mitigation Plan and Rural Electric Cooperative Annex, there will be several opportunities for public to comment. Similar to the initial development, citizens will be able to attend public meetings and comment on the plan (posted to WEM's website).

APPENDIX 1:
Copies of Memorandum of Understanding between Rural Electric Cooperatives and Wisconsin Emergency Management

(forthcoming)

COPY

mailed 5/16/08

I have reviewed the above description for the proposed project and concur that on behalf of our Rural Electric Cooperative we wish to participate in the development of this REC Annex so that we may be eligible to receive Hazard Mitigation and Pre-Disaster Mitigation Program Grant funds for eligible mitigation activities.

Share A. Brandt	WECA Manager	April 30, 2008
Name	Title	Date

WECA the Association of Wisconsin's Electric Cooperatives

Representing – Rural Electric Cooperative

Share A. Brandt

Signature

I have reviewed the above description for the proposed project and have determined that on behalf of our Rural Electric Cooperative we do not wish to participate in the development of this Annex.

Name	Title	Date

Representing – Rural Electric Cooperative

Signature

Please fax to:
Susan Streich-Boldt, Assistant State Hazard Mitigation Officer
Wisconsin Division of Emergency Management
608-242-3248
Or Mail to:
2400 Wright Street, P.O. Box 7865
Madison, WI 53707-7865

PLEASE RESPOND ASAP BUT NO LATER THAN APRIL 30, 2008

APPENDIX 2:
Rural Electric Cooperatives Threat Analyses

2.1 WORKSHEET—THREAT ANALYSIS—NATURAL THREATS

Version #:_____

Completed by: Brenda Schwertsig--Adams Columbia Title: IT Coordinator Date: 10/21/08

Approved by:_____ Title:_____ Date:_____

CLICK POST-IT FOR ALLOWABLE RANGES	Probability	Speed of Onset	Forewarning	Duration	Economic Impact	Level of Concern	Relative Risk
Avalanche: Rock	0.00					1.00	0.00
Avalanche: Snow	0.00					1.00	0.00
Blizzard	4.00	2.00	1.00	2.00	2.00	3.00	13.33
Cold Wave	4.00	2.00	1.00	2.00	1.00	5.00	4.00
Crop Failure	0.00					1.00	0.00
Drought	0.00					1.00	0.00
Earthquake (Magnitude 5 or more)	0.00					1.00	0.00
Electrical Storm/Lightning: Fire	5.00	2.00	1.00	1.00	3.00	5.00	12.00
Flood: Dam Burst	2.00	2.00	2.00	1.00	2.00	5.00	4.00
Flood: Flash	1.00	2.00	1.00	1.00	2.00	5.00	1.60
Flood: Predictable/Seasonal	1.00	1.00	1.00	2.00	2.00	5.00	1.60
Flood: Sea and Lake Surges	0.00					1.00	0.00
Flood: Tsunami (Tidal Wave)	0.00					1.00	0.00
Fog	4.00	2.00	1.00	1.00	1.00	5.00	3.20
Forest Fire/Smoke	3.00	2.00	2.00	1.00	2.00	5.00	6.00
Frost	3.00	1.00	1.00	2.00	1.00	4.00	3.00
Hail	2.00	2.00	1.00	1.00	1.00	4.00	2.00
Heat Wave	3.00	1.00	1.00	2.00	5.00	3.00	20.00
High Winds (70+ mph)	4.00	2.00	1.00	1.00	5.00	3.00	26.67
Hurricane/Typhoon	0.00					1.00	0.00
Ice Storm	4.00	2.00	1.00	2.00	5.00	2.00	50.00
Land Subsidence/Liquefaction	1.00	1.00	1.00	2.00	2.00	5.00	1.60
Landslide/Mudslide	1.00	2.00	2.00	1.00	1.00	5.00	1.00
Lightning: Electrical Disruption	4.00	2.00	2.00	1.00	2.00	2.00	20.00
Magnetic Storms (Sun Spots)	1.00	1.00	2.00	2.00	1.00	5.00	1.00
Sandstorm	1.00	1.00	1.00	1.00	1.00	5.00	0.60
Tornado	5.00	2.00	2.00	1.00	5.00	3.00	41.67
Torrential Rains	3.00	2.00	1.00	2.00	3.00	4.00	11.25
Volcanic Activity	0.00					1.00	0.00
1	0.00					1.00	0.00
2	0.00					1.00	0.00
3	0.00					1.00	0.00

2.1 WORKSHEET—THREAT ANALYSIS—NATURAL THREATS

Version #:_____

Completed by: Susan Dau--Barron Electric Title: General Manager / Staff Assistant Date: 10/24/08

Approved by:_____ Title:_____ Date:_____

CLICK POST-IT FOR ALLOWABLE RANGES	Probability	Speed of Onset	Forewarning	Duration	Economic Impact	Level of Concern	Relative Risk
Avalanche: Rock	0.00					1.00	0.00
Avalanche: Snow	0.00					1.00	0.00
Blizzard	4.00	2.00	1.00	2.00	2.00	1.00	40.00
Cold Wave	5.00	1.00	1.00	2.00	2.00	5.00	8.00
Crop Failure	0.00					1.00	0.00
Drought	0.00					1.00	0.00
Earthquake (Magnitude 5 or more)	1.00	2.00	2.00	1.00	5.00	1.00	25.00
Electrical Storm/Lightning: Fire	5.00	2.00	2.00	2.00	3.00	2.00	45.00
Flood: Dam Burst	0.00					1.00	0.00
Flood: Flash	2.00	2.00	2.00	2.00	2.00	1.00	24.00
Flood: Predictable/Seasonal	0.00					1.00	0.00
Flood: Sea and Lake Surges	0.00					1.00	0.00
Flood: Tsunami (Tidal Wave)	0.00					1.00	0.00
Fog	5.00	2.00	2.00	2.00	1.00	5.00	6.00
Forest Fire/Smoke	5.00	2.00	2.00	2.00	3.00	2.00	45.00
Frost	5.00	1.00	1.00	2.00	1.00	5.00	4.00
Hail	5.00	2.00	2.00	1.00	1.00	5.00	5.00
Heat Wave	4.00	1.00	1.00	2.00	1.00	5.00	3.20
High Winds (70+ mph)	4.00	2.00	2.00	2.00	5.00	1.00	120.00
Hurricane/Typhoon	0.00					1.00	0.00
Ice Storm	4.00	2.00	2.00	2.00	5.00	1.00	120.00
Land Subsidence/Liquefaction	0.00					1.00	0.00
Landslide/Mudslide	0.00					1.00	0.00
Lightning: Electrical Disruption	5.00	2.00	2.00	2.00	3.00	4.00	22.50
Magnetic Storms (Sun Spots)	1.00	1.00	1.00	2.00	1.00	5.00	0.80
Sandstorm	0.00					1.00	0.00
Tornado	5.00	2.00	2.00	1.00	4.00	1.00	100.00
Torrential Rains	3.00	2.00	2.00	2.00	1.00	4.00	4.50
Volcanic Activity	0.00					1.00	0.00
1						1.00	0.00
2						1.00	0.00
3						1.00	0.00

2.1 WORKSHEET—THREAT ANALYSIS—NATURAL THREATS

Version #: 1

Completed by: Stacy Pethke--Central WI Electric Title: Accountant Date: 7/30/08

Approved by: Kevin Kurtzwell Title: Operations Supervisor Date: 7/30/08

CLICK POST-IT FOR ALLOWABLE RANGES	Probability	Speed of Onset	Forewarning	Duration	Economic Impact	Level of Concern	Relative Risk
Avalanche: Rock	0.00					1.00	0.00
Avalanche: Snow	0.00					1.00	0.00
Blizzard	3.00	1.00	1.00	2.00	2.00	3.00	8.00
Cold Wave	2.00	1.00	1.00	2.00	1.00	4.00	2.00
Crop Failure	3.00	1.00	2.00	1.00	1.00	4.00	3.00
Drought	3.00	1.00	1.00	2.00	1.00	4.00	3.00
Earthquake (Magnitude 5 or more)	1.00	2.00	2.00	1.00	5.00	5.00	5.00
Electrical Storm/Lightning: Fire	4.00	2.00	2.00	1.00	2.00	3.00	13.33
Flood: Dam Burst	1.00	2.00	2.00	1.00	2.00	5.00	2.00
Flood: Flash	2.00	2.00	1.00	2.00	3.00	4.00	7.50
Flood: Predictable/Seasonal	0.00					1.00	0.00
Flood: Sea and Lake Surges	0.00					1.00	0.00
Flood: Tsunami (Tidal Wave)	0.00					1.00	0.00
Fog	4.00	2.00	1.00	2.00	1.00	5.00	4.00
Forest Fire/Smoke	2.00	2.00	2.00	1.00	2.00	4.00	5.00
Frost	5.00	2.00	1.00	2.00	1.00	5.00	5.00
Hail	4.00	2.00	1.00	2.00	2.00	3.00	13.33
Heat Wave	5.00	1.00	1.00	2.00	1.00	5.00	4.00
High Winds (70+ mph)	4.00	2.00	1.00	2.00	2.00	4.00	10.00
Hurricane/Typhoon	0.00					1.00	0.00
Ice Storm	4.00	2.00	1.00	2.00	2.00	3.00	13.33
Land Subsidence/Liquefaction	0.00					1.00	0.00
Landslide/Mudslide	0.00					1.00	0.00
Lightning: Electrical Disruption	3.00	2.00	2.00	1.00	1.00	3.00	5.00
Magnetic Storms (Sun Spots)	0.00					1.00	0.00
Sandstorm	0.00					1.00	0.00
Tornado	3.00	2.00	1.00	2.00	5.00	3.00	25.00
Torrential Rains	1.00	2.00	1.00	2.00	1.00	5.00	1.00
Volcanic Activity	0.00					1.00	0.00
1						1.00	0.00
2						1.00	0.00
3						1.00	0.00

2.1 WORKSHEET—THREAT ANALYSIS—NATURAL THREATS

Version #: 2008

Completed by: Jan Lahtonen--East Central Energy Title: Loss Control & Emergency Date: 11/6/08

Approved by: _____ Title: _____ Date: _____

CLICK POST-IT FOR ALLOWABLE RANGES	Probability	Speed of Onset	Forewarning	Duration	Economic Impact	Level of Concern	Relative Risk
Avalanche: Rock	1.00	2.00	2.00	1.00	1.00	5.00	1.00
Avalanche: Snow	1.00	2.00	1.00	1.00	1.00	4.00	1.00
Blizzard	4.00	1.00	1.00	2.00	2.00	2.00	16.00
Cold Wave	4.00	1.00	1.00	2.00	1.00	4.00	4.00
Crop Failure	0.00					5.00	0.00
Drought	2.00	1.00	1.00	2.00	1.00	4.00	2.00
Earthquake (Magnitude 5 or more)	0.00					1.00	0.00
Electrical Storm/Lightning: Fire	5.00	2.00	1.00	2.00	1.00	2.00	12.50
Flood: Dam Burst	1.00	2.00	2.00	1.00	1.00	5.00	1.00
Flood: Flash	1.00	2.00	2.00	1.00	1.00	5.00	1.00
Flood: Predictable/Seasonal	1.00	1.00	1.00	2.00	1.00	4.00	1.00
Flood: Sea and Lake Surges	0.00					5.00	0.00
Flood: Tsunami (Tidal Wave)	0.00					5.00	0.00
Fog	3.00	1.00	1.00	2.00	1.00	5.00	2.40
Forest Fire/Smoke	2.00	2.00	2.00	2.00	1.00	4.00	3.00
Frost	5.00	1.00	1.00	2.00	1.00	4.00	5.00
Hail	5.00	2.00	1.00	2.00	1.00	2.00	12.50
Heat Wave	4.00	1.00	1.00	2.00	1.00	4.00	4.00
High Winds (70+ mph)	4.00	2.00	1.00	1.00	2.00	2.00	16.00
Hurricane/Typhoon	0.00					5.00	0.00
Ice Storm	4.00	1.00	1.00	1.00	2.00	2.00	12.00
Land Subsidence/Liquefaction	0.00					5.00	0.00
Landslide/Mudslide	1.00	2.00	2.00	1.00	1.00	5.00	1.00
Lightning: Electrical Disruption	5.00	2.00	1.00	1.00	1.00	3.00	6.67
Magnetic Storms (Sun Spots)	1.00	1.00	1.00	2.00	1.00	5.00	0.80
Sandstorm	0.00					5.00	0.00
Tornado	2.00	2.00	1.00	1.00	1.00	3.00	2.67
Torrential Rains	3.00	2.00	1.00	2.00	1.00	4.00	3.75
Volcanic Activity	0.00					5.00	0.00
1						1.00	0.00
2						1.00	0.00
3						1.00	0.00

2.1 WORKSHEET—THREAT ANALYSIS—NATURAL THREATS

Version #: 1

Completed by: Richard Kelly--Eau Claire Energy Title: Manager Safety and Loss Control Date: 4/26/05

Approved by: _____ Title: _____ Date: _____

CLICK POST-IT FOR ALLOWABLE RANGES	Probability	Speed of Onset	Forewarning	Duration	Economic Impact	Level of Concern	Relative Risk
Avalanche: Rock	0.00					1.00	0.00
Avalanche: Snow	0.00					1.00	0.00
Blizzard	1.00	2.00	1.00	2.00	2.00	4.00	2.50
Cold Wave	3.00	2.00	1.00	2.00	1.00	5.00	3.00
Crop Failure	2.00	1.00	1.00	2.00	1.00	5.00	1.60
Drought	2.00	1.00	1.00	2.00	1.00	5.00	1.60
Earthquake (Magnitude 5 or more)	0.00					1.00	0.00
Electrical Storm/Lightning: Fire	2.00	2.00	2.00	2.00	4.00	3.00	16.00
Flood: Dam Burst	2.00	1.00	1.00	2.00	3.00	4.00	6.00
Flood: Flash	1.00	2.00	1.00	2.00	3.00	4.00	3.75
Flood: Predictable/Seasonal	2.00	1.00	1.00	2.00	1.00	5.00	1.60
Flood: Sea and Lake Surges	0.00					1.00	0.00
Flood: Tsunami (Tidal Wave)	0.00					1.00	0.00
Fog	2.00	2.00	1.00	2.00	2.00	4.00	5.00
Forest Fire/Smoke	2.00	2.00	2.00	2.00	3.00	5.00	7.20
Frost	2.00	1.00	1.00	2.00	1.00	5.00	1.60
Hail	2.00	2.00	1.00	1.00	1.00	4.00	2.00
Heat Wave	2.00	1.00	1.00	2.00	2.00	4.00	4.00
High Winds (70+ mph)	2.00	2.00	2.00	1.00	4.00	3.00	13.33
Hurricane/Typhoon	0.00					1.00	0.00
Ice Storm	2.00	1.00	1.00	2.00	5.00	3.00	13.33
Land Subsidence/Liquefaction	0.00					1.00	0.00
Landslide/Mudslide	0.00					1.00	0.00
Lightning: Electrical Disruption	2.00	2.00	2.00	1.00	2.00	3.00	6.67
Magnetic Storms (Sun Spots)	1.00	1.00	1.00	2.00	1.00	3.00	1.33
Sandstorm	0.00					1.00	0.00
Tornado	2.00	2.00	1.00	1.00	3.00	3.00	8.00
Torrential Rains	1.00	2.00	1.00	2.00	2.00	3.00	3.33
Volcanic Activity	0.00					1.00	0.00
1						1.00	0.00
2						1.00	0.00
3						1.00	0.00

2.1 WORKSHEET—THREAT ANALYSIS—NATURAL THREATS

Version #: 1

Completed by: Richard Kelly--Jackson Electric Title: Manager Safety and Loss Control Date: 4/26/05

Approved by: _____ Title: _____ Date: _____

CLICK POST-IT FOR ALLOWABLE RANGES	Probability	Speed of Onset	Forewarning	Duration	Economic Impact	Level of Concern	Relative Risk
Avalanche: Rock	0.00					1.00	0.00
Avalanche: Snow	0.00					1.00	0.00
Blizzard	1.00	2.00	1.00	2.00	2.00	4.00	2.50
Cold Wave	3.00	2.00	1.00	2.00	1.00	5.00	3.00
Crop Failure	2.00	1.00	1.00	2.00	1.00	5.00	1.60
Drought	2.00	1.00	1.00	2.00	1.00	5.00	1.60
Earthquake (Magnitude 5 or more)	0.00					1.00	0.00
Electrical Storm/Lightning: Fire	2.00	2.00	2.00	2.00	4.00	3.00	16.00
Flood: Dam Burst	2.00	1.00	1.00	2.00	3.00	4.00	6.00
Flood: Flash	1.00	2.00	1.00	2.00	3.00	4.00	3.75
Flood: Predictable/Seasonal	2.00	1.00	1.00	2.00	1.00	5.00	1.60
Flood: Sea and Lake Surges	0.00					1.00	0.00
Flood: Tsunami (Tidal Wave)	0.00					1.00	0.00
Fog	2.00	2.00	1.00	2.00	2.00	4.00	5.00
Forest Fire/Smoke	2.00	2.00	2.00	2.00	3.00	5.00	7.20
Frost	2.00	1.00	1.00	2.00	1.00	5.00	1.60
Hail	2.00	2.00	1.00	1.00	1.00	4.00	2.00
Heat Wave	2.00	1.00	1.00	2.00	2.00	4.00	4.00
High Winds (70+ mph)	2.00	2.00	2.00	1.00	4.00	3.00	13.33
Hurricane/Typhoon	0.00					1.00	0.00
Ice Storm	2.00	1.00	1.00	2.00	5.00	3.00	13.33
Land Subsidence/Liquefaction	0.00					1.00	0.00
Landslide/Mudslide	0.00					1.00	0.00
Lightning: Electrical Disruption	2.00	2.00	2.00	1.00	2.00	3.00	6.67
Magnetic Storms (Sun Spots)	1.00	1.00	1.00	2.00	1.00	3.00	1.33
Sandstorm	0.00					1.00	0.00
Tornado	2.00	2.00	1.00	1.00	3.00	3.00	8.00
Torrential Rains	1.00	2.00	1.00	2.00	2.00	3.00	3.33
Volcanic Activity	0.00					1.00	0.00
1						1.00	0.00
2						1.00	0.00
3						1.00	0.00

2.1 WORKSHEET—THREAT ANALYSIS—NATURAL THREATS

Version #: 1

Completed by: Lori Larsen--Jump River Electric Title: General Manager Date: 10/31/08

Approved by: _____ Title: _____ Date: _____

CLICK POST-IT FOR ALLOWABLE RANGES	Probability	Speed of Onset	Forewarning	Duration	Economic Impact	Level of Concern	Relative Risk
Avalanche: Rock	0.00					1.00	0.00
Avalanche: Snow	0.00					1.00	0.00
Blizzard	5.00	1.00	1.00	2.00	3.00	4.00	15.00
Cold Wave	5.00	1.00	1.00	2.00	2.00	4.00	10.00
Crop Failure	3.00	1.00	1.00	2.00	1.00	5.00	2.40
Drought	3.00	1.00	1.00	2.00	1.00	5.00	2.40
Earthquake (Magnitude 5 or more)	0.00					1.00	0.00
Electrical Storm/Lightning: Fire	5.00	2.00	2.00	2.00	3.00	3.00	30.00
Flood: Dam Burst	1.00	2.00	2.00	2.00	5.00	3.00	10.00
Flood: Flash	3.00	2.00	2.00	2.00	2.00	4.00	9.00
Flood: Predictable/Seasonal	2.00	1.00	1.00	2.00	1.00	5.00	1.60
Flood: Sea and Lake Surges	0.00					1.00	0.00
Flood: Tsunami (Tidal Wave)	0.00					1.00	0.00
Fog	4.00	2.00	2.00	2.00	1.00	5.00	4.80
Forest Fire/Smoke	4.00	2.00	2.00	2.00	3.00	3.00	24.00
Frost	5.00	1.00	1.00	2.00	1.00	5.00	4.00
Hail	4.00	2.00	2.00	1.00	2.00	4.00	10.00
Heat Wave	4.00	1.00	1.00	2.00	2.00	5.00	6.40
High Winds (70+ mph)	5.00	2.00	2.00	2.00	5.00	4.00	37.50
Hurricane/Typhoon	0.00					1.00	0.00
Ice Storm	5.00	2.00	1.00	2.00	5.00	4.00	31.25
Land Subsidence/Liquefaction	0.00					1.00	0.00
Landslide/Mudslide	0.00					1.00	0.00
Lightning: Electrical Disruption	5.00	2.00	2.00	2.00	3.00	4.00	22.50
Magnetic Storms (Sun Spots)	0.00					1.00	0.00
Sandstorm	0.00					1.00	0.00
Tornado	4.00	2.00	2.00	1.00	5.00	3.00	33.33
Torrential Rains	4.00	2.00	2.00	2.00	4.00	4.00	24.00
Volcanic Activity	0.00					1.00	0.00
1						1.00	0.00
2						1.00	0.00
3						1.00	0.00

2.1 WORKSHEET—THREAT ANALYSIS—NATURAL THREATS

Version #: 1.0

Completed by: Jeff Olson--Pierce Pepin Co-op Title: Vice President, Engineering & IT Date: 10/9/08

Approved by: _____ Title: _____ Date: _____

CLICK POST-IT FOR ALLOWABLE RANGES	Probability	Speed of Onset	Forewarning	Duration	Economic Impact	Level of Concern	Relative Risk
Avalanche: Rock	0.00					1.00	0.00
Avalanche: Snow	0.00					1.00	0.00
Blizzard	3.00	1.00	1.00	2.00	2.00	4.00	6.00
Cold Wave	4.00	1.00	1.00	2.00	3.00	2.00	24.00
Crop Failure	1.00	1.00	1.00	2.00	2.00	4.00	2.00
Drought	1.00	1.00	1.00	2.00	3.00	5.00	2.40
Earthquake (Magnitude 5 or more)	0.00	2.00	2.00	1.00	5.00	1.00	0.00
Electrical Storm/Lightning: Fire	3.00	2.00	1.00	2.00	2.00	4.00	7.50
Flood: Dam Burst	1.00	2.00	1.00	2.00	3.00	4.00	3.75
Flood: Flash	2.00	2.00	1.00	2.00	3.00	2.00	15.00
Flood: Predictable/Seasonal	2.00	1.00	1.00	2.00	3.00	3.00	8.00
Flood: Sea and Lake Surges	0.00					1.00	0.00
Flood: Tsunami (Tidal Wave)	0.00					1.00	0.00
Fog	2.00	2.00	1.00	2.00	2.00	4.00	5.00
Forest Fire/Smoke	1.00	2.00	2.00	2.00	1.00	5.00	1.20
Frost	3.00	2.00	1.00	2.00	2.00	4.00	7.50
Hail	4.00	2.00	1.00	1.00	2.00	3.00	10.67
Heat Wave	4.00	1.00	1.00	2.00	3.00	2.00	24.00
High Winds (70+ mph)	5.00	2.00	1.00	1.00	5.00	3.00	33.33
Hurricane/Typhoon	0.00					1.00	0.00
Ice Storm	3.00	2.00	1.00	2.00	4.00	2.00	30.00
Land Subsidence/Liquefaction	0.00					1.00	0.00
Landslide/Mudslide	0.00					1.00	0.00
Lightning: Electrical Disruption	4.00	2.00	1.00	1.00	3.00	3.00	16.00
Magnetic Storms (Sun Spots)	0.00					1.00	0.00
Sandstorm	0.00					1.00	0.00
Tornado	2.00	2.00	1.00	1.00	5.00	4.00	10.00
Torrential Rains	0.00					1.00	0.00
Volcanic Activity	0.00					1.00	0.00
1						1.00	0.00
2						1.00	0.00
3						1.00	0.00

2.1 WORKSHEET—THREAT ANALYSIS—NATURAL THREATS

Version #: 1

Completed by: Shannon Clark--Richland Electric Title: CEO & General Manager Date: 8/1/08

Approved by: _____ Title: _____ Date: _____

CLICK POST-IT FOR ALLOWABLE RANGES	Probability	Speed of Onset	Forewarning	Duration	Economic Impact	Level of Concern	Relative Risk
Avalanche: Rock	1.00	2.00	2.00	1.00	2.00	5.00	2.00
Avalanche: Snow	0.00	2.00	2.00	1.00	2.00	5.00	0.00
Blizzard	3.00	2.00	1.00	2.00	4.00	2.00	30.00
Cold Wave	5.00	2.00	1.00	2.00	3.00	3.00	25.00
Crop Failure	3.00	1.00	1.00	2.00	3.00	1.00	36.00
Drought	3.00	1.00	1.00	2.00	3.00	4.00	9.00
Earthquake (Magnitude 5 or more)	1.00	2.00	2.00	1.00	5.00	5.00	5.00
Electrical Storm/Lightning: Fire	5.00	2.00	1.00	1.00	3.00	2.00	30.00
Flood: Dam Burst	2.00	2.00	2.00	1.00	4.00	3.00	13.33
Flood: Flash	3.00	2.00	1.00	1.00	4.00	2.00	24.00
Flood: Predictable/Seasonal	5.00	2.00	1.00	2.00	5.00	2.00	62.50
Flood: Sea and Lake Surges	0.00	2.00	1.00	2.00	1.00	5.00	0.00
Flood: Tsunami (Tidal Wave)	0.00	2.00	2.00	1.00	1.00	5.00	0.00
Fog	5.00	2.00	2.00	2.00	1.00	5.00	6.00
Forest Fire/Smoke	1.00	2.00	2.00	2.00	2.00	5.00	2.40
Frost	5.00	2.00	1.00	2.00	1.00	5.00	5.00
Hail	5.00	2.00	2.00	1.00	4.00	3.00	33.33
Heat Wave	5.00	2.00	1.00	2.00	4.00	3.00	33.33
High Winds (70+ mph)	5.00	2.00	2.00	1.00	5.00	1.00	125.00
Hurricane/Typhoon	0.00	2.00	1.00	2.00	5.00	5.00	0.00
Ice Storm	3.00	2.00	2.00	2.00	5.00	5.00	18.00
Land Subsidence/Liquefaction	0.00	2.00	2.00	1.00	2.00	2.00	0.00
Landslide/Mudslide	1.00	2.00	2.00	1.00	3.00	2.00	7.50
Lightning: Electrical Disruption	4.00	2.00	2.00	1.00	5.00	1.00	100.00
Magnetic Storms (Sun Spots)	1.00	2.00	1.00	2.00	2.00	5.00	2.00
Sandstorm	0.00	2.00	2.00	1.00	1.00	5.00	0.00
Tornado	3.00	2.00	1.00	1.00	5.00	1.00	60.00
Torrential Rains	3.00	2.00	1.00	2.00	5.00	1.00	75.00
Volcanic Activity	0.00	2.00	1.00	2.00	1.00	5.00	0.00
1						1.00	0.00
2						1.00	0.00
3						1.00	0.00

2.1 WORKSHEET—THREAT ANALYSIS—NATURAL THREATS

Version #:_____

Completed by: Daniel J Steipflug --Scenic Rivers Title: Director of Operations Date: 5/12/05

Approved by: Richard E Kolb Title: Manager Date:_____

CLICK POST-IT FOR ALLOWABLE RANGES	Probability	Speed of Onset	Forewarning	Duration	Economic Impact	Level of Concern	Relative Risk
Avalanche: Rock	0.00					1.00	0.00
Avalanche: Snow	0.00					1.00	0.00
Blizzard	2.00	2.00	1.00	2.00	2.00	4.00	5.00
Cold Wave	2.00	2.00	1.00	2.00	1.00	5.00	2.00
Crop Failure	0.00					1.00	0.00
Drought	0.00					1.00	0.00
Earthquake (Magnitude 5 or more)	0.00					1.00	0.00
Electrical Storm/Lightning: Fire	1.00	2.00	2.00	1.00	1.00	5.00	1.00
Flood: Dam Burst	0.00					1.00	0.00
Flood: Flash	1.00	2.00	1.00	1.00	1.00	5.00	0.80
Flood: Predictable/Seasonal	1.00	2.00	1.00	1.00	1.00	5.00	0.80
Flood: Sea and Lake Surges	0.00					1.00	0.00
Flood: Tsunami (Tidal Wave)	0.00					1.00	0.00
Fog	1.00	2.00	1.00	1.00	1.00	5.00	0.80
Forest Fire/Smoke	1.00	2.00	1.00	1.00	1.00	5.00	0.80
Frost	5.00	1.00	1.00	2.00	1.00	5.00	4.00
Hail	3.00	2.00	1.00	1.00	1.00	5.00	2.40
Heat Wave	2.00	2.00	1.00	2.00	1.00	5.00	2.00
High Winds (70+ mph)	2.00	2.00	1.00	2.00	2.00	4.00	5.00
Hurricane/Typhoon	0.00					1.00	0.00
Ice Storm	1.00	2.00	1.00	2.00	3.00	1.00	15.00
Land Subsidence/Liquefaction	0.00					1.00	0.00
Landslide/Mudslide	0.00					1.00	0.00
Lightning: Electrical Disruption	3.00	2.00	1.00	1.00	1.00	4.00	3.00
Magnetic Storms (Sun Spots)	0.00					1.00	0.00
Sandstorm	0.00					1.00	0.00
Tornado	2.00	2.00	1.00	1.00	3.00	3.00	8.00
Torrential Rains	0.00					1.00	0.00
Volcanic Activity	0.00					1.00	0.00
1						1.00	0.00
2						1.00	0.00
3						1.00	0.00

2.1 WORKSHEET—THREAT ANALYSIS—NATURAL THREATS

Version #: 8/09

Completed by: Richard Kelly, Oakdale Electric Coop. Title: Manager, Safety and Loss Control Date: 8/12/09

Approved by: _____ Title: _____ Date: _____

CLICK POST-IT FOR ALLOWABLE RANGES	Probability	Speed of Onset	Forewarning	Duration	Economic Impact	Level of Concern	Relative Risk
Avalanche: Rock	1.00	2.00	1.00	1.00	1.00	5.00	0.80
Avalanche: Snow	0.00					1.00	0.00
Blizzard	1.00	1.00	1.00	2.00	3.00	4.00	3.00
Cold Wave	2.00	1.00	1.00	2.00	3.00	4.00	6.00
Crop Failure	2.00	1.00	1.00	2.00	4.00	5.00	6.40
Drought	1.00	1.00	1.00	2.00	2.00	4.00	2.00
Earthquake (Magnitude 5 or more)	0.00					1.00	0.00
Electrical Storm/Lightning: Fire	5.00	2.00	2.00	1.00	2.00	4.00	12.50
Flood: Dam Burst	1.00	2.00	2.00	2.00	2.00	4.00	3.00
Flood: Flash	1.00	2.00	2.00	2.00	2.00	4.00	3.00
Flood: Predictable/Seasonal	1.00	1.00	1.00	2.00	1.00	5.00	0.80
Flood: Sea and Lake Surges	0.00					1.00	0.00
Flood: Tsunami (Tidal Wave)	0.00					1.00	0.00
Fog	2.00	2.00	1.00	2.00	3.00	4.00	7.50
Forest Fire/Smoke	1.00	2.00	2.00	2.00	4.00	4.00	6.00
Frost	1.00	1.00	1.00	2.00	1.00	5.00	0.80
Hail	1.00	1.00	2.00	1.00	3.00	4.00	3.00
Heat Wave	2.00	2.00	1.00	2.00	2.00	4.00	5.00
High Winds (70+ mph)	2.00	2.00	2.00	1.00	5.00	3.00	16.67
Hurricane/Typhoon	0.00					1.00	0.00
Ice Storm	1.00	2.00	1.00	2.00	5.00	3.00	8.33
Land Subsidence/Liquefaction	0.00					1.00	0.00
Landslide/Mudslide	0.00					1.00	0.00
Lightning: Electrical Disruption	2.00	2.00	2.00	2.00	3.00	4.00	9.00
Magnetic Storms (Sun Spots)	1.00	2.00	2.00	2.00	1.00	5.00	1.20
Sandstorm	0.00					1.00	0.00
Tornado	2.00	2.00	1.00	1.00	3.00	4.00	6.00
Torrential Rains	3.00	2.00	1.00	2.00	3.00	4.00	11.25
Volcanic Activity	0.00					1.00	0.00
1 Powerline falls onto Interstate 90 or 94	3.00	2.00	2.00	2.00	5.00	4.00	22.50
2						1.00	0.00
3						1.00	0.00

2.1 WORKSHEET—THREAT ANALYSIS—NATURAL THREATS

Version #: 8/09

Completed by: Richard Kelly, Riverland Energy Coop. Title: Manager, Safety and Loss Control Date: 8/12/09

Approved by: _____ Title: _____ Date: _____

CLICK POST-IT FOR ALLOWABLE RANGES

	Probability	Speed of Onset	Forewarning	Duration	Economic Impact	Level of Concern	Relative Risk
Avalanche: Rock	2.00	2.00	1.00	1.00	2.00	4.00	4.00
Avalanche: Snow	0.00					1.00	0.00
Blizzard	1.00	1.00	1.00	2.00	3.00	4.00	3.00
Cold Wave	2.00	1.00	1.00	2.00	3.00	4.00	6.00
Crop Failure	2.00	1.00	1.00	2.00	4.00	5.00	6.40
Drought	1.00	1.00	1.00	2.00	2.00	4.00	2.00
Earthquake (Magnitude 5 or more)	0.00					1.00	0.00
Electrical Storm/Lightning: Fire	5.00	2.00	2.00	1.00	2.00	4.00	12.50
Flood: Dam Burst	3.00	2.00	2.00	2.00	2.00	3.00	12.00
Flood: Flash	3.00	2.00	2.00	2.00	2.00	4.00	9.00
Flood: Predictable/Seasonal	3.00	1.00	1.00	2.00	3.00	3.00	12.00
Flood: Sea and Lake Surges	0.00					1.00	0.00
Flood: Tsunami (Tidal Wave)	0.00					1.00	0.00
Fog	2.00	2.00	1.00	2.00	3.00	4.00	7.50
Forest Fire/Smoke	1.00	2.00	2.00	2.00	4.00	4.00	6.00
Frost	1.00	1.00	1.00	2.00	1.00	5.00	0.80
Hail	1.00	1.00	2.00	1.00	3.00	4.00	3.00
Heat Wave	2.00	2.00	1.00	2.00	2.00	4.00	5.00
High Winds (70+ mph)	2.00	2.00	2.00	1.00	5.00	3.00	16.67
Hurricane/Typhoon	0.00					1.00	0.00
Ice Storm	1.00	2.00	1.00	2.00	5.00	3.00	8.33
Land Subsidence/Liquefaction	0.00					1.00	0.00
Landslide/Mudslide	1.00	2.00	2.00	1.00	2.00	4.00	2.50
Lightning: Electrical Disruption	2.00	2.00	2.00	2.00	3.00	4.00	9.00
Magnetic Storms (Sun Spots)	1.00	2.00	2.00	2.00	1.00	5.00	1.20
Sandstorm	0.00					1.00	0.00
Tornado	2.00	2.00	1.00	1.00	3.00	4.00	6.00
Torrential Rains	3.00	2.00	1.00	2.00	3.00	3.00	15.00
Volcanic Activity	0.00					1.00	0.00
1 Power lines fall across interstate	2.00	2.00	2.00	2.00	5.00	4.00	15.00
2						1.00	0.00
3						1.00	0.00

Risk Assessment – Category

Sorted By Category

Risk Ranking High 75 and above
Medium 40 – 74
Low 39 and below

1 = Human Actions
2 = Natural Occurrence

Business functions problems due to fire - Coffeemaker overheated causing fire		A	C		X	T		X	V		=	Risk		1
Business functions problems due to fire - Overload circuit causing fire		B	C		X	T		X	V		=	Risk		1
Business functions problems due to fire - Improper storage of combustible materials		C	C		X	T		X	V		=	Risk		1
Business functions problems due to fire - Truck engine fire after hours in garage		D	C		X	T		X	V		=	Risk		1
Business functions problems due to Tornado - Central Office hit by tornado		A	C		X	T		X	V		=	Risk		2
Business function problems due to Flooding - Central Office affected by flooding of roads		A	C		X	T		X	V		=	Risk		2
Business function problems due to Flooding - Water pipe breaks in Central Office		B	C		X	T		X	V		=	Risk		2
Business functions problems due to human actions - Office set on fire by angry member		A	C		X	T		X	V		=	Risk		1
Business functions problems due to human actions - Central Office damaged by car hitting building		B	C		X	T		X	V		=	Risk		1
Business functions problems due to human actions - Central Office affected by bomb threat		C	C		X	T		X	V		=	Risk		1
Business functions affected due to personnel affected by pandemic flu - Several Office personnel sick		A	C		X	T		X	V		=	Risk		2
Business functions affected due to personnel affected by pandemic flu - Flu impacting operations sickness/deaths		B	C		X	T		X	V		=	Risk		2
Distribution System facilities affected due to fire - Substation fire un-know origin		A	C		X	T		X	V		=	Risk		2
Distribution System facilities affected due to fire - Person burning ditches causes substation fire		B	C		X	T		X	V		=	Risk		1
~~Distribution System facilities affected due to fire in National Forest~~		C	C		X	T		X	V		=	Risk		2
~~Distribution System facilities affected due to fire in National Forest~~		D	C		X	T		X	V		=	Risk		1
Distribution System facilities affected due to tornado - Residential area damaged by tornado		A	C		X	T		X	V		=	Risk		2
~~Distribution System facilities affected due to tornado in National Forest~~		B	C		X	T		X	V		=	Risk		2
Distribution System facilities affected due to flooding - Flash flood damaged URD because of washout area		A	C		X	T		X	V		=	Risk		2
Distribution System facilities affected due to ice storm - Ice storm damage to localized area causing downed poles		A	C		X	T		X	V		=	Risk		2
~~Distribution System facilities affected due to ice storm in National Forest~~		B	C		X	T		X	V		=	Risk		2
Distribution System facilities affected due to human actions - Substation transformer shot by angry customer		A	C		X	T		X	V		=	Risk		1
Distribution System facilities affected due to human actions - Transmission & distribution poles are vandalized		B	C		X	T		X	V		=	Risk		1
Distribution System facilities affected due to human actions - vehicle hits transmission line pole causing damage		C	C		X	T		X	V		=	Risk		1
Distribution System facilities affected due to personnel affected by pandemic flu - Several linemen sick, ice storm hits area		A	C		X	T		X	V		=	Risk		2
Distribution System facilities affected due to personnel affected by pandemic flu when ice storm hits area		B	C		X	T		X	V		=	Risk		2
Communication problems due to fire - Substation fire affects distribution lines feeding radio stations	1.3.4.1	A	C		X	T		X	V		=	Risk		2
Communication problems due to human action - Human cause fire affects substation and distribution lines feeding radio stations	1.3.4.1	B	C		X	T		X	V		=	Risk		1
Communication problems affected due to tornado - Tornado damages microwave system used for Cooperative Communications	1.3.4.2	A	C		X	T		X	V		=	Risk		2
Communication problems due to ice storm - Ice storm damages distributions lines cause loss of power communication sites	1.3.4.5	A	C		X	T		X	V		=	Risk		2
Communication problems due to human action -Vandalism of communication equipment at substation	1.3.4.6	A	C		X	T		X	V		=	Risk		1
Communication problems due to human action - Someone shoots communication equipment in substation	1.3.4.6	B	C		X	T		X	V		=	Risk		1
Communication problems due to human action - A vehicle strikes a communication tower's transformer	1.3.4.6	C	C		X	T		X	V		=	Risk		1
Communication problems due to human action - TDS has equipment problems that affect Cooperative communications	1.3.4.6	D	C		X	T		X	V		=	Risk		1
Communication problems affected due to personnel affected by pandemic flu - Employee's) sick and we are having IT problems	1.3.4.7	A	C		X	T		X	V		=	Risk		2
Communication problems affected due to personnel affected by pandemic flu	1.3.4.7	B	C		X	T		X	V		=	Risk		2

Back-Up generation affected due to fire - Fire occurs in area where backup generator in housed.	[redacted]	A		C	[redacted]	X	T	[redacted]	X	V	[redacted]	=	Risk	[redacted]	2
Back-Up generation affected due to fire - The backup generator catches fire during a startup test period	[redacted]	B		C	[redacted]	X	T	[redacted]	X	V	[redacted]	=	Risk	[redacted]	2
Back-Up Generation affected due to tornado - A tornado strikes building causing damage backup generator is damaged	[redacted]	A		C	[redacted]	X	T	[redacted]	X	V	[redacted]	=	Risk	[redacted]	2
Back-Up generation affected due to human action - A disgruntle employee vandalize backup generator	[redacted]	A		C	[redacted]	X	T	[redacted]	X	V	[redacted]	=	Risk	[redacted]	1
Transmission problems affecting system - Xcel Enengy losess transmisison lines which feeds our critical load substation	3.1.4.1.	A		C	[redacted]	X	T	[redacted]	X	V	[redacted]	=	Risk	[redacted]	2
Transmission problems affecting system - Regional collapse of transmission system affects criticle load substation	3.1.4.1.	B		C	[redacted]	X	T	[redacted]	X	V	[redacted]	=	Risk	[redacted]	2
Transmission problems affecting system -request for portable substation from DPC can not be fullfiled	3.1.4.2.	A		C	[redacted]	X	T	[redacted]	X	V	[redacted]	=	Risk	[redacted]	2
Transmission problems affecting system - URD fault	3.1.4.3.	A		C	[redacted]	X	T	[redacted]	X	V	[redacted]	=	Risk	[redacted]	2
Transmission problems affecting system - A vehicle hits/damages URD cabinets	3.1.4.4.	A		C	[redacted]	X	T	[redacted]	X	V	[redacted]	=	Risk	[redacted]	1
Transmission problems affecting system - A person intentionally causes damage to transmission line feeding critical loads	3.1.4.4.	B		C	[redacted]	X	T	[redacted]	X	V	[redacted]	=	Risk	[redacted]	1
Transmission problems affecting system - A person shoots a substation transformer casuing damage to critical load substation	3.1.4.4.	C		C	[redacted]	X	T	[redacted]	X	V	[redacted]	=	Risk	[redacted]	1
Transmission problems due to weather issues - Weather issue causes substation problem that feeds Enbridge pipeline	3.2.4.1.	A		C	[redacted]	X	T	[redacted]	X	V	[redacted]	=	Risk	[redacted]	2
Transmission problems due to weather issues - Unknown issues cause substation problem that feeds Enbridge pipeline	3.2.4.1.	B		C	[redacted]	X	T	[redacted]	X	V	[redacted]	=	Risk	[redacted]	2
Transmission problems affecting system -request for portable substation from DPC can not be fullfiled	3.2.4.2.	A		C	[redacted]	X	T	[redacted]	X	V	[redacted]	=	Risk	[redacted]	1
Transmission problems affecting system - A person intentionally causes damage to transmission line feeding critical loads	3.2.4.3.	A		C	[redacted]	X	T	[redacted]	X	V	[redacted]	=	Risk	[redacted]	1
Transmission problems affecting system - A person shoots a substation transformer casuing damage to critical load substation	3.2.4.3.	B		C	[redacted]	X	T	[redacted]	X	V	[redacted]	=	Risk	[redacted]	1
Mass Communication facilities affected due to fire at substation that feeds radio station tower		A		C	[redacted]	X	T	[redacted]	X	V	[redacted]	=	Risk	[redacted]	2
Business functions problems due to fire - Ditch burning causes transformer poles to be damaged service radio station towers		B		C	[redacted]	X	T	[redacted]	X	V	[redacted]	=	Risk	[redacted]	1
Mass Communication problems affected due to tornado - Distribution services damaged that serves radion station tower		A		C	[redacted]	X	T	[redacted]	X	V	[redacted]	=	Risk	[redacted]	2
Mass Communication problems due to ice storm - Ice storm damage affects distrution line service radio station tower		A		C	[redacted]	X	T	[redacted]	X	V	[redacted]	=	Risk	[redacted]	2
Transmission problems affecting system - A person shoots a transformer casuing damage to transformer serving radio tower		A		C	[redacted]	X	T	[redacted]	X	V	[redacted]	=	Risk	[redacted]	1
Business functions problems due to mechanical - Computer server hard disks fail		A		C	[redacted]	X	T	[redacted]	X	V	[redacted]	=	Risk	[redacted]	1
Business functions problems - A computer virus has infected the main server		B		C	[redacted]	X	T	[redacted]	X	V	[redacted]	=	Risk	[redacted]	1
Business functions problems - A Cooperative employee embezzles Cooperative funds		A		C	[redacted]	X	T	[redacted]	X	V	[redacted]	=	Risk	[redacted]	1
Business functions affected due to personnel affected by pandemic flu		A		C	[redacted]	X	T	[redacted]	X	V	[redacted]	=	Risk	[redacted]	2
Business functions affected due to personnel affected by pandemic flu		B		C	[redacted]	X	T	[redacted]	X	V	[redacted]	=	Risk	[redacted]	2
Business functions problems due to mechanical - Computer server hard disks fail	[redacted]	A		C	[redacted]	X	T	[redacted]	X	V	[redacted]	=	Risk	[redacted]	1
Business functions problems - A computer virus has infected the main server	[redacted]	B		C	[redacted]	X	T	[redacted]	X	V	[redacted]	=	Risk	[redacted]	1
Business functions problems - A Cooperative employee embezzles Cooperative funds	[redacted]	A		C	[redacted]	X	T	[redacted]	X	V	[redacted]	=	Risk	[redacted]	1
Business functions affected due to personnel affected by pandemic flu	[redacted]	A		C	[redacted]	X	T	[redacted]	X	V	[redacted]	=	Risk	[redacted]	2
Business functions affected due to personnel affected by pandemic flu	[redacted]	B		C	[redacted]	X	T	[redacted]	X	V	[redacted]	=	Risk	[redacted]	2
Business functions problems - Cooperative employee notices a white powder while opening mail	4.3.4.1.	A		C	[redacted]	X	T	[redacted]	X	V	[redacted]	=	Risk	[redacted]	1
Business functions affected due to personnel affected by pandemic flu	4.3.4.2.	A		C	[redacted]	X	T	[redacted]	X	V	[redacted]	=	Risk	[redacted]	2
Business functions affected due to personnel affected by pandemic flu	4.3.4.2.	B		C	[redacted]	X	T	[redacted]	X	V	[redacted]	=	Risk	[redacted]	2

Risk Assessment – Risk Score

Sorted By Category

Risk Ranking High 75 and above
Medium 40 - 74
Low 39 and below

1 = Human Actions
2 = Natural Occurrence

Business functions affected due to personnel affected by pandemic flu - Flu impacting operations sickness/deaths		B	C	X	T	[redacted]	X	V	[redacted]	=	Risk	[redacted] 2
Distribution System facilities affected due to fire in National Forest		C	C	X	T	[redacted]	X	V	[redacted]	=	Risk	[redacted] 2
Distribution System facilities affected due to fire in National Forest		D	C	X	T	[redacted]	X	V	[redacted]	=	Risk	[redacted] 1
Distribution System facilities affected due to tornado in National Forest		B	C	X	T	[redacted]	X	V	[redacted]	=	Risk	[redacted] 2
Distribution System facilities affected due to human actions - Transmission & distribution poles are vandalized		B	C	X	T	[redacted]	X	V	[redacted]	=	Risk	[redacted] 1
Distribution System facilities affected due to personnel affected by pandemic flu when ice storm hits area		B	C	X	T	[redacted]	X	V	[redacted]	=	Risk	[redacted] 2
Communication problems affected due to personnel affected by pandemic flu unable to process	1.3.4.7.	B	C	X	T	[redacted]	X	V	[redacted]	=	Risk	[redacted] 2
Business functions affected due to personnel affected by pandemic flu		B	C	X	T	[redacted]	X	V	[redacted]	=	Risk	[redacted] 2
Business functions affected due to personnel affected by pandemic flu	[redacted]	B	C	X	T	[redacted]	X	V	[redacted]	=	Risk	[redacted] 2
Business functions problems due to Tornado - Central Office hit by tornado		A	C	X	T	[redacted]	X	V	[redacted]	=	Risk	[redacted] 2
Distribution System facilities affected due to ice storm in National Forest		B	C	X	T	[redacted]	X	V	[redacted]	=	Risk	[redacted] 2
Back-Up Generation affected due to tornado		A	C	X	T	[redacted]	X	V	[redacted]	=	Risk	[redacted] 2
Business functions problems due to human actions - Central Office affected by bomb threat		C	C	X	T	[redacted]	X	V	[redacted]	=	Risk	[redacted] 1
Distribution System facilities affected due to tornado - Residential area damaged by tornado		A	C	X	T	[redacted]	X	V	[redacted]	=	Risk	[redacted] 2
Distribution System facilities affected due to personnel affected by pandemic fluwhen ice storm hits area		A	C	X	T	[redacted]	X	V	[redacted]	=	Risk	[redacted] 2
Business functions problems due to human actions - Office set on fire by angry member		A	C	X	T	[redacted]	X	V	[redacted]	=	Risk	[redacted] 1
Business functions problems - Cooperative employee notices a white powder while opening mail	4.3.4.1.	A	C	X	T	[redacted]	X	V	[redacted]	=	Risk	[redacted] 1
Business functions affected due to personnel affected by pandemic flu	4.3.4.2.	A	C	X	T	[redacted]	X	V	[redacted]	=	Risk	[redacted] 2
Distribution System facilities affected due to ice storm causing downed poles		A	C	X	T	[redacted]	X	V	[redacted]	=	Risk	[redacted] 2
Transmission problems affecting system - A person intentionally causes damage to transmission system	3.2.4.3.	A	C	X	T	[redacted]	X	V	[redacted]	=	Risk	[redacted] 1
Business functions affected due to personnel affected by pandemic flu - Several Office personnel sick		A	C	X	T	[redacted]	X	V	[redacted]	=	Risk	[redacted] 2
Business functions affected due to personnel affected by pandemic flu		A	C	X	T	[redacted]	X	V	[redacted]	=	Risk	[redacted] 2
Business functions affected due to personnel affected by pandemic flu	[redacted]	A	C	X	T	[redacted]	X	V	[redacted]	=	Risk	[redacted] 2
Transmission problems affecting system - A person intentionally causes damage to transmission system	3.1.4.4.	B	C	X	T	[redacted]	X	V	[redacted]	=	Risk	[redacted] 1
Transmission problems affecting system - A person caused damage to critical load substation	3.2.4.3.	B	C	X	T	[redacted]	X	V	[redacted]	=	Risk	[redacted] 1
Transmission problems affecting system -request for portable substation from DPC can not be fullfiled	3.2.4.2.	A	C	X	T	[redacted]	X	V	[redacted]	=	Risk	[redacted] 1
Mass Communication problems affected due to tornado - Distribution services damaged		A	C	X	T	[redacted]	X	V	[redacted]	=	Risk	[redacted] 2
Mass Communication problems due to ice storm - Ice storm damage affects radio station tower		A	C	X	T	[redacted]	X	V	[redacted]	=	Risk	[redacted] 2
Business functions problems due to fire - Ditch burning causes transformer poles to be damaged		B	C	X	T	[redacted]	X	V	[redacted]	=	Risk	[redacted] 1

Business functions problems - A computer virus has infected the main server		B	C		X	T		X	V		=	Risk		1
Business functions problems - A computer virus has infected the main server		B	C		X	T		X	V		=	Risk		1
Business functions problems due to fire - Improper storage of combustible materials		C	C		X	T		X	V		=	Risk		1
Business functions problems due to human actions - Central Office damaged by car hitting building		B	C		X	T		X	V		=	Risk		1
Distribution System facilities affected due to flooding - Flash flood damaged URD because of washout area		A	C		X	T		X	V		=	Risk		2
Communication problems affected due to tornado - Tornado damages microwave system	1.3.4.2.	A	C		X	T		X	V		=	Risk		2
Transmission problems affecting system - Regional collapse of transmission system	3.1.4.1.	B	C		X	T		X	V		=	Risk		2
Distribution System facilities affected due to fire - Substation fire un-know origin		A	C		X	T		X	V		=	Risk		2
Communication problems due to fire - Substation fire affects distribution lines feeding radio stations	1.3.4.1.	A	C		X	T		X	V		=	Risk		2
Business functions problems - A Cooperative employee embezzles Cooperative funds		A	C		X	T		X	V		=	Risk		1
Business functions problems - A Cooperative employee embezzles Cooperative funds		A	C		X	T		X	V		=	Risk		1
Business functions problems due to fire - Coffeemaker overheated causing fire		A	C		X	T		X	V		=	Risk		1
Business functions problems due to fire - Overload circuit causing fire		B	C		X	T		X	V		=	Risk		1
Business functions problems due to fire - Truck engine fire after hours in garage		D	C		X	T		X	V		=	Risk		1
Back-Up generation affected due to human action - A disgruntle employee vandalize backup generator		A	C		X	T		X	V		=	Risk		1
Distribution System facilities affected due to human actions - Substation transformer shot by angry customer		A	C		X	T		X	V		=	Risk		1
Transmission problems affecting system - A person shoots a transformer casuing damage to transformer		A	C		X	T		X	V		=	Risk		1
Business function problems due to Flooding - Central Office affected by flooding of roads		A	C		X	T		X	V		=	Risk		2
Communication problems affected due to personnel affected by pandemic flu - we are having IT problems	1.3.4.7.	A	C		X	T		X	V		=	Risk		2
Communication problems due to ice storm - cause loss of power to communication sites	1.3.4.5.	A	C		X	T		X	V		=	Risk		2
Transmission problems due to weather issues - Unknown issues cause substation problem that feeds Enbridge	3.2.4.1.	B	C		X	T		X	V		=	Risk		2
Distribution System facilities affected due to human actions - vehicle hits transmission line pole causing damage		C	C		X	T		X	V		=	Risk		1
Communication problems due to human action -Vandalism of communication equipment at substation	1.3.4.6.	A	C		X	T		X	V		=	Risk		1
Communication problems due to human action - Someone shoots communication equipment in substation	1.3.4.6.	B	C		X	T		X	V		=	Risk		1
Transmission problems affecting system - URD fault	3.1.4.3.	A	C		X	T		X	V		=	Risk		2
Transmission problems affecting system - A vehicle hits/damages URD cabinets	3.1.4.4.	A	C		X	T		X	V		=	Risk		1
Transmission problems due to weather issues - Weather issue causes substation problem that feeds Enbridge	3.2.4.1.	A	C		X	T		X	V		=	Risk		2
Mass Communication facilities affected due to fire at substation that feeds radio station tower		A	C		X	T		X	V		=	Risk		2
Back-Up generation affected due to fire - Fire occurs in area where backup generator in housed.		A	C		X	T		X	V		=	Risk		2
Back-Up generation affected due to fire - The backup generator catches fire during a startup test period		B	C		X	T		X	V		=	Risk		2
Business function problems due to Flooding - Water pipe breaks in Central Office		B	C		X	T		X	V		=	Risk		2
Communication problems due to human action - A vehicle strikes a communication tower's transformer	1.3.4.6.	C	C		X	T		X	V		=	Risk		1
Transmission problems affecting system -request for portable substation from DPC can not be fullfiled	3.1.4.2.	A	C		X	T		X	V		=	Risk		2
Communication problems due to human action - TDS has problems	1.3.4.6.	D	C		X	T		X	V		=	Risk		1
Transmission problems affecting system - Xcel Enengy losess transmisison lines	3.1.4.1.	A	C		X	T		X	V		=	Risk		2
Transmission problems affecting system - A person shoots a substation transformer casuing damage	3.1.4.4.	C	C		X	T		X	V		=	Risk		1
Distribution System facilities affected due to fire - Person burning ditches causes substation fire		B	C		X	T		X	V		=	Risk		1
Communication problems due to human action - Human cause fire affects substation and distribution lines	1.3.4.1.	B	C		X	T		X	V		=	Risk		1
Business functions problems due to mechanical - Computer server hard disks fail		A	C		X	T		X	V		=	Risk		1
Business functions problems due to mechanical - Computer server hard disks fail		A	C		X	T		X	V		=	Risk		1
Business functions affected due to personnel affected by pandemic flu	4.3.4.2.	B	C		X	T		X	V		=	Risk		2

Risk Assessment – Human Actions

Sorted By Category

Risk Ranking High 75 and above
Medium 40 - 74
Low 39 and below

1 = Human Actions
2 = Natural Occurrence

Distribution System facilities affected due to fire in National Forest		D	C		X	T	[illegible]	X	V	[illegible]	=	Risk	[illegible]	1
Distribution System facilities affected due to human actions - Transmission & distribution poles are vandalized		B	C		X	T	[illegible]	X	V	[illegible]	=	Risk	[illegible]	1
Business functions problems due to human actions - Central Office affected by bomb threat		C	C		X	T	[illegible]	X	V	[illegible]	=	Risk	[illegible]	1
Business functions problems due to human actions - Office set on fire by angry member		A	C		X	T	[illegible]	X	V	[illegible]	=	Risk	[illegible]	1
Business functions problems - Cooperative employee notices a white powder while opening mail	4.3.4.1.	A	C		X	T	[illegible]	X	V	[illegible]	=	Risk	[illegible]	1
Transmission problems affecting system - A person intentionally causes damage to transmission lines	3.2.4.3.	A	C		X	T	[illegible]	X	V	[illegible]	=	Risk	55.56	1
Transmission problems affecting system - A person intentionally causes damage to transmission lines	3.1.4.4.	B	C		X	T	[illegible]	X	V	[illegible]	=	Risk	[illegible]	1
Transmission problems affecting system - A person shoots a substation transformer casuing damage	3.2.4.3.	B	C		X	T	[illegible]	X	V	[illegible]	=	Risk	[illegible]	1
Transmission problems affecting system -request for portable substation from DPC can not be fullfiled	3.2.4.2.	A	C		X	T	[illegible]	X	V	[illegible]	=	Risk	41.67	1
Business functions problems due to fire - Ditch burning causes transformer poles to be damaged		B	C		X	T	[illegible]	X	V	[illegible]	=	Risk	38.89	1
Business functions problems - A computer virus has infected the main server		B	C		X	T	[illegible]	X	V	[illegible]	=	Risk	37.50	1
Business functions problems - A computer virus has infected the main server	[illegible]	B	C		X	T	[illegible]	X	V	[illegible]	=	Risk	37.50	1
Business functions problems due to fire - Improper storage of combustible materials		C	C		X	T	[illegible]	X	V	[illegible]	=	Risk	33.33	1
Business functions problems due to human actions - Central Office damaged by car hitting building		B	C		X	T	[illegible]	X	V	[illegible]	=	Risk	33.33	1
Business functions problems - A Cooperative employee embezzles Cooperative funds		A	C		X	T	[illegible]	X	V	[illegible]	=	Risk	30.56	1
Business functions problems - A Cooperative employee embezzles Cooperative funds	[illegible]	A	C		X	T	[illegible]	X	V	[illegible]	=	Risk	30.56	1
Business functions problems due to fire - Coffeemaker overheated causing fire		A	C		X	T	[illegible]	X	V	[illegible]	=	Risk	29.17	1
Business functions problems due to fire - Overload circuit causing fire		B	C		X	T	[illegible]	X	V	[illegible]	=	Risk	29.17	1
Business functions problems due to fire - Truck engine fire after hours in garage		D	C		X	T	[illegible]	X	V	[illegible]	=	Risk	29.17	1
Back-Up generation affected due to human action - A disgruntle employee vandalize backup generator	[illegible]	A	C		X	T	[illegible]	X	V	[illegible]	=	Risk	28.65	1
Distribution System facilities affected due to human actions - Substation transformer shot by angry customer		A	C		X	T	[illegible]	X	V	[illegible]	=	Risk	27.78	1
Transmission problems affecting system - A person shoots a transformer casuing damage to transformer		A	C		X	T	[illegible]	X	V	[illegible]	=	Risk	24.31	1
Distribution System facilities affected due to human actions - vehicle hits transmission line pole causing damage		C	C		X	T	[illegible]	X	V	[illegible]	=	Risk	[illegible]	1
Communication problems due to human action -Vandalism of communication equipment at substation	1.3.4.6.	A	C		X	T	[illegible]	X	V	[illegible]	=	Risk	[illegible]	1
Communication problems due to human action - Someone shoots communication equipment in substation	1.3.4.6.	B	C		X	T	[illegible]	X	V	[illegible]	=	Risk	[illegible]	1
Transmission problems affecting system - A vehicle hits/damages URD cabinets	3.1.4.4.	A	C		X	T	[illegible]	X	V	[illegible]	=	Risk	8.33	1
Communication problems due to human action - A vehicle strikes a communication tower's transformer	1.3.4.6.	C	C		X	T	[illegible]	X	V	[illegible]	=	Risk	6.25	1
Communication problems due to human action - TDS has problems	1.3.4.6.	D	C		X	T	[illegible]	X	V	[illegible]	=	Risk	5.56	1
Transmission problems affecting system - A person shoots a substation transformer casuing damage	3.1.4.4.	C	C		X	T	[illegible]	X	V	[illegible]	=	Risk	4.17	1
Distribution System facilities affected due to fire - Person burning ditches causes substation fire		B	C		X	T	[illegible]	X	V	[illegible]	=	Risk	2.78	1
Communication problems due to human action - Human cause fire affects substation and distribution lines	1.3.4.1.	B	C		X	T	[illegible]	X	V	[illegible]	=	Risk	2.78	1
Business functions problems due to mechanical - Computer server hard disks fail		A	C		X	T	[illegible]	X	V	[illegible]	=	Risk	2.78	1
Business functions problems due to mechanical - Computer server hard disks fail	[illegible]	A	C		X	T	[illegible]	X	V	[illegible]	=	Risk	2.78	1

Risk Assessment – Natural Occurrence

Sorted By Category

Risk Ranking High 75 and above / Medium 40 - 74 / Low 39 and below

1 = Human Actions
2 = Natural Occurrence

Business functions affected due to personnel affected by pandemic flu - Flu impacting operations sickness/deaths		B	C	X	T	[redacted]	X	V	[redacted]	=	Risk	[redacted]	2
Distribution System facilities affected due to fire in National Forest		C	C	X	T	[redacted]	X	V	[redacted]	=	Risk	[redacted]	2
Distribution System facilities affected due to tornado in National Forest		B	C	X	T	[redacted]	X	V	[redacted]	=	Risk	[redacted]	2
Distribution System facilities affected due to personnel affected by pandemic flu		B	C	X	T	[redacted]	X	V	[redacted]	=	Risk	[redacted]	2
Communication problems affected due to personnel affected by pandemic flu	1.3.4.7.	B	C	X	T	[redacted]	X	V	[redacted]	=	Risk	[redacted]	2
Business functions affected due to personnel affected by pandemic flu		B	C	X	T	[redacted]	X	V	[redacted]	=	Risk	[redacted]	2
Business functions affected due to personnel affected by pandemic flu	[redacted]	B	C	X	T	[redacted]	X	V	[redacted]	=	Risk	[redacted]	2
Business functions problems due to Tornado - Central Office hit by tornado		A	C	X	T	[redacted]	X	V	[redacted]	=	Risk	[redacted]	2
Distribution System facilities affected due to ice storm in National Forest		B	C	X	T	[redacted]	X	V	[redacted]	=	Risk	[redacted]	2
Back-Up Generation affected due to tornado - backup generator is damaged	[redacted]	A	C	X	T	[redacted]	X	V	[redacted]	=	Risk	[redacted]	2
Distribution System facilities affected due to tornado - Residential area damaged by tornado		A	C	X	T	[redacted]	X	V	[redacted]	=	Risk	[redacted]	2
Distribution System facilities affected due to personnel affected by pandemic flu		A	C	X	T	[redacted]	X	V	[redacted]	=	Risk	[redacted]	2
Business functions affected due to personnel affected by pandemic flu	4.3.4.2.	B	C	X	T	[redacted]	X	V	[redacted]	=	Risk	[redacted]	2
Business functions affected due to personnel affected by pandemic flu	4.3.4.2.	A	C	X	T	[redacted]	X	V	[redacted]	=	Risk	[redacted]	2
Distribution System facilities affected due to ice storm - causing downed poles		A	C	X	T	[redacted]	X	V	[redacted]	=	Risk	[redacted]	2
Business functions affected due to personnel affected by pandemic flu - Several Office personnel sick		A	C	X	T	[redacted]	X	V	[redacted]	=	Risk	[redacted]	2
Business functions affected due to personnel affected by pandemic flu		A	C	X	T	[redacted]	X	V	[redacted]	=	Risk	[redacted]	2
Business functions affected due to personnel affected by pandemic flu	[redacted]	A	C	X	T	[redacted]	X	V	[redacted]	=	Risk	[redacted]	2
Mass Communication problems affected due to tornado - Distribution services damaged		A	C	X	T	[redacted]	X	V	[redacted]	=	Risk	[redacted]	2
Mass Communication problems due to ice storm - Ice storm damage affects distrution line		A	C	X	T	[redacted]	X	V	[redacted]	=	Risk	[redacted]	2
Distribution System facilities affected due to flooding - Flash flood damaged URD because of washout area		A	C	X	T	[redacted]	X	V	[redacted]	=	Risk	[redacted]	2
Communication problems affected due to tornado - Tornado damages microwave system	1.3.4.2.	A	C	X	T	[redacted]	X	V	[redacted]	=	Risk	[redacted]	2
Transmission problems affecting system - Regional collapse of transmission system	3.1.4.1.	B	C	X	T	[redacted]	X	V	[redacted]	=	Risk	[redacted]	2
Distribution System facilities affected due to fire - Substation fire un-know origin		A	C	X	T	[redacted]	X	V	[redacted]	=	Risk	[redacted]	2
Communication problems due to fire - Substation fire affects distribution lines feeding radio stations	1.3.4.1.	A	C	X	T	[redacted]	X	V	[redacted]	=	Risk	[redacted]	2
Business function problems due to Flooding - Central Office affected by flooding of roads		A	C	X	T	[redacted]	X	V	[redacted]	=	Risk	[redacted]	2
Communication problems affected due to personnel affected by pandemic flu - we are having IT problems	1.3.4.7.	A	C	X	T	[redacted]	X	V	[redacted]	=	Risk	[redacted]	2
Communication problems due to ice storm - Ice storm damages distributions lines	1.3.4.5.	A	C	X	T	[redacted]	X	V	[redacted]	=	Risk	[redacted]	2
Transmission problems due to weather issues - Unknown issues cause substation problem that feeds Enbridge	3.2.4.1.	B	C	X	T	[redacted]	X	V	[redacted]	=	Risk	[redacted]	2
Transmission problems affecting system - URD fault	3.1.4.3.	A	C	X	T	[redacted]	X	V	[redacted]	=	Risk	[redacted]	2
Transmission problems due to weather issues - Weather issue causes substation problem that feeds Enbridge	3.2.4.1.	A	C	X	T	[redacted]	X	V	[redacted]	=	Risk	[redacted]	2
Mass Communication facilities affected due to fire at substation that feeds radio station tower		A	C	X	T	[redacted]	X	V	[redacted]	=	Risk	[redacted]	2
Back-Up generation affected due to fire - Fire occurs in area where backup generator in housed.	[redacted]	A	C	X	T	[redacted]	X	V	[redacted]	=	Risk	[redacted]	2
Back-Up generation affected due to fire - The backup generator catches fire during a startup test period	[redacted]	B	C	X	T	[redacted]	X	V	[redacted]	=	Risk	[redacted]	2
Business function problems due to Flooding - Water pipe breaks in Central Office		B	C	X	T	[redacted]	X	V	[redacted]	=	Risk	[redacted]	2
Transmission problems affecting system -request for portable substation from DPC can not be fullfiled	3.1.4.2.	A	C	X	T	[redacted]	X	V	[redacted]	=	Risk	[redacted]	2
Transmission problems affecting system - Xcel Enengy losess transmisison lines	3.1.4.1.	A	C	X	T	[redacted]	X	V	[redacted]	=	Risk	[redacted]	2

APPENDIX 3:
Identified Natural Hazards and Relative Risks

Electric Cooperative Risk and Vulnerability Threat Analysis

Relative Risk by Cooperative

Risks	Adams-Columbia Electric	Barron Electric	Central Wisconsin Electric	East Central Energy	Eau Claire Energy	Jackson Electric	Jump River Electric	Pierce Pepin Energy	Richland Electric	Scenic Rivers Energy
Avalanche: Rock	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	2.00	0.00
Avalanche: Snow	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00
Blizzard	13.33	40.00	8.00	16.00	2.50	2.50	15.00	6.00	30.00	5.00
Cold Wave	4.00	8.00	2.00	4.00	3.00	3.00	10.00	24.00	25.00	2.00
Crop Failure	0.00	0.00	3.00	0.00	1.60	1.60	2.40	2.00	36.00	0.00
Drought	0.00	0.00	3.00	2.00	1.60	1.60	2.40	2.40	9.00	0.00
Earthquake (5+)	0.00	25.00	5.00	0.00	0.00	0.00	0.00	0.00	5.00	0.00
Electrical Storm/Lightning: Fire	12.00	45.00	13.33	12.50	16.00	16.00	30.00	7.50	30.00	1.00
Flood: Damn Burst	4.00	0.00	2.00	1.00	6.00	6.00	10.00	3.75	13.33	0.00
Flood:Flash	1.60	24.00	7.50	1.00	3.75	3.75	9.00	15.00	24.00	0.80
Flood: Predictable/Seasonal	1.60	0.00	0.00	1.00	1.60	1.60	1.60	8.00	62.50	0.80
Fog	3.20	6.00	4.00	2.40	5.00	5.00	4.80	5.00	6.00	0.80
Forest Fire/Smoke	6.00	45.00	5.00	3.00	7.20	7.20	24.00	1.20	2.40	0.80
Frost	3.00	4.00	5.00	5.00	1.60	1.60	4.00	7.50	5.00	4.00
Hail	2.00	5.00	13.33	12.50	2.00	2.00	10.00	10.67	33.33	2.40
Heat Wave	20.00	3.20	4.00	4.00	4.00	4.00	6.40	24.00	33.33	2.00
High Winds (70+ mph)	26.67	120.00	10.00	16.00	13.33	13.33	37.50	33.33	125.00	5.00
Ice Storm	50.00	120.00	13.33	12.00	13.33	13.33	31.25	30.00	18.00	15.00
Land Subsidence/Liquefaction	1.60	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Land Slide/Mudslide	1.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	7.50	0.00
Lightning: Electric Disruption	20.00	22.50	5.00	6.67	6.67	6.67	22.50	16.00	100.00	3.00
Magnetic Storms (Sun Spots)	1.00	0.80	0.00	0.80	1.33	1.33	0.00	0.00	2.00	0.00
Sandstorm	0.60	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Tornado	41.67	100.00	25.00	2.67	8.00	8.00	33.33	10.00	60.00	8.00
Torrential Rains	11.25	4.50	1.00	3.75	3.33	3.33	24.00	0.00	75.00	0.00

Top 5 Relative Risk Rankings	
Highest	High Winds
2nd	Ice Storm
3rd	Tornado
4th	Lightning/Electric Disruption
5th Highest Risk	Lightning/Fire

Collective Averages
0.30
0.10
13.83
8.50
4.66
2.20
3.50
18.33
4.61
9.04
7.87
4.22
10.18
4.07
9.32
10.49
40.02
31.62
0.16
0.95
20.90
0.73
0.06
29.67
12.62

APPENDIX 4:
Rural Electric Cooperative Adoptions

(forthcoming)

APPENDIX 5:
Public Participation and Meeting Documentation

May 10, 2011

PUBLIC NOTICE:

The Wisconsin Electric Cooperative Association and Wisconsin Emergency Management are seeking public input on an annex to the State of Wisconsin's Hazard Mitigation Plan. The annex includes mitigation activities and projects for Rural Electric Cooperatives in the State of Wisconsin. The draft annex can be viewed at:
http://emergencymanagement.wi.gov/mitigation/docs/Draft_REC_Annex.pdf

On Tuesday, May 24, 2011 at the University of Wisconsin—Platteville, Pioneer Room, Markee Pioneer Student Center, 1 University Plaza, Platteville, WI 53818, from 10:00 a.m.-11:00 a.m., WEM and WECA staff will be available to answer questions regarding the Rural Electric Cooperative Annex.

Comments will be accepted through the close of business on June 1, 2011.

**This public notice was published in the Wisconsin State Journal and the Platteville Journal.

May 10, 2011

PUBLIC NOTICE:

The Wisconsin Electric Cooperative Association and Wisconsin Emergency Management are seeking public input on an annex to the State of Wisconsin's Hazard Mitigation Plan. The annex includes mitigation activities and projects for Rural Electric Cooperatives in the State of Wisconsin. The draft annex can be viewed at:
http://emergencymanagement.wi.gov/mitigation/docs/Draft_REC_Annex.pdf

On Thursday, May 26, 2011 at the United FCS Office, 611 South 32nd Ave., Wausau, WI 54402 from 10:00 a.m.-11:00 a.m., WEM and WECA staff will be available to answer questions regarding the Rural Electric Cooperative Annex.

Comments will be accepted through the close of business on June 1, 2011.

****This public notice was published in the Wisconsin State Journal and the Wausau Daily Herald.

Rural Electric Coop Annex Update

WECA Meeting
April 19, 2011

Progress to Date

- Please make sure to sign in for today's session.
- 2008 - 2010 disasters in review.
- Draft REC Annex for review and comment.
- Located on WEM's website: http://emergencymanagement.wi.gov/mitigation/default.asp (will be available 4/21/11--allows for WECA comments to be included.)
- Submit comments to lynsey.kawski@wi.gov

- Annex will be included in 2011 State of Wisconsin Hazard Mitigation Plan Update.
- Additional participating RECs may be added in future plan updates.
- In Chapter 3, please be aware that there is a cut-off date of 12/31/10 for natural hazard events. Any events after 12/31/10 will be included in the 2014 plan update.

Goal Setting and Prioritization Process

- Review goals listed in plan. Are they accurate?
- Review prioritization process in plan.
  - Do you agree or disagree?
  - Any comments or suggestions?
  - Looking for concurrence.

Your Input and Help

- Determine two public meeting dates—suggestions? Locations?
- Any additional projects and mitigation strategies to add since original submission?
- Overall thoughts and input?
- Need to get the public involved:
  - Possible to include inserts in monthly bill to let public know of two public meetings/plan on website for comment?
  - Other suggestions?

2011 Events

- Overview of federal declaration process.
- Potential of HMGP funding available for RECs who (to date) have participated in local county hazard mitigation plans (i.e. Clark Electric Cooperative, etc.)

Finally…

- Any comments or suggestions for the draft annex, please let me know:
  - Lynsey.kawski@wi.gov
  - 608-242-3222

APPENDIX H: STATE-OWNED BUILDING VULNERABILITY ASSESSMENT QUESTIONNAIRE

The first 14 questions are background information needed to conduct a successful risk assessment.

1. **ID Number**
   - Agency assigned ID number, if one exists

2. **Agency (name)**
   - Operating agency within or runs the building

3. **Institution**
   - Name of the subsidiary agency (DMA is the operating Agency, WEM is the institution within the agency

4. **Asset Number**
   - DOA assigned asset number; individually marking the DOA building

5. **Name of Building (alternate name)**
   - Alternate name that the institution or building manger would call their building

6. **Street Address of the Building**
   - Physical street address of building; could be same or different than mailing address

7. **City, Village, Town**
   - City, Village, Town which the building is located

8. **County**
   - County which the building is located

9. **State**
   - State within the building is located

10. **Zip Code (+4)**

11. **Institution Contact Name**
    - Primary Agency contact whom organizes the collection

12. **Contact Phone Number**
    - Primary agency contact phone number

13. **Building Contact Persons Name**
    - Building primary contact

14. **Contact Phone Number**
    - Building primary contact number

Physical Building Properties

15. **Latitude (decimal degree)**

- Latitude of the building in decimal degrees

16. **Longitude (decimal degree)**
    - Longitude of the building in decimal degrees

17. **Photograph Numbers: Number photo locations on sketch above**
    - Attached photographs of building

18. **Critical Facility**
    - Critical facilities include all state owned facilities that are considered essential because of their function, size, service area, or uniqueness, delivery of vital services and for the protection of the health and safety of citizens.

19. **Original Year of Construction**
    - Completed construction of original building

20. **Year of Additions**
    - Year of any additions to current building

21. **Name of each addition if different from building name**

22. **Gross Square Feet (outside dimensions)**
    - Square footage of building

23. **Number of Stories Above Ground**

24. **Number of Stories Below Ground**

25. **Number of occupied floors**
    - Number of floors to which there is a primary work area or offices for someone

26. **Square Footage of each Story**
    - Square footage of each story, both above and below ground

27. **Building Value ($)**
    - Current building value

28. **Valuation Year**
    - Year most recent building value was determined

29. **Contents Value ($)**
    - Value of contents in the building

30. **Building Condition**

    - Unknown
    - Excellent – **Risk = 1**
        - No defects
        - As new condition and appearance
    - Good – **Risk = 2**

    - Minor defects
    - Superficial wear and tear
    - Some deterioration to finishes
    - Major maintenance not required
- Fair – **Risk = 3**
    - Average condition
    - Significant defects are evident
    - Worn finishes require maintenance
    - Services are functional but need attention
    - Deferred maintenance work exists
- Poor – **Risk = 4**
    - Badly deteriorated
    - Potential structural problems
    - Inferior appearance
    - Major defects
    - Components fail frequently

31. **Building Structure Type**
http://academics.triton.edu/faculty/fheitzman/BUILDING%20STRUCTURE%20TYPES.html

- Type I – Building elements are of noncombustible materials (see Chapter_6_Types of Construction)
    - **Risk = 1**
- Type II – Building elements are of noncombustible materials (see Chapter_6_Types of Construction)
    - **Risk = 1**
- Type III – Exterior walls are of noncombustible materials and the interior building elements are of any material permitted by the code
    - **Risk = 2**
- Type IV – Heavy Timber; Exterior walls are of noncombustible materials and the interior building elements are of solid or laminated wood without concealed spaces
    - **Risk = 2**
- Type V – Structural elements, exterior and interior walls are of any materials permitted by the code.
    - Fire-resistance rated construction
        - **Risk = 3**
    - Non fire-resistance rated construction
        - **Risk = 3**
- Unknown

32. **Foundation Type**

0 = Unknown
1 = Slab
    - Is a structural engineering practice whereby the concrete slab that is to serve as the foundation for the structure is formed from a mold set into the ground.

2 = Perimeter (shallow)
    - Is embedded a meter or so into soil. One common type is the spread footing which consists of strips or pads of concrete (or other materials) which extend

below the frost line and transfer the weight from walls and columns to the soil or bedrock.

3 = Combined Footing

- A continuous spread footing is commonly used to provide a stable base around the entire perimeter of a structure. Buildings with spread footings often include interior spot footings. A spread footing supports the weight (load) from the exterior or foundation walls. The footing thickness provides the strength needed to support the weight. The wider width of the footing base creates a large area to transfer this weight to the ground and to prevent settlement.

4 = Single Column Footing

- A spot or pad footing is used to support a single point of contact, such as under a pier or post. A spot footing is typically a 2' by 2' square pad, 10" to 12" thick, and made with reinforced concrete rated to 3,000 to 5,000 pounds per square inch (psi) in compression.

5 = Pile

- These methods of retaining wall construction employ bored piling techniques - normally CFA or rotary. They provide special advantages where available working space dictates that basement excavation faces be vertical. Both methods offer technically effective and cost efficient temporary or permanent means of retaining the sides of bulk excavations even in water bearing strata. When used in permanent works, these walls can be designed to accommodate vertical loads in addition to moments and horizontal forces. Construction of both methods is the same as for foundation bearing piles. Contiguous walls are constructed with small gaps between adjacent piles. The size of this space is determined by the nature of the soils.

6 = Drilled Pier

- Rotary boring techniques offer larger diameter piles than any other piling method and permit pile construction through particularly dense or hard strata. Construction methods depend on the geology of the site. In particular, whether boring is to be undertaken in 'dry' ground conditions or through water-logged but stable strata - i.e. 'wet boring'. Boring is done until the hard rock or soft rock layer is reached in the case of end bearing piles. If the boring machine is not equipped with a rock auger, then socketing of the hard rock layer is done with the help of a heavy chisel which is dropped from a height of about 1.5 metres (depends on the weight of the chisel and design requirements) by suspending it from a tripod stand attached to a winch crane. The socketing is carried out until the desired depth within the rock layer has been attained. Usually, the required depth within the rock layer is considered to be equal to the diameter of the pile in hard rock layers and is taken to be equal to 2.5 times the diameter of the pile in soft rock layers.

7 = Elevated Pier

- Is a slab on grade foundation that has been separated from the ground and subsequently raised. Generally, a slab can be raised about three to five feet, although several factors affect how high a given slab can be raised. Factors such as adjacent property, drainage, fill height and grading all impose limitations on the maximum practicable raised slab elevation.

8 = Caisson

- Is a retaining, watertight structure used, for example, to work on the foundations of a bridge pier, for the construction of a concrete dam, or for the

repair of ships. These are constructed such that the water can be pumped out, keeping the working environment dry. When piers are to be built using an open caisson and it is not practical to reach suitable soil, friction pilings may be driven to form a suitable sub-foundation. These piles are connected by a foundation pad upon which the column pier is erected.

9 = None

33. **Substructure Type**

- Unknown
- Slab - concrete slab that is to serve as the foundation for the structure is formed from a mold set into the ground
  - **Risk = 1**
- Fill – Dirt raising base of structure to grade
  - **Risk = 0**
- Crawlspace - A crawl space (as the name suggests) is a type of basement in which one cannot stand up — the height may be as little as a foot, and the surface is often soil.
  - **Risk = 2**
- Basement – The lowermost portion of a structure partly or wholly below ground level
  - **Risk = 3**
- Pier (Post or Beam) – The piers are connected with grade beams - concrete beams at grade (also referred to as 'ground' beams) - and the structure is constructed to bear on the grade beams, sometimes with heavy column loads bearing directly on the piers.
  - **Risk = 1**
- Pile (or column) - Foundations relying on driven piles often have groups of piles connected by a pile cap (a large concrete block into which the heads of the piles are embedded) to distribute loads which are larger than one pile can bear
  - **Risk = 1**

Roof

34. **Roof Covering**

- Unknown
- Asphalt Shingle - Manufactured by coating a reinforcing material (felt or fibrous glass mat) with asphalt and having mineral granules on the side exposed to the weather.
  - **Risk = 3**
- Wood Shingle – Normal shingles made of wood instead of asphalt
  - **Risk = 3**
- Wood Shake - Wooden shingle that is made from split logs
  - **Risk = 3**
- Barrel Clay Tile – Curved clay tile
  - **Risk = 2**
- Flat Tile - A thin, flat or convex slab of hard material such as baked clay or plastic, laid in rows to cover walls, floors, and roofs.
  - **Risk = 2**
- Concrete Flat Tile - A thin, flat or convex concrete slab of hard material such as baked clay or plastic, laid in rows to cover walls, floors, and roofs.
  - **Risk = 2**

- Slate – flat tile made from slate
  - **Risk = 2**
- Metal Shingle – same as asphalt shingle, but metal
  - **Risk = 2**
- Metal Panel – large, flat metal pieces overlaid
  - **Risk = 2**
- Built-up with gravel – BUR consists of multiple plies of roof felts laminated together with bitumen with gravel on top
  - **Risk = 1**
- Built-up without gravel – BUR consists of multiple plies of roof felts laminated together with bitumen
  - **Risk = 1**
- Modified Bitumen – asphalt based roof felt
  - **Risk = 1**
- Single Ply Membrane (Mechanically Attached) - strong, flexible sheets composed predominately of synthetic polymer manufactured to strict quality control requirements – screw/nail/hinge
  - **Risk = 1**
- Single Ply Membrane (Adhered) - strong, flexible sheets composed predominately of synthetic polymer manufactured to strict quality control requirements – glued
  - **Risk = 1**
- Single Ply Membrane (Gravel Ballast) – strong, flexible sheets composed predominately of synthetic polymer manufactured to strict quality control requirements with gravel on top
  - **Risk = 1**
- Other

35. **Roof Wall Anchorage**

0 = Unknown

1 = Toe nail
- Nails or screws driven at an angle through the truss into the top plate of the wall
  - **Risk = 1**

2 = Anchor Bolt
- Metal framing anchors makes it possible to reinforce the connection between trusses or rafters and the supporting wall
  - **Risk = 1**

3 = Strap/Clips
- Steel straps that wrap over the top of the truss and attach to the wall on one side of the truss only
  - **Risk = 1**

4 = Weld
- Welding of adjacent wall panel and roof panel plates together to secure with exterior wall
  - **Risk = 1**

5 = None
- **Risk = 5**

36. **Shielding Height**

Shielding Height is the height of surrounding objects and placement of those objects for protecting/guarding said building from the elements.

