39

City of West Allis
Matter Summary

7525 W. Greenfield Ave.
West Allis, WI 53214

File Number	Title	Status
R-2004-0287	Resolution	In Committee

Resolution adopting the Milwaukee County Pre-Disaster Mitigation Plan.

Introduced: 10/5/2004 **Controlling Body:** Safety & Development Committee

COMMITTEE RECOMMENDATION ADOPT

ACTION DATE: 10/5/04

	MOVER	SECONDER	AYE	NO	PRESENT	EXCUSED
Barczak						✓
Czaplewski						
Dobrowski						
Kopplin						
Lajsic			✓			
Narlock						
Reinke			✓			
Sengstock						
Vitale		✓	✓			
Weigel	✓		✓			
TOTAL			4	0		1

SIGNATURE OF COMMITTEE MEMBER

Chair _____ Vice-Chair _____ Member _____

COMMON COUNCIL ACTION **ADOPT**

ACTION DATE: OCT 05 2004

	MOVER	SECONDER	AYE	NO	PRESENT	EXCUSED
Barczak						✓
Czaplewski			✓			
Dobrowski			✓			
Kopplin			✓			
Lajsic	✓		✓			
Narlock			✓			
Reinke		✓	✓			
Sengstock			✓			
Vitale			✓			
Weigel			✓			
TOTAL			9	0		1

C: Gary Streicher, Fire Dept.
Paul Ziehler

STANDING COMMITTEES OF THE CITY OF WEST ALLIS COMMON COUNCIL 2004

ADMINISTRATION & FINANCE

Chair: Michael J. Czaplewski
Vice-Chair: Martin J. Weigel
Gary T. Barczak
Thomas G. Lajsic
Rosalie L. Reinke

PUBLIC WORKS

Chair: Richard F. Narlock
Vice-Chair: Linda A. Dobrowski
Kurt E. Kopplin
Vincent Vitale
James W. Sengstock

SAFETY & DEVELOPMENT

Chair: Thomas G. Lajsic
Vice-Chair: Vincent Vitale
Gary T. Barczak
Martin J. Weigel
Rosalie L. Reinke

LICENSE & HEALTH

Chair: Kurt E. Kopplin
Vice-Chair: James W. Sengstock
Linda A. Dobrowski
Richard F. Narlock
Michael J. Czaplewski

ADVISORY

Chair: Rosalie L. Reinke
Vice-Chair: Gary T. Barczak
Linda A. Dobrowski
Vincent Vitale
Martin J. Weigel

City of West Allis

Resolution

7525 W. Greenfield Ave.
West Allis, WI 53214

File Number: R-2004-0287

Final Action:
OCT 05 2004

Resolution adopting the Milwaukee County Pre-Disaster Mitigation Plan.

WHEREAS, in October of 2000, the President of the United States signed into law the "Disaster Mitigation Act of 2000" (PL 106-390) to amend the "Robert T. Stafford Disaster Relief and Emergency Act of 1988" which, among other provisions, requires local governments to adopt a pre-disaster mitigation plan in order to be eligible for hazard mitigation funding; and

WHEREAS, the City of West Allis has worked closely with Milwaukee County Emergency Management to develop a county-wide pre-disaster mitigation plan that will serve the needs of West Allis; and

WHEREAS, the City of West Allis supports the Milwaukee County Pre-Disaster Mitigation Plan as a logical means toward protecting people and property from the potential devastating effects of natural hazards.

NOW, THEREFORE, BE IT RESOLVED by the Common Council of the City of West Allis that the "Milwaukee County Pre-Disaster Mitigation Plan," as approved by Wisconsin Emergency Management and the Federal Emergency Management Agency, be and is hereby approved.

BE IT FURTHER RESOLVED that a copy of this resolution shall be forwarded to the proper local, county, state, and federal officials.

ADM\ORDRES\ADMR262

ADOPTED October 5, 2004

Paul M. Ziehler

Paul M. Ziehler, City Admin. Officer, Clerk/Treas.