- Unknown
- Taller Buildings
  - **Risk = 1**
- Similar Buildings
  - **Risk = 1**
- Shorter Buildings
  - **Risk = 2**
- Taller Trees
  - **Risk = 1**
- Tree Height Similar to Building Height
  - **Risk = 1**
- Shorter Trees
  - **Risk = 2**
- None
  - **Risk = 3**

37. **Roof Slope (degrees)**

- Unknown
- Less than 10 degrees
  - **Risk = 1**
- 11 to 20 degrees
  - **Risk = 1**
- 21 to 30 degrees
  - **Risk = 2**
- 31 to 45 degrees
  - **Risk = 2**
- 46 to 60 degrees
  - **Risk = 3**
- Greater than 60 degrees
  - **Risk = 3**

38. **Gable Ends Braced**

- Unknown
- Braced – The triangular shape end wall is anchored to the roof and ceiling structure
  - **Risk = 0**
- Unbraced – The triangular shape end wall is not anchored to the roof or ceiling structure
  - **Risk = 2**
- NA

39. **Roof Sheathing**

- Unknown

- Plywood – Layered wood board
  - **Risk = 2**
- Oriented Strand Board (OSB) – Wood panel that shares many of the strength and performance characteristics of plywood
  - **Risk = 2**
- Plank – Roof decking, consisting of 2-inch (and thicker) tongue-and-groove planking, is commonly used for flat or low-pitched roofs in post-and-beam construction. Single tongue-and-groove decking in nominal 2 by 6 and 2 by 8 sizes is available with the V-joint pattern only
  - **Risk = 1**
- Metal Deck - Roof deck is popular because it is strong, lightweight, economical, and easy to install
  - **Risk = 1**
- Concrete Slab
  - **Risk = 1**
- Batten Deck – Wood roof deck
  - **Risk = 2**
- Other

40. **Roof Perimeter Architecture**

- Unknown
- Roof overhang < 2 feet
  - **Risk = 2**
- Roof overhang > 2 feet
  - **Risk = 3**
- Braced parapet
  - **Risk = 1**
- Unbraced parapet
  - **Risk = 2**
- Overhang and braced parapet
  - **Risk = 2**
- Overhang and unbraced parapet
  - **Risk = 3**
- None
  - **Risk = 1**
- Other

41. **Wall Cladding Type**

- Unknown
- Reinforced Masonry or Reinforced Concrete
  - **Risk = 1**
- Unreinforced Masonry
  - **Risk = 2**
- Brick Veneer
  - **Risk = 2**
- Composite Materials Siding

- **Risk = 2**
- Vinyl
  - **Risk = 2**
- Metal Panel
  - **Risk = 2**
- Wood
  - **Risk = 2**
- Stucco
  - **Risk = 2**
- EIFS – Exterior Insulation Finishing System
  - **Risk = 1**
- Glass
  - **Risk = 3**
- Other

Fire Detection and Suppression System

42. **Fire Alarms**
    - Automatic
      - **Risk = 1**
    - Manual
      - **Risk = 3**
    - None
      - **Risk = 5**

43. **Smoke Detectors**
    - Hardwired
      - **Risk = 1**
    - Hardwired and Interconnected
      - **Risk = 1**
    - Battery powered
      - **Risk = 3**
    - None
      - **Risk = 5**

44. **Sprinkler System**
    - Complete
      - **Risk = 1**
    - Partial _____%
      - **Risk = 3**
    - None
      - **Risk = 5**

Emergency Electric Power

45. **Building Connected to an Emergency Generator**
    - Yes – Institution wide generator(s)
      - **Risk = 1**
    - Yes – Building generator(s)
      - **Risk = 1**
    - No generator connection
      - **Risk = 3**

46. **Generator Fuel Type**
    - Diesel or Gas
    - Natural Gas
    - Propane or LP
    - Secondary electric supply

Waste Water Disposal and Treatment

47. **Waste Water Treatment System:**
    - Municipally Owned Waste Water Treatment Plant
        - A municipal wastewater treatment plant is a facility that is designed to treat municipal wastewater. The level of treatment at a plant will vary based on the BOD limits and the specific processes involved. This space type in Portfolio Manager is appropriate for primary, secondary, and advanced treatment facilities with or without nutrient removal. Treatment processes may include biological, chemical, and physical treatment. This space type is best applied to wastewater treatment facilities of 150 MGD or smaller
    - Institution Operated Waste Water Treatment Plant
    - Septic System:
        - Serving only this building or multiple buildings at institutions
        - Pumped to drain field or gravity flow to drain field

48. **Is waste water pumped from the building to the collection system or septic tank?**
    - Yes
    - No

Water Supply and Distribution System

49. **Water Supply:**
    - Municipally owned water system
        -
    - Institution operated water well(s):
        - Number of currently operating well(s) on property: _____
    - Institution operated water tower(s) or reservoir(s)
        - Total storage capacity: _____ gallons
        - Booster station:
            - Yes
            - No

50. **Water Distribution:**
    - Municipally owned distribution system and service line to this building
    - Institution owned distribution system and service line to this building
    - Well with service directly to this building

Occupancy and Use

51. **Occupancy Class IBC Chapter 3**

    Assembly Group A:
    - Uses intended for the gathering together of persons for the purposes such as civic, social or religious functions, recreation, food or drink

consumption or awaiting transportation. A room of less than 50 persons used for assembly but is accessory to a different occupancy shall be considered that different occupancy. Assembly area less than 750 square feet, which is accessory to a different occupancy, is not considered assembly. Assembly rooms which are accessory to Group E are not considered as Group A. Religious educational rooms and auditoriums with occupant loads less than 100 persons which are accessory to churches are considered A-3. Group A is divided into five sub groups,

- A-1
  - Usually with fixed seating, intended for production and viewing of the performing arts or motion pictures,
  - **Risk = 1**
- A-2
  - Uses intended for food and/or drink consumption
  - **Risk = 1**
- A-3
  - Uses intended for worship, recreation or amusement and other assembly uses not otherwise classified
  - **Risk = 1**
- A-4
  - Uses intended for viewing of indoor sporting events and activities with spectator seating
  - **Risk = 1**
- A-5
  - Uses intended for participation in or viewing outdoor activities
  - **Risk = 1**

Business:

- Assembly occupancies less than 50 persons and/or uses intended for office, professional or service-type transactions, including storage of records and accounts.
  - B
    - **Risk = 1**

Educational:

- Uses intended by 6 or more persons at any one time for educational purposes through the 12th grade. Daycare uses for educational, supervision or personal care services for more than 5 children older than 2 1/2yrs
  - E
    - **Risk = 1**

Factory & Industrial:

- Uses intended for assembling, disassembling, fabricating, finishing, manufacturing, packaging, repair or processing operations that are not classified Group H hazardous or Group S storage. Group is divided into two sub groups,
  - F-1
    - Moderate Hazard
    - **Risk = 3**
  - F-2
    - Low Hazard

- **Risk = 1**

High Hazard:

- Uses intended for manufacturing, processing, generation or storage of materials that constitute a physical or health hazard in quantities in excess of those allowed by code. Group H is divided into five sub groups,
  - H-1
    - Detonation hazard
    - **Risk = 5**
  - H-2
    - Accelerated burning
    - **Risk = 5**
  - H-3
    - Materials that readily support combustion or pose a physical hazard
    - **Risk = 5**
  - H-4
    - Materials are health hazard
    - **Risk = 5**
  - H-5
    - Semiconductor fabrication facilities and comparable R7D areas which HPM's are used
    - **Risk = 5**

Institutional:

- Uses intended in which people are cared for or live in a supervised environment, having physical limitations because of health or age are harbored for medical treatment or other care or treatment or in which the liberty of the occupants is restricted. Group I is divided into four sub groups
  - I-1
    - Houses more than 16 persons, on a 24 hour basis, who because of age, mental disability or other reasons, live in a supervised residential environment that provides personal care services. The occupants are capable of responding to an emergency situation without physical assistance from staff
    - **Risk = 5**
  - I-2
    - Used for medical, surgical, psychiatric, nursing or custodial care on a 24 hr basis of more than five persons who are not capable of self-preservation. Less than five people shall be considered an R-3
    - **Risk = 5**
  - I-3
    - Is inhabited by more than five persons who are under restraint or security and is occupied by persons who are generally incapable of self-preservation due to security measures not under the occupant's control
    - **Risk = 5**

Mercantile:

- Uses intended for the display and sale of merchandise, and involve stocks of goods, wares or merchandise incidental to such purposes and accessible to the public.
    - M
    - **Risk = 1**

Residential:

- Uses intended for sleeping purposes. Group R is divided into four sub groups
    - R-1
        - Occupants are transient in nature
        - **Risk = 3**
    - R-2
        - Occupancies containing sleeping units or more than two dwelling units where the occupants are more permanent in nature
        - **Risk = 5**
    - R-3
        - One and two family dwelling, or adult and child care facilities that provide accommodation for five or fewer persons of any age for less than 24 hours.
        - **Risk = 5**
        - **Town Houses** are occupancies where the development is owned by others but the individual plot of real estate that the dwelling is seated is owned by the occupant.
        - **Risk = 5**
        - **Condominiums** are occupancies where the development is owned by others including the individual plot of real estate but the interior of the dwelling unit from wall to wall are owned by the occupant.
        - **Risk = 5**
    - R-4
        - Are intended for occupancy as residential care/assisted living facilities including more than five but not more than sixteen occupants, excluding staff
        - **Risk = 5**

Storage:

- Uses intended for storage that is not classified as a hazardous occupancy. Group S is divided into two sub groups
    - S-1
        - Moderate-hazard storage
            - **Risk = 5**
    - S-2
        - Low-hazard storage
            - **Risk = 3**

Utility

- Uses intended for structures of an accessory character and not classified in any specific occupancy
    - U
        - **Risk = 1**

52. **Daytime Occupants (number of people)**

Week Day: _____

Weekend Day:_____

53. Nighttime Occupants (number of people)

Week Day: _____

Weekend Day: _____

54. **Kitchen Facilities**

0 = Unknown
1 = Yes
2 = No

55. **Kitchen Capacity (meals per day)**

56. **Dining Facilities**

0 = Unknown
1 = Yes
2 = No

57. **Dining Capacity (number of seats)**

58. **Sleeping Facilities**

0 = Unknown
1 = Yes
2 = No

59. **Sleeping Capacity (number of beds)**

60. **Number of Hospital Beds**

61. **Hazardous Materials Stored On-Site**

0 = Unknown
- **Risk = 1**

1 = Yes
- **Risk = 5**

2 = No
- **Risk = 1**

Flood

FEMA Map Service Center:
http://msc.fema.gov/webapp/wcs/stores/servlet/FemaWelcomeView?storeId=10001&catalogId=10001&langId=-1

62. **FIRM Panel Number**
    - This field identifies the FIRM panel number for which CBRS data is being referenced. This number is always a 4-digit number corresponding to the number shown on the FIRM title block

63. **FIRM Community Number**
    - Each record in the database references one FIRM panel or specific area on a map panel that contains one or more CBRS units. The community's name is presented in the Community field. It is important to note that the data presented in the CBRS Units on FIRM Panel field contains CBRS data for only those areas that fall within the boundaries of the community.

64. **FIRM Effective Date (mm/dd/yyyy)**
    - This field identifies the date of the subject FIRM panel containing CBRS areas

65. **Flood Hazard Zone**

Special Flood Hazard Area (SFHA)

- Zone A – **Risk = 5**
    - **A** The base floodplain mapped by approximate methods, i.e., BFEs are not determined. This is often called an unnumbered A Zone or an approximate A Zone.
    - **A1-30** These are known as numbered A Zones (e.g., A7 or A14). This is the base floodplain where the FIRM shows a BFE (old format).
    - **AE** The base floodplain where base flood elevations are provided. AE Zones are now used on new format FIRMs instead of A1-A30 Zones.
    - **AO** The base floodplain with sheet flow, ponding, or shallow flooding. Base flood depths (feet above ground) are provided.
    - **AH** Shallow flooding base floodplain. BFEs are provided.
    - **A99** Area to be protected from base flood by levees or Federal Flood Protection Systems under construction. BFEs are not determined.
    - **AR** The base floodplain that results from the decertification of a previously accredited flood protection system that is in the process of being restored to provide a 100-year or greater level of flood protection.
- Zone V and VE
    - **V** The coastal area subject to a velocity hazard (wave action) where BFEs are not determined on the FIRM.
    - **VE** The coastal area subject to a velocity hazard (wave action) where BFEs are provided on the FIRM.

Outside SFHA or Undetermined Flood Hazard

- Zone B and Zone X (shaded) – **Risk = 3**

    - Area of moderate flood hazard, usually the area between the limits of the 100-year and 500-year floods. B Zones are also used to designate base floodplains of lesser hazards, such as areas protected by levees from the 100-year flood, or shallow flooding areas with average depths of less than one foot or drainage areas less than 1 square mile.
- Zone C and Zone X (unshaded) – **Risk = 1**
    - Area of minimal flood hazard, usually depicted on FIRMs as above the 500-year flood level. Zone C may have ponding and local drainage problems that don't warrant a detailed study or designation as base floodplain. Zone X is the area determined to be outside the 500-year flood and protected by levee from 100-year flood.
- Zone D – **Risk = 1**
    - Area of undetermined but possible flood hazards.

66. **Base Flood Elevation**
    - The elevation shown on the Flood Insurance Rate Map for Zones AE, AH, A1-A30, AR, AR/A, AR/AE, AR/A1-A30, AR/AH, AR/AO, V1-V30, and VE that indicates the water surface elevation resulting from a flood that has a one percent chance of equaling or exceeding that level in any given year.

67. **Vertical Datum for Flood Elevation**
    - Unknown
    - NGVD (or MSL NGVD)
        - National Geodetic Vertical Datum was the vertical control datum established for vertical control surveying by the general adjustment of 1929. The datum was used to measure elevation or altitude above, and depression or depth below, mean sea level (MSL)
    - NAVD (or MSL NAVD)
        - North American Vertical Datum is the vertical control datum established for vertical control surveying based upon the general adjustment of the North American Datum of 1988
    - Other

68. **Other Vertical Datum Definition**
    - Definition of “other” vertical datum from question 67

69. **Lowest Adjacent Grade Elevation**
    - The lowest point of the ground level next to the building
    - The lowest or highest finished ground level that is immediately adjacent to the walls of the building. Use natural (pre-construction), ground level, if available, for Zone AO and Zone A (without BFE)
    - Risks are based on if the building is located within the floodplain
        - **>2 ft below = 7**
        - **1 ft below = 5**
        - **At BFE = 3**
        - **1 ft above 1**
        - **>2 ft above = 0**

70. **Post-FIRM**

- A building for which construction or substantial improvement occurred after December 31, 1974, or on or after the effective date of an initial Flood Insurance Rate Map (FIRM), whichever is later.
    - **Pre-FIRM = 5**
    - **Post-FIRM = 1**

71. **Elevation of Lowest Finished Floor**
    - The measured distance of a building's lowest floor above the National Geodetic Vertical Datum (NGVD) or other datum specified on the FIRM for that location.
    - Risks are based on if the building is located within the floodplain
        - **>2 ft below = 7**
        - **1 ft below = 5**
        - **At BFE = 3**
        - **1 ft above 1**
        - **>2 ft above = 0**

72. **Lowest Floor Below Grade on all sides**
    - Unknown
    - Yes – The lowest finished floor that is below ground level on all sides
        - **Risk = 3**
    - No – The lowest finished floor is above ground level on all sides
        - **Risk = 1**

73. **Mechanical Equipment Height Relative to Lowest Floor (feet)**

74. **Percentage of Contents Value on First Floor (%)**
    - **Risk:**
        - **0% = 0**
        - **1% - 20% = 1**
        - **21% - 40% = 2**
        - **41% - 60% = 3**
        - **61% - 80% = 4**
        - **81% - 100% = 5**

75. **Percentage of Contents Value Below Grade (%)**

76. **Building Flood Proofed**
    - Any combination of structural and nonstructural additions, changes, or adjustments to structures, which reduce or eliminate risk of flood damage to real estate or improved real property, water and sanitation facilities, or structures with their contents.
        - **Risk**
            - **Yes = 0**
            - **No = 5**

Wind

77. **Wind Exposure Class**
    - **Exposure B –** Urban and suburban areas, wooded areas or other terrain with numerous closely spaced obstructions having the size of single-family dwellings

or larger. Exposure B shall be assumed unless the site meets the definition of another type of exposure.
    - **Risk = 1**
- **Exposure C –** Open terrain with scattered obstructions, including surface undulations or other irregularities, having heights generally less than 30 feet (9144 mm) extending more than 1,500 feet (457.2) from the building site in any quadrant. This exposure shall also apply to any building located within Exposure B-type terrain where the building is directly adjacent to open areas of Exposure C-type terrain in any quadrant for a distance of more than 600 feet (182.9 m). This category includes flat open country, grasslands and shorelines in hurricane-prone regions.
    - **Risk = 3**
- **Exposure D –** Flat, unobstructed areas exposed to wind flowing over open water (excluding shorelines in hurricane-prone regions) for a distance of at least 1 mile (1.61 km). Shorelines in Exposure D include inland waterways, the Great Lakes and coastal areas of California, Oregon, Washington and Alaska. This exposure shall apply only to those buildings and other structures exposed to the wind coming from over the water. Exposure D extends inland from the shoreline a distance of 1,500 feet (460 m) or 10 times the height of the building or structure, whichever is greater
    - **Risk = 5**

78. **Topography**
- The configuration of a surface including its relief and the position of its natural and man-made features.
    - Unknown
    - Flat – No change in elevation
        - **Risk = 5**
    - Valley – Depression with predominant extent in one direction
        - **Risk = 5**
    - Ridge – Continuous elevational crest for some distance
        - **Risk = 5**
    - Slope – Steepness, incline, gradient, or grade of a straight line
        - **Risk = 5**

79. **Wind Shielding**
- Unknown
- None
    - **Risk = 3**
- One Side
    - **Risk = 2**
- Two Sides
    - **Risk = 2**
- Three Sides
    - **Risk = 1**
- Surrounded
    - **Risk = 1**

80. **Glass Door and Window Opening (%)**
- Unknown

- 0 to 10%
  - **Risk = 1**
- 11 to 20%
  - **Risk = 2**
- 21 to 30%
  - **Risk = 3**
- 31 to 40%
  - **Risk = 4**
- 41 to 50%
  - **Risk = 5**
- 51 to 60%
  - **Risk = 6**
- Greater than 60%
  - **Risk = 7**

81. **Other Door Area (%) (excludes glass doors)**
- Unknown
- 0 to 10%
  - **Risk = 1**
- 11 to 20%
  - **Risk = 2**
- 21 to 30%
  - **Risk = 3**
- Greater than 30%
  - **Risk = 4**

82. **Garage Doors (number of doors)**
- A garage door is a large door on a garage that can either be opened manually or by a garage door opener. Although of many designs, most garage doors are sectional, upward-acting, and self-storing. Garage doors are necessarily large to allow passage of automobiles and/or trucks.
  - Unknown
  - None
    - **Risk = 0**
  - 1 Door
    - **Risk = 1**
  - 2 Doors
    - **Risk = 1**
  - 3 Doors
    - **Risk = 2**
  - 4 Doors
    - **Risk = 2**
  - 5 Doors
    - **Risk = 3**
  - Greater than 5 doors
    - **Risk = 3**

83. **Roll-up doors (number of doors)**

- An overhead door is one designed to open from a mechanism at the top, allowing the door to be pulled up and into a horizontal position. Overhead doors are commonly used as garage doors.
  - Unknown
  - None
    - **Risk = 0**
  - 1 Door
    - **Risk = 1**
  - 2 Doors
    - **Risk = 1**
  - 3 Doors
    - **Risk = 2**
  - 4 Doors
    - **Risk = 2**
  - 5 Doors
    - **Risk = 3**
  - Greater than 5 doors
    - **Risk = 3**

84. **Door Protection**

- Unknown
- Wood
  - **Risk = 2**
- Metal
  - **Risk = 1**
- Plywood
  - **Risk = 2**
- None
  - **Risk = 3**
- Other
  - **Risk = 1**

Manufactured Housing

85. **Manufactured Housing – Tie Downs**
    - More tie downs are needed in coastal areas where there is more storm activity, and more damaging storm history. To combat the force of winds, two types of tie downs are used. A vertical tie is used over the roof of a single-wide home to combat wind damage. A diagonal tie down is used to tie the frame down to the ground. This combats winds from lifting up the home. Single-wide homes require both types of tie downs. Due to weight factors, a double-wide mobile home only requires the diagonal tie down to anchor the home and frame to the ground.
      - Unknown
      - Yes
        - **Risk = 1**
      - No
        - **Risk = 5**

Damage History

86. **Has the building received damages in the past from natural hazards?**

- Unknown
- Yes
    - **Risk = 5**
- No
    - **Risk = 1**

APPENDIX I: LOSS AVOIDANCE STUDY: WISCONSIN PROPERTY ACQUISITION AND STRUCTURE DEMOLITION, SEPTEMBER 2009

Loss Avoidance Study

Wisconsin, Property Acquisition and Structure Demolition

September 2009

FEMA

Federal Emergency Management Agency
U.S. Department of Homeland Security
500 C Street, Southwest
Washington, DC 20472

Loss Avoidance Study

Wisconsin, Property Acquisition and Structure Demolition

September 2009

FEMA

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Executive Summary:

Every year, Federal, State, and local agencies, as well as private entities, contribute funding to mitigation projects that will reduce or eliminate the long-term risks posed to people, the built environment, and the economy by natural hazards. The Department of Homeland Security's Federal Emergency Management Agency (FEMA) awards mitigation grants on the basis of whether the proposed mitigation projects are cost-effective.

Tools that have been used by FEMA in the past for determining the effectiveness of a project are based on the analysis of a probabilistic hazard event, completed prior to project funding and prior to project construction. With such significant investment in mitigation being made, policy makers have taken great interest in the effectiveness of mitigation during actual hazard events. In response, FEMA developed methodology using a quantitative approach to assess the performance of mitigation projects based on actual post-construction hazard events.

Since 1982, every county in Wisconsin has experienced at least one flood event, and 19 counties have experienced more than 20 flood events each (Wisconsin Emergency Management, 2009). In response to the flooding, local governments in Kenosha, Jefferson, and Crawford counties, with Federal and State assistance, acquired a total of 92 repetitive-loss properties from 1989 to 2008 at a cost of approximately $11 million. FEMA partnered with the State of Wisconsin and used the quantitative approach to complete a loss avoidance study for the acquisition projects.

FEMA calculated the value of the losses that had been avoided by the implementation of the mitigation projects and compared the losses avoided with the acquisition costs. The aggregate losses avoided were valued at $14.5 million, and the aggregate project cost was valued at approximately $11 million (both values in 2009 dollars), resulting in a Return on Investment of 132%. The results of the study demonstrate the cost-effectiveness of the selected acquisitions.

This report provides detailed documentation of the methodology implemented during the Wisconsin study and can be used as guidance for the preparation of future loss avoidance studies specific to acquisition projects. Additionally, it describes considerations and recommended practices that were identified during the completion of the study.

Section One:

Introduction

Because of frequent flooding in Wisconsin, a number of flood mitigation projects, specifically acquisition/demolition and acquisition/relocation projects, have been implemented in recent years along the Rock, Fox, and Kickapoo rivers. To evaluate the mitigation projects for cost-effectiveness, FEMA partnered with the State of Wisconsin to conduct a loss avoidance study (LAS or study). The intent of the study was to compare the losses avoided in all floods since the implementation of the mitigation to the cost of the mitigation projects. This report contains the results of the study.

1.1 Background

Mitigation is defined by the Department of Homeland Security's Federal Emergency Management Agency (FEMA) as any sustained action taken to reduce or eliminate long-term risk to people and property from hazards and their effects. Every year, FEMA provides States and communities with substantial financial assistance for projects that will reduce or eliminate risks from natural hazards through Hazard Mitigation Assistance grants, which include post-disaster grants under the Hazard Mitigation Grant Program (HMGP) and pre-disaster grants under the Pre-Disaster Mitigation Program, the Flood Mitigation Assistance Program, the Repetitive Flood Claims Program, and the Severe Repetitive Loss Program.

Mitigation refers to any sustained action taken to reduce or eliminate long-term risk from hazards and their effects.

With significant investment being made in mitigation, demonstrating cost-effectiveness is crucial for continued support. In order to evaluate the cost-effectiveness of mitigation projects, FEMA has developed a methodology for loss avoidance studies. The methodology is based on the analysis of actual natural hazard events that have occurred in the project study area since the completion of the mitigation project. The methodology provides a way to assess the benefits of a mitigation project in terms of its actual performance. Losses avoided are determined by comparing damage that would likely have been caused by the same storms without the project (Mitigation Project Absent [MP_A]) with damage that actually occurred with the project in place (Mitigation Project Complete [MP_C]).

The LAS methodology used for this study is consistent with the methodology described in *Loss Avoidance: Riverine Flood Methodology Report* (FEMA, in press[b]).

1.2 Purpose

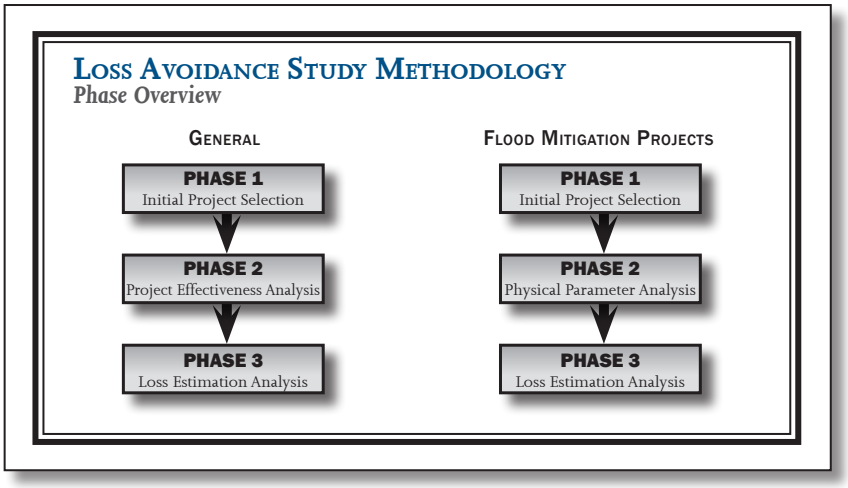
The purposes of the Wisconsin study are to verify the effectiveness of the acquisition projects that were analyzed and to document their economic performance. The study is intended to answer the question, "How much damage could have been caused by a storm event if the acquisition projects had not been completed?" Further, the study provides comprehensive documentation of the losses avoided (damages avoided or project benefits) that were determined utilizing quantitative methods.

1.3 Methodology Overview

Loss avoidance methodology can be applied to the mitigation of any type of natural hazard (e.g., flood, wildfire, seismic, wind). Flood hazard mitigation is divided into building modification and minor, localized flood reduction projects. Building modification projects mitigate damages by modifying a building to reduce its risk of flooding through acquisition/demolition, acquisition/relocation, elevation, and floodproofing. Acquisition/demolition projects are referred to as "acquisition projects," and acquisition/relocation projects are referred to as "relocation projects." Flood reduction projects mitigate damages by reducing the hazard itself and include stormwater drainage system improvements, channel modifications, flood walls/barriers, and other projects that reduce the severity of flooding. This study is focused on the performance of acquisition projects.

Loss avoidance studies are divided into three phases (see Figure 1.1). Although Phases 1 and 3 are similar regardless of the type of mitigation project, Phase 2 varies depending on the type of mitigation project. In flood-related studies, Phase 2 is called "Physical Parameter Analysis."

Figure 1.1



Source: FEMA (2007)

This study focuses on the acquisition/demolition, and acquisition/relocation of buildings in Wisconsin. No damage is calculated for the MP_C condition for acquisition projects because the buildings have been demolished or relocated.

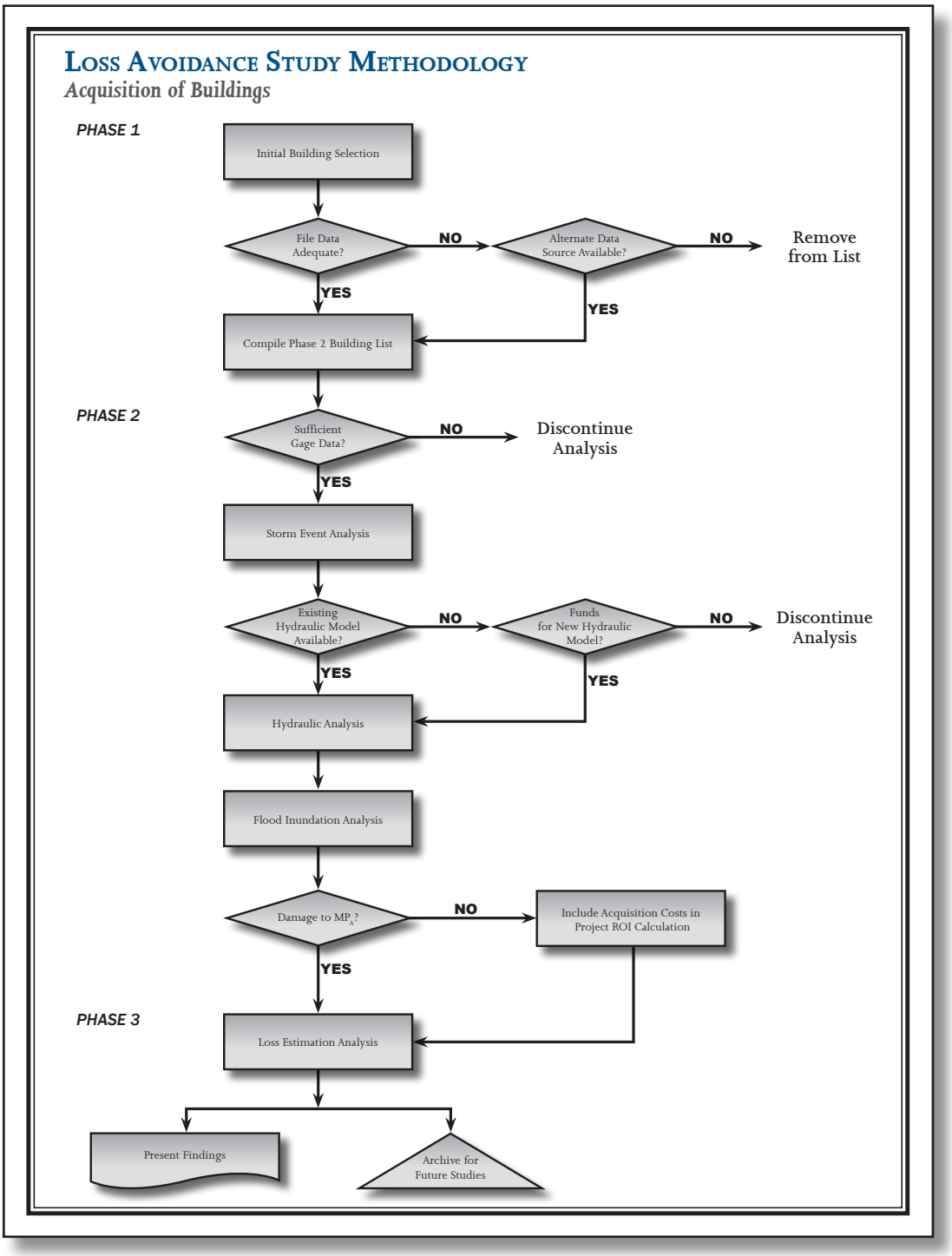
Phase 1 consists of the development of the initial project list. Projects are selected based on criteria determined by the sponsoring agency. For acquisition projects, the initial list of buildings in each project is screened based on the availability of data required for completion of all phases of the study. Buildings with adequate data advance to Phase 2 of the study.

Phase 2 is composed of three distinct analyses—Storm Event Analysis, Hydraulic Analysis, and Flood Inundation Analysis. A Storm Event Analysis is performed to determine whether any storm event occurred since the mitigation project was implemented that would have caused damages in the MP_A scenario. A Hydraulic Analysis is performed to determine the extent and depth of flooding in those events. A Flood Inundation Analysis uses the results of the Hydraulic Analysis and is conducted to determine the depth of flooding inside buildings within the project extents. If the depth or limit of inundation determined for the MP_A scenario indicates that damage would have occurred if the project had not been implemented, the building advances to Phase 3 for a Loss Estimation Analysis.

In Phase 3 for acquisition projects, damages are calculated for the MP_A conditions. Because no damages would have occurred for the MP_C condition, the MP_A damages are equivalent to the losses avoided. The Return on Investment (ROI) is calculated by comparing the losses avoided to the project investment. The definition of ROI used in this study is not the same as a financial ROI, which is a measure of net profit, expressed relative to the dollars invested. For the LAS, an ROI of greater than 100 percent indicates that project benefits have exceeded project costs, and the project is considered cost-effective.

The LAS methodology for building acquisitions is shown in Figure 1.2.

Figure 1.2


Loss Avoidance Study Methodology
Acquisition of Buildings
PHASE 1
Initial Building Selection
File Data Adequate?
NO
Alternate Data Source Available?
NO
Remove from List
YES
YES
Compile Phase 2 Building List
PHASE 2
Sufficient Gage Data?
NO
Discontinue Analysis
YES
Storm Event Analysis
Existing Hydraulic Model Available?
NO
Funds for New Hydraulic Model?
NO
Discontinue Analysis
YES
YES
Hydraulic Analysis
Flood Inundation Analysis
Damage to MP$_A$?
NO
Include Acquisition Costs in Project ROI Calculation
YES
PHASE 3
Loss Estimation Analysis
Present Findings
Archive for Future Studies

Section Two:

Mitigation Project Information

Because Wisconsin is highly susceptible to flooding, the State of Wisconsin has initiated a number of flood mitigation projects to reduce the need for costly emergency response and repairs. The mitigation projects include the acquisition, elevation, and relocation of flood-prone properties and have been funded by FEMA and other public agencies and by private sources.

This study is focused on 73 residential building acquisitions in Kenosha County, 18 residential building acquisitions in Jefferson County, and one public building acquisition and relocation in Crawford County between 1989 and 2008. The acquisitions occurred in the cities of Wheatland, Silver Lake, and Salem (Kenosha County); Fort Atkinson (Jefferson County); and Gays Mills (Crawford County), which are affected by flooding from the Fox, Rock, and Kickapoo rivers.

The study consisted of residential building acquisitions in Kenosha and Jefferson counties and one public building acquisition in Crawford County.

2.1 History

The State of Wisconsin has long been vulnerable to severe storms, tornadoes, and flooding. Each year, flooding causes residents, businesses, and taxpayers millions of dollars in damage even though not every flood is severe enough to be declared a disaster. Since 1982, every county in Wisconsin has experienced at least one flood event, and 19 counties have experienced more than 20 flood events each (Wisconsin Emergency Management, 2009). Table 2.1 shows the number of major disaster declarations and emergency declarations that have occurred in Wisconsin in recent decades.

Table 2.1

Wisconsin Disaster History

Declaration Type	Time Period	Declarations
Major Disaster Declarations	1965 - 2008	32
Emergency Declarations	1976 - 2008	6

Source: FEMA, Wisconsin State Disaster History, 2009

Between 1990 and 2000, the two Wisconsin flood events that affected the most counties occurred in 1990 and 1993 (Wisconsin Emergency Management, 2004). The 1990 flood was accompanied by tornadoes and affected 17 counties across southern Wisconsin. Total damages exceeded $21 million (Wisconsin Emergency Management, 2004).

The Great Flood of 1993 was the result of two to three times the normal amount of rainfall across the entire state following a winter with greater than average snowfall. In the summer, every major river in Wisconsin flooded, and 20 dams were overtopped, broken, or washed away. Crop and soil damages, residential damages, and business losses totaled at least $877 million. More than half (46) of the state's 72 counties were designated in the declaration (Wisconsin Historical Society, 2009).

The flooding in southern Wisconsin in June 2008 was the most costly natural disaster in the state's recorded history (Wisconsin Emergency Management, 2009). Damages were estimated to exceed $1.5 billion (Fitzpatrick et al., 2008). The June 2008 floods were aggravated by saturated soils persisting from a combination of record-breaking snowfalls in the winter of 2007/2008 and heavy rains in spring 2008 (Fitzpatrick et al., 2008). Extensive flooding along the Baraboo, Kickapoo, Crawfish, and Rock rivers caused particularly severe damages in surrounding communities. The Governor of Wisconsin declared a state of emergency in 30 counties.

2.2 Funding and Timeline

Although building acquisitions have been occurring since long before 1993, the Great Flood of 1993 was the impetus behind a collaborative effort between the State of Wisconsin and FEMA to increase the acquisition of flood-prone properties. As of July 2008, more than 300 properties in Wisconsin had been acquired to prevent future flood damages (FEMA, 2008b).

In 1994, Kenosha County officials developed the Fox River Flood Mitigation Program in an effort to help residents move out of the 100-year floodplain of the Illinois Fox River. As of August 2008, the program had won grants totaling approximately $7.4 million from sources including the HMGP, Wisconsin Emergency Management, Wisconsin Department of Natural Resources, and Community Development Block Grants from the Wisconsin Department of Commerce (FEMA, n.d.[b]). Approximately 75 buildings were acquired between 1995 and July 2008 (FEMA, n.d.[a]). In the first 10 years of the program, 56 buildings had been acquired, with FEMA contributing $2.5 million in HMGP and Flood Mitigation Assistance grants and $3 million from Community Development Block Grants sponsored by the Wisconsin Department of Commerce (FEMA, n.d.[c]).

Jefferson County developed the Flood Mitigation Buyout Program, a voluntary program aimed at reducing the costs associated with

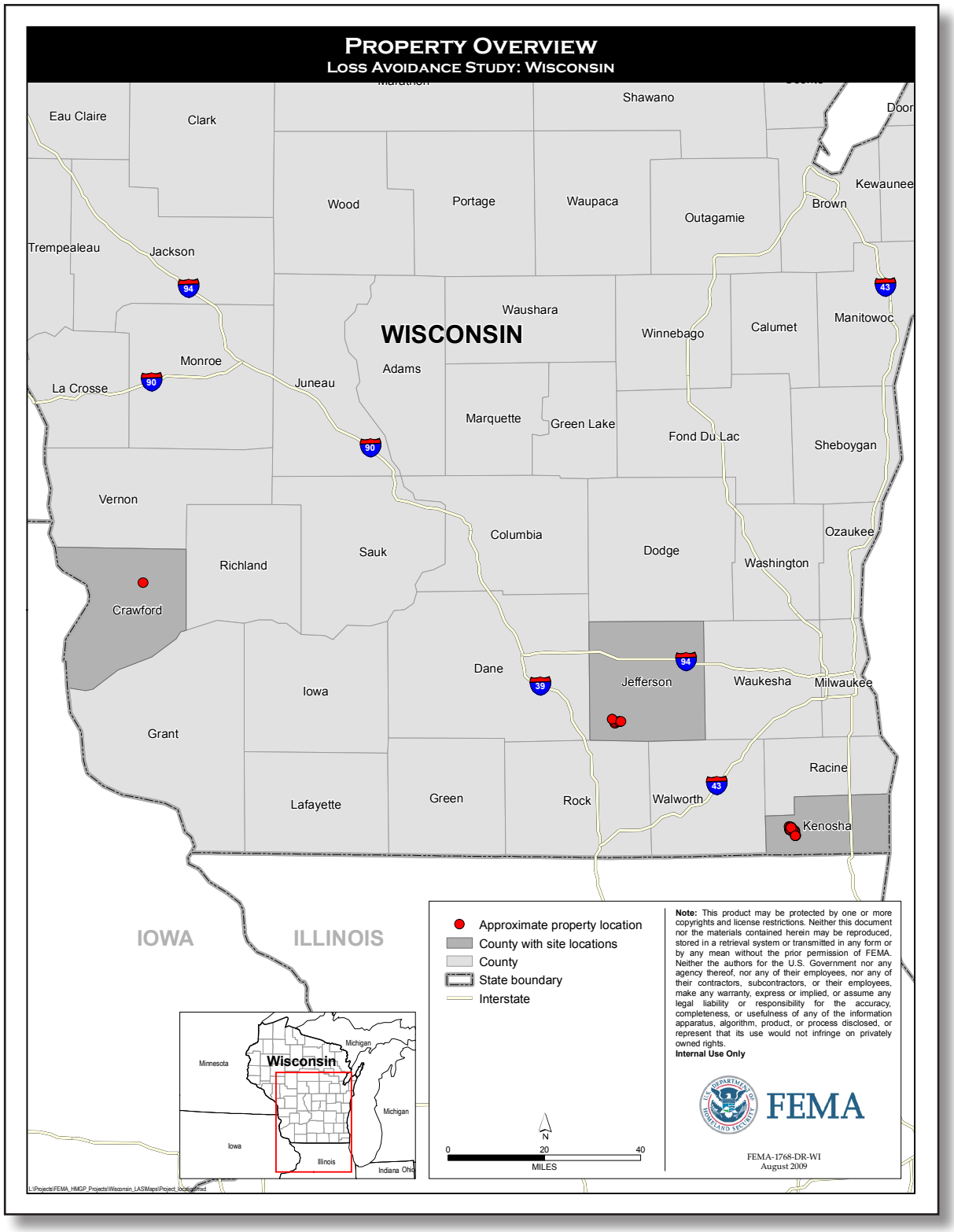
damage caused by severe weather events. Since 1995, Jefferson County has acquired 35 buildings with the assistance of the HMGP. The HMGP requires a 75/25% cost split for each project. FEMA funds 75%, the State of Wisconsin funds 12.5%, and Jefferson County funds the remaining 12.5%. Jefferson County has used multiple sources of funding, including a Lake Protection Grant from the Wisconsin Department of Natural Resources and a Community Development Block Grant from the Wisconsin Department of Commerce (Wisconsin Emergency Management, n.d.[a]). Since 1995, the Federal portion has totaled more than $1.5 million (Wisconsin Emergency Management, n.d.[b]).

Crawford County has also initiated a number of flood mitigation projects, including floodproofing of buildings, acquisitions, and relocations. This study includes the acquisition and relocation of the Crawford County Highway Shop in the city of Gays Mills. The $2.7 million project involved acquiring, demolishing, and clearing the property and rebuilding out of the floodplain. FEMA funded 75% of the cost, and the State and County funded the remaining 25% (FEMA, n.d.[d]).

2.3 Location

The locations of the 92 acquisition projects assessed in the study are shown in Figure 2.1. The breakdown of the acquisition projects by county are as follows: 73 in Kenosha County, 18 in Jefferson County, and 1 in Crawford County. The Kenosha County acquisitions were affected primarily by flooding from the Fox River, the Jefferson County acquisitions by the Rock River, and the Crawford Country acquisition by the Kickapoo River.

Figure 2.1


PROPERTY OVERVIEW
LOSS AVOIDANCE STUDY: WISCONSIN
Eau Claire
Clark
Shawano
Door
Wood
Portage
Waupaca
Outagamie
Brown
Kewaunee
Trempealeau
Jackson
94
43
Waushara
WISCONSIN
Winnebago
Calumet
Manitowoc
Monroe
La Crosse
90
Juneau
Adams
Marquette
Green Lake
Fond Du Lac
Sheboygan
Vernon
Columbia
Dodge
Ozaukee
Richland
Sauk
Washington
Crawford
Dane
39
Jefferson
Waukesha
Milwaukee
Iowa
Grant
Racine
Lafayette
Green
Rock
Walworth
Kenosha
IOWA
ILLINOIS
Minnesota
Wisconsin
Michigan
Iowa
Illinois
Indiana
Ohio
Approximate property location
County with site locations
County
State boundary
Interstate
N
0
20
40
MILES
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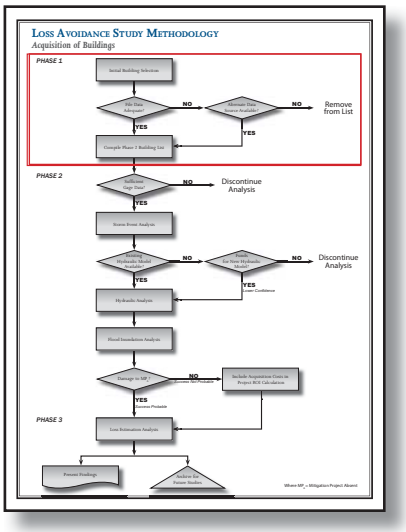
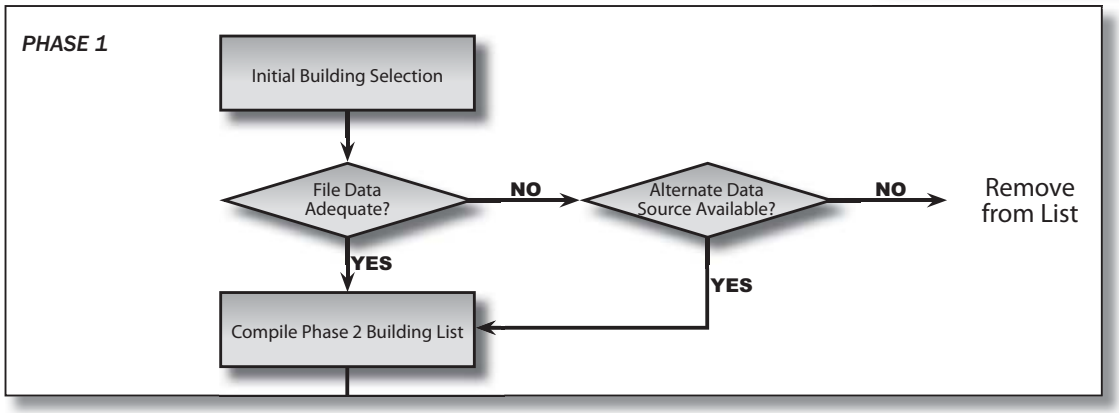
Section Three:

Phase 1 – Initial Project Selection and Screening



This section contains a discussion of Phase 1 (Initial Project Selection) for an LAS (see Figure 3.1). In Phase 1, an initial list of candidate projects is selected, and data are collected for analysis of the projects. Buildings are analyzed and screened individually within an acquisition project based on the availability of the data that are required for Phase 1, and a list of buildings advancing to Phase 2 is compiled.

Figure 3.1



3.1 Initial Data Collection and Screening

The selection of the initial projects is based on criteria defined for a particular LAS. The criteria may include but are not limited to:

- **Area of Interest:** The area of interest is the geographic boundary of a study. The boundary can be a reach of a river or channel, a single community or watershed, a region, a jurisdictional boundary (e.g., city, county, state, special district), or any other area. The boundary must be defined by the agency sponsoring the study. An acquisition project can consist of a single building but more often includes multiple buildings. Regardless of the number of buildings in a project, every building is evaluated individually using the information that is available for that building.
- **Hazard Type:** Projects in an LAS are selected based on the type of hazard they are mitigating. Examples of hazard types are riverine flood and coastal flood.
- **Project Type:** Many project types can be analyzed in an LAS. Flood-related projects include elevation, acquisition, relocation, floodproofing (called building modification projects), stormwater

drainage system improvements, channel modifications, flood walls/barriers, and other projects that would reduce the severity of flooding (called flood reduction projects).

- **Study Baseline:** The study baseline for an LAS is the date the mitigation activity was completed. Only the storm events that occurred after the study baseline should be evaluated for a study. For an acquisition/demolition project, the study baseline is the date of demolition for each building. Consequently, it is more likely that losses avoided can be assessed for buildings with older demolition dates. A mitigation project, which may include the acquisition of multiple buildings, is not closed until after the acquisition and demolition of each building included in the project is complete. Therefore, using the demolition date instead of a closeout date is recommended, and each building should be evaluated individually.

For acquisition projects, once an initial list of projects has been selected, buildings in each project must be analyzed individually. Buildings should be removed from the analysis during Phase 1 if specific, necessary building data are not available or cannot be easily estimated. Buildings may also be eliminated based on the quality of the available data.

The data that are required to complete an LAS for acquisition projects are:

- Actual acquisition costs, including the fair market value of the building paid to the homeowner, demolition costs, legal fees, assessor's costs, and any other costs associated with the project.
- Demolition completion dates for each building.
- First floor elevations (FFEs) for the MP_A scenario, preferably in the form of FEMA elevation certificates. FFEs can be estimated in the absence of surveyed FFEs.
- Building location information in the form of latitude/longitude data, address, and/or assessor parcel number.
- Building information, including building type (i.e., residential, commercial, industrial, or municipal), construction type (e.g., wood frame, manufactured), basement information (finished versus unfinished and square footage), number of floors, living square footage, foundation type, number of stories, garage type and square footage, and building replacement value (BRV).

Data required for an acquisition project:

- Project cost
- Project completion date
- First floor elevation
- Building location information
- Building characteristics and replacement value

FFEs are important because they provide the basis for the damage calculations. Damages are calculated in Phase 3 based on the depth of flooding inside the building. Because of the sensitivity of the damage calculations, even an error of 0.5 foot in the FFE can affect the damage calculations significantly. Surveyed FFEs are therefore preferred.

3.2 Wisconsin Study: Phase 1 Summary

FEMA and the Wisconsin State Emergency Management Agency initiated the Wisconsin LAS. The two agencies worked together to develop a project list for the study based on the following criteria:

- **Area of Interest:** Projects located in Kenosha, Jefferson and Crawford counties.
- **Hazard Type:** Riverine flooding.
- **Project Type:** Residential building acquisition in Kenosha and Jefferson counties; public building acquisition in Crawford County.
- **Study Baseline:** Acquisitions were completed between November 11, 1989, and June 27, 2008.

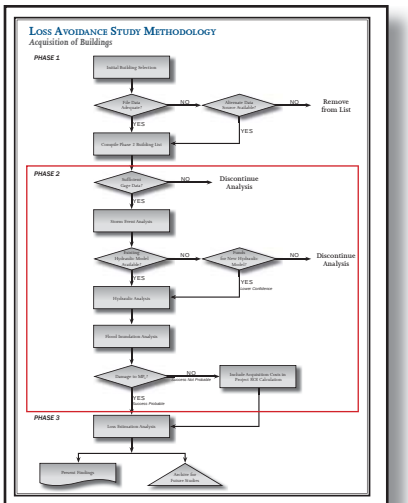
Acquisitions were completed between November 11, 1989, and June 27, 2008.

The data collection efforts for the study included:

- **Project Cost Data:** Project cost data were provided by the counties for each building. The total acquisition cost for each building was inflated to 2009 dollars.
- **Building Location Data:** Building location data can be difficult to obtain for acquisition projects because the buildings no longer exist. In this study, although the buildings had been demolished up to 20 years earlier, building address, latitude, and longitude data were available and provided by the Counties. Building locations were plotted using latitude and longitude Geographic Information System (GIS) data and then verified using a web mapping service. Buildings that did not have matching latitude/longitude and address data were replotted using geocoding technology, namely Batch Geocode (www.batchgeocode.com) and Geocode US (www.geocoder.us) in order to generate an accurate latitude and longitude. Forty-one building locations had matching latitude/longitude and address data or the latitudes generated by geocoding technology were within 0.001 decimal degrees of latitude and longitude provided by the Counties. Fifty building locations were determined using the Batch Geocode, and one location was determined using Geocode US.
- **Building Information:** Building information such as construction type, number of floors, square footage, FFE, BRV, and acquisition completion date was provided by the Counties.
- **Building Screening:** No buildings were removed from the analysis during Phase 1. All 92 buildings had sufficient data to proceed to Phase 2.

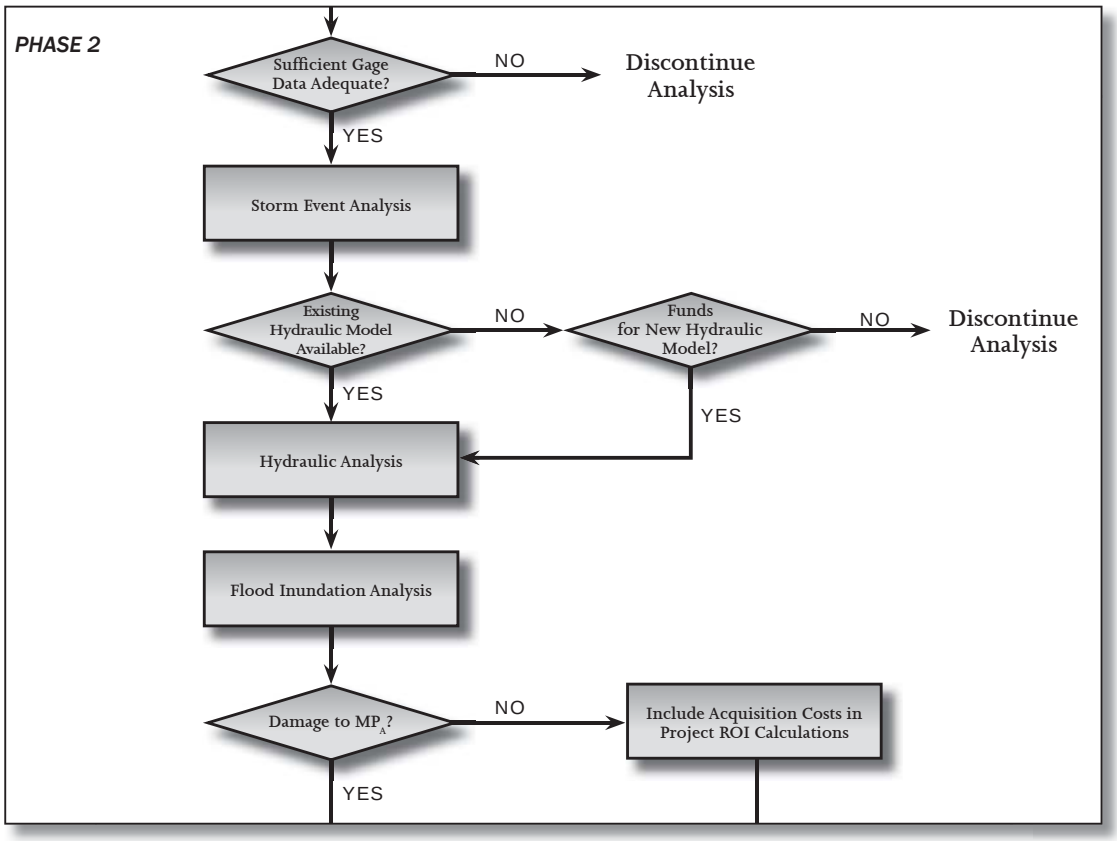
Section Four:

Phase 2 – Physical Parameter Analysis



This section contains a discussion of Phase 2 (Physical Parameter Analysis) for acquisition projects (see Figure 4.1). Phase 2 consists of a Storm Event Analysis, a Hydraulic Analysis, and a Flood Inundation Analysis.

Figure 4.1



- **Storm Event Analysis:** A Storm Event Analysis is conducted to identify potentially damaging events that occurred since the study baseline and assess data availability. Data include high water marks (HWMs) or stream/precipitation gage readings.
- **Hydraulic Analysis:** A Hydraulic Analysis is used to determine how flows move through the project area and the water surface elevations (WSEs) from known storm events. For building modification projects, if a water surface profile from an existing model is available, or enough HWMs to create a digital

water surface were collected during the Storm Event Analysis, it may not be necessary to use hydraulic modeling software.

- **Flood Inundation Analysis:** The Flood Inundation Analysis is conducted to determine the depth of flooding that would have occurred during storm events since the study baseline at each building location in the MP_A scenario.

For a more information on the general methodology for Phase 2, see the Loss Avoidance: Riverine Flood Methodology Report (FEMA, 2009).

4.1 Storm Event Analysis

An LAS for any flood-related project is dependent on the occurrence of an MP_A storm event after the study baseline that is severe enough to have caused damage in the MP_A scenario. For some projects, more than one storm event may have occurred during the project's lifetime that could have caused damages.

The purpose of the Storm Event Analysis is to determine which storm event data are available. Data for the Storm Event Analysis may be collected in the form of HWMs from floods, stream gage discharge data, stream gage stage data, or precipitation gage data. Figure 4.2 provides the usual order of preference for storm event data. If no HWMs were recorded, the availability of sufficient stream gage data should be determined because stream gage data are the next best source of data for the analysis. The stream gage should be in or near the study area and have a period of record covering the event(s) of interest. Stream gage data may include measurements of stage (WSE), discharge (flow rate), or both.

When no stream gages are available, precipitation gages must be located. If precipitation gages are used, a hydrologic analysis must be completed as part of the analysis to convert rainfall data to flow at the project site. If no storm event data are available, the buildings along that flooding source must be eliminated from evaluation. A list of peak events since the first building was demolished can be compiled from the gage data during this phase if the scope of the study calls for the analysis of more than one event.

4.1.1 Wisconsin Study: Storm Event Analysis

4.1.1.1 Fox River

The earliest demolition completion date for the buildings in Kenosha County was July 21, 1995. An analysis of flow and stage data for the U.S. Geological Survey (USGS) gage (ID# 05545750) for the Fox River

Figure 4.2

near New Munster, Wisconsin, was performed to determine when damaging storms could have occurred along the Fox River after July 1995. The data available for the USGS gage at New Munster include instantaneous discharge (generally available every 15 minutes), daily mean discharge, annual peak stream flow, and annual peak gage height. The National Weather Service (NWS) also reports the top 10 peak gage heights as well as flood impacts corresponding to increasing water levels at the gage near New Munster.

Historical flooding information that had been summarized from application materials (such as for the HMGP) was available for a number of the buildings. Generally, this information provided only the month and/or year of flooding or indicated that the building experienced flooding every year. However, the USGS gage data and NWS information for the Fox River provided sufficient information regarding the potentially damaging floods. Table 4.1 lists the available peak water levels on the Fox River near New Munster and the flood impacts estimated by the NWS.

The daily and annual peak flow data and the dates of historical flooding are shown in Figure 4.3. A comparison of the peak flows and reported dates of historical flooding indicate that either the low

Table 4.1

Peak Water Levels and Corresponding Flood Impacts for the Fox River near New Munster, Wisconsin

Date[1]	Reported Peak Water Level for Fox River near New Munster (feet, NGVD 29)[2]	Flood Impacts Estimated by the National Weather Service
June 15, 2008	750.9	**Above a water level of 750.4 feet, NGVD 29:** There are 1 to 5 inches of water over Highway 50 near the Fox River. There is widespread flooding to homes adjacent to the river in the towns of Wheatland, Silver Lake and Salem. Some families evacuate their homes. Some county roads are closed.
August 24, 2007	750.7	
May 24, 2004	749.5	**Above a water level of 749.2 feet, NGVD 29:** There is widespread flooding to homes adjacent to the river in the towns of Wheatland, Silver Lake and Salem. Some families evacuate their homes. Some county roads are closed.
June 15, 1999	749.4	
April 12, 2008	748.9	**Above a water level of 748.5 feet, NGVD 29:** There is widespread flooding of homes in low lying areas adjacent to the river in the Wheatland, Silver Lake and Salem areas. Some families evacuate their homes. Some county roads are closed.
April 29, 2009	748.5	
June 2, 2000	748.5	
February 11, 2001	748.4	**Above a water level of 747.9 feet, NGVD 29:** Water is into the lower levels of some homes in the Town of Salem and the Village of Silver Lake. Water is up to the floor levels of some homes in the Wheatland area.
February 22, 1997	748.3	
June 13, 2001	748.0	
March 15, 2006	747.9	
June 19, 1996	747.9	
February 15, 2005	747.3	**Above a water level of 747.3 feet, NGVD 29:** Water surrounds a home near the intersection of Highway 50 and Highway W in the Wheatland area.
June 5, 2002	747.2	**Above a water level of 747.2 feet, NGVD 29:** Water in yards of some homes in the Salem, Silver Lake, and Wheatland areas.
April 10, 1998	746.1	**Above a water level of 745.7 feet, NGVD 29:** Water is near some homes along Highway W in the Silver Lake area of Kenosha County.
May 12, 2003	745.0	**Above a water level of 744.7 feet, NGVD 29:** There is minor...non-damaging lowland flooding in the New Munster area.

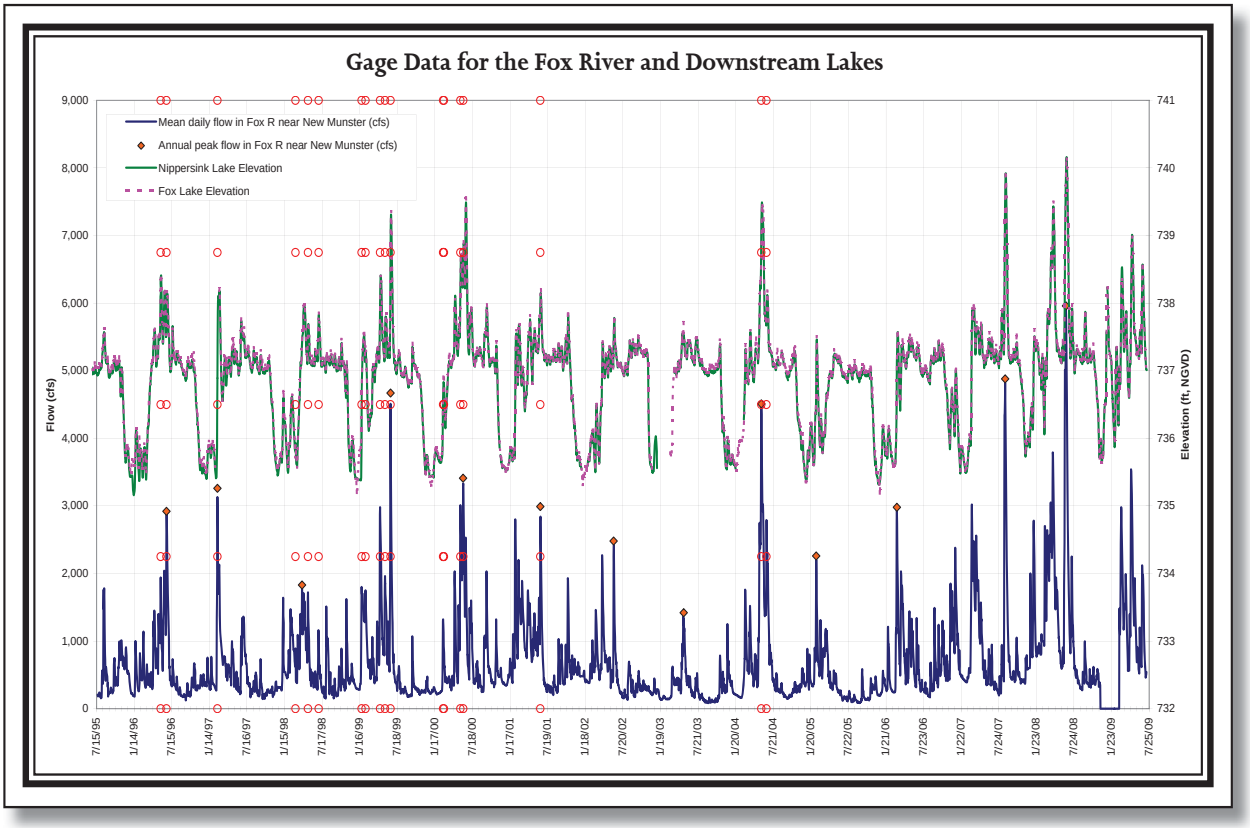
Sources: Annual peak stage from USGS (2009a); historical crests and flood impacts from NWS (2009).

1 Only events after the earliest acquisition date of July 21, 1995 are included.

2 Reported gage heights were converted to elevations relative to the NGVD 29 using the reported gage datum of 735.72 feet NGVD 29.

NGVD29 = National Geodetic Vertical Datum of 1929

Figure 4.3



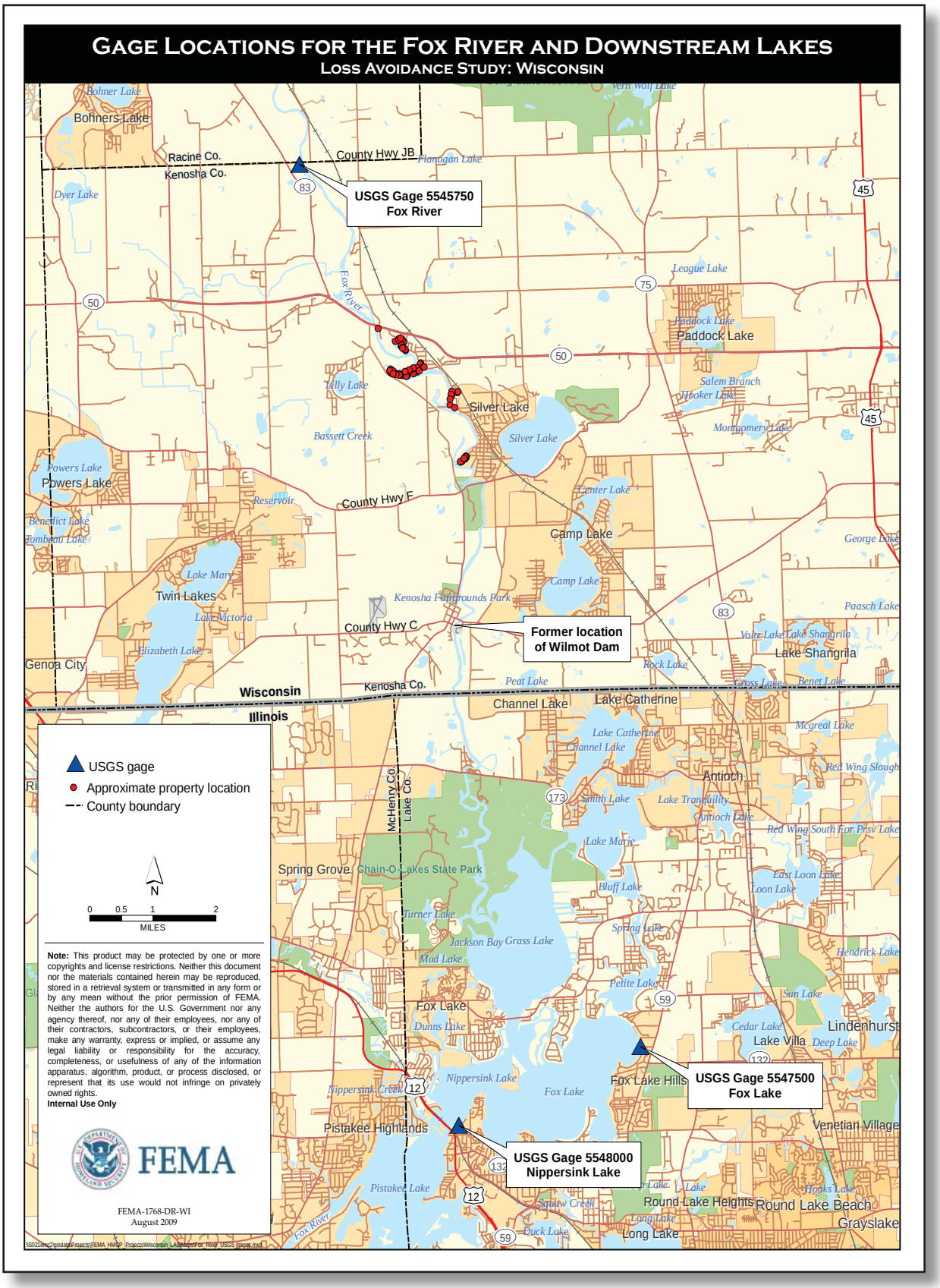
flows occurring frequently were causing flooding, which would not be logical, or the flooding was the result of one of the following:

- An incorrect month or year was reported in the application.
- Flooding was from overland flow rather than the Fox River.
- Backwater effects from downstream lake levels were leading to increased elevations in the Fox River upstream.

Additional analysis was performed to determine whether backwater effects were likely to be increasing the water level in the Fox River in the vicinity of the buildings near Silver Lake, Salem, and Wheatland. The Fox River flows into Grass Lake in Lake County, Illinois, approximately 9 miles downstream of the buildings in Silver Lake. Flow from Grass Lake continues to Nippersink and Fox lakes, then to Pistakee Lake before continuing farther downstream as Fox River.

The USGS reports mean daily lake levels (and instantaneous lake levels every 15 minutes for the past 60 days) for Nippersink Lake (ID# 05548000) and Fox Lake (ID# 05547500). The locations of the USGS gages are shown in Figure 4.4. The mean daily lake levels were also compared to the flow in Fox River near New Munster, as shown in Figure 4.3. The data were used in the Hydraulic Analysis

Figure 4.4


Gage Locations for the Fox River and Downstream Lakes
Loss Avoidance Study: Wisconsin
USGS Gage 5545750
Fox River
Former location
of Wilmot Dam
USGS Gage 5547500
Fox Lake
USGS Gage 5548000
Nippersink Lake
Bohners Lake
Racine Co.
Kenosha Co.
County Hwy JB
Paddock Lake
Silver Lake
Powers Lake
Twin Lakes
Genoa City
Camp Lake
Lake Shangrila
Wisconsin
Illinois
Channel Lake
Lake Catherine
Antioch
Spring Grove
Chain-O-Lakes State Park
Fox Lake
Lindenhurst
Lake Villa
Fox Lake Hills
Pistakee Highlands
Venetian Village
Round Lake Heights
Round Lake Beach
Grayslake
Long Lake
McHenry Co.
Lake Co.
County Hwy F
County Hwy C
Kenosha Fairgrounds Park
USGS gage
Approximate property location
County boundary
N
0 0.5 1 2
MILES
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(see Section 4.2.1) to determine how downstream lake levels would influence the Fox River levels upstream.

The Hydraulic Analysis and subsequent Flood Inundation Analysis indicated that multiple storm events occurring only weeks apart could potentially have caused damage. Because loss avoidance calculations are based on the assumption that sufficient time elapses between storm events to allow for repairs to be completed, it was necessary to limit the storm event analysis to a single storm within the selected time interval. A time interval of at least 180 days between storms, or approximately 6 months, was chosen to allow for the hypothetical repairs to be completed. The storm during this period that would have resulted in the most damage was selected.

A time interval of at least 180 days between storms was chosen to allow for the hypothetical repairs to be completed.

Note that this assumption could affect the loss avoidance calculations. For example, Figure 4.3 shows that the record flow occurring in June 2008 was preceded by a fairly large event in April 2008 (approximately 2 months earlier). For this study, only the larger event in June was used in the loss calculations. A total of 14 events were considered in Phase 3 of the LAS for the Fox River (one event a year between 1996 and 2009).

4.1.1.2 Rock River

According to the Jefferson County Flood Insurance Study (FIS), buildings studied along the Rock River are within the portion of the reach that is subject to backwater effects from Lake Koshkonong. USGS completed an HWM study for the June 2008 flood in southern Wisconsin (Fitzpatrick et al., 2008). The report confirms that HWMs along the Rock River between the lake and up to 2 miles upstream would correspond to the stage of the lake. The USGS Lake Koshkonong gage near Newville, Wisconsin (ID# 05427235), was used for the Storm Event Analysis (see Figure 4.5).

Buildings along Rock River are subject to backwater effects from Lake Koshkonong. Lake stages were therefore used for the analysis.

Daily stage data were compiled for the period between the earliest acquisition date of January 1, 1989, and June 30, 2009. The daily stages are shown in Figure 4.6. The solid horizontal line represents the lowest FFE (779.2 feet National Geodetic Vertical Datum of 1929 [NGVD29]) in the Jefferson County projects. The dashed horizontal line represents the elevation 2 feet below the lowest FFE because that is where damages will begin to be counted.

Using the same assumptions for Rock River that were used for the Fox River, a total of 8 storm events, with at least 6 months separating them, were identified to have been large enough to cause damage in the MP_A scenario. The storm events are listed in Table 4.2.

Figure 4.5

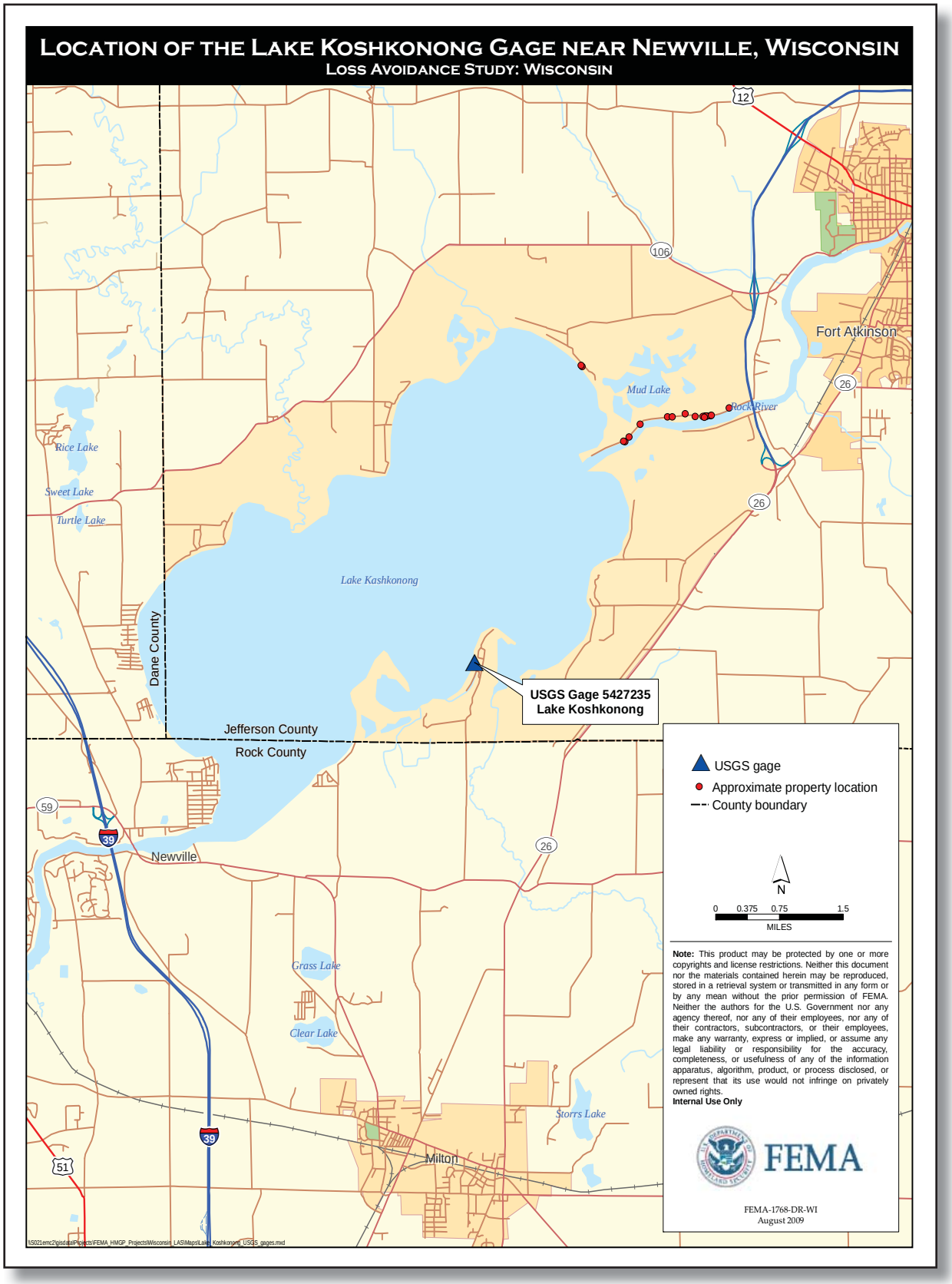
Location of the Lake Koshkonong Gage near Newville, Wisconsin
Loss Avoidance Study: Wisconsin
12
106
Fort Atkinson
26
Mud Lake
Rock River
Rice Lake
Sweet Lake
Turtle Lake
Lake Kashkonong
Dane County
USGS Gage 5427235
Lake Koshkonong
Jefferson County
Rock County
59
39
Newville
Grass Lake
Clear Lake
Storrs Lake
Milton
51
USGS gage
Approximate property location
County boundary
N
0 0.375 0.75 1.5
MILES
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Figure 4.6

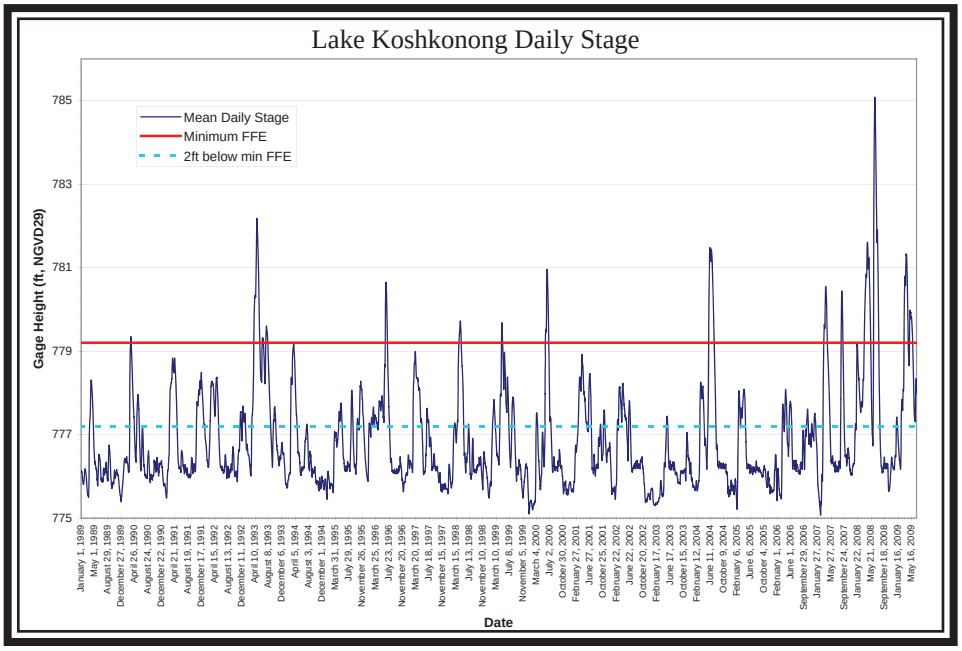


Table 4.2

Peak Water Levels on Lake Koshkonong Used in Analysis

Date of Storms	Stage (feet, NGVD29)
April 25, 1993	782.18
June 24, 1996	780.65
April 29, 1999	779.68
June 8, 2000	780.96
June 5, 2004	781.48
April 8, 2007	780.55
June 22, 2008	785.08
March 29, 2009	781.33

Source: USGS 2009b
NGVD29 = National Geodetic Vertical Datum of 1929

4.1.1.3 Kickapoo River

The USGS Kickapoo River gage (ID# 05410000) at Gays Mills, Wisconsin, was inundated in a large event in 1977 and has not been reinstalled. Therefore, the gage did not have the period of record necessary to complete the analysis. However, the NWS's Advanced Hydrologic Prediction Center has archived the top 10 peak stages for the Kickapoo River in the same location (Gage ID GMIW3). The peak stages are listed in Table 4.3.

Table 4.3

Peak Water Levels on Kickapoo River Used in Analysis

Date of Storm	Stage (feet, NGVD 29)
June 9, 2008	705.44
July 2, 1978	704.80
August 20, 2007	704.79
February 10, 1966	701.75
June 1, 2000	701.50
April 3, 1982	701.10
July 22, 1951	701.00
March 3, 1965	700.80

Source: NWS (2009)
NGVD29 = National Geodetic Vertical Datum of 1929

Only two events occurred after the project completion date for the building in Crawford County.

Of the 10 highest stages shown in Table 4.3, only the August 2007 and June 2008 events occurred after the date the building in Gays Mills was demolished (January 2005). These two events were used in the analysis.

4.2 Hydraulic Analysis

Hydraulic modeling is usually required to determine the WSE and depth of flooding at locations of interest. Hydraulic modeling uses peak flows determined in the Storm Event Analysis (see Section 4.1) as the discharges in the model. This is in conjunction with using detailed topographic data to estimate WSEs at a series of cross sections for the event(s) of interest. It may not be necessary to use a hydraulic model for each event if results of HWM studies or WSE profiles developed from existing hydraulic models are sufficient to determine the WSE and flood depths for the desired storm events.

If the flood source was studied in detail, for example for a FEMA Flood Insurance Rate Map (FIRM), obtaining a copy of the existing hydraulic model may be possible. Results from the existing model in the FIS may be used to interpolate actual storm events, or modifying the model may be possible simply by replacing the original flow data with the event of interest. However, only portions of the original model may be applicable for use, especially if the channel has migrated since the model was completed.

When an existing hydraulic model is not available, the parameters required to set up a new model include cross section elevation data, roughness coefficients, boundary conditions, discharge (from the Storm Event Analysis), and data for any hydraulic structures in the model area. A list of FEMA-acceptable hydraulic models is available at www.fema.gov. If creating a new hydraulic model is necessary, detailed topographic data for all river reaches of interest are necessary for channel cross sections to be created. Outlier buildings or buildings located where adequate topographic data are not available should be removed from the building list.

Buildings located on flooding sources with existing hydraulic modeling available or on flooding sources that can be modeled with appropriate methods will proceed to the Flood Inundation Analysis.

4.2.1 Wisconsin Study: Hydraulic Modeling

4.2.1.1 Fox River

The Fox River was studied in detail for the FEMA FIS and FIRMs in 1977 to aid in floodplain management decisions. The Kenosha County FIS contains flood profiles and discharge summaries for the 10-, 50-, 100-, and 500-year storm events. The hydraulic model of the Fox River that was used to create the flood profiles in the Kenosha County FIS was obtained from the Southeastern Wisconsin Regional Planning Commission (a scanned file of input and output from the U.S. Army Corps of Engineers [USACE] Hydrologic Engineering Center's [HEC's] water surface profile computer program, HEC-2, for the Fox River from Wilmot Dam to the Racine County Line) and from the Wisconsin Department of Natural Resources (a text file with the HEC-2 input for the Fox River in the incorporated area of Silver Lake).

Table 4.4

Summary of Discharges on Fox River

Location	Drainage Area	Peak Discharges (cfs)			
		10-Year	50-Year	100-Year	500-Year
Above County Trunk Highway JB (approximately 40 feet upstream of the USGS gage near New Munster). This flow applies upstream of the Racine County boundary.	812.7 sq. mi.	4,500	6,950	8,200	11,400
Above County Trunk Highway F (approximately 8.5 miles downstream of the USGS gage near New Munster). This flow applies from the Racine County boundary to Highway F.	858.8 sq. mi.	4,550	7,100	8,350	11,500
Above County Trunk Highway C (approximately 11 miles downstream of the USGS gage near New Munster). This flow applies from Highway F to Highway C and downstream to the Illinois border.	868.0 sq. mi.	4,650	7,200	8,450	11,600

Source: FEMA (1996) cfs = cubic foot (feet) per second sq. mi. = square mile(s) USGS = U.S. Geological Survey

The flow change locations in the HEC-2 model were the same as the locations given in the summary of discharges table in the FIS for Kenosha County. The locations are listed in Table 4.4. Because the USGS gage for the Fox River near New Munster is about 40 feet downstream of the Racine County line and more than 3 miles upstream of the buildings that are part of the study, it is likely that the flow affecting the buildings would be higher than the flow measured at the USGS gage. The buildings in the study are all between the Racine County boundary and Highway F. For the hydraulic modeling, it was assumed that the flow measured at the USGS gage near New Munster would be equivalent to the HEC-2 flows applied upstream of the Racine County boundary. This assumption is consistent with a modeling approach that would apply the flow calculated at the downstream end of a particular reach of a river to the entire reach. It was assumed that this approach would be consistent with the way the flows were calculated along the Fox River and input to the existing HEC-2 model.

The amount to increase the downstream flows in the model was based on a combination of the measured flow at the USGS gage compared to the FIS flow for the same location (shown as "Above County Trunk Highway JB" in Table 4.4) and the difference in the FIS flows from upstream to downstream. Most of the measured flows were below the 10-year flow. For the flows that were between the 10- and 50-year flows, the downstream flows were interpolated. All flows were rounded to the nearest 10 cubic foot per second (cfs). The method is explained below and example calculations are shown in Table 4.5.

The June 2008 storm provides an example of the method used for flows that were between the 10- and 50-year flows. On June 15, 2008, the measured peak flow at the USGS gage was 5,960 cfs or a value about 60% between the FIS flows of 4,500 cfs and 6,950 cfs for the 10- and 50-year events.

From the Racine County boundary downstream to Highway F, the flow in the HEC-2 model is increased by 50 cfs for the 10-year event and 150 cfs for the 50-year event to account for the increased drainage area. The flow for the June 2008 event would therefore have been increased by a value of 60% between 50 cfs and 150 cfs, or 110 cfs. Adding 110 cfs to 5,960 cfs results in a flow of 6,070 cfs for the June 2008 event. From Highway F downstream to the Illinois border, the flow is increased by 100 cfs for both the 10- and the 50-year events. Therefore, for all the measured flows greater than the 10-year flow listed in the FIS, the flow was increased by 100 cfs downstream of Highway F. For the June 2008 event, the addition of 100 cfs to 6,070 cfs results in a downstream flow of 6,170 cfs.

Table 4.5

Example Calculations for Determining Discharges in Hydraulic Model

Location	Discharges used in Hydraulic Model (cfs)				Increases in Model Flows from Upstream to Downstream (cfs)			
	March 15, 2006, Storm Event Flows	10-Year Flows from FIS	June 15, 2008, Storm Event Flows	50-Year Flows from FIS	March 15, 2006, Storm Event Flows	10-Year Flows from FIS	June 15, 2008, Storm Event Flows	50-Year Flows from FIS
Upstream of Racine County boundary	2,980	4,500	5,960	6,950	NA	NA	NA	NA
From Racine County boundary to Highway F	3,010	4,550	6,070	7,100	30 = (2,980/4,500)*50	50 = 4,550 – 4,500	110 = 50 + [(5,960– 4,500)/(6,950-4,500)]*(150 – 50)	150 =7,100-6,950
Downstream of Highway F to Illinois border	3,080	4,650	6,170	7,200	70 =(2,980/4,500)*100	100 =4,650-4,550	100 =(100+100)/2	100 =7,200-7,100

cfs = cubic foot (feet) per second
FIS = Flood Insurance Study for Kenosha County (FEMA, 1996)
NA = Not applicable

For the measured flows that were below the FIS 10-year flow, the amount to increase the flows going downstream was based on using the ratio of the measured flow to the FIS 10-year flow and applying the ratio to the flow increases used in the FIS for the 10-year event. For example, on March 15, 2006, the measured peak flow at the USGS gage was 2,980 cfs. The flow increase from the Racine County boundary downstream to Highway F for the 10-year event is 50 cfs (from 4,500 cfs to 4,550 cfs, as shown in Table 4.5). Because 2,980 cfs is 66% of the 10-year flow of 4,500 cfs, the flow was increased by 66% of 50 cfs, which was rounded to 30 cfs, between the Racine County boundary and Highway F. The 10-year flow in the HEC-2 model increases by 100 cfs from Highway F downstream to the Illinois border. Therefore, the flow in this reach for the March 2006 event was increased by 66% of 100 cfs, which was rounded to 70 cfs. For the March 2006 event, this resulted in an upstream inflow of 2,980 cfs applied upstream of the Racine County boundary, 3,010 cfs applied from the Racine County boundary to Highway F, and 3,080 cfs applied downstream of Highway F.

The Storm Event Analysis (see Section 4.1.1) determined that the historical flooding of buildings was controlled by backwater effects. Subsequently, the FIS for Lake County, Illinois, and Kenosha County, Wisconsin, were reviewed for information about backwater effects. The Lake County FIS flood profiles for the Fox River are controlled by Grass Lake during the 10-, 50-, 100-, and 500-year events at a point approximately 0.8 mile downstream of the Illinois/Wisconsin boundary.

An existing HEC-2 model was imported into the HEC-RAS program for the analysis of the Fox River.

The HEC-2 model from the FIS was imported into the USACE hydraulic modeling program, Hydrologic Engineering Center River Analysis System (HEC-RAS). to model the water levels corresponding to measured flows in the Fox River. The downstream tailwater conditions in the HEC-2 model obtained from the Southeastern Wisconsin Regional Planning Commission were based on the effects of the Wilmot Dam, which has been removed. Therefore, it was necessary to estimate what the downstream water levels would be without the dam. The Kenosha County flood profile for the Fox River starts at the Illinois/Wisconsin boundary and continues upstream. The FIS profile upstream of the dam does not reflect current conditions because the modeling was performed in 1977 and the dam was removed in 1992. However, the FIS profile downstream of the dam still represents current conditions.

The 10-year FIS profile has a water surface slope of approximately 0.0002 from approximately 500 feet downstream of the removed Wilmot Dam to Grass Lake. The downstream water levels are controlled by Grass Lake. The downstream section from the

HEC-2 model was copied so that the downstream boundary of the HEC-RAS model would be at the same location approximately 500 feet downstream of the removed Wilmot Dam.

The daily water levels are very similar in the Fox and Nippersink lakes. Grass Lake is upstream of Fox Lake and Nippersink Lake (see Figure 4.4), but there is no water-level gage on Grass Lake. It was assumed that the water level in Grass Lake would be 0.5 foot higher than the level measured in Fox Lake or Nippersink Lake. The higher elevation of Fox Lake and Nippersink Lake was used. As shown in Figure 4.4, Fox Lake and Nippersink Lake are connected and are roughly the same distance downstream of Grass Lake. The combination of the level of Grass Lake and an assumed slope upstream from Grass Lake to the former location of Wilmot Dam was used to determine the downstream boundary condition for the HEC-RAS model for selected storm events. For a particular instantaneous flow rate, it was assumed that the downstream water level should be based on the mean daily water level for the same day as the flow event.

An initial water surface slope from Grass Lake of 0.0002 was used based on the FIS, but there were several events with reported historical flooding that were not modeled correctly, such that the WSE would not have caused damages at the buildings that were damaged. Hence, the model was calibrated based on the reported flooding. The assumption that Grass Lake would be 0.5 foot higher than the measured downstream lake levels became a part of the calibration because of its effect on water levels in combination with the water surface slope.

The slope used in the calibrated model was 0.0005 instead of the initial slope of 0.0002, although there were still a few events with reported historical flooding where the modeled water levels would not have been high enough to result in calculated damages. As discussed in the Storm Event Analysis in Section 4.1.1, it is possible that either the month or year of the reported flooding was wrong or the flooding may not have actually been caused by the Fox River.

After the HEC-RAS model was calibrated, the events that occurred no more frequently than every 180 days (180 days are allowed for repairing damages) and that resulted in the highest water surface profiles were selected for the Flood Inundation Analysis.

4.2.1.2 Rock River

As discussed in Section 4.1.1, the Storm Event Analysis for Rock River provided sufficient information for a Flood Inundation Analysis. The USGS HWM study of the June 2008 flood (Fitzpatrick

et al., 2008) confirmed that HWMs along the Rock River between Lake Koshkonong and 2 miles upstream of the lake correspond to the stage of the lake. WSEs recorded at the Lake Koshkonong gage for all other events were also assumed to be equivalent to the WSEs at each building along Lake Koshkonong and Rock River, consistent with the USGS HWM study for the June 2008 flood.

4.2.1.3 Kickapoo River

The USGS HWM study of the June 2008 flood (Fitzpatrick et al., 2008) confirmed that HWMs near the building in Gays Mills correspond to the peak stage measured at the gage in the Kickapoo River (Gage ID GMIW3). The June 2008 event had a measured WSE at the gage of 705.44 feet NGVD29. The two HWMs closest to the building in Gays Mills were determined to be 705.15 feet NGVD29 and 705.65 feet NGVD29 (using a conversion of 0.15 foot from the USGS Vertcon program to convert between North American Vertical Datum of 1988 [NAVD88] and NGVD29). The measured HWMs for June 2008 are higher and lower than the measured peak water surface at the gage, so it was reasonable to use the gage elevation as the WSE at the building. The WSE at the building in Gays Mills for the August 2007 event was also assumed to be equivalent to the peak elevation of 704.79 feet NGVD29 measured at the Kickapoo River gage.

4.3 Flood Inundation Analysis

For acquisition projects, the Flood Inundation Analysis is the final step of Phase 2. WSEs are compared to the MP_A FFEs to determine whether buildings would have been affected by the peak storm event(s). Mapping the flood boundary is not required for acquisition projects because the flood depths are required only at the individual buildings.

Most Flood Inundation Analyses and mapping are conducted using GIS software. The cross sections from the hydraulic model are digitized and attributed with peak WSEs for the events of interest. Flood elevations are then interpolated and converted to a water surface layer to account for flood elevations in all areas between the cross sections. From this surface, a peak WSE at each building is exported in table format.

When MP_A FFE data are available for acquisition projects, extracting the WSE at the building from the flood elevation surface directly greatly reduces analysis time by eliminating the need to compare the ground elevation and flood elevation surfaces. To determine the

depth of flooding in the building for the MP_A scenario, the FFE is subtracted from the WSE at each building.

When the FFE is unknown, detailed topographic information is needed to calculate the flood depth between the ground and the WSE. The flood depth at each building is then calculated by subtracting an assumed height above grade, based on the building's foundation type or building photography, from the overall flood depth.

4.3.1 Wisconsin Study: Flood Inundation Analysis

The Flood Inundation Analysis was completed by comparing the WSE for the actual storm events directly to the FFE for each building. The MP_A FFEs were provided for each building by the Counties participating in the study. The vertical datum of each FFE was not provided. The reported FFEs were assumed to be relative to NGVD29 because FIRMs and FEMA elevation certificates are predominantly reported relative to NGVD29. This assumption could result in the calculation of slightly deeper flood depths if any of the FFEs were reported relative to NAVD88. Based on the conversion from NGVD29 to NAVD88 from the USGS Vertcon program, the difference between NGVD29 and NAVD88 is 0.25 foot in the Fox River area, 0.22 foot in the Rock River area, and 0.15 foot in the Kickapoo River area.

4.3.1.1 Fox River

The locations of the lettered cross sections from the FIS (HEC-2) model of Fox River were digitized from the FIRMs for Kenosha County and the Flood Boundary and Floodway Map for Silver Lake using GIS software. The locations of intermediate cross sections in the model were digitized based on the downstream distance between the sections in the HEC-2 model. The cross sections upstream and downstream of each building were then identified. The WSE at each building was interpolated based on the WSE at the model cross sections upstream and downstream of the building and the distance between the two sections versus the approximate distance from the upstream section to the building.

To determine the flood depth for each building, the FFE was subtracted from the WSE (interpolated from the results of the HEC-RAS model) for each storm event analyzed. The flood depths at each building for the top three storms that resulted in the greatest losses avoided are shown in Appendix B, Figures B.1 through B.3. These figures show the flood depths at all the buildings in Kenosha County, regardless of whether the building had been demolished after the particular storm event.

4.3.1.2 Rock River

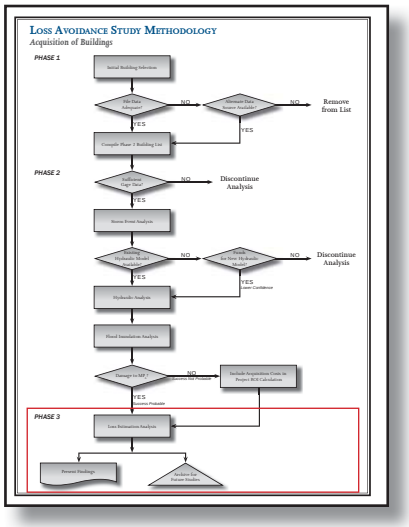
The FFE for each building was subtracted from the stage of Lake Koshkonong for each storm event on the Rock River. The flood depths for the top three storms that resulted in the greatest losses avoided are shown in Appendix C, Figures C.1 through C.3. These figures show the flood depths at all the buildings in Jefferson County, regardless of whether the building had been demolished after the particular storm event.

4.3.1.3 Kickapoo River

The FFE for the building in Gays Mills was subtracted from the measured river stage for each of the two storm events on the Kickapoo River. The flood depth for each storm is shown in Appendix D, Figure D.1.

Section Five:

Phase 3 – Loss Estimation Analysis

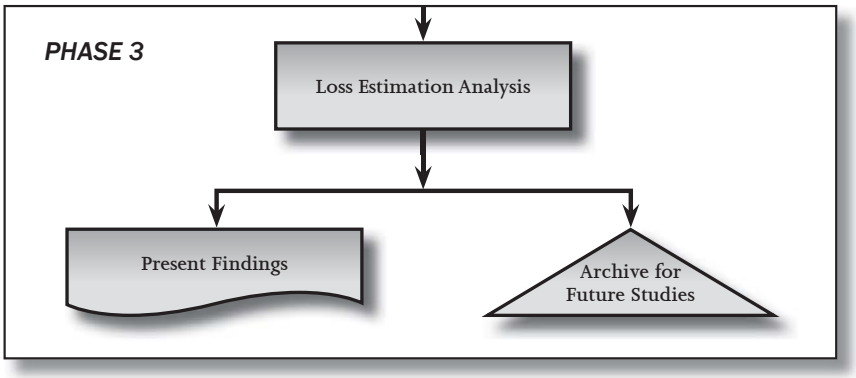


The final phase of an LAS consists of estimating the losses avoided based on the effectiveness of the mitigation project during the MP_C storm events. This section provides a synopsis of Phase 3, the Loss Estimation Analysis, for an acquisition project. The methodology is illustrated in Figure 5.1.

The two major tasks in Phase 3 are:

- Calculating losses avoided
- Calculating the ROI

Figure 5.1



The approach used to estimate flood damages is based on the FEMA Benefit-Cost Analysis (BCA) Version 4 software (FEMA, 2008a) and technical guidance unless stated otherwise in the text. *What Is a Benefit?* (FEMA, 2001) also provides a basis for calculating losses. The values in the 2001 publication have been updated since 2001, but the methodology is still current.

For a more information on Phase 3, see *Loss Avoidance: Riverine Flood Methodology Report* (FEMA, in press[b]) and *Loss Avoidance: Nontraditional Benefits Methodology Report* (FEMA, in press[a]).

5.1 Calculating Losses Avoided

In Phases 1 and 2 of an acquisition study, the following information is determined:

- The storm events that have occurred since the study baseline that would have caused damages in the MP_A scenario.
- The number and type of buildings affected by the storm events being analyzed in the MP_A scenario.

- The flood depth at each building in the MP_A scenario, estimated from the Flood Inundation Analysis.

For Phase 3, the dollar value estimate of the losses (damages) is calculated for the MP_A scenario using the flood depth at each building for events occurring after the study baseline. The general method of calculating losses avoided (in dollars) would be to subtract MP_C damages from the MP_A damages, per the formula presented in Figure 5.2.

Figure 5.2

Loss Estimation Analysis

$$MP_A - MP_C = LA$$

Where MP_A = Mitigation Project Absent
Where MP_C = Mitigation Project Completed
Where **LA** = Losses Avoided

However, for acquisition projects, there are no MP_C damages because the building no longer exists. Therefore, losses avoided are equal to MP_A damages.

When losses are calculated, all of the losses should be presented as present-day values. Therefore, if historical losses from similar events are used as estimates, they should be adjusted to present-day values.

5.1.1 Loss Categories

Once the Flood Inundation Analysis is complete and the potentially affected buildings have been identified, flood damages must be evaluated. As shown in Table 5.1, potential damages are divided into loss categories. Loss categories generally include physical damage, loss of function, and emergency management costs, all of which contain multiple loss types. The calculation of the losses avoided for building modification projects, such as acquisition projects, differs from flood reduction projects in that only the loss types that apply to buildings can be used in calculating losses.

5.1.1.1 Physical Damage

For an acquisition study, physical damage is limited to the direct damage to the building and its contents. Physical damages can be estimated using either:

Table 5.1

Loss Estimation Categories and Types

Loss Category	Loss Type
Physical Damage	Buildings*
	Contents*
	Roads and Bridges
	Infrastructure
	Landscaping
	Environmental Impacts
	Vehicles/Equipment
Loss of Function	Displacement Expense*
	Loss of Rental Income*
	Loss of Business Income*
	Lost Wages*
	Disruption Time for Residents*
	Loss of Public Services*
	Economic Impact of Utility Loss
	Economic Impact of Road/Bridge Closure
Emergency Management	Debris Cleanup
	Governmental Expense

Source: FEMA (2007)
* Applies to building acquisition projects

- FEMA BCA Version 4 software depth-damage functions
- Historical damages from events of similar size

When available, actual repair costs (or replacement costs if the building was substantially damaged) should be used to estimate losses if similar flood events have occurred in the past. However, it must first be verified that the hydraulic conditions of the river and the physical condition of the project site were substantially the same during the two events. For example, if the building has been altered since the historical event, or if sandbagging was used during the event, repair costs related to flood damage should not be used for the LAS.

Historical damage data may be obtained from various sources such as homeowner insurance claims, flood insurance claims, the National Flood Insurance Program BureauNet database, Small Business Administration loan application databases, local contractors, and homeowner interviews. The BCA that was performed for the funding application of the mitigation project may also contain historical damage data. Additionally, for events in which there was

Sources of Physical Damage Data

- Depth-damage curves obtained from HAZUS-MH
- Insurance information
- HMGP or FMA project files and BCAs
- Public Assistance program Project Worksheets
- Historical flood damage information

a disaster declaration, FEMA may have provided grant funds under the Public Assistance (PA) Program for repairs to buildings owned by public entities and certain private, non-profit organizations. Damage and repair information may be obtained from Damage Survey Reports (DSRs) or Project Worksheets (PWs) that FEMA prepared to document eligible costs under the PA Program. If this information is not available, the losses must be estimated.

Standardized damage curves relating depth of flooding to building and contents damage (calculated as a percentage of the BRV) are available from FEMA and the USACE.

5.1.1.2 Loss of Function

For an acquisition study, loss-of-function damages are the economic impacts to an individual or the community that occur because of the physical damage to the building. Loss-of-function damages can vary extensively depending on the type of building. For example, loss-of-function costs associated with damage to a residence could be costs associated with moving to and renting another residence while flooding subsides and repairs occur. Loss-of-function costs associated with damages to a business could be lost business, temporary relocation to another building, or lost wages for employees. Loss-of-function costs resulting from damages to public buildings could be the loss of critical public services, such as police and fire departments.

Sources of Loss-of-Function Data

- Factors used in HAZUS-MH for loss of function calculations
- FEMA BCA loss of function calculations
- Individual Assistance program documentation
- Public Assistance Program Project Worksheets or Damage Survey Reports
- Net income from business owners
- Annual operation budget from local agencies
- Population served by critical facilities and distance to next available facility
- Historical flood damage information

For acquisition studies, loss of function includes displacement expense, loss of rental income, loss of business income, lost wages, disruption time for residents, and loss of public service.

Loss-of-function costs are based on the amount of time a building is not functional after a flood because of the amount of destruction to the building and the value of the particular function. The amount of time a building cannot be used in its normal capacity increases with the severity of damage to the building.

As with physical depth-damage relationships, published relationships between flood depth and loss-of-function time can be used to calculate these costs. For example, the FEMA BCA Version 4 software contains methodologies and values that can be used to calculate loss of function. The Hazards U.S. – Multihazard (HAZUS-MH) Technical Manual (FEMA, 2006) contains methods similar to the FEMA BCA Version 4 software with regional adjustments to various loss-of-function methods.

Communities may also provide costs from past events that demonstrate the impact of the events. In these cases, local values

provide a more accurate representation of a project area than the national or regional values from tools such as the FEMA BCA Version 4 software or HAZUS-MH. Additionally, USACE publications on post-disaster impacts from flooding and FEMA DSRs or PWs contain information about loss of function from specific locations.

5.1.1.3 Emergency Management Costs

Emergency management costs are costs related to response and recovery activities conducted by local, State, and Federal government agencies as a result of a hazard event. For example, the community experiences costs for ensuring public safety. It is important to note that emergency management costs should be considered only for an LAS when a large group of adjacent buildings is acquired. The costs are obtained primarily from historical damage records, such as DSRs or PWs prepared by FEMA during declared disaster events under the PA Program. If actual costs from previous events are known, they should be used. If costs are to be estimated, the following steps can be used to calculate the impacts of emergency response measures:

- Local representatives can be interviewed to identify the types of services required and the level of effort required in delivering those services.
- The duration of the flood and the appropriate salary categories can be used to estimate the costs for first responders.
- The estimated flood recovery time and the appropriate salary categories can be used to estimate the impact to other municipal employees. The impact may include cleanup and costs associated with implementing repairs.

Sources of Emergency Management Data

- Public Assistance program Project Worksheets for emergency work
- Interviews with local public safety officials
- Historical flood damage information

5.1.2 Wisconsin Study: Calculating Losses Avoided

The methodology described above was used to calculate MP_A damages for the three counties in this study. As explained previously, no MP_C damages exist because all building were demolished. Physical damages were limited to buildings and contents damage and were estimated based on the flood depth above FFE, calculated during the Flood Inundation Analysis. Because all buildings in Kenosha and Jefferson counties were residential, loss-of-function costs were limited to displacement and disruption. The losses for the public building in Gays Mills, however, included loss of public service based on the annual budget. Displacement was not counted due the industrial function of the building.

For all buildings, physical damages to the buildings and contents were estimated using present-day (2009) BRVs provided by the Counties for each building, and an appropriate building-to-content

ratio provided by the FEMA BCA Version 4 software for the value of contents. The damages were calculated using the appropriate depth-damage functions based on building type, provided by the FEMA BCA Version 4 software. All depth-damage functions used in this study can be found in Appendix A.

For the residential buildings in Kenosha and Jefferson counties, FEMA BCA Version 4 software guidance for residential displacement cost of $1.44/square foot/month rental costs were used. For all buildings, the FEMA BCA Version 4 software damage function for displacement time was used to estimate the repair time in days.

For residential buildings, losses avoided were calculated using physical damages, and displacement and disruption costs.

Disruption costs were also estimated for the residential buildings in Kenosha and Jefferson counties. FEMA BCA Version 4 software guidance provides a national average wage of $28.11 per hour per person. The time of disruption was calculated using the estimate that each adult occupant is disrupted 40 hours plus 8 hours for every 1% in building damage (FEMA, 2006). Assuming a conservative estimate of two adults per building, these standards were used to calculate the disruption time for residents.

To calculate the loss-of-function damages for the public building in Gays Mills, the total annual operating budget for the building was obtained. According to the 2001 Crawford County Budget, the total budget for the Highway Shop Operating was $1,978,786. This value was inflated to 2009 dollars ($2,506,667) and divided by 365 to determine a daily value of service. The FEMA BCA Version 4 software damage function for loss of function was used to estimate the days of loss for each event.

Emergency management costs are not expected to change and therefore are generally not included in LASs for acquisition projects. Acquisition of a single residential building, small groups of buildings, or groups in scattered locations is unlikely to reduce a community's emergency management costs because the area affected by a disaster is not decreased and the total population affected by disaster is not substantially decreased (FEMA, 2001). Therefore, emergency management costs should be considered only when a large group of adjacent buildings is acquired. The number of acquired buildings in each of the three Wisconsin counties was not large enough to significantly affect emergency response. Emergency management costs were therefore not estimated for this study.

5.2 Calculating Return on Investment

Calculating the ROI is the final task in determining losses avoided. The results vary depending on the number of events evaluated for

each building and the resulting level of damage. Figure 5.3 provides an illustration of the formula used in calculating ROI.

The denominator, Project Investment (PI), is the total project investment for the project being evaluated, or in the case of acquisition projects, the fair market cost to acquire and demolish the building and restore the property. Project investment does not represent the Federal investment alone. Rather, it is the total investment for the project made by all parties involved. The investment total must be representative of the acquisition costs. Also, all of the losses avoided are calculated in present-day values; therefore, the actual costs to acquire each building should also be adjusted to present-day values.

Figure 5.3

Return on Mitigation Investment

$$\frac{\$\ LA}{\$\ PI} \times 100 = \%ROI$$

Where **LA** = Losses Avoided
Where **PI** = Project Investment
Where **ROI** = Return on Investment

The numerator, Losses Avoided (LA), represents the total losses avoided for the mitigation project being evaluated. The ROI may be calculated for one or many flood events occurring after the study baseline. If a storm event did not occur that was large enough to have caused damage in the MP_A scenario, the losses avoided are zero. If multiple events are being evaluated for each mitigation project, the LA would represent the total losses avoided for all the flood events. Therefore, the ROI would represent the cumulative ROI.

An ROI can be calculated for each individual building, for a mitigation project (which could include multiple buildings), by storm event, or for the whole study area (which could include multiple projects). If an ROI is calculated for multiple buildings, taking an average of the ROI for each building is not appropriate. The total losses avoided for all of the buildings should be added and divided by the total construction costs. This is referred to as aggregation.

5.2.1 Wisconsin Study: Calculating Return on Investment

The ROI is influenced by data quality, storm severity, and the relative costs of the building acquisitions. In general, buildings affected by a greater number of events yielded higher ROIs. ROI was calculated in four ways to provide a series of data:

- Within each county, an ROI was calculated for each individual building for each event analyzed (see Appendix B, Tables B.1 through B.14, for Kenosha County; Appendix C, Tables C.1 through C.8, for Jefferson County; and Appendix D, Table D.1, for Crawford County).
- An ROI was also calculated for each building based on the cumulative avoided loss for all of the events that would have affected the building had it not been acquired (see Appendix E, Table E.1).
- A total ROI was calculated for each event occurring within each of the three counties based on the cumulative avoided losses of all the buildings within the county that would have been affected and the total cost to acquire all the buildings with the county. These values are shown in Table 5.2 for Kenosha County, Table 5.3 for Jefferson County, and Table 5.4 for Crawford County.
- A total ROI was calculated for the study as a whole, based on the cumulative loss of all the buildings and all storm events and the total cost to acquire all of the buildings (see Appendix E, Table E.1).

For the individual buildings in the study, ROI ranged from 0% to 2,586%. The building with an ROI of 2,586% had an unusually low project cost of $7,841 in current values, which was verified by Kenosha County.

The total losses avoided for the 73 buildings along the Fox River in Kenosha County were $8,275,864 with an ROI of 102%. One of the properties along the Fox River was acquired after the building had burned down at a cost of $1,348 in current values. No ROI was calculated because it was assumed that nothing would have been rebuilt so that there would be no damages avoided.

The total losses avoided for the 18 buildings along the Rock River in Jefferson County were $2,345,726 with an ROI of 107%. The total losses avoided for the building along the Kickapoo River in Crawford County were $3,929,449 with an ROI of 592%.

Appendix E, Table E.1, shows that the aggregate ROI for all three counties in the Wisconsin study was 132%, using the combined losses avoided of $14,551,039 and a combined project investment of $10,996,559. The ROI reflects all the losses avoided for events occurring after each building's demolition completion date, and it will increase as additional storm events occur. More detailed loss calculations for each building and each event are included in Appendices B through D.

Table 5.2

Return on Mitigation Investment and Loss Estimation Results for Buildings in Kenosha County

Analysis Information			Results by Loss Category				Total Losses Avoided	Project Investment[2]	Current ROI
Event Date	Number of Buildings Included in Analysis[1]	Number of Buildings with Losses Avoided	Building Damage	Contents Damage	Displacement Costs	Disruption Costs			
June-1996	8	3	$22,508	$13,795	$225	$19,460	$55,986	$988,615	6%
February-1997	10	4	$19,832	$12,039	$0	$20,343	$52,214	$1,182,299	4%
April-1998	11	3	$10,509	$6,918	$0	$12,516	$29,942	$1,318,900	2%
June-1999	16	14	$151,037	$89,000	$7,535	$105,166	$352,737	$1,870,844	19%
June-2000	22	18	$110,853	$69,653	$4,935	$95,205	$280,647	$2,495,784	11%
June-2001	34	20	$63,266	$39,459	$549	$77,636	$180,910	$3,948,322	5%
June-2002	45	13	$29,506	$18,814	$0	$44,174	$92,493	$5,024,413	2%
May-2003	55	7	$9,914	$6,795	$0	$20,624	$37,332	$6,028,187	1%
May-2004	57	50	$509,699	$308,143	$25,480	$361,724	$1,205,046	$6,243,728	19%
February-2005	58	9	$11,468	$8,825	$0	$25,877	$46,169	$6,352,558	1%
March-2006	62	23	$49,311	$34,031	$0	$76,126	$159,468	$6,790,484	2%
August-2007	71	65	$895,853	$528,110	$64,601	$610,111	$2,098,675	$7,845,846	27%
June-2008	72	68	$1,286,888	$742,212	$127,733	$818,008	$2,974,840	$7,971,390	37%
April/ May-2009	73	51	$268,570	$167,736	$8,246	$264,851	$709,403	$8,141,177	9%
		TOTAL	$3,439,213	$2,045,529	$239,302	$2,551,820	$8,275,864	$8,141,177	102%

1 Only buildings that were acquired prior to the event were included in the analysis.
2 Project investment costs for each event only include the project costs for the buildings that were included in the analysis for that event.

Table 5.3

Return on Mitigation Investment & Loss Estimation Results for Buildings in Jefferson County

Analysis Information			Results by Loss Category				Total Losses Avoided	Project Investment[2]	Current ROI
Event Date	Number of Buildings Included in Analysis[1]	Number of Buildings with Losses Avoided	Building Damage	Contents Damage	Displacement Costs	Disruption Costs			
April-1993	1	1	$14,367	$8,269	$1,190	$11,749	$35,574	$162,919	22%
June-1996	5	4	$8,372	$7,227	$-	$13,538	$29,137	$584,328	5%
April-1999	10	1	$476	$457	$-	$2,564	$3,497	$1,087,395	0.3%
June-2000	12	8	$21,885	$18,435	$-	$29,501	$69,821	$1,345,334	5%
June-2004	15	13	$92,162	$59,103	$2,151	$84,422	$237,839	$1,676,168	14%
April-2007	17	12	$57,344	$38,029	$3,488	$57,952	$156,813	$1,903,128	8%
June-2008	18	18	$680,052	$340,856	$111,508	$344,988	$1,477,403	$2,191,601	67%
March-2009	18	16	$136,167	$84,116	$8,485	$106,874	$335,643	$2,191,601	15%
		TOTAL	$1,010,826	$556,492	$126,822	$651,586	$2,345,726	$2,191,601	107%

1 Only buildings that were acquired prior to the event were included in the analysis.
2 Project investment costs for each event only include the project costs for the buildings that were included in the analysis for that event.

Table 5.4

Return on Mitigation Investment & Loss Estimation Results for Buildings in Crawford County

Analysis Information			Results by Loss Category				Total Losses Avoided	Project Investment[2]	Current ROI
Event Date	Number of Buildings Included in Analysis[1]	Number of Buildings with Losses Avoided	Building Damage	Contents Damage	Displacement Costs	Loss of Function Costs			
August-2007	1	1	$313,198	$239,331	$0	$1,282,521	$1,835,050	$663,780	276%
June-2008	1	1	$345,427	$265,575	$0	$1,483,397	$2,094,399	$663,780	316%
		TOTAL	$658,624	$504,906	$0	$2,765,918	$3,929,449	$663,780	592%

1 Only buildings that were acquired prior to the event were included in the analysis.
2 Project investment costs for each event only include the project costs for the buildings that were included in the analysis for that event.

Section Six:

Considerations and Recommended Practices

This study yielded findings of potential value to future loss avoidance studies. This section is a summary of the special considerations and recommended practices that have resulted from the study. The information is divided into data collection and availability and analysis methodology.

6.1 Data Collection and Availability

Backwater effects were considered for both Kenosha and Jefferson counties. The Fox River in Kenosha County flows into Grass Lake in Lake County, Illinois, approximately 9 miles downstream of the buildings in Silver Lake. Flow from Grass Lake continues to Nippersink and Fox lakes, then to Pistakee Lake before continuing farther downstream as Fox River. The Rock River in Jefferson County flows directly into Lake Koshkonong. Because of the backwater effects indicated on the FIS, stream gage flows and the normal method could not be used directly for the analysis of the Fox River. The downstream boundary for the Fox River model was calculated using a peak stage on Grass Lake and extrapolating upstream with a constant slope to the most downstream modeled cross section. Buildings along Rock River were completely within the backwater effect due to Lake Koshkonong, according to the FIS and the USGS HWM study for the June 2008 event (Fitzpatrick et al., 2008). Therefore, Lake Koshkonong stages were compared directly to FFEs for the Flood Inundation Analysis.

6.2 Analysis Methodology

As discussed in Section 4.1 (Storm Event Analysis), the Hydraulic Analysis and subsequent Flood Inundation Analysis indicated that multiple storm events occurring only weeks apart could potentially have caused damages. Because the loss avoidance calculations are based on the assumption that sufficient time elapses between storm events to allow for repairs to be completed, it was necessary to limit the storm event analysis to a single storm within the selected time interval. For this analysis, a time interval of at least 180 days between storms, or approximately 6 months, was chosen to allow for the hypothetical repairs to be completed.

For future studies, this assumption could be modified to include a time interval that includes a consideration of the actual repair times for the area or uses a curve of theoretical repair times based on the flooding depth sustained.

Appendix A:

Loss Avoidance Study: Wisconsin, Property Acquisition and Structure Demolition

Loss Calculation Table

List of Tables

Table A.1 FEMA BCA Version 4 Depth-Damage Functions.....A-3

Table A.1

FEMA BCA Version 4 Depth–Damage Functions

	Damage Curve	Source	Type	–3 ft	–2 ft	–1 ft	0 ft	1 ft	2 ft	3 ft	4 ft	5 ft	6 ft	7 ft	8 ft	9 ft	10 ft	11 ft	12 ft	13 ft	14 ft	15 ft	16 ft
Structures	1	USACE Generic (BCA Default)	1 story no basement	0.0	0.0	2.5	13.4	23.3	32.1	40.1	47.1	53.2	58.6	63.2	67.2	70.5	73.5	75.4	77.2	78.5	79.5	80.2	80.7
	2	USACE Generic (BCA Default)	1 story with basement	0.0	13.8	19.4	25.5	32.0	38.7	45.5	52.2	58.6	64.5	69.8	74.2	77.7	80.1	81.1	81.1	81.1	81.1	81.1	81.1
	3	USACE Generic (BCA Default)	2 story no basement	0.0	0.0	3.0	9.3	15.2	20.9	26.3	31.4	36.2	40.7	44.9	48.8	52.4	55.7	58.7	61.4	63.8	65.9	67.7	69.2
	4	USACE Generic (BCA Default)	2 story with basement	0.0	10.2	13.9	17.9	22.3	27.0	31.9	36.9	41.9	46.9	51.8	56.4	60.8	64.8	68.4	71.4	73.7	75.4	76.4	76.4
	5	USACE Generic (BCA Default)	Split no basement	0.0	0.0	6.4	7.2	9.4	12.9	17.4	22.8	28.9	35.5	42.3	49.2	56.1	62.6	68.6	73.9	78.4	81.7	83.8	84.4
	6	USACE Generic (BCA Default)	Split with basement	0.0	10.4	14.2	18.5	23.2	28.2	33.4	38.6	43.8	48.8	53.5	57.8	61.6	64.8	67.2	68.8	69.3	69.3	69.3	69.3
	7	BCA Default	Light Industrial	0.0	0.0	0.0	0.0	10.4	16.8	20.9	25.9	30.1	33.8	37.0	41.5	44.6	46.7	46.7	46.7	46.7	46.7	46.7	46.7
Contents	1	USACE Generic (BCA Default)	1 story no basement	0.0	0.0	2.4	8.1	13.3	17.9	22.0	25.7	28.8	31.5	33.8	35.7	37.2	38.4	39.2	39.7	40.0	40.0	40.0	40.0
	2	USACE Generic (BCA Default)	1 story with basement	0.0	10.5	13.2	16.0	18.9	21.8	24.7	27.4	30.0	32.4	34.5	36.3	37.7	38.6	39.1	39.1	39.1	39.1	39.1	39.1
	3	USACE Generic (BCA Default)	2 story no basement	0.0	0.0	1.0	5.0	8.7	12.2	15.5	18.5	21.3	23.9	26.3	28.4	30.3	32.0	33.4	34.7	35.6	36.4	36.9	37.2
	4	USACE Generic (BCA Default)	2 story with basement	0.0	8.4	10.1	11.9	13.8	15.7	17.7	19.8	22.0	24.3	26.7	29.1	31.7	34.4	37.2	40.0	43.0	46.1	49.3	52.6
	5	USACE Generic (BCA Default)	Split no basement	0.0	0.0	2.2	2.9	4.7	7.5	11.1	15.3	20.1	25.2	30.5	35.7	40.9	45.8	50.2	54.1	57.2	59.4	60.5	60.5
	6	USACE Generic (BCA Default)	Split with basement	0.0	7.3	9.4	11.6	13.8	16.1	18.2	20.2	22.1	23.6	24.9	25.8	26.3	26.3	26.3	26.3	26.3	26.3	26.3	26.3
	7	BCA Default	Light Industrial	0.0	0.0	0.0	0.0	19.0	31.0	42.0	52.0	61.0	72.0	82.0	91.0	94.0	95.0	95.0	95.0	95.0	95.0	95.0	95.0
Displacement	1	HAZUS/New BCA	Residential	0.0	0.0	0.0	0.0	45.0	90.0	135.0	180.0	225.0	270.0	315.0	360.0	405.0	450.0	495.0	540.0	585.0	630.0	675.0	720.0
	2	HAZUS/New BCA	Non-residential	0.0	0.0	0.0	0.0	45.0	90.0	135.0	180.0	225.0	270.0	315.0	360.0	405.0	450.0	450.0	450.0	450.0	450.0	450.0	450.0
Loss of Function	1	HAZUS/New BCA	Residential	0.0	0.0	0.0	0.0	45.0	90.0	135.0	180.0	225.0	270.0	315.0	360.0	405.0	450.0	495.0	540.0	585.0	630.0	675.0	720.0
	2	HAZUS/New BCA	Non-residential	0.0	0.0	0.0	0.0	45.0	90.0	135.0	180.0	225.0	270.0	315.0	360.0	405.0	450.0	450.0	450.0	450.0	450.0	450.0	450.0

Note: All non-residential structures assumed to be engineered structure types
FEMA Content-to-BRV Ratios
1. FEMA standard value for contents for Residential is 100% of the Building Replacement Value
2. FEMA standard value for contents for Medical Office is 13% of the Building Replacement Value
3. FEMA standard value for contents for Hotel is 15% of the Building Replacement Value
4. FEMA standard value for contents for Office 1-Story is 12% of the Building Replacement Value

Appendix B:

Summary of Losses Avoided and ROI Calculations for Kenosha County

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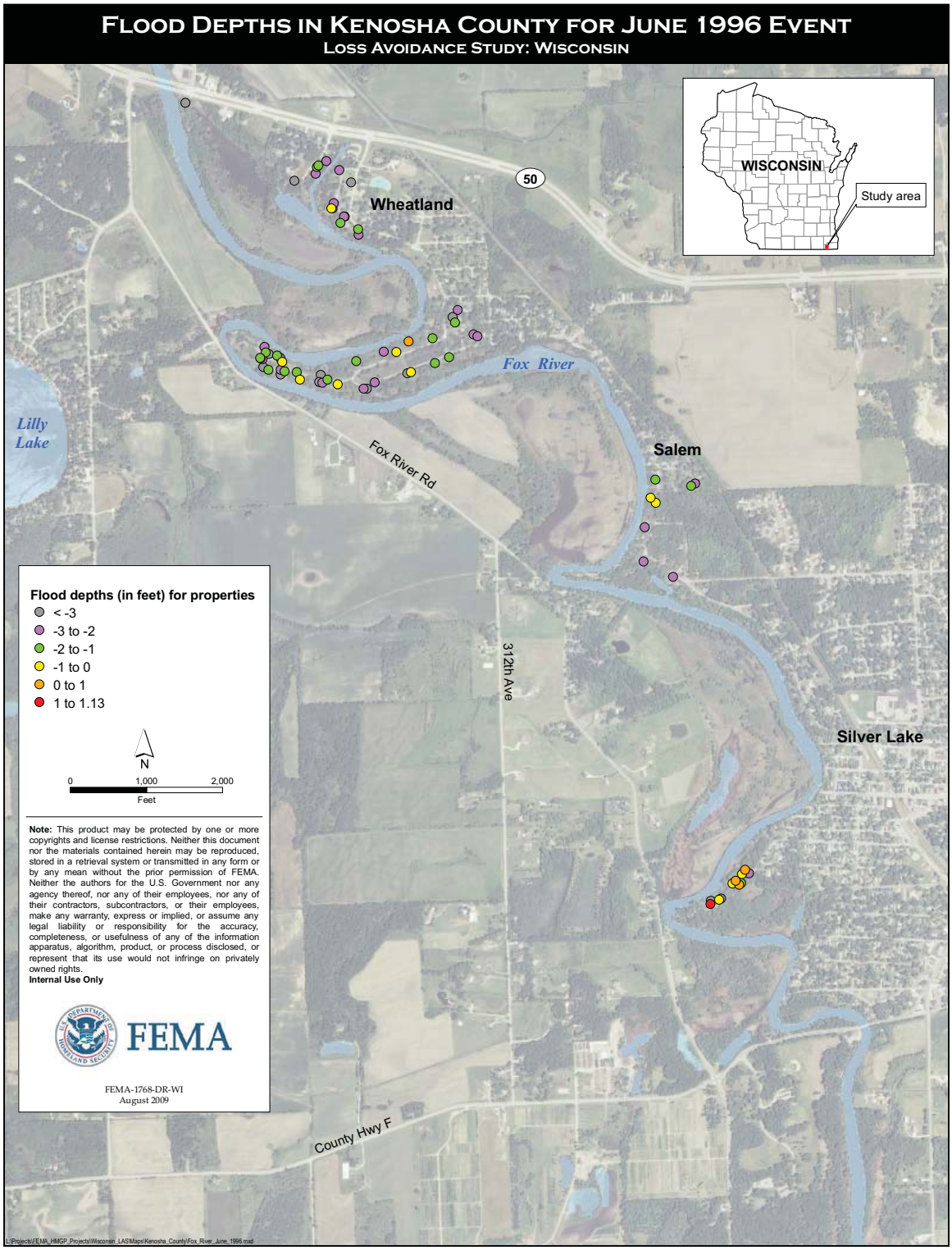
Figure B.1


Flood Depths in Kenosha County for June 1996 Event
Loss Avoidance Study: Wisconsin
WISCONSIN
Study area
50
Wheatland
Fox River
Lilly Lake
Fox River Rd
Salem
312th Ave
Silver Lake
County Hwy F
Flood depths (in feet) for properties
< -3
-3 to -2
-2 to -1
-1 to 0
0 to 1
1 to 1.13
N
0
1,000
2,000
Feet
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August 2009

Table B.1 Part 1 of 2

Loss Estimation and ROI Calculations for June 1996 Event in Kenosha County

BLDG NO.	ADDRESS	ACQUISITION COMPLETION DATE	FFE (FT, NGVD)[1]	2009 BRV[2]	FLOOD DEPTH (FT)	BUILDING DAMAGE	CONTENTS DAMAGE	DISPLACEMENT COSTS	DISRUPTION COSTS	TOTAL LOSSES AVOIDED	PROJECT INVESTMENT[3]	RETURN ON INVESTMENT
51	32139 77th Street	Jul-1995	747.0	$ 134,820	-1.8	$ 720	$ 691	$ -	$ 2,489	$ 3,901	$ 135,493	3%
52	32129 77th Street	Jul-1995	747.9	$ 95,760	-2.7	$ -	$ -	$ -	$ -	$ -	$ 121,895	0%
53	437 S. Riverside Drive	Jul-1995	744.0	$ 85,680	0.1	$ 12,577	$ 7,515	$ 225	$ 8,851	$ 29,167	$ 121,453	24%
54	601 S. Riverside Drive	Jul-1995	749.0	$ 107,835	-4.9	$ -	$ -	$ -	$ -	$ -	$ 123,925	0%
55	8106 Shorewood Drive	Jul-1995	746.7	$ 95,760	-2.2	$ -	$ -	$ -	$ -	$ -	$ 127,728	0%
56	31524 76th Street	Sep-1995	745.1	$ 70,560	0.0	$ 9,211	$ 5,588	$ -	$ 8,120	$ 22,919	$ 116,379	20%
57	31217 77th Street	Feb-1996	747.0	$ 75,600	-2.1	$ -	$ -	$ -	$ -	$ -	$ 124,635	0%
58	32041 77th Street	Feb-1996	750.7	$ 87,360	-5.5	$ -	$ -	$ -	$ -	$ -	$ 117,107	0%
60	419 S. Riverside Drive	Oct-1996	745.0	$ 78,750	-0.9	$ -	$ -	$ -	$ -	$ -	$ 7,841	0%
59	32104 77th Street	Nov-1996	748.0	$ 176,190	-2.8	$ -	$ -	$ -	$ -	$ -	$ 185,843	0%
61	32028 77th Street	Apr-1997	747.0	$ 89,880	-1.8	$ -	$ -	$ -	$ -	$ -	$ 136,601	0%
62	31628 76th Street	Dec-1998	747.7	$ 106,680	-2.7	$ -	$ -	$ -	$ -	$ -	$ 137,189	0%
63	32029 77th Street	Dec-1998	746.6	$ 79,800	-1.4	$ -	$ -	$ -	$ -	$ -	$ 100,017	0%
64	32018 77th Street	Dec-1998	747.5	$ 82,320	-2.3	$ -	$ -	$ -	$ -	$ -	$ 116,767	0%
65	31710 77th Street	Jan-1999	746.4	$ 107,100	-1.4	$ -	$ -	$ -	$ -	$ -	$ 139,792	0%
66	32143 77th Street	Mar-1999	747.0	$ 145,530	-1.8	$ -	$ -	$ -	$ -	$ -	$ 58,179	0%
11	32132 77th Street	Dec-1999	747.0	$ 84,000	-1.8	$ -	$ -	$ -	$ -	$ -	$ 90,458	0%
44	31422 76th Street	Dec-1999	746.8	$ 94,500	-1.7	$ -	$ -	$ -	$ -	$ -	$ 117,619	0%
45	32034 77th Street	Dec-1999	745.5	$ 121,800	-0.3	$ -	$ -	$ -	$ -	$ -	$ 133,352	0%
12	31823 77th Street	Dec-1999	749.0	$ 102,900	-4.0	$ -	$ -	$ -	$ -	$ -	$ 116,432	0%
68	32015 77th Street	Dec-1999	748.5	$ 121,590	-3.4	$ -	$ -	$ -	$ -	$ -	$ 136,982	0%
67	31917 77th Street	Jan-2000	746.1	$ 68,355	-1.0	$ -	$ -	$ -	$ -	$ -	$ 30,097	0%
8	31805 71st Street	Jun-2000	748.0	$ 133,980	-2.5	$ -	$ -	$ -	$ -	$ -	$ 203,279	0%
16	31811 71st Street	Jun-2000	746.5	$ 63,000	-1.0	$ -	$ -	$ -	$ -	$ -	$ 93,912	0%
17	31519 77th Street	Jun-2000	745.8	$ 58,800	-0.9	$ -	$ -	$ -	$ -	$ -	$ 105,167	0%
18	6929 319th Avenue	Jun-2000	747.5	$ 73,500	-2.0	$ -	$ -	$ -	$ -	$ -	$ 98,058	0%
69	6921 319th Avenue	Jun-2000	748.0	$ 103,320	-2.5	$ -	$ -	$ -	$ -	$ -	$ 108,859	0%
73	441 S. Riverside Drive	Jun-2000	745.0	$ 105,840	-0.9	$ -	$ -	$ -	$ -	$ -	$ 131,060	0%
10	31638 76th Street	Jul-2000	747.6	$ 150,570	-2.7	$ -	$ -	$ -	$ -	$ -	$ 166,468	0%
14	8153 Shorewood Drive	Jul-2000	746.5	$ 78,750	-2.0	$ -	$ -	$ -	$ -	$ -	$ 115,113	0%
70	31214 77th Street	Sep-2000	747.0	$ 98,280	-2.1	$ -	$ -	$ -	$ -	$ -	$ 75,177	0%
1	6712 Wheatland Road	Dec-2000	750.5	$ 64,680	-4.9	$ -	$ -	$ -	$ -	$ -	$ 122,709	0%
71	6905 319th Avenue	Dec-2000	748.0	$ 138,915	-2.5	$ -	$ -	$ -	$ -	$ -	$ 136,356	0%
72	31705 71st Street	Jan-2001	747.0	$ 78,960	-1.5	$ -	$ -	$ -	$ -	$ -	$ 96,381	0%
29	31822 71st Street	Sep-2001	748.0	$ 139,125	-2.5	$ -	$ -	$ -	$ -	$ -	$ 146,597	0%
2	31809 77th Street	Oct-2001	748.0	$ 81,480	-3.0	$ -	$ -	$ -	$ -	$ -	$ 34,954	0%
4	31733 77th Street	Oct-2001	746.0	$ 98,070	-1.0	$ -	$ -	$ -	$ -	$ -	$ 35,951	0%
5	31826 77th Street	Oct-2001	748.5	$ 97,860	-3.4	$ -	$ -	$ -	$ -	$ -	$ 99,666	0%
7	31911 77th Street	Oct-2001	746.5	$ 75,810	-1.4	$ -	$ -	$ -	$ -	$ -	$ 83,304	0%
9	32114 77th Street	Oct-2001	749.5	$ 75,600	-4.3	$ -	$ -	$ -	$ -	$ -	$ 103,368	0%
28	31711 71st Street	Oct-2001	748.0	$ 60,060	-2.5	$ -	$ -	$ -	$ -	$ -	$ 113,134	0%

Table B.1 Part 2 of 2

Loss Estimation and ROI Calculations for June 1996 Event in Kenosha County

BLDG NO.	ADDRESS	ACQUISITION COMPLETION DATE	FFE (FT, NGVD)[1]	2009 BRV[2]	FLOOD DEPTH (FT)	BUILDING DAMAGE	CONTENTS DAMAGE	DISPLACEMENT COSTS	DISRUPTION COSTS	TOTAL LOSSES AVOIDED	PROJECT INVESTMENT[3]	RETURN ON INVESTMENT
23	6940 317th Avenue	Feb-2002	750.0	$ 58,800	-4.5	$ -	$ -	$ -	$ -	$ -	$ 130,769	0%
15	8200 No. Riverside Drive	Sep-2002	746.8	$ 63,000	-2.4	$ -	$ -	$ -	$ -	$ -	$ 130,863	0%
3	31417 77th Street	Oct-2002	746.0	$ 104,160	-1.2	$ -	$ -	$ -	$ -	$ -	$ 114,648	0%
13	32005 77th Street	Oct-2002	746.5	$ 75,600	-1.4	$ -	$ -	$ -	$ -	$ -	$ 119,677	0%
19	8032 Shorewood Drive	Oct-2002	745.0	$ 95,760	-0.5	$ -	$ -	$ -	$ -	$ -	$ 133,702	0%
24	31701 77th Street	Oct-2002	748.7	$ 79,800	-3.8	$ -	$ -	$ -	$ -	$ -	$ 82,325	0%
25	6912 318th Avenue	Oct-2002	748.0	$ 58,800	-2.5	$ -	$ -	$ -	$ -	$ -	$ 87,774	0%
20	31533 77th Street	Oct-2002	748.5	$ 56,070	-3.6	$ -	$ -	$ -	$ -	$ -	$ 42,029	0%
32	31709 77th Street	Jan-2003	747.6	$ 67,200	-2.7	$ -	$ -	$ -	$ -	$ -	$ 80,759	0%
34	7956 Shorewood Drive	Jan-2003	746.0	$ 63,525	-1.5	$ -	$ -	$ -	$ -	$ -	$ 111,428	0%
22	445 So. Riverside Drive	Feb-2003	746.2	$ 98,280	-2.1	$ -	$ -	$ -	$ -	$ -	$ 100,568	0%
30	31715 71st Street	May-2003	748.1	$ 58,800	-2.6	$ -	$ -	$ -	$ -	$ -	$ 86,360	0%
31	501 So. Riverside Drive	Oct-2003	745.4	$ 168,000	-1.3	$ -	$ -	$ -	$ -	$ -	$ 129,181	0%
21	607 So. Riverside Drive	Sep-2004	748.3	$ 74,970	-4.2	$ -	$ -	$ -	$ -	$ -	$ 108,830	0%
47	31627 71st Street	Aug-2005	747.0	$ 104,160	-1.5	$ -	$ -	$ -	$ -	$ -	$ 140,789	0%
48	31315 77th Street	Aug-2005	746.0	$ 95,760	-1.2	$ -	$ -	$ -	$ -	$ -	$ 153,438	0%
38	6913 319th Avenue	Dec-2005	747.0	$ 71,400	-1.5	$ -	$ -	$ -	$ -	$ -	$ 1,348	0%
49	31602 76th Street	Dec-2005	746.1	$ 104,160	-1.1	$ -	$ -	$ -	$ -	$ -	$ 142,351	0%
26	30522 80th Street	Jun-2006	746.0	$ 61,740	-1.5	$ -	$ -	$ -	$ -	$ -	$ 110,106	0%
35	7536 313th Avenue	Jun-2006	748.0	$ 74,130	-2.8	$ -	$ -	$ -	$ -	$ -	$ 129,190	0%
36	511 S. Riverside Drive	Jun-2006	743.7	$ 51,660	0.4	$ -	$ -	$ -	$ -	$ -	$ 59,472	0%
37	606 Wisconsin Avenue	Jun-2006	743.0	$ 37,800	1.1	$ -	$ -	$ -	$ -	$ -	$ 114,398	0%
40	30510 80th Street	Jun-2006	747.5	$ 65,100	-3.0	$ -	$ -	$ -	$ -	$ -	$ 119,470	0%
39	7600 313th Street	Aug-2006	747.0	$ 64,680	-1.9	$ -	$ -	$ -	$ -	$ -	$ 96,803	0%
33	31901 71st Street	Jan-2007	750.8	$ 58,800	-5.3	$ -	$ -	$ -	$ -	$ -	$ 121,564	0%
41	7962 Shorewood Drive	Mar-2007	745.0	$ 65,520	-0.5	$ -	$ -	$ -	$ -	$ -	$ 140,801	0%
42	31613 71st Street	Mar-2007	748.0	$ 107,730	-2.5	$ -	$ -	$ -	$ -	$ -	$ 163,558	0%
50	415 S. Riverside Drive	Feb-2008	744.0	$ 63,525	0.1	$ -	$ -	$ -	$ -	$ -	$ 125,544	0%
43	7522 313th Avenue	Jun-2008	749.0	$ 130,620	-3.8	$ -	$ -	$ -	$ -	$ -	$ 169,787	0%
					TOTAL	$ 22,508	$ 13,795	$ 225	$ 19,460	$ 55,986	$ 988,615	6%

[1] *Vertical datum information was not provided with the first floor elevation (FFE) information supplied by the county. Elevations were assumed to be relative to the National Geodetic Vertical Datum of 1929 (NGVD).*

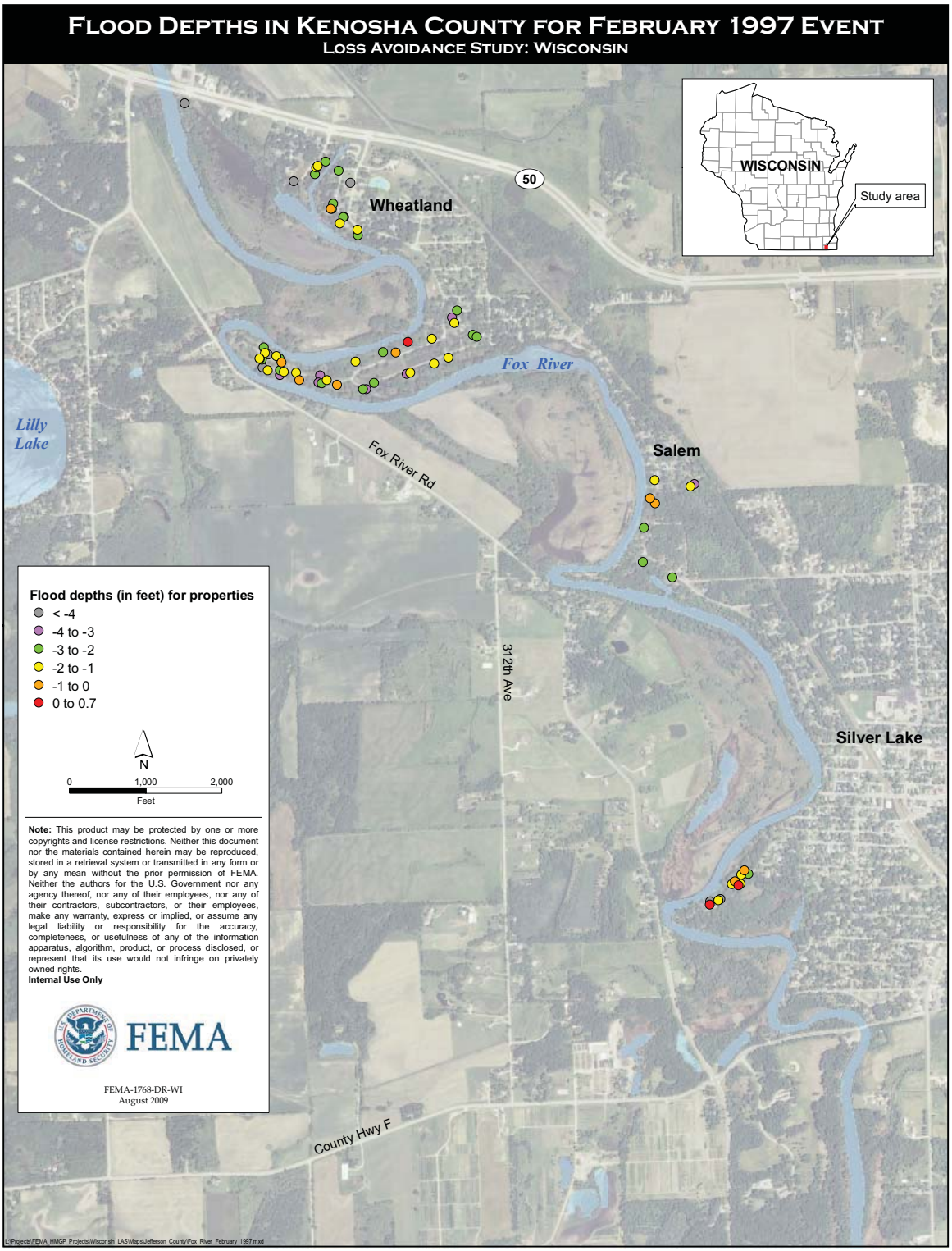
[2] *Building replacement value (BRV) based on unit cost per square foot of living space for the county.*

[3] *Project investment costs for each event only include the project costs for the buildings that were included in the analysis for that event.*

Not included in the calculations - the acquisition was not completed before the event.

It was assumed there would not be damages because the building had burned down prior to the acquisition.

Figure B.2


Flood Depths in Kenosha County for February 1997 Event
Loss Avoidance Study: Wisconsin
WISCONSIN
Study area
50
Wheatland
Fox River
Lilly Lake
Fox River Rd
Salem
312th Ave
Silver Lake
County Hwy F
Flood depths (in feet) for properties
< -4
-4 to -3
-3 to -2
-2 to -1
-1 to 0
0 to 0.7
N
0
1,000
2,000
Feet
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August 2009

Table B.2 Part 1 of 2

Loss Estimation and ROI Calculations for February 1997 Event in Kenosha County

BLDG NO.	ADDRESS	ACQUISITION COMPLETION DATE	FFE (FT, NGVD)[1]	2009 BRV[2]	FLOOD DEPTH (FT)	BUILDING DAMAGE	CONTENTS DAMAGE	DISPLACEMENT COSTS	DISRUPTION COSTS	TOTAL LOSSES AVOIDED	PROJECT INVESTMENT[3]	RETURN ON INVESTMENT
51	32139 77th Street	Jul-1995	747.0	$ 134,820	-1.8	$ 645	$ 619	$ -	$ 2,464	$ 3,728	$ 135,493	3%
52	32129 77th Street	Jul-1995	747.9	$ 95,760	-2.7	$ -	$ -	$ -	$ -	$ -	$ 121,895	0%
53	437 S. Riverside Drive	Jul-1995	744.0	$ 85,680	-0.3	$ 8,759	$ 5,517	$ -	$ 6,847	$ 21,123	$ 121,453	17%
54	601 S. Riverside Drive	Jul-1995	749.0	$ 107,835	-5.3	$ -	$ -	$ -	$ -	$ -	$ 123,925	0%
55	8106 Shorewood Drive	Jul-1995	746.7	$ 95,760	-2.4	$ -	$ -	$ -	$ -	$ -	$ 127,728	0%
56	31524 76th Street	Sep-1995	745.1	$ 70,560	-0.1	$ 8,736	$ 5,339	$ -	$ 7,817	$ 21,893	$ 116,379	19%
57	31217 77th Street	Feb-1996	747.0	$ 75,600	-2.2	$ -	$ -	$ -	$ -	$ -	$ 124,635	0%
58	32041 77th Street	Feb-1996	750.7	$ 87,360	-5.6	$ -	$ -	$ -	$ -	$ -	$ 117,107	0%
60	419 S. Riverside Drive	Oct-1996	745.0	$ 78,750	-1.3	$ 1,691	$ 564	$ -	$ 3,215	$ 5,470	$ 7,841	70%
59	32104 77th Street	Nov-1996	748.0	$ 176,190	-2.8	$ -	$ -	$ -	$ -	$ -	$ 185,843	0%
61	32028 77th Street	Apr-1997	747.0	$ 89,880	-1.8	$ -	$ -	$ -	$ -	$ -	$ 136,601	0%
62	31628 76th Street	Dec-1998	747.7	$ 106,680	-2.8	$ -	$ -	$ -	$ -	$ -	$ 137,189	0%
63	32029 77th Street	Dec-1998	746.6	$ 79,800	-1.5	$ -	$ -	$ -	$ -	$ -	$ 100,017	0%
64	32018 77th Street	Dec-1998	747.5	$ 82,320	-2.3	$ -	$ -	$ -	$ -	$ -	$ 116,767	0%
65	31710 77th Street	Jan-1999	746.4	$ 107,100	-1.4	$ -	$ -	$ -	$ -	$ -	$ 139,792	0%
66	32143 77th Street	Mar-1999	747.0	$ 145,530	-1.8	$ -	$ -	$ -	$ -	$ -	$ 58,179	0%
11	32132 77th Street	Dec-1999	747.0	$ 84,000	-1.8	$ -	$ -	$ -	$ -	$ -	$ 90,458	0%
44	31422 76th Street	Dec-1999	746.8	$ 94,500	-1.8	$ -	$ -	$ -	$ -	$ -	$ 117,619	0%
45	32034 77th Street	Dec-1999	745.5	$ 121,800	-0.4	$ -	$ -	$ -	$ -	$ -	$ 133,352	0%
12	31823 77th Street	Dec-1999	749.0	$ 102,900	-4.0	$ -	$ -	$ -	$ -	$ -	$ 116,432	0%
68	32015 77th Street	Dec-1999	748.5	$ 121,590	-3.4	$ -	$ -	$ -	$ -	$ -	$ 136,982	0%
67	31917 77th Street	Jan-2000	746.1	$ 68,355	-1.1	$ -	$ -	$ -	$ -	$ -	$ 30,097	0%
8	31805 71st Street	Jun-2000	748.0	$ 133,980	-2.4	$ -	$ -	$ -	$ -	$ -	$ 203,279	0%
16	31811 71st Street	Jun-2000	746.5	$ 63,000	-0.9	$ -	$ -	$ -	$ -	$ -	$ 93,912	0%
17	31519 77th Street	Jun-2000	745.8	$ 58,800	-1.0	$ -	$ -	$ -	$ -	$ -	$ 105,167	0%
18	6929 319th Avenue	Jun-2000	747.5	$ 73,500	-1.9	$ -	$ -	$ -	$ -	$ -	$ 98,058	0%
69	6921 319th Avenue	Jun-2000	748.0	$ 103,320	-2.4	$ -	$ -	$ -	$ -	$ -	$ 108,859	0%
73	441 S. Riverside Drive	Jun-2000	745.0	$ 105,840	-1.3	$ -	$ -	$ -	$ -	$ -	$ 131,060	0%
10	31638 76th Street	Jul-2000	747.6	$ 150,570	-2.8	$ -	$ -	$ -	$ -	$ -	$ 166,468	0%
14	8153 Shorewood Drive	Jul-2000	746.5	$ 78,750	-2.3	$ -	$ -	$ -	$ -	$ -	$ 115,113	0%
70	31214 77th Street	Sep-2000	747.0	$ 98,280	-2.2	$ -	$ -	$ -	$ -	$ -	$ 75,177	0%
1	6712 Wheatland Road	Dec-2000	750.5	$ 64,680	-4.8	$ -	$ -	$ -	$ -	$ -	$ 122,709	0%
71	6905 319th Avenue	Dec-2000	748.0	$ 138,915	-2.4	$ -	$ -	$ -	$ -	$ -	$ 136,356	0%
72	31705 71st Street	Jan-2001	747.0	$ 78,960	-1.5	$ -	$ -	$ -	$ -	$ -	$ 96,381	0%
29	31822 71st Street	Sep-2001	748.0	$ 139,125	-2.4	$ -	$ -	$ -	$ -	$ -	$ 146,597	0%
2	31809 77th Street	Oct-2001	748.0	$ 81,480	-3.0	$ -	$ -	$ -	$ -	$ -	$ 34,954	0%
4	31733 77th Street	Oct-2001	746.0	$ 98,070	-1.1	$ -	$ -	$ -	$ -	$ -	$ 35,951	0%
5	31826 77th Street	Oct-2001	748.5	$ 97,860	-3.5	$ -	$ -	$ -	$ -	$ -	$ 99,666	0%
7	31911 77th Street	Oct-2001	746.5	$ 75,810	-1.4	$ -	$ -	$ -	$ -	$ -	$ 83,304	0%
9	32114 77th Street	Oct-2001	749.5	$ 75,600	-4.3	$ -	$ -	$ -	$ -	$ -	$ 103,368	0%
28	31711 71st Street	Oct-2001	748.0	$ 60,060	-2.5	$ -	$ -	$ -	$ -	$ -	$ 113,134	0%

Table B.2 Part 2 of 2

Loss Estimation and ROI Calculations for February 1997 Event in Kenosha County

BLDG NO.	ADDRESS	ACQUISITION COMPLETION DATE	FFE (FT, NGVD)[1]	2009 BRV[2]	FLOOD DEPTH (FT)	BUILDING DAMAGE	CONTENTS DAMAGE	DISPLACEMENT COSTS	DISRUPTION COSTS	TOTAL LOSSES AVOIDED	PROJECT INVESTMENT[3]	RETURN ON INVESTMENT
23	6940 317th Avenue	Feb-2002	750.0	$ 58,800	-4.4	$ -	$ -	$ -	$ -	$ -	$ 130,769	0%
15	8200 No. Riverside Drive	Sep-2002	746.8	$ 63,000	-2.7	$ -	$ -	$ -	$ -	$ -	$ 130,863	0%
3	31417 77th Street	Oct-2002	746.0	$ 104,160	-1.3	$ -	$ -	$ -	$ -	$ -	$ 114,648	0%
13	32005 77th Street	Oct-2002	746.5	$ 75,600	-1.4	$ -	$ -	$ -	$ -	$ -	$ 119,677	0%
19	8032 Shorewood Drive	Oct-2002	745.0	$ 95,760	-0.7	$ -	$ -	$ -	$ -	$ -	$ 133,702	0%
24	31701 77th Street	Oct-2002	748.7	$ 79,800	-3.9	$ -	$ -	$ -	$ -	$ -	$ 82,325	0%
25	6912 318th Avenue	Oct-2002	748.0	$ 58,800	-2.4	$ -	$ -	$ -	$ -	$ -	$ 87,774	0%
20	31533 77th Street	Oct-2002	748.5	$ 56,070	-3.7	$ -	$ -	$ -	$ -	$ -	$ 42,029	0%
32	31709 77th Street	Jan-2003	747.6	$ 67,200	-2.8	$ -	$ -	$ -	$ -	$ -	$ 80,759	0%
34	7956 Shorewood Drive	Jan-2003	746.0	$ 63,525	-1.7	$ -	$ -	$ -	$ -	$ -	$ 111,428	0%
22	445 So. Riverside Drive	Feb-2003	746.2	$ 98,280	-2.5	$ -	$ -	$ -	$ -	$ -	$ 100,568	0%
30	31715 71st Street	May-2003	748.1	$ 58,800	-2.6	$ -	$ -	$ -	$ -	$ -	$ 86,360	0%
31	501 So. Riverside Drive	Oct-2003	745.4	$ 168,000	-1.7	$ -	$ -	$ -	$ -	$ -	$ 129,181	0%
21	607 So. Riverside Drive	Sep-2004	748.3	$ 74,970	-4.6	$ -	$ -	$ -	$ -	$ -	$ 108,830	0%
47	31627 71st Street	Aug-2005	747.0	$ 104,160	-1.5	$ -	$ -	$ -	$ -	$ -	$ 140,789	0%
48	31315 77th Street	Aug-2005	746.0	$ 95,760	-1.3	$ -	$ -	$ -	$ -	$ -	$ 153,438	0%
38	6913 319th Avenue	Dec-2005	747.0	$ 71,400	-1.4	$ -	$ -	$ -	$ -	$ -	$ 1,348	0%
49	31602 76th Street	Dec-2005	746.1	$ 104,160	-1.2	$ -	$ -	$ -	$ -	$ -	$ 142,351	0%
26	30522 80th Street	Jun-2006	746.0	$ 61,740	-1.7	$ -	$ -	$ -	$ -	$ -	$ 110,106	0%
35	7536 313th Avenue	Jun-2006	748.0	$ 74,130	-2.8	$ -	$ -	$ -	$ -	$ -	$ 129,190	0%
36	511 S. Riverside Drive	Jun-2006	743.7	$ 51,660	0.0	$ -	$ -	$ -	$ -	$ -	$ 59,472	0%
37	606 Wisconsin Avenue	Jun-2006	743.0	$ 37,800	0.7	$ -	$ -	$ -	$ -	$ -	$ 114,398	0%
40	30510 80th Street	Jun-2006	747.5	$ 65,100	-3.2	$ -	$ -	$ -	$ -	$ -	$ 119,470	0%
39	7600 313th Street	Aug-2006	747.0	$ 64,680	-1.9	$ -	$ -	$ -	$ -	$ -	$ 96,803	0%
33	31901 71st Street	Jan-2007	750.8	$ 58,800	-5.2	$ -	$ -	$ -	$ -	$ -	$ 121,564	0%
41	7962 Shorewood Drive	Mar-2007	745.0	$ 65,520	-0.7	$ -	$ -	$ -	$ -	$ -	$ 140,801	0%
42	31613 71st Street	Mar-2007	748.0	$ 107,730	-2.5	$ -	$ -	$ -	$ -	$ -	$ 163,558	0%
50	415 S. Riverside Drive	Feb-2008	744.0	$ 63,525	-0.3	$ -	$ -	$ -	$ -	$ -	$ 125,544	0%
43	7522 313th Avenue	Jun-2008	749.0	$ 130,620	-3.9	$ -	$ -	$ -	$ -	$ -	$ 169,787	0%
					TOTAL	$ 19,832	$ 12,039	$ -	$ 20,343	$ 52,214	$ 1,182,299	4%

[1] *Vertical datum information was not provided with the first floor elevation (FFE) information supplied by the county. Elevations were assumed to be relative to the National Geodetic Vertical Datum of 1929 (NGVD).*

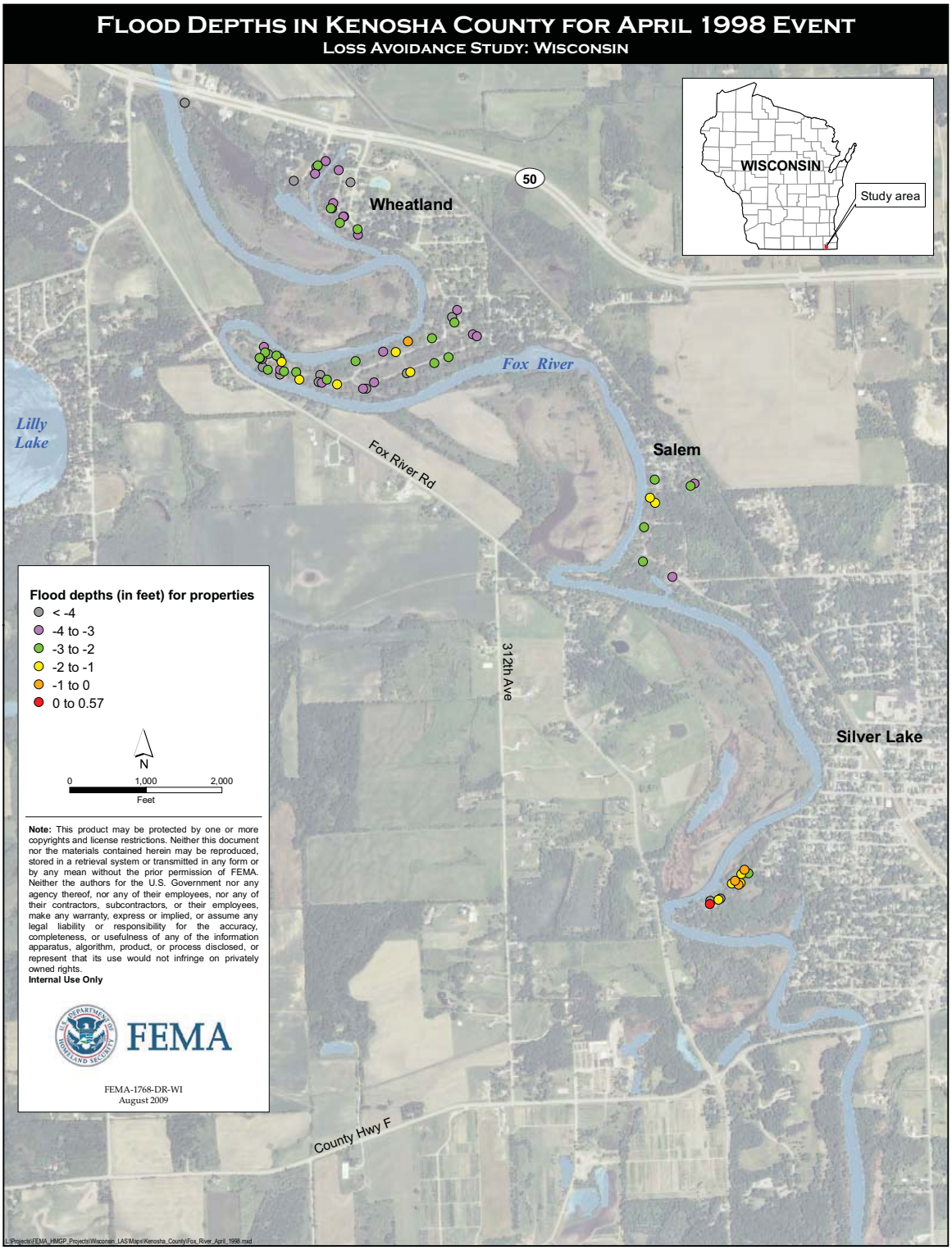
[2] *Building replacement value (BRV) based on unit cost per square foot of living space for the county.*

[3] *Project investment costs for each event only include the project costs for the buildings that were included in the analysis for that event.*

Not included in the calculations - the acquisition was not completed before the event.

It was assumed there would not be damages because the building had burned down prior to the acquisition.

Figure B.3


Flood Depths in Kenosha County for April 1998 Event
Loss Avoidance Study: Wisconsin
WISCONSIN
Study area
50
Wheatland
Fox River
Lilly Lake
Fox River Rd
Salem
312th Ave
Silver Lake
County Hwy F
Flood depths (in feet) for properties
< -4
-4 to -3
-3 to -2
-2 to -1
-1 to 0
0 to 0.57
N
0
1,000
2,000
Feet
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August 2009

Table B.3 Part 1 of 2

Loss Estimation and ROI Calculations for April 1998 Event in Kenosha County

BLDG NO.	ADDRESS	ACQUISITION COMPLETION DATE	FFE (FT, NGVD)[1]	2009 BRV[2]	FLOOD DEPTH (FT)	BUILDING DAMAGE	CONTENTS DAMAGE	DISPLACEMENT COSTS	DISRUPTION COSTS	TOTAL LOSSES AVOIDED	PROJECT INVESTMENT[3]	RETURN ON INVESTMENT
51	32139 77th Street	Jul-1995	747.0	$ 134,820	-2.8	$ -	$ -	$ -	$ -	$ -	$ 135,493	0%
52	32129 77th Street	Jul-1995	747.9	$ 95,760	-3.7	$ -	$ -	$ -	$ -	$ -	$ 121,895	0%
53	437 S. Riverside Drive	Jul-1995	744.0	$ 85,680	-0.4	$ 7,461	$ 4,838	$ -	$ 6,165	$ 18,465	$ 121,453	15%
54	601 S. Riverside Drive	Jul-1995	749.0	$ 107,835	-5.4	$ -	$ -	$ -	$ -	$ -	$ 123,925	0%
55	8106 Shorewood Drive	Jul-1995	746.7	$ 95,760	-3.0	$ -	$ -	$ -	$ -	$ -	$ 127,728	0%
56	31524 76th Street	Sep-1995	745.1	$ 70,560	-1.0	$ 1,698	$ 1,630	$ -	$ 3,331	$ 6,659	$ 116,379	6%
57	31217 77th Street	Feb-1996	747.0	$ 75,600	-3.0	$ -	$ -	$ -	$ -	$ -	$ 124,635	0%
58	32041 77th Street	Feb-1996	750.7	$ 87,360	-6.6	$ -	$ -	$ -	$ -	$ -	$ 117,107	0%
60	419 S. Riverside Drive	Oct-1996	745.0	$ 78,750	-1.4	$ 1,349	$ 450	$ -	$ 3,019	$ 4,819	$ 7,841	61%
59	32104 77th Street	Nov-1996	748.0	$ 176,190	-3.8	$ -	$ -	$ -	$ -	$ -	$ 185,843	0%
61	32028 77th Street	Apr-1997	747.0	$ 89,880	-2.8	$ -	$ -	$ -	$ -	$ -	$ 136,601	0%
62	31628 76th Street	Dec-1998	747.7	$ 106,680	-3.7	$ -	$ -	$ -	$ -	$ -	$ 137,189	0%
63	32029 77th Street	Dec-1998	746.6	$ 79,800	-2.5	$ -	$ -	$ -	$ -	$ -	$ 100,017	0%
64	32018 77th Street	Dec-1998	747.5	$ 82,320	-3.4	$ -	$ -	$ -	$ -	$ -	$ 116,767	0%
65	31710 77th Street	Jan-1999	746.4	$ 107,100	-2.4	$ -	$ -	$ -	$ -	$ -	$ 139,792	0%
66	32143 77th Street	Mar-1999	747.0	$ 145,530	-2.8	$ -	$ -	$ -	$ -	$ -	$ 58,179	0%
11	32132 77th Street	Dec-1999	747.0	$ 84,000	-2.8	$ -	$ -	$ -	$ -	$ -	$ 90,458	0%
44	31422 76th Street	Dec-1999	746.8	$ 94,500	-2.7	$ -	$ -	$ -	$ -	$ -	$ 117,619	0%
45	32034 77th Street	Dec-1999	745.5	$ 121,800	-1.4	$ -	$ -	$ -	$ -	$ -	$ 133,352	0%
12	31823 77th Street	Dec-1999	749.0	$ 102,900	-5.0	$ -	$ -	$ -	$ -	$ -	$ 116,432	0%
68	32015 77th Street	Dec-1999	748.5	$ 121,590	-4.4	$ -	$ -	$ -	$ -	$ -	$ 136,982	0%
67	31917 77th Street	Jan-2000	746.1	$ 68,355	-2.0	$ -	$ -	$ -	$ -	$ -	$ 30,097	0%
8	31805 71st Street	Jun-2000	748.0	$ 133,980	-3.6	$ -	$ -	$ -	$ -	$ -	$ 203,279	0%
16	31811 71st Street	Jun-2000	746.5	$ 63,000	-2.1	$ -	$ -	$ -	$ -	$ -	$ 93,912	0%
17	31519 77th Street	Jun-2000	745.8	$ 58,800	-1.9	$ -	$ -	$ -	$ -	$ -	$ 105,167	0%
18	6929 319th Avenue	Jun-2000	747.5	$ 73,500	-3.1	$ -	$ -	$ -	$ -	$ -	$ 98,058	0%
69	6921 319th Avenue	Jun-2000	748.0	$ 103,320	-3.6	$ -	$ -	$ -	$ -	$ -	$ 108,859	0%
73	441 S. Riverside Drive	Jun-2000	745.0	$ 105,840	-1.4	$ -	$ -	$ -	$ -	$ -	$ 131,060	0%
10	31638 76th Street	Jul-2000	747.6	$ 150,570	-3.6	$ -	$ -	$ -	$ -	$ -	$ 166,468	0%
14	8153 Shorewood Drive	Jul-2000	746.5	$ 78,750	-2.8	$ -	$ -	$ -	$ -	$ -	$ 115,113	0%
70	31214 77th Street	Sep-2000	747.0	$ 98,280	-3.1	$ -	$ -	$ -	$ -	$ -	$ 75,177	0%
1	6712 Wheatland Road	Dec-2000	750.5	$ 64,680	-6.1	$ -	$ -	$ -	$ -	$ -	$ 122,709	0%
71	6905 319th Avenue	Dec-2000	748.0	$ 138,915	-3.6	$ -	$ -	$ -	$ -	$ -	$ 136,356	0%
72	31705 71st Street	Jan-2001	747.0	$ 78,960	-2.6	$ -	$ -	$ -	$ -	$ -	$ 96,381	0%
29	31822 71st Street	Sep-2001	748.0	$ 139,125	-3.6	$ -	$ -	$ -	$ -	$ -	$ 146,597	0%
2	31809 77th Street	Oct-2001	748.0	$ 81,480	-4.0	$ -	$ -	$ -	$ -	$ -	$ 34,954	0%
4	31733 77th Street	Oct-2001	746.0	$ 98,070	-2.0	$ -	$ -	$ -	$ -	$ -	$ 35,951	0%
5	31826 77th Street	Oct-2001	748.5	$ 97,860	-4.4	$ -	$ -	$ -	$ -	$ -	$ 99,666	0%
7	31911 77th Street	Oct-2001	746.5	$ 75,810	-2.4	$ -	$ -	$ -	$ -	$ -	$ 83,304	0%
9	32114 77th Street	Oct-2001	749.5	$ 75,600	-5.3	$ -	$ -	$ -	$ -	$ -	$ 103,368	0%
28	31711 71st Street	Oct-2001	748.0	$ 60,060	-3.6	$ -	$ -	$ -	$ -	$ -	$ 113,134	0%

Table B.3 Part 2 of 2

Loss Estimation and ROI Calculations for April 1998 Event in Kenosha County

BLDG NO.	ADDRESS	ACQUISITION COMPLETION DATE	FFE (FT, NGVD)[1]	2009 BRV[2]	FLOOD DEPTH (FT)	BUILDING DAMAGE	CONTENTS DAMAGE	DISPLACEMENT COSTS	DISRUPTION COSTS	TOTAL LOSSES AVOIDED	PROJECT INVESTMENT[3]	RETURN ON INVESTMENT
23	6940 317th Avenue	Feb-2002	750.0	$ 58,800	-5.6	$ -	$ -	$ -	$ -	$ -	$ 130,769	0%
15	8200 No. Riverside Drive	Sep-2002	746.8	$ 63,000	-3.1	$ -	$ -	$ -	$ -	$ -	$ 130,863	0%
3	31417 77th Street	Oct-2002	746.0	$ 104,160	-2.1	$ -	$ -	$ -	$ -	$ -	$ 114,648	0%
13	32005 77th Street	Oct-2002	746.5	$ 75,600	-2.4	$ -	$ -	$ -	$ -	$ -	$ 119,677	0%
19	8032 Shorewood Drive	Oct-2002	745.0	$ 95,760	-1.3	$ -	$ -	$ -	$ -	$ -	$ 133,702	0%
24	31701 77th Street	Oct-2002	748.7	$ 79,800	-4.8	$ -	$ -	$ -	$ -	$ -	$ 82,325	0%
25	6912 318th Avenue	Oct-2002	748.0	$ 58,800	-3.6	$ -	$ -	$ -	$ -	$ -	$ 87,774	0%
20	31533 77th Street	Oct-2002	748.5	$ 56,070	-4.6	$ -	$ -	$ -	$ -	$ -	$ 42,029	0%
32	31709 77th Street	Jan-2003	747.6	$ 67,200	-3.7	$ -	$ -	$ -	$ -	$ -	$ 80,759	0%
34	7956 Shorewood Drive	Jan-2003	746.0	$ 63,525	-2.2	$ -	$ -	$ -	$ -	$ -	$ 111,428	0%
22	445 So. Riverside Drive	Feb-2003	746.2	$ 98,280	-2.6	$ -	$ -	$ -	$ -	$ -	$ 100,568	0%
30	31715 71st Street	May-2003	748.1	$ 58,800	-3.7	$ -	$ -	$ -	$ -	$ -	$ 86,360	0%
31	501 So. Riverside Drive	Oct-2003	745.4	$ 168,000	-1.8	$ -	$ -	$ -	$ -	$ -	$ 129,181	0%
21	607 So. Riverside Drive	Sep-2004	748.3	$ 74,970	-4.7	$ -	$ -	$ -	$ -	$ -	$ 108,830	0%
47	31627 71st Street	Aug-2005	747.0	$ 104,160	-2.7	$ -	$ -	$ -	$ -	$ -	$ 140,789	0%
48	31315 77th Street	Aug-2005	746.0	$ 95,760	-2.1	$ -	$ -	$ -	$ -	$ -	$ 153,438	0%
38	6913 319th Avenue	Dec-2005	747.0	$ 71,400	-2.6	$ -	$ -	$ -	$ -	$ -	$ 1,348	0%
49	31602 76th Street	Dec-2005	746.1	$ 104,160	-2.1	$ -	$ -	$ -	$ -	$ -	$ 142,351	0%
26	30522 80th Street	Jun-2006	746.0	$ 61,740	-2.3	$ -	$ -	$ -	$ -	$ -	$ 110,106	0%
35	7536 313th Avenue	Jun-2006	748.0	$ 74,130	-3.8	$ -	$ -	$ -	$ -	$ -	$ 129,190	0%
36	511 S. Riverside Drive	Jun-2006	743.7	$ 51,660	-0.1	$ -	$ -	$ -	$ -	$ -	$ 59,472	0%
37	606 Wisconsin Avenue	Jun-2006	743.0	$ 37,800	0.6	$ -	$ -	$ -	$ -	$ -	$ 114,398	0%
40	30510 80th Street	Jun-2006	747.5	$ 65,100	-3.8	$ -	$ -	$ -	$ -	$ -	$ 119,470	0%
39	7600 313th Street	Aug-2006	747.0	$ 64,680	-2.9	$ -	$ -	$ -	$ -	$ -	$ 96,803	0%
33	31901 71st Street	Jan-2007	750.8	$ 58,800	-6.4	$ -	$ -	$ -	$ -	$ -	$ 121,564	0%
41	7962 Shorewood Drive	Mar-2007	745.0	$ 65,520	-1.3	$ -	$ -	$ -	$ -	$ -	$ 140,801	0%
42	31613 71st Street	Mar-2007	748.0	$ 107,730	-3.7	$ -	$ -	$ -	$ -	$ -	$ 163,558	0%
50	415 S. Riverside Drive	Feb-2008	744.0	$ 63,525	-0.4	$ -	$ -	$ -	$ -	$ -	$ 125,544	0%
43	7522 313th Avenue	Jun-2008	749.0	$ 130,620	-4.9	$ -	$ -	$ -	$ -	$ -	$ 169,787	0%
					TOTAL	$ 10,509	$ 6,918	$ -	$ 12,516	$ 29,942	$ 1,318,900	2%

[1] *Vertical datum information was not provided with the first floor elevation (FFE) information supplied by the county. Elevations were assumed to be relative to the National Geodetic Vertical Datum of 1929 (NGVD).*

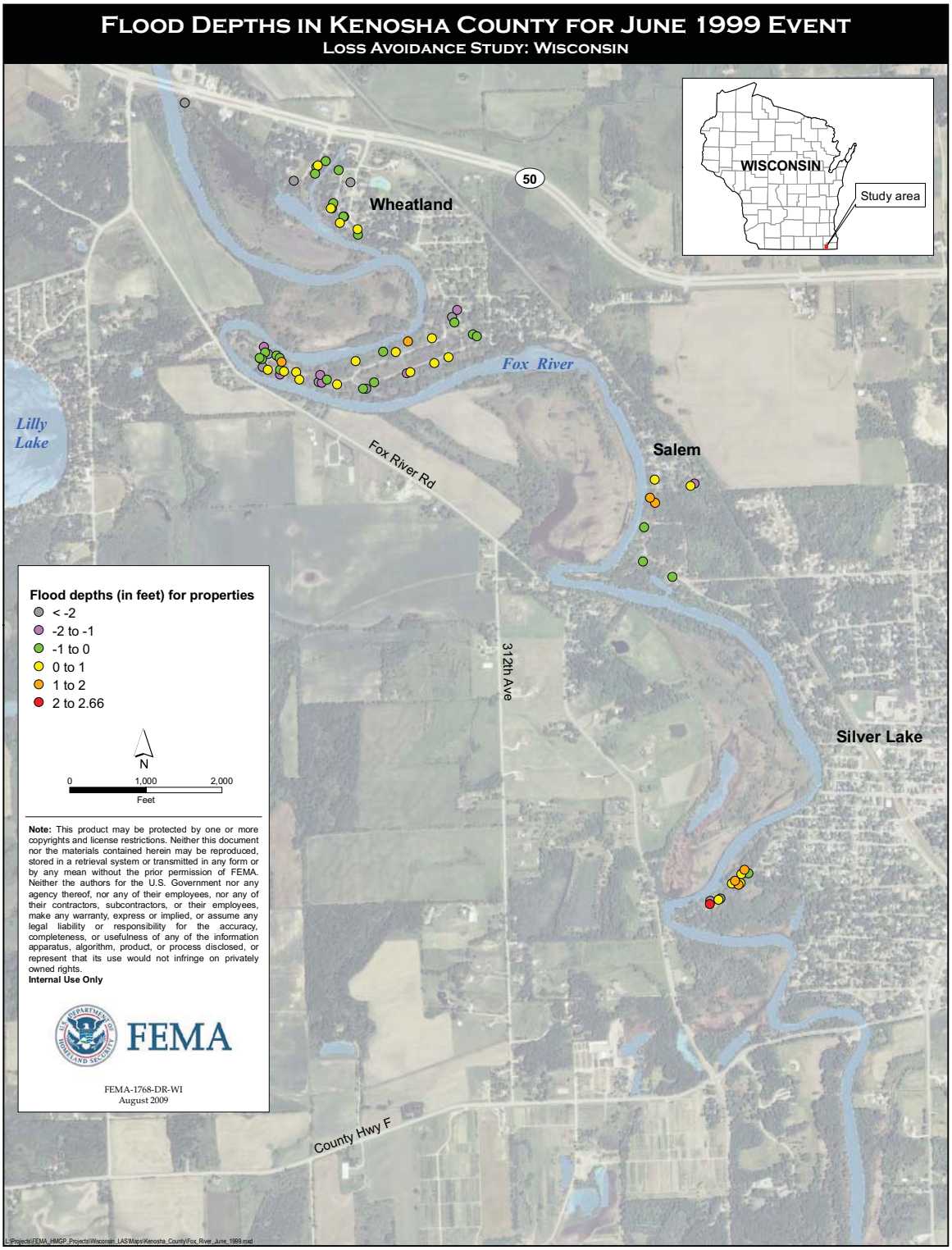
[2] *Building replacement value (BRV) based on unit cost per square foot of living space for the county.*

[3] *Project investment costs for each event only include the project costs for the buildings that were included in the analysis for that event.*

Not included in the calculations - the acquisition was not completed before the event.

It was assumed there would not be damages because the building had burned down prior to the acquisition.