APPROVED October 8, 2004

Jeannette Bell

Jeannette Bell, Mayor

Gary Streicher

From: Martin King
Sent: Thursday, August 05, 2004 4:36 PM
To: Gary Streicher
Subject: FW: PDM on Website

Assistant Chief Martin M. King
West Allis Fire Department
Bureau of Fire Prevention and Urban Affairs
7332 West National Avenue
West Allis, WI 53214
(414) 302-8904 (414) 302-8927 (fax)
mking@ci.west-allis.wi.us

-----Original Message-----
From: RHetchler@milwcnty.com [mailto:RHetchler@milwcnty.com]
Sent: Thursday, August 05, 2004 3:38 PM
To: Andy Pederson; Carl Tisonik; Carol Wantuch; Cindy Tomasello; Dean Redman; Frank Lockwood; Frank Lockwood; Gary Streicher; George King; Jackie Ove; Jerry Hammernik; Jim Martins; Mark Ferguson; Patrick Boyle; Pat Nook; Richard Durica; Robert Bina; Robert Delgadillo; Roland Poppy; Ron Sudfeld; Tim Tarras; Tom Czaja; Tom Tollaksen; William Kappel; Martin King; Paul Brandtman; Tami Mayzik; pat.oconnor@dma.state.wi.us
Cc: cstenbol@milwcnty.com
Subject: PDM on Website

For everyone's information-

The final draft of the Pre-Disaster Mitigation (PDM) Plan is now available on the Milwaukee County Sheriff's website. Follow these steps to access the document.

-go to www.mkesheriff.org
-look on the right-hand side under "hot news";
-Click on "Emergency Management Releases a Pre-Disaster Mitigation (PDM) Plan";
-at the bottom of the page click on the link that says, "Click here to go to the Emergency Management Page where you will find a link to the Plan";
-click where it says, "Click Here To View Guide";

(Note: It's a rather large document [in PDF form, so you'll need Adobe Acrobat], so it may take a little time to download depending on your internet connection speed. There are approximately 125 pages.)

This can be printed out if you need a copy for your local Board or Council to review before approving. Everyone should have received a copy of a draft resolution from Tim Tarras of Maxim Technologies. If you didn't receive it, let me know and I can send you another one if you need it. Remember, if a municipality does not approve this plan, that municipality will not be eligible for future Hazard Mitigation Grant Program project funding. This is the new FEMA regulation.

We need to have time to submit this plan to Wisconsin Emergency Management, so we need your municipality's approval of the plan no later than October 1, 2004. So, please, make sure it goes before your Board or Council ASAP in order to make the time frame. From there it will be sent to FEMA for approval by November 1, 2004. This document will be updated every five (5)

years or sooner if need be. Thank you to everyone who has worked on this project. Your cooperation has been, and continues to be, greatly appreciated.

Rick Hetchler
Municipal Emergency Services Coordinator
Milwaukee County - Office of the Sheriff
Emergency Management Bureau
Safety Building, Room 304
Milwaukee, WI 53223
(O) 414.278.4709
(F) 414.223.1265
email: rhetchler@milwcnty.com

"Let's Be Careful Out There"

Gary Streicher

From: Martin King
Sent: Wednesday, July 21, 2004 11:33 AM
To: Gary Streicher
Subject: FW: Final Milwaukee PDM Plan

Assistant Chief Martin M. King
West Allis Fire Department
Bureau of Fire Prevention and Urban Affairs
7332 West National Avenue
West Allis, WI 53214
(414) 302-8904 (414) 302-8927 (fax)
mking@ci.west-allis.wi.us

-----Original Message-----
From: Tim Tarras [mailto:ttarras@maximusa.com]
Sent: Wednesday, July 21, 2004 10:21 AM
To: Andy Pederson; Bill Kappel; Boyle, Patrick; Carl Stenbol; Carl Tisonik; Carol Wantuch; Cindy Tomasello; Dean Redman; Frank Lockwood; George King; Jackie Ove; Jerry Hammernik; Jim Martins; Mark Ferguson; Martin King; Pat Nook; Paul Brandtman; Richard Durica; Rick Hetchler; Robert Bina; Roland Poppy; Ron Sudfeld; Tami Mayzik; Tim Tarras; Tom Czaja; Tom Tollaksen
Subject: Final Milwaukee PDM Plan

Good Morning:

Yesterday I sent out the 4 copies of the final revision as well as a CD containing a PDF version of the Pre-disaster Mitigation Plan (the Plan) to Carl. This needs to be sent to your respective councils for their approval. I have attached a resolution template that can be copied onto your letterhead and modified as you see fit. After the council approves the Plan, send a copy of the signed resolution to Rick for inclusion in the Plan.