Figure B.4


Flood Depths in Kenosha County for June 1999 Event
Loss Avoidance Study: Wisconsin
WISCONSIN
Study area
50
Wheatland
Fox River
Lilly Lake
Fox River Rd
Salem
312th Ave
Silver Lake
County Hwy F
Flood depths (in feet) for properties
< -2
-2 to -1
-1 to 0
0 to 1
1 to 2
2 to 2.66
N
0
1,000
2,000
Feet
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August 2009

Table B.4 Part 1 of 2

Loss Estimation and ROI Calculations for June 1999 Event in Kenosha County

BLDG NO.	ADDRESS	ACQUISITION COMPLETION DATE	FFE (FT, NGVD)[1]	2009 BRV[2]	FLOOD DEPTH (FT)	BUILDING DAMAGE	CONTENTS DAMAGE	DISPLACEMENT COSTS	DISRUPTION COSTS	TOTAL LOSSES AVOIDED	PROJECT INVESTMENT[3]	RETURN ON INVESTMENT
51	32139 77th Street	Jul-1995	747.0	$ 134,820	-0.1	$ 16,394	$ 10,046	$ -	$ 7,718	$ 34,158	$ 135,493	**25%**
52	32129 77th Street	Jul-1995	747.9	$ 95,760	-1.0	$ 2,339	$ 2,246	$ -	$ 3,347	$ 7,932	$ 121,895	**7%**
53	437 S. Riverside Drive	Jul-1995	744.0	$ 85,680	1.7	$ 25,005	$ 14,031	$ 2,901	$ 15,375	$ 57,312	$ 121,453	**47%**
54	601 S. Riverside Drive	Jul-1995	749.0	$ 107,835	-3.4	$ -	$ -	$ -	$ -	$ -	$ 123,925	**0%**
55	8106 Shorewood Drive	Jul-1995	746.7	$ 95,760	-0.5	$ 7,486	$ 4,961	$ -	$ 5,765	$ 18,211	$ 127,728	**14%**
56	31524 76th Street	Sep-1995	745.1	$ 70,560	1.7	$ 20,608	$ 11,563	$ 2,392	$ 15,384	$ 49,947	$ 116,379	**43%**
57	31217 77th Street	Feb-1996	747.0	$ 75,600	-0.3	$ 7,401	$ 4,696	$ -	$ 6,652	$ 18,750	$ 124,635	**15%**
58	32041 77th Street	Feb-1996	750.7	$ 87,360	-3.8	$ -	$ -	$ -	$ -	$ -	$ 117,107	**0%**
60	419 S. Riverside Drive	Oct-1996	745.0	$ 78,750	0.7	$ 10,459	$ 5,903	$ 1,078	$ 8,222	$ 25,662	$ 7,841	**327%**
59	32104 77th Street	Nov-1996	748.0	$ 176,190	-1.1	$ 4,790	$ 1,597	$ -	$ 3,471	$ 9,858	$ 185,843	**5%**
61	32028 77th Street	Apr-1997	747.0	$ 89,880	-0.1	$ 10,859	$ 6,661	$ -	$ 7,683	$ 25,202	$ 136,601	**18%**
62	31628 76th Street	Dec-1998	747.7	$ 106,680	-1.0	$ 3,045	$ 2,758	$ -	$ 3,533	$ 9,336	$ 137,189	**7%**
63	32029 77th Street	Dec-1998	746.6	$ 79,800	0.2	$ 12,616	$ 7,474	$ 394	$ 9,359	$ 29,842	$ 100,017	**30%**
64	32018 77th Street	Dec-1998	747.5	$ 82,320	-0.6	$ 5,374	$ 3,710	$ -	$ 5,185	$ 14,268	$ 116,767	**12%**
65	31710 77th Street	Jan-1999	746.4	$ 107,100	0.4	$ 12,197	$ 6,758	$ 769	$ 7,371	$ 27,095	$ 139,792	**19%**
66	32143 77th Street	Mar-1999	747.0	$ 145,530	-0.1	$ 12,465	$ 6,598	$ -	$ 6,101	$ 25,164	$ 58,179	**43%**
11	32132 77th Street	Dec-1999	747.0	$ 84,000	-0.1	$ -	$ -	$ -	$ -	$ -	$ 90,458	**0%**
44	31422 76th Street	Dec-1999	746.8	$ 94,500	0.0	$ -	$ -	$ -	$ -	$ -	$ 117,619	**0%**
45	32034 77th Street	Dec-1999	745.5	$ 121,800	1.4	$ -	$ -	$ -	$ -	$ -	$ 133,352	**0%**
12	31823 77th Street	Dec-1999	749.0	$ 102,900	-2.3	$ -	$ -	$ -	$ -	$ -	$ 116,432	**0%**
68	32015 77th Street	Dec-1999	748.5	$ 121,590	-1.7	$ -	$ -	$ -	$ -	$ -	$ 136,982	**0%**
67	31917 77th Street	Jan-2000	746.1	$ 68,355	0.7	$ -	$ -	$ -	$ -	$ -	$ 30,097	**0%**
8	31805 71st Street	Jun-2000	748.0	$ 133,980	-0.9	$ -	$ -	$ -	$ -	$ -	$ 203,279	**0%**
16	31811 71st Street	Jun-2000	746.5	$ 63,000	0.6	$ -	$ -	$ -	$ -	$ -	$ 93,912	**0%**
17	31519 77th Street	Jun-2000	745.8	$ 58,800	0.8	$ -	$ -	$ -	$ -	$ -	$ 105,167	**0%**
18	6929 319th Avenue	Jun-2000	747.5	$ 73,500	-0.3	$ -	$ -	$ -	$ -	$ -	$ 98,058	**0%**
69	6921 319th Avenue	Jun-2000	748.0	$ 103,320	-0.8	$ -	$ -	$ -	$ -	$ -	$ 108,859	**0%**
73	441 S. Riverside Drive	Jun-2000	745.0	$ 105,840	0.7	$ -	$ -	$ -	$ -	$ -	$ 131,060	**0%**
10	31638 76th Street	Jul-2000	747.6	$ 150,570	-1.0	$ -	$ -	$ -	$ -	$ -	$ 166,468	**0%**
14	8153 Shorewood Drive	Jul-2000	746.5	$ 78,750	-0.4	$ -	$ -	$ -	$ -	$ -	$ 115,113	**0%**
70	31214 77th Street	Sep-2000	747.0	$ 98,280	-0.4	$ -	$ -	$ -	$ -	$ -	$ 75,177	**0%**
1	6712 Wheatland Road	Dec-2000	750.5	$ 64,680	-3.2	$ -	$ -	$ -	$ -	$ -	$ 122,709	**0%**
71	6905 319th Avenue	Dec-2000	748.0	$ 138,915	-0.8	$ -	$ -	$ -	$ -	$ -	$ 136,356	**0%**
72	31705 71st Street	Jan-2001	747.0	$ 78,960	0.1	$ -	$ -	$ -	$ -	$ -	$ 96,381	**0%**
29	31822 71st Street	Sep-2001	748.0	$ 139,125	-0.9	$ -	$ -	$ -	$ -	$ -	$ 146,597	**0%**
2	31809 77th Street	Oct-2001	748.0	$ 81,480	-1.3	$ -	$ -	$ -	$ -	$ -	$ 34,954	**0%**
4	31733 77th Street	Oct-2001	746.0	$ 98,070	0.7	$ -	$ -	$ -	$ -	$ -	$ 35,951	**0%**
5	31826 77th Street	Oct-2001	748.5	$ 97,860	-1.7	$ -	$ -	$ -	$ -	$ -	$ 99,666	**0%**
7	31911 77th Street	Oct-2001	746.5	$ 75,810	0.3	$ -	$ -	$ -	$ -	$ -	$ 83,304	**0%**
9	32114 77th Street	Oct-2001	749.5	$ 75,600	-2.6	$ -	$ -	$ -	$ -	$ -	$ 103,368	**0%**
28	31711 71st Street	Oct-2001	748.0	$ 60,060	-0.9	$ -	$ -	$ -	$ -	$ -	$ 113,134	**0%**

Table B.4 Part 2 of 2

Loss Estimation and ROI Calculations for June 1999 Event in Kenosha County

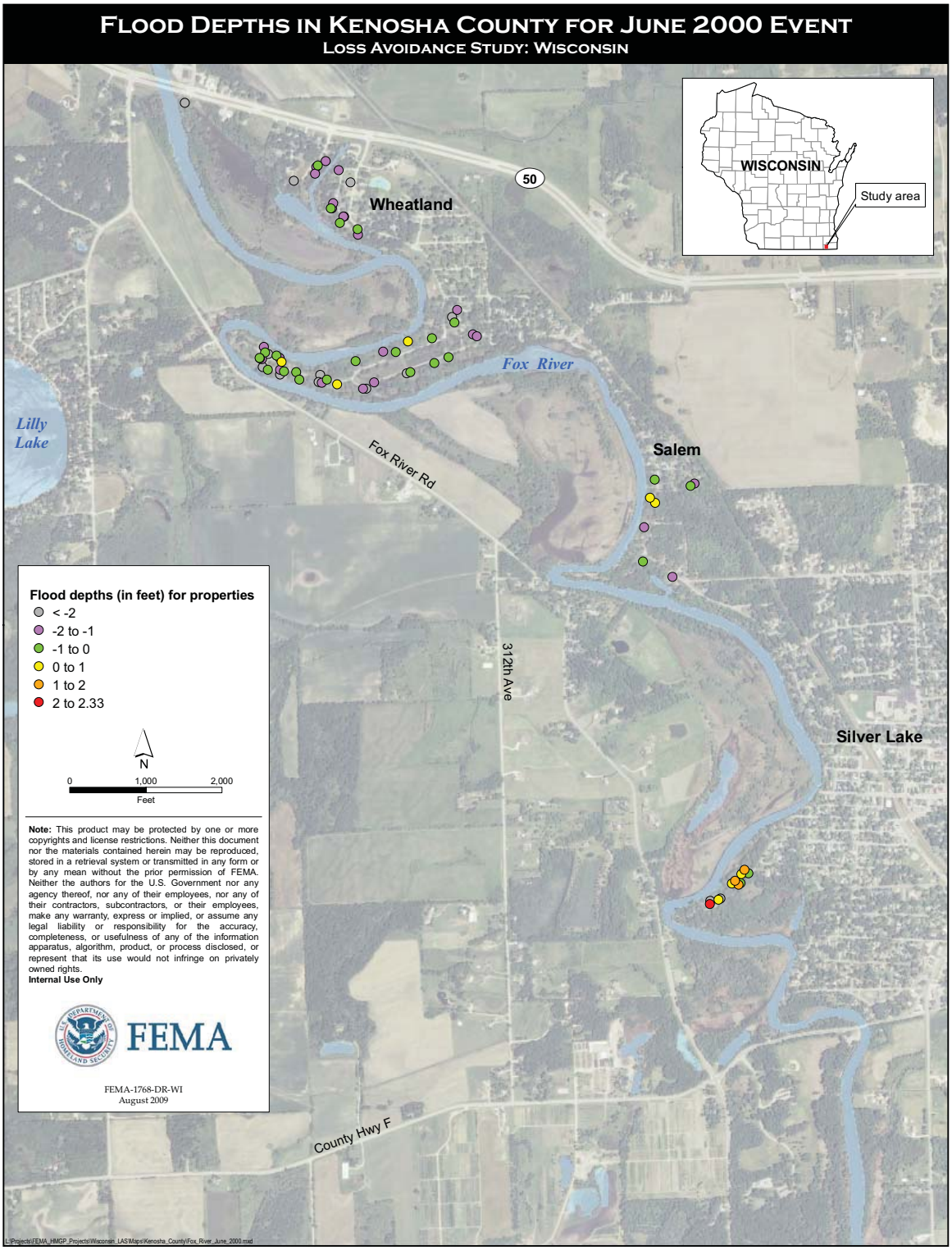
BLDG NO.	ADDRESS	ACQUISITION COMPLETION DATE	FFE (FT, NGVD)[1]	2009 BRV[2]	FLOOD DEPTH (FT)	BUILDING DAMAGE	CONTENTS DAMAGE	DISPLACEMENT COSTS	DISRUPTION COSTS	TOTAL LOSSES AVOIDED	PROJECT INVESTMENT[3]	RETURN ON INVESTMENT
23	6940 317th Avenue	Feb-2002	750.0	$ 58,800	-2.9	$ -	$ -	$ -	$ -	$ -	$ 130,769	0%
15	8200 No. Riverside Drive	Sep-2002	746.8	$ 63,000	-0.8	$ -	$ -	$ -	$ -	$ -	$ 130,863	0%
3	31417 77th Street	Oct-2002	746.0	$ 104,160	0.6	$ -	$ -	$ -	$ -	$ -	$ 114,648	0%
13	32005 77th Street	Oct-2002	746.5	$ 75,600	0.3	$ -	$ -	$ -	$ -	$ -	$ 119,677	0%
19	8032 Shorewood Drive	Oct-2002	745.0	$ 95,760	1.2	$ -	$ -	$ -	$ -	$ -	$ 133,702	0%
24	31701 77th Street	Oct-2002	748.7	$ 79,800	-2.1	$ -	$ -	$ -	$ -	$ -	$ 82,325	0%
25	6912 318th Avenue	Oct-2002	748.0	$ 58,800	-0.8	$ -	$ -	$ -	$ -	$ -	$ 87,774	0%
20	31533 77th Street	Oct-2002	748.5	$ 56,070	-1.9	$ -	$ -	$ -	$ -	$ -	$ 42,029	0%
32	31709 77th Street	Jan-2003	747.6	$ 67,200	-1.0	$ -	$ -	$ -	$ -	$ -	$ 80,759	0%
34	7956 Shorewood Drive	Jan-2003	746.0	$ 63,525	0.2	$ -	$ -	$ -	$ -	$ -	$ 111,428	0%
22	445 So. Riverside Drive	Feb-2003	746.2	$ 98,280	-0.5	$ -	$ -	$ -	$ -	$ -	$ 100,568	0%
30	31715 71st Street	May-2003	748.1	$ 58,800	-1.0	$ -	$ -	$ -	$ -	$ -	$ 86,360	0%
31	501 So. Riverside Drive	Oct-2003	745.4	$ 168,000	0.3	$ -	$ -	$ -	$ -	$ -	$ 129,181	0%
21	607 So. Riverside Drive	Sep-2004	748.3	$ 74,970	-2.7	$ -	$ -	$ -	$ -	$ -	$ 108,830	0%
47	31627 71st Street	Aug-2005	747.0	$ 104,160	0.1	$ -	$ -	$ -	$ -	$ -	$ 140,789	0%
48	31315 77th Street	Aug-2005	746.0	$ 95,760	0.6	$ -	$ -	$ -	$ -	$ -	$ 153,438	0%
38	6913 319th Avenue	Dec-2005	747.0	$ 71,400	0.2	$ -	$ -	$ -	$ -	$ -	$ 1,348	0%
49	31602 76th Street	Dec-2005	746.1	$ 104,160	0.6	$ -	$ -	$ -	$ -	$ -	$ 142,351	0%
26	30522 80th Street	Jun-2006	746.0	$ 61,740	0.2	$ -	$ -	$ -	$ -	$ -	$ 110,106	0%
35	7536 313th Avenue	Jun-2006	748.0	$ 74,130	-1.1	$ -	$ -	$ -	$ -	$ -	$ 129,190	0%
36	511 S. Riverside Drive	Jun-2006	743.7	$ 51,660	2.0	$ -	$ -	$ -	$ -	$ -	$ 59,472	0%
37	606 Wisconsin Avenue	Jun-2006	743.0	$ 37,800	2.6	$ -	$ -	$ -	$ -	$ -	$ 114,398	0%
40	30510 80th Street	Jun-2006	747.5	$ 65,100	-1.3	$ -	$ -	$ -	$ -	$ -	$ 119,470	0%
39	7600 313th Street	Aug-2006	747.0	$ 64,680	-0.2	$ -	$ -	$ -	$ -	$ -	$ 96,803	0%
33	31901 71st Street	Jan-2007	750.8	$ 58,800	-3.6	$ -	$ -	$ -	$ -	$ -	$ 121,564	0%
41	7962 Shorewood Drive	Mar-2007	745.0	$ 65,520	1.2	$ -	$ -	$ -	$ -	$ -	$ 140,801	0%
42	31613 71st Street	Mar-2007	748.0	$ 107,730	-0.9	$ -	$ -	$ -	$ -	$ -	$ 163,558	0%
50	415 S. Riverside Drive	Feb-2008	744.0	$ 63,525	1.7	$ -	$ -	$ -	$ -	$ -	$ 125,544	0%
43	7522 313th Avenue	Jun-2008	749.0	$ 130,620	-2.2	$ -	$ -	$ -	$ -	$ -	$ 169,787	0%
					TOTAL	$ 151,037	$ 89,000	$ 7,535	$ 105,166	$ 352,737	$ 1,870,844	19%

[1] *Vertical datum information was not provided with the first floor elevation (FFE) information supplied by the county. Elevations were assumed to be relative to the National Geodetic Vertical Datum of 1929 (NGVD).*

[2] *Building replacement value (BRV) based on unit cost per square foot of living space for the county.*

[3] *Project investment costs for each event only include the project costs for the buildings that were included in the analysis for that event.*

Figure B.5


Flood Depths in Kenosha County for June 2000 Event
Loss Avoidance Study: Wisconsin
WISCONSIN
Study area
50
Wheatland
Fox River
Lilly Lake
Fox River Rd
Salem
312th Ave
Silver Lake
County Hwy F
Flood depths (in feet) for properties
< -2
-2 to -1
-1 to 0
0 to 1
1 to 2
2 to 2.33
N
0
1,000
2,000
Feet
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FEMA
FEMA-1768-DR-WI
August 2009

Table B.5 Part 1 of 2

Loss Estimation and ROI Calculations for June 2000 Event in Kenosha County

BLDG NO.	ADDRESS	ACQUISITION COMPLETION DATE	FFE (FT, NGVD)[1]	2009 BRV[2]	FLOOD DEPTH (FT)	BUILDING DAMAGE	CONTENTS DAMAGE	DISPLACEMENT COSTS	DISRUPTION COSTS	TOTAL LOSSES AVOIDED	PROJECT INVESTMENT[3]	RETURN ON INVESTMENT
51	32139 77th Street	Jul-1995	747.0	$ 134,820	-1.1	$ 3,200	$ 3,072	$ -	$ 3,316	$ 9,589	$ 135,493	7%
52	32129 77th Street	Jul-1995	747.9	$ 95,760	-2.0	$ 97	$ 93	$ -	$ 2,294	$ 2,485	$ 121,895	2%
53	437 S. Riverside Drive	Jul-1995	744.0	$ 85,680	1.3	$ 22,448	$ 12,694	$ 2,311	$ 14,033	$ 51,487	$ 121,453	42%
54	601 S. Riverside Drive	Jul-1995	749.0	$ 107,835	-3.7	$ -	$ -	$ -	$ -	$ -	$ 123,925	0%
55	8106 Shorewood Drive	Jul-1995	746.7	$ 95,760	-1.2	$ 1,948	$ 1,871	$ -	$ 3,164	$ 6,983	$ 127,728	5%
56	31524 76th Street	Sep-1995	745.1	$ 70,560	0.7	$ 14,606	$ 8,421	$ 1,056	$ 11,559	$ 35,642	$ 116,379	31%
57	31217 77th Street	Feb-1996	747.0	$ 75,600	-1.3	$ 1,394	$ 1,339	$ -	$ 3,078	$ 5,811	$ 124,635	5%
58	32041 77th Street	Feb-1996	750.7	$ 87,360	-4.8	$ -	$ -	$ -	$ -	$ -	$ 117,107	0%
60	419 S. Riverside Drive	Oct-1996	745.0	$ 78,750	0.3	$ 8,862	$ 4,902	$ 529	$ 7,310	$ 21,604	$ 7,841	276%
59	32104 77th Street	Nov-1996	748.0	$ 176,190	-2.0	$ -	$ -	$ -	$ -	$ -	$ 185,843	0%
61	32028 77th Street	Apr-1997	747.0	$ 89,880	-1.1	$ 2,118	$ 2,033	$ -	$ 3,309	$ 7,459	$ 136,601	5%
62	31628 76th Street	Dec-1998	747.7	$ 106,680	-1.9	$ 266	$ 256	$ -	$ 2,361	$ 2,883	$ 137,189	2%
63	32029 77th Street	Dec-1998	746.6	$ 79,800	-0.7	$ 4,672	$ 3,315	$ -	$ 4,882	$ 12,868	$ 100,017	13%
64	32018 77th Street	Dec-1998	747.5	$ 82,320	-1.6	$ 892	$ 856	$ -	$ 2,736	$ 4,483	$ 116,767	4%
65	31710 77th Street	Jan-1999	746.4	$ 107,100	-0.6	$ 6,052	$ 2,873	$ -	$ 4,790	$ 13,715	$ 139,792	10%
66	32143 77th Street	Mar-1999	747.0	$ 145,530	-1.1	$ 4,133	$ 1,378	$ -	$ 3,526	$ 9,037	$ 58,179	16%
11	32132 77th Street	Dec-1999	747.0	$ 84,000	-1.0	$ 2,006	$ 1,926	$ -	$ 3,323	$ 7,254	$ 90,458	8%
44	31422 76th Street	Dec-1999	746.8	$ 94,500	-0.9	$ 2,900	$ 2,549	$ -	$ 3,629	$ 9,079	$ 117,619	8%
45	32034 77th Street	Dec-1999	745.5	$ 121,800	0.4	$ 21,392	$ 12,529	$ 1,039	$ 10,148	$ 45,108	$ 133,352	34%
12	31823 77th Street	Dec-1999	749.0	$ 102,900	-3.2	$ -	$ -	$ -	$ -	$ -	$ 116,432	0%
68	32015 77th Street	Dec-1999	748.5	$ 121,590	-2.6	$ 6,507	$ 4,951	$ -	$ 4,656	$ 16,114	$ 136,982	12%
67	31917 77th Street	Jan-2000	746.1	$ 68,355	-0.2	$ 7,359	$ 4,595	$ -	$ 7,091	$ 19,044	$ 30,097	63%
8	31805 71st Street	Jun-2000	748.0	$ 133,980	-1.8	$ -	$ -	$ -	$ -	$ -	$ 203,279	0%
16	31811 71st Street	Jun-2000	746.5	$ 63,000	-0.3	$ -	$ -	$ -	$ -	$ -	$ 93,912	0%
17	31519 77th Street	Jun-2000	745.8	$ 58,800	-0.1	$ -	$ -	$ -	$ -	$ -	$ 105,167	0%
18	6929 319th Avenue	Jun-2000	747.5	$ 73,500	-1.3	$ -	$ -	$ -	$ -	$ -	$ 98,058	0%
69	6921 319th Avenue	Jun-2000	748.0	$ 103,320	-1.8	$ -	$ -	$ -	$ -	$ -	$ 108,859	0%
73	441 S. Riverside Drive	Jun-2000	745.0	$ 105,840	0.3	$ -	$ -	$ -	$ -	$ -	$ 131,060	0%
10	31638 76th Street	Jul-2000	747.6	$ 150,570	-1.9	$ -	$ -	$ -	$ -	$ -	$ 166,468	0%
14	8153 Shorewood Drive	Jul-2000	746.5	$ 78,750	-1.0	$ -	$ -	$ -	$ -	$ -	$ 115,113	0%
70	31214 77th Street	Sep-2000	747.0	$ 98,280	-1.3	$ -	$ -	$ -	$ -	$ -	$ 75,177	0%
1	6712 Wheatland Road	Dec-2000	750.5	$ 64,680	-4.2	$ -	$ -	$ -	$ -	$ -	$ 122,709	0%
71	6905 319th Avenue	Dec-2000	748.0	$ 138,915	-1.8	$ -	$ -	$ -	$ -	$ -	$ 136,356	0%
72	31705 71st Street	Jan-2001	747.0	$ 78,960	-0.8	$ -	$ -	$ -	$ -	$ -	$ 96,381	0%
29	31822 71st Street	Sep-2001	748.0	$ 139,125	-1.8	$ -	$ -	$ -	$ -	$ -	$ 146,597	0%
2	31809 77th Street	Oct-2001	748.0	$ 81,480	-2.2	$ -	$ -	$ -	$ -	$ -	$ 34,954	0%
4	31733 77th Street	Oct-2001	746.0	$ 98,070	-0.2	$ -	$ -	$ -	$ -	$ -	$ 35,951	0%
5	31826 77th Street	Oct-2001	748.5	$ 97,860	-2.7	$ -	$ -	$ -	$ -	$ -	$ 99,666	0%
7	31911 77th Street	Oct-2001	746.5	$ 75,810	-0.6	$ -	$ -	$ -	$ -	$ -	$ 83,304	0%
9	32114 77th Street	Oct-2001	749.5	$ 75,600	-3.6	$ -	$ -	$ -	$ -	$ -	$ 103,368	0%
28	31711 71st Street	Oct-2001	748.0	$ 60,060	-1.8	$ -	$ -	$ -	$ -	$ -	$ 113,134	0%

Table B.5 Part 2 of 2

Loss Estimation and ROI Calculations for June 2000 Event in Kenosha County

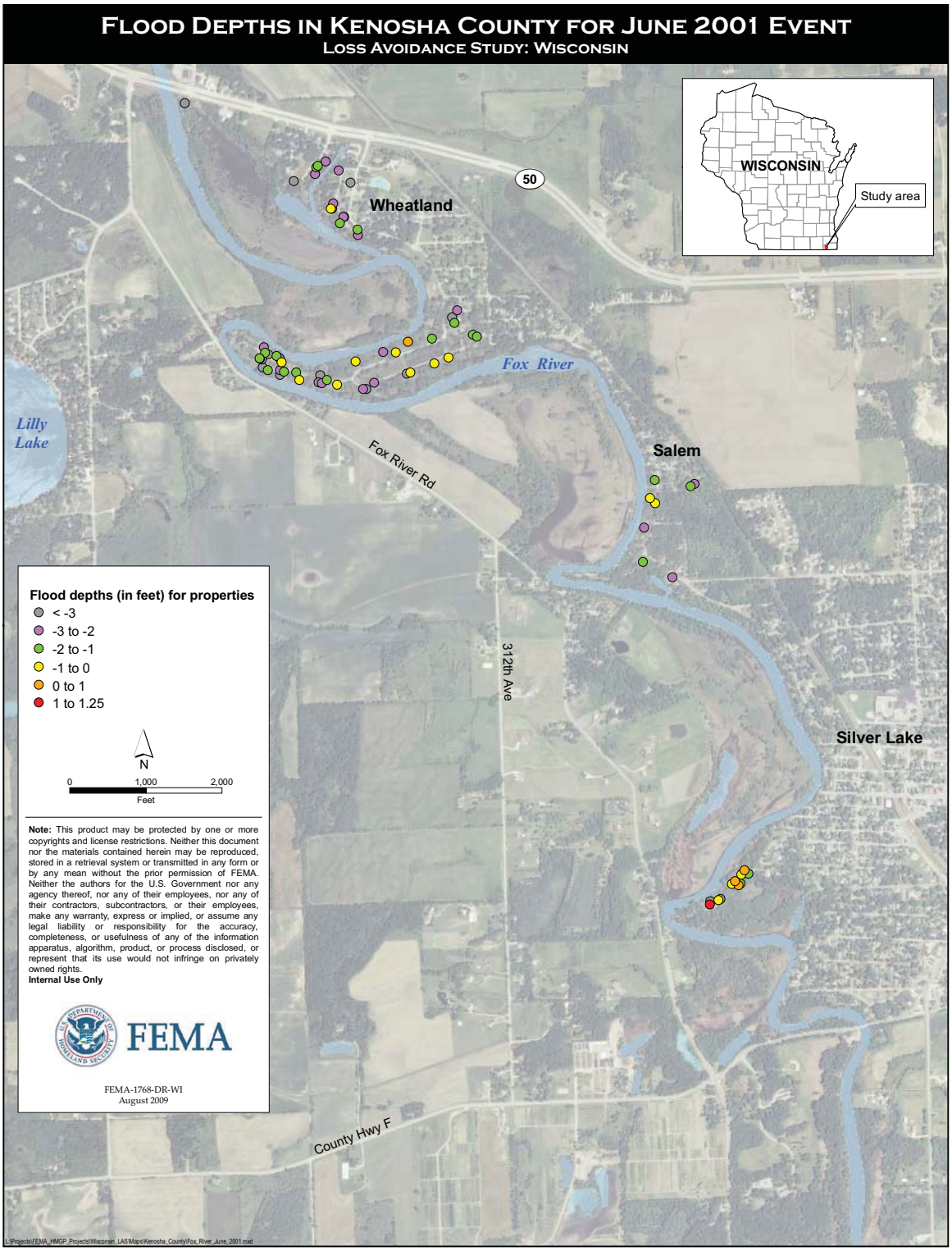
BLDG NO.	ADDRESS	ACQUISITION COMPLETION DATE	FFE (FT, NGVD)[1]	2009 BRV[2]	FLOOD DEPTH (FT)	BUILDING DAMAGE	CONTENTS DAMAGE	DISPLACEMENT COSTS	DISRUPTION COSTS	TOTAL LOSSES AVOIDED	PROJECT INVESTMENT[3]	RETURN ON INVESTMENT
23	6940 317th Avenue	Feb-2002	750.0	$ 58,800	-3.8	$ -	$ -	$ -	$ -	$ -	$ 130,769	0%
15	8200 No. Riverside Drive	Sep-2002	746.8	$ 63,000	-1.4	$ -	$ -	$ -	$ -	$ -	$ 130,863	0%
3	31417 77th Street	Oct-2002	746.0	$ 104,160	-0.3	$ -	$ -	$ -	$ -	$ -	$ 114,648	0%
13	32005 77th Street	Oct-2002	746.5	$ 75,600	-0.6	$ -	$ -	$ -	$ -	$ -	$ 119,677	0%
19	8032 Shorewood Drive	Oct-2002	745.0	$ 95,760	0.5	$ -	$ -	$ -	$ -	$ -	$ 133,702	0%
24	31701 77th Street	Oct-2002	748.7	$ 79,800	-3.0	$ -	$ -	$ -	$ -	$ -	$ 82,325	0%
25	6912 318th Avenue	Oct-2002	748.0	$ 58,800	-1.8	$ -	$ -	$ -	$ -	$ -	$ 87,774	0%
20	31533 77th Street	Oct-2002	748.5	$ 56,070	-2.8	$ -	$ -	$ -	$ -	$ -	$ 42,029	0%
32	31709 77th Street	Jan-2003	747.6	$ 67,200	-1.9	$ -	$ -	$ -	$ -	$ -	$ 80,759	0%
34	7956 Shorewood Drive	Jan-2003	746.0	$ 63,525	-0.5	$ -	$ -	$ -	$ -	$ -	$ 111,428	0%
22	445 So. Riverside Drive	Feb-2003	746.2	$ 98,280	-0.9	$ -	$ -	$ -	$ -	$ -	$ 100,568	0%
30	31715 71st Street	May-2003	748.1	$ 58,800	-1.9	$ -	$ -	$ -	$ -	$ -	$ 86,360	0%
31	501 So. Riverside Drive	Oct-2003	745.4	$ 168,000	-0.1	$ -	$ -	$ -	$ -	$ -	$ 129,181	0%
21	607 So. Riverside Drive	Sep-2004	748.3	$ 74,970	-3.0	$ -	$ -	$ -	$ -	$ -	$ 108,830	0%
47	31627 71st Street	Aug-2005	747.0	$ 104,160	-0.8	$ -	$ -	$ -	$ -	$ -	$ 140,789	0%
48	31315 77th Street	Aug-2005	746.0	$ 95,760	-0.3	$ -	$ -	$ -	$ -	$ -	$ 153,438	0%
38	6913 319th Avenue	Dec-2005	747.0	$ 71,400	-0.8	$ -	$ -	$ -	$ -	$ -	$ 1,348	0%
49	31602 76th Street	Dec-2005	746.1	$ 104,160	-0.3	$ -	$ -	$ -	$ -	$ -	$ 142,351	0%
26	30522 80th Street	Jun-2006	746.0	$ 61,740	-0.5	$ -	$ -	$ -	$ -	$ -	$ 110,106	0%
35	7536 313th Avenue	Jun-2006	748.0	$ 74,130	-2.0	$ -	$ -	$ -	$ -	$ -	$ 129,190	0%
36	511 S. Riverside Drive	Jun-2006	743.7	$ 51,660	1.6	$ -	$ -	$ -	$ -	$ -	$ 59,472	0%
37	606 Wisconsin Avenue	Jun-2006	743.0	$ 37,800	2.3	$ -	$ -	$ -	$ -	$ -	$ 114,398	0%
40	30510 80th Street	Jun-2006	747.5	$ 65,100	-2.0	$ -	$ -	$ -	$ -	$ -	$ 119,470	0%
39	7600 313th Street	Aug-2006	747.0	$ 64,680	-1.1	$ -	$ -	$ -	$ -	$ -	$ 96,803	0%
33	31901 71st Street	Jan-2007	750.8	$ 58,800	-4.6	$ -	$ -	$ -	$ -	$ -	$ 121,564	0%
41	7962 Shorewood Drive	Mar-2007	745.0	$ 65,520	0.5	$ -	$ -	$ -	$ -	$ -	$ 140,801	0%
42	31613 71st Street	Mar-2007	748.0	$ 107,730	-1.8	$ -	$ -	$ -	$ -	$ -	$ 163,558	0%
50	415 S. Riverside Drive	Feb-2008	744.0	$ 63,525	1.3	$ -	$ -	$ -	$ -	$ -	$ 125,544	0%
43	7522 313th Avenue	Jun-2008	749.0	$ 130,620	-3.1	$ -	$ -	$ -	$ -	$ -	$ 169,787	0%
					TOTAL	$ 110,853	$ 69,653	$ 4,935	$ 95,205	$ 280,647	$ 2,495,784	11%

[1] *Vertical datum information was not provided with the first floor elevation (FFE) information supplied by the county. Elevations were assumed to be relative to the National Geodetic Vertical Datum of 1929 (NGVD).*

[2] *Building replacement value (BRV) based on unit cost per square foot of living space for the county.*

[3] *Project investment costs for each event only include the project costs for the buildings that were included in the analysis for that event.*

Figure B.6


Flood Depths in Kenosha County for June 2001 Event
Loss Avoidance Study: Wisconsin
WISCONSIN
Study area
50
Wheatland
Fox River
Lilly Lake
Fox River Rd
Salem
312th Ave
Silver Lake
County Hwy F
Flood depths (in feet) for properties
< -3
-3 to -2
-2 to -1
-1 to 0
0 to 1
1 to 1.25
N
0
1,000
2,000
Feet
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August 2009

Table B.6 Part 1 of 2

Loss Estimation and ROI Calculations for June 2001 Event in Kenosha County

BLDG NO.	ADDRESS	ACQUISITION COMPLETION DATE	FFE (FT, NGVD)[1]	2009 BRV[2]	FLOOD DEPTH (FT)	BUILDING DAMAGE	CONTENTS DAMAGE	DISPLACEMENT COSTS	DISRUPTION COSTS	TOTAL LOSSES AVOIDED	PROJECT INVESTMENT[3]	RETURN ON INVESTMENT
51	32139 77th Street	Jul-1995	747.0	$ 134,820	-1.7	$ 1,079	$ 1,036	$ -	$ 2,609	$ 4,724	$ 135,493	3%
52	32129 77th Street	Jul-1995	747.9	$ 95,760	-2.6	$ -	$ -	$ -	$ -	$ -	$ 121,895	0%
53	437 S. Riverside Drive	Jul-1995	744.0	$ 85,680	0.2	$ 13,593	$ 8,049	$ 433	$ 9,384	$ 31,460	$ 121,453	26%
54	601 S. Riverside Drive	Jul-1995	749.0	$ 107,835	-4.8	$ -	$ -	$ -	$ -	$ -	$ 123,925	0%
55	8106 Shorewood Drive	Jul-1995	746.7	$ 95,760	-2.1	$ -	$ -	$ -	$ -	$ -	$ 127,728	0%
56	31524 76th Street	Sep-1995	745.1	$ 70,560	0.1	$ 10,020	$ 6,012	$ 116	$ 8,636	$ 24,783	$ 116,379	21%
57	31217 77th Street	Feb-1996	747.0	$ 75,600	-1.9	$ 108	$ 103	$ -	$ 2,313	$ 2,524	$ 124,635	2%
58	32041 77th Street	Feb-1996	750.7	$ 87,360	-5.4	$ -	$ -	$ -	$ -	$ -	$ 117,107	0%
60	419 S. Riverside Drive	Oct-1996	745.0	$ 78,750	-0.7	$ 3,620	$ 1,586	$ -	$ 4,316	$ 9,523	$ 7,841	121%
59	32104 77th Street	Nov-1996	748.0	$ 176,190	-2.7	$ -	$ -	$ -	$ -	$ -	$ 185,843	0%
61	32028 77th Street	Apr-1997	747.0	$ 89,880	-1.7	$ 700	$ 672	$ -	$ 2,599	$ 3,971	$ 136,601	3%
62	31628 76th Street	Dec-1998	747.7	$ 106,680	-2.6	$ -	$ -	$ -	$ -	$ -	$ 137,189	0%
63	32029 77th Street	Dec-1998	746.6	$ 79,800	-1.3	$ 1,333	$ 1,280	$ -	$ 3,000	$ 5,613	$ 100,017	6%
64	32018 77th Street	Dec-1998	747.5	$ 82,320	-2.2	$ -	$ -	$ -	$ -	$ -	$ 116,767	0%
65	31710 77th Street	Jan-1999	746.4	$ 107,100	-1.2	$ 2,442	$ 814	$ -	$ 3,274	$ 6,530	$ 139,792	5%
66	32143 77th Street	Mar-1999	747.0	$ 145,530	-1.7	$ 1,383	$ 461	$ -	$ 2,676	$ 4,520	$ 58,179	8%
11	32132 77th Street	Dec-1999	747.0	$ 84,000	-1.7	$ 687	$ 660	$ -	$ 2,617	$ 3,964	$ 90,458	4%
44	31422 76th Street	Dec-1999	746.8	$ 94,500	-1.6	$ 943	$ 905	$ -	$ 2,698	$ 4,546	$ 117,619	4%
45	32034 77th Street	Dec-1999	745.5	$ 121,800	-0.2	$ 13,455	$ 8,367	$ -	$ 7,217	$ 29,040	$ 133,352	22%
12	31823 77th Street	Dec-1999	749.0	$ 102,900	-3.8	$ -	$ -	$ -	$ -	$ -	$ 116,432	0%
68	32015 77th Street	Dec-1999	748.5	$ 121,590	-3.3	$ -	$ -	$ -	$ -	$ -	$ 136,982	0%
67	31917 77th Street	Jan-2000	746.1	$ 68,355	-0.9	$ 2,505	$ 2,057	$ -	$ 3,897	$ 8,458	$ 30,097	28%
8	31805 71st Street	Jun-2000	748.0	$ 133,980	-2.4	$ -	$ -	$ -	$ -	$ -	$ 203,279	0%
16	31811 71st Street	Jun-2000	746.5	$ 63,000	-0.9	$ 2,277	$ 1,879	$ -	$ 3,874	$ 8,030	$ 93,912	9%
17	31519 77th Street	Jun-2000	745.8	$ 58,800	-0.8	$ 2,717	$ 2,063	$ -	$ 4,327	$ 9,108	$ 105,167	9%
18	6929 319th Avenue	Jun-2000	747.5	$ 73,500	-1.9	$ 217	$ 209	$ -	$ 2,382	$ 2,808	$ 98,058	3%
69	6921 319th Avenue	Jun-2000	748.0	$ 103,320	-2.4	$ -	$ -	$ -	$ -	$ -	$ 108,859	0%
73	441 S. Riverside Drive	Jun-2000	745.0	$ 105,840	-0.8	$ 4,818	$ 2,101	$ -	$ 4,296	$ 11,216	$ 131,060	9%
10	31638 76th Street	Jul-2000	747.6	$ 150,570	-2.6	$ -	$ -	$ -	$ -	$ -	$ 166,468	0%
14	8153 Shorewood Drive	Jul-2000	746.5	$ 78,750	-1.9	$ 175	$ 58	$ -	$ 2,349	$ 2,581	$ 115,113	2%
70	31214 77th Street	Sep-2000	747.0	$ 98,280	-2.0	$ 49	$ 47	$ -	$ 2,271	$ 2,367	$ 75,177	3%
1	6712 Wheatland Road	Dec-2000	750.5	$ 64,680	-4.8	$ -	$ -	$ -	$ -	$ -	$ 122,709	0%
71	6905 319th Avenue	Dec-2000	748.0	$ 138,915	-2.4	$ -	$ -	$ -	$ -	$ -	$ 136,356	0%
72	31705 71st Street	Jan-2001	747.0	$ 78,960	-1.4	$ 1,144	$ 1,099	$ -	$ 2,901	$ 5,144	$ 96,381	5%
29	31822 71st Street	Sep-2001	748.0	$ 139,125	-2.4	$ -	$ -	$ -	$ -	$ -	$ 146,597	0%
2	31809 77th Street	Oct-2001	748.0	$ 81,480	-2.9	$ -	$ -	$ -	$ -	$ -	$ 34,954	0%
4	31733 77th Street	Oct-2001	746.0	$ 98,070	-0.9	$ -	$ -	$ -	$ -	$ -	$ 35,951	0%
5	31826 77th Street	Oct-2001	748.5	$ 97,860	-3.3	$ -	$ -	$ -	$ -	$ -	$ 99,666	0%
7	31911 77th Street	Oct-2001	746.5	$ 75,810	-1.3	$ -	$ -	$ -	$ -	$ -	$ 83,304	0%
9	32114 77th Street	Oct-2001	749.5	$ 75,600	-4.2	$ -	$ -	$ -	$ -	$ -	$ 103,368	0%
28	31711 71st Street	Oct-2001	748.0	$ 60,060	-2.4	$ -	$ -	$ -	$ -	$ -	$ 113,134	0%

Table B.6 Part 2 of 2

Loss Estimation and ROI Calculations for June 2001 Event in Kenosha County

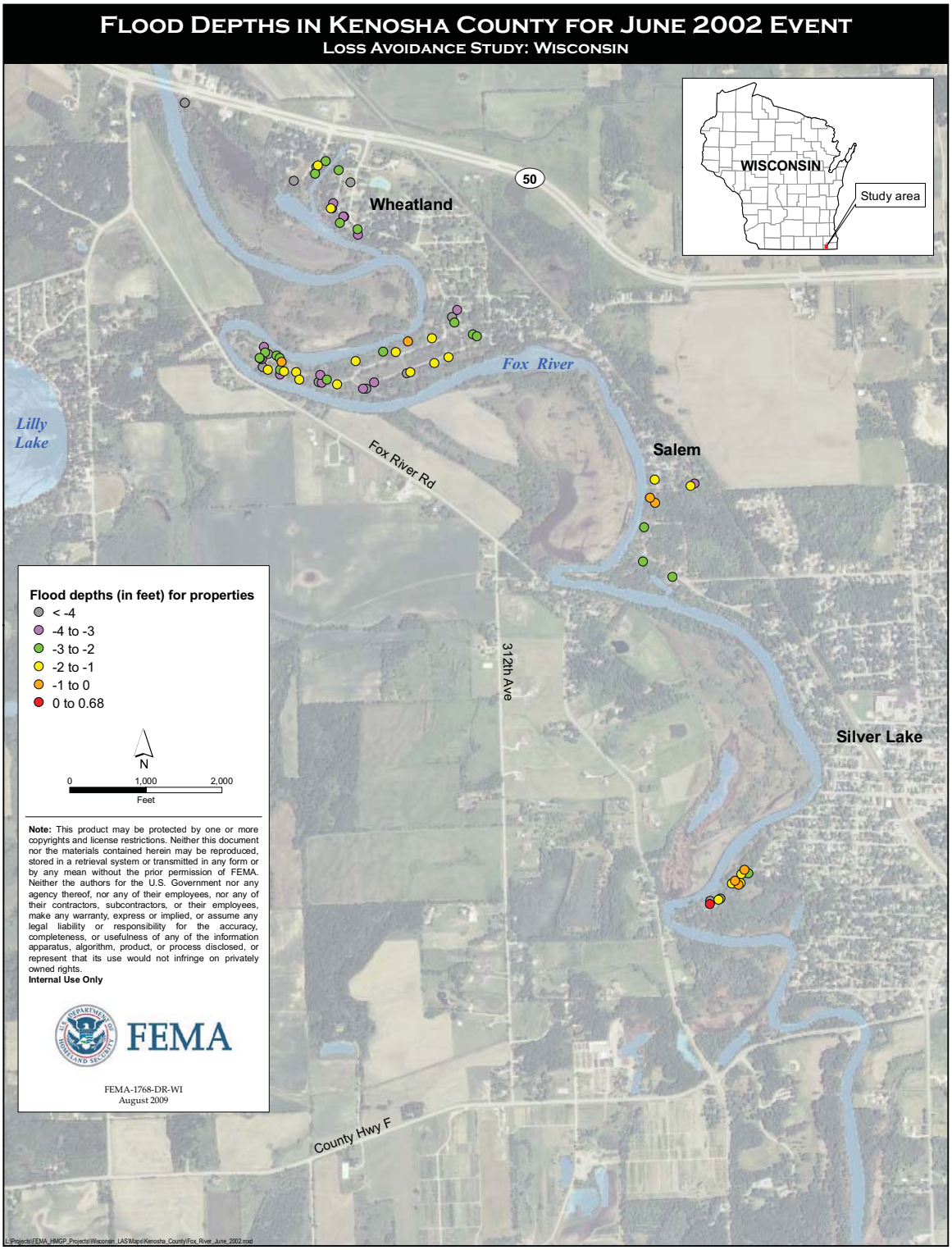
BLDG NO.	ADDRESS	ACQUISITION COMPLETION DATE	FFE (FT, NGVD)[1]	2009 BRV[2]	FLOOD DEPTH (FT)	BUILDING DAMAGE	CONTENTS DAMAGE	DISPLACEMENT COSTS	DISRUPTION COSTS	TOTAL LOSSES AVOIDED	PROJECT INVESTMENT[3]	RETURN ON INVESTMENT
23	6940 317th Avenue	Feb-2002	750.0	$ 58,800	-4.4	$ -	$ -	$ -	$ -	$ -	$ 130,769	0%
15	8200 No. Riverside Drive	Sep-2002	746.8	$ 63,000	-2.3	$ -	$ -	$ -	$ -	$ -	$ 130,863	0%
3	31417 77th Street	Oct-2002	746.0	$ 104,160	-1.0	$ -	$ -	$ -	$ -	$ -	$ 114,648	0%
13	32005 77th Street	Oct-2002	746.5	$ 75,600	-1.3	$ -	$ -	$ -	$ -	$ -	$ 119,677	0%
19	8032 Shorewood Drive	Oct-2002	745.0	$ 95,760	-0.4	$ -	$ -	$ -	$ -	$ -	$ 133,702	0%
24	31701 77th Street	Oct-2002	748.7	$ 79,800	-3.7	$ -	$ -	$ -	$ -	$ -	$ 82,325	0%
25	6912 318th Avenue	Oct-2002	748.0	$ 58,800	-2.4	$ -	$ -	$ -	$ -	$ -	$ 87,774	0%
20	31533 77th Street	Oct-2002	748.5	$ 56,070	-3.5	$ -	$ -	$ -	$ -	$ -	$ 42,029	0%
32	31709 77th Street	Jan-2003	747.6	$ 67,200	-2.6	$ -	$ -	$ -	$ -	$ -	$ 80,759	0%
34	7956 Shorewood Drive	Jan-2003	746.0	$ 63,525	-1.4	$ -	$ -	$ -	$ -	$ -	$ 111,428	0%
22	445 So. Riverside Drive	Feb-2003	746.2	$ 98,280	-1.9	$ -	$ -	$ -	$ -	$ -	$ 100,568	0%
30	31715 71st Street	May-2003	748.1	$ 58,800	-2.5	$ -	$ -	$ -	$ -	$ -	$ 86,360	0%
31	501 So. Riverside Drive	Oct-2003	745.4	$ 168,000	-1.2	$ -	$ -	$ -	$ -	$ -	$ 129,181	0%
21	607 So. Riverside Drive	Sep-2004	748.3	$ 74,970	-4.1	$ -	$ -	$ -	$ -	$ -	$ 108,830	0%
47	31627 71st Street	Aug-2005	747.0	$ 104,160	-1.4	$ -	$ -	$ -	$ -	$ -	$ 140,789	0%
48	31315 77th Street	Aug-2005	746.0	$ 95,760	-1.0	$ -	$ -	$ -	$ -	$ -	$ 153,438	0%
38	6913 319th Avenue	Dec-2005	747.0	$ 71,400	-1.4	$ -	$ -	$ -	$ -	$ -	$ 1,348	0%
49	31602 76th Street	Dec-2005	746.1	$ 104,160	-1.0	$ -	$ -	$ -	$ -	$ -	$ 142,351	0%
26	30522 80th Street	Jun-2006	746.0	$ 61,740	-1.4	$ -	$ -	$ -	$ -	$ -	$ 110,106	0%
35	7536 313th Avenue	Jun-2006	748.0	$ 74,130	-2.7	$ -	$ -	$ -	$ -	$ -	$ 129,190	0%
36	511 S. Riverside Drive	Jun-2006	743.7	$ 51,660	0.5	$ -	$ -	$ -	$ -	$ -	$ 59,472	0%
37	606 Wisconsin Avenue	Jun-2006	743.0	$ 37,800	1.2	$ -	$ -	$ -	$ -	$ -	$ 114,398	0%
40	30510 80th Street	Jun-2006	747.5	$ 65,100	-2.9	$ -	$ -	$ -	$ -	$ -	$ 119,470	0%
39	7600 313th Street	Aug-2006	747.0	$ 64,680	-1.8	$ -	$ -	$ -	$ -	$ -	$ 96,803	0%
33	31901 71st Street	Jan-2007	750.8	$ 58,800	-5.2	$ -	$ -	$ -	$ -	$ -	$ 121,564	0%
41	7962 Shorewood Drive	Mar-2007	745.0	$ 65,520	-0.4	$ -	$ -	$ -	$ -	$ -	$ 140,801	0%
42	31613 71st Street	Mar-2007	748.0	$ 107,730	-2.4	$ -	$ -	$ -	$ -	$ -	$ 163,558	0%
50	415 S. Riverside Drive	Feb-2008	744.0	$ 63,525	0.3	$ -	$ -	$ -	$ -	$ -	$ 125,544	0%
43	7522 313th Avenue	Jun-2008	749.0	$ 130,620	-3.7	$ -	$ -	$ -	$ -	$ -	$ 169,787	0%
					TOTAL	$ 63,266	$ 39,459	$ 549	$ 77,636	$ 180,910	$ 3,948,322	5%

[1] *Vertical datum information was not provided with the first floor elevation (FFE) information supplied by the county. Elevations were assumed to be relative to the National Geodetic Vertical Datum of 1929 (NGVD).*

[2] *Building replacement value (BRV) based on unit cost per square foot of living space for the county.*

[3] *Project investment costs for each event only include the project costs for the buildings that were included in the analysis for that event.*

Figure B.7


Flood Depths in Kenosha County for June 2002 Event
Loss Avoidance Study: Wisconsin
WISCONSIN
Study area
50
Wheatland
Fox River
Lilly Lake
Fox River Rd
Salem
312th Ave
Silver Lake
County Hwy F
Flood depths (in feet) for properties
< -4
-4 to -3
-3 to -2
-2 to -1
-1 to 0
0 to 0.68
N
0
1,000
2,000
Feet
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August 2009

Table B.7 Part 1 of 2

Loss Estimation and ROI Calculations for June 2002 Event in Kenosha County

BLDG NO.	ADDRESS	ACQUISITION COMPLETION DATE	FFE (FT, NGVD)[1]	2009 BRV[2]	FLOOD DEPTH (FT)	BUILDING DAMAGE	CONTENTS DAMAGE	DISPLACEMENT COSTS	DISRUPTION COSTS	TOTAL LOSSES AVOIDED	PROJECT INVESTMENT[3]	RETURN ON INVESTMENT
51	32139 77th Street	Jul-1995	747.0	$ 134,820	-2.3	$ -	$ -	$ -	$ -	$ -	$ 135,493	**0%**
52	32129 77th Street	Jul-1995	747.9	$ 95,760	-3.2	$ -	$ -	$ -	$ -	$ -	$ 121,895	**0%**
53	437 S. Riverside Drive	Jul-1995	744.0	$ 85,680	-0.3	$ 8,485	$ 5,373	$ -	$ 6,703	$ 20,560	$ 121,453	**17%**
54	601 S. Riverside Drive	Jul-1995	749.0	$ 107,835	-5.3	$ -	$ -	$ -	$ -	$ -	$ 123,925	**0%**
55	8106 Shorewood Drive	Jul-1995	746.7	$ 95,760	-2.7	$ -	$ -	$ -	$ -	$ -	$ 127,728	**0%**
56	31524 76th Street	Sep-1995	745.1	$ 70,560	-0.6	$ 5,192	$ 3,486	$ -	$ 5,558	$ 14,236	$ 116,379	**12%**
57	31217 77th Street	Feb-1996	747.0	$ 75,600	-2.6	$ -	$ -	$ -	$ -	$ -	$ 124,635	**0%**
58	32041 77th Street	Feb-1996	750.7	$ 87,360	-6.0	$ -	$ -	$ -	$ -	$ -	$ 117,107	**0%**
60	419 S. Riverside Drive	Oct-1996	745.0	$ 78,750	-1.3	$ 1,615	$ 538	$ -	$ 3,171	$ 5,324	$ 7,841	**68%**
59	32104 77th Street	Nov-1996	748.0	$ 176,190	-3.3	$ -	$ -	$ -	$ -	$ -	$ 185,843	**0%**
61	32028 77th Street	Apr-1997	747.0	$ 89,880	-2.3	$ -	$ -	$ -	$ -	$ -	$ 136,601	**0%**
62	31628 76th Street	Dec-1998	747.7	$ 106,680	-3.2	$ -	$ -	$ -	$ -	$ -	$ 137,189	**0%**
63	32029 77th Street	Dec-1998	746.6	$ 79,800	-2.0	$ 81	$ 78	$ -	$ 2,295	$ 2,454	$ 100,017	**2%**
64	32018 77th Street	Dec-1998	747.5	$ 82,320	-2.8	$ -	$ -	$ -	$ -	$ -	$ 116,767	**0%**
65	31710 77th Street	Jan-1999	746.4	$ 107,100	-1.9	$ 396	$ 132	$ -	$ 2,415	$ 2,942	$ 139,792	**2%**
66	32143 77th Street	Mar-1999	747.0	$ 145,530	-2.3	$ -	$ -	$ -	$ -	$ -	$ 58,179	**0%**
11	32132 77th Street	Dec-1999	747.0	$ 84,000	-2.3	$ -	$ -	$ -	$ -	$ -	$ 90,458	**0%**
44	31422 76th Street	Dec-1999	746.8	$ 94,500	-2.2	$ -	$ -	$ -	$ -	$ -	$ 117,619	**0%**
45	32034 77th Street	Dec-1999	745.5	$ 121,800	-0.8	$ 5,142	$ 4,020	$ -	$ 4,148	$ 13,310	$ 133,352	**10%**
12	31823 77th Street	Dec-1999	749.0	$ 102,900	-4.5	$ -	$ -	$ -	$ -	$ -	$ 116,432	**0%**
68	32015 77th Street	Dec-1999	748.5	$ 121,590	-3.9	$ -	$ -	$ -	$ -	$ -	$ 136,982	**0%**
67	31917 77th Street	Jan-2000	746.1	$ 68,355	-1.5	$ 810	$ 777	$ -	$ 2,782	$ 4,369	$ 30,097	**15%**
8	31805 71st Street	Jun-2000	748.0	$ 133,980	-3.0	$ -	$ -	$ -	$ -	$ -	$ 203,279	**0%**
16	31811 71st Street	Jun-2000	746.5	$ 63,000	-1.5	$ 790	$ 758	$ -	$ 2,813	$ 4,361	$ 93,912	**5%**
17	31519 77th Street	Jun-2000	745.8	$ 58,800	-1.5	$ 804	$ 772	$ -	$ 2,864	$ 4,440	$ 105,167	**4%**
18	6929 319th Avenue	Jun-2000	747.5	$ 73,500	-2.5	$ -	$ -	$ -	$ -	$ -	$ 98,058	**0%**
69	6921 319th Avenue	Jun-2000	748.0	$ 103,320	-3.0	$ -	$ -	$ -	$ -	$ -	$ 108,859	**0%**
73	441 S. Riverside Drive	Jun-2000	745.0	$ 105,840	-1.3	$ 2,149	$ 716	$ -	$ 3,162	$ 6,028	$ 131,060	**5%**
10	31638 76th Street	Jul-2000	747.6	$ 150,570	-3.2	$ -	$ -	$ -	$ -	$ -	$ 166,468	**0%**
14	8153 Shorewood Drive	Jul-2000	746.5	$ 78,750	-2.5	$ -	$ -	$ -	$ -	$ -	$ 115,113	**0%**
70	31214 77th Street	Sep-2000	747.0	$ 98,280	-2.6	$ -	$ -	$ -	$ -	$ -	$ 75,177	**0%**
1	6712 Wheatland Road	Dec-2000	750.5	$ 64,680	-5.4	$ -	$ -	$ -	$ -	$ -	$ 122,709	**0%**
71	6905 319th Avenue	Dec-2000	748.0	$ 138,915	-3.0	$ -	$ -	$ -	$ -	$ -	$ 136,356	**0%**
72	31705 71st Street	Jan-2001	747.0	$ 78,960	-2.0	$ -	$ -	$ -	$ -	$ -	$ 96,381	**0%**
29	31822 71st Street	Sep-2001	748.0	$ 139,125	-3.0	$ -	$ -	$ -	$ -	$ -	$ 146,597	**0%**
2	31809 77th Street	Oct-2001	748.0	$ 81,480	-3.5	$ -	$ -	$ -	$ -	$ -	$ 34,954	**0%**
4	31733 77th Street	Oct-2001	746.0	$ 98,070	-1.5	$ 1,117	$ 1,073	$ -	$ 2,761	$ 4,951	$ 35,951	**14%**
5	31826 77th Street	Oct-2001	748.5	$ 97,860	-4.0	$ -	$ -	$ -	$ -	$ -	$ 99,666	**0%**
7	31911 77th Street	Oct-2001	746.5	$ 75,810	-1.9	$ 183	$ 176	$ -	$ 2,358	$ 2,717	$ 83,304	**3%**
9	32114 77th Street	Oct-2001	749.5	$ 75,600	-4.8	$ -	$ -	$ -	$ -	$ -	$ 103,368	**0%**
28	31711 71st Street	Oct-2001	748.0	$ 60,060	-3.0	$ -	$ -	$ -	$ -	$ -	$ 113,134	**0%**

Table B.7 Part 2 of 2

Loss Estimation and ROI Calculations for June 2002 Event in Kenosha County

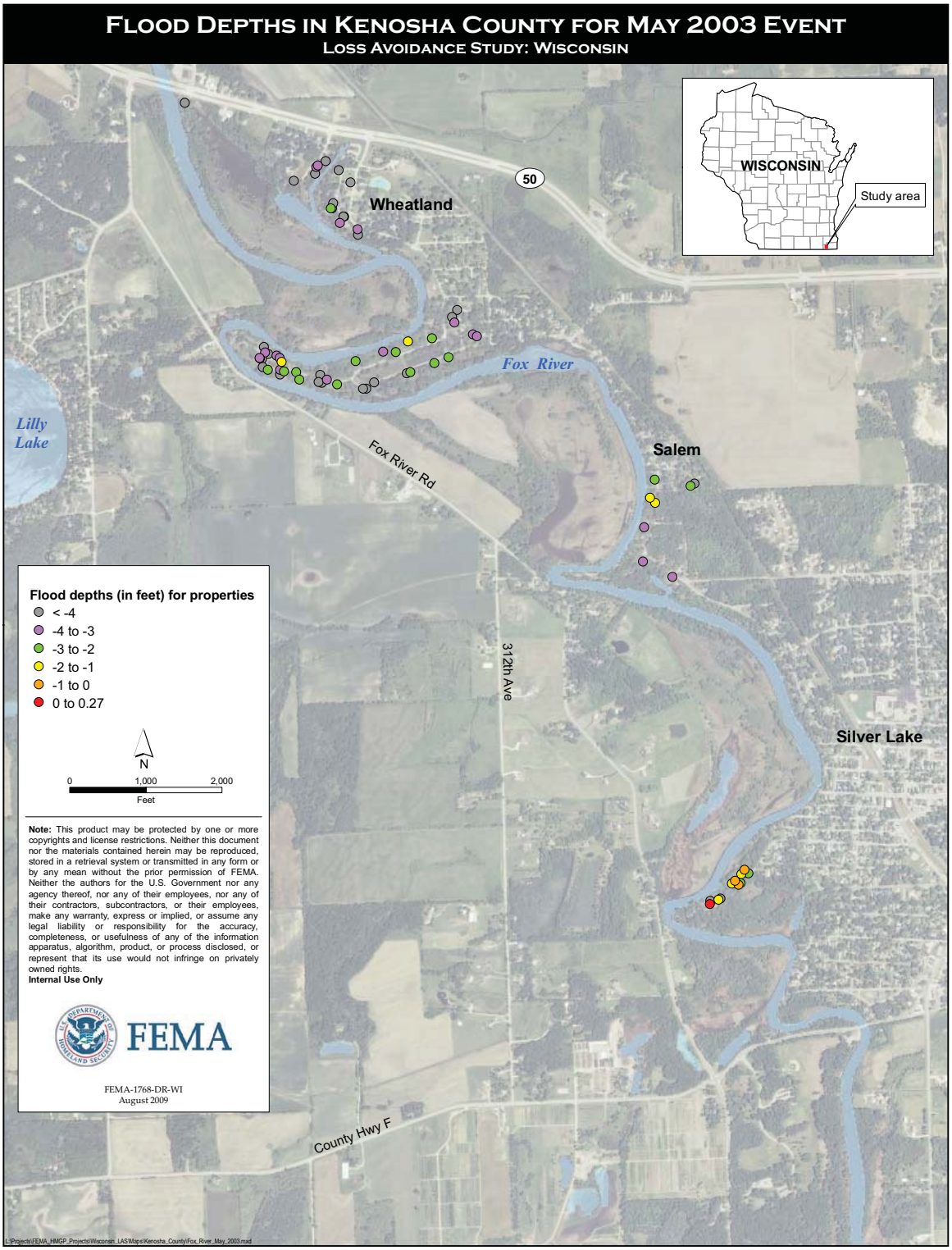
BLDG NO.	ADDRESS	ACQUISITION COMPLETION DATE	FFE (FT, NGVD)[1]	2009 BRV[2]	FLOOD DEPTH (FT)	BUILDING DAMAGE	CONTENTS DAMAGE	DISPLACEMENT COSTS	DISRUPTION COSTS	TOTAL LOSSES AVOIDED	PROJECT INVESTMENT[3]	RETURN ON INVESTMENT
23	6940 317th Avenue	Feb-2002	750.0	$ 58,800	-5.0	$ -	$ -	$ -	$ -	$ -	$ 130,769	0%
15	8200 No. Riverside Drive	Sep-2002	746.8	$ 63,000	-2.9	$ -	$ -	$ -	$ -	$ -	$ 130,863	0%
3	31417 77th Street	Oct-2002	746.0	$ 104,160	-1.7	$ -	$ -	$ -	$ -	$ -	$ 114,648	0%
13	32005 77th Street	Oct-2002	746.5	$ 75,600	-1.9	$ -	$ -	$ -	$ -	$ -	$ 119,677	0%
19	8032 Shorewood Drive	Oct-2002	745.0	$ 95,760	-1.0	$ -	$ -	$ -	$ -	$ -	$ 133,702	0%
24	31701 77th Street	Oct-2002	748.7	$ 79,800	-4.3	$ -	$ -	$ -	$ -	$ -	$ 82,325	0%
25	6912 318th Avenue	Oct-2002	748.0	$ 58,800	-3.0	$ -	$ -	$ -	$ -	$ -	$ 87,774	0%
20	31533 77th Street	Oct-2002	748.5	$ 56,070	-4.2	$ -	$ -	$ -	$ -	$ -	$ 42,029	0%
32	31709 77th Street	Jan-2003	747.6	$ 67,200	-3.2	$ -	$ -	$ -	$ -	$ -	$ 80,759	0%
34	7956 Shorewood Drive	Jan-2003	746.0	$ 63,525	-2.0	$ -	$ -	$ -	$ -	$ -	$ 111,428	0%
22	445 So. Riverside Drive	Feb-2003	746.2	$ 98,280	-2.5	$ -	$ -	$ -	$ -	$ -	$ 100,568	0%
30	31715 71st Street	May-2003	748.1	$ 58,800	-3.1	$ -	$ -	$ -	$ -	$ -	$ 86,360	0%
31	501 So. Riverside Drive	Oct-2003	745.4	$ 168,000	-1.7	$ -	$ -	$ -	$ -	$ -	$ 129,181	0%
21	607 So. Riverside Drive	Sep-2004	748.3	$ 74,970	-4.6	$ -	$ -	$ -	$ -	$ -	$ 108,830	0%
47	31627 71st Street	Aug-2005	747.0	$ 104,160	-2.0	$ -	$ -	$ -	$ -	$ -	$ 140,789	0%
48	31315 77th Street	Aug-2005	746.0	$ 95,760	-1.7	$ -	$ -	$ -	$ -	$ -	$ 153,438	0%
38	6913 319th Avenue	Dec-2005	747.0	$ 71,400	-2.0	$ -	$ -	$ -	$ -	$ -	$ 1,348	0%
49	31602 76th Street	Dec-2005	746.1	$ 104,160	-1.6	$ -	$ -	$ -	$ -	$ -	$ 142,351	0%
26	30522 80th Street	Jun-2006	746.0	$ 61,740	-2.0	$ -	$ -	$ -	$ -	$ -	$ 110,106	0%
35	7536 313th Avenue	Jun-2006	748.0	$ 74,130	-3.3	$ -	$ -	$ -	$ -	$ -	$ 129,190	0%
36	511 S. Riverside Drive	Jun-2006	743.7	$ 51,660	0.0	$ -	$ -	$ -	$ -	$ -	$ 59,472	0%
37	606 Wisconsin Avenue	Jun-2006	743.0	$ 37,800	0.7	$ -	$ -	$ -	$ -	$ -	$ 114,398	0%
40	30510 80th Street	Jun-2006	747.5	$ 65,100	-3.5	$ -	$ -	$ -	$ -	$ -	$ 119,470	0%
39	7600 313th Street	Aug-2006	747.0	$ 64,680	-2.4	$ -	$ -	$ -	$ -	$ -	$ 96,803	0%
33	31901 71st Street	Jan-2007	750.8	$ 58,800	-5.8	$ -	$ -	$ -	$ -	$ -	$ 121,564	0%
41	7962 Shorewood Drive	Mar-2007	745.0	$ 65,520	-1.0	$ -	$ -	$ -	$ -	$ -	$ 140,801	0%
42	31613 71st Street	Mar-2007	748.0	$ 107,730	-3.0	$ -	$ -	$ -	$ -	$ -	$ 163,558	0%
50	415 S. Riverside Drive	Feb-2008	744.0	$ 63,525	-0.3	$ -	$ -	$ -	$ -	$ -	$ 125,544	0%
43	7522 313th Avenue	Jun-2008	749.0	$ 130,620	-4.4	$ -	$ -	$ -	$ -	$ -	$ 169,787	0%
					TOTAL	$ 29,506	$ 18,814	$ -	$ 44,174	$ 92,493	$ 5,024,413	2%

[1] *Vertical datum information was not provided with the first floor elevation (FFE) information supplied by the county. Elevations were assumed to be relative to the National Geodetic Vertical Datum of 1929 (NGVD).*

[2] *Building replacement value (BRV) based on unit cost per square foot of living space for the county.*

[3] *Project investment costs for each event only include the project costs for the buildings that were included in the analysis for that event.*

Figure B.8


Flood Depths in Kenosha County for May 2003 Event
Loss Avoidance Study: Wisconsin
WISCONSIN
Study area
50
Wheatland
Fox River
Lilly Lake
Fox River Rd
Salem
312th Ave
Silver Lake
County Hwy F
Flood depths (in feet) for properties
< -4
-4 to -3
-3 to -2
-2 to -1
-1 to 0
0 to 0.27
N
0
1,000
2,000
Feet
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August 2009

Table B.8 Part 1 of 2

Loss Estimation and ROI Calculations for May 2003 Event in Kenosha County

BLDG NO.	ADDRESS	ACQUISITION COMPLETION DATE	FFE (FT, NGVD)[1]	2009 BRV[2]	FLOOD DEPTH (FT)	BUILDING DAMAGE	CONTENTS DAMAGE	DISPLACEMENT COSTS	DISRUPTION COSTS	TOTAL LOSSES AVOIDED	PROJECT INVESTMENT[3]	RETURN ON INVESTMENT
51	32139 77th Street	Jul-1995	747.0	$ 134,820	-3.3	$ -	$ -	$ -	$ -	$ -	$ 135,493	0%
52	32129 77th Street	Jul-1995	747.9	$ 95,760	-4.2	$ -	$ -	$ -	$ -	$ -	$ 121,895	0%
53	437 S. Riverside Drive	Jul-1995	744.0	$ 85,680	-0.7	$ 4,661	$ 3,374	$ -	$ 4,695	$ 12,730	$ 121,453	10%
54	601 S. Riverside Drive	Jul-1995	749.0	$ 107,835	-5.7	$ -	$ -	$ -	$ -	$ -	$ 123,925	0%
55	8106 Shorewood Drive	Jul-1995	746.7	$ 95,760	-3.3	$ -	$ -	$ -	$ -	$ -	$ 127,728	0%
56	31524 76th Street	Sep-1995	745.1	$ 70,560	-1.4	$ 995	$ 955	$ -	$ 2,883	$ 4,833	$ 116,379	4%
57	31217 77th Street	Feb-1996	747.0	$ 75,600	-3.4	$ -	$ -	$ -	$ -	$ -	$ 124,635	0%
58	32041 77th Street	Feb-1996	750.7	$ 87,360	-7.0	$ -	$ -	$ -	$ -	$ -	$ 117,107	0%
60	419 S. Riverside Drive	Oct-1996	745.0	$ 78,750	-1.7	$ 641	$ 214	$ -	$ 2,615	$ 3,469	$ 7,841	44%
59	32104 77th Street	Nov-1996	748.0	$ 176,190	-4.2	$ -	$ -	$ -	$ -	$ -	$ 185,843	0%
61	32028 77th Street	Apr-1997	747.0	$ 89,880	-3.3	$ -	$ -	$ -	$ -	$ -	$ 136,601	0%
62	31628 76th Street	Dec-1998	747.7	$ 106,680	-4.1	$ -	$ -	$ -	$ -	$ -	$ 137,189	0%
63	32029 77th Street	Dec-1998	746.6	$ 79,800	-2.9	$ -	$ -	$ -	$ -	$ -	$ 100,017	0%
64	32018 77th Street	Dec-1998	747.5	$ 82,320	-3.8	$ -	$ -	$ -	$ -	$ -	$ 116,767	0%
65	31710 77th Street	Jan-1999	746.4	$ 107,100	-2.7	$ -	$ -	$ -	$ -	$ -	$ 139,792	0%
66	32143 77th Street	Mar-1999	747.0	$ 145,530	-3.3	$ -	$ -	$ -	$ -	$ -	$ 58,179	0%
11	32132 77th Street	Dec-1999	747.0	$ 84,000	-3.2	$ -	$ -	$ -	$ -	$ -	$ 90,458	0%
44	31422 76th Street	Dec-1999	746.8	$ 94,500	-3.1	$ -	$ -	$ -	$ -	$ -	$ 117,619	0%
45	32034 77th Street	Dec-1999	745.5	$ 121,800	-1.8	$ 691	$ 663	$ -	$ 2,504	$ 3,858	$ 133,352	3%
12	31823 77th Street	Dec-1999	749.0	$ 102,900	-5.4	$ -	$ -	$ -	$ -	$ -	$ 116,432	0%
68	32015 77th Street	Dec-1999	748.5	$ 121,590	-4.8	$ -	$ -	$ -	$ -	$ -	$ 136,982	0%
67	31917 77th Street	Jan-2000	746.1	$ 68,355	-2.4	$ -	$ -	$ -	$ -	$ -	$ 30,097	0%
8	31805 71st Street	Jun-2000	748.0	$ 133,980	-4.1	$ -	$ -	$ -	$ -	$ -	$ 203,279	0%
16	31811 71st Street	Jun-2000	746.5	$ 63,000	-2.6	$ -	$ -	$ -	$ -	$ -	$ 93,912	0%
17	31519 77th Street	Jun-2000	745.8	$ 58,800	-2.2	$ -	$ -	$ -	$ -	$ -	$ 105,167	0%
18	6929 319th Avenue	Jun-2000	747.5	$ 73,500	-3.6	$ -	$ -	$ -	$ -	$ -	$ 98,058	0%
69	6921 319th Avenue	Jun-2000	748.0	$ 103,320	-4.1	$ -	$ -	$ -	$ -	$ -	$ 108,859	0%
73	441 S. Riverside Drive	Jun-2000	745.0	$ 105,840	-1.7	$ 854	$ 285	$ -	$ 2,612	$ 3,750	$ 131,060	3%
10	31638 76th Street	Jul-2000	747.6	$ 150,570	-4.0	$ -	$ -	$ -	$ -	$ -	$ 166,468	0%
14	8153 Shorewood Drive	Jul-2000	746.5	$ 78,750	-3.1	$ -	$ -	$ -	$ -	$ -	$ 115,113	0%
70	31214 77th Street	Sep-2000	747.0	$ 98,280	-3.4	$ -	$ -	$ -	$ -	$ -	$ 75,177	0%
1	6712 Wheatland Road	Dec-2000	750.5	$ 64,680	-6.5	$ -	$ -	$ -	$ -	$ -	$ 122,709	0%
71	6905 319th Avenue	Dec-2000	748.0	$ 138,915	-4.1	$ -	$ -	$ -	$ -	$ -	$ 136,356	0%
72	31705 71st Street	Jan-2001	747.0	$ 78,960	-3.1	$ -	$ -	$ -	$ -	$ -	$ 96,381	0%
29	31822 71st Street	Sep-2001	748.0	$ 139,125	-4.1	$ -	$ -	$ -	$ -	$ -	$ 146,597	0%
2	31809 77th Street	Oct-2001	748.0	$ 81,480	-4.4	$ -	$ -	$ -	$ -	$ -	$ 34,954	0%
4	31733 77th Street	Oct-2001	746.0	$ 98,070	-2.4	$ -	$ -	$ -	$ -	$ -	$ 35,951	0%
5	31826 77th Street	Oct-2001	748.5	$ 97,860	-4.8	$ -	$ -	$ -	$ -	$ -	$ 99,666	0%
7	31911 77th Street	Oct-2001	746.5	$ 75,810	-2.8	$ -	$ -	$ -	$ -	$ -	$ 83,304	0%
9	32114 77th Street	Oct-2001	749.5	$ 75,600	-5.8	$ -	$ -	$ -	$ -	$ -	$ 103,368	0%
28	31711 71st Street	Oct-2001	748.0	$ 60,060	-4.1	$ -	$ -	$ -	$ -	$ -	$ 113,134	0%

Table B.8 Part 2 of 2

Loss Estimation and ROI Calculations for May 2003 Event in Kenosha County

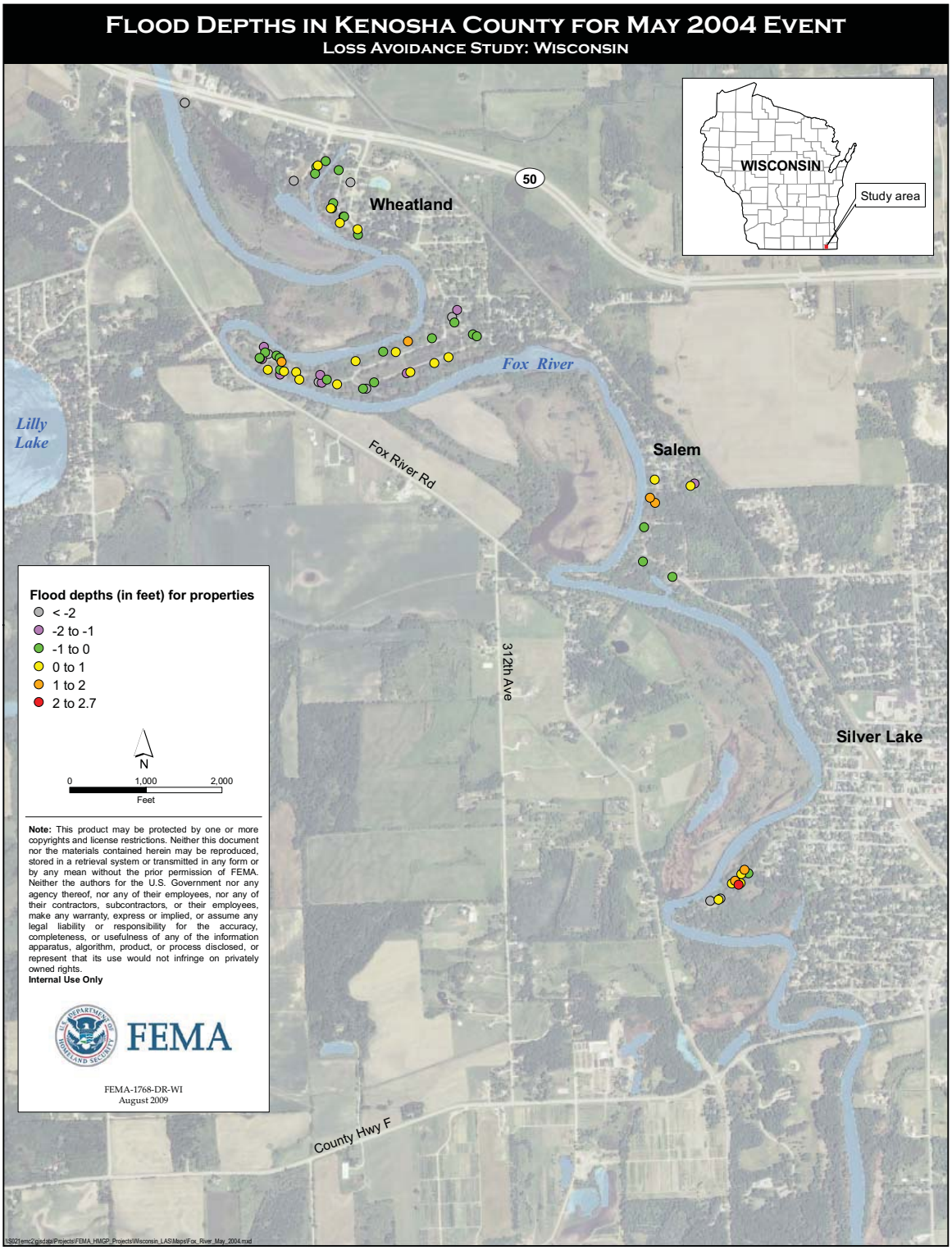
BLDG NO.	ADDRESS	ACQUISITION COMPLETION DATE	FFE (FT, NGVD)[1]	2009 BRV[2]	FLOOD DEPTH (FT)	BUILDING DAMAGE	CONTENTS DAMAGE	DISPLACEMENT COSTS	DISRUPTION COSTS	TOTAL LOSSES AVOIDED	PROJECT INVESTMENT[3]	RETURN ON INVESTMENT
23	6940 317th Avenue	Feb-2002	750.0	$ 58,800	-6.1	$ -	$ -	$ -	$ -	$ -	$ 130,769	0%
15	8200 No. Riverside Drive	Sep-2002	746.8	$ 63,000	-3.4	$ -	$ -	$ -	$ -	$ -	$ 130,863	0%
3	31417 77th Street	Oct-2002	746.0	$ 104,160	-2.5	$ -	$ -	$ -	$ -	$ -	$ 114,648	0%
13	32005 77th Street	Oct-2002	746.5	$ 75,600	-2.8	$ -	$ -	$ -	$ -	$ -	$ 119,677	0%
19	8032 Shorewood Drive	Oct-2002	745.0	$ 95,760	-1.6	$ 980	$ 941	$ -	$ 2,709	$ 4,630	$ 133,702	3%
24	31701 77th Street	Oct-2002	748.7	$ 79,800	-5.1	$ -	$ -	$ -	$ -	$ -	$ 82,325	0%
25	6912 318th Avenue	Oct-2002	748.0	$ 58,800	-4.1	$ -	$ -	$ -	$ -	$ -	$ 87,774	0%
20	31533 77th Street	Oct-2002	748.5	$ 56,070	-4.9	$ -	$ -	$ -	$ -	$ -	$ 42,029	0%
32	31709 77th Street	Jan-2003	747.6	$ 67,200	-4.0	$ -	$ -	$ -	$ -	$ -	$ 80,759	0%
34	7956 Shorewood Drive	Jan-2003	746.0	$ 63,525	-2.6	$ -	$ -	$ -	$ -	$ -	$ 111,428	0%
22	445 So. Riverside Drive	Feb-2003	746.2	$ 98,280	-2.9	$ -	$ -	$ -	$ -	$ -	$ 100,568	0%
30	31715 71st Street	May-2003	748.1	$ 58,800	-4.2	$ -	$ -	$ -	$ -	$ -	$ 86,360	0%
31	501 So. Riverside Drive	Oct-2003	745.4	$ 168,000	-2.1	$ -	$ -	$ -	$ -	$ -	$ 129,181	0%
21	607 So. Riverside Drive	Sep-2004	748.3	$ 74,970	-5.0	$ -	$ -	$ -	$ -	$ -	$ 108,830	0%
47	31627 71st Street	Aug-2005	747.0	$ 104,160	-3.1	$ -	$ -	$ -	$ -	$ -	$ 140,789	0%
48	31315 77th Street	Aug-2005	746.0	$ 95,760	-2.5	$ -	$ -	$ -	$ -	$ -	$ 153,438	0%
38	6913 319th Avenue	Dec-2005	747.0	$ 71,400	-3.1	$ -	$ -	$ -	$ -	$ -	$ 1,348	0%
49	31602 76th Street	Dec-2005	746.1	$ 104,160	-2.5	$ -	$ -	$ -	$ -	$ -	$ 142,351	0%
26	30522 80th Street	Jun-2006	746.0	$ 61,740	-2.6	$ -	$ -	$ -	$ -	$ -	$ 110,106	0%
35	7536 313th Avenue	Jun-2006	748.0	$ 74,130	-4.2	$ -	$ -	$ -	$ -	$ -	$ 129,190	0%
36	511 S. Riverside Drive	Jun-2006	743.7	$ 51,660	-0.4	$ -	$ -	$ -	$ -	$ -	$ 59,472	0%
37	606 Wisconsin Avenue	Jun-2006	743.0	$ 37,800	0.3	$ -	$ -	$ -	$ -	$ -	$ 114,398	0%
40	30510 80th Street	Jun-2006	747.5	$ 65,100	-4.1	$ -	$ -	$ -	$ -	$ -	$ 119,470	0%
39	7600 313th Street	Aug-2006	747.0	$ 64,680	-3.3	$ -	$ -	$ -	$ -	$ -	$ 96,803	0%
33	31901 71st Street	Jan-2007	750.8	$ 58,800	-6.9	$ -	$ -	$ -	$ -	$ -	$ 121,564	0%
41	7962 Shorewood Drive	Mar-2007	745.0	$ 65,520	-1.6	$ -	$ -	$ -	$ -	$ -	$ 140,801	0%
42	31613 71st Street	Mar-2007	748.0	$ 107,730	-4.1	$ -	$ -	$ -	$ -	$ -	$ 163,558	0%
50	415 S. Riverside Drive	Feb-2008	744.0	$ 63,525	-0.7	$ -	$ -	$ -	$ -	$ -	$ 125,544	0%
43	7522 313th Avenue	Jun-2008	749.0	$ 130,620	-5.3	$ -	$ -	$ -	$ -	$ -	$ 169,787	0%
					TOTAL	$ 9,914	$ 6,795	$ -	$ 20,624	$ 37,332	$ 6,028,187	1%

[1] *Vertical datum information was not provided with the first floor elevation (FFE) information supplied by the county. Elevations were assumed to be relative to the National Geodetic Vertical Datum of 1929 (NGVD).*

[2] *Building replacement value (BRV) based on unit cost per square foot of living space for the county.*

[3] *Project investment costs for each event only include the project costs for the buildings that were included in the analysis for that event.*

Figure B.9


Flood Depths in Kenosha County for May 2004 Event
Loss Avoidance Study: Wisconsin
WISCONSIN
Study area
50
Wheatland
Fox River
Lilly Lake
Fox River Rd
Salem
312th Ave
Silver Lake
County Hwy F
Flood depths (in feet) for properties
< -2
-2 to -1
-1 to 0
0 to 1
1 to 2
2 to 2.7
N
0
1,000
2,000
Feet
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August 2009

Table B.9 Part 1 of 2

Loss Estimation and ROI Calculations for May 2004 Event in Kenosha County

BLDG NO.	ADDRESS	ACQUISITION COMPLETION DATE	FFE (FT, NGVD)[1]	2009 BRV[2]	FLOOD DEPTH (FT)	BUILDING DAMAGE	CONTENTS DAMAGE	DISPLACEMENT COSTS	DISRUPTION COSTS	TOTAL LOSSES AVOIDED	PROJECT INVESTMENT[3]	RETURN ON INVESTMENT
51	32139 77th Street	Jul-1995	747.0	$ 134,820	-0.1	$ 16,343	$ 10,019	$ -	$ 7,701	$ 34,063	$ 135,493	**25%**
52	32129 77th Street	Jul-1995	747.9	$ 95,760	-1.0	$ 2,332	$ 2,239	$ -	$ 3,344	$ 7,915	$ 121,895	**6%**
53	437 S. Riverside Drive	Jul-1995	744.0	$ 85,680	1.8	$ 25,760	$ 14,426	$ 3,075	$ 15,771	$ 59,032	$ 121,453	**49%**
54	601 S. Riverside Drive	Jul-1995	749.0	$ 107,835	-3.3	$ -	$ -	$ -	$ -	$ -	$ 123,925	**0%**
55	8106 Shorewood Drive	Jul-1995	746.7	$ 95,760	-0.5	$ 8,007	$ 5,234	$ -	$ 6,010	$ 19,251	$ 127,728	**15%**
56	31524 76th Street	Sep-1995	745.1	$ 70,560	1.7	$ 20,624	$ 11,571	$ 2,396	$ 15,395	$ 49,986	$ 116,379	**43%**
57	31217 77th Street	Feb-1996	747.0	$ 75,600	-0.3	$ 7,467	$ 4,731	$ -	$ 6,691	$ 18,889	$ 124,635	**15%**
58	32041 77th Street	Feb-1996	750.7	$ 87,360	-3.8	$ -	$ -	$ -	$ -	$ -	$ 117,107	**0%**
60	419 S. Riverside Drive	Oct-1996	745.0	$ 78,750	0.8	$ 10,918	$ 6,191	$ 1,236	$ 8,484	$ 26,829	$ 7,841	**342%**
59	32104 77th Street	Nov-1996	748.0	$ 176,190	-1.1	$ 4,766	$ 1,589	$ -	$ 3,465	$ 9,819	$ 185,843	**5%**
61	32028 77th Street	Apr-1997	747.0	$ 89,880	-0.1	$ 10,828	$ 6,645	$ -	$ 7,667	$ 25,140	$ 136,601	**18%**
62	31628 76th Street	Dec-1998	747.7	$ 106,680	-1.0	$ 3,099	$ 2,786	$ -	$ 3,555	$ 9,440	$ 137,189	**7%**
63	32029 77th Street	Dec-1998	746.6	$ 79,800	0.2	$ 12,606	$ 7,468	$ 392	$ 9,354	$ 29,820	$ 100,017	**30%**
64	32018 77th Street	Dec-1998	747.5	$ 82,320	-0.6	$ 5,350	$ 3,697	$ -	$ 5,172	$ 14,220	$ 116,767	**12%**
65	31710 77th Street	Jan-1999	746.4	$ 107,100	0.4	$ 12,219	$ 6,771	$ 777	$ 7,380	$ 27,147	$ 139,792	**19%**
66	32143 77th Street	Mar-1999	747.0	$ 145,530	-0.1	$ 12,434	$ 6,578	$ -	$ 6,092	$ 25,104	$ 58,179	**43%**
11	32132 77th Street	Dec-1999	747.0	$ 84,000	-0.1	$ 10,233	$ 6,269	$ -	$ 7,728	$ 24,230	$ 90,458	**27%**
44	31422 76th Street	Dec-1999	746.8	$ 94,500	0.0	$ 12,540	$ 7,590	$ -	$ 8,217	$ 28,348	$ 117,619	**24%**
45	32034 77th Street	Dec-1999	745.5	$ 121,800	1.4	$ 32,180	$ 18,186	$ 3,347	$ 14,131	$ 67,844	$ 133,352	**51%**
12	31823 77th Street	Dec-1999	749.0	$ 102,900	-2.2	$ -	$ -	$ -	$ -	$ -	$ 116,432	**0%**
68	32015 77th Street	Dec-1999	748.5	$ 121,590	-1.7	$ 18,977	$ 13,826	$ -	$ 9,268	$ 42,072	$ 136,982	**31%**
67	31917 77th Street	Jan-2000	746.1	$ 68,355	0.7	$ 13,856	$ 8,004	$ 963	$ 11,366	$ 34,188	$ 30,097	**114%**
8	31805 71st Street	Jun-2000	748.0	$ 133,980	-0.9	$ 5,130	$ 4,147	$ -	$ 3,971	$ 13,248	$ 203,279	**7%**
16	31811 71st Street	Jun-2000	746.5	$ 63,000	0.6	$ 12,323	$ 7,141	$ 795	$ 11,046	$ 31,306	$ 93,912	**33%**
17	31519 77th Street	Jun-2000	745.8	$ 58,800	0.8	$ 12,679	$ 7,284	$ 984	$ 11,947	$ 32,895	$ 105,167	**31%**
18	6929 319th Avenue	Jun-2000	747.5	$ 73,500	-0.4	$ 6,951	$ 4,438	$ -	$ 6,502	$ 17,892	$ 98,058	**18%**
69	6921 319th Avenue	Jun-2000	748.0	$ 103,320	-0.9	$ 4,124	$ 3,286	$ -	$ 4,044	$ 11,454	$ 108,859	**11%**
73	441 S. Riverside Drive	Jun-2000	745.0	$ 105,840	0.8	$ 14,626	$ 8,291	$ 1,645	$ 8,464	$ 33,025	$ 131,060	**25%**
10	31638 76th Street	Jul-2000	747.6	$ 150,570	-0.9	$ 5,036	$ 1,835	$ -	$ 3,753	$ 10,624	$ 166,468	**6%**
14	8153 Shorewood Drive	Jul-2000	746.5	$ 78,750	-0.3	$ 5,698	$ 2,906	$ -	$ 5,503	$ 14,107	$ 115,113	**12%**
70	31214 77th Street	Sep-2000	747.0	$ 98,280	-0.4	$ 9,396	$ 5,987	$ -	$ 6,549	$ 21,933	$ 75,177	**29%**
1	6712 Wheatland Road	Dec-2000	750.5	$ 64,680	-3.2	$ -	$ -	$ -	$ -	$ -	$ 122,709	**0%**
71	6905 319th Avenue	Dec-2000	748.0	$ 138,915	-0.9	$ 5,552	$ 4,421	$ -	$ 4,046	$ 14,019	$ 136,356	**10%**
72	31705 71st Street	Jan-2001	747.0	$ 78,960	0.1	$ 11,360	$ 6,805	$ 160	$ 8,720	$ 27,045	$ 96,381	**28%**
29	31822 71st Street	Sep-2001	748.0	$ 139,125	-0.9	$ 5,340	$ 4,313	$ -	$ 3,975	$ 13,627	$ 146,597	**9%**
2	31809 77th Street	Oct-2001	748.0	$ 81,480	-1.3	$ 1,517	$ 1,456	$ -	$ 3,086	$ 6,059	$ 34,954	**17%**
4	31733 77th Street	Oct-2001	746.0	$ 98,070	0.7	$ 20,024	$ 11,559	$ 1,411	$ 11,432	$ 44,426	$ 35,951	**124%**
5	31826 77th Street	Oct-2001	748.5	$ 97,860	-1.7	$ 649	$ 623	$ -	$ 2,547	$ 3,818	$ 99,666	**4%**
7	31911 77th Street	Oct-2001	746.5	$ 75,810	0.3	$ 12,489	$ 7,365	$ 478	$ 9,658	$ 29,989	$ 83,304	**36%**
9	32114 77th Street	Oct-2001	749.5	$ 75,600	-2.6	$ -	$ -	$ -	$ -	$ -	$ 103,368	**0%**
28	31711 71st Street	Oct-2001	748.0	$ 60,060	-0.9	$ 2,172	$ 1,792	$ -	$ 3,875	$ 7,839	$ 113,134	**7%**

Table B.9 Part 2 of 2

Loss Estimation and ROI Calculations for May 2004 Event in Kenosha County

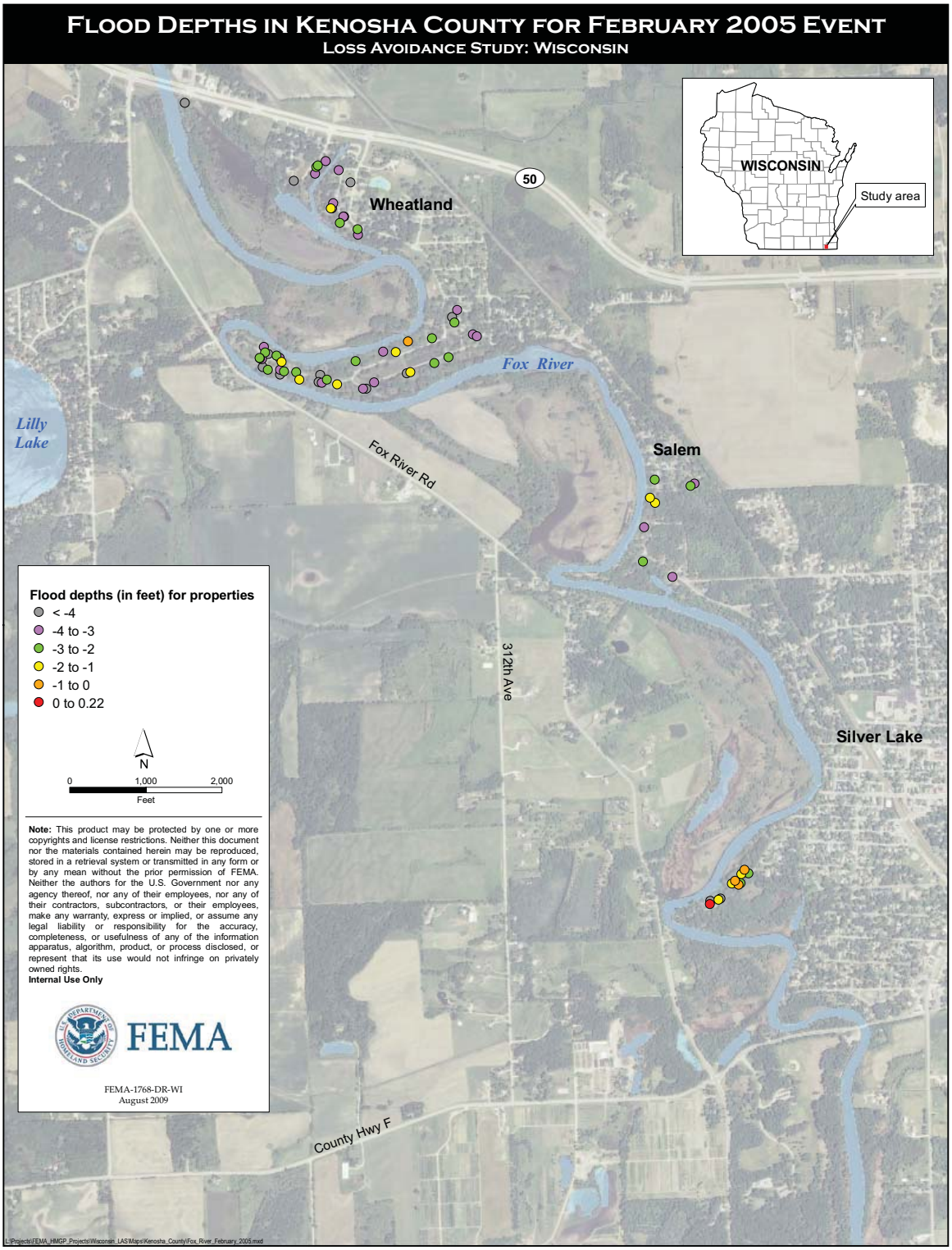
BLDG NO.	ADDRESS	ACQUISITION COMPLETION DATE	FFE (FT, NGVD)[1]	2009 BRV[2]	FLOOD DEPTH (FT)	BUILDING DAMAGE	CONTENTS DAMAGE	DISPLACEMENT COSTS	DISRUPTION COSTS	TOTAL LOSSES AVOIDED	PROJECT INVESTMENT[3]	RETURN ON INVESTMENT
23	6940 317th Avenue	Feb-2002	750.0	$ 58,800	-2.9	$ -	$ -	$ -	$ -	$ -	$ 130,769	0%
15	8200 No. Riverside Drive	Sep-2002	746.8	$ 63,000	-0.7	$ 3,385	$ 2,458	$ -	$ 4,665	$ 10,508	$ 130,863	8%
3	31417 77th Street	Oct-2002	746.0	$ 104,160	0.6	$ 19,947	$ 11,583	$ 1,228	$ 10,862	$ 43,620	$ 114,648	38%
13	32005 77th Street	Oct-2002	746.5	$ 75,600	0.3	$ 12,545	$ 7,392	$ 495	$ 9,712	$ 30,144	$ 119,677	25%
19	8032 Shorewood Drive	Oct-2002	745.0	$ 95,760	1.2	$ 24,407	$ 13,831	$ 2,426	$ 13,712	$ 54,376	$ 133,702	41%
24	31701 77th Street	Oct-2002	748.7	$ 79,800	-2.1	$ -	$ -	$ -	$ -	$ -	$ 82,325	0%
25	6912 318th Avenue	Oct-2002	748.0	$ 58,800	-0.9	$ 2,309	$ 1,850	$ -	$ 4,015	$ 8,175	$ 87,774	9%
20	31533 77th Street	Oct-2002	748.5	$ 56,070	-1.9	$ 176	$ 169	$ -	$ 2,390	$ 2,734	$ 42,029	7%
32	31709 77th Street	Jan-2003	747.6	$ 67,200	-1.0	$ 2,033	$ 1,797	$ -	$ 3,610	$ 7,440	$ 80,759	9%
34	7956 Shorewood Drive	Jan-2003	746.0	$ 63,525	0.3	$ 10,140	$ 6,001	$ 334	$ 9,428	$ 25,903	$ 111,428	23%
22	445 So. Riverside Drive	Feb-2003	746.2	$ 98,280	-0.4	$ 8,614	$ 5,578	$ -	$ 6,191	$ 20,383	$ 100,568	20%
30	31715 71st Street	May-2003	748.1	$ 58,800	-1.0	$ 1,491	$ 1,422	$ -	$ 3,389	$ 6,302	$ 86,360	7%
31	501 So. Riverside Drive	Oct-2003	745.4	$ 168,000	0.4	$ 19,258	$ 10,679	$ 1,250	$ 7,405	$ 38,592	$ 129,181	30%
21	607 So. Riverside Drive	Sep-2004	748.3	$ 74,970	-2.5	$ -	$ -	$ -	$ -	$ -	$ 108,830	0%
47	31627 71st Street	Aug-2005	747.0	$ 104,160	0.1	$ -	$ -	$ -	$ -	$ -	$ 140,789	0%
48	31315 77th Street	Aug-2005	746.0	$ 95,760	0.6	$ -	$ -	$ -	$ -	$ -	$ 153,438	0%
38	6913 319th Avenue	Dec-2005	747.0	$ 71,400	0.1	$ -	$ -	$ -	$ -	$ -	$ 1,348	0%
49	31602 76th Street	Dec-2005	746.1	$ 104,160	0.6	$ -	$ -	$ -	$ -	$ -	$ 142,351	0%
26	30522 80th Street	Jun-2006	746.0	$ 61,740	0.3	$ -	$ -	$ -	$ -	$ -	$ 110,106	0%
35	7536 313th Avenue	Jun-2006	748.0	$ 74,130	-1.1	$ -	$ -	$ -	$ -	$ -	$ 129,190	0%
36	511 S. Riverside Drive	Jun-2006	743.7	$ 51,660	2.1	$ -	$ -	$ -	$ -	$ -	$ 59,472	0%
37	606 Wisconsin Avenue	Jun-2006	743.0	$ 37,800	2.7	$ -	$ -	$ -	$ -	$ -	$ 114,398	0%
40	30510 80th Street	Jun-2006	747.5	$ 65,100	-1.2	$ -	$ -	$ -	$ -	$ -	$ 119,470	0%
39	7600 313th Street	Aug-2006	747.0	$ 64,680	-0.2	$ -	$ -	$ -	$ -	$ -	$ 96,803	0%
33	31901 71st Street	Jan-2007	750.8	$ 58,800	-3.7	$ -	$ -	$ -	$ -	$ -	$ 121,564	0%
41	7962 Shorewood Drive	Mar-2007	745.0	$ 65,520	1.3	$ -	$ -	$ -	$ -	$ -	$ 140,801	0%
42	31613 71st Street	Mar-2007	748.0	$ 107,730	-0.9	$ -	$ -	$ -	$ -	$ -	$ 163,558	0%
50	415 S. Riverside Drive	Feb-2008	744.0	$ 63,525	1.8	$ -	$ -	$ -	$ -	$ -	$ 125,544	0%
43	7522 313th Avenue	Jun-2008	749.0	$ 130,620	-2.2	$ -	$ -	$ -	$ -	$ -	$ 169,787	0%
					TOTAL	$ 509,699	$ 308,143	$ 25,480	$ 361,724	$ 1,205,046	$ 6,243,728	19%

[1] *Vertical datum information was not provided with the first floor elevation (FFE) information supplied by the county. Elevations were assumed to be relative to the National Geodetic Vertical Datum of 1929 (NGVD).*

[2] *Building replacement value (BRV) based on unit cost per square foot of living space for the county.*

[3] *Project investment costs for each event only include the project costs for the buildings that were included in the analysis for that event.*

Figure B.10


Flood Depths in Kenosha County for February 2005 Event
Loss Avoidance Study: Wisconsin
WISCONSIN
Study area
50
Wheatland
Fox River
Lilly Lake
Fox River Rd
Salem
312th Ave
Silver Lake
County Hwy F
Flood depths (in feet) for properties
< -4
-4 to -3
-3 to -2
-2 to -1
-1 to 0
0 to 0.22
N
0
1,000
2,000
Feet
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August 2009

Table B.10 Part 1 of 2

Loss Estimation and ROI Calculations for February 2005 Event in Kenosha County

BLDG NO.	ADDRESS	ACQUISITION COMPLETION DATE	FFE (FT, NGVD)[1]	2009 BRV[2]	FLOOD DEPTH (FT)	BUILDING DAMAGE	CONTENTS DAMAGE	DISPLACEMENT COSTS	DISRUPTION COSTS	TOTAL LOSSES AVOIDED	PROJECT INVESTMENT[3]	RETURN ON INVESTMENT
51	32139 77th Street	Jul-1995	747.0	$ 134,820	-2.8	$ -	$ -	$ -	$ -	$ -	$ 135,493	0%
52	32129 77th Street	Jul-1995	747.9	$ 95,760	-3.7	$ -	$ -	$ -	$ -	$ -	$ 121,895	0%
53	437 S. Riverside Drive	Jul-1995	744.0	$ 85,680	-0.8	$ 4,189	$ 3,127	$ -	$ 4,448	$ 11,763	$ 121,453	10%
54	601 S. Riverside Drive	Jul-1995	749.0	$ 107,835	-5.8	$ -	$ -	$ -	$ -	$ -	$ 123,925	0%
55	8106 Shorewood Drive	Jul-1995	746.7	$ 95,760	-3.2	$ -	$ -	$ -	$ -	$ -	$ 127,728	0%
56	31524 76th Street	Sep-1995	745.1	$ 70,560	-1.0	$ 1,699	$ 1,631	$ -	$ 3,332	$ 6,662	$ 116,379	6%
57	31217 77th Street	Feb-1996	747.0	$ 75,600	-3.1	$ -	$ -	$ -	$ -	$ -	$ 124,635	0%
58	32041 77th Street	Feb-1996	750.7	$ 87,360	-6.5	$ -	$ -	$ -	$ -	$ -	$ 117,107	0%
60	419 S. Riverside Drive	Oct-1996	745.0	$ 78,750	-1.8	$ 525	$ 175	$ -	$ 2,549	$ 3,249	$ 7,841	41%
59	32104 77th Street	Nov-1996	748.0	$ 176,190	-3.8	$ -	$ -	$ -	$ -	$ -	$ 185,843	0%
61	32028 77th Street	Apr-1997	747.0	$ 89,880	-2.8	$ -	$ -	$ -	$ -	$ -	$ 136,601	0%
62	31628 76th Street	Dec-1998	747.7	$ 106,680	-3.7	$ -	$ -	$ -	$ -	$ -	$ 137,189	0%
63	32029 77th Street	Dec-1998	746.6	$ 79,800	-2.4	$ -	$ -	$ -	$ -	$ -	$ 100,017	0%
64	32018 77th Street	Dec-1998	747.5	$ 82,320	-3.3	$ -	$ -	$ -	$ -	$ -	$ 116,767	0%
65	31710 77th Street	Jan-1999	746.4	$ 107,100	-2.4	$ -	$ -	$ -	$ -	$ -	$ 139,792	0%
66	32143 77th Street	Mar-1999	747.0	$ 145,530	-2.8	$ -	$ -	$ -	$ -	$ -	$ 58,179	0%
11	32132 77th Street	Dec-1999	747.0	$ 84,000	-2.8	$ -	$ -	$ -	$ -	$ -	$ 90,458	0%
44	31422 76th Street	Dec-1999	746.8	$ 94,500	-2.7	$ -	$ -	$ -	$ -	$ -	$ 117,619	0%
45	32034 77th Street	Dec-1999	745.5	$ 121,800	-1.3	$ 2,070	$ 1,987	$ -	$ 3,013	$ 7,071	$ 133,352	5%
12	31823 77th Street	Dec-1999	749.0	$ 102,900	-5.0	$ -	$ -	$ -	$ -	$ -	$ 116,432	0%
68	32015 77th Street	Dec-1999	748.5	$ 121,590	-4.4	$ -	$ -	$ -	$ -	$ -	$ 136,982	0%
67	31917 77th Street	Jan-2000	746.1	$ 68,355	-2.0	$ -	$ -	$ -	$ -	$ -	$ 30,097	0%
8	31805 71st Street	Jun-2000	748.0	$ 133,980	-3.5	$ -	$ -	$ -	$ -	$ -	$ 203,279	0%
16	31811 71st Street	Jun-2000	746.5	$ 63,000	-2.0	$ 65	$ 63	$ -	$ 2,295	$ 2,423	$ 93,912	3%
17	31519 77th Street	Jun-2000	745.8	$ 58,800	-1.9	$ 86	$ 82	$ -	$ 2,314	$ 2,482	$ 105,167	2%
18	6929 319th Avenue	Jun-2000	747.5	$ 73,500	-2.9	$ -	$ -	$ -	$ -	$ -	$ 98,058	0%
69	6921 319th Avenue	Jun-2000	748.0	$ 103,320	-3.4	$ -	$ -	$ -	$ -	$ -	$ 108,859	0%
73	441 S. Riverside Drive	Jun-2000	745.0	$ 105,840	-1.8	$ 689	$ 230	$ -	$ 2,541	$ 3,460	$ 131,060	3%
10	31638 76th Street	Jul-2000	747.6	$ 150,570	-3.7	$ -	$ -	$ -	$ -	$ -	$ 166,468	0%
14	8153 Shorewood Drive	Jul-2000	746.5	$ 78,750	-3.0	$ -	$ -	$ -	$ -	$ -	$ 115,113	0%
70	31214 77th Street	Sep-2000	747.0	$ 98,280	-3.1	$ -	$ -	$ -	$ -	$ -	$ 75,177	0%
1	6712 Wheatland Road	Dec-2000	750.5	$ 64,680	-5.9	$ -	$ -	$ -	$ -	$ -	$ 122,709	0%
71	6905 319th Avenue	Dec-2000	748.0	$ 138,915	-3.4	$ -	$ -	$ -	$ -	$ -	$ 136,356	0%
72	31705 71st Street	Jan-2001	747.0	$ 78,960	-2.5	$ -	$ -	$ -	$ -	$ -	$ 96,381	0%
29	31822 71st Street	Sep-2001	748.0	$ 139,125	-3.5	$ -	$ -	$ -	$ -	$ -	$ 146,597	0%
2	31809 77th Street	Oct-2001	748.0	$ 81,480	-4.0	$ -	$ -	$ -	$ -	$ -	$ 34,954	0%
4	31733 77th Street	Oct-2001	746.0	$ 98,070	-2.0	$ -	$ -	$ -	$ -	$ -	$ 35,951	0%
5	31826 77th Street	Oct-2001	748.5	$ 97,860	-4.4	$ -	$ -	$ -	$ -	$ -	$ 99,666	0%
7	31911 77th Street	Oct-2001	746.5	$ 75,810	-2.4	$ -	$ -	$ -	$ -	$ -	$ 83,304	0%
9	32114 77th Street	Oct-2001	749.5	$ 75,600	-5.3	$ -	$ -	$ -	$ -	$ -	$ 103,368	0%
28	31711 71st Street	Oct-2001	748.0	$ 60,060	-3.5	$ -	$ -	$ -	$ -	$ -	$ 113,134	0%

Table B.10 Part 2 of 2

Loss Estimation and ROI Calculations for February 2005 Event in Kenosha County

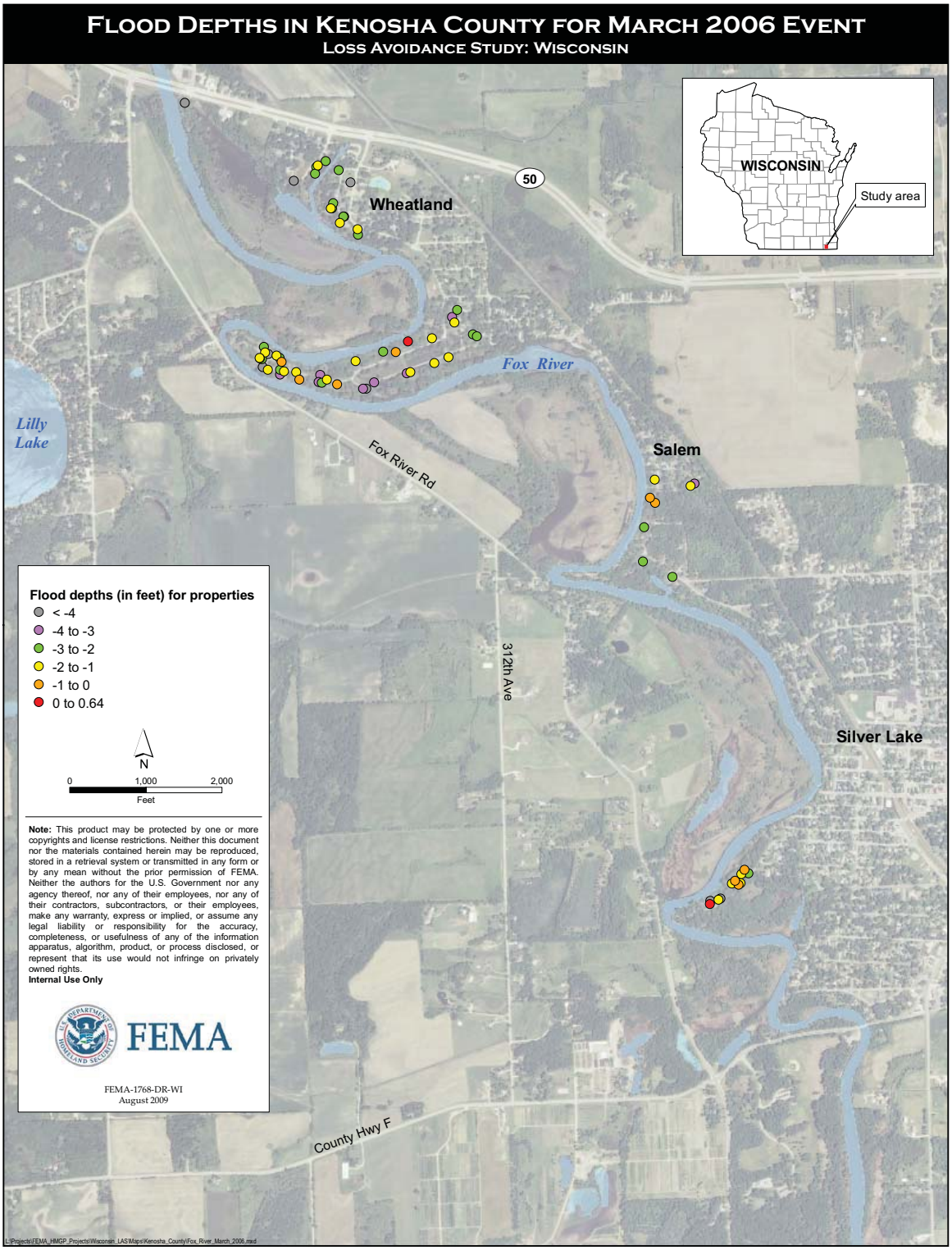
BLDG NO.	ADDRESS	ACQUISITION COMPLETION DATE	FFE (FT, NGVD)[1]	2009 BRV[2]	FLOOD DEPTH (FT)	BUILDING DAMAGE	CONTENTS DAMAGE	DISPLACEMENT COSTS	DISRUPTION COSTS	TOTAL LOSSES AVOIDED	PROJECT INVESTMENT[3]	RETURN ON INVESTMENT
23	6940 317th Avenue	Feb-2002	750.0	$ 58,800	-5.5	$ -	$ -	$ -	$ -	$ -	$ 130,769	0%
15	8200 No. Riverside Drive	Sep-2002	746.8	$ 63,000	-3.4	$ -	$ -	$ -	$ -	$ -	$ 130,863	0%
3	31417 77th Street	Oct-2002	746.0	$ 104,160	-2.2	$ -	$ -	$ -	$ -	$ -	$ 114,648	0%
13	32005 77th Street	Oct-2002	746.5	$ 75,600	-2.4	$ -	$ -	$ -	$ -	$ -	$ 119,677	0%
19	8032 Shorewood Drive	Oct-2002	745.0	$ 95,760	-1.5	$ 1,301	$ 1,249	$ -	$ 2,860	$ 5,409	$ 133,702	4%
24	31701 77th Street	Oct-2002	748.7	$ 79,800	-4.8	$ -	$ -	$ -	$ -	$ -	$ 82,325	0%
25	6912 318th Avenue	Oct-2002	748.0	$ 58,800	-3.5	$ -	$ -	$ -	$ -	$ -	$ 87,774	0%
20	31533 77th Street	Oct-2002	748.5	$ 56,070	-4.6	$ -	$ -	$ -	$ -	$ -	$ 42,029	0%
32	31709 77th Street	Jan-2003	747.6	$ 67,200	-3.7	$ -	$ -	$ -	$ -	$ -	$ 80,759	0%
34	7956 Shorewood Drive	Jan-2003	746.0	$ 63,525	-2.4	$ -	$ -	$ -	$ -	$ -	$ 111,428	0%
22	445 So. Riverside Drive	Feb-2003	746.2	$ 98,280	-3.0	$ -	$ -	$ -	$ -	$ -	$ 100,568	0%
30	31715 71st Street	May-2003	748.1	$ 58,800	-3.6	$ -	$ -	$ -	$ -	$ -	$ 86,360	0%
31	501 So. Riverside Drive	Oct-2003	745.4	$ 168,000	-2.2	$ -	$ -	$ -	$ -	$ -	$ 129,181	0%
21	607 So. Riverside Drive	Sep-2004	748.3	$ 74,970	-5.1	$ -	$ -	$ -	$ -	$ -	$ 108,830	0%
47	31627 71st Street	Aug-2005	747.0	$ 104,160	-2.5	$ -	$ -	$ -	$ -	$ -	$ 140,789	0%
48	31315 77th Street	Aug-2005	746.0	$ 95,760	-2.2	$ -	$ -	$ -	$ -	$ -	$ 153,438	0%
38	6913 319th Avenue	Dec-2005	747.0	$ 71,400	-2.4	$ -	$ -	$ -	$ -	$ -	$ 1,348	0%
49	31602 76th Street	Dec-2005	746.1	$ 104,160	-2.1	$ -	$ -	$ -	$ -	$ -	$ 142,351	0%
26	30522 80th Street	Jun-2006	746.0	$ 61,740	-2.5	$ -	$ -	$ -	$ -	$ -	$ 110,106	0%
35	7536 313th Avenue	Jun-2006	748.0	$ 74,130	-3.8	$ -	$ -	$ -	$ -	$ -	$ 129,190	0%
36	511 S. Riverside Drive	Jun-2006	743.7	$ 51,660	-0.5	$ -	$ -	$ -	$ -	$ -	$ 59,472	0%
37	606 Wisconsin Avenue	Jun-2006	743.0	$ 37,800	0.2	$ -	$ -	$ -	$ -	$ -	$ 114,398	0%
40	30510 80th Street	Jun-2006	747.5	$ 65,100	-4.0	$ -	$ -	$ -	$ -	$ -	$ 119,470	0%
39	7600 313th Street	Aug-2006	747.0	$ 64,680	-2.9	$ -	$ -	$ -	$ -	$ -	$ 96,803	0%
33	31901 71st Street	Jan-2007	750.8	$ 58,800	-6.2	$ -	$ -	$ -	$ -	$ -	$ 121,564	0%
41	7962 Shorewood Drive	Mar-2007	745.0	$ 65,520	-1.5	$ -	$ -	$ -	$ -	$ -	$ 140,801	0%
42	31613 71st Street	Mar-2007	748.0	$ 107,730	-3.5	$ -	$ -	$ -	$ -	$ -	$ 163,558	0%
50	415 S. Riverside Drive	Feb-2008	744.0	$ 63,525	-0.8	$ -	$ -	$ -	$ -	$ -	$ 125,544	0%
43	7522 313th Avenue	Jun-2008	749.0	$ 130,620	-4.8	$ -	$ -	$ -	$ -	$ -	$ 169,787	0%
					TOTAL	$ 11,468	$ 8,825	$ -	$ 25,877	$ 46,169	$ 6,352,558	1%

[1] *Vertical datum information was not provided with the first floor elevation (FFE) information supplied by the county. Elevations were assumed to be relative to the National Geodetic Vertical Datum of 1929 (NGVD).*

[2] *Building replacement value (BRV) based on unit cost per square foot of living space for the county.*

[3] *Project investment costs for each event only include the project costs for the buildings that were included in the analysis for that event.*

Figure B.11


Flood Depths in Kenosha County for March 2006 Event
Loss Avoidance Study: Wisconsin
WISCONSIN
Study area
50
Wheatland
Fox River
Lilly Lake
Fox River Rd
Salem
312th Ave
Silver Lake
County Hwy F
Flood depths (in feet) for properties
< -4
-4 to -3
-3 to -2
-2 to -1
-1 to 0
0 to 0.64
N
0
1,000
2,000
Feet
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August 2009

Table B.11 Part 1 of 2

Loss Estimation and ROI Calculations for March 2006 Event in Kenosha County

BLDG NO.	ADDRESS	ACQUISITION COMPLETION DATE	FFE (FT, NGVD)[1]	2009 BRV[2]	FLOOD DEPTH (FT)	BUILDING DAMAGE	CONTENTS DAMAGE	DISPLACEMENT COSTS	DISRUPTION COSTS	TOTAL LOSSES AVOIDED	PROJECT INVESTMENT[3]	RETURN ON INVESTMENT
51	32139 77th Street	Jul-1995	747.0	$ 134,820	-2.0	$ -	$ -	$ -	$ -	$ -	$ 135,493	0%
52	32129 77th Street	Jul-1995	747.9	$ 95,760	-2.9	$ -	$ -	$ -	$ -	$ -	$ 121,895	0%
53	437 S. Riverside Drive	Jul-1995	744.0	$ 85,680	-0.4	$ 8,107	$ 5,176	$ -	$ 6,504	$ 19,787	$ 121,453	16%
54	601 S. Riverside Drive	Jul-1995	749.0	$ 107,835	-5.4	$ -	$ -	$ -	$ -	$ -	$ 123,925	0%
55	8106 Shorewood Drive	Jul-1995	746.7	$ 95,760	-2.6	$ -	$ -	$ -	$ -	$ -	$ 127,728	0%
56	31524 76th Street	Sep-1995	745.1	$ 70,560	-0.3	$ 7,141	$ 4,505	$ -	$ 6,801	$ 18,447	$ 116,379	16%
57	31217 77th Street	Feb-1996	747.0	$ 75,600	-2.4	$ -	$ -	$ -	$ -	$ -	$ 124,635	0%
58	32041 77th Street	Feb-1996	750.7	$ 87,360	-5.8	$ -	$ -	$ -	$ -	$ -	$ 117,107	0%
60	419 S. Riverside Drive	Oct-1996	745.0	$ 78,750	-1.4	$ 1,520	$ 507	$ -	$ 3,117	$ 5,144	$ 7,841	66%
59	32104 77th Street	Nov-1996	748.0	$ 176,190	-3.0	$ -	$ -	$ -	$ -	$ -	$ 185,843	0%
61	32028 77th Street	Apr-1997	747.0	$ 89,880	-2.0	$ -	$ -	$ -	$ -	$ -	$ 136,601	0%
62	31628 76th Street	Dec-1998	747.7	$ 106,680	-3.0	$ -	$ -	$ -	$ -	$ -	$ 137,189	0%
63	32029 77th Street	Dec-1998	746.6	$ 79,800	-1.7	$ 621	$ 596	$ -	$ 2,599	$ 3,816	$ 100,017	4%
64	32018 77th Street	Dec-1998	747.5	$ 82,320	-2.5	$ -	$ -	$ -	$ -	$ -	$ 116,767	0%
65	31710 77th Street	Jan-1999	746.4	$ 107,100	-1.6	$ 1,197	$ 399	$ -	$ 2,751	$ 4,347	$ 139,792	3%
66	32143 77th Street	Mar-1999	747.0	$ 145,530	-2.0	$ -	$ -	$ -	$ -	$ -	$ 58,179	0%
11	32132 77th Street	Dec-1999	747.0	$ 84,000	-2.0	$ -	$ -	$ -	$ -	$ -	$ 90,458	0%
44	31422 76th Street	Dec-1999	746.8	$ 94,500	-2.0	$ 54	$ 52	$ -	$ 2,274	$ 2,380	$ 117,619	2%
45	32034 77th Street	Dec-1999	745.5	$ 121,800	-0.6	$ 8,775	$ 5,920	$ -	$ 5,489	$ 20,184	$ 133,352	15%
12	31823 77th Street	Dec-1999	749.0	$ 102,900	-4.2	$ -	$ -	$ -	$ -	$ -	$ 116,432	0%
68	32015 77th Street	Dec-1999	748.5	$ 121,590	-3.6	$ -	$ -	$ -	$ -	$ -	$ 136,982	0%
67	31917 77th Street	Jan-2000	746.1	$ 68,355	-1.3	$ 1,252	$ 1,202	$ -	$ 3,072	$ 5,525	$ 30,097	18%
8	31805 71st Street	Jun-2000	748.0	$ 133,980	-2.7	$ -	$ -	$ -	$ -	$ -	$ 203,279	0%
16	31811 71st Street	Jun-2000	746.5	$ 63,000	-1.2	$ 1,326	$ 1,273	$ -	$ 3,196	$ 5,796	$ 93,912	6%
17	31519 77th Street	Jun-2000	745.8	$ 58,800	-1.2	$ 1,119	$ 1,074	$ -	$ 3,105	$ 5,297	$ 105,167	5%
18	6929 319th Avenue	Jun-2000	747.5	$ 73,500	-2.1	$ -	$ -	$ -	$ -	$ -	$ 98,058	0%
69	6921 319th Avenue	Jun-2000	748.0	$ 103,320	-2.6	$ -	$ -	$ -	$ -	$ -	$ 108,859	0%
73	441 S. Riverside Drive	Jun-2000	745.0	$ 105,840	-1.4	$ 2,017	$ 672	$ -	$ 3,106	$ 5,796	$ 131,060	4%
10	31638 76th Street	Jul-2000	747.6	$ 150,570	-3.0	$ -	$ -	$ -	$ -	$ -	$ 166,468	0%
14	8153 Shorewood Drive	Jul-2000	746.5	$ 78,750	-2.5	$ -	$ -	$ -	$ -	$ -	$ 115,113	0%
70	31214 77th Street	Sep-2000	747.0	$ 98,280	-2.4	$ -	$ -	$ -	$ -	$ -	$ 75,177	0%
1	6712 Wheatland Road	Dec-2000	750.5	$ 64,680	-5.0	$ -	$ -	$ -	$ -	$ -	$ 122,709	0%
71	6905 319th Avenue	Dec-2000	748.0	$ 138,915	-2.6	$ -	$ -	$ -	$ -	$ -	$ 136,356	0%
72	31705 71st Street	Jan-2001	747.0	$ 78,960	-1.7	$ 621	$ 596	$ -	$ 2,603	$ 3,820	$ 96,381	4%
29	31822 71st Street	Sep-2001	748.0	$ 139,125	-2.7	$ -	$ -	$ -	$ -	$ -	$ 146,597	0%
2	31809 77th Street	Oct-2001	748.0	$ 81,480	-3.2	$ -	$ -	$ -	$ -	$ -	$ 34,954	0%
4	31733 77th Street	Oct-2001	746.0	$ 98,070	-1.3	$ 1,699	$ 1,631	$ -	$ 3,028	$ 6,358	$ 35,951	18%
5	31826 77th Street	Oct-2001	748.5	$ 97,860	-3.7	$ -	$ -	$ -	$ -	$ -	$ 99,666	0%
7	31911 77th Street	Oct-2001	746.5	$ 75,810	-1.6	$ 681	$ 654	$ -	$ 2,653	$ 3,988	$ 83,304	5%
9	32114 77th Street	Oct-2001	749.5	$ 75,600	-4.5	$ -	$ -	$ -	$ -	$ -	$ 103,368	0%
28	31711 71st Street	Oct-2001	748.0	$ 60,060	-2.7	$ -	$ -	$ -	$ -	$ -	$ 113,134	0%

Table B.11 Part 2 of 2

Loss Estimation and ROI Calculations for March 2006 Event in Kenosha County

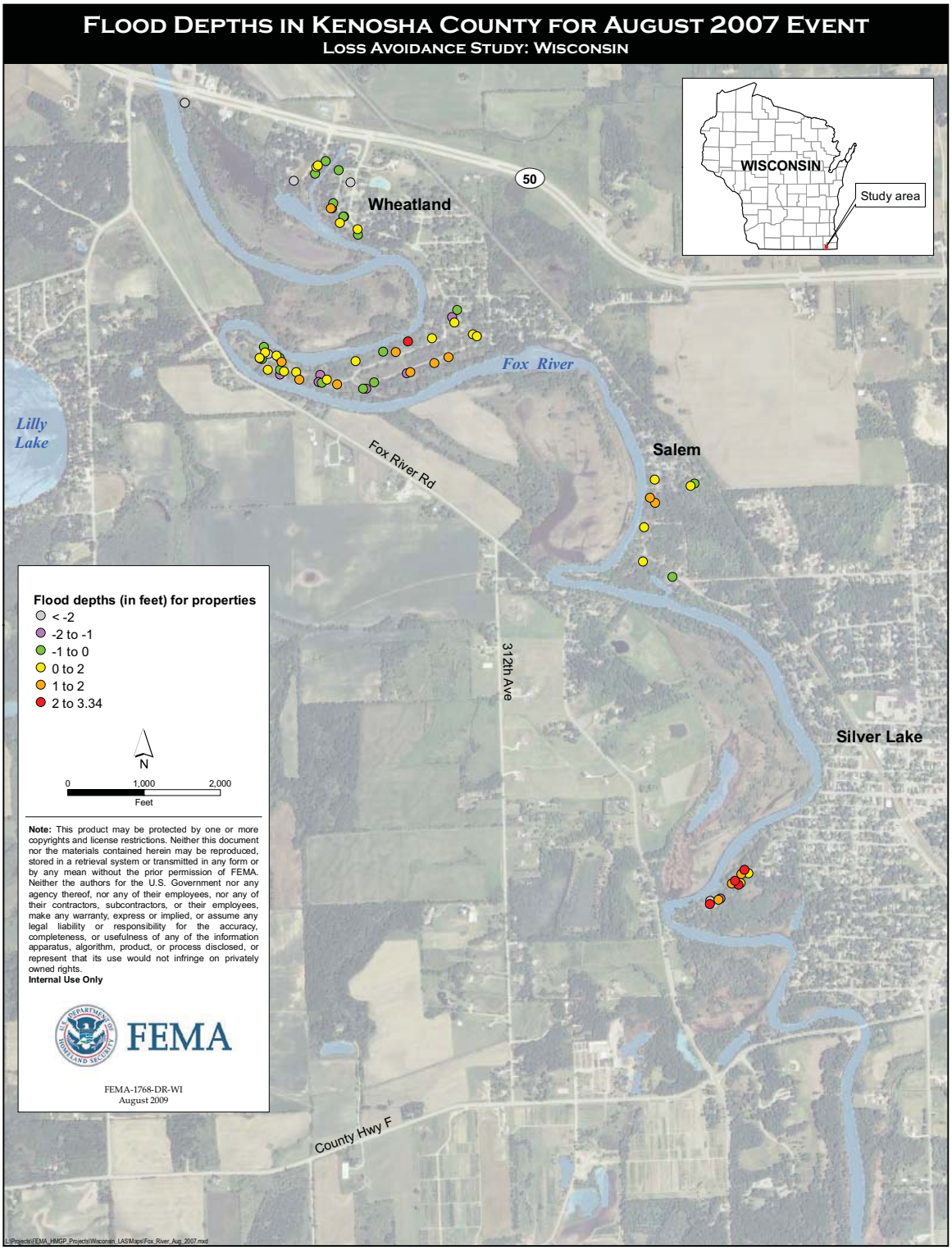
BLDG NO.	ADDRESS	ACQUISITION COMPLETION DATE	FFE (FT, NGVD)[1]	2009 BRV[2]	FLOOD DEPTH (FT)	BUILDING DAMAGE	CONTENTS DAMAGE	DISPLACEMENT COSTS	DISRUPTION COSTS	TOTAL LOSSES AVOIDED	PROJECT INVESTMENT[3]	RETURN ON INVESTMENT
23	6940 317th Avenue	Feb-2002	750.0	$ 58,800	-4.7	$ -	$ -	$ -	$ -	$ -	$ 130,769	0%
15	8200 No. Riverside Drive	Sep-2002	746.8	$ 63,000	-2.9	$ -	$ -	$ -	$ -	$ -	$ 130,863	0%
3	31417 77th Street	Oct-2002	746.0	$ 104,160	-1.5	$ 1,321	$ 1,268	$ -	$ 2,819	$ 5,408	$ 114,648	5%
13	32005 77th Street	Oct-2002	746.5	$ 75,600	-1.6	$ 717	$ 688	$ -	$ 2,675	$ 4,080	$ 119,677	3%
19	8032 Shorewood Drive	Oct-2002	745.0	$ 95,760	-0.9	$ 3,625	$ 2,942	$ -	$ 3,951	$ 10,518	$ 133,702	8%
24	31701 77th Street	Oct-2002	748.7	$ 79,800	-4.1	$ -	$ -	$ -	$ -	$ -	$ 82,325	0%
25	6912 318th Avenue	Oct-2002	748.0	$ 58,800	-2.6	$ -	$ -	$ -	$ -	$ -	$ 87,774	0%
20	31533 77th Street	Oct-2002	748.5	$ 56,070	-3.9	$ -	$ -	$ -	$ -	$ -	$ 42,029	0%
32	31709 77th Street	Jan-2003	747.6	$ 67,200	-3.0	$ -	$ -	$ -	$ -	$ -	$ 80,759	0%
34	7956 Shorewood Drive	Jan-2003	746.0	$ 63,525	-1.9	$ 212	$ 203	$ -	$ 2,399	$ 2,813	$ 111,428	3%
22	445 So. Riverside Drive	Feb-2003	746.2	$ 98,280	-2.6	$ -	$ -	$ -	$ -	$ -	$ 100,568	0%
30	31715 71st Street	May-2003	748.1	$ 58,800	-2.8	$ -	$ -	$ -	$ -	$ -	$ 86,360	0%
31	501 So. Riverside Drive	Oct-2003	745.4	$ 168,000	-1.8	$ 1,191	$ 397	$ -	$ 2,568	$ 4,155	$ 129,181	3%
21	607 So. Riverside Drive	Sep-2004	748.3	$ 74,970	-4.7	$ -	$ -	$ -	$ -	$ -	$ 108,830	0%
47	31627 71st Street	Aug-2005	747.0	$ 104,160	-1.7	$ 743	$ 713	$ -	$ 2,570	$ 4,025	$ 140,789	3%
48	31315 77th Street	Aug-2005	746.0	$ 95,760	-1.5	$ 1,212	$ 1,163	$ -	$ 2,818	$ 5,193	$ 153,438	3%
38	6913 319th Avenue	Dec-2005	747.0	$ 71,400	-1.6	$ -	$ -	$ -	$ -	$ -	$ 1,348	0%
49	31602 76th Street	Dec-2005	746.1	$ 104,160	-1.4	$ 1,617	$ 1,552	$ -	$ 2,947	$ 6,115	$ 142,351	4%
26	30522 80th Street	Jun-2006	746.0	$ 61,740	-1.9	$ -	$ -	$ -	$ -	$ -	$ 110,106	0%
35	7536 313th Avenue	Jun-2006	748.0	$ 74,130	-3.0	$ -	$ -	$ -	$ -	$ -	$ 129,190	0%
36	511 S. Riverside Drive	Jun-2006	743.7	$ 51,660	-0.1	$ -	$ -	$ -	$ -	$ -	$ 59,472	0%
37	606 Wisconsin Avenue	Jun-2006	743.0	$ 37,800	0.6	$ -	$ -	$ -	$ -	$ -	$ 114,398	0%
40	30510 80th Street	Jun-2006	747.5	$ 65,100	-3.4	$ -	$ -	$ -	$ -	$ -	$ 119,470	0%
39	7600 313th Street	Aug-2006	747.0	$ 64,680	-2.1	$ -	$ -	$ -	$ -	$ -	$ 96,803	0%
33	31901 71st Street	Jan-2007	750.8	$ 58,800	-5.4	$ -	$ -	$ -	$ -	$ -	$ 121,564	0%
41	7962 Shorewood Drive	Mar-2007	745.0	$ 65,520	-0.9	$ -	$ -	$ -	$ -	$ -	$ 140,801	0%
42	31613 71st Street	Mar-2007	748.0	$ 107,730	-2.7	$ -	$ -	$ -	$ -	$ -	$ 163,558	0%
50	415 S. Riverside Drive	Feb-2008	744.0	$ 63,525	-0.4	$ -	$ -	$ -	$ -	$ -	$ 125,544	0%
43	7522 313th Avenue	Jun-2008	749.0	$ 130,620	-4.1	$ -	$ -	$ -	$ -	$ -	$ 169,787	0%
					TOTAL	$ 49,311	$ 34,031	$ -	$ 76,126	$ 159,468	$ 6,790,484	2%

[1] *Vertical datum information was not provided with the first floor elevation (FFE) information supplied by the county. Elevations were assumed to be relative to the National Geodetic Vertical Datum of 1929 (NGVD).*

[2] *Building replacement value (BRV) based on unit cost per square foot of living space for the county.*

[3] *Project investment costs for each event only include the project costs for the buildings that were included in the analysis for that event.*

Figure B.12


Flood Depths in Kenosha County for August 2007 Event
Loss Avoidance Study: Wisconsin
WISCONSIN
Study area
50
Wheatland
Fox River
Lilly Lake
Fox River Rd
Salem
312th Ave
Silver Lake
County Hwy F
Flood depths (in feet) for properties
< -2
-2 to -1
-1 to 0
0 to 2
1 to 2
2 to 3.34
N
0
1,000
2,000
Feet
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FEMA
FEMA-1768-DR-WI
August 2009

Table B.12 Part 1 of 2

Loss Estimation and ROI Calculations for August 2007 Event in Kenosha County

BLDG NO.	ADDRESS	ACQUISITION COMPLETION DATE	FFE (FT, NGVD)[1]	2009 BRV[2]	FLOOD DEPTH (FT)	BUILDING DAMAGE	CONTENTS DAMAGE	DISPLACEMENT COSTS	DISRUPTION COSTS	TOTAL LOSSES AVOIDED	PROJECT INVESTMENT[3]	RETURN ON INVESTMENT
51	32139 77th Street	Jul-1995	747.0	$ 134,820	0.4	$ 22,858	$ 13,437	$ 982	$ 9,874	$ 47,152	$ 135,493	**35%**
52	32129 77th Street	Jul-1995	747.9	$ 95,760	-0.5	$ 7,108	$ 4,763	$ -	$ 5,587	$ 17,458	$ 121,895	**14%**
53	437 S. Riverside Drive	Jul-1995	744.0	$ 85,680	2.3	$ 29,826	$ 16,527	$ 4,066	$ 17,905	$ 68,324	$ 121,453	**56%**
54	601 S. Riverside Drive	Jul-1995	749.0	$ 107,835	-2.7	$ 4,745	$ 3,610	$ -	$ 4,228	$ 12,583	$ 123,925	**10%**
55	8106 Shorewood Drive	Jul-1995	746.7	$ 95,760	0.1	$ 13,664	$ 8,194	$ 171	$ 8,667	$ 30,695	$ 127,728	**24%**
56	31524 76th Street	Sep-1995	745.1	$ 70,560	2.2	$ 23,582	$ 13,108	$ 3,100	$ 17,280	$ 57,070	$ 116,379	**49%**
57	31217 77th Street	Feb-1996	747.0	$ 75,600	0.2	$ 11,490	$ 6,838	$ 279	$ 9,084	$ 27,691	$ 124,635	**22%**
58	32041 77th Street	Feb-1996	750.7	$ 87,360	-3.4	$ -	$ -	$ -	$ -	$ -	$ 117,107	**0%**
60	419 S. Riverside Drive	Oct-1996	745.0	$ 78,750	1.3	$ 13,512	$ 7,798	$ 2,147	$ 9,966	$ 33,423	$ 7,841	**426%**
59	32104 77th Street	Nov-1996	748.0	$ 176,190	-0.6	$ 9,451	$ 4,407	$ -	$ 4,661	$ 18,519	$ 185,843	**10%**
61	32028 77th Street	Apr-1997	747.0	$ 89,880	0.4	$ 15,186	$ 8,931	$ 644	$ 9,848	$ 34,609	$ 136,601	**25%**
62	31628 76th Street	Dec-1998	747.7	$ 106,680	-0.5	$ 8,872	$ 5,805	$ -	$ 5,989	$ 20,667	$ 137,189	**15%**
63	32029 77th Street	Dec-1998	746.6	$ 79,800	0.7	$ 16,413	$ 9,468	$ 1,172	$ 11,499	$ 38,553	$ 100,017	**39%**
64	32018 77th Street	Dec-1998	747.5	$ 82,320	-0.2	$ 9,644	$ 5,943	$ -	$ 7,518	$ 23,104	$ 116,767	**20%**
65	31710 77th Street	Jan-1999	746.4	$ 107,100	0.9	$ 15,339	$ 8,728	$ 1,850	$ 8,690	$ 34,606	$ 139,792	**25%**
66	32143 77th Street	Mar-1999	747.0	$ 145,530	0.4	$ 16,597	$ 9,197	$ 1,053	$ 7,378	$ 34,225	$ 58,179	**59%**
11	32132 77th Street	Dec-1999	747.0	$ 84,000	0.4	$ 14,281	$ 8,393	$ 620	$ 9,895	$ 33,190	$ 90,458	**37%**
44	31422 76th Street	Dec-1999	746.8	$ 94,500	0.5	$ 17,131	$ 10,001	$ 916	$ 10,402	$ 38,449	$ 117,619	**33%**
45	32034 77th Street	Dec-1999	745.5	$ 121,800	1.8	$ 37,327	$ 20,876	$ 4,534	$ 16,032	$ 78,769	$ 133,352	**59%**
12	31823 77th Street	Dec-1999	749.0	$ 102,900	-1.8	$ 634	$ 609	$ -	$ 2,526	$ 3,769	$ 116,432	**3%**
68	32015 77th Street	Dec-1999	748.5	$ 121,590	-1.2	$ 22,277	$ 15,417	$ -	$ 10,489	$ 48,183	$ 136,982	**35%**
67	31917 77th Street	Jan-2000	746.1	$ 68,355	1.2	$ 17,025	$ 9,665	$ 1,640	$ 13,451	$ 41,782	$ 30,097	**139%**
8	31805 71st Street	Jun-2000	748.0	$ 133,980	-0.4	$ 11,711	$ 7,588	$ -	$ 6,180	$ 25,480	$ 203,279	**13%**
16	31811 71st Street	Jun-2000	746.5	$ 63,000	1.1	$ 15,083	$ 8,590	$ 1,371	$ 13,017	$ 38,062	$ 93,912	**41%**
17	31519 77th Street	Jun-2000	745.8	$ 58,800	1.3	$ 15,444	$ 8,732	$ 1,595	$ 14,062	$ 39,833	$ 105,167	**38%**
18	6929 319th Avenue	Jun-2000	747.5	$ 73,500	0.1	$ 10,536	$ 6,314	$ 141	$ 8,696	$ 25,687	$ 98,058	**26%**
69	6921 319th Avenue	Jun-2000	748.0	$ 103,320	-0.4	$ 9,256	$ 5,969	$ -	$ 6,278	$ 21,503	$ 108,859	**20%**
73	441 S. Riverside Drive	Jun-2000	745.0	$ 105,840	1.3	$ 18,114	$ 10,452	$ 2,869	$ 9,946	$ 41,381	$ 131,060	**32%**
10	31638 76th Street	Jul-2000	747.6	$ 150,570	-0.4	$ 9,854	$ 4,894	$ -	$ 5,192	$ 19,941	$ 166,468	**12%**
14	8153 Shorewood Drive	Jul-2000	746.5	$ 78,750	0.2	$ 8,357	$ 4,586	$ 355	$ 7,022	$ 20,320	$ 115,113	**18%**
70	31214 77th Street	Sep-2000	747.0	$ 98,280	0.2	$ 14,694	$ 8,761	$ 312	$ 8,973	$ 32,741	$ 75,177	**44%**
1	6712 Wheatland Road	Dec-2000	750.5	$ 64,680	-2.8	$ -	$ -	$ -	$ -	$ -	$ 122,709	**0%**
71	6905 319th Avenue	Dec-2000	748.0	$ 138,915	-0.4	$ 12,453	$ 8,030	$ -	$ 6,281	$ 26,764	$ 136,356	**20%**
72	31705 71st Street	Jan-2001	747.0	$ 78,960	0.6	$ 14,918	$ 8,674	$ 889	$ 10,746	$ 35,226	$ 96,381	**37%**
29	31822 71st Street	Sep-2001	748.0	$ 139,125	-0.4	$ 12,178	$ 7,888	$ -	$ 6,186	$ 26,252	$ 146,597	**18%**
2	31809 77th Street	Oct-2001	748.0	$ 81,480	-0.8	$ 4,170	$ 3,071	$ -	$ 4,551	$ 11,792	$ 34,954	**34%**
4	31733 77th Street	Oct-2001	746.0	$ 98,070	1.2	$ 24,657	$ 13,988	$ 2,406	$ 13,557	$ 54,608	$ 35,951	**152%**
5	31826 77th Street	Oct-2001	748.5	$ 97,860	-1.2	$ 1,854	$ 1,780	$ -	$ 3,101	$ 6,735	$ 99,666	**7%**
7	31911 77th Street	Oct-2001	746.5	$ 75,810	0.8	$ 16,139	$ 9,282	$ 1,226	$ 11,824	$ 38,470	$ 83,304	**46%**
9	32114 77th Street	Oct-2001	749.5	$ 75,600	-2.1	$ -	$ -	$ -	$ -	$ -	$ 103,368	**0%**
28	31711 71st Street	Oct-2001	748.0	$ 60,060	-0.4	$ 5,147	$ 3,348	$ -	$ 6,103	$ 14,597	$ 113,134	**13%**

Table B.12 Part 2 of 2

Loss Estimation and ROI Calculations for August 2007 Event in Kenosha County

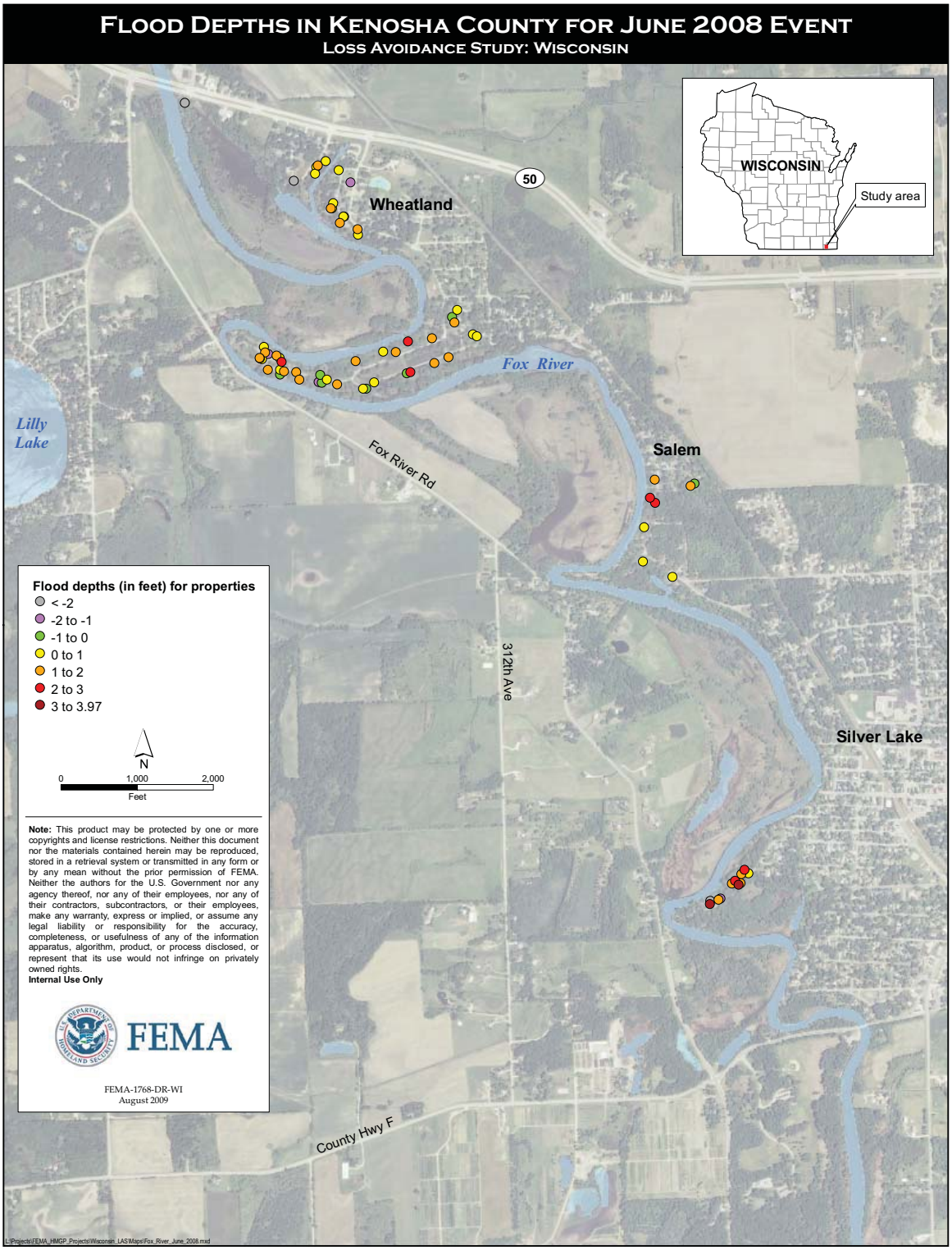
BLDG NO.	ADDRESS	ACQUISITION COMPLETION DATE	FFE (FT, NGVD)[1]	2009 BRV[2]	FLOOD DEPTH (FT)	BUILDING DAMAGE	CONTENTS DAMAGE	DISPLACEMENT COSTS	DISRUPTION COSTS	TOTAL LOSSES AVOIDED	PROJECT INVESTMENT[3]	RETURN ON INVESTMENT
23	6940 317th Avenue	Feb-2002	750.0	$ 58,800	-2.4	$ -	$ -	$ -	$ -	$ -	$ 130,769	**0%**
15	8200 No. Riverside Drive	Sep-2002	746.8	$ 63,000	-0.2	$ 7,222	$ 4,465	$ -	$ 7,405	$ 19,092	$ 130,863	**15%**
3	31417 77th Street	Oct-2002	746.0	$ 104,160	1.1	$ 25,186	$ 14,332	$ 2,325	$ 13,124	$ 54,967	$ 114,648	**48%**
13	32005 77th Street	Oct-2002	746.5	$ 75,600	0.8	$ 16,172	$ 9,297	$ 1,238	$ 11,870	$ 38,577	$ 119,677	**32%**
19	8032 Shorewood Drive	Oct-2002	745.0	$ 95,760	1.8	$ 29,042	$ 16,254	$ 3,495	$ 15,889	$ 64,679	$ 133,702	**48%**
24	31701 77th Street	Oct-2002	748.7	$ 79,800	-1.5	$ 902	$ 866	$ -	$ 2,757	$ 4,526	$ 82,325	**5%**
25	6912 318th Avenue	Oct-2002	748.0	$ 58,800	-0.4	$ 5,217	$ 3,371	$ -	$ 6,239	$ 14,827	$ 87,774	**17%**
20	31533 77th Street	Oct-2002	748.5	$ 56,070	-1.4	$ 894	$ 858	$ -	$ 2,966	$ 4,717	$ 42,029	**11%**
32	31709 77th Street	Jan-2003	747.6	$ 67,200	-0.4	$ 5,760	$ 3,747	$ -	$ 6,104	$ 15,611	$ 80,759	**19%**
34	7956 Shorewood Drive	Jan-2003	746.0	$ 63,525	0.8	$ 13,599	$ 7,817	$ 1,043	$ 11,877	$ 34,336	$ 111,428	**31%**
22	445 So. Riverside Drive	Feb-2003	746.2	$ 98,280	0.1	$ 14,578	$ 8,700	$ 289	$ 8,920	$ 32,487	$ 100,568	**32%**
30	31715 71st Street	May-2003	748.1	$ 58,800	-0.5	$ 4,402	$ 2,944	$ -	$ 5,616	$ 12,962	$ 86,360	**15%**
31	501 So. Riverside Drive	Oct-2003	745.4	$ 168,000	0.9	$ 24,908	$ 14,222	$ 3,193	$ 8,917	$ 51,240	$ 129,181	**40%**
21	607 So. Riverside Drive	Sep-2004	748.3	$ 74,970	-2.0	$ 10,434	$ 7,914	$ -	$ 8,508	$ 26,856	$ 108,830	**25%**
47	31627 71st Street	Aug-2005	747.0	$ 104,160	0.5	$ 19,493	$ 11,345	$ 1,135	$ 10,666	$ 42,638	$ 140,789	**30%**
48	31315 77th Street	Aug-2005	746.0	$ 95,760	1.1	$ 23,148	$ 13,173	$ 2,136	$ 13,121	$ 51,578	$ 153,438	**34%**
38	6913 319th Avenue	Dec-2005	747.0	$ 71,400	0.6	$ -	$ -	$ -	$ -	$ -	$ 1,348	**0%**
49	31602 76th Street	Dec-2005	746.1	$ 104,160	1.1	$ 25,406	$ 14,447	$ 2,375	$ 13,219	$ 55,447	$ 142,351	**39%**
26	30522 80th Street	Jun-2006	746.0	$ 61,740	0.8	$ 13,180	$ 7,578	$ 1,006	$ 11,850	$ 33,614	$ 110,106	**31%**
35	7536 313th Avenue	Jun-2006	748.0	$ 74,130	-0.6	$ 4,826	$ 3,334	$ -	$ 5,177	$ 13,337	$ 129,190	**10%**
36	511 S. Riverside Drive	Jun-2006	743.7	$ 51,660	2.6	$ 19,207	$ 10,592	$ 2,762	$ 18,971	$ 51,532	$ 59,472	**87%**
37	606 Wisconsin Avenue	Jun-2006	743.0	$ 37,800	3.3	$ 15,993	$ 8,757	$ 2,543	$ 21,278	$ 48,571	$ 114,398	**42%**
40	30510 80th Street	Jun-2006	747.5	$ 65,100	-0.7	$ 3,778	$ 2,687	$ -	$ 4,859	$ 11,324	$ 119,470	**9%**
39	7600 313th Street	Aug-2006	747.0	$ 64,680	0.3	$ 10,555	$ 6,230	$ 387	$ 9,588	$ 26,760	$ 96,803	**28%**
33	31901 71st Street	Jan-2007	750.8	$ 58,800	-3.2	$ -	$ -	$ -	$ -	$ -	$ 121,564	**0%**
41	7962 Shorewood Drive	Mar-2007	745.0	$ 65,520	1.8	$ 19,890	$ 11,131	$ 2,395	$ 15,902	$ 49,319	$ 140,801	**35%**
42	31613 71st Street	Mar-2007	748.0	$ 107,730	-0.5	$ 8,967	$ 5,866	$ -	$ 5,992	$ 20,826	$ 163,558	**13%**
50	415 S. Riverside Drive	Feb-2008	744.0	$ 63,525	2.3	$ -	$ -	$ -	$ -	$ -	$ 125,544	**0%**
43	7522 313th Avenue	Jun-2008	749.0	$ 130,620	-1.7	$ -	$ -	$ -	$ -	$ -	$ 169,787	**0%**
					TOTAL	**$ 895,853**	**$ 528,110**	**$ 64,601**	**$ 610,111**	**$ 2,098,675**	**$ 7,845,846**	**27%**

[1] *Vertical datum information was not provided with the first floor elevation (FFE) information supplied by the county. Elevations were assumed to be relative to the National Geodetic Vertical Datum of 1929 (NGVD).*

[2] *Building replacement value (BRV) based on unit cost per square foot of living space for the county.*

[3] *Project investment costs for each event only include the project costs for the buildings that were included in the analysis for that event.*

Figure B.13


Flood Depths in Kenosha County for June 2008 Event
Loss Avoidance Study: Wisconsin
WISCONSIN
Study area
50
Wheatland
Fox River
Lilly Lake
Fox River Rd
Salem
312th Ave
Silver Lake
County Hwy F
Flood depths (in feet) for properties
< -2
-2 to -1
-1 to 0
0 to 1
1 to 2
2 to 3
3 to 3.97
N
0
1,000
2,000
Feet
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August 2009

Table B.13 Part 1 of 2

Loss Estimation and ROI Calculations for June 2008 Event in Kenosha County

BLDG NO.	ADDRESS	ACQUISITION COMPLETION DATE	FFE (FT, NGVD)1	2009 BRV2	FLOOD DEPTH (FT)	BUILDING DAMAGE	CONTENTS DAMAGE	DISPLACEMENT COSTS	DISRUPTION COSTS	TOTAL LOSSES AVOIDED	PROJECT INVESTMENT3	RETURN ON INVESTMENT
51	32139 77th Street	Jul-1995	747.0	$ 134,820	1.1	$ 32,469	$ 18,483	$ 2,979	$ 13,081	$ 67,012	$ 135,493	**49%**
52	32129 77th Street	Jul-1995	747.9	$ 95,760	0.2	$ 14,554	$ 8,661	$ 353	$ 9,084	$ 32,652	$ 121,895	**27%**
53	437 S. Riverside Drive	Jul-1995	744.0	$ 85,680	3.0	$ 34,143	$ 18,740	$ 5,161	$ 20,172	$ 78,215	$ 121,453	**64%**
54	601 S. Riverside Drive	Jul-1995	749.0	$ 107,835	-2.1	$ 14,081	$ 10,713	$ -	$ 8,122	$ 32,915	$ 123,925	**27%**
55	8106 Shorewood Drive	Jul-1995	746.7	$ 95,760	0.8	$ 20,300	$ 11,679	$ 1,531	$ 11,783	$ 45,294	$ 127,728	**35%**
56	31524 76th Street	Sep-1995	745.1	$ 70,560	2.9	$ 27,703	$ 15,220	$ 4,145	$ 19,907	$ 66,974	$ 116,379	**58%**
57	31217 77th Street	Feb-1996	747.0	$ 75,600	0.9	$ 16,954	$ 9,708	$ 1,398	$ 12,335	$ 40,394	$ 124,635	**32%**
58	32041 77th Street	Feb-1996	750.7	$ 87,360	-2.6	$ -	$ -	$ -	$ -	$ -	$ 117,107	**0%**
60	419 S. Riverside Drive	Oct-1996	745.0	$ 78,750	2.0	$ 16,345	$ 9,538	$ 3,155	$ 11,584	$ 40,622	$ 7,841	**518%**
59	32104 77th Street	Nov-1996	748.0	$ 176,190	0.1	$ 17,480	$ 9,496	$ 376	$ 6,711	$ 34,063	$ 185,843	**18%**
61	32028 77th Street	Apr-1997	747.0	$ 89,880	1.1	$ 21,600	$ 12,298	$ 1,975	$ 13,057	$ 48,930	$ 136,601	**36%**
62	31628 76th Street	Dec-1998	747.7	$ 106,680	0.3	$ 17,080	$ 10,104	$ 571	$ 9,450	$ 37,203	$ 137,189	**27%**
63	32029 77th Street	Dec-1998	746.6	$ 79,800	1.5	$ 21,782	$ 12,280	$ 2,354	$ 14,525	$ 50,941	$ 100,017	**51%**
64	32018 77th Street	Dec-1998	747.5	$ 82,320	0.6	$ 15,720	$ 9,131	$ 961	$ 10,838	$ 36,650	$ 116,767	**31%**
65	31710 77th Street	Jan-1999	746.4	$ 107,100	1.6	$ 19,827	$ 11,496	$ 3,436	$ 10,575	$ 45,334	$ 139,792	**32%**
66	32143 77th Street	Mar-1999	747.0	$ 145,530	1.1	$ 22,840	$ 13,103	$ 3,209	$ 9,307	$ 48,458	$ 58,179	**83%**
11	32132 77th Street	Dec-1999	747.0	$ 84,000	1.1	$ 20,265	$ 11,534	$ 1,864	$ 13,099	$ 46,763	$ 90,458	**52%**
44	31422 76th Street	Dec-1999	746.8	$ 94,500	1.2	$ 23,744	$ 13,471	$ 2,315	$ 13,550	$ 53,080	$ 117,619	**45%**
45	32034 77th Street	Dec-1999	745.5	$ 121,800	2.6	$ 44,601	$ 24,622	$ 6,338	$ 18,718	$ 94,280	$ 133,352	**71%**
12	31823 77th Street	Dec-1999	749.0	$ 102,900	-1.0	$ 2,512	$ 2,412	$ -	$ 3,347	$ 8,271	$ 116,432	**7%**
68	32015 77th Street	Dec-1999	748.5	$ 121,590	-0.5	$ 27,574	$ 17,879	$ -	$ 12,448	$ 57,902	$ 136,982	**42%**
67	31917 77th Street	Jan-2000	746.1	$ 68,355	1.9	$ 21,416	$ 11,961	$ 2,653	$ 16,340	$ 52,370	$ 30,097	**174%**
8	31805 71st Street	Jun-2000	748.0	$ 133,980	0.3	$ 22,091	$ 13,026	$ 848	$ 9,665	$ 45,629	$ 203,279	**22%**
16	31811 71st Street	Jun-2000	746.5	$ 63,000	1.8	$ 19,182	$ 10,733	$ 2,316	$ 15,943	$ 48,174	$ 93,912	**51%**
17	31519 77th Street	Jun-2000	745.8	$ 58,800	2.1	$ 19,184	$ 10,684	$ 2,465	$ 16,923	$ 49,256	$ 105,167	**47%**
18	6929 319th Avenue	Jun-2000	747.5	$ 73,500	0.8	$ 15,876	$ 9,119	$ 1,235	$ 11,964	$ 38,194	$ 98,058	**39%**
69	6921 319th Avenue	Jun-2000	748.0	$ 103,320	0.3	$ 17,188	$ 10,125	$ 685	$ 9,731	$ 37,730	$ 108,859	**35%**
73	441 S. Riverside Drive	Jun-2000	745.0	$ 105,840	2.0	$ 21,911	$ 12,784	$ 4,220	$ 11,560	$ 50,476	$ 131,060	**39%**
10	31638 76th Street	Jul-2000	747.6	$ 150,570	0.3	$ 16,603	$ 9,159	$ 894	$ 7,208	$ 33,864	$ 166,468	**20%**
14	8153 Shorewood Drive	Jul-2000	746.5	$ 78,750	0.9	$ 11,583	$ 6,608	$ 1,465	$ 8,864	$ 28,520	$ 115,113	**25%**
70	31214 77th Street	Sep-2000	747.0	$ 98,280	0.9	$ 21,797	$ 12,492	$ 1,768	$ 12,224	$ 48,281	$ 75,177	**64%**
1	6712 Wheatland Road	Dec-2000	750.5	$ 64,680	-2.0	$ -	$ -	$ -	$ -	$ -	$ 122,709	**0%**
71	6905 319th Avenue	Dec-2000	748.0	$ 138,915	0.3	$ 23,116	$ 13,616	$ 923	$ 9,733	$ 47,388	$ 136,356	**35%**
72	31705 71st Street	Jan-2001	747.0	$ 78,960	1.3	$ 20,376	$ 11,536	$ 2,058	$ 13,855	$ 47,824	$ 96,381	**50%**
29	31822 71st Street	Sep-2001	748.0	$ 139,125	0.3	$ 22,951	$ 13,532	$ 883	$ 9,668	$ 47,033	$ 146,597	**32%**
2	31809 77th Street	Oct-2001	748.0	$ 81,480	0.0	$ 10,653	$ 6,461	$ -	$ 8,129	$ 25,244	$ 34,954	**72%**
4	31733 77th Street	Oct-2001	746.0	$ 98,070	1.9	$ 30,957	$ 17,281	$ 3,859	$ 16,446	$ 68,543	$ 35,951	**191%**
5	31826 77th Street	Oct-2001	748.5	$ 97,860	-0.5	$ 7,650	$ 5,070	$ -	$ 5,765	$ 18,484	$ 99,666	**19%**
7	31911 77th Street	Oct-2001	746.5	$ 75,810	1.5	$ 21,178	$ 11,920	$ 2,348	$ 14,813	$ 50,260	$ 83,304	**60%**
9	32114 77th Street	Oct-2001	749.5	$ 75,600	-1.4	$ 1,110	$ 1,066	$ -	$ 2,909	$ 5,086	$ 103,368	**5%**
28	31711 71st Street	Oct-2001	748.0	$ 60,060	0.3	$ 9,760	$ 5,764	$ 351	$ 9,558	$ 25,433	$ 113,134	**22%**

Table B.13 Part 2 of 2

Loss Estimation and ROI Calculations for June 2008 Event in Kenosha County

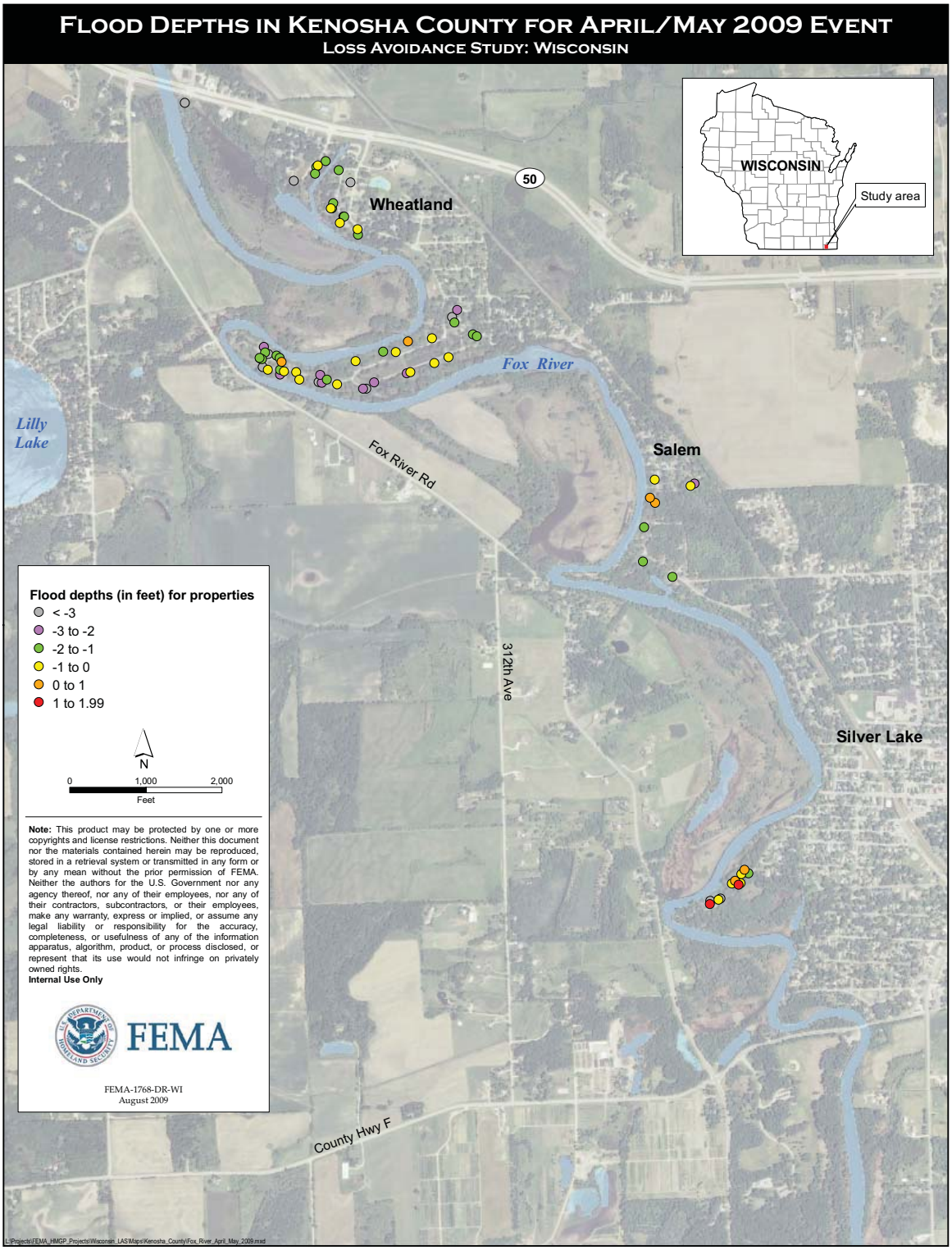
BLDG NO.	ADDRESS	ACQUISITION COMPLETION DATE	FFE (FT, NGVD)1	2009 BRV2	FLOOD DEPTH (FT)	BUILDING DAMAGE	CONTENTS DAMAGE	DISPLACEMENT COSTS	DISRUPTION COSTS	TOTAL LOSSES AVOIDED	PROJECT INVESTMENT3	RETURN ON INVESTMENT
23	6940 317th Avenue	Feb-2002	750.0	$ 58,800	-1.7	$ 462	$ 443	$ -	$ 2,602	$ 3,507	$ 130,769	**3%**
15	8200 No. Riverside Drive	Sep-2002	746.8	$ 63,000	0.5	$ 11,555	$ 6,738	$ 638	$ 10,498	$ 29,429	$ 130,863	**22%**
3	31417 77th Street	Oct-2002	746.0	$ 104,160	1.8	$ 31,835	$ 17,808	$ 3,858	$ 15,995	$ 69,496	$ 114,648	**61%**
13	32005 77th Street	Oct-2002	746.5	$ 75,600	1.5	$ 21,189	$ 11,923	$ 2,358	$ 14,855	$ 50,325	$ 119,677	**42%**
19	8032 Shorewood Drive	Oct-2002	745.0	$ 95,760	2.5	$ 34,559	$ 19,099	$ 4,855	$ 18,480	$ 76,992	$ 133,702	**58%**
24	31701 77th Street	Oct-2002	748.7	$ 79,800	-0.8	$ 3,581	$ 2,745	$ -	$ 4,267	$ 10,593	$ 82,325	**13%**
25	6912 318th Avenue	Oct-2002	748.0	$ 58,800	0.3	$ 9,748	$ 5,744	$ 383	$ 9,705	$ 25,579	$ 87,774	**29%**
20	31533 77th Street	Oct-2002	748.5	$ 56,070	-0.6	$ 3,641	$ 2,517	$ -	$ 5,169	$ 11,327	$ 42,029	**27%**
32	31709 77th Street	Jan-2003	747.6	$ 67,200	0.3	$ 10,915	$ 6,446	$ 391	$ 9,554	$ 27,306	$ 80,759	**34%**
34	7956 Shorewood Drive	Jan-2003	746.0	$ 63,525	1.5	$ 17,646	$ 9,936	$ 1,945	$ 14,742	$ 44,268	$ 111,428	**40%**
22	445 So. Riverside Drive	Feb-2003	746.2	$ 98,280	0.8	$ 20,723	$ 11,928	$ 1,548	$ 11,732	$ 45,932	$ 100,568	**46%**
30	31715 71st Street	May-2003	748.1	$ 58,800	0.2	$ 8,980	$ 5,341	$ 226	$ 9,117	$ 23,664	$ 86,360	**27%**
31	501 So. Riverside Drive	Oct-2003	745.4	$ 168,000	1.6	$ 30,958	$ 17,945	$ 5,339	$ 10,537	$ 64,779	$ 129,181	**50%**
21	607 So. Riverside Drive	Sep-2004	748.3	$ 74,970	-1.4	$ 13,068	$ 9,185	$ -	$ 10,089	$ 32,342	$ 108,830	**30%**
47	31627 71st Street	Aug-2005	747.0	$ 104,160	1.3	$ 26,627	$ 15,086	$ 2,657	$ 13,746	$ 58,116	$ 140,789	**41%**
48	31315 77th Street	Aug-2005	746.0	$ 95,760	1.8	$ 29,261	$ 16,369	$ 3,545	$ 15,992	$ 65,167	$ 153,438	**42%**
38	6913 319th Avenue	Dec-2005	747.0	$ 71,400	1.3	$ -	$ -	$ -	$ -	$ -	$ 1,348	**0%**
49	31602 76th Street	Dec-2005	746.1	$ 104,160	1.9	$ 32,097	$ 17,945	$ 3,918	$ 16,108	$ 70,068	$ 142,351	**49%**
26	30522 80th Street	Jun-2006	746.0	$ 61,740	1.5	$ 17,117	$ 9,639	$ 1,883	$ 14,718	$ 43,357	$ 110,106	**39%**
35	7536 313th Avenue	Jun-2006	748.0	$ 74,130	0.1	$ 10,652	$ 6,382	$ 147	$ 8,712	$ 25,894	$ 129,190	**20%**
36	511 S. Riverside Drive	Jun-2006	743.7	$ 51,660	3.3	$ 21,672	$ 11,871	$ 3,422	$ 21,117	$ 58,080	$ 59,472	**98%**
37	606 Wisconsin Avenue	Jun-2006	743.0	$ 37,800	3.9	$ 17,652	$ 9,634	$ 3,024	$ 23,252	$ 53,562	$ 114,398	**47%**
40	30510 80th Street	Jun-2006	747.5	$ 65,100	0.0	$ 8,743	$ 5,284	$ 4	$ 8,289	$ 22,320	$ 119,470	**19%**
39	7600 313th Street	Aug-2006	747.0	$ 64,680	1.0	$ 15,211	$ 8,676	$ 1,345	$ 12,826	$ 38,059	$ 96,803	**39%**
33	31901 71st Street	Jan-2007	750.8	$ 58,800	-2.5	$ -	$ -	$ -	$ -	$ -	$ 121,564	**0%**
41	7962 Shorewood Drive	Mar-2007	745.0	$ 65,520	2.5	$ 23,663	$ 13,076	$ 3,326	$ 18,492	$ 58,558	$ 140,801	**42%**
42	31613 71st Street	Mar-2007	748.0	$ 107,730	0.3	$ 17,155	$ 10,155	$ 557	$ 9,411	$ 37,278	$ 163,558	**23%**
50	415 S. Riverside Drive	Feb-2008	744.0	$ 63,525	3.0	$ 25,367	$ 13,921	$ 3,840	$ 20,209	$ 63,337	$ 125,544	**50%**
43	7522 313th Avenue	Jun-2008	749.0	$ 130,620	-0.9	$ -	$ -	$ -	$ -	$ -	$ 169,787	**0%**
					TOTAL	**$ 1,286,888**	**$ 742,212**	**$ 127,733**	**$ 818,008**	**$ 2,974,840**	**$ 7,971,390**	**37%**

[1] *Vertical datum information was not provided with the first floor elevation (FFE) information supplied by the county. Elevations were assumed to be relative to the National Geodetic Vertical Datum of 1929 (NGVD).*

[2] *Building replacement value (BRV) based on unit cost per square foot of living space for the county.*

[3] *Project investment costs for each event only include the project costs for the buildings that were included in the analysis for that event.*

Figure B.14


Flood Depths in Kenosha County for April/May 2009 Event
Loss Avoidance Study: Wisconsin
WISCONSIN
Study area
50
Wheatland
Fox River
Lilly Lake
Fox River Rd
Salem
312th Ave
Silver Lake
County Hwy F
Flood depths (in feet) for properties
< -3
-3 to -2
-2 to -1
-1 to 0
0 to 1
1 to 1.99
N
0
1,000
2,000
Feet
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August 2009

Table B.14 Part 1 of 2

Loss Estimation and ROI Calculations for April/ May 2009 Event in Kenosha County

BLDG NO.	ADDRESS	ACQUISITION COMPLETION DATE	FFE (FT, NGVD)[1]	2009 BRV[2]	FLOOD DEPTH (FT)	BUILDING DAMAGE	CONTENTS DAMAGE	DISPLACEMENT COSTS	DISRUPTION COSTS	TOTAL LOSSES AVOIDED	PROJECT INVESTMENT[3]	RETURN ON INVESTMENT
51	32139 77th Street	Jul-1995	747.0	$ 134,820	-1.2	$ 2,619	$ 2,514	$ -	$ 3,122	$ 8,255	$ 135,493	**6%**
52	32129 77th Street	Jul-1995	747.9	$ 95,760	-2.1	$ -	$ -	$ -	$ -	$ -	$ 121,895	**0%**
53	437 S. Riverside Drive	Jul-1995	744.0	$ 85,680	1.0	$ 19,873	$ 11,348	$ 1,720	$ 12,680	$ 45,621	$ 121,453	**38%**
54	601 S. Riverside Drive	Jul-1995	749.0	$ 107,835	-4.0	$ -	$ -	$ -	$ -	$ -	$ 123,925	**0%**
55	8106 Shorewood Drive	Jul-1995	746.7	$ 95,760	-1.4	$ 1,379	$ 1,323	$ -	$ 2,896	$ 5,598	$ 127,728	**4%**
56	31524 76th Street	Sep-1995	745.1	$ 70,560	0.6	$ 13,498	$ 7,839	$ 829	$ 10,853	$ 33,019	$ 116,379	**28%**
57	31217 77th Street	Feb-1996	747.0	$ 75,600	-1.4	$ 1,120	$ 1,075	$ -	$ 2,915	$ 5,111	$ 124,635	**4%**
58	32041 77th Street	Feb-1996	750.7	$ 87,360	-4.9	$ -	$ -	$ -	$ -	$ -	$ 117,107	**0%**
60	419 S. Riverside Drive	Oct-1996	745.0	$ 78,750	0.0	$ 7,286	$ 3,913	$ -	$ 6,410	$ 17,609	$ 7,841	**225%**
59	32104 77th Street	Nov-1996	748.0	$ 176,190	-2.2	$ -	$ -	$ -	$ -	$ -	$ 185,843	**0%**
61	32028 77th Street	Apr-1997	747.0	$ 89,880	-1.2	$ 1,730	$ 1,660	$ -	$ 3,114	$ 6,504	$ 136,601	**5%**
62	31628 76th Street	Dec-1998	747.7	$ 106,680	-2.1	$ -	$ -	$ -	$ -	$ -	$ 137,189	**0%**
63	32029 77th Street	Dec-1998	746.6	$ 79,800	-0.9	$ 3,210	$ 2,550	$ -	$ 4,058	$ 9,818	$ 100,017	**10%**
64	32018 77th Street	Dec-1998	747.5	$ 82,320	-1.7	$ 539	$ 517	$ -	$ 2,543	$ 3,599	$ 116,767	**3%**
65	31710 77th Street	Jan-1999	746.4	$ 107,100	-0.7	$ 4,997	$ 2,204	$ -	$ 4,347	$ 11,548	$ 139,792	**8%**
66	32143 77th Street	Mar-1999	747.0	$ 145,530	-1.2	$ 3,376	$ 1,125	$ -	$ 3,292	$ 7,794	$ 58,179	**13%**
11	32132 77th Street	Dec-1999	747.0	$ 84,000	-1.2	$ 1,647	$ 1,581	$ -	$ 3,130	$ 6,358	$ 90,458	**7%**
44	31422 76th Street	Dec-1999	746.8	$ 94,500	-1.1	$ 2,107	$ 2,022	$ -	$ 3,251	$ 7,380	$ 117,619	**6%**
45	32034 77th Street	Dec-1999	745.5	$ 121,800	0.3	$ 19,344	$ 11,454	$ 620	$ 9,392	$ 40,810	$ 133,352	**31%**
12	31823 77th Street	Dec-1999	749.0	$ 102,900	-3.3	$ -	$ -	$ -	$ -	$ -	$ 116,432	**0%**
68	32015 77th Street	Dec-1999	748.5	$ 121,590	-2.8	$ 3,732	$ 2,840	$ -	$ 3,629	$ 10,201	$ 136,982	**7%**
67	31917 77th Street	Jan-2000	746.1	$ 68,355	-0.4	$ 6,156	$ 3,966	$ -	$ 6,299	$ 16,422	$ 30,097	**55%**
8	31805 71st Street	Jun-2000	748.0	$ 133,980	-1.9	$ 241	$ 231	$ -	$ 2,330	$ 2,802	$ 203,279	**1%**
16	31811 71st Street	Jun-2000	746.5	$ 63,000	-0.4	$ 5,504	$ 3,567	$ -	$ 6,178	$ 15,250	$ 93,912	**16%**
17	31519 77th Street	Jun-2000	745.8	$ 58,800	-0.3	$ 6,265	$ 3,919	$ -	$ 7,041	$ 17,225	$ 105,167	**16%**
18	6929 319th Avenue	Jun-2000	747.5	$ 73,500	-1.4	$ 1,081	$ 1,038	$ -	$ 2,910	$ 5,029	$ 98,058	**5%**
69	6921 319th Avenue	Jun-2000	748.0	$ 103,320	-1.9	$ 224	$ 215	$ -	$ 2,346	$ 2,786	$ 108,859	**3%**
73	441 S. Riverside Drive	Jun-2000	745.0	$ 105,840	0.0	$ 9,759	$ 5,239	$ -	$ 6,396	$ 21,394	$ 131,060	**16%**
10	31638 76th Street	Jul-2000	747.6	$ 150,570	-2.0	$ -	$ -	$ -	$ -	$ -	$ 166,468	**0%**
14	8153 Shorewood Drive	Jul-2000	746.5	$ 78,750	-1.3	$ 1,724	$ 575	$ -	$ 3,233	$ 5,532	$ 115,113	**5%**
70	31214 77th Street	Sep-2000	747.0	$ 98,280	-1.4	$ 1,393	$ 1,337	$ -	$ 2,886	$ 5,616	$ 75,177	**7%**
1	6712 Wheatland Road	Dec-2000	750.5	$ 64,680	-4.3	$ -	$ -	$ -	$ -	$ -	$ 122,709	**0%**
71	6905 319th Avenue	Dec-2000	748.0	$ 138,915	-1.9	$ 303	$ 291	$ -	$ 2,347	$ 2,941	$ 136,356	**2%**
72	31705 71st Street	Jan-2001	747.0	$ 78,960	-1.0	$ 2,402	$ 2,119	$ -	$ 3,617	$ 8,138	$ 96,381	**8%**
29	31822 71st Street	Sep-2001	748.0	$ 139,125	-1.9	$ 253	$ 243	$ -	$ 2,331	$ 2,827	$ 146,597	**2%**
2	31809 77th Street	Oct-2001	748.0	$ 81,480	-2.3	$ -	$ -	$ -	$ -	$ -	$ 34,954	**0%**
4	31733 77th Street	Oct-2001	746.0	$ 98,070	-0.4	$ 9,093	$ 5,827	$ -	$ 6,419	$ 21,339	$ 35,951	**59%**
5	31826 77th Street	Oct-2001	748.5	$ 97,860	-2.8	$ -	$ -	$ -	$ -	$ -	$ 99,666	**0%**
7	31911 77th Street	Oct-2001	746.5	$ 75,810	-0.8	$ 3,643	$ 2,734	$ -	$ 4,410	$ 10,787	$ 83,304	**13%**
9	32114 77th Street	Oct-2001	749.5	$ 75,600	-3.7	$ -	$ -	$ -	$ -	$ -	$ 103,368	**0%**
28	31711 71st Street	Oct-2001	748.0	$ 60,060	-1.9	$ 79	$ 76	$ -	$ 2,308	$ 2,462	$ 113,134	**2%**