If you would like me to send a PDF version of the Plan to you via email please let me know and I will send it to you. The PDF version is 6MB in size so those that did not receive the preliminary plan may not be able to receive this one either.

If you have any questions or comments please contact me.

Thank you for your time.

Sincerely,

Tim Tarras
GIS Manager
555 South 72nd Ave
Wausau, WI 54401
Phone: 715-845-4100
Fax: 715-842-0381
ttarras@maximusa.com

Milwaukee County, Wisconsin

Pre-Disaster Mitigation Plan

Wisconsin Emergency Management

FEMA

MAXIM Technologies

August 2004

MILWAUKEE COUNTY WISCONSIN
PRE-DISASTER MITIGATION PLAN

Prepared for:

Milwaukee County Emergency Management
821 West State Street
Milwaukee, WI 53233

Prepared by:

Maxim Technologies, Inc.
555 South 72nd Avenue
Wausau, WI 54401
(715)-845-4100
ttarras@maximusa.com

Maxim Project # 4340191

August 2004

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LIST OF ACRONYMNS

COE	U.S. Army Corps of Engineers
DMA	Disaster Mitigation Act
FEMA	Federal Emergency Management Agency
GIS	Geographic Information Systems
HUD	U.S. Department of Housing and Urban Development
MMSD	Milwaukee Metropolitan Sewer District
NFIP	National Flood Insurance Program
NOAA	National Oceanic and Atmospheric Administration
NRCS	Natural Resource Conservation Service
NWS	National Weather Service
PDM	Pre-Disaster Mitigation Plan
SEWRPC	Southeast Wisconsin Regional Planning Commission
USFS	United States Forest Service
USGS	United States Geological Survey
WEM	Wisconsin Emergency Management
WDNR	Wisconsin Department of Natural Resources

1.0 INTRODUCTION

The effects from natural hazards directly impact the safety and well being of Milwaukee County residents. Historically, county residents have dealt with floods, high winds, and severe summer storms with damaging thunderstorms, hail, tornadoes, harsh winter storms with extreme cold and blizzards, and drought. While most hazards cannot be eliminated, the effects from them can be mitigated. Milwaukee County, working in conjunction with Wisconsin Emergency Management (WEM) and Maxim Technologies (Maxim), prepared this Pre-Disaster Mitigation (PDM) Plan (the Plan) to help guide and focus hazard mitigation activities. The Milwaukee County Pre-Disaster Mitigation Plan profiles significant hazards to the community and identifies mitigation projects that can reduce their future impacts. The purpose of the Plan is to promote sound public policy designed to protect citizens, critical facilities, infrastructure, private property, and the environment from natural hazards. The Milwaukee County Pre-Disaster Mitigation Plan includes resources and information to assist county residents, organizations, local government, and others interested in participating in planning for natural hazards. The mitigation plan provides a list of mitigation projects that will assist Milwaukee County in reducing risk and preventing loss from future hazard events.

1.1 AUTHORITY

The Disaster Mitigation Act (DMA) of 2000 amends the Robert T. Stafford Disaster Relief and Emergency Assistance Act by adding a new section: Section 322 – Mitigation Planning. It requires all local governments to have an approved Pre-Disaster Mitigation Plan in place by November 1, 2004 to be eligible to receive Hazard Mitigation Grant Program project funding.