Table B.14 Part 2 of 2

Loss Estimation and ROI Calculations for April/ May 2009 Event in Kenosha County

BLDG NO.	ADDRESS	ACQUISITION COMPLETION DATE	FFE (FT, NGVD)[1]	2009 BRV[2]	FLOOD DEPTH (FT)	BUILDING DAMAGE	CONTENTS DAMAGE	DISPLACEMENT COSTS	DISRUPTION COSTS	TOTAL LOSSES AVOIDED	PROJECT INVESTMENT[3]	RETURN ON INVESTMENT
23	6940 317th Avenue	Feb-2002	750.0	$ 58,800	-3.9	$ -	$ -	$ -	$ -	$ -	$ 130,769	0%
15	8200 No. Riverside Drive	Sep-2002	746.8	$ 63,000	-1.6	$ 574	$ 551	$ -	$ 2,659	$ 3,784	$ 130,863	3%
3	31417 77th Street	Oct-2002	746.0	$ 104,160	-0.5	$ 8,446	$ 5,555	$ -	$ 5,896	$ 19,896	$ 114,648	17%
13	32005 77th Street	Oct-2002	746.5	$ 75,600	-0.8	$ 3,722	$ 2,772	$ -	$ 4,463	$ 10,958	$ 119,677	9%
19	8032 Shorewood Drive	Oct-2002	745.0	$ 95,760	0.3	$ 15,524	$ 9,171	$ 552	$ 9,540	$ 34,786	$ 133,702	26%
24	31701 77th Street	Oct-2002	748.7	$ 79,800	-3.1	$ -	$ -	$ -	$ -	$ -	$ 82,325	0%
25	6912 318th Avenue	Oct-2002	748.0	$ 58,800	-1.9	$ 119	$ 114	$ -	$ 2,340	$ 2,573	$ 87,774	3%
20	31533 77th Street	Oct-2002	748.5	$ 56,070	-3.0	$ -	$ -	$ -	$ -	$ -	$ 42,029	0%
32	31709 77th Street	Jan-2003	747.6	$ 67,200	-2.0	$ -	$ -	$ -	$ -	$ -	$ 80,759	0%
34	7956 Shorewood Drive	Jan-2003	746.0	$ 63,525	-0.7	$ 3,607	$ 2,581	$ -	$ 4,803	$ 10,991	$ 111,428	10%
22	445 So. Riverside Drive	Feb-2003	746.2	$ 98,280	-1.2	$ 1,949	$ 1,871	$ -	$ 3,141	$ 6,960	$ 100,568	7%
30	31715 71st Street	May-2003	748.1	$ 58,800	-2.0	$ -	$ -	$ -	$ -	$ -	$ 86,360	0%
31	501 So. Riverside Drive	Oct-2003	745.4	$ 168,000	-0.4	$ 11,262	$ 5,631	$ -	$ 5,264	$ 22,157	$ 129,181	17%
21	607 So. Riverside Drive	Sep-2004	748.3	$ 74,970	-3.3	$ -	$ -	$ -	$ -	$ -	$ 108,830	0%
47	31627 71st Street	Aug-2005	747.0	$ 104,160	-1.0	$ 2,900	$ 2,654	$ -	$ 3,501	$ 9,055	$ 140,789	6%
48	31315 77th Street	Aug-2005	746.0	$ 95,760	-0.5	$ 7,757	$ 5,103	$ -	$ 5,892	$ 18,753	$ 153,438	12%
38	6913 319th Avenue	Dec-2005	747.0	$ 71,400	-0.9	$ -	$ -	$ -	$ -	$ -	$ 1,348	0%
49	31602 76th Street	Dec-2005	746.1	$ 104,160	-0.5	$ 8,694	$ 5,684	$ -	$ 6,003	$ 20,381	$ 142,351	14%
26	30522 80th Street	Jun-2006	746.0	$ 61,740	-0.7	$ 3,476	$ 2,492	$ -	$ 4,781	$ 10,748	$ 110,106	10%
35	7536 313th Avenue	Jun-2006	748.0	$ 74,130	-2.2	$ -	$ -	$ -	$ -	$ -	$ 129,190	0%
36	511 S. Riverside Drive	Jun-2006	743.7	$ 51,660	1.3	$ 13,341	$ 7,553	$ 1,349	$ 13,864	$ 36,106	$ 59,472	61%
37	606 Wisconsin Avenue	Jun-2006	743.0	$ 37,800	2.0	$ 12,050	$ 6,722	$ 1,515	$ 16,586	$ 36,873	$ 114,398	32%
40	30510 80th Street	Jun-2006	747.5	$ 65,100	-2.2	$ -	$ -	$ -	$ -	$ -	$ 119,470	0%
39	7600 313th Street	Aug-2006	747.0	$ 64,680	-1.3	$ 1,147	$ 1,101	$ -	$ 3,046	$ 5,295	$ 96,803	5%
33	31901 71st Street	Jan-2007	750.8	$ 58,800	-4.7	$ -	$ -	$ -	$ -	$ -	$ 121,564	0%
41	7962 Shorewood Drive	Mar-2007	745.0	$ 65,520	0.3	$ 10,638	$ 6,283	$ 381	$ 9,551	$ 26,853	$ 140,801	19%
42	31613 71st Street	Mar-2007	748.0	$ 107,730	-2.0	$ 62	$ 59	$ -	$ 2,274	$ 2,395	$ 163,558	1%
50	415 S. Riverside Drive	Feb-2008	744.0	$ 63,525	1.0	$ 14,767	$ 8,431	$ 1,282	$ 12,704	$ 37,184	$ 125,544	30%
43	7522 313th Avenue	Jun-2008	749.0	$ 130,620	-3.3	$ -	$ -	$ -	$ -	$ -	$ 169,787	0%
					TOTAL	$ 268,570	$ 167,736	$ 8,246	$ 264,851	$ 709,403	$ 8,141,177	9%

[1] *Vertical datum information was not provided with the first floor elevation (FFE) information supplied by the county. Elevations were assumed to be relative to the National Geodetic Vertical Datum of 1929 (NGVD).*

[2] *Building replacement value (BRV) based on unit cost per square foot of living space for the county.*

[3] *Project investment costs for each event only include the project costs for the buildings that were included in the analysis for that event.*

Appendix C:

Summary of Losses Avoided and ROI Calculations for Jefferson County

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Figure C.1

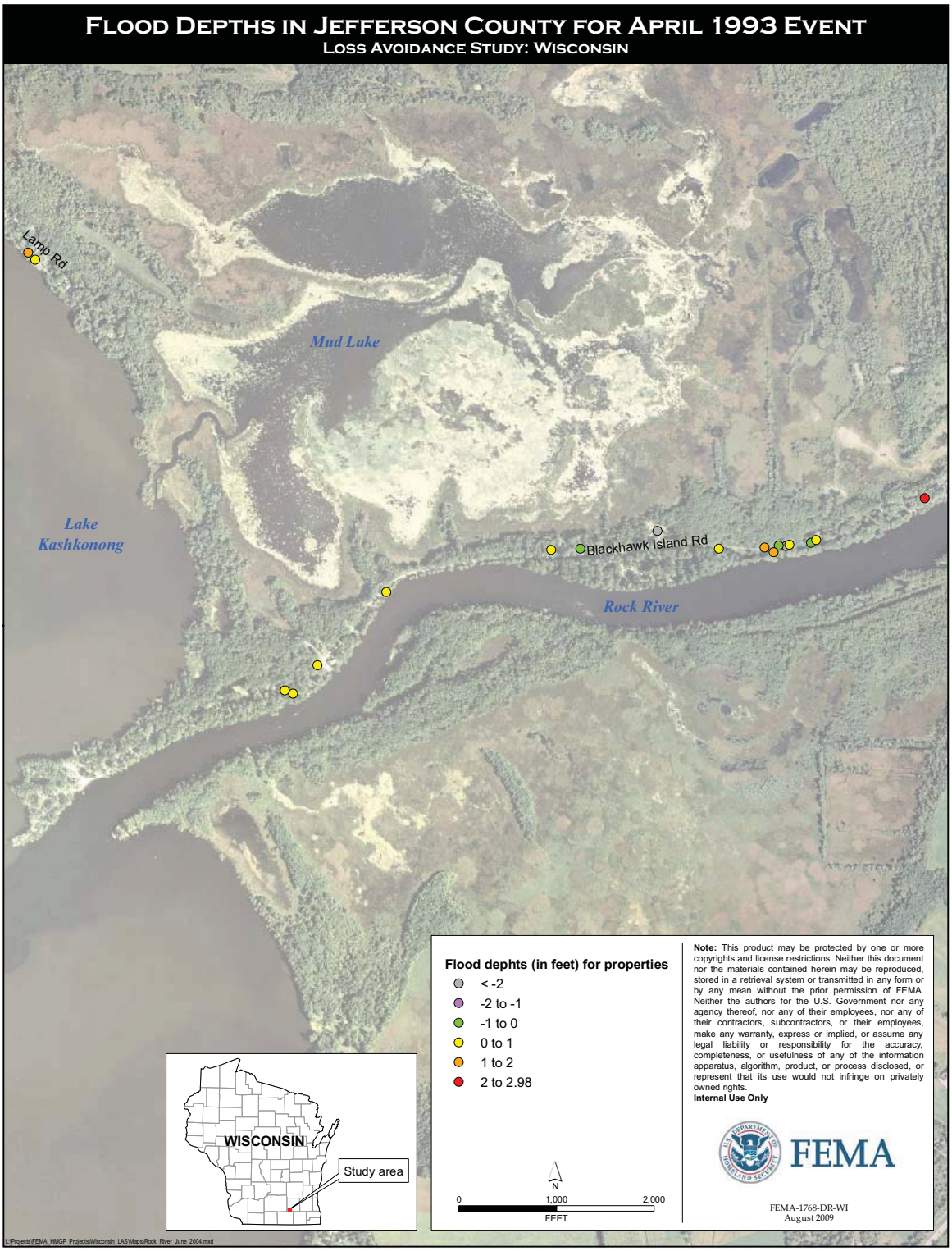
Flood Depths in Jefferson County for April 1993 Event
Loss Avoidance Study: Wisconsin
Lamp Rd
Mud Lake
Lake Kashkonong
Blackhawk Island Rd
Rock River
WISCONSIN
Study area
Flood dephts (in feet) for properties
< -2
-2 to -1
-1 to 0
0 to 1
1 to 2
2 to 2.98
N
0
1,000
2,000
FEET
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Table C.1

Loss Estimation and ROI Calculations for April 1993 Event in Jefferson County

BLDG NO.	ADDRESS	ACQUISITION COMPLETION DATE	FFE (FT, NGVD)[1]	2009 BRV[2]	FLOOD DEPTH (FT)	BUILDING DAMAGE	CONTENTS DAMAGE	DISPLACEMENT COSTS	DISRUPTION COSTS	TOTAL LOSSES AVOIDED	PROJECT INVESTMENT[3]	RETURN ON INVESTMENT
84	W7521 Blackhawk Island Road	Nov-1989	781.4	$ 68,020	0.8	$ 14,367	$ 8,269	$ 1,190	$ 11,749	$ 35,574	$ 162,919	**22%**
76	W7191 Blackhawk Island Road	Sep-1995	782.0	$ 81,225	0.2	$ -	$ -	$ -	$ -	$ -	$ 88,193	**0%**
85	W7119 Blackhawk Island Road	Nov-1995	785.4	$ 49,685	-3.2	$ -	$ -	$ -	$ -	$ -	$ 144,654	**0%**
75	W7622 &W7624 Blackhawk Island Road	Feb-1996	782.0	$ 148,770	0.2	$ -	$ -	$ -	$ -	$ -	$ 132,334	**0%**
74	W7352 Blackhawk Island Road	Jun-1996	782.0	$ 66,500	0.2	$ -	$ -	$ -	$ -	$ -	$ 56,228	**0%**
82	W7664 Blackhawk Island Road	Dec-1997	782.0	$ 83,410	0.2	$ -	$ -	$ -	$ -	$ -	$ 100,617	**0%**
78	W7091 Blackhawk Island Road	Aug-1998	783.0	$ 203,775	-0.9	$ -	$ -	$ -	$ -	$ -	$ 112,253	**0%**
77	W7616 Blackhawk Island Road	Feb-1999	782.0	$ 129,675	0.2	$ -	$ -	$ -	$ -	$ -	$ 115,429	**0%**
83	W7114 Blackhawk Island Road	Mar-1999	781.8	$ 76,000	0.4	$ -	$ -	$ -	$ -	$ -	$ 88,296	**0%**
80	W7126 Blackhawk Island Road	Apr-1999	783.1	$ 72,960	-0.9	$ -	$ -	$ -	$ -	$ -	$ 86,471	**0%**
79	W7366 Blackhawk Island Road	Jun-1999	786.0	$ 107,445	-3.8	$ -	$ -	$ -	$ -	$ -	$ 170,317	**0%**
81	W7324 Blackhawk Island Road	Sep-1999	782.9	$ 81,510	-0.7	$ -	$ -	$ -	$ -	$ -	$ 87,622	**0%**
87	W7143 Blackhawk Island Road	Oct-2003	780.5	$ 33,060	1.7	$ -	$ -	$ -	$ -	$ -	$ 67,713	**0%**
89	W7679 Lamp Road	Oct-2003	781.7	$ 65,360	0.5	$ -	$ -	$ -	$ -	$ -	$ 209,498	**0%**
88	W7139 Blackhawk Island Road	Oct-2003	780.7	$ 74,480	1.5	$ -	$ -	$ -	$ -	$ -	$ 53,623	**0%**
86	W7084 Blackhawk Island Road	Aug-2004	781.9	$ 71,250	0.3	$ -	$ -	$ -	$ -	$ -	$ 70,279	**0%**
91	W6984 Blackhawk Island Road	Aug-2006	779.2	$ 114,000	3.0	$ -	$ -	$ -	$ -	$ -	$ 156,680	**0%**
90	W7689 Lamp Road	Mar-2008	780.9	$ 133,000	1.3	$ -	$ -	$ -	$ -	$ -	$ 288,474	**0%**
					TOTAL	**$ 14,367**	**$ 8,269**	**$ 1,190**	**$ 11,749**	**$ 35,574**	**$ 162,919**	**22%**

[1] *Vertical datum information was not provided with the first floor elevation (FFE) information supplied by the county. Elevations were assumed to be relative to the National Geodetic Vertical Datum of 1929 (NGVD).*

[2] *Building replacement value (BRV) based on unit cost per square foot of living space for the county.*

[3] *Project investment costs for each event only include the project costs for the buildings that were included in the analysis for that event.*

Not included in the calculations - the acquisition was not completed before the event.

Figure C.2

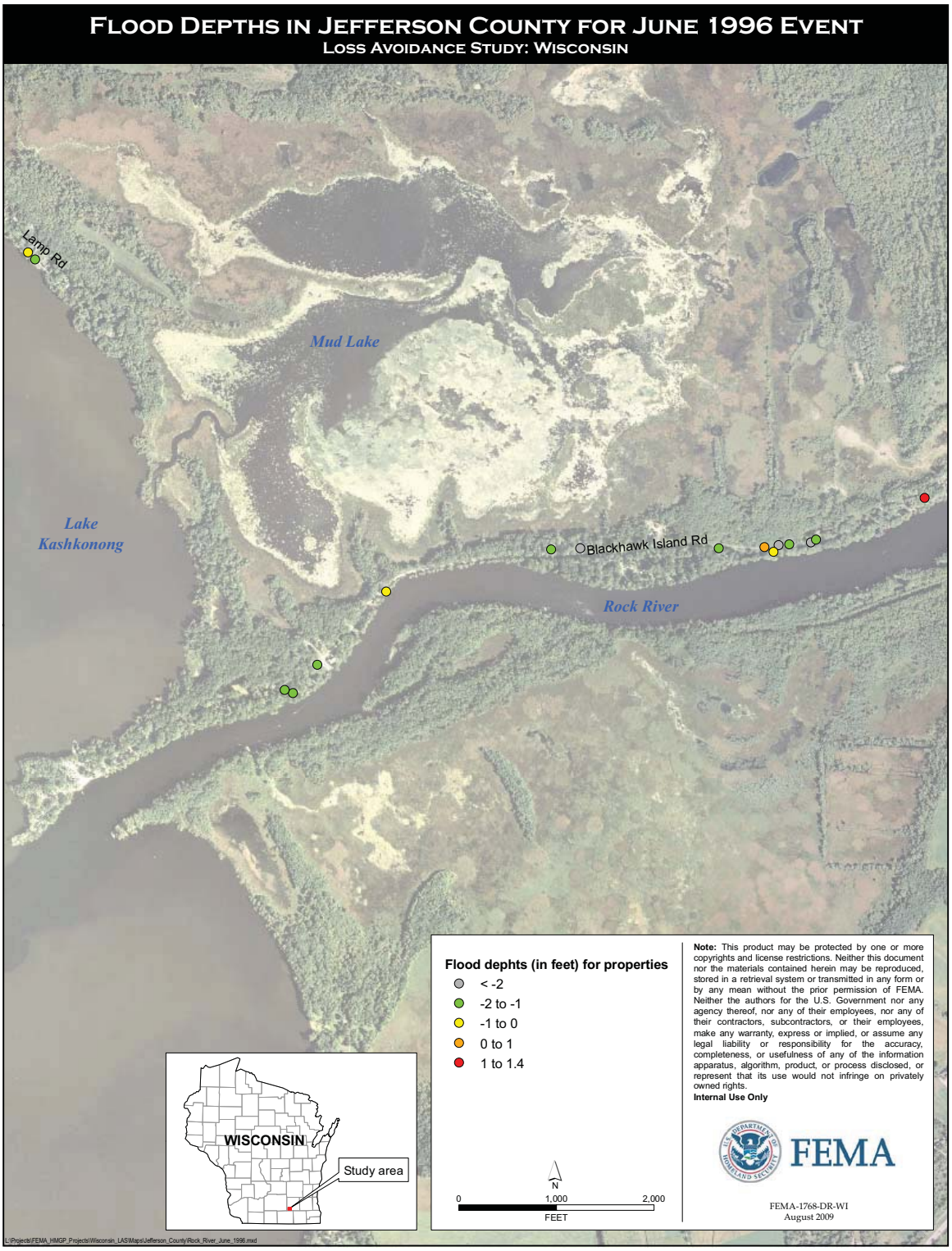
Flood Depths in Jefferson County for June 1996 Event
Loss Avoidance Study: Wisconsin
Lamp Rd
Mud Lake
Lake Kashkonong
Blackhawk Island Rd
Rock River
Flood dephts (in feet) for properties
< -2
-2 to -1
-1 to 0
0 to 1
1 to 1.4
N
0
1,000
2,000
FEET
WISCONSIN
Study area
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Table C.2

Loss Estimation and ROI Calculations for June 1996 Event in Jefferson County

BLDG NO.	ADDRESS	ACQUISITION COMPLETION DATE	FFE (FT, NGVD)[1]	2009 BRV[2]	FLOOD DEPTH (FT)	BUILDING DAMAGE	CONTENTS DAMAGE	DISPLACEMENT COSTS	DISRUPTION COSTS	TOTAL LOSSES AVOIDED	PROJECT INVESTMENT[3]	RETURN ON INVESTMENT
84	W7521 Blackhawk Island Road	Nov-1989	781.4	$ 68,020	-0.8	$ 3,554	$ 2,602	$ -	$ 4,599	$ 10,755	$ 162,919	7%
76	W7191 Blackhawk Island Road	Sep-1995	782.0	$ 81,225	-1.4	$ 1,320	$ 1,267	$ -	$ 2,980	$ 5,567	$ 88,193	6%
85	W7119 Blackhawk Island Road	Nov-1995	785.4	$ 49,685	-4.7	$ -	$ -	$ -	$ -	$ -	$ 144,654	0%
75	W7622 &W7624 Blackhawk Island Road	Feb-1996	782.0	$ 148,770	-1.4	$ 2,418	$ 2,321	$ -	$ 2,980	$ 7,718	$ 132,334	6%
74	W7352 Blackhawk Island Road	Jun-1996	782.0	$ 66,500	-1.4	$ 1,081	$ 1,037	$ -	$ 2,980	$ 5,098	$ 56,228	9%
82	W7664 Blackhawk Island Road	Dec-1997	782.0	$ 83,410	-1.4	$ -	$ -	$ -	$ -	$ -	$ 100,617	0%
78	W7091 Blackhawk Island Road	Aug-1998	783.0	$ 203,775	-2.4	$ -	$ -	$ -	$ -	$ -	$ 112,253	0%
77	W7616 Blackhawk Island Road	Feb-1999	782.0	$ 129,675	-1.4	$ -	$ -	$ -	$ -	$ -	$ 115,429	0%
83	W7114 Blackhawk Island Road	Mar-1999	781.8	$ 76,000	-1.1	$ -	$ -	$ -	$ -	$ -	$ 88,296	0%
80	W7126 Blackhawk Island Road	Apr-1999	783.1	$ 72,960	-2.4	$ -	$ -	$ -	$ -	$ -	$ 86,471	0%
79	W7366 Blackhawk Island Road	Jun-1999	786.0	$ 107,445	-5.4	$ -	$ -	$ -	$ -	$ -	$ 170,317	0%
81	W7324 Blackhawk Island Road	Sep-1999	782.9	$ 81,510	-2.2	$ -	$ -	$ -	$ -	$ -	$ 87,622	0%
87	W7143 Blackhawk Island Road	Oct-2003	780.5	$ 33,060	0.1	$ -	$ -	$ -	$ -	$ -	$ 67,713	0%
89	W7679 Lamp Road	Oct-2003	781.7	$ 65,360	-1.0	$ -	$ -	$ -	$ -	$ -	$ 209,498	0%
88	W7139 Blackhawk Island Road	Oct-2003	780.7	$ 74,480	-0.1	$ -	$ -	$ -	$ -	$ -	$ 53,623	0%
86	W7084 Blackhawk Island Road	Aug-2004	781.9	$ 71,250	-1.3	$ -	$ -	$ -	$ -	$ -	$ 70,279	0%
91	W6984 Blackhawk Island Road	Aug-2006	779.2	$ 114,000	1.4	$ -	$ -	$ -	$ -	$ -	$ 156,680	0%
90	W7689 Lamp Road	Mar-2008	780.9	$ 133,000	-0.2	$ -	$ -	$ -	$ -	$ -	$ 288,474	0%
					TOTAL	$ 8,372	$ 7,227	$ -	$ 13,538	$ 29,137	$ 584,328	5%

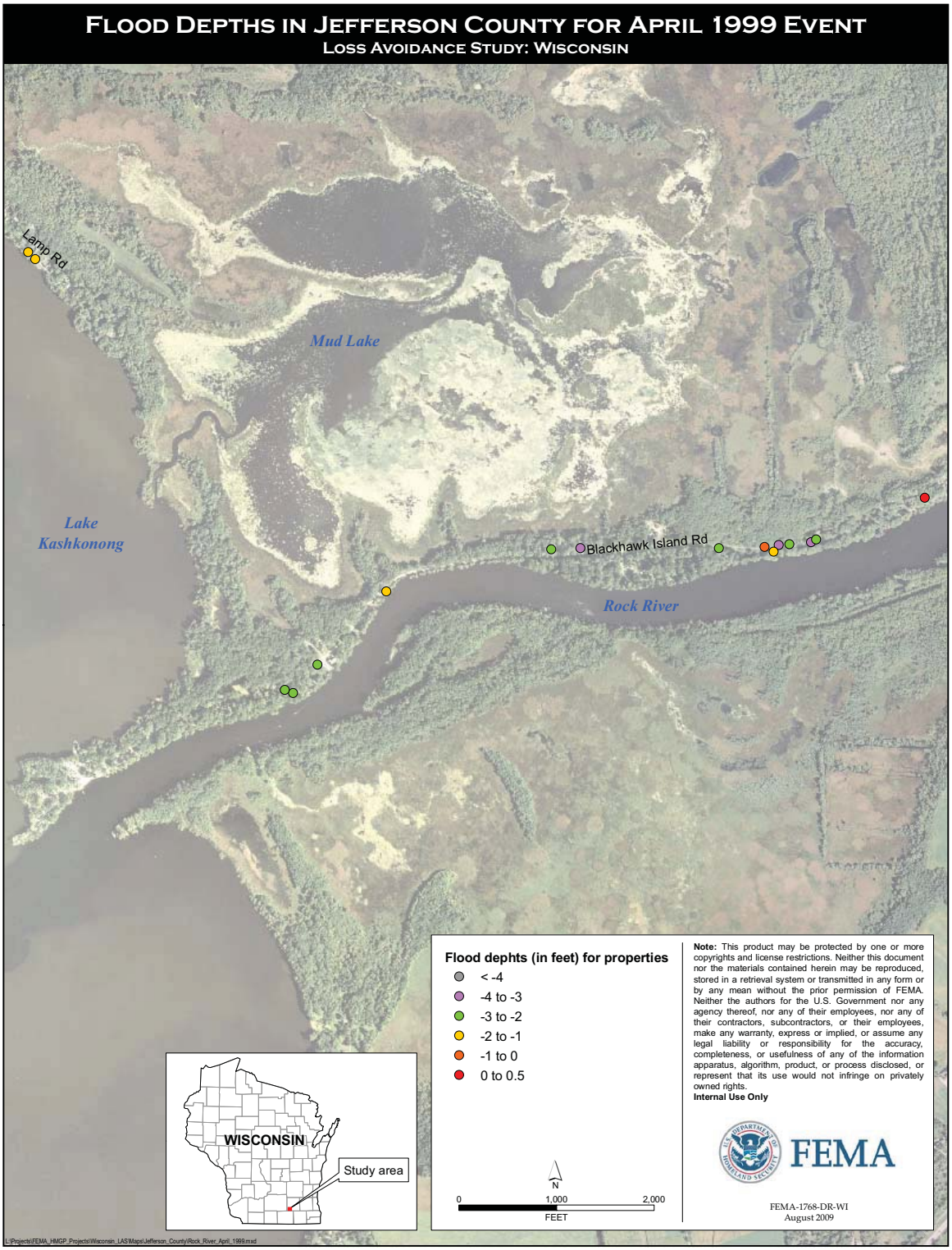
[1] *Vertical datum information was not provided with the first floor elevation (FFE) information supplied by the county. Elevations were assumed to be relative to the National Geodetic Vertical Datum of 1929 (NGVD).*

[2] *Building replacement value (BRV) based on unit cost per square foot of living space for the county.*

[3] *Project investment costs for each event only include the project costs for the buildings that were included in the analysis for that event.*

Not included in the calculations - the acquisition was not completed before the event.

Figure C.3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Mud Lake
Lake Kashkonong
Blackhawk Island Rd
Rock River
WISCONSIN
Study area
Flood depths (in feet) for properties
< -4
-4 to -3
-3 to -2
-2 to -1
-1 to 0
0 to 0.5
N
0
1,000
2,000
FEET
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Table C.3

Loss Estimation and ROI Calculations for April 1999 Event in Jefferson County

BLDG NO.	ADDRESS	ACQUISITION COMPLETION DATE	FFE (FT, NGVD)[1]	2009 BRV[2]	FLOOD DEPTH (FT)	BUILDING DAMAGE	CONTENTS DAMAGE	DISPLACEMENT COSTS	DISRUPTION COSTS	TOTAL LOSSES AVOIDED	PROJECT INVESTMENT[3]	RETURN ON INVESTMENT
84	W7521 Blackhawk Island Road	Nov-1989	781.4	$ 68,020	-1.7	$ 476	$ 457	$ -	$ 2,564	$ 3,497	$ 162,919	2%
76	W7191 Blackhawk Island Road	Sep-1995	782.0	$ 81,225	-2.3	$ -	$ -	$ -	$ -	$ -	$ 88,193	0%
85	W7119 Blackhawk Island Road	Nov-1995	785.4	$ 49,685	-5.7	$ -	$ -	$ -	$ -	$ -	$ 144,654	0%
75	W7622 &W7624 Blackhawk Island Road	Feb-1996	782.0	$ 148,770	-2.3	$ -	$ -	$ -	$ -	$ -	$ 132,334	0%
74	W7352 Blackhawk Island Road	Jun-1996	782.0	$ 66,500	-2.3	$ -	$ -	$ -	$ -	$ -	$ 56,228	0%
82	W7664 Blackhawk Island Road	Dec-1997	782.0	$ 83,410	-2.3	$ -	$ -	$ -	$ -	$ -	$ 100,617	0%
78	W7091 Blackhawk Island Road	Aug-1998	783.0	$ 203,775	-3.4	$ -	$ -	$ -	$ -	$ -	$ 112,253	0%
77	W7616 Blackhawk Island Road	Feb-1999	782.0	$ 129,675	-2.3	$ -	$ -	$ -	$ -	$ -	$ 115,429	0%
83	W7114 Blackhawk Island Road	Mar-1999	781.8	$ 76,000	-2.1	$ -	$ -	$ -	$ -	$ -	$ 88,296	0%
80	W7126 Blackhawk Island Road	Apr-1999	783.1	$ 72,960	-3.4	$ -	$ -	$ -	$ -	$ -	$ 86,471	0%
79	W7366 Blackhawk Island Road	Jun-1999	786.0	$ 107,445	-6.3	$ -	$ -	$ -	$ -	$ -	$ 170,317	0%
81	W7324 Blackhawk Island Road	Sep-1999	782.9	$ 81,510	-3.2	$ -	$ -	$ -	$ -	$ -	$ 87,622	0%
87	W7143 Blackhawk Island Road	Oct-2003	780.5	$ 33,060	-0.8	$ -	$ -	$ -	$ -	$ -	$ 67,713	0%
89	W7679 Lamp Road	Oct-2003	781.7	$ 65,360	-2.0	$ -	$ -	$ -	$ -	$ -	$ 209,498	0%
88	W7139 Blackhawk Island Road	Oct-2003	780.7	$ 74,480	-1.0	$ -	$ -	$ -	$ -	$ -	$ 53,623	0%
86	W7084 Blackhawk Island Road	Aug-2004	781.9	$ 71,250	-2.3	$ -	$ -	$ -	$ -	$ -	$ 70,279	0%
91	W6984 Blackhawk Island Road	Aug-2006	779.2	$ 114,000	0.5	$ -	$ -	$ -	$ -	$ -	$ 156,680	0%
90	W7689 Lamp Road	Mar-2008	780.9	$ 133,000	-1.2	$ -	$ -	$ -	$ -	$ -	$ 288,474	0%
					TOTAL	$ 476	$ 457	$ -	$ 2,564	$ 3,497	$ 1,087,395	0%

[1] *Vertical datum information was not provided with the first floor elevation (FFE) information supplied by the county. Elevations were assumed to be relative to the National Geodetic Vertical Datum of 1929 (NGVD).*

[2] *Building replacement value (BRV) based on unit cost per square foot of living space for the county.*

[3] *Project investment costs for each event only include the project costs for the buildings that were included in the analysis for that event.*

Not included in the calculations - the acquisition was not completed before the event.

Figure C.4

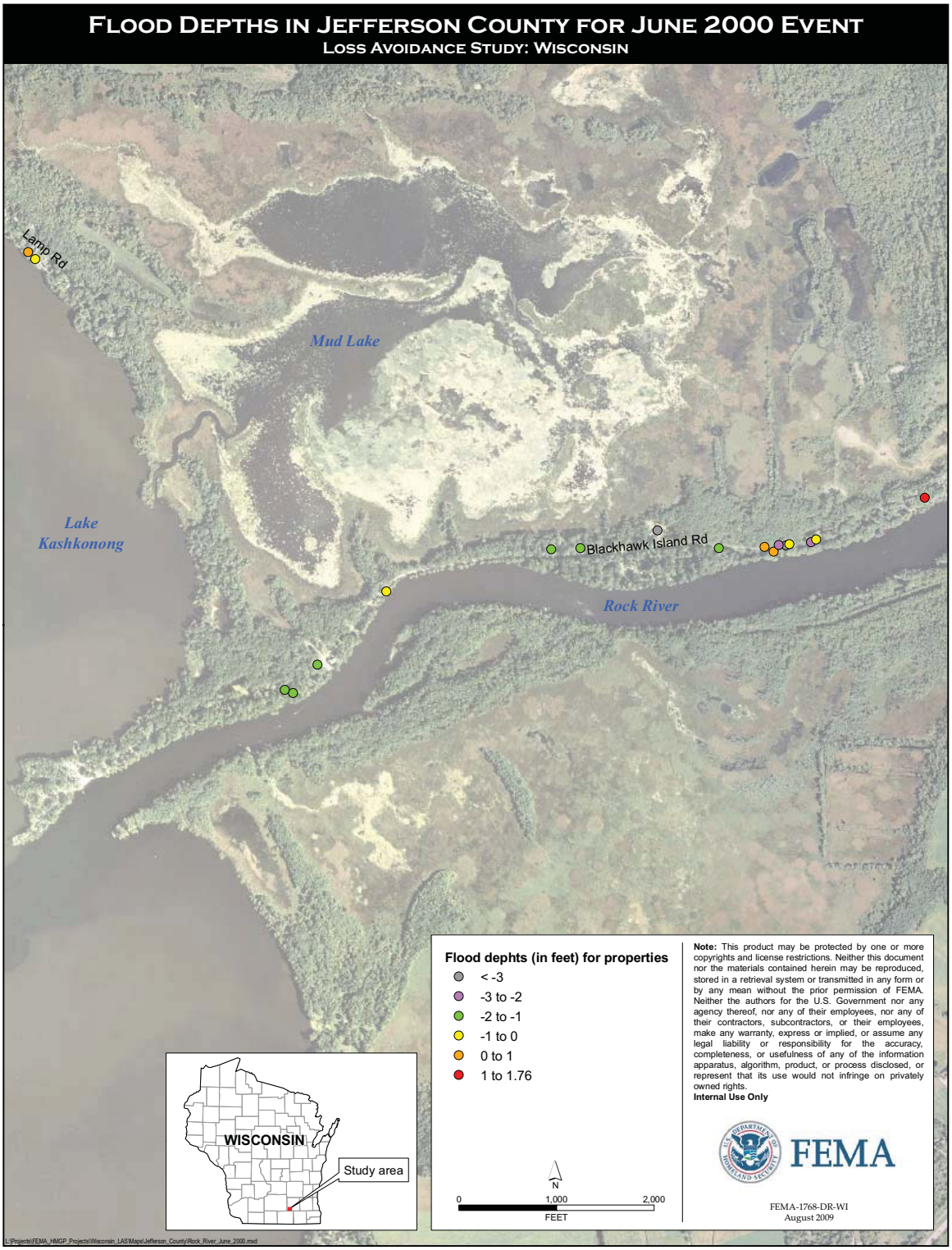
Flood Depths in Jefferson County for June 2000 Event
Loss Avoidance Study: Wisconsin
Lamp Rd
Mud Lake
Lake Kashkonong
Blackhawk Island Rd
Rock River
WISCONSIN
Study area
Flood depths (in feet) for properties
< -3
-3 to -2
-2 to -1
-1 to 0
0 to 1
1 to 1.76
N
0
1,000
2,000
FEET
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Table C.4

Loss Estimation and ROI Calculations for June 2000 Event in Jefferson County

BLDG NO.	ADDRESS	ACQUISITION COMPLETION DATE	FFE (FT, NGVD)[1]	2009 BRV[2]	FLOOD DEPTH (FT)	BUILDING DAMAGE	CONTENTS DAMAGE	DISPLACEMENT COSTS	DISRUPTION COSTS	TOTAL LOSSES AVOIDED	PROJECT INVESTMENT[3]	RETURN ON INVESTMENT
84	W7521 Blackhawk Island Road	Nov-1989	781.4	$ 68,020	-0.4	$ 5,852	$ 3,804	$ -	$ 6,119	$ 15,775	$ 162,919	**10%**
76	W7191 Blackhawk Island Road	Sep-1995	782.0	$ 81,225	-1.0	$ 1,949	$ 1,871	$ -	$ 3,328	$ 7,149	$ 88,193	**8%**
85	W7119 Blackhawk Island Road	Nov-1995	785.4	$ 49,685	-4.4	$ -	$ -	$ -	$ -	$ -	$ 144,654	**0%**
75	W7622 &W7624 Blackhawk Island Road	Feb-1996	782.0	$ 148,770	-1.0	$ 3,570	$ 3,428	$ -	$ 3,328	$ 10,326	$ 132,334	**8%**
74	W7352 Blackhawk Island Road	Jun-1996	782.0	$ 66,500	-1.0	$ 1,596	$ 1,532	$ -	$ 3,328	$ 6,456	$ 56,228	**11%**
82	W7664 Blackhawk Island Road	Dec-1997	782.0	$ 83,410	-1.0	$ 2,002	$ 1,922	$ -	$ 3,328	$ 7,252	$ 100,617	**7%**
78	W7091 Blackhawk Island Road	Aug-1998	783.0	$ 203,775	-2.1	$ -	$ -	$ -	$ -	$ -	$ 112,253	**0%**
77	W7616 Blackhawk Island Road	Feb-1999	782.0	$ 129,675	-1.0	$ 3,112	$ 2,988	$ -	$ 3,328	$ 9,428	$ 115,429	**8%**
83	W7114 Blackhawk Island Road	Mar-1999	781.8	$ 76,000	-0.8	$ 3,640	$ 2,734	$ -	$ 4,403	$ 10,776	$ 88,296	**12%**
80	W7126 Blackhawk Island Road	Apr-1999	783.1	$ 72,960	-2.1	$ -	$ -	$ -	$ -	$ -	$ 86,471	**0%**
79	W7366 Blackhawk Island Road	Jun-1999	786.0	$ 107,445	-5.1	$ -	$ -	$ -	$ -	$ -	$ 170,317	**0%**
81	W7324 Blackhawk Island Road	Sep-1999	782.9	$ 81,510	-1.9	$ 163	$ 156	$ -	$ 2,339	$ 2,658	$ 87,622	**3%**
87	W7143 Blackhawk Island Road	Oct-2003	780.5	$ 33,060	0.5	$ -	$ -	$ -	$ -	$ -	$ 67,713	**0%**
89	W7679 Lamp Road	Oct-2003	781.7	$ 65,360	-0.7	$ -	$ -	$ -	$ -	$ -	$ 209,498	**0%**
88	W7139 Blackhawk Island Road	Oct-2003	780.7	$ 74,480	0.3	$ -	$ -	$ -	$ -	$ -	$ 53,623	**0%**
86	W7084 Blackhawk Island Road	Aug-2004	781.9	$ 71,250	-1.0	$ -	$ -	$ -	$ -	$ -	$ 70,279	**0%**
91	W6984 Blackhawk Island Road	Aug-2006	779.2	$ 114,000	1.8	$ -	$ -	$ -	$ -	$ -	$ 156,680	**0%**
90	W7689 Lamp Road	Mar-2008	780.9	$ 133,000	0.1	$ -	$ -	$ -	$ -	$ -	$ 288,474	**0%**
					TOTAL	**$ 21,885**	**$ 18,435**	**$ -**	**$ 29,501**	**$ 69,821**	**$ 1,345,334**	**5%**

[1] *Vertical datum information was not provided with the first floor elevation (FFE) information supplied by the county. Elevations were assumed to be relative to the National Geodetic Vertical Datum of 1929 (NGVD).*

[2] *Building replacement value (BRV) based on unit cost per square foot of living space for the county.*

[3] *Project investment costs for each event only include the project costs for the buildings that were included in the analysis for that event.*

Not included in the calculations - the acquisition was not completed before the event.

Figure C.5

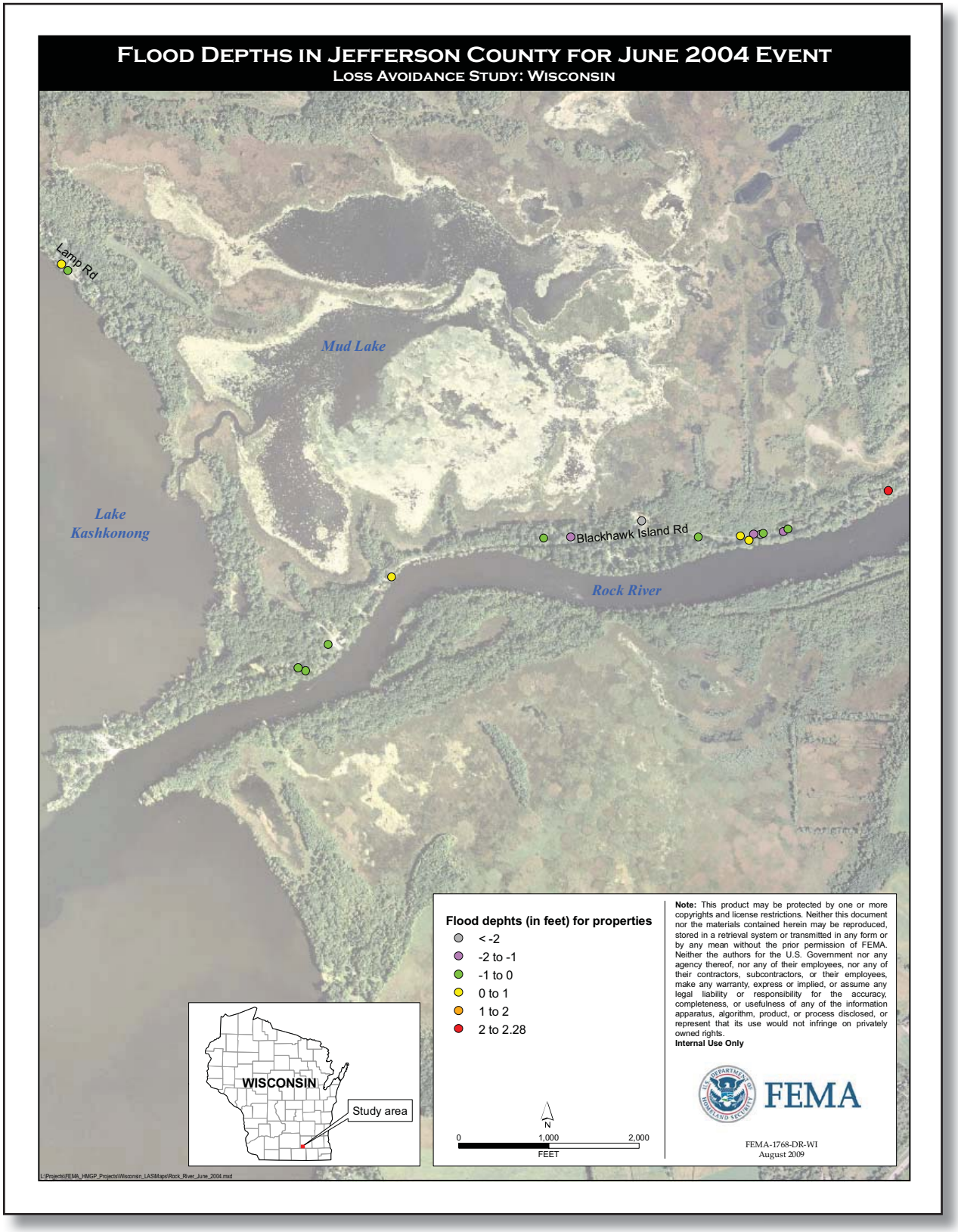
Flood Depths in Jefferson County for June 2004 Event
Loss Avoidance Study: Wisconsin
Lamp Rd
Mud Lake
Lake Kashkonong
Blackhawk Island Rd
Rock River
WISCONSIN
Study area
Flood dephts (in feet) for properties
< -2
-2 to -1
-1 to 0
0 to 1
1 to 2
2 to 2.28
N
0
1,000
2,000
FEET
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Table C.5

Loss Estimation and ROI Calculations for June 2004 Event in Jefferson County

BLDG NO.	ADDRESS	ACQUISITION COMPLETION DATE	FFE (FT, NGVD)[1]	2009 BRV[2]	FLOOD DEPTH (FT)	BUILDING DAMAGE	CONTENTS DAMAGE	DISPLACEMENT COSTS	DISRUPTION COSTS	TOTAL LOSSES AVOIDED	PROJECT INVESTMENT[3]	RETURN ON INVESTMENT
84	W7521 Blackhawk Island Road	Nov-1989	781.4	$ 68,020	0.1	$ 9,653	$ 5,793	$ 122	$ 8,632	$ 24,200	$ 162,919	**15%**
76	W7191 Blackhawk Island Road	Sep-1995	782.0	$ 81,225	-0.5	$ 6,280	$ 4,172	$ -	$ 5,726	$ 16,178	$ 88,193	**18%**
85	W7119 Blackhawk Island Road	Nov-1995	785.4	$ 49,685	-3.9	$ -	$ -	$ -	$ -	$ -	$ 144,654	**0%**
75	W7622 &W7624 Blackhawk Island Road	Feb-1996	782.0	$ 148,770	-0.5	$ 11,503	$ 7,641	$ -	$ 5,726	$ 24,870	$ 132,334	**19%**
74	W7352 Blackhawk Island Road	Jun-1996	782.0	$ 66,500	-0.5	$ 5,142	$ 3,415	$ -	$ 5,726	$ 14,284	$ 56,228	**25%**
82	W7664 Blackhawk Island Road	Dec-1997	782.0	$ 83,410	-0.5	$ 6,449	$ 4,284	$ -	$ 5,726	$ 16,460	$ 100,617	**16%**
78	W7091 Blackhawk Island Road	Aug-1998	783.0	$ 203,775	-1.5	$ 2,292	$ 2,201	$ -	$ 2,755	$ 7,248	$ 112,253	**6%**
77	W7616 Blackhawk Island Road	Feb-1999	782.0	$ 129,675	-0.5	$ 10,026	$ 6,660	$ -	$ 5,726	$ 22,413	$ 115,429	**19%**
83	W7114 Blackhawk Island Road	Mar-1999	781.8	$ 76,000	-0.3	$ 7,947	$ 4,986	$ -	$ 6,952	$ 19,886	$ 88,296	**23%**
80	W7126 Blackhawk Island Road	Apr-1999	783.1	$ 72,960	-1.6	$ 730	$ 700	$ -	$ 2,699	$ 4,129	$ 86,471	**5%**
79	W7366 Blackhawk Island Road	Jun-1999	786.0	$ 107,445	-4.5	$ -	$ -	$ -	$ -	$ -	$ 170,317	**0%**
81	W7324 Blackhawk Island Road	Sep-1999	782.9	$ 81,510	-1.4	$ 1,223	$ 1,174	$ -	$ 2,923	$ 5,320	$ 87,622	**6%**
87	W7143 Blackhawk Island Road	Oct-2003	780.5	$ 33,060	1.0	$ 7,638	$ 4,363	$ 727	$ 12,639	$ 25,366	$ 67,713	**37%**
89	W7679 Lamp Road	Oct-2003	781.7	$ 65,360	-0.2	$ 7,547	$ 4,661	$ -	$ 7,442	$ 19,650	$ 209,498	**9%**
88	W7139 Blackhawk Island Road	Oct-2003	780.7	$ 74,480	0.8	$ 15,732	$ 9,054	$ 1,303	$ 11,749	$ 37,837	$ 53,623	**71%**
86	W7084 Blackhawk Island Road	Aug-2004	781.9	$ 71,250	-0.4	$ -	$ -	$ -	$ -	$ -	$ 70,279	**0%**
91	W6984 Blackhawk Island Road	Aug-2006	779.2	$ 114,000	2.3	$ -	$ -	$ -	$ -	$ -	$ 156,680	**0%**
90	W7689 Lamp Road	Mar-2008	780.9	$ 133,000	0.6	$ -	$ -	$ -	$ -	$ -	$ 288,474	**0%**
					TOTAL	**$ 92,162**	**$ 59,103**	**$ 2,151**	**$ 84,422**	**$ 237,839**	**$ 1,676,168**	**14%**

[1] *Vertical datum information was not provided with the first floor elevation (FFE) information supplied by the county. Elevations were assumed to be relative to the National Geodetic Vertical Datum of 1929 (NGVD).*

[2] *Building replacement value (BRV) based on unit cost per square foot of living space for the county.*

[3] *Project investment costs for each event only include the project costs for the buildings that were included in the analysis for that event.*

Not included in the calculations - the acquisition was not completed before the event.

Figure C.6

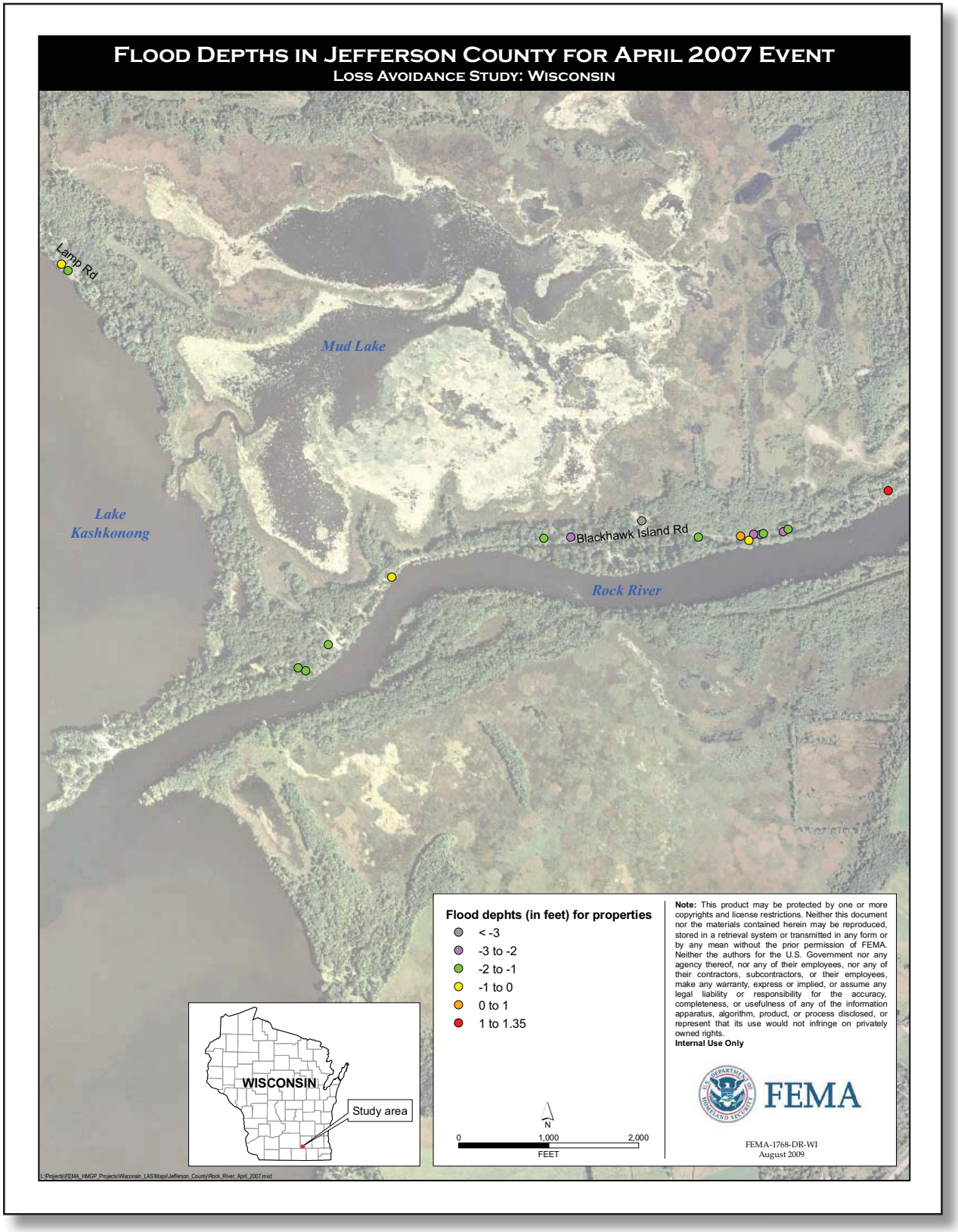
Flood Depths in Jefferson County for April 2007 Event
Loss Avoidance Study: Wisconsin
Lamp Rd
Mud Lake
Lake Kashkonong
Blackhawk Island Rd
Rock River
WISCONSIN
Study area
Flood depths (in feet) for properties
< -3
-3 to -2
-2 to -1
-1 to 0
0 to 1
1 to 1.35
N
0
1,000
2,000
FEET
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Table C.6

Loss Estimation and ROI Calculations for April 2007 Event in Jefferson County

BLDG NO.	ADDRESS	ACQUISITION COMPLETION DATE	FFE (FT, NGVD)[1]	2009 BRV[2]	FLOOD DEPTH (FT)	BUILDING DAMAGE	CONTENTS DAMAGE	DISPLACEMENT COSTS	DISRUPTION COSTS	TOTAL LOSSES AVOIDED	PROJECT INVESTMENT[3]	RETURN ON INVESTMENT
84	W7521 Blackhawk Island Road	Nov-1989	781.4	$ 68,020	-0.9	$ 2,813	$ 2,214	$ -	$ 4,109	$ 9,135	$ 162,919	6%
76	W7191 Blackhawk Island Road	Sep-1995	782.0	$ 81,225	-1.5	$ 1,117	$ 1,072	$ -	$ 2,867	$ 5,056	$ 88,193	6%
85	W7119 Blackhawk Island Road	Nov-1995	785.4	$ 49,685	-4.8	$ -	$ -	$ -	$ -	$ -	$ 144,654	0%
75	W7622 &W7624 Blackhawk Island Road	Feb-1996	782.0	$ 148,770	-1.5	$ 2,046	$ 1,964	$ -	$ 2,867	$ 6,877	$ 132,334	5%
74	W7352 Blackhawk Island Road	Jun-1996	782.0	$ 66,500	-1.5	$ 914	$ 878	$ -	$ 2,867	$ 4,659	$ 56,228	8%
82	W7664 Blackhawk Island Road	Dec-1997	782.0	$ 83,410	-1.5	$ 1,147	$ 1,101	$ -	$ 2,867	$ 5,115	$ 100,617	5%
78	W7091 Blackhawk Island Road	Aug-1998	783.0	$ 203,775	-2.5	$ -	$ -	$ -	$ -	$ -	$ 112,253	0%
77	W7616 Blackhawk Island Road	Feb-1999	782.0	$ 129,675	-1.5	$ 1,783	$ 1,712	$ -	$ 2,867	$ 6,362	$ 115,429	6%
83	W7114 Blackhawk Island Road	Mar-1999	781.8	$ 76,000	-1.2	$ 1,520	$ 1,459	$ -	$ 3,148	$ 6,128	$ 88,296	7%
80	W7126 Blackhawk Island Road	Apr-1999	783.1	$ 72,960	-2.5	$ -	$ -	$ -	$ -	$ -	$ 86,471	0%
79	W7366 Blackhawk Island Road	Jun-1999	786.0	$ 107,445	-5.5	$ -	$ -	$ -	$ -	$ -	$ 170,317	0%
81	W7324 Blackhawk Island Road	Sep-1999	782.9	$ 81,510	-2.3	$ -	$ -	$ -	$ -	$ -	$ 87,622	0%
87	W7143 Blackhawk Island Road	Oct-2003	780.5	$ 33,060	0.0	$ 4,594	$ 2,764	$ 37	$ 8,498	$ 15,893	$ 67,713	23%
89	W7679 Lamp Road	Oct-2003	781.7	$ 65,360	-1.1	$ 1,471	$ 1,412	$ -	$ 3,261	$ 6,143	$ 209,498	3%
88	W7139 Blackhawk Island Road	Oct-2003	780.7	$ 74,480	-0.2	$ 8,763	$ 5,396	$ -	$ 7,540	$ 21,699	$ 53,623	40%
86	W7084 Blackhawk Island Road	Aug-2004	781.9	$ 71,250	-1.4	$ 1,104	$ 1,060	$ -	$ 2,946	$ 5,111	$ 70,279	7%
91	W6984 Blackhawk Island Road	Aug-2006	779.2	$ 114,000	1.3	$ 30,073	$ 16,997	$ 3,451	$ 14,113	$ 64,635	$ 156,680	41%
90	W7689 Lamp Road	Mar-2008	780.9	$ 133,000	-0.3	$ -	$ -	$ -	$ -	$ -	$ 288,474	0%
					TOTAL	$ 57,344	$ 38,029	$ 3,488	$ 57,952	$ 156,813	$ 1,903,128	8%

[1] *Vertical datum information was not provided with the first floor elevation (FFE) information supplied by the county. Elevations were assumed to be relative to the National Geodetic Vertical Datum of 1929 (NGVD).*

[2] *Building replacement value (BRV) based on unit cost per square foot of living space for the county.*

[3] *Project investment costs for each event only include the project costs for the buildings that were included in the analysis for that event.*

Not included in the calculations - the acquisition was not completed before the event.

Figure C.7

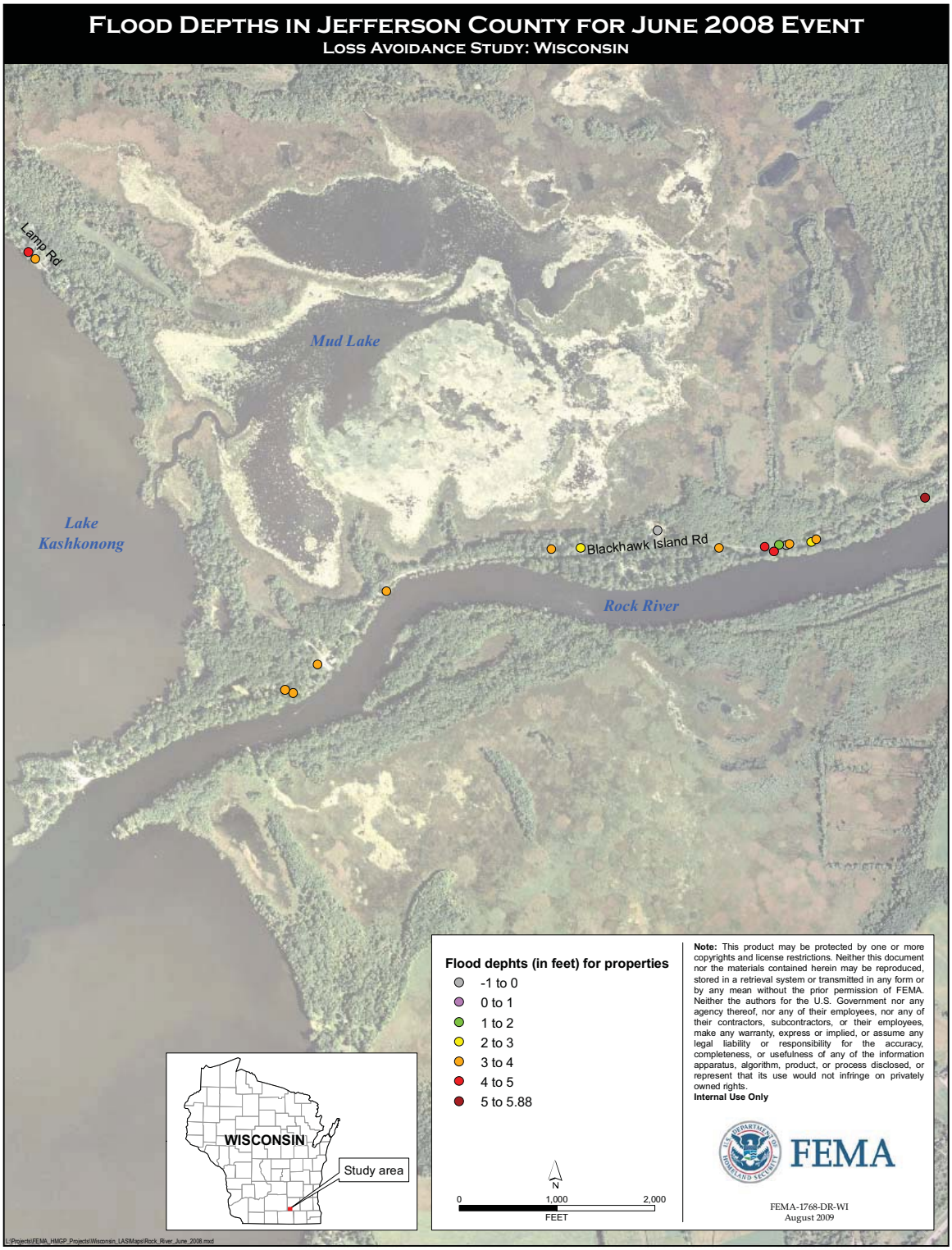
Flood Depths in Jefferson County for June 2008 Event
Loss Avoidance Study: Wisconsin
Lamp Rd
Mud Lake
Lake Kashkonong
Blackhawk Island Rd
Rock River
WISCONSIN
Study area
Flood dephts (in feet) for properties
-1 to 0
0 to 1
1 to 2
2 to 3
3 to 4
4 to 5
5 to 5.88
N
0
1,000
2,000
FEET
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Table C.7

Loss Estimation and ROI Calculations for June 2008 Event in Jefferson County

BLDG NO.	ADDRESS	ACQUISITION COMPLETION DATE	FFE (FT, NGVD)[1]	2009 BRV[2]	FLOOD DEPTH (FT)	BUILDING DAMAGE	CONTENTS DAMAGE	DISPLACEMENT COSTS	DISRUPTION COSTS	TOTAL LOSSES AVOIDED	PROJECT INVESTMENT[3]	RETURN ON INVESTMENT
84	W7521 Blackhawk Island Road	Nov-1989	781.4	$ 68,020	3.7	$ 30,514	$ 16,676	$ 5,613	$ 22,425	$ 75,228	$ 162,919	**46%**
76	W7191 Blackhawk Island Road	Sep-1995	782.0	$ 81,225	3.1	$ 33,026	$ 18,110	$ 5,610	$ 20,536	$ 77,282	$ 88,193	**88%**
85	W7119 Blackhawk Island Road	Nov-1995	785.4	$ 49,685	-0.3	$ 5,141	$ 3,232	$ -	$ 6,903	$ 15,276	$ 144,654	**11%**
75	W7622 &W7624 Blackhawk Island Road	Feb-1996	782.0	$ 148,770	3.1	$ 60,490	$ 33,170	$ 10,276	$ 20,536	$ 124,471	$ 132,334	**94%**
74	W7352 Blackhawk Island Road	Jun-1996	782.0	$ 66,500	3.1	$ 27,039	$ 14,827	$ 4,593	$ 20,536	$ 66,995	$ 56,228	**119%**
82	W7664 Blackhawk Island Road	Dec-1997	782.0	$ 83,410	3.1	$ 33,915	$ 18,597	$ 5,761	$ 20,536	$ 78,809	$ 100,617	**78%**
78	W7091 Blackhawk Island Road	Aug-1998	783.0	$ 203,775	2.1	$ 66,227	$ 36,893	$ 9,368	$ 16,866	$ 129,354	$ 112,253	**115%**
77	W7616 Blackhawk Island Road	Feb-1999	782.0	$ 129,675	3.1	$ 52,726	$ 28,912	$ 8,957	$ 20,536	$ 111,131	$ 115,429	**96%**
83	W7114 Blackhawk Island Road	Mar-1999	781.8	$ 76,000	3.3	$ 32,232	$ 17,648	$ 5,675	$ 21,323	$ 76,878	$ 88,296	**87%**
80	W7126 Blackhawk Island Road	Apr-1999	783.1	$ 72,960	2.0	$ 23,420	$ 13,060	$ 3,272	$ 16,686	$ 56,438	$ 86,471	**65%**
79	W7366 Blackhawk Island Road	Jun-1999	786.0	$ 107,445	-0.9	$ 3,389	$ 2,946	$ -	$ 3,667	$ 10,002	$ 170,317	**6%**
81	W7324 Blackhawk Island Road	Sep-1999	782.9	$ 81,510	2.2	$ 27,469	$ 15,259	$ 4,021	$ 17,406	$ 64,155	$ 87,622	**73%**
87	W7143 Blackhawk Island Road	Oct-2003	780.5	$ 33,060	4.6	$ 33,060	$ 9,091	$ 3,396	$ 25,024	$ 70,570	$ 67,713	**104%**
89	W7679 Lamp Road	Oct-2003	781.7	$ 65,360	3.4	$ 28,177	$ 15,419	$ 5,027	$ 21,638	$ 70,261	$ 209,498	**34%**
88	W7139 Blackhawk Island Road	Oct-2003	780.7	$ 74,480	4.4	$ 36,807	$ 20,019	$ 7,316	$ 24,475	$ 88,616	$ 53,623	**165%**
86	W7084 Blackhawk Island Road	Aug-2004	781.9	$ 71,250	3.2	$ 29,319	$ 16,070	$ 5,033	$ 20,756	$ 71,179	$ 70,279	**101%**
91	W6984 Blackhawk Island Road	Aug-2006	779.2	$ 114,000	5.9	$ 114,000	$ 35,541	$ 15,032	$ 28,313	$ 192,886	$ 156,680	**123%**
90	W7689 Lamp Road	Mar-2008	780.9	$ 133,000	4.2	$ 43,103	$ 25,387	$ 12,557	$ 16,825	$ 97,871	$ 288,474	**34%**
					TOTAL	**$ 680,052**	**$ 340,856**	**$ 111,508**	**$ 344,988**	**$ 1,477,403**	**$ 2,191,601**	**67%**

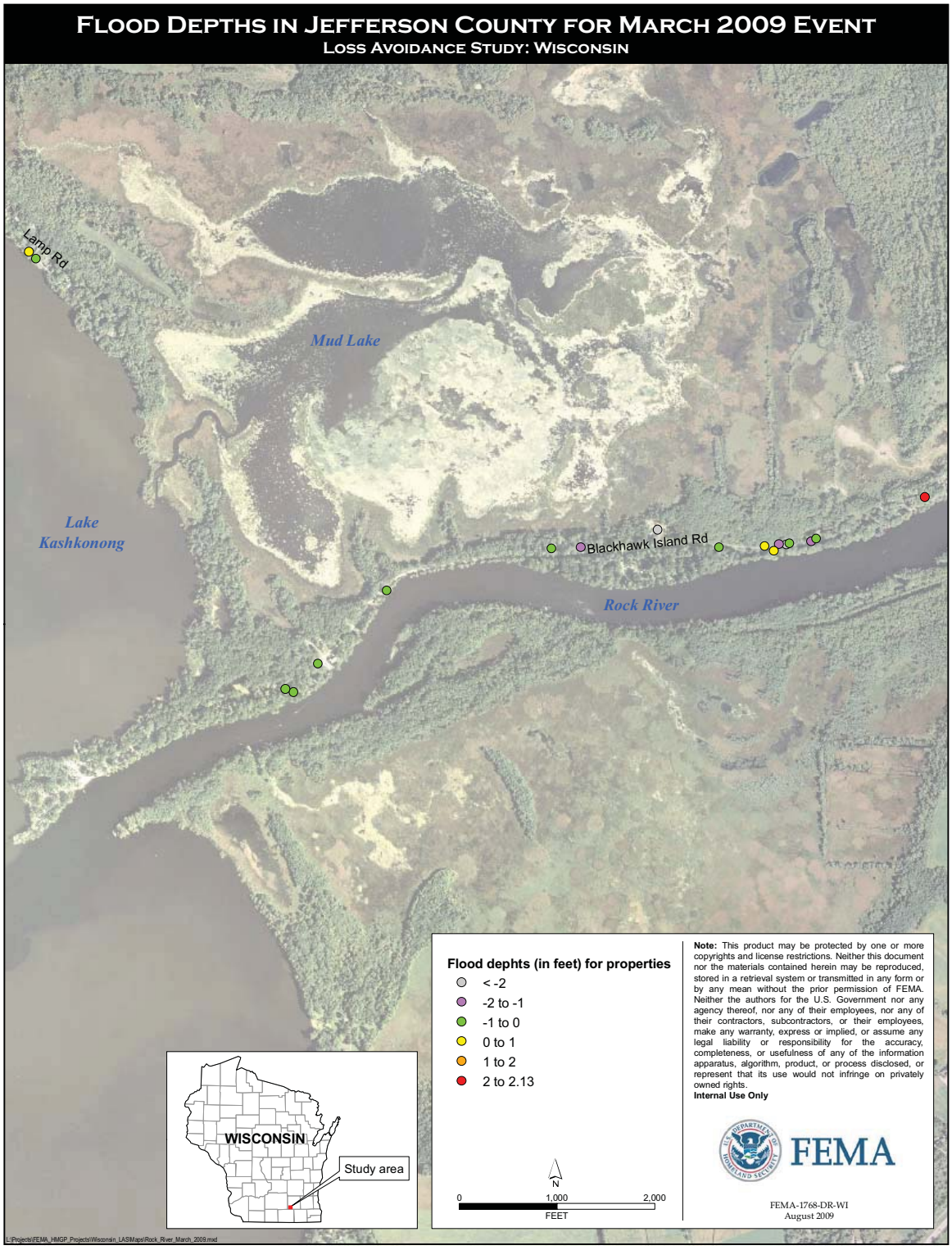
[1] *Vertical datum information was not provided with the first floor elevation (FFE) information supplied by the county. Elevations were assumed to be relative to the National Geodetic Vertical Datum of 1929 (NGVD).*

[2] *Building replacement value (BRV) based on unit cost per square foot of living space for the county.*

[3] *Project investment costs for each event only include the project costs for the buildings that were included in the analysis for that event.*

Not included in the calculations - the acquisition was not completed before the event.

Figure C.8


Flood Depths in Jefferson County for March 2009 Event
Loss Avoidance Study: Wisconsin
Lamp Rd
Mud Lake
Lake Kashkonong
Blackhawk Island Rd
Rock River
Flood dephts (in feet) for properties
< -2
-2 to -1
-1 to 0
0 to 1
1 to 2
2 to 2.13
N
0
1,000
2,000
FEET
WISCONSIN
Study area
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FEMA-1768-DR-WI
August 2009
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Table C.8

Loss Estimation and ROI Calculations for March 2009 Event in Jefferson County

BLDG NO.	ADDRESS	ACQUISITION COMPLETION DATE	FFE (FT, NGVD)[1]	2009 BRV[2]	FLOOD DEPTH (FT)	BUILDING DAMAGE	CONTENTS DAMAGE	DISPLACEMENT COSTS	DISRUPTION COSTS	TOTAL LOSSES AVOIDED	PROJECT INVESTMENT[3]	RETURN ON INVESTMENT
84	W7521 Blackhawk Island Road	Nov-1989	781.4	$ 68,020	-0.1	$ 8,596	$ 5,238	$ -	$ 7,932	$ 21,766	$ 162,919	**13%**
76	W7191 Blackhawk Island Road	Sep-1995	782.0	$ 81,225	-0.7	$ 4,952	$ 3,477	$ -	$ 4,991	$ 13,421	$ 88,193	**15%**
85	W7119 Blackhawk Island Road	Nov-1995	785.4	$ 49,685	-4.0	$ -	$ -	$ -	$ -	$ -	$ 144,654	**0%**
75	W7622 &W7624 Blackhawk Island Road	Feb-1996	782.0	$ 148,770	-0.7	$ 9,071	$ 6,369	$ -	$ 4,991	$ 20,430	$ 132,334	**15%**
74	W7352 Blackhawk Island Road	Jun-1996	782.0	$ 66,500	-0.7	$ 4,055	$ 2,847	$ -	$ 4,991	$ 11,892	$ 56,228	**21%**
82	W7664 Blackhawk Island Road	Dec-1997	782.0	$ 83,410	-0.7	$ 5,086	$ 3,571	$ -	$ 4,991	$ 13,647	$ 100,617	**14%**
78	W7091 Blackhawk Island Road	Aug-1998	783.0	$ 203,775	-1.7	$ 1,528	$ 1,467	$ -	$ 2,586	$ 5,582	$ 112,253	**5%**
77	W7616 Blackhawk Island Road	Feb-1999	782.0	$ 129,675	-0.7	$ 7,906	$ 5,551	$ -	$ 4,991	$ 18,449	$ 115,429	**16%**
83	W7114 Blackhawk Island Road	Mar-1999	781.8	$ 76,000	-0.4	$ 6,705	$ 4,337	$ -	$ 6,217	$ 17,258	$ 88,296	**20%**
80	W7126 Blackhawk Island Road	Apr-1999	783.1	$ 72,960	-1.8	$ 456	$ 438	$ -	$ 2,530	$ 3,424	$ 86,471	**4%**
79	W7366 Blackhawk Island Road	Jun-1999	786.0	$ 107,445	-4.7	$ -	$ -	$ -	$ -	$ -	$ 170,317	**0%**
81	W7324 Blackhawk Island Road	Sep-1999	782.9	$ 81,510	-1.5	$ 917	$ 880	$ -	$ 2,755	$ 4,552	$ 87,622	**5%**
87	W7143 Blackhawk Island Road	Oct-2003	780.5	$ 33,060	0.8	$ 7,147	$ 4,105	$ 615	$ 11,971	$ 23,838	$ 67,713	**35%**
89	W7679 Lamp Road	Oct-2003	781.7	$ 65,360	-0.3	$ 6,478	$ 4,102	$ -	$ 6,707	$ 17,287	$ 209,498	**8%**
88	W7139 Blackhawk Island Road	Oct-2003	780.7	$ 74,480	0.6	$ 14,626	$ 8,473	$ 1,052	$ 11,081	$ 35,231	$ 53,623	**66%**
86	W7084 Blackhawk Island Road	Aug-2004	781.9	$ 71,250	-0.6	$ 4,888	$ 3,335	$ -	$ 5,334	$ 13,556	$ 70,279	**19%**
91	W6984 Blackhawk Island Road	Aug-2006	779.2	$ 114,000	2.1	$ 37,780	$ 21,014	$ 5,445	$ 17,154	$ 81,392	$ 156,680	**52%**
90	W7689 Lamp Road	Mar-2008	780.9	$ 133,000	0.5	$ 15,979	$ 8,914	$ 1,372	$ 7,652	$ 33,916	$ 288,474	**12%**
					TOTAL	**$ 136,167**	**$ 84,116**	**$ 8,485**	**$ 106,874**	**$ 335,643**	**$ 2,191,601**	**15%**

[1] *Vertical datum information was not provided with the first floor elevation (FFE) information supplied by the county. Elevations were assumed to be relative to the National Geodetic Vertical Datum of 1929 (NGVD).*

[2] *Building replacement value (BRV) based on unit cost per square foot of living space for the county.*

[3] *Project investment costs for each event only include the project costs for the buildings that were included in the analysis for that event.*

Not included in the calculations - the acquisition was not completed before the event.

Appendix D:

Summary of Losses Avoided and ROI Calculations for Crawford County

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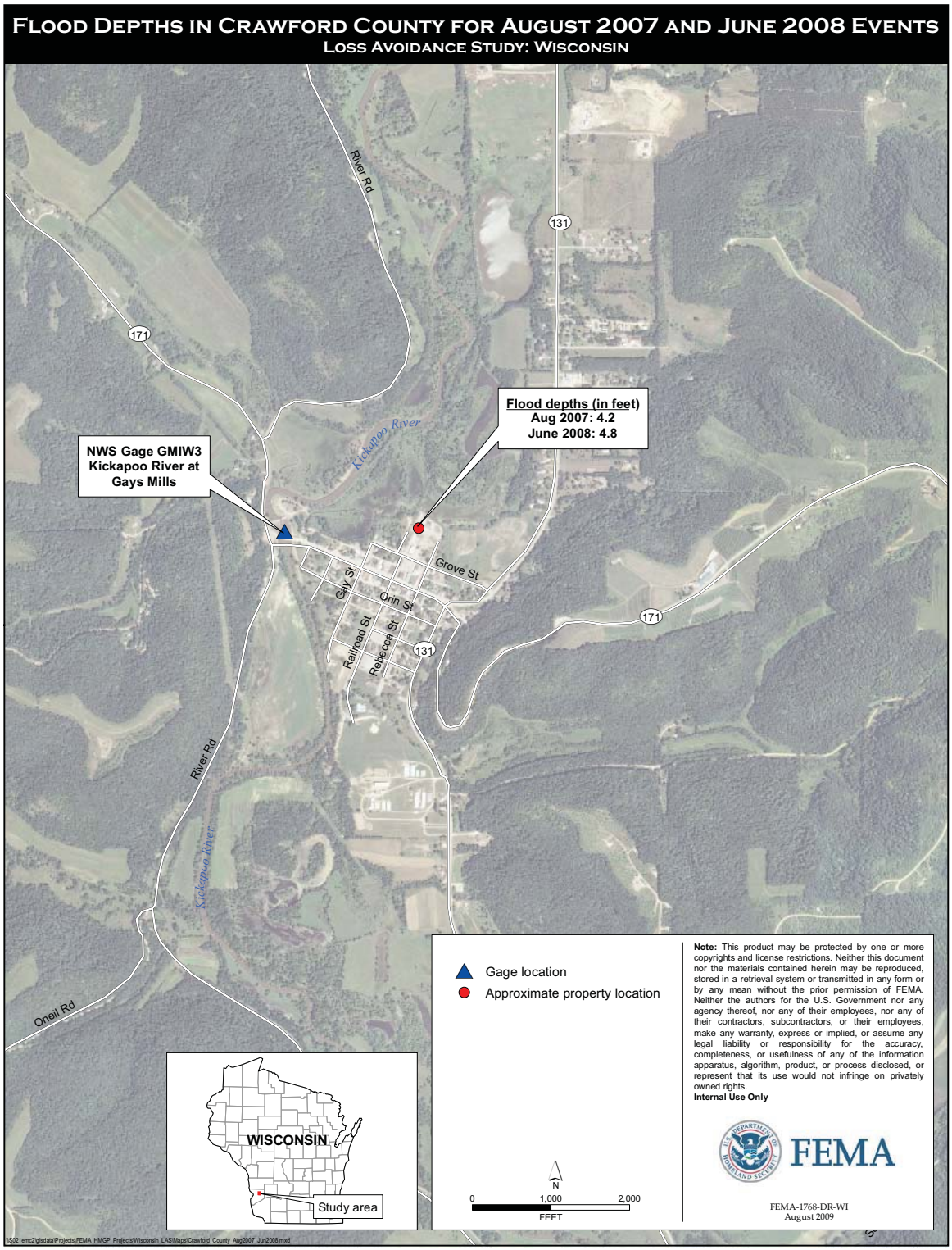
Table D.1 Losses Estimation and ROI Calculations for Crawford, August 2007 and June 2008 Event....D-4

Figure D.1


Flood Depths in Crawford County for August 2007 and June 2008 Events
Loss Avoidance Study: Wisconsin
River Rd
131
171
Flood depths (in feet)
Aug 2007: 4.2
June 2008: 4.8
NWS Gage GMIW3
Kickapoo River at
Gays Mills
Kickapoo River
Grove St
Gay St
Orin St
Railroad St
Rebecca St
131
171
River Rd
Kickapoo River
Oneil Rd
WISCONSIN
Study area
Gage location
Approximate property location
N
0
1,000
2,000
FEET
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August 2009

Table D.1

Loss Estimation and ROI Calculations for August 2007 and June 2008 Events in Crawford County

BLDG NO.	ADDRESS	STORM EVENT DATE	ACQUISITION COMPLETION DATE	FFE (FT, NGVD)[1]	2009 BRV[2]	FLOOD DEPTH (FT)	BUILDING DAMAGE	CONTENTS DAMAGE	DISPLACEMENT COSTS	LOSS OF FUNCTION[3]	TOTAL LOSSES AVOIDED	PROJECT INVESTMENT	RETURN ON INVESTMENT
92	118 North Railroad	Aug-2007	Jan-2005	700.6	$ 1,180,542	4.1	$ 313,198	$ 239,331	$ -	$ 1,282,521	$ 1,835,050	$ 663,780	**276%**
92	118 North Railroad	Jun-2008	Jan-2005	700.6	$ 1,180,542	4.8	$ 345,427	$ 265,575	$ -	$ 1,483,397	$ 2,094,399	$ 663,780	**316%**
						TOTAL	**$ 658,624**	**$ 504,906**	**$ -**	**$ 2,765,918**	**$ 3,929,449**	**$ 663,780**	**592%**

[1] *Vertical datum information was not provided with the first floor elevation (FFE) information supplied by the county. Elevations were assumed to be relative to the National Geodetic Vertical Datum of 1929 (NGVD).*

[2] *Building replacement value (BRV) based on unit cost per square foot of living space for the county.*

[3] *This value will be filled in for the next draft once estimates of business income are obtained.*

Appendix E:

Summary of Losses Avoided and ROI Calculations for All Events

List of Tables

Table E.1 Losses Estimation and ROI Calculations for All Events E-3

Table E.1 Part 1 of 4

Summary of Losses Avoided and ROI Calculations by County for All Events

Building Number	Address	Acquisition Completion Date	2009 Value of Acquisition Cost (including Demo Cost)	Total Losses Avoided	ROI (%)
1	6712 Wheatland Road, Wheatland	December-2000	$122,709	$0	0%
2	31809 77th Street, Wheatland	October-2001	$34,954	$43,095	123%
3	31417 77th Street, Wheatland	October-2002	$114,648	$193,387	169%
4	31733 77th Street, Wheatland	October-2001	$35,951	$200,226	557%
5	31826 77th Street, Wheatland	October-2001	$99,666	$29,037	29%
6	31727 77th Street, Wheatland	November-2001	$55,294	$77,794	141%
7	31911 77th Street, Wheatland	October-2001	$83,304	$136,212	164%
8	31805 71st Street, Wheatland	June-2000	$203,279	$87,159	43%
9	32114 77th Street, Wheatland	October-2001	$103,368	$5,086	5%
10	31638 76th Street, Wheatland	July-2000	$166,468	$64,428	39%
11	32132 77th Street, Wheatland	December-1999	$90,458	$121,760	135%
12	31823 77th Street, Wheatland	December-1999	$116,432	$12,040	10%
13	32005 77th Street, Wheatland	October-2002	$119,677	$134,084	112%
14	8153 Shorewood Drive, Salem	July-2000	$115,113	$71,060	62%
15	8200 No. Riverside Drive, Salem	September-2002	$130,863	$62,813	48%
16	31811 71st Street, Wheatland	June-2000	$93,912	$153,402	163%
17	31519 77th Street, Wheatland	June-2000	$105,167	$160,535	153%
18	6929 319th Avenue, Wheatland	June-2000	$98,058	$89,610	91%
19	8032 Shorewood Drive, Salem	October-2002	$133,702	$251,390	188%
20	31533 77th Street, Wheatland	October-2002	$42,029	$18,778	45%
21	607 So. Riverside Drive, Silver Lake	Sep-04	$108,830	$59,197	54%
22	445 So. Riverside Drive, Silver Lake	Feb-03	$100,568	$105,763	105%
23	6940 317th Avenue, Wheatland	Feb-02	$130,769	$3,507	3%
24	31701 77th Street, Wheatland	Oct-02	$82,325	$15,119	18%
25	6912 318th Avenue, Wheatland	Oct-02	$87,774	$51,154	58%
26	30522 80th Street, Salem	Jun-06	$110,106	$87,720	80%
27	32025 77th Street, Wheatland	Jan-02	$119,301	$76,705	64%

Table E.1 Part 2 of 4

Summary of Losses Avoided and ROI Calculations by County for All Events

Building Number	Address	Acquisition Completion Date	2009 Value of Acquisition Cost (including Demo Cost)	Total Losses Avoided	ROI (%)
28	31711 71st Street, Wheatland	Oct-01	$113,134	$50,331	44%
29	31822 71st Street, Wheatland	Sep-01	$146,597	$89,739	61%
30	31715 71st Street, Wheatland	May-03	$86,360	$42,927	50%
31	501 So. Riverside Drive, Silver Lake	Oct-03	$129,181	$180,923	140%
32	31709 77th Street, Wheatland	Jan-03	$80,759	$50,357	62%
33	31901 71st Street, Wheatland	Jan-07	$121,564	$0	0%
34	7956 Shorewood Drive, Salem	Jan-03	$111,428	$118,311	106%
35	7536 313th Avenue, Wheatland	Jun-06	$129,190	$39,231	30%
36	511 S. Riverside Drive, Silver Lake	Jun-06	$59,472	$145,718	245%
37	606 Wisconsin Avenue, Silver Lake	Jun-06	$114,398	$139,006	122%
38	6913 319th Avenue, Wheatland	Dec-05	$1,348	$0	0%
39	7600 313th Street, Wheatland	Aug-06	$96,803	$70,113	72%
40	30510 80th Street, Salem	Jun-06	$119,470	$33,645	28%
41	7962 Shorewood Drive, Salem	Mar-07	$140,801	$134,729	96%
42	31613 71st Street, Wheatland	Mar-07	$163,558	$60,499	37%
43	7522 313th Avenue, Wheatland	Jun-08	$169,787	$0	0%
44	31422 76th Street, Wheatland	Dec-99	$117,619	$143,261	122%
45	32034 77th Street, Wheatland	Dec-99	$133,352	$400,274	300%
46	617 S. Riverside Drive, Silver Lake	Jan-02	$153,752	$198,997	129%
47	31627 71st Street, Wheatland	Aug-05	$140,789	$113,835	81%
48	31315 77th Street, Wheatland	Aug-05	$153,438	$140,691	92%
49	31602 76th Street, Wheatland	Dec-05	$142,351	$152,012	107%
50	415 S. Riverside Drive, Silver Lake	Feb-08	$125,544	$100,520	80%
51	32139 77th Street, Wheatland	Jul-95	$135,493	$212,581	157%
52	32129 77th Street, Wheatland	Jul-95	$121,895	$68,443	56%

It was assumed there would not be damages because the building had burned down prior to the acquisition.

Table E.1 Part 3 of 4

Summary of Losses Avoided and ROI Calculations by County for All Events

Building Number	Address	Acquisition Completion Date	2009 Value of Acquisition Cost (including Demo Cost)	Total Losses Avoided	ROI (%)
53	437 S. Riverside Drive, Silver Lake	Jul-95	$121,453	$525,046	432%
54	601 S. Riverside Drive, Silver Lake	Jul-95	$123,925	$45,498	37%
55	8106 Shorewood Drive, Salem	Jul-95	$127,728	$126,032	99%
56	31524 76th Street, Wheatland	Sep-95	$116,379	$413,069	355%
57	31217 77th Street, Wheatland	Feb-96	$124,635	$119,170	96%
58	32041 77th Street, Wheatland	Feb-96	$117,107	$0	0%
59	32104 77th Street, Wheatland	Nov-96	$185,843	$72,259	39%
60	419 S. Riverside Drive, Silver Lake	Oct-96	$7,841	$202,747	2,586%
61	32028 77th Street, Wheatland	Apr-97	$136,601	$151,816	111%
62	31628 76th Street, Wheatland	Dec-98	$137,189	$79,530	58%
63	32029 77th Street, Wheatland	Dec-98	$100,017	$183,726	184%
64	32018 77th Street, Wheatland	Dec-98	$116,767	$96,324	82%
65	31710 77th Street, Wheatland	Jan-99	$139,792	$173,265	124%
66	32143 77th Street, Wheatland	Mar-99	$58,179	$154,302	265%
67	31917 77th Street, Wheatland	Jan-00	$30,097	$182,158	605%
68	32015 77th Street, Wheatland	Dec-99	$136,982	$174,471	127%
69	6921 319th Avenue, Wheatland	Jun-00	$108,859	$73,473	67%
70	31214 77th Street, Wheatland	Sep-00	$75,177	$110,938	148%
71	6905 319th Avenue, Wheatland	Dec-00	$136,356	$91,112	67%
72	31705 71st Street, Wheatland	Jan-01	$96,381	$127,197	132%
73	441 S. Riverside Drive, Silver Lake	Jun-00	$131,060	$176,526	135%
74	W7352 Blackhawk Island Road, Fort Atkinson	Jun-96	$56,228	$109,384	195%
75	W7622 &W7624 Blackhawk Island Road, Fort Atkinson	Feb-96	$132,334	$194,693	147%
76	W7191 Blackhawk Island Road, Fort Atkinson	Sep-95	$88,193	$124,653	141%
77	W7616 Blackhawk Island Road, Fort Atkinson	Feb-99	$115,429	$167,783	145%

Table E.1 Part 4 of 4

Summary of Losses Avoided and ROI Calculations by County for All Events

Building Number	Address	Acquisition Completion Date	2009 Value of Acquisition Cost (including Demo Cost)	Total Losses Avoided	ROI (%)
78	W7091 Blackhawk Island Road, Fort Atkinson	Aug-98	$112,253	$142,184	127%
79	W7366 Blackhawk Island Road, Fort Atkinson	Jun-99	$170,317	$10,002	6%
80	W7126 Blackhawk Island Road, Fort Atkinson	Apr-99	$86,471	$63,991	74%
81	W7324 Blackhawk Island Road, Fort Atkinson	Sep-99	$87,622	$76,685	88%
82	W7664 Blackhawk Island Road, Fort Atkinson	Dec-97	$100,617	$121,283	121%
83	W7114 Blackhawk Island Road, Fort Atkinson	Mar-99	$88,296	$130,925	148%
84	W7521 Blackhawk Island Road, Fort Atkinson	Nov-89	$162,919	$195,930	120%
85	W7119 Blackhawk Island Road, Fort Atkinson	Nov-95	$144,654	$15,276	11%
86	W7084 Blackhawk Island Road, Fort Atkinson	Aug-04	$70,279	$89,846	128%
87	W7143 Blackhawk Island Road, Fort Atkinson	Oct-03	$67,713	$135,667	200%
88	W7139 Blackhawk Island Road, Fort Atkinson	Oct-03	$53,623	$183,383	342%
89	W7679 Lamp Road, Fort Atkinson	Oct-03	$209,498	$113,342	54%
90	W7689 Lamp Road, Fort Atkinson	Mar-08	$288,474	$131,787	46%
91	W6984 Blackhawk Island Road, Fort Atkinson	Aug-06	$156,680	$338,914	216%
92	118 North Railroad, Gays Mills	Jan-05	$663,780	$3,929,449	592%
		Total	$10,996,559	$14,551,039	132%

Acronyms:

BCA
Benefit-Cost Analysis

BRV
building replacement value

cfs
cubic foot (feet) per second

FEMA
Federal Emergency Management Agency

FFE
first floor elevation

FIRM
Flood Insurance Rate Map

FIS
Flood Insurance Study

GIS
Geographic Information System

HAZUS-MH
Hazards U.S. – Multihazard

HEC
Hydrologic Engineering Center

HEC-RAS
Hydrologic Engineering Center River Analysis System

HMGP
Hazard Mitigation Grant Program

HWM
high water mark

LAS
loss avoidance study

MP_A
Mitigation Project Absent

MP_C
Mitigation Project Complete

NAVD88
North American Vertical Datum of 1988

NGVD29
National Geodetic Vertical Datum of 1929

NWS
National Weather Service

PA Program
Public Assistance Program

PI
Project Investment

PW
Project Worksheet

ROI
Return on Investment

USACE
U.S. Army Corps of Engineers

USGS
U.S. Geological Survey

WSE
water surface elevation

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APPENDIX J: EVALUATING LOSSES AVOIDED THROUGH ACQUISITION PROJECTS: WISCONSIN PROPERTY ACQUISITION, OCTOBER 2010

Evaluating Losses Avoided Through Acquisition Projects

Wisconsin Property Acquisitions

October 2010

FEMA

WEM

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Executive Summary

The Federal Emergency Management Agency (FEMA) awards mitigation grants to reduce the negative impact of natural hazards on property, people, and the environment. FEMA funds projects based on numerous factors, including a cost-effectiveness analysis of a range of hazard events. Presidential-declared disasters provide considerable funds to States and communities via the Hazard Mitigation Grant Program (HMGP). The HMGP assists States and local communities in implementing long-term hazard mitigation measures. It can be used to fund projects that protect public or private property. Under the HMGP, FEMA may contribute up to 75 percent of project costs. The community must formally agree to provide a local match in the amount of the remaining project costs (at least 25 percent). In Wisconsin, the state will contribute up to 12.5 percent of the project costs to go toward the local match. After significant funds are distributed for mitigation projects, the questions arise: Was the project truly cost effective? How effective was the project during ensuing disasters or hazard events?

The Loss Avoidance Study (LAS) methodology was developed by FEMA to provide a quantitative approach to assess performance of mitigation measures. This report, *Evaluating Losses Avoided through Acquisition Projects*, evaluates the effectiveness of property acquisitions as a mitigation measure.

In response to the flooding in Milwaukee County, local governments (with Federal and State assistance) acquired a total of 54 repetitively flooded properties. FEMA partnered with the State of Wisconsin and used the quantitative approach to complete a loss avoidance study for the acquisition projects.

A total of five projects, located in Milwaukee County, were chosen during the data collection phase.

Project #1:	City of Wauwatosa (23 properties)
Projects #2 & 3:	City of Milwaukee – two projects (19 and 2 properties in Lincoln Creek neighborhood)
Project #4:	Village of Brown Deer (9 properties)
Project #5:	Village of Oak Creek (1 property).

For the five projects, this report contains project descriptive information and the impacts of those projects. All of the acquisition projects were funded from the Disaster Declarations (#1180 & #1238) resulting from two flood events in1997 and 1998. Phase Two involved analysis. Damage analysis was collected for these projects, resulting in an estimate in damages that would have occurred had these projects not been executed. Two separate methodologies were used to determine potential losses avoided. For the first project (Wauwatosa) information was available from Benefit Cost Analysis (BCA) reports. These provided more in-depth information than was available for the other four projects. Damage estimates were based on *actual* storm events and the potential losses that may have occurred had the mitigation project not taken place. For projects #2-5, FEMA's HAZUS modeling software was used to model a 100-year flood event. This modeling assumes that most properties are damaged to some degree during a 100-year flood event. Because the first project includes multiple events, the return on investment is higher than the one-time event modeled by HAZUS for projects #2-5.

The final phase involved reporting results. The cost associated with damages was estimated using a loss estimation analysis. These analyses calculated the dollar amount from physical damage and loss of function from pre and post mitigation. The total losses avoided were estimated at $2,155,513. The total project investment for the five projects (based on the original project cost) was $2,954,399. As a result, the collective return on investment for the flood events was 73 percent. If results are examined by type of methodology, the Wauwatosa project (*actual* events) yields a return on investment of 148 percent. For Projects # 2-5, the return on investment is 49 percent.

Using either methodology yields significant returns on investments which will only increase as more flooding events occur, making property acquisition an effective mitigation tool.

DRAFT

Section I: Introduction

Removal of flood prone homes in Milwaukee County provides green space.

Whether the onset of flooding is a result of torrential rainfall or floodplain development, the State of Wisconsin has a long history of flooding. Fortunately, there are tools and techniques which, when put into effect in a timely fashion, allow us to avoid serious consequences. These tools and techniques are known as mitigation. Mitigation is any sustainable activity or project that reduces losses for people, property, or possessions. This can be achieved through risk analysis, which results in information that provides a foundation for mitigation activities that reduce risk, and flood insurance that protects financial investment.

There are numerous possible courses of action that can be considered for a mitigation project as follows:

- Do nothing – with this alternative, no costs are involved but damages and emergency response costs will continue to occur in future events.
- Elevation – may be a cost-effective alternative for certain properties. Properties located in the flood fringe are elevated to the 100-year base flood elevation plus two feet of freeboard. This is not an alternative for properties located in the floodway. Future damages would be prevented to the level of protection; however, emergency response costs would continue in future events. Although property damage may be prevented, property owners most likely would not have access to their properties during flooding events.
- Acquisition/Relocation/Demolition – the preferred alternative, may be the only alternative for floodway properties. Permanently mitigates damages to the property and no emergency response is required.

Acquisition is the chosen type of mitigation for this report. In a property acquisition project, the community buys private property, acquires title to it, and removes or relocates the structures. By law, that property is now public property and must forever remain open space land. The community can use it to create public parks, wildlife refuges, etc. but it cannot sell it to private individuals and development is limited. Property acquisitions work the same way as any other real estate transaction. Property owners who want to sell their property are given fair market value. It is a good opportunity for people who live in or near hazard areas to move to safer ground.

1.1 Purpose

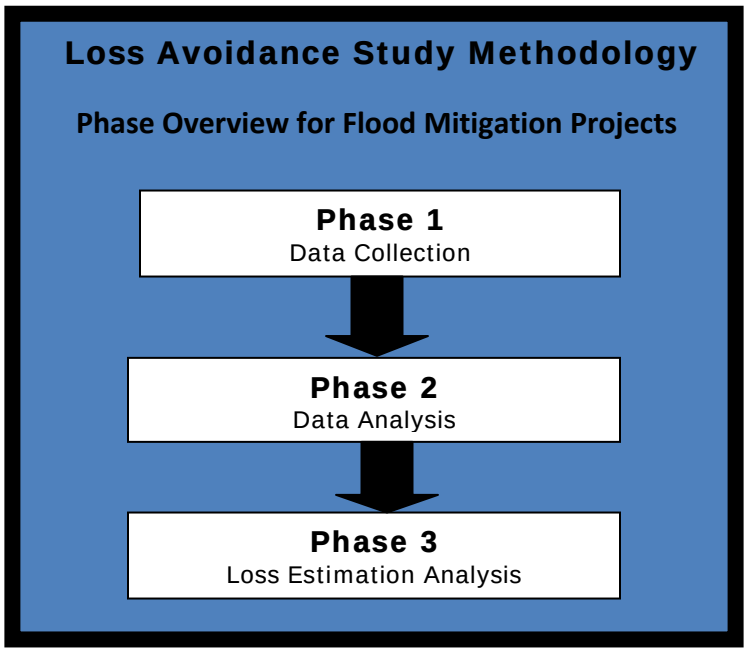
The State of Wisconsin has invested millions of dollars to acquire flood-prone properties. How well is this mitigation initiative working? Can losses avoided be quantified as a direct result of implementing acquisition projects? This study seeks to provide the answers.

The scope of this study includes five projects with 54 acquisition properties that were executed in four cities in Milwaukee County and funded through FEMA's Hazard Mitigation Grant Program (HMGP). The study provides comprehensive documentation of "losses avoided" (damages avoided or benefits) utilizing quantitative methods. It also describes a reproducible and verifiable methodology so that results are meaningful and defensible.

1.2 Methodology Overview

This study focused on the performance of acquisition projects and was divided into three phases: **Phase 1**- Data Collection, **Phase 2** –Data Analysis and **Phase 3** – Loss Estimation Analysis.

Figure 1.2.1



Phase 1: Data Collection includes the development of the initial project list. Projects were selected based on parameters established for the study. The selected projects were then screened based on the availability of data necessary to complete the study. The final project list then proceeded to Phase 2.

Phase 2: Data Analysis included multiple analyses to determine if there were measurable avoided losses since the projects' completion. To calculate the flood losses avoided due to acquisition projects in Milwaukee County, it was essential to obtain pre-mitigation data on each structure to be evaluated. This data included:

- Location
- Building Value
- Contents Value

Phase 3: Loss Estimation Analysis involves analyzing each project for flood damage loss. Loss Estimation Analysis is the final phase of a loss avoidance study. It is conducted to estimate the avoided losses based on the effectiveness of the mitigation project during the selected storm

event. The Loss Estimation Analysis is accomplished by calculating the amount of damage in dollars associated with the damage analysis calculated in Phase 2 of the study.

This phase includes two major tasks:

1. Calculating Losses Avoided (LA)

   When calculating losses avoided (LA), the first step is to determine the dollar value estimate of the damage that *would* have occurred had the mitigation project not been executed and then the *estimated* damage in dollars that might occur after a flood event.

2. Calculating Return On Investment (ROI)

   In determining the Return on Investment (ROI), losses avoided (LA) and project investments (PI) or acquisition costs are used. The formula used to calculate ROI is shown below.

$$\frac{\textbf{\$LA}\ \text{(Loss Avoided)}}{\textbf{\$PI}\ \text{(Project Investment or Acquisition Cost)}} \times 100 = \textbf{ROI}$$

Section 2: Project Selection

2.1 Data Collection (Initial Project Selection)

The first step is to determine the parameters of the study. These parameters may include, but are not limited to; hazard type, area of interest and project type.

Hazard Type

Projects may be chosen and screened based on hazard type. For this study, flooding was chosen as the hazard type.

Area of Interest

Depending on the study, the area of interest could vary from a community, a county, a region of a state, etc. The entity conducting the study should identify and define the area of interest prior to project selection. For this study, four communities were identified for five separate projects on residential acquisitions. A listing of state projects was reviewed to determine areas where property acquisitions had occurred. The following communities in Milwaukee County, Wisconsin were chosen for this study:

- City of Wauwatosa
- City of Milwaukee (Lincoln Creek - 2 projects)
- Village of Oak Creek
- Village of Brown Deer

Project type

Project selection may be based on project type. If flooding is the chosen hazard, the project type may be acquisitions, elevations or other mitigation projects. For this project, property acquisition was chosen as the project type.

2.2 Project Screening

The initial list of projects must be evaluated to determine if enough specific data and characteristics are available for the methodology being applied. If the data is not available, the project should be removed from the list.

There are three primary considerations for the project screening process: initial site visits, local preferences, and available information.

Initial Site Visit

A site visit should be done in order to conduct a preliminary assessment of the project and meet the local officials that have worked with the project and have the most knowledge of it.

Conducting the detailed data collection for Phase 2 and 3 can also be done at this time. The visit may reveal a lack of data necessary to complete the project or other resources that may be available.

Local Preferences

State or local officials may have a preference for certain projects over others. This must be taken into consideration in selecting the projects.

Available Information

Some of the projects initially selected may not have enough information in project files to proceed. FEMA and other contracting agencies have had different long-term data storage requirements since mitigation programs began. Some of the basic information such as the original funding application and financial reports are usually kept in FEMA files. Some of the more detailed information including design drawings and digital data are often not in the same files. Therefore, the person conducting the study may be required to use other resources such as local governments or contracting consultants to retrieve the information. If adequate information cannot be found, the list of possible projects may be reduced.

2.3 Final Project Selection

For this report, a listing of state projects was reviewed and communities were chosen that had a number of property acquisitions acquired with FEMA mitigation funds. Next, the occurrence of damaging events since the acquisitions occurred was taken into consideration. Multiple damage events increase the analysis potential of the project. How the analysis is completed on a project is affected by the available data on the project property. Next, available information on the damage events since the buyout occurred, i.e. stream data/gauge information, the National Climatic Data Center (NCDC) historical data, FEMA disaster declaration information, etc. was collected.

The four communities noted in Section 2.1 were chosen based on the information that was available from local, state and FEMA offices. The final project list then proceeded to Phase 2: Data Analysis.

Section 3: Project Information

This section of the report provides background information on each of the acquisition projects and the impacts from the selected storm events (see Section 3.1). Information for this section comes from the FEMA project files, the National Weather Service and the State of Wisconsin Department of Military Affairs, Wisconsin Emergency Management Division.

This study focuses on five projects that include 54 residential properties in Milwaukee County. The acquisition projects are:

Project #1:	City of Wauwatosa (23 properties)
Projects #2 & 3:	City of Milwaukee – two projects (19 and 2 properties)
Project #4:	Village of Brown Deer (9 properties)
Project #5:	Village of Oak Creek (1 property).

The bodies of water that affect these cities include the Menomonee River (Wauwatosa), Lincoln Creek (City of Milwaukee) and the Root River (Oak Creek).

The first project (City of Wauwatosa) included information from a Benefit Cost Analysis (BCA) and actual flood events. Also included in the analysis of this project was HAZUS modeling. The remaining four projects did not have BCA data and HAZUS modeling was the only information used in the analysis of the return on investment on these projects.

3.1 History

Milwaukee County has been a part of five major disaster declarations within the past 13 years. All of the acquisition projects were funded from the Disaster Declarations resulting from the two events: July 1997 and August 1998 (See Table 3.1).

From the night of June 20 to the morning of June 21, 1997, a storm system passed through the southeastern portion of Wisconsin in the area of Milwaukee, Ozaukee, Washington and Waukesha Counties. This storm system generated torrential rains throughout this four-county area with rainfall ranging from five to nearly ten inches in a thirty-hour period. The most intense rainfall was centered in northern Milwaukee County. Areas within the county which were damaged significantly included Brown Deer, Glendale and Wauwatosa. The County also received significant damages to its parks and golf courses. Initial damage assessments reported $71 million to private property and $17 million to public property for a total $87 million for this four-county area.

During the period of August 4th and 7th, 1998 a series of slow-moving thunderstorms dumped five to ten inches of rain in a three to five hour period and affected a four-county area (Milwaukee, Rock, Sheboygan and Waukesha). Milwaukee County had six to ten inches of rainfall. Some of the hardest hit areas within Milwaukee County were the same areas that had been affected by flooding the previous summer.

Table 3.1.1 Disaster Declarations for Milwaukee County (used in this report)	
Date	**Disaster Number**
July 7, 1997	DR-1180
August 12, 1998	DR-1238

Source: FEMA

3.2 Project #1: Wauwatosa, WI – (Menomonee River)

Historic River Crest Data and Flood Impacts

Six historic crests have occurred on the Menomonee River at Wauwatosa, WI since the June 21, 1997 storm. Flood stage levels are shown in Table 3.2.1 with the historic crests shown in Table 3.2.2. This data is from the USGS #04087120 stream gauge located near the 70th Street bridge as shown in Figure 3.2.1 (gauge height is 628.86 ft. NGVD 29). The expected local flood impacts are shown in Table 3.2.3.

Table 3.2.1 Flood Stages	
Major Flood Stage	18 Feet
Moderate Flood Stage	15 Feet
Flood Stage	11 Feet
Action Stage	8 Feet

Source: National Weather Service

Table 3.2.2 Historical Crests for Menomonee River at Wauwatosa			
Date:	Depth:	Elevation:	Flood Stage:
August 6, 1998	18.30 ft	647.16	Major
June 8, 2008	15.68 ft	644.54	Moderate
July 15, 2010	13.95 ft	642.81	Flood
July 21, 1999	13.00 ft	641.86	Flood
July 2, 2000	12.48 ft	641.34	Flood
July 4, 2004	11.80 ft	640.66	Flood

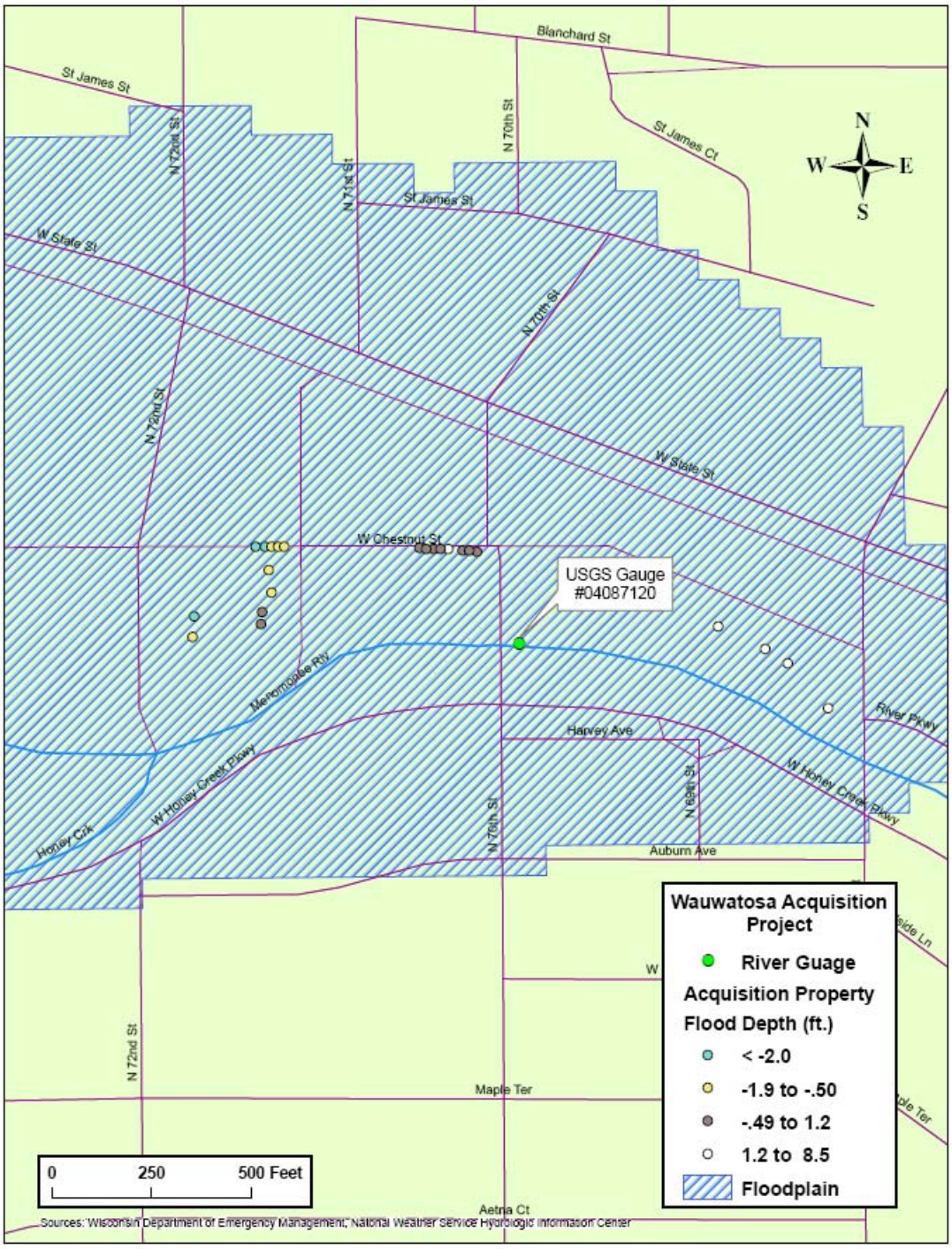
Source: National Weather Service

Table 3.2.3 Flood Impacts in Wauwatosa, WI	
Crest: (ft.) **(Flood Stages)**	**Impact:**
18.89 (Major)	The river is well out of its banks and causing some flooding of homes. A stage of 18.9 feet can be considered to be about a 100-year flood.
17.89 (Moderate)	The river is well out of its banks and causing flooding to some homes. A stage of 17.9 feet can be considered to be about a 50-year flood.
16.8 (Moderate)	The river is well out of its banks and causing flooding to some homes. A stage of 16.8 feet is considered to be about a 25-year flood.
14.3 (Flood Stage)	The river is well out if its banks causing some flooding to homes. A stage of 14.3 feet can be considered to be about a 10-year flood.
12.2 (Flood Stage)	The river is well out of its banks and flooding surrounding lowland. This level is considered to be about a 5-year flood.
11 (Flood Stage)	The river is well out of its banks and flooding surrounding lowland.
10 (Action Stage)	There is minor lowland flooding. This level is considered to be between a 2 year flood and a 5 year flood.
9.4 (Action Stage)	There is minor lowland flooding. This level is considered to be about a 2 year flood.
9 (Action Stage)	There is minor lowland flooding.
8 (Action Stage)	There is minor lowland flooding

Source: National Weather Service

A portion of the Federal disaster aid provided for this event was funding for disaster mitigation programs. These are a variety of programs all designed to reduce or eliminate the impact of future events and may include programs such as flood proofing or acquisition. The community of Wauwatosa applied for and was awarded funding for an acquisition project (project #1180.0007) in which the community proposed buying properties that had a history of receiving damage during flood events such as the June 21st, 1997 event. Figure 3.2.1 shows the location of acquisition properties within the flood plain, the flood depth, and the location of the USGS Gauge #04087120 and its proximity to the properties. The list of properties and addresses is provided in Table 3.2.4.

Figure 3.2.1 Acquisition Properties with Flood Depths and USGS Stream Gauge #04087120



The values represented in Table 3.2.4 will be used to calculate losses avoided for potential flooding events based on the historical crests as detailed in Table 3.2.2. Because this is an acquisition project, Losses Avoided will be equal to the total values calculated using the Damage Depth Function (DDF) from the Benefit Cost Analysis (BCA). As defined by the Army Corps

of Engineers, the Depth-Damage Function is a mathematical relationship between the depth of flood water above or below the first floor of a building and the amount of damage that can be attributed to that water.

Table 3.2.4 Wauwatosa Proposed Property Acquisition Addresses & Values*

Property Address:	Building Value:	Contents Value:	Total Value:
7013 W Chestnut St.	$ 70,400	$21,120	$91,520
7029 W Chestnut St.	$ 92,400	$27,720	$120,120
1195 N 71st St.	$ 88,000	$44,000	$132,000
1147 N 68th St.	$103,400	$31,000	$134,400
6817 River Parkway	$129,900	$39,000	$168,900
1183 N 71st St.	$167,200	$50,160	$217,360
7121 W Chestnut St.	$179,900	$53,970	$233,870
7005 W Chestnut St.	$ 70,400	$21,000	$91,400
7021 W Chestnut St.	$ 92,500	$27,750	$120,250
7009 W Chestnut St.	$ 57,200	$17,000	$74,200
1177 N 71st St.	$102,800	$31,000	$133,800
7025 W Chestnut St.	$172,800	$51,840	$224,640
1168 N 72nd St.	$ 91,600	$27,500	$119,100
6825 River Parkway	$179,200	$54,000	$233,200
6833 River Parkway	$140,000	$33,000	$173,000
7117 W Chestnut St.	$145,600	$43,680	$189,280
7127 W Chestnut St.	$119,900	$35,970	$155,870
7113 W Chestnut St.	$101,400	$30,420	$131,820
7037 W Chestnut St.	$151,200	$45,360	$196,560
7109 W Chestnut St.	$168,000	$50,400	$218,400
7033 W Chestnut St.	$125,400	$37,620	$163,020
1173 N 71st St.	$195,800	$59,000	$254,800
1176 N 72nd St.	$143,400	$43,020	$186,420

Source: WEM – B/C Analysis, January 1998
(*Note: Values were drawn directly from the Benefit Cost Analysis (BCA) and closing documents obtained from WEM, and represent best available values for these properties. All values have been adjusted for inflation.)

The 23 properties involved in the acquisition project were in the floodway of the Menomonee River as indicated on the Flood Insurance Rate Map #550284 0005B, dated December 1, 1978. Data necessary for the analysis of the 23 properties was obtained from the State of Wisconsin, Department of Military Affairs- Wisconsin Emergency Management – Recovery Section. The physical location of the properties is described as the area of 68th and 72nd Streets south of Chestnut Street and River Parkway near Hart Park as shown in the highlighted area of Figure 3.2.1.

Table 3.2.5 represents damage and return on investment (ROI) results by event for properties involved in the acquisition project. Additional costs such as displacement and disruption have not been calculated or applied in the analysis.

Table 3.2.5 Mitigation Investment and Loss Estimation *by Event*

Analysis Information			Estimated Losses Avoided				
Event Date	Buildings Included in Analysis	Buildings With Potential Losses Avoided	Building Damage	Content Damage	Total Loss Avoided	Project Investment	Projected ROI
August 6, 1998	1	1	$ 129,900	$ 39,000	$ 168,900	$71,000	138%
July 21, 1999	22	2	$ 107,421	$ 31,398	$ 138,820	$ 250,000	-44%
July 2, 2000	23	2	$ 59,240	$ 16,916	$ 76,156	$ 250,000	-70%
July 4, 2004	23	1	$ 40,735	$ 12,221	$ 52,956	$ 90,000	-41%
June 8, 2008	23	7	$ 285,971	$ 81,281	$ 367,252	$ 649,337	-43%
July 15, 2010	23	5	$ 197,345	$ 57,671	$ 255,016	$ 460,500	-45%

Source: Wisconsin Loss Avoidance Study - 2010

The following tables (Table 3.2.6 thru Table 3.2.11) show loss estimation for each historical crest represented in Table 3.2.2, beginning with the highest historical crest (647.16' on 8/6/98) to the lowest (640.66' on 7/4/04). Only the properties that had completed the acquisition process are represented for each event.

Table 3.2.6 Loss Estimation Calculations For August 6, 1998 (647.16 ft)

Property Address	Date of Acquisition	[1]FFE	[1]BFE	[2]Flood Elevation	Flood Depth	[1]DDF	Building Value *	Contents Value *	Building Damage	Contents Damage	Losses Avoided
6817 River Parkway	19-Mar-98	644.6	644.1	647.16	2.56	100%	$129,900	$39,000	$129,900	$39,000	$168,900

[1]Source: FFE, BFE and DDF – BCA analysis by WEM, January 1998
[2]Source: Flood Elevation – National Weather Service Gauge Data
*All values have been adjusted for inflation.

In the following tables, note the highlighted properties as these are the properties that had a DDF from the completed BCA's and therefore, ensuing damage from which Losses Avoided could be computed.

Table 3.2.7 Loss Estimation Calculations For June 8, 2008 (644.54 ft)

Property Address	Date of Acquisition	[1]FFE	[1]BFE	[2]Flood Elevation	Flood Depth	[1]DDF	Building Value*	Contents Value*	Building Damage	Contents Damage	Losses Avoided
6817 River Parkway	19-Mar-98	644.6	644.1	644.54	-0.06	17%	$171,582	$51,514	$29,169	$8,757	$37,926
6833 River Parkway	28-Jan-99	643.5	644.3	644.54	1.04	38%	$184,923	$43,589	$70,271	$16,564	$86,834
1168 N 72nd St.	02-Feb-99	649.2	648.2	644.54	-4.66	0%	$120,992	$36,324	$0.00	$0.00	$0.00
7021 W Chestnut St.	05-Mar-99	639.3	646	644.54	5.24	100%	$122,181	$36,654	$122,181	$36,654	$158,836
7013 W Chestnut St.	09-Mar-99	647.3	645.7	644.54	-2.76	0%	$92,990	$27,897	$0.00	$0.00	$0.00
1195 N 71st St.	19-Mar-99	649	647.5	644.54	-4.46	0%	$116,237	$58,119	$0.00	$0.00	$0.00
1147 N 68th St.	19-Mar-99	644.5	644	644.54	0.04	17%	$136,579	$40,947	$23,218	$6,961	$30,179
1183 N 71st St.	19-Mar-99	648.4	647.4	644.54	-3.86	0%	$220,851	$66,255	$0.00	$0.00	$0.00
7005 W Chestnut St.	19-Mar-99	646.8	645	644.54	-2.26	9%	$92,990	$27,738	$8,369	$2,496	$10,866
1177 N 71st St.	19-Mar-99	646.8	647.3	644.54	-2.26	9%	$135,786	$40,947	$12,221	$3,685	$15,906
6825 River Parkway	19-Mar-99	644.5	644.2	644.54	0.04	0%	$236,701	$71,327	$0.00	$0.00	$0.00
7033 W Chestnut St.	19-Mar-99	647.8	646.6	644.54	-3.26	0%	$165,638	$49,691	$0.00	$0.00	$0.00
1176 N 72nd St.	19-Mar-99	650.3	648.5	644.54	-5.76	0%	$189,414	$56,824	$0.00	$0.00	$0.00
7029 W Chestnut St.	06-May-99	647.5	646.4	644.54	-2.96	0%	$122,049	$36,615	$0.00	$0.00	$0.00
7009 W Chestnut St.	06-May-99	646.9	645.5	644.54	-2.36	0%	$75,554	$22,455	$0.00	$0.00	$0.00
7025 W Chestnut St.	06-May-99	646.6	646.2	644.54	-2.06	9%	$228,248	$68,474	$20,542	$6,163	$26,705
7117 W Chestnut St.	06-May-99	649.4	648.2	644.54	-4.86	0%	$192,320	$57,696	$0.00	$0.00	$0.00
7127 W Chestnut St.	06-May-99	650.6	648.8	644.54	-6.06	0%	$158,373	$47,512	$0.00	$0.00	$0.00
7113 W Chestnut St.	06-May-99	649.6	648.1	644.54	-5.06	0%	$133,937	$40,181	$0.00	$0.00	$0.00
7037 W Chestnut St.	06-May-99	647.3	646.8	644.54	-2.76	0%	$199,717	$59,915	$0.00	$0.00	$0.00
7109 W Chestnut St.	06-May-99	649.5	647.9	644.54	-4.96	0%	$221,907	$66,572	$0.00	$0.00	$0.00
1173 N 71st St.	06-May-99	647.9	647.3	644.54	-3.36	0%	$258,628	$77,932	$0.00	$0.00	$0.00
7121 W Chestnut St.	27-Oct-99	649.9	648.6	644.54	-5.36	0%	$237,626	$71,288	$0.00	$0.00	$0.00

[1]FFE, BFE and DDF Source: WEM-BCA Analysis-January 1998
[2]Flood Elevation Source: National Weather Service Gauge Data
*All values have been adjusted for inflation

Table 3.2.8 Loss Estimation Calculations For July 15, 2010 (642.81 ft)

Property Address	Date of Acquisition	[1]FFE	[1]BFE	[2]Flood Elevation	Flood Depth	[1]DDF	Building Value*	Contents Value*	Building Damage	Contents Damage	Losses Avoided
6817 River Parkway	19-Mar-98	644.6	644.1	642.81	-1.79	9%	$173,415	$52,065	$15,607	$4,686	$20,293
6833 River Parkway	28-Jan-99	643.5	644.3	642.81	-0.69	13%	$186,898	$44,055	$24,297	$5,727	$30,024
1168 N 72nd St.	02-Feb-99	649.2	648.2	642.81	-6.39	0%	$122,285	$36,712	$0.00	$0.00	$0.00
7021 W Chestnut St.	05-Mar-99	639.3	646	642.81	3.51	100%	$123,486	$37,046	$123,486	$37,046	$160,532
7013 W Chestnut St.	09-Mar-99	647.3	645.7	642.81	-4.49	0%	$93,983	$28,195	$0.00	$0.00	$0.00
1195 N 71st St.	19-Mar-99	649	647.5	642.81	-6.19	0%	$117,479	$58,739	$0.00	$0.00	$0.00
1147 N 68th St.	19-Mar-99	644.5	644	642.81	-1.69	9%	$138,038	$41,385	$12,423	$3,725	$16,148
1183 N 71st St.	19-Mar-99	648.4	647.4	642.81	-5.59	0%	$223,210	$66,963	$0.00	$0.00	$0.00
7005 W Chestnut St.	19-Mar-99	646.8	645	642.81	-3.99	0%	$93,983	$28,035	$0.00	$0.00	$0.00
1177 N 71st St.	19-Mar-99	646.8	647.3	642.81	-3.99	0%	$137,237	$41,385	$0.00	$0.00	$0.00
6825 River Parkway	19-Mar-99	644.5	644.2	642.81	-1.69	9%	$239,230	$72,089	$21,531	$6,488	$28,019
7033 W Chestnut St.	19-Mar-99	647.8	646.6	642.81	-4.99	0%	$167,407	$50,222	$0.00	$0.00	$0.00
1176 N 72nd St.	19-Mar-99	650.3	648.5	642.81	-7.49	0%	$191,437	$57,431	$0.00	$0.00	$0.00
7029 W Chestnut St.	06-May-99	647.5	646.4	642.81	-4.69	0%	$123,353	$37,006	$0.00	$0.00	$0.00
7009 W Chestnut St.	06-May-99	646.9	645.5	642.81	-4.09	0%	$76,361	$22,695	$0.00	$0.00	$0.00
7025 W Chestnut St.	06-May-99	646.6	646.2	642.81	-3.79	0%	$230,686	$69,206	$0.00	$0.00	$0.00
7117 W Chestnut St.	06-May-99	649.4	648.2	642.81	-6.59	0%	$194,374	$58,312	$0.00	$0.00	$0.00
7127 W Chestnut St.	06-May-99	650.6	648.8	642.81	-7.79	0%	$160,065	$48,020	$0.00	$0.00	$0.00
7113 W Chestnut St.	06-May-99	649.6	648.1	642.81	-6.79	0%	$135,368	$40,610	$0.00	$0.00	$0.00
7037 W Chestnut St.	06-May-99	647.3	646.8	642.81	-4.49	0%	$201,850	$60,555	$0.00	$0.00	$0.00
7109 W Chestnut St.	06-May-99	649.5	647.9	642.81	-6.69	0%	$224,278	$67,283	$0.00	$0.00	$0.00
1173 N 71st St.	06-May-99	647.9	647.3	642.81	-5.09	0%	$261,391	$78,764	$0.00	$0.00	$0.00
7121 W Chestnut St.	27-Oct-99	649.9	648.6	642.81	-7.09	0%	$240,164	$72,049	$0.00	$0.00	$0.00

[1]FFE, BFE and DDF Source: WEM-BCA Analysis-January 1998
[2]Flood Elevation Source: National Weather Service Gauge Data
*All values have been adjusted for inflation

Table 3.2.9 Loss Estimation Calculations For July 21, 1999 (641.86 ft)

Property Address	Date of Acquisition	[1]FFE	[1]BFE	[2]Flood Elevation	Flood Depth	[1]DDF	Building Value*	Contents Value*	Building Damage	Contents Damage	Losses Avoided
6817 River Parkway	19-Mar-98	644.6	644.1	641.86	-2.74	0%	$132,768.96	$39,861.35	$0.00	$0.00	$0.00
6833 River Parkway	28-Jan-99	643.5	644.3	641.86	-1.64	9%	$143,092.02	$33,728.83	$12,878.28	$3,035.60	$15,913.88
1168 N 72nd St.	02-Feb-99	649.2	648.2	641.86	-7.34	0%	$93,623.07	$28,107.36	$0.00	$0.00	$0.00
7021 W Chestnut St.	05-Mar-99	639.3	646	641.86	2.56	100%	$94,542.94	$28,362.88	$94,542.94	$28,362.88	$122,905.83
7013 W Chestnut St.	09-Mar-99	647.3	645.7	641.86	-5.44	0%	$71,954.85	$21,586.45	$0.00	$0.00	$0.00
1195 N 71st St.	19-Mar-99	649	647.5	641.86	-7.14	0%	$89,943.56	$44,971.78	$0.00	$0.00	$0.00
1147 N 68th St.	19-Mar-99	644.5	644	641.86	-2.64	0%	$105,683.68	$31,684.66	$0.00	$0.00	$0.00
1183 N 71st St.	19-Mar-99	648.4	647.4	641.86	-6.54	0%	$170,892.76	$51,267.83	$0.00	$0.00	$0.00
7005 W Chestnut St.	19-Mar-99	646.8	645	641.86	-4.94	0%	$71,954.85	$21,463.80	$0.00	$0.00	$0.00
1177 N 71st St.	19-Mar-99	646.8	647.3	641.86	-4.94	0%	$105,070.43	$31,684.66	$0.00	$0.00	$0.00
6825 River Parkway	19-Mar-99	644.5	644.2	641.86	-2.64	0%	$183,157.79	$55,192.64	$0.00	$0.00	$0.00
7033 W Chestnut St.	19-Mar-99	647.8	646.6	641.86	-5.94	0%	$128,169.57	$38,450.87	$0.00	$0.00	$0.00
1176 N 72nd St.	19-Mar-99	650.3	648.5	641.86	-8.44	0%	$146,567.12	$43,970.13	$0.00	$0.00	$0.00
7029 W Chestnut St.	06-May-99	647.5	646.4	641.86	-5.64	0%	$94,440.74	$28,332.22	$0.00	$0.00	$0.00
7009 W Chestnut St.	06-May-99	646.9	645.5	641.86	-5.04	0%	$58,463.31	$17,375.46	$0.00	$0.00	$0.00
7025 W Chestnut St.	06-May-99	646.6	646.2	641.86	-4.74	0%	$176,616.44	$52,984.93	$0.00	$0.00	$0.00
7117 W Chestnut St.	06-May-99	649.4	648.2	641.86	-7.54	0%	$148,815.71	$44,644.71	$0.00	$0.00	$0.00
7127 W Chestnut St.	06-May-99	650.6	648.8	641.86	-8.74	0%	$122,548.10	$36,764.43	$0.00	$0.00	$0.00
7113 W Chestnut St.	06-May-99	649.6	648.1	641.86	-7.74	0%	$103,639.51	$31,091.85	$0.00	$0.00	$0.00
7037 W Chestnut St.	06-May-99	647.3	646.8	641.86	-5.44	0%	$154,539.39	$46,361.82	$0.00	$0.00	$0.00
7109 W Chestnut St.	06-May-99	649.5	647.9	641.86	-7.64	0%	$171,710.43	$51,513.13	$0.00	$0.00	$0.00
1173 N 71st St.	06-May-99	647.9	647.3	641.86	-6.04	0%	$200,124.42	$60,303.07	$0.00	$0.00	$0.00

[1]FFE, BFE and DDF Source: WEM-BCA Analysis-January 1998
[2]Flood Elevation Source: National Weather Service Gauge Data
*All values have been adjusted for inflation

Table 3.2.10 Loss Estimation Calculations For July 2, 2000 (641.34 ft)

Property Address	Date of Acquisition	FFE	BFE	Flood Elevation	Flood Depth	DDF	Building Value	Contents Value	Building Damage	Contents Damage	Losses Avoided
6817 River Parkway	19-Mar-98	644.6	644.1	641.34	-3.26	0%	$137,231.78	$41,201.23	$0.00	$0.00	$0.00
6833 River Parkway	28-Jan-99	643.5	644.3	641.34	-2.16	9%	$147,901.84	$34,862.58	$13,311.17	$3,137.63	$16,448.80
1168 N 72nd St.	02-Feb-99	649.2	648.2	641.34	-7.86	0%	$96,770.06	$29,052.15	$0.00	$0.00	$0.00
7021 W Chestnut St.	05-Mar-99	639.3	646	641.34	2.04	47%	$97,720.86	$29,316.26	$45,928.80	$13,778.64	$59,707.44
7013 W Chestnut St.	09-Mar-99	647.3	645.7	641.34	-5.96	0%	$74,373.50	$22,312.05	$0.00	$0.00	$0.00
1195 N 71st St.	19-Mar-99	649	647.5	641.34	-7.66	0%	$92,966.87	$46,483.44	$0.00	$0.00	$0.00
1147 N 68th St.	19-Mar-99	644.5	644	641.34	-3.16	0%	$109,236.07	$32,749.69	$0.00	$0.00	$0.00
1183 N 71st St.	19-Mar-99	648.4	647.4	641.34	-7.06	0%	$176,637.06	$52,991.12	$0.00	$0.00	$0.00
7005 W Chestnut St.	19-Mar-99	646.8	645	641.34	-5.46	0%	$74,373.50	$22,185.28	$0.00	$0.00	$0.00
1177 N 71st St.	19-Mar-99	646.8	647.3	641.34	-5.46	0%	$108,602.21	$32,749.69	$0.00	$0.00	$0.00
6825 River Parkway	19-Mar-99	644.5	644.2	641.34	-3.16	0%	$189,314.36	$57,047.85	$0.00	$0.00	$0.00
7033 W Chestnut St.	19-Mar-99	647.8	646.6	641.34	-6.46	0%	$132,477.79	$39,743.34	$0.00	$0.00	$0.00
1176 N 72nd St.	19-Mar-99	650.3	648.5	641.34	-8.96	0%	$151,493.74	$45,448.12	$0.00	$0.00	$0.00
7029 W Chestnut St.	06-May-99	647.5	646.4	641.34	-6.16	0%	$97,615.21	$29,284.56	$0.00	$0.00	$0.00
7009 W Chestnut St.	06-May-99	646.9	645.5	641.34	-5.56	0%	$60,428.47	$17,959.51	$0.00	$0.00	$0.00
7025 W Chestnut St.	06-May-99	646.6	646.2	641.34	-5.26	0%	$182,553.13	$54,765.94	$0.00	$0.00	$0.00
7117 W Chestnut St.	06-May-99	649.4	648.2	641.34	-8.06	0%	$153,817.91	$46,145.37	$0.00	$0.00	$0.00
7127 W Chestnut St.	06-May-99	650.6	648.8	641.34	-9.26	0%	$126,667.36	$38,000.21	$0.00	$0.00	$0.00
7113 W Chestnut St.	06-May-99	649.6	648.1	641.34	-8.26	0%	$107,123.19	$32,136.96	$0.00	$0.00	$0.00
7037 W Chestnut St.	06-May-99	647.3	646.8	641.34	-5.96	0%	$159,733.99	$47,920.20	$0.00	$0.00	$0.00
7109 W Chestnut St.	06-May-99	649.5	647.9	641.34	-8.16	0%	$177,482.21	$53,244.66	$0.00	$0.00	$0.00
1173 N 71st St.	06-May-99	647.9	647.3	641.34	-6.56	0%	$206,851.29	$62,330.06	$0.00	$0.00	$0.00
7121 W Chestnut St.	27-Oct-99	649.9	648.6	641.34	-8.56	0%	$190,053.87	$57,016.16	$0.00	$0.00	$0.00

[1]FFE, BFE and DDF Source: WEMA-BCA Analysis-January 1998
[2]Flood Elevation Source: National Weather Service Gauge Data
*All values have been adjusted for inflation

Table 3.2.11 Loss Estimation Calculations For July 4, 2004 (640.66 ft)

Property Address	Date of Acquisition	[1]FFE	[1]BFE	Flood Elevation	Flood Depth	[1]DDF	Building Value	Contents Value	Building Damage	Contents Damage	Losses Avoided
6817 River Parkway	19-Mar-98	644.6	644.1	640.66	-3.94	0%	$150,540.55	$45,196.93	$0.00	$0.00	$0.00
6833 River Parkway	28-Jan-99	643.5	644.3	640.66	-2.84	0%	$162,245.40	$38,243.56	$0.00	$0.00	$0.00
1168 N 72nd St.	02-Feb-99	649.2	648.2	640.66	-8.54	0%	$106,154.85	$31,869.63	$0.00	$0.00	$0.00
7021 W Chestnut St.	05-Mar-99	639.3	646	640.66	1.36	38%	$107,197.85	$32,159.36	$40,735.18	$12,220.56	$52,955.74
7013 W Chestnut St.	09-Mar-99	647.3	645.7	640.66	-6.64	0%	$81,586.26	$24,475.88	$0.00	$0.00	$0.00
1195 N 71st St.	19-Mar-99	649	647.5	640.66	-8.34	0%	$101,982.82	$50,991.41	$0.00	$0.00	$0.00
1147 N 68th St.	19-Mar-99	644.5	644	640.66	-3.84	0%	$119,829.82	$35,925.77	$0.00	$0.00	$0.00
1183 N 71st St.	19-Mar-99	648.4	647.4	640.66	-7.74	0%	$193,767.36	$58,130.21	$0.00	$0.00	$0.00
7005 W Chestnut St.	19-Mar-99	646.8	645	640.66	-6.14	0%	$81,586.26	$24,336.81	$0.00	$0.00	$0.00
1177 N 71st St.	19-Mar-99	646.8	647.3	640.66	-6.14	0%	$119,134.48	$35,925.77	$0.00	$0.00	$0.00
6825 River Parkway	19-Mar-99	644.5	644.2	640.66	-3.84	0%	$207,674.11	$62,580.37	$0.00	$0.00	$0.00
7033 W Chestnut St.	19-Mar-99	647.8	646.6	640.66	-7.14	0%	$145,325.52	$43,597.66	$0.00	$0.00	$0.00
1176 N 72nd St.	19-Mar-99	650.3	648.5	640.66	-9.64	0%	$166,185.64	$49,855.69	$0.00	$0.00	$0.00
7029 W Chestnut St.	06-May-99	647.5	646.4	640.66	-6.84	0%	$107,081.96	$32,124.59	$0.00	$0.00	$0.00
7009 W Chestnut St.	06-May-99	646.9	645.5	640.66	-6.24	0%	$66,288.83	$19,701.23	$0.00	$0.00	$0.00
7025 W Chestnut St.	06-May-99	646.6	646.2	640.66	-5.94	0%	$200,257.18	$60,077.15	$0.00	$0.00	$0.00
7117 W Chestnut St.	06-May-99	649.4	648.2	640.66	-8.74	0%	$168,735.21	$50,620.56	$0.00	$0.00	$0.00
7127 W Chestnut St.	06-May-99	650.6	648.8	640.66	-9.94	0%	$138,951.60	$41,685.48	$0.00	$0.00	$0.00
7113 W Chestnut St.	06-May-99	649.6	648.1	640.66	-8.94	0%	$117,512.02	$35,253.61	$0.00	$0.00	$0.00
7037 W Chestnut St.	06-May-99	647.3	646.8	640.66	-6.64	0%	$175,225.03	$52,567.51	$0.00	$0.00	$0.00
7109 W Chestnut St.	06-May-99	649.5	647.9	640.66	-8.84	0%	$194,694.48	$58,408.34	$0.00	$0.00	$0.00
1173 N 71st St.	06-May-99	647.9	647.3	640.66	-7.24	0%	$226,911.78	$68,374.85	$0.00	$0.00	$0.00
7121 W Chestnut St.	27-Oct-99	649.9	648.6	640.66	-9.24	0%	$208,485.34	$62,545.60	$0.00	$0.00	$0.00

[1]FFE, BFE and DDF Source: WEM-BCA Analysis-January 1998
[2]Flood Elevation Source: National Weather Service Gauge Data
*All values have been adjusted for inflation

Table 3.2.12 represents potential return on investment based on the cumulative results of the damage estimates for each property and all storm events noted earlier.

Table 3.2.12 Cumulative Loss Estimation and ROI Calculations

Property Address	Date of Acquisition	Total Losses Avoided	Project Investment*	Return on Investment
6817 River Parkway	19-Mar-98	$227,120	$71,000	320%
6833 River Parkway	28-Jan-99	$149,221	$160,000	93%
1168 N 72nd St.	02-Feb-99	$0.00	$91,000	
7021 W Chestnut St.	05-Mar-99	$554,937	$90,000	617%
7013 W Chestnut St.	09-Mar-99	$0.00	$70,340	
1195 N 71st St.	19-Mar-99	$0.00	$89,500	
1147 N 68th St.	19-Mar-99	$46,327	$72,000	64%
1183 N 71st St.	19-Mar-99	$0.00	$88,000	
7005 W Chestnut St.	19-Mar-99	$10,866	$61,000	18%
1177 N 71st St.	19-Mar-99	$15,906	$116,337	14%
6825 River Parkway	19-Mar-99	$28,019	$67,500	42%
7033 W Chestnut St.	19-Mar-99	$0.00	$75,500	
1176 N 72nd St.	19-Mar-99	$0.00	$103,000	
7029 W Chestnut St.	06-May-99	$0.00	$82,921	
7009 W Chestnut St.	06-May-99	$0.00	$94,000	
7025 W Chestnut St.	06-May-99	$26,705	$79,000	34%
7117 W Chestnut St.	06-May-99	$0.00	$66,000	
7127 W Chestnut St.	06-May-99	$0.00	$101,000	
7113 W Chestnut St.	06-May-99	$0.00	$70,000	
7037 W Chestnut St.	06-May-99	$0.00	$87,500	
7109 W Chestnut St.	06-May-99	$0.00	$72,500	
1173 N 71st St.	06-May-99	$0.00	$98,000	
7121 W Chestnut St.	27-Oct-99	$0.00	$93,900	
TOTAL:	N/A	**$1,059,101**	**$716,837**	**148%**

*Project Investment – WEM closeout information

Return on investment was calculated using the following formula:

Return on Investment (ROI)

$1,059,101 LA *(Loss Avoided)*
---------- X 100= **148%** (ROI)
$716,837 PI *(Project Investment or Acquisition Cost)*

Table 3.2.13, represents potential losses avoided and return on investment (ROI) for a 100 year flood event modeled using HAZUS-MH MR4.

Table 3.2.13 Losses Avoided - 100 Year HAZUS Model Flood Event

Property Address	Date of Acquisition	Building Value	HAZUS Building Damage %	Contents Value	HAZUS Contents Damage %	HAZUS Building Damage	HAZUS Content Damage	Losses Avoided	Project Investment	Return on Investment
6817 River Parkway	19-Mar-98	$173,415	28.97%	$52,065	28.95%	$50,238	$15,073	$65,311	$71,000	92%
6833 River Parkway	28-Jan-99	$186,898	26.29%	$44,055	35.43%	$49,136	$15,609	$64,744	$160,000	40%
1168 N 72nd St.	02-Feb-99	$122,285	26.19%	$36,712	25.26%	$32,026	$9,273	$41,300	$91,000	45%
7021 W Chestnut St.	05-Mar-99	$123,486	37.90%	$37,046	32.88%	$46,801	$12,181	$58,982	$90,000	66%
7013 W Chestnut St.	09-Mar-99	$93,983	34.37%	$28,195	28.46%	$32,302	$8,024	$40,326	$70,340	57%
1195 N 71st St.	19-Mar-99	$117,479	24.51%	$58,739	22.92%	$28,794	$13,463	$42,257	$89,500	47%
1147 N 68th St.	19-Mar-99	$138,038	39.95%	$41,385	37.95%	$55,146	$15,705	$70,852	$72,000	98%
1183 N 71st St.	19-Mar-99	$223,210	28.69%	$66,963	28.58%	$64,039	$19,138	$83,177	$88,000	95%
7005 W Chestnut St.	19-Mar-99	$93,983	34.37%	$28,05	28.46%	$32,302	$7,979	$40,281	$61,000	66%
1177 N 71st St.	19-Mar-99	$137,237	29.54%	$41,385	29.43%	$40,540	$12,179	$52,719	$116,337	45%
6825 River Parkway	19-Mar-99	$239,230	31.02%	$72,089	30.61%	$74,209	$22,067	$96,276	$67,500	143%
7033 W Chestnut St.	19-Mar-99	$167,407	33.88%	$50,222	32.90%	$56,718	$16,523	$73,241	$75,500	97%
1176 N 72nd St.	19-Mar-99	$ 191,437	26.19%	$ 57,431	25.26%	$50,137	$14,507	$64,645	$103,000	63%
7029 W Chestnut St.	06-May-99	$123,353	37.90%	$37,006	32.88%	$46,751	$12,168	$58,918	$82,921	71%
7009 W Chestnut St.	06-May-99	$76,361	34.37%	$22,695	28.46%	$26,245	$6,459	$32,704	$94,000	35%
7025 W Chestnut St.	06-May-99	$230,686	33.88%	$69,206	32.90%	$78,156	$22,769	$100,925	$79,000	128%
7117 W Chestnut St.	06-May-99	$194,374	26.25%	$58,312	25.33%	$51,023	$14,770	$65,794	$66,000	100%
7127 W Chestnut St.	06-May-99	$160,065	24.26%	$48,020	22.56%	$38,832	$10,833	$49,665	$101,000	49%
7113 W Chestnut St.	06-May-99	$135,368	26.25%	$40,610	25.33%	$35,534	$10,287	$45,821	$70,000	65%
7037 W Chestnut St.	06-May-99	$201,850	32.53%	$60,555	31.82%	$65,662	$19,269	$84,930	$87,500	97%
7109 W Chestnut St.	06-May-99	$224,278	26.25%	$67,283	25.33%	$58,873	$17,043	$75,916	$72,500	105%
1173 N 71st St.	06-May-99	$261,391	26.31%	$78,764	25.42%	$68,772	$20,022	$88,794	$98,000	91%
7121 W Chestnut St.	27-Oct-99	$240,164	26.25%	$72,049	25.33%	$63,043	$18,250	$81,293	$93,900	87%
TOTALS:								**$1,478,870**	**$1,999,998**	**74%**

Sources: WEM Property Information Sheets and FEMA – HAZUS-MH-MR4 (All values have been adjusted for inflation.)

Table 3.2.13 shows a ROI of 74%. The HAZUS model assumes damage from *one* 100-year flood event, not multiple events as is the case with the *actual* storm event data. The HAZUS model also assumes that all properties suffered damage during a 100 year flood event.

Data Considerations:
Some of the data shortfalls that were encountered were a lack of information on the actual property such as if there was a basement or slab foundation. Accurate property valuation for the Project Investment was difficult to arrive at as some properties did not have any valuation included as in the case of Repetitive Loss Properties where no value is needed for it to be included in an acquisition. Also, factors such as insurance money already paid on a property for damages will be subtracted from the assessed market value and will skew the property valuation that is noted for the property.

Conclusion:
In reviewing the HAZUS data for a 100 year flood event, the resulting potential for losses avoided is encouraging. While the analyses by *actual event* results have not indicated a dramatic ROI for all properties, there have not been additional flood events of the magnitude that are possible in this area. However, when viewed in the context of ***when*** the next event does happen, there is no question that there will be significant losses avoided as a result of this acquisition project. And, as time goes by, the return on investment will only continue to grow with each future damage event.

3.3 Project #2: Milwaukee, WI – (1st Lincoln Creek Project)

On June 21, 1997, several communities in Milwaukee County experienced torrential rainfall of as much as 10 inches during a 30 hour period. This was considered in excess of the "100 year rainfall" and overwhelmed storm water systems causing flash flooding across much of the county. In the Lincoln Creek neighborhood, Lincoln Creek crested at 20.09 feet at 9 am CST on the 21st which was 7.09 feet above flood stage. This flooding was rated as major for the area and caused significant damage to individual properties.

The Lincoln Creek area was highlighted for mitigation activity as it had experienced over 4,000 separate flood events from 1960 to 1997. In response to the damages received during the June 21, 1997 storm event and the past history of the area, Wisconsin Emergency Management, in collaboration with the City of Milwaukee, moved forward with an application for Federal disaster aid for hazard mitigation assistance. Once approved, the funds were directed to acquisition projects in the Lincoln Creek area. The City of Milwaukee - Lincoln Creek acquisition project (project #1180.0006) proposed to purchase 19 properties. A second project (#1236.004), proposed to purchase two properties in the Lincoln Creek area that had flood damage histories.

Figure 3.3.1 shows the location of the acquisition properties in the Lincoln Creek neighborhood and the USGS Gauge #04087000. The list of these properties and addresses is provided in Table 3.3.1.

Figure 3.3.1 Acquisition Properties in Floodplain

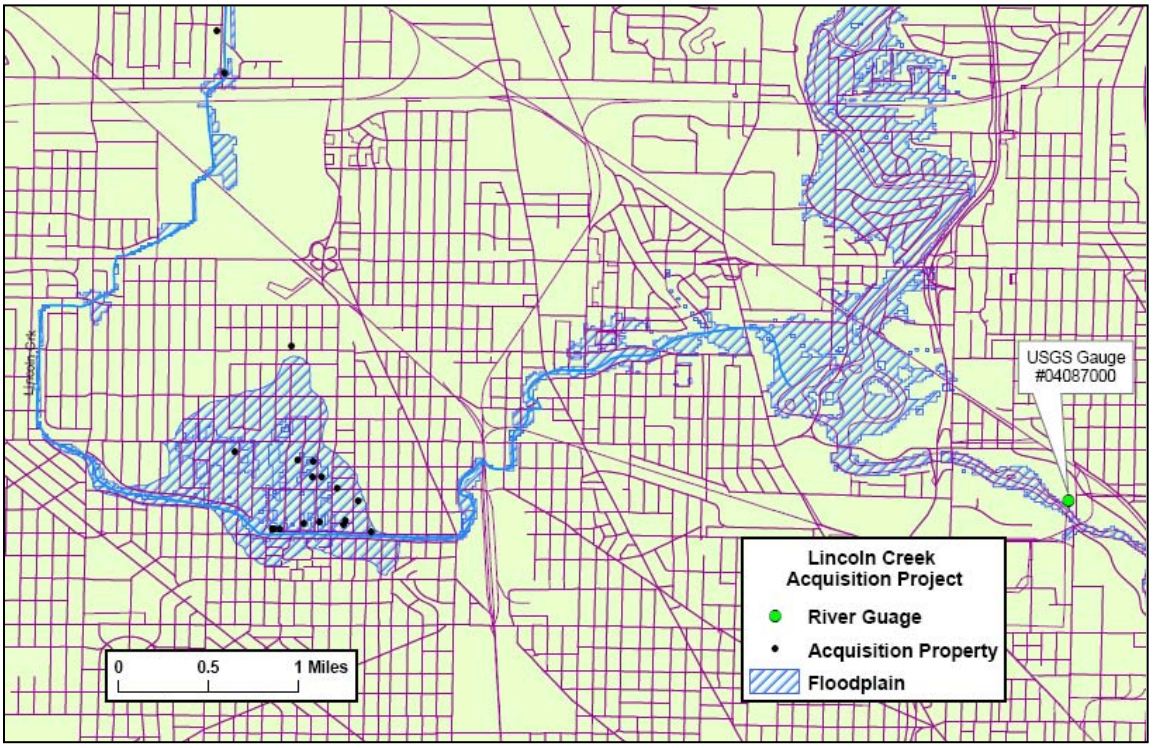


Table 3.3.1 Proposed Acquisition Properties and Values			
Address	**Building Value***	**Contents Value***	**Total Value***
4608 W Congress St.	$ 49,633	$ 24,816	$ 74,449
4755 N 49th St.	$ 61,388	$ 30,694	$ 92,082
4438 N 45th St.	$ 57,469	$ 28,735	$ 86,204
4028 W Congress St.	$ 60,082	$ 30,041	$ 90,122
6605 N 51st St.	$ 79,673	$ 39,837	$ 119,510
4643 N 44th St.	$ 66,612	$ 29,388	$ 96,000
4444 N 44th St.	$ 58,776	$ 29,388	$ 88,163
4223 W Beethoven Place	$ 53,551	$ 26,776	$ 80,327
6410 N 51st St.	$ 82,286	$ 41,143	$ 123,429
4624 W Congress St.	$ 58,776	$ 29,388	$ 88,163
4642 N 44th St.	$ 54,857	$ 27,429	$ 82,286
4717 N 44th St.	$ 62,515	$ 31,257	$ 93,772
4630 W Congress St.	$ 53,551	$ 26,776	$ 80,327
5220 N 46th St.	$ 52,245	$ 26,122	$ 78,367
4212 W Beethoven Place	$ 74,449	$ 37,224	$ 111,673
4536 N 42nd St.	$ 75,755	$ 37,878	$ 113,633
4248 W Glendale Ave	$ 57,469	$ 28,735	$ 86,204
4715 N 45th St.	$ 58,776	$ 29,388	$ 88,163
5674 S 20th St.	$208,980	$104,490	$ 313,469

*Source: WEM Property Information Sheets – all values have been adjusted for inflation.

In addition to the acquisition project initiated by the City of Milwaukee, the Milwaukee Metropolitan Sewerage District (MMSD) began a flood management project along Lincoln Creek in the fall of 1997. The project was completed in 2002, and involved two large detention basins, one in Havenwoods State Forest and the other north of Green Tree Road. Channel modifications including widening, deepening, and re-engineering (returning to a more natural state – creating meanders, natural rock lining) were also completed. The completed mitigation project offers some protection from a one percent flood (100 year) event, however, it is noted that larger events may continue to cause damage.

Estimated losses for a modeled 100-year flood event are shown in Table 3.3.2. Table 3.3.3 shows the Return on Investment (ROI) for the acquisition project based on flood elevations prior to MMSD mitigation project.

Table 3.3.2 Losses Avoided - HAZUS-MH MR4 Modeled 100 Year Flood Event

Date of Acquisition	Address	Building Value	Contents Value	Building Damage % HAZUS	Contents Damage % HAZUS	Building Damage	Contents Damage	Project Investment	Total Losses Avoided
17-Jun-99	4608 W Congress St.	$ 49,633	$ 24,816	17%	16%	$ 8,438	$ 3,971	$ 55,678	$ 12,408
18-Jun-99	4755 N 49th St.	$ 61,388	$ 30,694	17%	16%	$ 10,436	$ 4,911	$ 64,678	$ 15,347
22-Jun-99	4438 N 45th St.	$ 57,470	$ 28,735	19%	16%	$ 10,919	$ 4,598	$ 61,678	$ 15,517
22-Jun-99	4028 W Congress St.	$ 60,082	$ 30,041	17%	16%	$ 10,214	$ 4,807	$ 60,078	$ 15,020
28-Jun-99	6605 N 51st St.	$ 79,673	$ 39,837	0%	0%	$ -	$ -	$ 74,868	$ -
28-Jun-99	4643 N 44th St.	$ 66,612	$ 29,388	19%	16%	$ 12,656	$ 4,702	$ 68,678	$ 17,358
29-Jun-99	4444 N 44th St.	$ 58,776	$ 29,388	19%	16%	$ 11,167	$ 4,702	$ 62,678	$ 15,869
15-Jul-99	4223 W Beethoven Place	$ 53,551	$ 26,776	17%	16%	$ 9,104	$ 4,284	$ 58,678	$ 13,388
15-Jul-99	6410 N 51st St.	$ 82,286	$ 41,143	0%	0%	$ -	$ -	$ 31,442	$ -
15-Jul-99	4624 W Congress St.	$ 58,776	$ 29,388	17%	16%	$ 9,992	$ 4,702	$ 62,678	$ 14,694
22-Jul-99	4642 N 44th St.	$ 54,857	$ 27,429	17%	16%	$ 9,326	$ 4,389	$ 59,678	$ 13,714
28-Jul-99	4717 N 44th St.	$ 62,515	$ 31,257	19%	16%	$ 11,878	$ 5,001	$ 65,541	$ 16,879
28-Jul-99	4630 W Congress St.	$ 53,551	$ 26,776	17%	16%	$ 9,104	$ 4,284	$ 39,207	$ 13,388
03-Aug-99	5220 N 46th St.	$ 52,245	$ 26,122	0%	0%	$ -	$ -	$ 56,793	$ -
09-Aug-99	4212 W Beethoven Place	$ 74,449	$ 37,224	19%	16%	$ 14,145	$ 5,956	$ 74,678	$ 20,101
20-Aug-99	4536 N 42nd St.	$ 75,755	$ 37,878	19%	16%	$ 14,393	$ 6,060	$ 75,678	$ 20,454
09-Nov-99	4248 W Glendale Ave	$ 57,469	$ 28,735	19%	16%	$ 10,919	$ 4,598	$ 61,678	$ 15,517
20-Jan-00	4715 N 45th St.	$ 58,776	$ 29,388	17%	16%	$ 9,992	$ 4,702	$ 54,544	$ 14,694
25-Jan-02	5674 S 20th St.	$208,980	$104,490	0%	0%	$ -	$ -	$177,678	$ -

Sources: WEM Property Information Sheets and FEMA – HAZUS-MH-MR4 (All values have been adjusted for inflation.)

Table 3.3.3 Return on Investment Calculations (Calculations Based on Flood Elevation Prior to MMSD* Mitigation Project)				
Address	**Date of Acquisition**	**Project Investment**	**Total Losses Avoided**	**ROI**
4608 W Congress St.	17-Jun-99	$ 55,678	$ 12,408	22%
4755 N 49th St.	18-Jun-99	$ 64,678	$ 15,347	24%
4438 N 45th St.	22-Jun-99	$ 61,678	$ 15,517	25%
4028 W Congress St.	22-Jun-99	$ 60,078	$ 15,020	25%
6605 N 51st St.	28-Jun-99	$ 74,868	$ -	0%
4643 N 44th St.	28-Jun-99	$ 68,678	$ 17,358	25%
4444 N 44th St.	29-Jun-99	$ 62,678	$ 15,869	25%
4223 W Beethoven Place	15-Jul-99	$ 58,678	$ 13,388	23%
6410 N 51st St.	15-Jul-99	$ 31,442	$ -	0%
4624 W Congress St.	15-Jul-99	$ 62,678	$ 14,694	23%
4642 N 44th St.	22-Jul-99	$ 59,678	$ 13,714	23%
4717 N 44th St.	28-Jul-99	$ 65,541	$ 16,879	26%
4630 W Congress St.	28-Jul-99	$ 39,207	$ 13,388	34%
5220 N 46th St.	03-Aug-99	$ 56,793	$ -	0%
4212 W Beethoven Place	09-Aug-99	$ 74,678	$ 20,101	27%
4536 N 42nd St.	20-Aug-99	$ 75,678	$ 20,454	27%
4248 W Glendale Ave	09-Nov-99	$ 61,678	$ 15,517	25%
4715 N 45th St.	20-Jan-00	$ 54,544	$ 14,694	27%
5674 S 20th St.	25-Jan-02	$177,678	$ -	0%
TOTALS:		**$925,823**	**$234,348**	**25%**

Sources: WEM Property Information Sheets and FEMA – HAZUS-MH-MR4 (All values have been adjusted for inflation.)
*MMSD-Milwaukee Metropolitan Sewerage District

Return on investment was calculated using the following formula:

Return on Investment (ROI)

$ 234,348 LA *(Loss Avoided)*
---------- X 100= **25%** (ROI)
$ 925,823 PI *(Project Investment or Acquisition Cost)*

Again, the HAZUS model assumes damage to most properties in a one-time 100-year flood event. The ROI for these properties from this one-time event is 25%. Multiple events will only continue to increase the return on investment for these properties.

After the completion of the MMSD project in the Lincoln Creek area, the floodplains were re-evaluated, resulting in much of the Lincoln Creek community being removed from the flood plain. While this did affect several of the houses in the Lincoln Creek acquisition project, four of the properties would have remained in a potential hazard area. Table 3.3.4 lists those properties and corresponding damages from a modeled 100-year flood event utilizing the revised flood plain data. Figure 3.3.2 shows the location of these properties as well as the updated floodplain. Table 3.3.5 represents the ROI for these properties bases on values established.

Figure 3.3.2 Locations of Acquisition Properties - Updated Floodplain

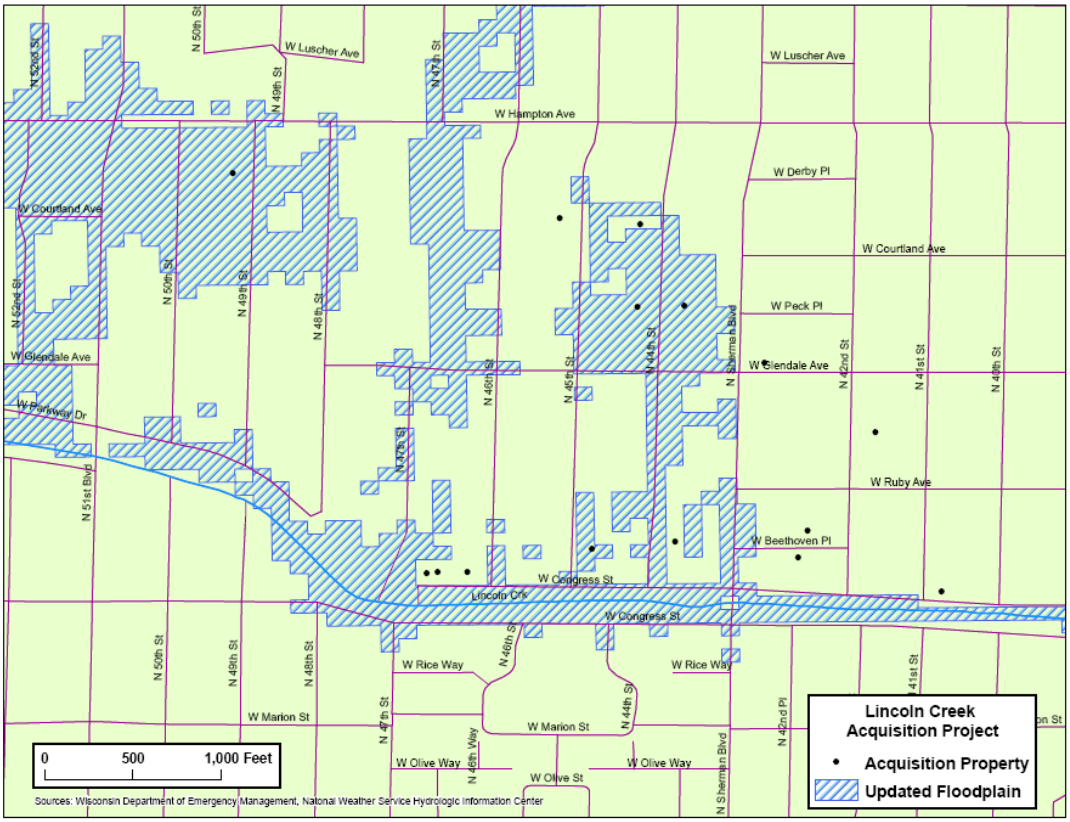


Table 3.3.4 Losses Avoided - HAZUS-MH MR4 Modeled 100 Year Flood Event
(After MMSD* Mitigation Project Completion)

Date of Acquisition	Address	Building Value	Contents Value	Building Damage % HAZUS	Contents Damage % HAZUS	Building Damage	Contents Damage	Project Investment	Total Losses Avoided
22-Jun-99	4438 N 45th St.	$57,469	$28,735	23.37%	21.32%	$ 13,431	$ 6,126	$61,678	$ 19,557
18-Jun-99	4755 N 49th St.	$61,387	$30,694	22.26%	20.31%	$ 13,665	$ 6,234	$64,678	$ 19,899
28-Jun-99	4643 N 44th St.	$66,612	$29,388	21.41%	18.57%	$ 14,262	$ 5,457	$68,678	$ 19,719
22-Jul-99	4642 N 44th St.	$54,857	$27,429	22.02%	20.26%	$ 12,080	$ 5,557	$59,678	$ 17,637

Sources: WEM Property Information Sheets, FEMA-HAZUS-MH-MR4 (All values have been adjusted for inflation)
*MMSD-Milwaukee Metropolitan Sewerage District

Table 3.3.5 Loss Estimation and Return on Investment Calculations
(Based on Flood Elevation After MMSD* Mitigation Project)

Address	Date of Acquisition	Project Investment	Total Losses Avoided	ROI
4438 N 45th St.	22-Jun-99	$61,678	$ 19,557	31.71%
4755 N 49th St.	18-Jun-99	$64,678	$ 19,899	30.77%
4643 N 44th St.	28-Jun-99	$68,678	$ 19,719	28.71%
4642 N 44th St.	22-Jul-99	$59,678	$ 17,637	29.55%

Sources: WEM Property Information Sheets, FEMA-HAZUS-MH-MR4
(All values have been adjusted for inflation)
*MMSD-Milwaukee Metropolitan Sewerage District

3.4 Project #3: Milwaukee, WI – (2nd Lincoln Creek Project)

Table 3.4.1, contains the addresses of the acquisition project properties and the building and contents values used for the project analysis. The values were taken from the property information worksheets provided by Wisconsin Emergency Management and the City of Milwaukee and have been adjusted for inflation.

Figure 3.4.1 shows the location of acquisition properties in the Lincoln Creek area as well as the floodplain for the area. The floodplain used for this analysis is the pre 2008 floodplain.

Table 3.4.1 Acquisition Properties - Addresses and Values

Property Address	Building Value	Content Value	Total Value
4924 W Hampton Ave	$ 76,178	$ 38,089	$ 114,268
4748 N 46th Street	$ 50,376	$ 25,188	$ 75,564

Source: WEM Property Information Sheets - all values adjusted for inflation.

Figure 3.4.1 Acquisition Properties Location in Floodplain

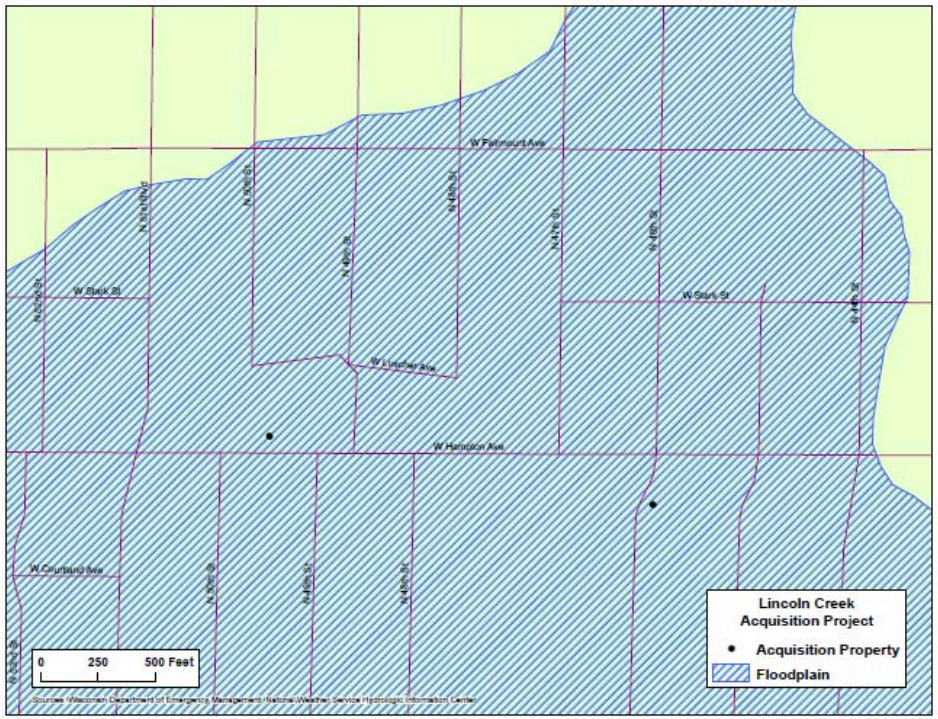


Table 3.4.2 represents potential losses avoided for a 100 year flood event modeled using HAZUS-MH MR4.

Table 3.4.2 Loss Estimation - HAZUS-MH MR4 Modeled 100 Year Flood Event

Property Address	Acquisition Date	Building Value	HAZUS Damage %	Content Value	HAZUS Damage %	Building Damage	Contents Damage	Total Losses Avoided
4924 W Hampton Ave	4/12/2001	$ 76,178.43	17.00%	$ 38,089	16.00%	$ 12,950	$ 6,094	$ 19,045
4748 N 46th Street	4/12/2001	$ 50,376.06	17.00%	$ 25,188	16.00%	$ 8,564	$ 4,030	$ 12,594

Sources: WEM Property Information Sheets, FEMA-HAZUS-MH-MR4 (All values have been adjusted for inflation)

Table 3.4.3 represents potential return on investment (ROI) based on the damage estimates calculated in HAZUS for a 100-year flood event.

Table 3.4.3 Return on Investment Calculations

Property Address	Acquisition Date	Total Losses Avoided	Project Investment	ROI
4924 W Hampton Ave	4/12/2001	$ 19,045	$ 54,480	35%
4748 N 46th Street	4/12/2001	$ 12,594	$ 36,244	35%
TOTAL:		**$ 31,642**	**$ 90,724**	**35%**

Source: WEM Property Information Sheets – all values have been adjusted for inflation

Return on investment was calculated using the following formula:

Return on Investment (ROI)

$ 31,642 LA *(Loss Avoided)*
---------- X 100= **35%** (ROI)
$ 90,724 PI *(Project Investment or Acquisition Cost)*

In analyzing the mitigation efforts accomplished in the Lincoln Creek neighborhood, several conclusions can be drawn. As the modeled results from the HAZUS analysis indicate there is a consistent return on investment for the properties involved in the first Lincoln Creek acquisition project, with most properties producing over a 20% return per event. There have been 4 events since the completion of the acquisition project that were at or near flood stage; based on estimated losses several of the acquisition properties would have already paid for themselves amounting to a 100% return on investment.

Uniquely, in the Lincoln Creek area, two separate mitigation projects were accomplished independently of each other. In the second project, over 35% ROI was estimated for one event. The resulting outcome illustrates the opportunities that exist for mitigation and the successes that can be realized when those opportunities are pursued. Once again mitigation should be viewed in the context of *when* the next event happens not *if*. In this context there is no question that there will be significant losses avoided as a result of well thought out acquisition projects efficiently executed.

3.5 Project #4: Village of Oak Creek (Oak Creek)

Keeping with the strategy developed and approved by the Wisconsin Interagency Disaster Recovery Group (IDRG), and in conjunction with Wisconsin Emergency Management and the Village of Oak Creek, an application was submitted to fund an acquisition project in the community of Oak Creek, WI. The proposed acquisition project involved one property that had a history of flood damages over a number of years and was identified by FEMA as a repetitive-loss property under the NFIP.

The application process cites flood damages in 1996, 1998, 1999, and twice in 2000. It is known that the property had flooded prior to 1996 but documentation is not available. After the flooding in May and July of 2000, it was determined the property was not habitable. The application and accompanying communication from Wisconsin Emergency Management further indicated that without acquisition, the property would continue to incur damages with flood insurance claims paid. Funds re-obligated from FEMA-1180-DR-WI were made available to accomplish the proposed acquisition.

Table 3.5.1 lists the property involved in the acquisition and the building and content value.

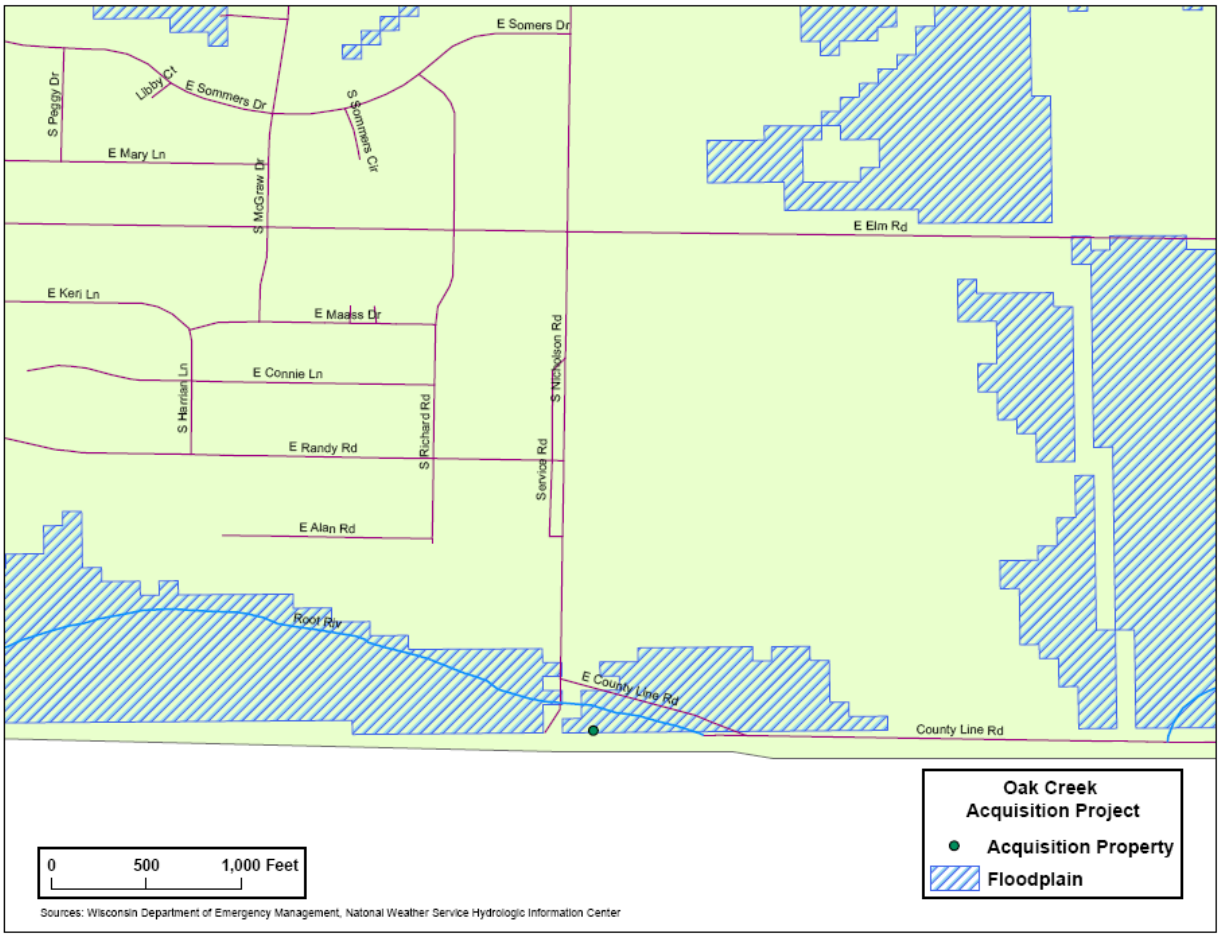
Table 3.5.1 Acquisition Properties - Addresses and Values

Property Address	Building Value	Content Value	Total Value
11040 S. Nicholson Rd	$ 145,147	$72,574	$217,721

Source: WEM Property information sheets - all values have been adjusted for inflation

Figure 3.5.1 shows the location of the acquisition property and the floodplain in the area along the Root River, in Oak Creek, WI.

Figure 3.5.1 Acquisition Property Location and Floodplain



A HAZUS-MH MR4 flood model analysis was completed to determine estimated damages for a 100 year flood event. Table 3.5.2 shows the results of this analysis. Using the estimated damages from this analysis, the Return on Investment (ROI) was calculated; Table 3.5.3 shows these results.

Table 3.5.2 Loss Estimation - HAZUS-MH MR4 Modeled 100 Year Flood Event

Property Address	Acquisition Date	Building Value	HAZUS Building Damage %	Content Value	HAZUS Contents Damage %	Building Damage	Contents Damage	Project Investment	Total Losses Avoided
11040 S. Nicholson Rd	2/11/2002	$145,147	$28.83%	$72,574	36.83%	$41,846	$26,729	$112,183	$68,575

Sources: WEM Property Information Sheets, FEMA-HAZUS-MH-MR4 (All values have been adjusted for inflation)

Table 3.5.3 Loss Estimation and Return on Investment Calculations

Address	Date of Acquisition	Project Investment	Total Losses Avoided	ROI
11040 S. Nicholson Rd.	2/11/2002	$112,183	$68,575	61.13%

Sources: WEM Property Information Sheets, FEMA-HAZUS-MH-MR4
All values have been adjusted for inflation)

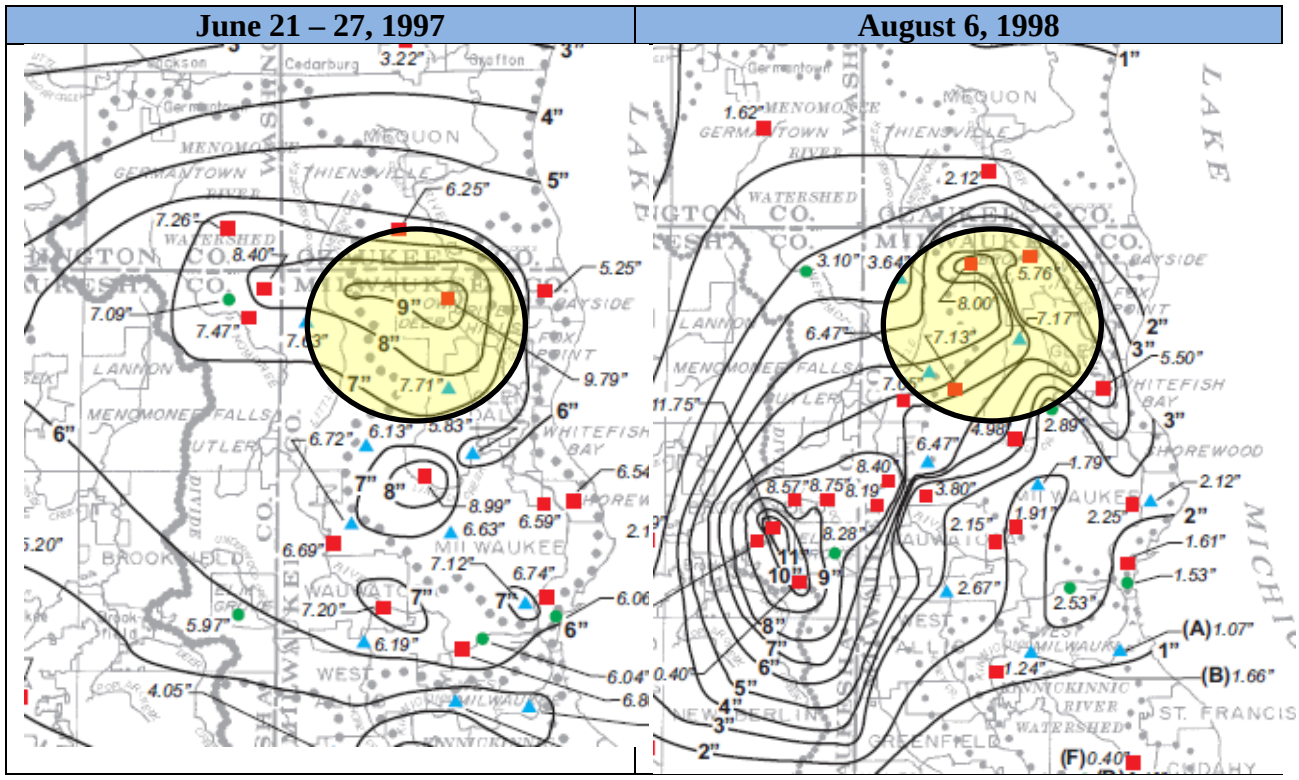
Reviewing National Climatic Data Center (NCDC) data, it appears likely that the property would have flooded as many as three times since the acquisition was initiated. Specifically, it is noted for the February 2001 flood event, the Root River was above flood stage in excess of three days. This caused flooding in many homes along the river in both Racine and Milwaukee Counties. In view of these subsequent flooding events and the amount of losses avoided for such events, it is evident that the acquisition project has been cost effective.