Milwaukee County and the cities of Bayside, Brown Deer, Cudahy, Fox Point, Franklin, Glendale, Greendale, Greenfield, Hales Corners, Milwaukee, Oak Creek, River Hills, St. Francis, Shorewood, South Milwaukee, Wauwatosa, West Allis, West Milwaukee, and Whitefish Bay have adopted this Pre-Disaster Mitigation Plan. These governing bodies have the authority to promote sound public policy regarding natural hazards. Copies of the signed Resolutions from these jurisdictions are included as ***Appendix A*** to this plan. The Plan was adopted at the regularly scheduled board meetings of the cities of Bayside, Brown Deer, Cudahy, Fox Point, Franklin, Glendale, Greendale, Greenfield, Hales Corners, Milwaukee, Oak Creek, River Hills, St. Francis, Shorewood, South Milwaukee, Wauwatosa, West Allis, West Milwaukee, and Whitefish Bay Boards, as well as the Milwaukee County Board. All of these meetings were open to the public and advertised through the communities' typical process for publicizing public meetings.

The Milwaukee County Emergency Management Bureau Administrator will be responsible for submitting the adopted Plan to the State Hazard Mitigation Office in Madison, Wisconsin. The State Hazard Mitigation Officer will then submit the Plan to the Federal Emergency Management Agency (FEMA) for review. This review will address the federal criteria outlined in FEMA Interim Final Rule 44 CFR Part 201. Upon acceptance by FEMA, Milwaukee County and the other Plan signatories will gain eligibility for local mitigation project grants and post-disaster hazard mitigation grant projects (HMGP).

1.2 ACKNOWLEDGEMENTS

Many groups and individuals have contributed to development of the Milwaukee County Pre-Disaster Mitigation Plan. The Milwaukee County Emergency Management Bureau, Regional Director of Wisconsin Emergency Management, and the Wisconsin State Hazard Mitigation Officer provided significant guidance and support to all aspects of plan development. The National Weather Service (NWS) provided historic newspaper accounts of severe weather events and other weather data.

Numerous elected officials, city and county personnel, and the local communities participated in the planning process and contributed significantly to the Plan's development.

1.3 PROJECT AREA LOCATION

Milwaukee County is located in southeast Wisconsin and has a land area of about 154,879 acres or 242 square miles (U.S. Bureau of the Census, 2001). The County is unique to Wisconsin, as 19 jurisdictions within the County encompass the total land area of the County. Milwaukee County is bounded by Lake Michigan on the east, Racine County to the south, Waukesha County to the west, and Ozaukee and Washington Counties to the north. Milwaukee is the county seat and other cities include Bayside, Brown Deer, Cudahy, Fox Point, Franklin, Glendale, Greendale, Greenfield, Hales Corners, Oak Creek, River Hills, St. Francis, Shorewood, South Milwaukee, Wauwatosa, West Allis, West Milwaukee, and Whitefish Bay. The Menomonee, Milwaukee, Root, Kinnickinnic Rivers, and Oak Creek are the major rivers that flow through Milwaukee County and into Lake Michigan. ***Map 1-1*** is a general reference map of the county.

Land use in Milwaukee County is primarily residential, followed by open lands, transportation, and agricultural. Croplands primarily produce fruits and vegetables and there is some limited dairy production.

According to the 2000 census, the population of Milwaukee County is 940,164. This represents a 2.0 percent decline in population in the 10 years since the last census. The median age in Milwaukee County is 33.7 years (U.S. Bureau of the Census, 2001).

Milwaukee County is located within the region generally classified as continental with some modification for the Great Lakes. The weather can be quite variable with large day-to-day temperature variations, particularly during the fall and the spring. Normal annual precipitation is 34 inches, with over 68 percent of the precipitation falling from March through September. Winter temperatures can vary between 13 to 28 degrees Fahrenheit. The average annual temperature for summer, June – August, is 78.8 degrees Fahrenheit. (Wisconsin State Climatology Office)

For the purposes of this hazard assessment and mitigation plan, weather is of interest when it threatens life or property and thus becomes a hazard. The NWS provides short-term forecasts of hazardous weather to the public, in addition to issuing severe weather watches and warnings. The NWS also produces regularly scheduled severe weather outlooks and updates on various forms of hazardous weather including heavy rain and winter storms. Descriptions of historic weather related hazard events and documentation of the frequency, severity, and impact of hazardous weather are presented in Section 3.0 of this plan.