3.6 Project #5: Village of Brown Deer (South Branch)

In the summers of 1997 and 1998 the community of Brown Deer in the northeastern section of Milwaukee County, experienced two rainfall events described as "in excess of 100-year rainfall," During the June 21, 1997 event it was reported to the National Climatic Data Center (NCDC) that at one point, Brown Deer and Green Bay roads were under water with fish swimming on the road. Churchill Lane is less than a mile south of Brown Deer road and experienced extremely high water in the area of South Branch, flooding several homes in the area. The same area received significant damage again on August 6, 1998 with the Churchill Lane area flooding similar to the 1997 event. Both weather events and subsequent flooding resulted in Presidential Disaster Declarations for the community and as a result, potential HMGP funding.

Rainfall frequency maps for Milwaukee County are represented in Figure 3.6.1, with the approximate location of the acquisition properties in the community of Brown Deer highlighted.

Figure 3.6.1 Rainfall Frequency Maps
Location of Acquisition Properties in Brown Deer
And Measured Rainfall Amounts for June 21-27, 1997 and August 6, 1998



Source: Southeastern Wisconsin Regional Planning Commission (SEWRPC)

Table 3.6.1 contains the addresses of the acquisition project properties and the building and contents values used for the project analysis. The values were taken from the property

information worksheets provided by Wisconsin Emergency Management and the Village of Brown Deer and have been adjusted for inflation.

Figure 3.6.2 shows the location of acquisition properties in the Churchill Lane area as well as the flood plain for the area. Figure 3.6.3 and 3.6.4 are aerial photos of the area before and after acquisition. Figure 3.6.5 and 3.6.6 are street level pictures of the area after acquisition during the recent storm event in July 22, 2010.

Table 3.6.1 Brown Deer Acquisition Project Addresses and Values

Property Address	Building Value	Content Value	Total Value
4847 W Churchill Lane	$ 156,735	$78,367	$ 235,102
4871 W Churchill Lane	$ 156,735	$78,367	$ 235,102
4895 W Churchill Lane	$ 169,796	$84,898	$ 254,694
4920 W Churchill Lane	$ 171,102	$85,551	$ 256,653
4921 W Churchill Lane	$ 161,959	$80,980	$ 242,939
4949 W Churchill Lane	$ 163,265	$81,633	$ 244,898
4979 W Churchill Lane	$ 167,184	$83,592	$ 250,776
4991 W Churchill Lane	$ 172,408	$88,816	$ 261,224
5005 W Churchill Lane	$ 138,449	$69,224	$ 207,673

Source: WEM Final Report and Property Information Sheet (DR1238-WI)

Figure 3.6.2 Acquisition Properties Location in Floodplain

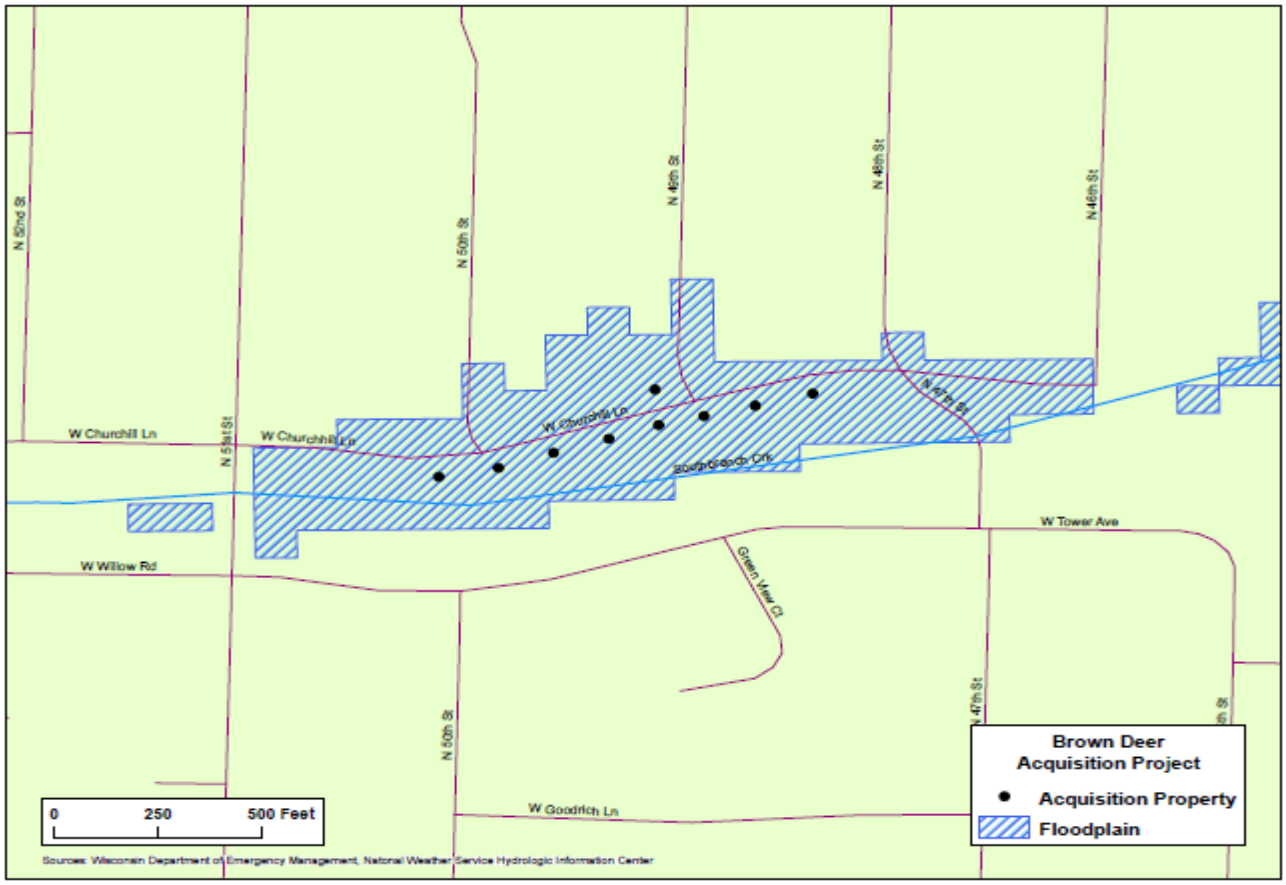


Figure 3.6.3 Churchill Lane Properties Pre-Acquisition

Figure 3.6.4 Churchill Lane Properties Post-Acquisition

Figure 3.6.5 Churchill Lane July 22, 2010

Figure 3.6.6 Churchill Lane and 51st St July 22, 2010

Table 3.6.2 reflects the damages paid through flood insurance as a result of the storm in June 1997 and August 1998. Data was not available for the 4847 W Churchill Lane property.

Table 3.6.2 Damages Paid on Acquisition Properties

Property Address	Losses Paid June 21-21, 1997 Flooding	Losses Paid August 6, 1998 Flooding	Total Losses Paid	Adjusted Loss June (2010 $$)	Adjusted Loss August (2010 $$)	Total Loss Adjusted (2010 $$)
4847 W Churchill Lane	N/A	N/A	N/A	N/A	N/A	N/A
4871 W Churchill Lane	$73,600	$63,531	$137,131	$99,784	$84,812	$184,596
4895 W Churchill Lane	$66,239	$57,192	$123,431	$89,804	$76,350	$166,154
4920 W Churchill Lane	$88,737	$65,711	$154,447	$120,306	$87,722	$208,027
4921 W Churchill Lane	$118,525	$46,110	$164,635	$160,692	$61,556	$222,247
4949 W Churchill Lane	$47,600	$35,357	$82,957	$64,534	$47,200	$111,734
4979 W Churchill Lane	$51,431	$62,267	$113,698	$69,728	$83,125	$152,853
4991 W Churchill Lane	$42,236	$2,153	$44,388	$57,262	$2,874	$60,135
5005 W Churchill Lane	$20,848	$7,656	$28,503	$28,264	$10,220	$38,484
TOTALS:	**-**	**-**	**-**	**$690,375**	**$453,857**	**$1,144,232**

Source: WEM

Table 3.6.3 represents potential losses avoided for a 100 year flood event modeled using HAZUS-MH MR4. It also shows the potential Return on Investment (ROI) based on the damage estimates calculated in HAZUS for a 100 year flood event.

Table 3.6.3 Loss Estimation for HAZUS-MH MR4 Modeled 100 Year Flood Event

Property Address	Date of Acquisition	Building Value	Building Damage % (HAZUS)	Contents Value	Contents Damage % (HAZUS)	Building Damage	Contents Damage	Total Losses Avoided	Project Investment	ROI
4847 W Churchill Lane	10/14/1999	$156,735	41.55%	$78,367	37.26%	$65,123	$29,200	$94,323	$131,880	72%
4871 W Churchill Lane	10/14/1999	$156,735	39.27%	$78,367	34.52%	$61,550	$27,052	$88,602	$ 81,188	109%
4895 W Churchill Lane	10/14/1999	$169,796	37.87%	$84,898	32.84%	$64,302	$27,880	$92,182	$ 95,796	96%
4920 W Churchill Lane	10/14/1999	$171,102	35.38%	$85,551	29.73%	$60,536	$25,434	$85,970	$ 97,915	88%
4921 W Churchill Lane	10/14/1999	$161,959	36.93%	$80,980	31.66%	$59,812	$25,638	$85,450	$133,899	64%
4949 W Churchill Lane	10/14/1999	$163,265	35.31%	$81,633	29.64%	$57,649	$24,196	$81,845	$106,530	77%
4979 W Churchill Lane	10/14/1999	$167,184	34.53%	$83,592	28.67%	$57,729	$23,966	$81,694	$103,382	79%
4991 W Churchill Lane	10/14/1999	$172,408	34.53%	$88,816	28.67%	$59,533	$25,464	$84,996	$147,121	58%
5005 W Churchill Lane	10/14/1999	$138,449	34.15%	$69,224	28.18%	$47,280	$19,507	$66,788	$121,121	55%
TOTALS:								**$761,850**	**$1,108,831**	**69%**

Sources: WEM Property Information Sheets, FEMA-HAZUS-MH-MR4 (All values have been adjusted for inflation)

Return on investment was calculated using the following formula:

Return on Investment (ROI)

$$\frac{\textbf{\$ 761,850}\ \text{LA}\ \textit{(Loss Avoided)}}{\textbf{\$ 1,108,831}\ \text{PI}\ \textit{(Project Investment or Acquisition Cost)}} \times 100 = \textbf{69\%}\ \text{(ROI)}$$

In reviewing the loss data for the two storm events prior to the community acquisition project it is important to note the comparison between actual losses (Table 3.6.2) and estimated losses from the HAZUS model run (Table 3.6.3). Damage estimates from a HAZUS model run depends largely on the accuracy of the data available to make the estimates for damages. In the HAZUS analysis for the Brown Deer acquisition it appears the data was fairly consistent and that the results, although not exact, are acceptable to estimate losses avoided for possible future events.

As a result of the acquisition project in the Village of Brown Deer, and in conjunction with the Metropolitan Milwaukee Sewerage District, a detention basin was created along South Branch Creek, utilizing the properties the Village acquired. This catch basin, which functions as part of a larger system along South Branch Creek, has helped to mitigate flood damage from subsequent events throughout the northeastern section of Milwaukee County.

Other major rain events in 2004, 2008, and as recently as July 22, 2010 would most certainly have caused flooding and similar damage as the storms in 1997 and 1998. Fortunately, the mitigation projects (acquisition and detention basin) were completed in 2001 and have effectively avoided losses that would have exceeded an estimated $2.2 million dollars. It is clear that the most effective mitigation programs are those that remove properties from the flood plain. As evidenced by these projects in Milwaukee County, specifically the Brown Deer project, the positive outcomes are numerous not only for the affected residents in the community but the County as well and prove to be extremely cost effective over the lifetime of the project.

Section 4 Loss Estimation Analysis

The Loss Estimation Analysis is the final phase of a loss avoidance study. This is conducted to estimate the avoided losses based on the effectiveness of the mitigation project during the storm event of interest. The Loss Estimation Analysis is accomplished by calculating the damage (in dollars) associated with the damage analysis reported in Section Two. This section briefly reviews the procedures used to determine the success of the mitigation effort set forth in this study. It includes two major tasks:

(1) Calculating Losses Avoided (LA)
(2) Calculating Return On Investment (ROI)

Calculating Losses Avoided

The losses avoided analysis determines the dollar value estimate of the damage that *may* have occurred had the mitigation project not been executed and the damage that *could* occur after the project was executed. The losses avoided (in dollars) were calculated by subtracting the mitigation completed from the estimated mitigation absent damages. The end result of the loss calculation was an estimated loss value for the event that actually occurred. The losses were calculated in present-day values.

Calculating Return on Investment

The final task in determining losses avoided is to calculate the ROI. The methodology and results may vary depending upon the number of events being analyzed for each mitigation project and the level of damage sustained during each impacting event.

The bottom portion of the equation (PI) is the total project investment for the mitigation projects being evaluated. Project investment does not represent the Federal investment alone, but rather the resource investment from all parties involved. It does not include work conducted outside of the mitigation projects. The upper portion of the equation (LA) is the total losses avoided. Multiple events are being evaluated for each mitigation project. The LA represents the total losses for all the storm events evaluated.

The first project (City of Wauwatosa) reflects *actual* event data and estimated losses avoided from those events. These events range from major to minor flooding. Projects Two through Five reflect HAZUS modeling and are based on a one-time, 100-year flood event. From this

information, it is evident that actual flooding events will result in a significant return on investment that will increase as additional flooding events occur.

The diagrams below represent a numerical representation of the findings:

Return on Mitigation Investment

$$\frac{\$\ LA}{\$\ PI} \times 100 = \%\ ROI$$

Where LA = Losses Avoided
Where PI = Project Investment
Where ROI = Return on Investment

Return on Mitigation Investment

$$\frac{\$2{,}155{,}513}{\$2{,}954{,}399} \times 100 = 73\%$$

Table 4.1 Return on Mitigation Investment			
Project #:	**Losses Avoided:**	**Project Investment**	**Return on Investment:**
#1: City of Wauwatosa	$1,059,101	$ 716,837	148%
#2: City of Milwaukee (1st project)	$ 234,348	$ 925,823	25%
#3: City of Milwaukee (2nd project)	$ 31,639	$ 90,724	35%
#4: Village of Oak Creek	$ 68,575	$ 112,183	61%
#5: Village of Brown Deer	$ 761,850	$1,108,832	75%
Totals:	**$ 2,155,513**	**$2,954,399**	**73%**

Section 5 Summary

The projects included in this report all involved acquiring properties in the flood plain and removing them. The acquired properties were then returned to green space and any future development is limited. Additionally, two of the acquisition projects were completed in conjunction with other types of mitigation projects involving a detention basin and re-engineering a creek channel.

The size of each project varied depending on circumstances unique to each community. The outcomes for each of these projects was also unique to each community and provided exceptional support for why an acquisitions project is often the best course of action for a community. The outcomes are as follows:

- City of Wauwatosa – a community park was created
- City of Milwaukee – Lincoln Creek neighborhood – severely damaged structures have been removed and replaced with green space
- Village of Oak Creek – structure has been removed and assistance is no long required from the community first responders in a flood event
- Village of Brown Deer – structures have been replaced with a detention basin in conjunction with another project which helped prevent flooding in a much broader area of the community

Without question, there is a cost associated with any acquisition project. While this cost can be analyzed in a quantitative manner for structures and contents, it is not so simple to determine associated benefits for the greater community. The costs reflected in Table 4.1 in Section 4 include varied costs associated with the analysis of the data for each project and the total of all projects with an average ROI. For example, in Project #1 (City of Wauwatosa) the losses avoided and project investment costs were taken from the *actual* events and *actual* properties that could have been affected in each event following mitigation (acquisition) of the properties. All of the acquired properties from this project did not always show damage from the event, thus they were not all included in each flood event (or the total Project Investment). For Projects #2 through #5, HAZUS modeling was conducted estimating damage for most properties for a one-time, 100-year flood event. Project investment or acquisition costs were then calculated for most, if not all, properties acquired for each of these projects. Overall, as shown in Table 4.1, the return on investment (ROI) for all five projects is estimated at 73%. This is combining the *actual* events of Project #1 with the one-time, 100-year events for Projects #2-5. It may be more accurate to show the ROI for Project #1 as 148% from *actual* events and the ROI for Projects #2-5 for HAZUS modeling as an average of 49%. (see Table 5.1 below)

Table 5.1 Return on Mitigation Investment by Type of Analysis (Actual Events vs. HAZUS modeling)			
Project #:	**Losses Avoided:**	**Project Investment**	**Return on Investment:**
#1: City of Wauwatosa	$1,059,101	$ 716,837	148%
Total: (Project #1)	**$1,059,101**	**$ 716,837**	**148%**
HAZUS Modeling for a 100-year flood event			
#2: City of Milwaukee (1st project)	$ 234,348	$ 925,823	25%
#3: City of Milwaukee (2nd project)	$ 31,639	$ 90,724	35%
#4: Village of Oak Creek	$ 68,575	$ 112,183	61%
#5: Village of Brown Deer	$ 761,850	$1,108,832	75%
Totals: (Project #2-5)	**$1,096,412**	**$2,237,562**	**49%**

Whichever analysis is chosen (Table 4.1 or Table 5.1) the Return on Investment is significant and indicates that as flooding events occur, the ROI will continue to increase at a considerable rate and over time, will undoubtedly be much higher than the original project investment costs.

Unquestionably, when a property has been removed through acquisition, it is no longer at risk for loss from a flood event. The community no longer needs to risk people and equipment when responding to flooded residents at the acquired property. When the acquisition involves collaborative efforts such as the Brown Deer or Lincoln Creek projects, the benefit to the larger community can often go unnoticed. If these benefits are examined in addition to the direct losses avoided because of the acquisition, the benefit to the community becomes even more substantial.

Once again, as evidenced by the historical experience of flooding in areas such as Milwaukee County, the question is not *if* flooding will happen again, but *when* it happens again. Because of projects like those included in this report and on-going in communities and counties throughout the state of Wisconsin, the impact to people and property has been successfully mitigated in a very cost effective manner. While the dramatic results may not be evident for all properties in all instances, the ROI calculations support the assertion that over the course of subsequent events the cumulative benefit far outweighs the cost of these types of projects.

APPENDIX K: AUTHORITIES

The Stafford Act, the federal disaster assistance law as passed by Congress in 1973 and amended in 1988, 1994 and 2000, allows for discretionary disaster assistance to states. The President of the United States has the discretion to declare a disaster and direct the Federal Emergency Management Agency (FEMA) to assist states when a disaster overwhelms a state's capability to respond and recover. The Stafford Act also allows for partial funding for state emergency management programs for disaster preparedness, response, recovery and mitigation if the state agrees to a performance contract. Title 44 of the Code of Federal Regulations, Emergency Management and Assistance, describes the administrative policies, rules and regulations governing the application of the Stafford Act and FEMA's role as a federal agency.

The federal and state legislation that addresses hazard mitigation is listed below. These are the authorities that empower Wisconsin's mitigation activities.

FEDERAL AUTHORITIES

Part 201 of Title 44 of the Code of Federal Regulations, Mitigation Planning: Sections 201.1 through 201.7 describe the policies and procedures for state, local, and tribal all hazards mitigation planning as required by the provisions of section 322 of the Stafford Act. These sections require that state and local governments and tribal organizations to develop hazard mitigation plans to qualify for continued receipt of federal disaster assistance.

Section 203 of Title 44 of the Code of Federal Regulations, Pre-Disaster Mitigation: Established a pre-disaster mitigation program to provide funding for cost-effective hazard mitigation measures to states and local governments.

Subpart N of Section 206 of Title 44 of the Code of Federal Regulations, Hazard Mitigation Grant Program: Sections 206.430 through 206.440 describe the requirements for implementing the Hazard Mitigation Grant Program at the state level.

Subpart H of Section 206 of Title 44 of the Code of Federal Regulations, Public Assistance Eligibility: Section 206,226(e) allows cost effective hazard mitigation measures as in allowable cost in restoration projects.

Part 78 of Title 44 of the Code of Federal Regulations, Flood Mitigation Assistance: The Flood Mitigation Assistance program was created as part of the National Flood Insurance Reform Act of 1994 with the goal of reducing or eliminating claims under the National Flood Insurance Program. Flood Mitigation Assistance is a pre-disaster grant program awarding separate grants for flood mitigation planning as well as flood mitigation projects.

Part 79 of Title 44 of the Code of Federal Regulations, Flood Mitigation Grants: The purpose of this part is to prescribe actions, procedures, and requirements for

administration of the hazard mitigation grant programs made available under the National Flood Insurance Act of 1968, as amended, and the Flood Disaster Protection Act of 1973, as amended, 42 U.S.C. 4001 *et seq.* The Severe Repetitive Loss (SRL) and Flood Mitigation Assistance (FMA) grant programs mitigate losses from floods, minimizing impacts to the National Flood Insurance Fund (NFIF).

Part 80 of Title 44 of the Code of Federal Regulations, Property Acquisition and Relocation for Open Space: This part provides guidance on the administration of FEMA mitigation assistance for projects to acquire property for open space purposes under all FEMA hazard mitigation assistance programs. It provides information on the eligibility and procedures for implementing projects for acquisition and relocation of at-risk properties from the hazard area to maintain the property for open space purposes.

STATE AUTHORITIES

Wisconsin State Statute, Chapter 166 (Emergency Management): Authorizes and establishes the organization for state and local emergency management programs, which are charged with the responsibility to the state and its subdivisions to cope with natural and technological disasters. Includes authorization for Wisconsin Emergency Management to require satisfactory completion of an annual plan of work from local county emergency management directors in return for receiving partial funding from the state for local emergency management positions.

Wisconsin Statutes, Chapter 87: Authorizes the Wisconsin Department of Natural Resources to construct, maintain and alter flood control structures.

Wisconsin Administrative Rules, NR 115: Establishes minimum shoreland protection rules.

Wisconsin Administrative Rules, NR 116: Describes the Wisconsin Department of Natural Resources Floodplain Management Program. Section 87.30 Wisconsin Statutes requires communities to zone their flood hazard areas in accordance with minimum statewide standards that are established in NR 116.

Wisconsin Administrative Rules, NR 117: Describes the Wisconsin Department of Natural Resources minimum statewide standards for how local communities zone their shorelands and wetlands.

Wisconsin Administrative Rules, NR 199: The Municipal Flood Control and Riparian Restoration Program provides grants to local governments to minimize flooding and flood-related damages by acquiring property, floodproofing structures, creating open-space flood storage areas, constructing flood control structures and restoring the flood-carrying capacity and natural and beneficial functions of watercourses.

Governor's Executive Order 67: Requires all state actions affecting construction of any structure or facility to be consistent with and obey state statutes regulating floodplains, wetlands, erosion and shoreland management.

Governor's Executive Order 73: Requires flood mitigation for state owned or leased property and otherwise prohibits state government buildings from being built in a 100-year floodplain for most facilities or the 500-year floodplain for critical facilities.

Wisconsin Building Codes: Wisconsin Administrative Code Comm. 61 to 65 includes the Wisconsin Enrolled Commercial Building Code and the adopted provisions of the International Code Council codes: International Building Code, International Energy Conservation Code, International Mechanical Code, and the International Fuel Gas Code. Wisconsin Administrative Code Comm. 20 and 21 includes the State's Uniform Dwelling Code (UDC) for one and two-family dwellings.

Home Safety Act of 2003: Requires the UDC be enforced in all municipalities and requires that new construction be inspected for code compliance.

Wisconsin State Statute 66.1001, Comprehensive Planning Law: After January 1, 2010, communities are required to have a comprehensive plan if they want to make land use decisions. All community programs and actions that affect land use must be guided by, and consistent with, the community's comprehensive plan.

State of Wisconsin Administrative Plan for the Hazard Mitigation Grant Program: Describes Wisconsin Emergency Management's policies and guidelines for administering the HMGP portion of disaster assistance funds in accordance with Subpart N of Section 206 of Title 44 CFR.

Wisconsin State Statute, Chapter 31: Ensures that dams are safely built, operated and maintained. NR 333 provides design and construction standards for large dams and requires all large dams to have Emergency Action Plans (EAP). EAPs identify potential emergency conditions at a high hazard dam and prescribe procedures to be followed to eliminate the loss of life and minimize property damage. NR 335 covers the administration of the Municipal Dam Repair and Removal Grant Program. DNR is responsible for administration of these regulations.

Wisconsin State Statutes 917 and 1997 Wisconsin Act 27: Provides Forest Fire Protection Grants to increase forest fire protection and suppression capabilities through cooperative efforts with local fire departments. Priority factors include 1) whether the fire departments serve areas that are part of a forest fire control area; 2) fire departments respond to wild fires within their jurisdiction at no cost to the DNR; and 3) fire departments with a majority of members meeting NFPA 1051 standards for wildland fire fighting training. Municipal fire departments that have executed a forest fire suppression agreement acceptable to the DNR are eligible to apply. There is a 50% local match required. Eligible fire departments can receive a maximum grant award of $10,000. Eligible county fire associations can receive a maximum grant award of $25,000.

APPENDIX L: ACRONYMS

ADA	American Disabilities Act
ASFPM	Association of State Floodplain Managers
BCA	Benefit Cost Analysis
BCR	Benefit Cost Ratio
CATEX	Categorical Exclusion
CDBG	Community Development Block Grant
CFR	Code of Federal Regulations
COMM	Department of Commerce
CRS	Community Rating System
DAE	Disaster Assistance Employee
DATCP	Department of Agriculture, Trade and Consumer Protection
DFO	Disaster Field Office
DHFS	Department of Health and Family Services
DMA2K	Disaster Mitigation Act of 2000
DNR	Department of Natural Resources
DOA	Department of Administration
DOB	Department of Benefits
DOT	Department of Transportation
DRM	Disaster Recovery Manager
DSR	Damage Survey Report
EA	Environmental Assessment
EDA	Economic Development Administration
EIS	Environmental Impact Statement
EMR	Emergency Minimal Repair
EOC	Emergency Operations Center
FCO	Federal Coordinating Officer
FEMA	Federal Emergency Management Agency
FIA	Flood Insurance Administration
FIRM	Flood Insurance Rate Map
FIS	Flood Insurance Study
FMA	Flood Mitigation Assistance
FMO	Financial Management Officer
GIS	Geographic Information System
HAZUS	
HMPG	Hazard Mitigation Grant Program
HMTAP	Hazard Mitigation Technical Assistance Program
HUD	Housing and Urban Development
IA	Individual Assistance
IAO	Individual Assistance Officer
IAP	Incident Action Plan
IBC	International Building Code
ICC	Increased Cost of Compliance
ICS	Incident Command System
IDRG	Interagency Disaster Recovery Group

LCA	Local Capability Assessment
MMSD	Milwaukee Metropolitan Sewage District
MOU	Memorandum of Understanding
MRRPC	Mississippi River Regional Planning Commission
NEMIS	National Emergency Management Information System
NEPA	National Environmental Policy Act
NFIP	National Flood Insurance Program
NFIRA	National Flood Insurance Reform Act
NRCS	Natural Resources Conservation Service
OCI	Office of Commissioner of Insurance
OMB	Office of Management and Budget
PA	Public Assistance
PAO	Public Assistance Officer
PDA	Preliminary Damage Assessment
PDM	Pre-Disaster Mitigation
PDM-C	Pre-Disaster Mitigation Competitive
PSC	Public Service Commission
REO	Regional Environmental Officer
RER	Record for Environmental Review
RFC	Repetitive Flood Claims
RLP	Repetitive Loss Property
RLR	Repetitive Loss Report
RPC	Regional Planning Commission
SARWG	State Agency Resource Working Group
SCA	State Capability Assessment
SFHA	Special Flood Hazard Area
SHMO	State Hazard Mitigation Officer
SHMP	State Hazard Mitigation Plan
SHMT	State Hazard Mitigation Team
SHS	State Historical Society
SRL	Severe Repetitive Loss
UDC	Uniform Dwelling Code
USDA	U. S. Department of Agriculture
UW-EXT	University of Wisconsin – Extension
WAFSCM	Wisconsin Association for Floodplain, Stormwater and Coastal Managers
WEM	Wisconsin Emergency Management
WHMT	Wisconsin Hazard Mitigation Team
WIHRO	Wisconsin Interagency Hazard Mitigation Recovery Office
WIVOAD	Wisconsin Volunteer Organizations Active in Disasters

APPENDIX M: AGENCY CONCURRENCES

STATE AGENCY CONCURRENCE
OF THE
STATE OF WISCONSIN HAZARD MITIGATION PLAN
2011 THREE-YEAR UPDATE

The undersigned has reviewed the State of Wisconsin Hazard Mitigation Plan and concurs that it is a working document that will improve Wisconsin's ability to minimize the effects of natural hazards and resist disaster, thereby protecting the health, safety, and economy of its citizens. As a member of the Wisconsin Hazard Mitigation Team, this agency has contributed to the development and update of the Plan and will continue to implement the actions outlined therein. The agency will continue to provide support for and participate in the plan update process as well as recovery efforts after each federal disaster declaration.

The Department of Administration will implement the following hazard mitigation Action Items detailed in Section 4 of the Plan: 1.1 through 1.11.

Mike Huebsch

Mr. Mike Huebsch, Secretary
Wisconsin Department of Administration

1/25/12
Date

STATE AGENCY CONCURRENCE
OF THE
STATE OF WISCONSIN HAZARD MITIGATION PLAN
2011 THREE-YEAR UPDATE

The undersigned has reviewed the State of Wisconsin Hazard Mitigation Plan and concurs that it is a working document that will improve Wisconsin's ability to minimize the effects of natural hazards and resist disaster, thereby protecting the health, safety, and economy of its citizens. As a member of the Wisconsin Hazard Mitigation Team, this agency has contributed to the development and update of the Plan and will continue to implement the actions outlined therein. The agency will continue to provide support for and participate in the plan update process as well as recovery efforts after each federal disaster declaration.

The Department of Agriculture, Trade and Consumer Protection will implement the following hazard mitigation Action Item detailed in Section 4 of the Plan: 2.1.

Ben Brancel

Mr. Ben Brancel, Secretary
Wisconsin Department of Agriculture, Trade and Consumer Protection

12-16-11
Date

STATE AGENCY CONCURRENCE
OF THE
STATE OF WISCONSIN HAZARD MITIGATION PLAN
2011 THREE-YEAR UPDATE

The undersigned has reviewed the State of Wisconsin Hazard Mitigation Plan and concurs that it is a working document that will improve Wisconsin's ability to minimize the effects of natural hazards and resist disaster, thereby protecting the health, safety, and economy of its citizens. As a member of the Wisconsin Hazard Mitigation Team, this agency has contributed to the development and update of the Plan and will continue to implement the actions outlined therein. The agency will continue to provide support for and participate in the plan update process as well as recovery efforts after each federal disaster declaration.

The Department of Natural Resources will implement the following hazard mitigation Action Items detailed in Section 4 of the Plan: 3.1 through 3.23.

Matt Moroney

Ms. Cathy Stepp, Secretary
for Wisconsin Department of Natural Resources

2/7/12
Date

State of Wisconsin
Department of Health Services

Scott Walker, Governor
Dennis G. Smith, Secretary

STATE OF WISCONSIN
HAZARD MITIGATION PLAN
2011 THREE-YEAR UPDATE
CONCURRENCE

The undersigned has reviewed the State of Wisconsin Emergency Management Hazard Mitigation Plan and concurs that it is a working document that will improve Wisconsin's ability to minimize the effects of natural hazards and resist disaster, thereby protecting the health, safety, and economy of its citizens.

As a member of the Wisconsin Hazard Mitigation Team, this agency has contributed to the development and update of the Plan and will continue to implement the actions outlined therein. The agency will continue to provide support for and participate in the plan update process as well as recovery efforts after each federal disaster declaration.

The Department of Health Services will implement the hazard mitigation Action Items detailed in Section 4 of the Plan, 4.1 and 4.2.

Dennis G Smith — Jan. 18, 2012

Mr. Dennis G. Smith, Secretary — Date

Wisconsin Department of Health Services

1 West Wilson Street • Post Office Box 7850 • Madison, WI 53707-7850 • Telephone 608-266-9622 •
dhs.wisconsin.gov

STATE AGENCY CONCURRENCE
OF THE
STATE OF WISCONSIN HAZARD MITIGATION PLAN
2011 THREE-YEAR UPDATE

The undersigned has reviewed the State of Wisconsin Hazard Mitigation Plan and concurs that it is a working document that will improve Wisconsin's ability to minimize the effects of natural hazards and resist disaster, thereby protecting the health, safety, and economy of its citizens. As a member of the Wisconsin Hazard Mitigation Team, this agency has contributed to the development and update of the Plan and will continue to implement the actions outlined therein. The agency will continue to provide support for and participate in the plan update process as well as recovery efforts after each federal disaster declaration.

The Department of Safety and Professional Services will implement the following hazard mitigation Action Items detailed in Section 4 of the Plan: 5.1 through 5.13.

Mr. Dave Ross, Secretary
Wisconsin Department of Safety and Professional Services

Date 12/20/11

STATE AGENCY CONCURRENCE
OF THE
STATE OF WISCONSIN HAZARD MITIGATION PLAN
2011 THREE-YEAR UPDATE

The undersigned has reviewed the State of Wisconsin Hazard Mitigation Plan and concurs that it is a working document that will improve Wisconsin's ability to minimize the effects of natural hazards and resist disaster, thereby protecting the health, safety, and economy of its citizens. As a member of the Wisconsin Hazard Mitigation Team, this agency has contributed to the development and update of the Plan and will continue to implement the actions outlined therein. The agency will continue to provide support for and participate in the plan update process as well as recovery efforts after each federal disaster declaration.

The Office of the Commissioner of Insurance will implement the following hazard mitigation Action Item detailed in Section 4 of the Plan: 6.1.

Mr. Ted Nickel, Commissioner
Wisconsin Office of the Commissioner of Insurance

14 Dec 11
Date

RECEIVED
DEC 15 2011
Name: _____

STATE AGENCY CONCURRENCE
OF THE
STATE OF WISCONSIN HAZARD MITIGATION PLAN
2011 THREE-YEAR UPDATE

The undersigned has reviewed the State of Wisconsin Hazard Mitigation Plan and concurs that it is a working document that will improve Wisconsin's ability to minimize the effects of natural hazards and resist disaster, thereby protecting the health, safety, and economy of its citizens. As a member of the Wisconsin Hazard Mitigation Team, this agency has contributed to the development and update of the Plan and will continue to implement the actions outlined therein. The agency will continue to provide support for and participate in the plan update process as well as recovery efforts after each federal disaster declaration.

The Public Service Commission of Wisconsin will implement the following hazard mitigation Action Items detailed in Section 4 of the Plan: 7.1 through 7.3.

Mr. Phil Montgomery, Chair
Public Service Commission of Wisconsin

12/13/2011
Date

STATE AGENCY CONCURRENCE
OF THE
STATE OF WISCONSIN HAZARD MITIGATION PLAN
2011 THREE-YEAR UPDATE

The undersigned has reviewed the State of Wisconsin Hazard Mitigation Plan and concurs that it is a working document that will improve Wisconsin's ability to minimize the effects of natural hazards and resist disaster, thereby protecting the health, safety, and economy of its citizens. As a member of the Wisconsin Hazard Mitigation Team, this agency has contributed to the development and update of the Plan and will continue to implement the actions outlined therein. The agency will continue to provide support for and participate in the plan update process as well as recovery efforts after each federal disaster declaration.

The Department of Transportation will implement the following hazard mitigation Action Items detailed in Section 4 of the Plan: 8.1 through 8.3.

Mk Gottlieb

Mr. Mark Gottlieb, P.E., Secretary
Wisconsin Department of Transportation

2/14/2012
Date

STATE AGENCY CONCURRENCE
OF THE
STATE OF WISCONSIN HAZARD MITIGATION PLAN
2011 THREE-YEAR UPDATE

The undersigned has reviewed the State of Wisconsin Hazard Mitigation Plan and concurs that it is a working document that will improve Wisconsin's ability to minimize the effects of natural hazards and resist disaster, thereby protecting the health, safety, and economy of its citizens. As a member of the Wisconsin Hazard Mitigation Team, this agency has contributed to the development and update of the Plan and will continue to implement the actions outlined therein. The agency will continue to provide support for and participate in the plan update process as well as recovery efforts after each federal disaster declaration.

The Division of Emergency Management will implement the following hazard mitigation Action Items detailed in Section 4 of the Plan: 10.1 through 10.33.

Mr. Brian Satula, Administrator
Wisconsin Division of Emergency Management

12/09/2011
Date

STATE AGENCY CONCURRENCE
OF THE
STATE OF WISCONSIN HAZARD MITIGATION PLAN
2011 THREE-YEAR UPDATE

The undersigned has reviewed the State of Wisconsin Hazard Mitigation Plan and concurs that it is a working document that will improve Wisconsin's ability to minimize the effects of natural hazards and resist disaster, thereby protecting the health, safety, and economy of its citizens. As a member of the Wisconsin Hazard Mitigation Team, this agency has contributed to the development and update of the Plan and will continue to implement the actions outlined therein. The agency will continue to provide support for and participate in the plan update process as well as recovery efforts after each federal disaster declaration.

The Wisconsin State Historical Society will implement the following hazard mitigation Action Items detailed in Section 4 of the Plan: 11.1 and 11.2.

Ellsworth H. Brown 1/27/12

Mr. Ellsworth H. Brown, Director
Wisconsin State Historical Society

Date

STATE AGENCY CONCURRENCE
OF THE
STATE OF WISCONSIN HAZARD MITIGATION PLAN
2011 THREE-YEAR UPDATE

The undersigned has reviewed the State of Wisconsin Hazard Mitigation Plan and concurs that it is a working document that will improve Wisconsin's ability to minimize the effects of natural hazards and resist disaster, thereby protecting the health, safety, and economy of its citizens. As a member of the Wisconsin Hazard Mitigation Team, this agency has contributed to the development and update of the Plan and will continue to implement the actions outlined therein. The agency will continue to provide support for and participate in the plan update process as well as recovery efforts after each federal disaster declaration.

The National Weather Service Forecast Office Milwaukee/Sullivan will implement the following hazard mitigation Action Item detailed in Section 4 of the Plan: 12.1.

Stephen F Brueske

Mr. Stephen Brueske, Meteorologist-In-Charge
National Weather Service Forecast Office
Milwaukee/Sullivan, WI

1/27/12
Date

STATE AGENCY CONCURRENCE
OF THE
STATE OF WISCONSIN HAZARD MITIGATION PLAN
2011 THREE-YEAR UPDATE

The undersigned has reviewed the State of Wisconsin Hazard Mitigation Plan and concurs that it is a working document that will improve Wisconsin's ability to minimize the effects of natural hazards and resist disaster, thereby protecting the health, safety, and economy of its citizens. As a member of the Wisconsin Hazard Mitigation Team, this agency has contributed to the development and update of the Plan and will continue to implement the actions outlined therein. The agency will continue to provide support for and participate in the plan update process as well as recovery efforts after each federal disaster declaration.

The Wisconsin Economic Development Corporation will implement the following hazard mitigation Action Items detailed in Section 4 of the Plan: 13.1 and 13.2.

Paul Jadin, Secretary of Commerce
Wisconsin Economic Development Corporation

1.5.12
Date

APPENDIX N: STANDARD STATE HAZARD MITIGATION PLAN REVIEW CROSSWALK

Instructions for Using the Plan Review Crosswalk for Review of Standard State Hazard Mitigation Plans

Attached is a Plan Review Crosswalk based on the ***Multi-Hazard Mitigation Planning Guidance Under the Disaster Mitigation Act of 2000***, published by FEMA, with revisions dated November 2006. This Plan Review Crosswalk is consistent with the *Disaster Mitigation Act of 2000* (P.L. 106-390), enacted October 30, 2000 and *44 CFR Part 201 – Mitigation Planning, Interim Final Rule* (the Rule), published February 26, 2002.

SCORING SYSTEM

N – Needs Improvement: The plan does not meet the minimum for the requirement. Reviewer's comments must be provided.

S – Satisfactory: The plan meets the minimum for the requirement. Reviewer's comments are encouraged, but not required.

Each requirement includes separate elements. All elements of a requirement must be rated "Satisfactory" in order for the requirement to be fulfilled and receive a summary score of "Satisfactory." A "Needs Improvement" score on elements shaded in gray (recommended but not required) will not preclude the plan from passing.

Optional matrices for assisting in the review of sections on profiling hazards and assessing vulnerability are found at the end of the Plan Review Crosswalk.

The example below illustrates how to fill in the Plan Review Crosswalk.

Example

Assessing Vulnerability by Jurisdiction

Requirement §201.4(c)(2)(ii): *[The State risk assessment **shall** include an] overview and analysis of the State's vulnerability to the hazards described in this paragraph (c)(2), based on estimates provided in local risk assessments … . The State **shall** describe vulnerability in terms of the jurisdictions most threatened by the identified hazards, and most vulnerable to damage and loss associated with hazard event.*

Element	Location in the Plan (section or annex and page #)	Reviewer's Comments	SCORE N	SCORE S
A. Does the plan describe the State's vulnerability based on information from the local risk assessments?	Section III, pp. 12-28	The plan includes a description of local vulnerable structures. The plan presented a vulnerability summary by regions in the state. This information was collected from the approved plans on file.		✓
B. Does the plan present information on those jurisdictions that face the most risk?	Section III, pp. 30-36	The vulnerability description did not indicate which jurisdictions were the most vulnerable. **Required Revisions:** • Use the information provided in the summaries to determine which jurisdictions are most threatened by the identified hazards. • Identify which jurisdictions have suffered or are likely to suffer the most losses. • If data are not readily available, note these data limitations in the plan. Include actions in the mitigation strategy to obtain these data for the plan update.	✓	
		SUMMARY SCORE	✓	

Standard State Hazard Mitigation Plan Review and Approval Status

State Point of Contact: Roxanne Gray	**Address:** WEM 2400 Wright Street—P.O. Box 7865 Madison, Wisconsin 53707
Title: State Hazard Mitigation Officer	
Agency: Wisconsin Emergency Management Agency	
Phone Number: 608-242-3211	**E-Mail:** Roxanne.gray@wisconsin.gov

FEMA Reviewer: Tom Smith	**Title:** Community Planner	**Date:** November 8, 2011 and November 21, 2011
Date Received in FEMA Region [Insert #]		
Plan Not Approved		
Plan Approved	**X**	
Date Approved		

STANDARD STATE HAZARD MITIGATION PLAN SUMMARY CROSSWALK

The plan cannot be approved if the plan has not been formally adopted.

Each requirement includes separate elements. All elements of the requirement must be rated "Satisfactory" in order for the requirement to be fulfilled and receive a score of "Satisfactory." Elements of each requirement are listed on the following pages of the Plan Review Crosswalk. A "Needs Improvement" score on elements shaded in gray (recommended but not required) will not preclude the plan from passing. Reviewer's comments must be provided for requirements receiving a **"Needs Improvement"** score.

SCORING SYSTEM

Please check one of the following for each requirement.

N – Needs Improvement: The plan does not meet the minimum for the requirement. Reviewer's comments must be provided.

S – Satisfactory: The plan meets the minimum for the requirement. Reviewer's comments are encouraged, but not required.

Prerequisite	NOT MET	MET
Adoption by the State: §201.4(c)(6) and §201.4(c)(7)	X	

Planning Process	N	S
Documentation of the Planning Process: §201.4(c)(1)		X
Coordination Among Agencies: §201.4(b)		X
Program Integration: §201.4(b)		X

Risk Assessment	N	S
Identifying Hazards: §201.4(c)(2)(i)		X
Profiling Hazards: §201.4(c)(2)(i)		X
Assessing Vulnerability by Jurisdiction: §201.4(c)(2)(ii)		X
Assessing Vulnerability of State Facilities: §201.4(c)(2)(ii)		X
Estimating Potential Losses by Jurisdiction: §201.4(c)(2)(iii)		X
Estimating Potential Losses of State Facilities: §201.4(c)(2)(iii)		X

Mitigation Strategy	N	S
Hazard Mitigation Goals: §201.4(c)(3)(i)		X
State Capability Assessment: §201.4(c)(3)(ii)		X
Local Capability Assessment: §201.4(c)(3)(ii)		X
Mitigation Actions: §201.4(c)(3)(iii)		X
Funding Sources: §201.4(c)(3)(iv)		X

Coordination of Local Mitigation Planning	N	S
Local Funding and Technical Assistance: §201.4(c)(4)(i)		X
Local Plan Integration: §201.4(c)(4)(ii)		X
Prioritizing Local Assistance: §201.4(c)(4)(iii)		X

Severe Repetitive Loss Mitigation Strategy *(only required for 90/10 under FMA & SRL)*	N	S
Repetitive Loss Mitigation Strategy: §201.4(c)(3)(v)		X
Coordination with Repetitive Loss Jurisdictions §201.4(c)(3)(v)		X

Plan Maintenance Process	N	S
Monitoring, Evaluating, and Updating the Plan: §201.4(c)(5)(i)		X
Monitoring Progress of Mitigation Activities: §201.4(c)(5)(ii) and (iii)		X

STANDARD STATE HAZARD MITIGATION PLAN APPROVAL STATUS

PLAN NOT APPROVED (Pending Plan Adoption)**	X**
PLAN APPROVED	

See Reviewer's Comments

PREREQUISITE

Adoption by the State

Requirement §201.4(c)(6): *The plan **must** be formally adopted by the State prior to submittal to [FEMA] for final review and approval.*

Requirement §201.4(c)(7): *The plan **must** include assurances that the State will comply with all applicable Federal statutes and regulations in effect with respect to the periods for which it receives grant funding, in compliance with 44 CFR 13.11(c). The State will amend its plan whenever necessary to reflect changes in State or Federal laws and statutes as required in 44 CFR 13.11(d).*

Element	Location in the Plan (section or annex and page #)	Reviewer's Comments	SCORE NOT MET	SCORE MET
A. Has the State formally adopted the **new or updated** plan?				
B. Does the plan provide assurances that the State will **continue to** comply with all applicable Federal statutes and regulations during the periods for which it receives grant funding, in compliance with 44 CFR 13.11(c), and will amend its plan whenever necessary to reflect changes in State or Federal laws and statutes as required in 44 CFR 13.11(d)?	Section 1.3, page 1-2	Fine		X
		SUMMARY SCORE		

PLANNING PROCESS: *§201.4(b): An effective planning process is essential in developing and maintaining a good plan.*

Documentation of the Planning Process

Requirement §201.4(c)(1): *[The State plan **must** include a] description of the planning process used to develop the plan, including how it was prepared, who was involved in the process, and how other agencies participated.*

Element	Location in the Plan (section or annex and page #)	Reviewer's Comments	SCORE N	SCORE S
A. Does the plan provide a narrative description of how the **new or updated** plan was prepared?	Section 2.1.4, pp. 2-6 to 2-8	Good.		X
B. Does the **new or updated** plan indicate who was involved in the **current** planning process?	Section 1.4, page 2-2 and Section 2.1.4, pp.2-6 to 2-8.	State mitigation staff conducted interviews of personnel in other state agencies and representatives of public and private institutions. The agencies interviewed included Transportation, DNR, Division of Housing, National Weather Service, and USGS.		X
C. Does the **new or updated** plan indicate how other agencies participated in the **current** planning process?	Section 2.1.4, page 2-7; Section 2.2, pp. 2-8 to 2-17	Plan includes a detailed description of outreach efforts over an extended time period. Recent outreach efforts have been to agencies involved in RiskMAP projects and to the state's rural electrical cooperatives.		X
D. Does the updated plan document how the planning team reviewed and analyzed each section of the plan?	Section 2.1.4, pp. 2-6 to 2-8	Fine		X

E. Does the updated plan indicate for each section whether or not it was revised as part of the update process?	Section 2.1.4, pp. 2-6 to 2-8	Fine		X
		SUMMARY SCORE		X

Coordination Among Agencies

Requirement §201.4(b): *The [State] mitigation planning process* ***should*** *include coordination with other State agencies, appropriate Federal agencies, interested groups, and … .*

Element	Location in the Plan (section or annex and page #)	Reviewer's Comments	SCORE N	SCORE S
A. Does the **new or updated** plan describe how Federal and State agencies were involved in the **current** planning process?	Section 2.2, pp. 2-8 to 2-17	The plan describes a long-term effort of cooperation and collaboration with other state and federal agencies.		X
B. Does the **new or updated** plan describe how interested groups (e.g., businesses, non-profit organizations, and other interested parties) were involved in the **current** planning process?	Section 2.2, pp. 2-8 to 2-17	Good outreach to rural electrical cooperatives. Good outreach to non-profits involved in flood plain management and environmental protection.		X
C. Does the updated plan discuss how coordination among Federal and State agencies changed since approval of the previous plan?	Section 2.1.4, pp. 2-6 to 2-8	State shifted from group meetings with state agencies to a strategy of one-on-one interviews and surveys. This one-on-one approach appears to be a successful strategy.		X
		SUMMARY SCORE		X

Program Integration

Requirement §201.4(b): *[The State mitigation planning process* ***should****] be integrated to the extent possible with other ongoing State planning efforts as well as other FEMA mitigation programs and initiatives.*

Element	Location in the Plan (section or annex and page #)	Reviewer's Comments	SCORE N	SCORE S
A. Does the **new or updated** plan describe how the State mitigation planning process is integrated with other ongoing State planning efforts?	Section 2.3, pp. 2-17 to 2-21	The Wisconsin Mitigation effort supports other state efforts supporting flood plain management and state mitigation efforts support other preparedness, response, and recovery efforts.		X
B. Does the **new or updated** plan describe how the State mitigation planning process is integrated with FEMA mitigation programs and initiatives?	Section 2.3, pp. 2-20 and 2-21	The state hazard mitigation staff coordinates with federal flood plain management and flood insurance programs. The state has coordinated a statewide HAZUS analysis for flooding and has participated in statewide RiskMAP efforts.		X
		SUMMARY SCORE		X

RISK ASSESSMENT: *§201.4(c)(2): [The State plan must include a risk assessment] that provides the factual basis for activities proposed in the strategy portion of the mitigation plan. Statewide risk assessments must characterize and analyze natural hazards and risks to provide a statewide overview. This overview will allow the State to compare potential losses throughout the State and to determine their priorities for implementing mitigation measures under the strategy, and to prioritize jurisdictions for receiving technical and financial support in developing more detailed local risk and vulnerability assessments.*

Identifying Hazards

Requirement §201.4(c)(2)(i): *[The State risk assessment **shall** include an] overview of the type … of all natural hazards that can affect the State … .*

Element	Location in the Plan (section or annex and page #)	Reviewer's Comments	SCORE N	SCORE S
A. Does the **new or updated** plan provide a description of the type of **all natural hazards** that can affect the State? If the hazard identification omits (without explanation) any hazards commonly recognized as threats to the State, this part of the plan cannot receive a Satisfactory score.	Section 3.2.1, pp. 3-3 to 3-5	Ok. The state plan begins to discuss issues regarding climate change. The discussion is preliminary and general and the next plan update should include more a more detailed risk assessment for climate change and a more detailed treatment of mitigation strategies.		X
		SUMMARY SCORE		X

Profiling Hazards

Requirement §201.4(c)(2)(i): *[The State risk assessment **shall** include an overview of the] location of all natural hazards that can affect the State, including information on previous occurrences of hazard events, as well as the probability of future hazard events, using maps where appropriate … .*

Element	Location in the Plan (section or annex and page #)	Reviewer's Comments	SCORE N	SCORE S
A. Does the risk assessment identify the **location** (i.e., geographic area affected) of each natural hazards addressed in the **new or updated** plan?	Section 3.3 -- Section 3.16, pp. 3-7 to 3-169	Plan includes maps and written text describing the locations most vulnerable to different hazards.		X
B. Does the **new or updated** plan provide information on **previous occurrences** of each hazard addressed in the plan?	Section 3.3 -- Section 3.16, pp. 3-7 to 3-169	Good. Plan describes the history of previous events and it ranks hazards based on past frequency.		X
C. Does the **new or updated** plan include the **probability of future events** (i.e., chance of occurrence) for each hazard addressed in the plan?	Section 3.3 -- Section 3.16, pp. 3-7 to 3-169	All hazards are ranked in terms of probability—high, medium, or low.		X
		SUMMARY SCORE		X

Assessing Vulnerability

Requirement §201.4(c)(2)(ii): *[The State risk assessment **shall** include an] overview and analysis of the State's vulnerability to the hazards described in this*

paragraph (c)(2), based on estimates provided in local risk assessments as well as the State risk assessment. The State ***shall*** *describe vulnerability in terms of the jurisdictions most threatened by the identified hazards, and most vulnerable to damage and loss associated with hazard events. State owned critical or operated facilities located in the identified hazard areas shall also be addressed … .*

Requirement §201.4(d): Plan must be reviewed and revised to reflect changes in development…

Assessing Vulnerability by Jurisdiction

Element	Location in the Plan (section or annex and page #)	Reviewer's Comments	SCORE N	SCORE S
A. Does the **new or updated** plan describe the State's vulnerability based on estimates provided in local risk assessments as well as the State risk assessment?	Section 3.19, pp. 3-199 to 3-211	Plan integrates local hazard mitigation plan data from communities located along the Mississippi and Wisconsin Rivers and higher-risk counties such as Milwaukee, Kenosha, and Racine. **Recommended Revisions**: *Future updates should include a comparison of the local plan estimates for flood losses versus the estimated losses identified in the statewide HAZUS run.*		X
B. Does the **new or updated** plan describe the State's vulnerability in terms of the jurisdictions most threatened and most vulnerable to damage and loss associated with hazard event(s)?	Section 3.19, pp. 3-199 to 3-211	Plan describes hazard risks in many of the state's southern counties (these are the highest risk counties) and Appendix D identifies those communities with the highest number of repetitive loss properties.		X
C. Does the updated plan explain the process used to analyze the information from the local risk assessments, as necessary?	Section 3.19, pp. 3-199 to 3-211	The plan highlights local risk analysis information and describes some of the methodology. Some of the processes differ depending on the sophistication of the local government staff.		X
D. Does the updated plan reflect changes in development for jurisdictions in hazard prone areas?	Section 3.2.1, page 3-6; Section 3.19.2, pp. 3-205 to 3-211	The plan highlights those communities in the state with the highest building exposure to various hazards types and those communities with the highest potential losses associated with different hazard events.		X
		SUMMARY SCORE		X

Assessing Vulnerability of State Facilities

Element	Location in the Plan (section or annex and page #)	Reviewer's Comments	SCORE N	SCORE S
A. Does the **new or updated** plan describe the types of State owned or operated critical facilities located in the identified hazard areas?	Section 3.17.4, pp. 3-188	The plan has been updated to include information on the risks associated with facilities managed by the Department of Corrections. The risk assessment for other state-owned facilities relies on a 2005 analysis that was prepared by the URS Corporation and the state is committed to updating this 2005 data. **Recommended Revisions:** *The state should continue to*		X

		improve its inventory of state owned facilities and state critical facilities.		
		SUMMARY SCORE		X

Estimating Potential Losses

Requirement §201.4(c)(2)(iii): *[The State risk assessment **shall** include an] overview and analysis of potential losses to the identified vulnerable structures, based on estimates provided in local risk assessments as well as the State risk assessment. The State **shall** estimate the potential dollar losses to State owned or operated buildings, infrastructure, and critical facilities located in the identified hazard areas.*

Requirement §201.4(d): Plan must be reviewed and revised to reflect changes in development…

Estimating Potential Losses by Jurisdiction

Element	Location in the Plan (section or annex and page #)	Reviewer's Comments	SCORE N	SCORE S
A. Does the **new or updated** plan present an overview and analysis of the potential losses to the identified vulnerable structures?	Section 3.3 to 3.16, pp. 3-7 to 3-169	The plan highlights the areas and structures at risk based on an analysis of past losses and damages related to hazard events. The plan includes estimates of buildings and structures at risk based on local assessment data. The plan also includes the results of a HAZUS analysis for flooding and an inventory of buildings at risk for coastal erosion.		X
B. Are the potential losses based on estimates provided in local risk assessments as well as the State risk assessment?	Section 3.19, pp. 3-199 to 3-211	Fine.		X
C. Does the updated plan reflect the effects of changes in development on loss estimates?	Section 3.19.2, pp. 3-205 to 3-211	The plan highlights the highest risk counties based on population and building characteristics **Recommended Revisions:** The state plan should factor in some consideration of the growth rates of different communities based on the 2010 census. It appears that 2010 census data was not available for the 2011 plan update but this should not be an issue for the next plan update.		X
		SUMMARY SCORE		X

Estimating Potential Losses of State Facilities

Element	Location in the Plan (section or annex and page #)	Reviewer's Comments	SCORE N	SCORE S
A. Does the **new or updated** plan present an estimate of the potential dollar losses to State owned or operated buildings, infrastructure, and critical facilities in the identified hazard areas?	Section 3.17 and 3.18 pp. 3-170 to 3-199	Rough estimates of the numbers and types of buildings potentially at risk. The HAZUS analysis for flood risks includes some estimates of potential losses.		X

SUMMARY SCORE		X

MITIGATION STRATEGY: *§201.4(c)(3) [To be effective the plan must include a] Mitigation Strategy that provides the State's blueprint for reducing the losses identified in the risk assessment.*

Hazard Mitigation Goals

Requirement §201.4(c)(3)(i): *[The State mitigation strategy **shall** include a] description of State goals to guide the selection of activities to mitigate and reduce potential losses.*

Requirement §201.4(d): Plan must be reviewed and revised to reflect changes in development, progress in statewide mitigation efforts, and changes in priorities…

Element	Location in the Plan (section or annex and page #)	Reviewer's Comments	SCORE N	SCORE S
A. Does the **new or updated** plan provide a description of State mitigation **goals** that guide the selection of mitigation activities?	Section 4.1, page 4-1	Fine.		X
B. Does the updated plan demonstrate that the goals were assessed and either remain valid or have been revised?	Section 4.1, page 4-1	Some refinement.		X
		SUMMARY SCORE		X

State Capability Assessment ***Requirement §201.4(c)(3)(ii):*** *[The State mitigation strategy **shall** include a] discussion of the State's pre-and post-disaster hazard management policies, programs, and capabilities to mitigate the hazards in the area, including: an evaluation of State laws, regulations, policies, and programs related to hazard mitigation as well as to development in hazard-prone areas [and] a discussion of State funding capabilities for hazard mitigation projects … .*

Element	Location in the Plan (section or annex and page #)	Reviewer's Comments	SCORE N	SCORE S
A. Does the **new or updated** plan include an evaluation of the State's **pre-disaster** hazard management policies, programs, and capabilities?	Section 4.2, pp. 4-2 to 4-4	Fine		X
B. Does the **new or updated** plan include an evaluation of the State's **post-disaster** hazard management policies, programs, and capabilities?	Section 4.2, pp. 4-2 to 4-4	Fine		X
C. Does the **new or updated** plan include an evaluation of the State's policies related to **development in hazard prone areas**?	Table 4.2-3, pp. 4-93 to 4-98	State law authorizes local actions. State law requires the development of comprehensive plans and the SHMO has made efforts to promote the consideration of hazard mitigation into comprehensive planning.		X
D. Does the **new or updated** plan include a discussion of State **funding capabilities** for hazard mitigation projects?	Table 4.2.1, pp. 4-51 to 4-82	Analyzes state laws and state and federal resources that can be used for recovery and hazard mitigation.		X

E. Does the updated plan address any hazard management capabilities of the State that have changed since approval of the previous plan?	Table 4.2.1, pp. 4-51 to 4-82	Includes up-to-date information regarding funding and budget limitations.		X
		SUMMARY SCORE		X

Local Capability Assessment

Requirement §201.4(c)(3)(ii): *[The State mitigation strategy **shall** include] a general description and analysis of the effectiveness of local mitigation policies, programs, and capabilities.*

Element	Location in the Plan (section or annex and page #)	Reviewer's Comments	SCORE N	SCORE S
A. Does the **new or updated** plan present a general description of the local mitigation policies, programs, and capabilities?	Table 4.2-3. pp. 4-93 to 4-98	Fine.		X
B. Does the **new or updated** plan provide a general analysis of the effectiveness of local mitigation policies, programs, and capabilities?	Table 4.2-3. pp. 4-93 to 4-98	State plan analyzes the limitations and barriers to effective mitigation at the local level. The plan highlights some of the most successful local programs.		X
		SUMMARY SCORE		X

Mitigation Actions

Requirement §201.4(c)(3)(iii): *[State plans **shall** include an] identification, evaluation, and prioritization of cost-effective, environmentally sound, and technically feasible mitigation actions and activities the State is considering and an explanation of how each activity contributes to the overall mitigation strategy. This section **should** be linked to local plans, where specific local actions and projects are identified.*

Requirement §201.4(d): Plan must be reviewed and revised to reflect changes in development, progress in statewide mitigation efforts, and changes in priorities…

Element	Location in the Plan (section or annex and page #)	Reviewer's Comments	SCORE N	SCORE S
A. Does the **new or updated** plan identify cost-effective, environmentally sound, and technically feasible mitigation actions and activities the State is considering?	Section 4.3.17, pp. 4-47 to 4-49	Action items are evaluated on the basis of criteria related to cost effectiveness, environmental impacts, and technical feasibility.		X
B. Does the **new or updated** plan evaluate these actions and activities?	Table 4.3-2, pp. 4-100 to 4-112	Action items are evaluated based on their contribution to the overall statewide goals on the basis of their contribution to overall mitigation strategies.		X
C. Does the **new or updated** plan prioritize these actions and activities?	Section 4.3.16, pp. 4-45 and 4-46 and Table 4.3-2, pp. 4-100 to 4-112	The plan conveys a good sense of its priorities for mitigation actions. Since 1993, the state hazard mitigation program has given priority to the acquisition, demolition, relocation, and/or floodproofing of floodprone properties. The ***"items considered in evaluating proposed projects"*** appear logical and thorough.		X
D. Does the **new or updated** plan explain how each activity contributes to the overall State mitigation strategy?	Table 4.3-2, pp. 4-100 to 4-112	A statement on this is provided for each strategy.		X

E. Does the mitigation strategy **in the new or updated** section reflect actions and projects identified in local plans?	Section 5.4.1, pp. 5-10 to 5-13	Good summary of local strategies and how these strategies are coordinated with the state plan.		X
		SUMMARY SCORE		X

Funding Sources

Requirement §201.4(c)(3)(iv): *[The State mitigation strategy **shall** include an] identification of current and potential sources of Federal, State, local, or private funding to implement mitigation activities.*

Element	Location in the Plan (section or annex and page #)	Reviewer's Comments	SCORE N	SCORE S
A. Does the **new or updated** plan identify **current** sources of Federal, State, local, or private funding to implement mitigation activities?	Section 4.4, pp. 4-50 to 4-98	Excellent		X
B. Does the **new or updated** plan identify **potential** sources of Federal, State, local, or private funding to implement mitigation activities?	Section 4.4, pp. 4-50 to 4-98	Fine		X
C. Does the updated plan identify the sources of mitigation funding used to implement activities in the mitigation strategy since approval of the previous plan?	Appendix C	Fine		X
		SUMMARY SCORE		X

COORDINATION OF LOCAL MITIGATION PLANNING

Local Funding and Technical Assistance

Requirement §201.4(c)(4)(i): *[The section on the Coordination of Local Mitigation Planning **must** include a] description of the State process to support, through funding and technical assistance, the development of local mitigation plans.*

Element	Location in the Plan (section or annex and page #)	Reviewer's Comments	SCORE N	SCORE S
A. Does the **new or updated** plan provide a description of the State process to support, through funding and technical assistance, the development of local mitigation plans?	Section 5.1 to 5.3, pp. 5-1 to 5-9 and Section 7.7.1 pp. 7-66 to 7-69	Excellent		X
B. Does the updated plan describe the funding and technical assistance the State has provided in the past three years to assist local jurisdictions in completing approvable mitigation plans?	Section 5.1 to 5.3, pp. 5-1 to 5-9 and Section 7.7.1 pp. 7-66 to 7-69	Excellent		X

SUMMARY SCORE		X

Local Plan Integration

Requirement §201.4(c)(4)(ii): *[The section on the Coordination of Local Mitigation Planning **must** include a] description of the State process and timeframe by which the local plans will be reviewed, coordinated, and linked to the State Mitigation Plan.*

Requirement §201.4(d): Plan must be reviewed and revised to reflect changes in development, progress in statewide mitigation efforts, and changes in priorities…

Element	Location in the Plan (section or annex and page #)	Reviewer's Comments	SCORE N	SCORE S
A. Does the **new or updated** plan provide a description of the **process and timeframe** the State established to **review** local plans?	Section 5.2, pp. 5-3 to 5-7	State provides technical assistance on grants and it monitors the status of local plans and plan updates.		X
B. Does the **new or updated** plan provide a description of the **process and timeframe** the State established to **coordinate and link** local plans to the State Mitigation Plan?	Section 3.19.1, pp. 3-200 to 3-211	The state plan incorporates some risk assessment information from local plans. The plan highlights information regarding the frequency of disasters and the extent of risk to buildings and improvements by community or county within the state.		X
		SUMMARY SCORE		X

Prioritizing Local Assistance

Requirement §201.4(c)(4)(iii): *[The section on the Coordination of Local Mitigation Planning **must** include] criteria for prioritizing communities and local jurisdictions that would receive planning and project grants under available funding programs, which **should** include consideration for communities with the highest risks, repetitive loss properties, and most intense development pressures.*

*Further, that for non-planning grants, a principal criterion for prioritizing grants **shall** be the extent to which benefits are maximized according to a cost benefit review of proposed projects and their associated costs.*

Requirement §201.4(d): Plan must be reviewed and revised to reflect changes in development, progress in statewide mitigation efforts, and changes in priorities…

Element	Location in the Plan (section or annex and page #)	Reviewer's Comments	SCORE N	SCORE S
A. Does the **new or updated** plan provide a description of the criteria for prioritizing those communities and local jurisdictions that would receive planning and project grants under available mitigation funding programs?	Section 4.3.16 and Section 4.3.17, pp. 4-45 to 4-49 for project priorities.	Good description of priorities for project grants. Section 5.2 identifies the priorities for local planning grants. **Recommended Revision.** *The next state plan update should give some priority for mitigation programs for the state's fastest*		X

	Section 5.2, pp. 5-3 to 5-5	*growing communities.*		
B. **For the new or updated plan, do** the prioritization criteria include, for non-planning grants, the consideration of the extent to which benefits are maximized according to a cost benefit review of proposed projects and their associated cost?	Section 4.3.17, page 4-48	Fine.		X
C. **For the new or updated plan, do** the criteria include considerations for communities with the highest risk?	Section 4.3.16, pp. 4-45 to 4-46; Section 5.1, pp. 5-1 to 5-3	Priority is given to communities most affected by hazards and communities with the greatest number of buildings and facilities at risk. **Recommended Revision.** *The next state plan update should give some special consideration to risks and mitigation priorities in fast growing communities in the state.*		X
D. **For the new or updated plan, do** the criteria include considerations for repetitive loss properties?	Section 7.3, pp. 7-37 to 7-38	The plan indicates that the mitigation of flood prone properties and repetitive loss properties has been a priority since 1993.		X
E. **For the new or updated plan, do** the criteria include considerations for communities with the most intense development pressures?	***Not in Plan.***	**Recommended Revisions:** *Wisconsin has several fast growing counties and communities according to the 2010 census. These communities are under intense pressure in terms of the administration for flood plain rules, building codes, and other basic health and safety regulations. A higher priority should be given to supporting mitigation projects and mitigation plans for these fast growth communities.*		X
		SUMMARY SCORE		X

PLAN MAINTENANCE PROCESS

Monitoring, Evaluating, and Updating the Plan ***Requirement §201.4(c)(5)(i):*** *[The Standard State Plan Maintenance Process **must** include an] established method and schedule for monitoring, evaluating, and updating the plan.*

Element	Location in the Plan (section or annex and page #)	Reviewer's Comments	SCORE N	SCORE S
A. Does the **new or updated** plan describe the method and schedule for monitoring the plan? (e.g., identifies the party responsible for **monitoring**, includes schedule for reports, site visits, phone calls, and/or meetings)	Section 6.1 to 6.2	Excellent		X
B. Does the **new or updated** plan describe the method and schedule for **evaluating** the plan? (e.g., identifies the party responsible for evaluating the plan, includes the criteria used to evaluate the plan)	Section 6.1 and 6.2, page 6.1 to 6.3	Fine		X
C. Does the **new or updated** plan describe the method and schedule for **updating** the plan?	Table 6.1-1, page 6-3	Excellent		X
D. Does the updated plan include an analysis of whether the previously approved plan's method and schedule worked, and what elements or processes, if any, were changed?	Section 6. pp. 6-1 to 6-5	The state appears to have established an effective schedule and method for updating its previous plan. The plan indicates that there is some difficulty in preparing an annual description of		X

		progress related to mitigation actions. The plan indicates that the state intends to improve its annual assessment of mitigation actions.		
		SUMMARY SCORE		X

Monitoring Progress of Mitigation Activities ***Requirement §201.4(c)(5)(ii):*** *[The Standard State Plan Maintenance Process **must** include a] system for monitoring implementation of mitigation measures and project closeouts. Requirement **§201.4(c)(5)(iii):** [The Standard State Plan Maintenance Process **must** include a] system for reviewing progress on achieving goals as well as activities and projects in the Mitigation Strategy.*

Element	Location in the Plan (section or annex and page #)	Reviewer's Comments	SCORE N	SCORE S
A. Does the **new or updated** plan describe how mitigation measures and project closeouts will be monitored?	Section 6.3 page 6-4	Good		X
B. Does the **new or updated** plan identify a system for reviewing progress on achieving goals in the Mitigation Strategy?	Section 6.2, page 6-4 and 6-5	Annual reports.		X
C. Does the updated plan describe any modifications, if any, to the system identified in the previously approved plan to track the initiation, status, and completion of mitigation activities?	Section 6.2, page 6-4 and 6-5	Shift from bi-annual to annual reports.		X
D. Does the **new or updated** plan identify a system for reviewing progress on implementing activities and projects of the Mitigation Strategy?	Section 6.2. page 6-4	Plan call for annual reports on progress but these reports were not completed during the last three year planning cycle.		X
E. Does the updated plan discuss if mitigation actions were implemented as planned?	Section 4.3.1 to Section 4.3.13, pp. 4-6 to 4-44	Plan describes to status of mitigation action items including those implemented and completed.		X
		SUMMARY SCORE		X

SEVERE REPETITIVE LOSS STRATEGY *(only required for 90/10 under FMA & SRL)*

Repetitive Loss Mitigation Strategy

Requirement §201.4(c)(3)(v): *A State may request the reduced cost share authorized under §79.4(c)(2) of this chapter for the FMA and SRL programs, if it has an approved State Mitigation Plan … that also identifies specific actions the State has taken to reduce the number of repetitive loss properties (which **must** include severe repetitive loss properties), and specifies how the State intends to reduce the number of such repetitive loss properties.*

Element	Location in the Plan (section or annex and page #)	Reviewer's Comments	SCORE NOT MET	SCORE MET
A. Does the new or updated plan describe State mitigation goals that support the selection of mitigation activities for repetitive loss properties (see also Part 201.4(c)(3)(i))?	Section 4.3.16, pp. 4-45 to 4-46; Section 7.2.9 to	A priority is for projects that "***reduce the cost of repairing properties suffering repetitive damages***".		X

	Section 7.3, pp. 7-31 to 7-42 and Appendix D			
B. Does the new or updated plan consider repetitive loss properties in its evaluation of the State's hazard management policies, programs, and capabilities and its general description of the local mitigation capabilities (see also Part 201.4(c)(3)(ii))?	Section 4.3.16, pp. 4-45 to 4-46; Section 7.2.9 to Section 7.3, pp. 7-31 to 7-42 and Appendix D	The state has been successful in acquiring, elevating, or flood-proofing properties classified as repetitive loss properties. Appendix D identifies 112 repetitive loss properties that have been mitigated under different federal and state mitigation programs.		X
C. Does the new or updated plan address repetitive loss properties in its risk assessment (see also Part 201.4(c)(2))?	Section 4.3.16, pp. 4-45 to 4-46; Section 7.2.9 to Section 7.3, pp. 7-31 to 7-42 and Appendix D	Appendix D identifies the communities in the state most vulnerable to adverse economic impacts due to repetitive loss properties. Appendix D includes a ranking of the ten communities in the state with the highest number of repetitive loss properties.		X
D. Does the new or updated plan identify, evaluate and prioritize cost-effective, environmentally sound, and technically feasible mitigation actions for repetitive loss properties (see also Part 201.4(c)(3)(iii))?	Section 7.2.6 to Section 7.2.10, pp. 7-20 to 7-32 and Appendix D	Historically the state's priority has been the acquisition of repetitive loss properties but mitigation efforts have also included elevating structures and flood-proofing structures.		X
E. Does the new or updated plan describe specific actions that have been implemented to mitigate repetitive loss properties, including actions taken to reduce the number of severe repetitive loss properties?	Section 7.2.9 to 7.2.11, pp. 7-20 to 7-32 and Appendix D	Appendix D highlights some successful acquisition programs that took place following disasters.		X
F. Does the new or updated plan identify current and potential sources of Federal, State, local, or private funding to implement mitigation activities for repetitive loss properties (see also Part 201.4(c)(3)(iv))?	Table 4.2.1, pp. 4-51 to 4-82	Most of the sources of funding identified are federal funding sources.		X
		SUMMARY SCORE		X

Coordination with Repetitive Loss Jurisdictions

Requirement §201.4(c)(3(v): *In addition, the plan* ***must*** *describe the strategy the State has to ensure that local jurisdictions with severe repetitive loss properties take actions to reduce the number of these properties, including the development of local mitigation plans.*

Element	Location in the Plan (section or annex and page #)	Reviewer's Comments	SCORE N	SCORE S
A. Does the new or updated plan provide a description of the State process to support, through funding and technical assistance, the development of local mitigation plans in communities with severe repetitive loss properties (see also Part 201.4(c)(4)(i))?	Appendix D	Appendix D identifies those communities with the most repetitive loss properties and it highlights the actions that have been taken by a variety of local jurisdictions to eliminate or mitigate these properties. Appendix D also highlights the funding sources the state uses to mitigate repetitive flood losses.		X

B. Does the new or updated plan include considerations for repetitive loss properties in its criteria for prioritizing communities and local jurisdictions that would receive planning and project grants under available mitigation funding programs (see also Part 201.4(c)(3)(iii))?	Section 7.2.9 to 7.2.11, pp. 7-20 to 7-32 and Appendix D	The plan indicates that the state supports local mitigation plans in counties with repetitive loss and severe repetitive loss properties. Appendix D identifies the communities most affected by repetitive losses associated with flooding.		X
		SUMMARY SCORE		X

APPENDIX O: ENHANCED STATE HAZARD MITIGATION PLAN REVIEW CROSSWALK

Instructions for Using the Attached Plan Review Crosswalk for Review of Enhanced State Hazard Mitigation Plans

Attached is a Plan Review Crosswalk based on the ***Multi-Hazard Mitigation Planning Guidance Under the Disaster Mitigation Act of 2000***, published by FEMA, dated March 2004, and revised June 2007. This Plan Review Crosswalk is consistent with the *Disaster Mitigation Act of 2000* (P.L. 106-390), enacted October 30, 2000 and *44 CFR Part 201 – Mitigation Planning* (the Rule).

SCORING SYSTEM

N – Needs Improvement: The plan does not meet the minimum for the requirement. Reviewer's comments must be provided.

S – Satisfactory: The plan meets the minimum for the requirement. Reviewer's comments are encouraged, but not required.

Each requirement includes separate elements. All elements of a requirement must be rated "Satisfactory" in order for the requirement to be fulfilled and receive a summary score of "Satisfactory."

The example below illustrates how to fill in the Plan Review Crosswalk.

Example

6. Effective Use of Available Mitigation Funding

Requirement §201.5(b)(3): *[The Enhanced Plan **must** demonstrate] that the State effectively uses existing mitigation programs to achieve its mitigation goals.*

Element	Location in the Plan (section or annex and page #)	Reviewer's Comments	SCORE N	SCORE S
A. Does the new or updated Enhanced Plan document how the State has made full use of funding available from FEMA mitigation grant programs, and if the State has not made full use of this funding, does the plan explain the reasons why?	Section VI, pp. 2-3	The plan contains information that the State has not made full use of funding from FEMA grant programs, without explaining why this is the case. **Required Revision:** • Discuss why all available funding from FEMA grant programs was not used.	✓	
		SUMMARY SCORE	✓	

Enhanced State Hazard Mitigation Plan Review and Approval Status

State Point of Contact: **Roxanne Gray**	**Address:** **2400 Wright Street** **Madison, WI 53707-7865**
Title: **State Hazard Mitigation Officer**	
Agency: **Wisconsin Emergency Management**	
Phone Number: **608-242-3211**	**E-Mail:** **Roxanne.Gray@wisconsin.gov**

FEMA Reviewer: Tom Smith	**Title:** Community Planner	**Date:** 11-25-2011
Date Received in FEMA Region [insert #]		
Plan Not Approved		
Plan Approved	**X**	
Date Approved		

ENHANCED STATE HAZARD MITIGATION PLAN SUMMARY CROSSWALK

The plan cannot be approved if the plan has not been formally adopted.

Each requirement includes separate elements. All elements of the requirement must be rated "Satisfactory" in order for the requirement to be fulfilled and receive a score of "Satisfactory." Elements of each requirement are listed on the following pages of the Plan Review Crosswalk. Reviewer's comments must be provided for requirements receiving a **"Needs Improvement"** score.

SCORING SYSTEM
Please check one of the following for each requirement:
N – Needs Improvement: The plan does not meet the minimum for the requirement. Reviewer's comments must be provided.

S – Satisfactory: The plan meets the minimum for the requirement. Reviewer's comments are encouraged, but not required.

Prerequisite	**NOT MET**	**MET**
1. Compliance with Standard State Plan Requirements: §201.5(b)		X

Comprehensive State Hazard Mitigation Planning Program	**N**	**S**
2. Integration with Other Planning Initiatives: §201.5(b)(1)		X
3. Project Implementation Capability: §201.5(b)(2)(i) and (ii)		X
4. Program Management Capability: §201.5(b)(2)(iii A-D)		X
5. Assessment of Mitigation Actions: §201.5(b)(2)(iv)		X
6. Effective Use of Available Mitigation Funding: §201.5(b)(3)		X
7. Commitment to a Comprehensive Mitigation Program: §201.5(b)(4)(i-vi)		X

ENHANCED STATE HAZARD MITIGATION PLAN APPROVAL STATUS

PLAN NOT APPROVED	
PLAN APPROVED	X

See Reviewer's Comments

PREREQUISITE

1. Compliance with Standard State Plan Requirements

Requirement §201.5(b): *Enhanced State Mitigation Plans **must** include all elements of the Standard State Mitigation Plan identified in §201.4 … .*

Element	Location in the Plan (section or annex and page #)	Reviewer's Comments	SCORE NOT MET	SCORE MET
A. Does the **new or updated** Enhanced Plan meet all the Standard State Mitigation Plan requirements?		See standard plan crosswalk.		X
		SUMMARY SCORE		X

COMPREHENSIVE STATE HAZARD MITIGATION PLANNING PROGRAM

2. Integration with Other Planning Initiatives

Requirement §201.5(b)(1): *[An Enhanced Plan **must** demonstrate] that the plan is integrated to the extent practicable with other State and/or regional planning initiatives (comprehensive, growth management, economic development, capital improvement, land development, and/or emergency management plans) and FEMA mitigation programs and initiatives that provide guidance to State and regional agencies.*

Element	Location in the Plan (section or annex and page #)	Reviewer's Comments	SCORE N	SCORE S
A. Does the **new or updated** Enhanced Plan demonstrate how it is integrated to the extent practicable with other State and regional planning initiatives (comprehensive, growth management, economic development, capital improvement, land development, and/or emergency management plans)?	Section 7.1 pp.7-1 to 7-11 and Section 2.3, pp.2-17 to 2-21	The state's plan documents a strong effort to integrate hazard mitigation in to other state and regional planning initiatives. The SHMO has made significant efforts to coordinate hazard mitigation with statewide efforts promoting comprehensive planning and resource protection plans.		X
B. Does the **new or updated** Enhanced Plan demonstrate how it has been integrated to the extent practicable with FEMA mitigation programs and initiatives that provide guidance to State and regional agencies?	Section 7.2, pp. 7-12 to 7-37	Excellent		X
		SUMMARY SCORE		X

3. Project Implementation Capability

Requirement §201.5(b)(2)(i) and (ii): *[The Enhanced Plan **must** document] the State's project implementation capability, identifying and demonstrating the ability to implement the plan, including:*

- *Established eligibility criteria for multi-hazard mitigation measures.*
- *A system to determine the cost effectiveness of mitigation measures, consistent with OMB Circular A-94, Guidelines and Discount Rates for Benefit-Cost Analysis of Federal Programs, and*
- *[A system] to rank the measures according to the State's eligibility criteria.*

Element	Location in the Plan (section or annex and page #)	Reviewer's Comments	SCORE N	SCORE S
A. Does the **new or updated** Enhanced Plan demonstrate that the State has established eligibility criteria for multi-hazard mitigation measures? **Does the updated Plan describe changes, if any, to those criteria?**	Section 7.3, pp. 7-37 to 7-41 and Appendix F, see attachment C	The plan contains a clear statement on project eligibility criteria. These criteria have not changed from the last plan update. The plan incorporates criteria suggested in FEMA guidance as well as criteria developed by the state.		X
B. Does the **new or updated** Enhanced Plan describe the State's system for determining the cost effectiveness of mitigation measures, consistent with OMB Circular A-94? **Does the updated Plan describe changes, if any, to this system?**	Section 7.4.2, pp. 7-47 to 7-49. Appendix F	This section has been updated to reflect all of FEMA's benefit/cost analysis guidance.		**X**
C. Does the **new or updated** Enhanced Plan describe the State's system to rank the measures according to the State's eligibility criteria, **including a process to prioritize projects between jurisdictions and between proposals that address different or multiple hazards**?	Section 7.3, pp. 7-37 to 7-41 and Attachment C of Appendix F	Plan includes a detailed scoring system. The projects that get the highest number of points are given funding priority.		**X**
		SUMMARY SCORE		X

4. Program Management Capability

Requirement §201.5(b)(2)(iii A-D): *[The Enhanced Plan **must** demonstrate] that the State has the capability to effectively manage the HMGP as well as other mitigation grant programs, [and provide] a record of the following:*

- *Meeting HMGP and other mitigation grant application timeframes and submitting complete, technically feasible, and eligible project applications with appropriate supporting documentation;*
- *Preparing and submitting accurate environmental reviews and benefit-cost analyses;*
- *Submitting complete and accurate quarterly progress and financial reports on time; and*
- *Completing HMGP and other mitigation grant projects within established performance periods, including financial reconciliation.*

Element	Location in the Plan (section or annex and page #)	Reviewer's Comments	SCORE N	SCORE S
A. Does the **new or updated** Enhanced Plan describe the State's capability to effectively manage the HMGP as well as other mitigation grant programs?	Section 7.4, pp. 7-44 to 7-56 and Section 7.4.5, page 7-55 and Appendix F	***[See Regional Certification to Determine Score]*** *See attachment.*		X
B. Does the **new or updated** Enhanced Plan provide a record for meeting HMGP and other mitigation grant application timeframes and submitting complete, technically feasible, and eligible project applications with appropriate supporting documentation?	Section 7.4. pp. 7-41 to 7-52 and Attachment D of Appendix F	***[See Regional Certification to Determine Score]*** *See attachment.*		X
C. Does the **new or updated** Enhanced Plan provide a record for preparing and submitting accurate environmental reviews and benefit-cost analyses?	Section 7.4.1 pp. 7-45 to 7-50	***[See Regional Certification to Determine Score]*** *See attachment.*		X
D. Does the **new or updated** Enhanced Plan provide a record for submitting complete and accurate quarterly progress and financial reports on time?	Section 7.4.3 pp. 7-49 to 7-50	***[See Regional Certification to Determine Score]*** *See attachment.*		X
E. Does the **new or updated** Enhanced Plan provide a record for completing HMGP and other mitigation grant projects within established performance periods, including financial reconciliation?	Section 7.4.3 pp. 7-49 to 7-50 and Section 7.4.5, pg.7-52	***[See Regional Certification to Determine Score]*** *See attachment.*		X
SUMMARY SCORE				X

5. Assessment of Mitigation Actions

Requirement §201.5(b)(2)(iv): *[The Enhanced Plan **must** document the] system and strategy by which the State will conduct an assessment of the completed mitigation actions and include a record of the effectiveness (actual cost avoidance) of each mitigation action.*

Element	Location in the Plan (section or annex and page #)	Reviewer's Comments	SCORE N	SCORE S
A. Does the **new or updated** Enhanced Plan describe the system and strategy by which the State will conduct an assessment of the completed mitigation actions?	Section 7.5 pp. 7-52 to 7-64	Excellent record and assessment of completed mitigation projects.		X
B. Does the **new or updated** Enhanced Plan include the record of the effectiveness (i.e., actual cost avoidance) of each mitigation actions, **including how the assessment was completed?**	Section 7.5.1 pp. 7-53 to 7-58 and Appendices I and J	The plan includes the results of two detailed loss avoidance studies. These assessments involved extensive documentation and a rigorous methodology.		X
		SUMMARY SCORE		X

6. Effective Use of Available Mitigation Funding

Requirement §201.5(b)(3): *[The Enhanced Plan **must** demonstrate] that the State effectively uses existing mitigation programs to achieve its mitigation goals.*

Element	Location in the Plan (section or annex and page #)	Reviewer's Comments	SCORE N	SCORE S
A. Does the new or updated Enhanced Plan document how the State has made full use of funding available from FEMA mitigation grant programs, and if the State has not made full use of this funding, does the plan explain the reasons why?	Section 7.2.6 thru 7.2.12, pp. 7-20 to 7-35 and Section 7.6, pp.7-64 to 7-66 and Appendices B and C	Plan includes an extensive record of how the state has administered various FEMA grants programs.		X
B. Does the **new or updated** Enhanced Plan document how the State is effectively using existing programs to achieve its mitigation goals?	Section 7.6, pp.7-64 to 7-66 and Appendices B and C	The plan indicates that the state has administered approximately $100 million in HMA grants since 1991. With these grants, the state has administered a impressive list of mitigation projects. The plan includes clear priorities and the state has accomplished many of its priority projects.		X

SUMMARY SCORE		X

7. Commitment to a Comprehensive Mitigation Program

Requirement §201.5(b)(4)(i-vi): *[The Enhanced Plan **must** demonstrate] that the State is committed to a comprehensive state mitigation program, which might include any of the following:*

- *A commitment to support local mitigation planning by providing workshops and training, State planning grants, or coordinated capability development of local officials, including Emergency Management and Floodplain Management certifications.*
- *A Statewide program of hazard mitigation through the development of legislative initiatives, mitigation councils, formation of public/private partnerships, and/or other executive actions that promote hazard mitigation.*
- *The State provides a portion of the non-Federal match for HMGP and/or other mitigation projects.*
- *To the extent allowed by State Law, the State requires or encourages local governments to use a current version of a nationally applicable model building code or standard that addresses natural hazards as a basis for design and construction of State sponsored mitigation projects.*
- *A comprehensive, multi-year plan to mitigate the risks posed to the existing buildings that have been identified as necessary for post-disaster response and recovery operations.*
- *A comprehensive description of how the State integrates mitigation into its post-disaster recovery operations.*

Element	Location in the Plan (section or annex and page #)	Reviewer's Comments	SCORE N	SCORE S
A. Does the **new or updated** Enhanced Plan demonstrate that the State is committed to a comprehensive State mitigation program?	Section 7.7, pp. 7-66 to 7-89	Excellent		X
B. Does the updated Enhanced Plan demonstrate progress in implementing a comprehensive State mitigation program, including new mitigation initiatives developed or implemented by the State?	Section 7.1.3, page 7-10 and Appendices G, D, and H	For this update, the state planning team made outreach to numerous Rural Electrical Cooperatives and developed an annex to the state plan for these companies. This annex will create the opportunity for the state to initiate significant mitigation projects in cooperation with the rural cooperatives. The state also continues demonstrate significant results in promoting local hazard mitigation projects and effective coordination with other state agencies.		X
		SUMMARY SCORE		X