1.4 REGIONAL ECONOMY

The major source of income in Milwaukee County is educational, health, and social services (22.4 Percent), followed by manufacturing (18.5 percent). The average annual unemployment rate in 2000 in the county was 4.5 percent. (U.S. Census Bureau, 2000).

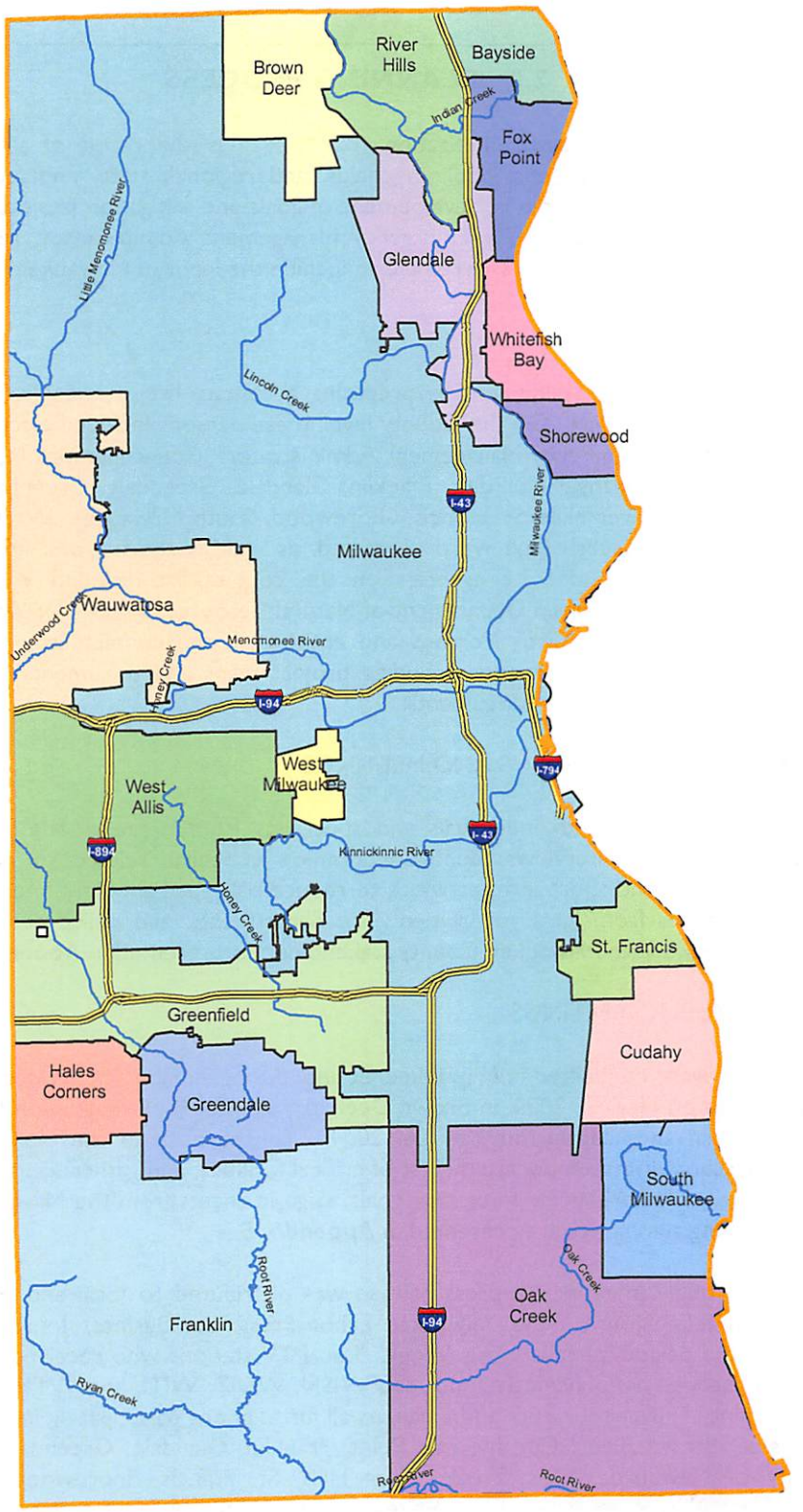
The estimated percent of people of all ages in poverty in the state was 8.7 percent in April of 2000. Milwaukee County has a poverty rate of 15.3 percent for the same time frame (U.S. Bureau of the Census, 2001a).

1.5 SCOPE AND PLAN ORGANIZATION

The scope of the Milwaukee County Pre-Disaster Mitigation Plan includes the following:

- Identify and prioritize disaster events that are most probable and destructive,
- Identify critical facilities,
- Identify areas within the community that are most vulnerable,
- Develop goals for reducing the effects of a disaster event,
- Develop specific projects to be implemented for each goal,
- Develop procedures for monitoring progress and updating the Plan, and
- Officially adopt the Plan.

The Plan is organized into sections that describe the planning process (Section 2.0), risk assessment (Section 3.0), mitigation strategies (Section 4.0), and plan maintenance (Section 5.0). Appendices containing supporting information are included at the end of the Plan.



N

0 1 2 3 4 Miles

— Rivers

═ Interstate

▭ County Boundary

Location Map
Milwaukee County
Southeast Wisconsin
Pre-disaster Mitigation
Map 1-1

2.0 PLANNING PROCESS

The Milwaukee County Pre-Disaster Mitigation (PDM) Plan is the result of a collaborative effort between Milwaukee County citizens, public agencies, and regional, state, and federal organizations. Public participation played a key role in development of goals and mitigation projects. Interviews were conducted with the Milwaukee County Emergency Management Administrator, representatives from each jurisdiction, and 6 public meetings were held to include the input of Milwaukee County residents.

2.1 CONTACT LIST

The PDM planning process was initiated by preparing a contact list of individuals whose input was needed to help develop the Plan. On the County level, these persons included elected officials (County Commissioners) and the Emergency Management Administrator. Councilpersons from each jurisdiction (Bayside, Brown Deer, Cudahy, Fox Point, Franklin, Glendale, Greendale, Greenfield, Hales Corners, Milwaukee, Oak Creek, River Hills, St. Francis, Shorewood, South Milwaukee, Wauwatosa, West Allis, West Milwaukee, and Whitefish Bay) were contacted, as well as the mayors, fire chiefs, and public works directors. Federal and State agencies on the contact list included Wisconsin Emergency Management (WEM) and Wisconsin Department of Natural Resources (WDNR). ***Appendix B*** presents the Milwaukee County contact list. Persons and entities on the contact list received a variety of information during the planning process, including project maps and documents for review, meeting notifications, and mitigation strategy documents.

2.2 STAKEHOLDER INTERVIEWS AND MEETINGS

Interviews were conducted with individuals and specialists from organizations interested in hazard mitigation planning. The interviews identified common concerns related to natural hazards and identified key long-term and short-term activities to reduce risk. Stakeholders interviewed for the plan included representatives from local government, fire departments, and police departments. A list of meetings and interviews with Milwaukee County stakeholders is presented in ***Appendix B***.

2.3 FORMAL PUBLIC MEETINGS

Six public meetings were conducted in Milwaukee County during initial plan development. The meetings were in Wauwatosa on May 24, 2004, in Brown Deer May 25, 2004, Milwaukee on May 25h and June 6, 2004 and in Franklin and Cudahy on May 26, 2004. The purpose of the meetings was to gather information on historic disasters, update the list of critical facilities, and gather ideas from citizens about mitigation planning and priorities for mitigation goals. Sign-in sheets from the Milwaukee County public meetings and meeting summaries are presented in ***Appendix B***.

In advance of the public meetings, a press release was distributed to local and regional newspapers including the Milwaukee Journal, the Milwaukee Labor Press, the Business Journal, The Community Newspaper, and the periodical called This Week. Local TV stations who received copies of the press release as public service announcements included WISN, WDJT, WITI, and WTMJ. Notices of public meetings were sent in advance, via fax and email, to all jurisdictions participating in the planning process including Bayside, Brown Deer, Cudahy, Fox Point, Franklin, Glendale, Greendale, Greenfield, Hales Corners, City of Milwaukee, Oak Creek, River Hills, St. Francis, Shorewood, South Milwaukee, Wauwatosa, West Allis, West Milwaukee, Whitefish Bay, and Milwaukee County. A copy of the press release and media distribution list is included in ***Appendix B***. ***Appendix B*** also contains copies of the press release as it appeared in several local newspapers.

The city councils and county commission meetings at which the resolutions adopting the Plan were passed provided the public with the opportunity to review the final version of the plan.

2.4 PLAN REVIEW

Review copies of the draft Plan were provided to the Emergency Management Administrator for distribution in hard copy. Plan reviewers included the County Board, mayors of the various jurisdictions, and other federal, state, and local officials. The Emergency Management Administrator provided review copies of the Plan to all jurisdictions involved in the planning process including Bayside, Brown Deer, Cudahy, Fox Point, Franklin, Glendale, Greendale, Greenfield, Hales Corners, City of Milwaukee, Oak Creek, River Hills, Saint Francis, Shorewood, South Milwaukee, Wauwatosa, West Allis, West Milwaukee, Whitefish Bay, and Milwaukee County. Public comments collected during a 30-day review period were submitted to the Emergency Management Administrator. The Emergency Management Administrator reviewed the comments and submitted a consolidated list to Maxim.

A review of the Plan for completeness was conducted after the initial comments were addressed. Plan copies were submitted to the Wisconsin State Hazard Mitigation Officer and the Wisconsin FEMA representative for review. The review period lasted 30 days. Upon receipt of comments, the Plan was finalized and taken to the county commissioners and jurisdictions for adoption.

Future comments on this Plan should be addressed to:

Milwaukee County Sheriff' Office
Emergency Management Bureau
Safety Building Rm. 304
821 West State Street
Milwaukee, WI 53233
(414) 278-4709

3.0 HAZARD EVALUATION AND RISK ASSESSMENT

A risk assessment was conducted to address requirements of the Disaster and Mitigation Act of 2000 (DMA 2000) for evaluating the risk to the community from the highest priority hazards. DMA 2000 requires measuring potential losses to critical facilities and property resulting from natural hazards by assessing the vulnerability of buildings and critical infrastructure to natural hazards. In addition to the requirements of DMA 2000, the risk assessment approach taken in this study evaluated risks to vulnerable populations and examined the risk presented by natural hazards. The goal of the risk assessment process is to determine which hazards present the greatest risk and what areas are cumulatively the most vulnerable to hazards.

The hazard risk assessment requires information about what hazards have historically impacted the community and what hazards may present risks in the future. Identifying historical and possible future hazards was primarily accomplished in two phases. The first phase entailed interviewing local government officials and staff, local emergency planning and response staff, and the general public. ***Plan Section 2.0*** describes the interview/public input process in detail. The second phase entailed researching government records and news publications for records of previous hazard events. The results of the initial hazard evaluation were used to focus further risk assessment on hazards that have historically caused the most problems and those judged to be of future concern.

The risk assessment approach used for the Milwaukee County Pre-Disaster Mitigation Plan entailed using GIS software and data to develop vulnerability models for people, structures, and critical facilities and evaluating those vulnerabilities in relation to hazard profiles that model where hazards exist. This type of approach to risk assessment is very dependent on the detail and accuracy of the data used during the analysis. The schedule and resources available for conducting this risk assessment dictated that existing data be used to perform the assessment. The existing information is extensive but also has many limitations. The results of risk assessment allow hazards to be compared and relative comparisons to be made of areas within the jurisdiction.

3.1 HISTORICAL HAZARDS

Many types of natural hazards may affect Milwaukee County. Examples of natural hazards that have impacted the region include flooding, severe winter storms, tornadoes, and heat waves, among others.

The hazards most likely to affect Milwaukee County were derived from a number of sources. Hazard information was compiled by examining data from WEM, FEMA, the U.S. Coast Guard, and the NWS, reviewing historical newspaper articles, and interviewing local experts. Most importantly, the residents of Milwaukee County voiced their opinions about what hazards had affected their lives and their communities during the public meetings. ***Table 3-1*** lists the historical occurrence of natural disasters affecting Milwaukee County, including State and Federal declared disasters.

3.1.1 Floods

A flood is a natural event for rivers and streams. Excess water from snowmelt and rainfall accumulates and overflows onto the banks and adjacent floodplains. Floodplains are lowlands, adjacent to rivers and lakes that are subject to recurring floods. A flash flood generally results from a torrential rain (short duration) or cloudburst on a relatively small drainage area.

Table 3-1
HISTORIC HAZARDS, DECLARED DISASTERS, AND WEATHER –RELATED FATALITEIS IN MILWAUKEE COUNTY

Date	Event	Area Affected	State Disaster Declaration	Federal Disaster Declaration	Remarks
June 2002[4]	Heat wave	Countywide	No	No	2 Fatalities
April 2002[4]	Heat wave	Countywide	No	No	1 Fatality
December 2000[3]	Excessive Snow	Countywide	No	Yes	53 Inches of snow during the month
July 2000[4,5]	Tornado	Franklin, Oak Creek	No	Yes	$9 million in damages
July 2000[1,5]	Flooding	City of Milwaukee, Franklin, Oak Creek, Greendale, Hales Corners, and South Milwaukee	Yes	No	6.5 inches of Rain and $6.8 million in damages.
March 2000[4]	Tornado	St. Francis	No	No	$4.6 million in damages
January 2000[3]	Blizzard	Countywide	No	No	15.4 inches of snow in 24 hours
July 1999[4]	Heat wave	Countywide	No	No	8 Fatalities
November 1998[4]	High Wind	Countywide	No	No	1 Fatality
August 1998[1,2,3]	Flooding	Countywide	Yes	Yes	Over 6 inches of rain. $11 million in damages
May 1998	High Winds	Countywide	No	No	$19.2 million in damages
November 1997[4]	Extreme Cold	Countywide	No	No	1 Fatality
July 1997[4]	Heat wave	Countywide	No	No	1 Fatality
July 1997[1,2]	Flooding	Countywide	Yes	Yes	Over 4 inches of rain
June 1997[1,2,3]	Flooding	Countywide	Yes	Yes	Over $78 million in damages
February 1996[4]	Extreme Cold	Countywide	No	No	4 Fatalities
January 1996[4]	Extreme Wind Chill	Countywide	No	No	
December 1995[4]	Cold	Countywide	No	No	2 Fatality
November 1995[4]	Cold	Countywide	No	No	1 Fatality
November 1995[3]	Blizzard	Countywide	No	No	
July 1995[3,4]	Heat wave	Countywide	No	No	85 Fatalities
June 1993[1,3]	Flooding /Wind Damage	Countywide	No	Yes	
May 1989[4]	Tornado	City of Milwaukee	No	No	$250 thousand in damages
December 1987[3]	Blizzard	City of Milwaukee	No	No	10 Fatalities
September 1986[1,2]	Flooding	Countywide	No	Yes	$6 million in damages
August 1986[1,2,3]	Flooding	Countywide	No	Yes	$20 million in damages. 2 fatalities[3]
July 1985[4]	Tornado	City of Milwaukee	No	No	
July 1981[4]	Tornado	City of Milwaukee	No	No	

Table 3-1
HISTORIC HAZARDS, DECLARED DISASTERS, AND WEATHER –RELATED FATALITEIS IN MILWAUKEE COUNTY

Date	Event	Area Affected	State Disaster Declaration	Federal Disaster Declaration	Remarks
August 1980[4]	Tornado	City of Milwaukee	No	No	$250 thousand in damages
December 1978-January 1979[3]	Blizzard	Countywide	No	No	
August 1977[4]	Tornado	City of Milwaukee	No	No	
August 1975[4]	Tornado	City of Milwaukee	No	No	
August 1975[4]	Tornado	City of Milwaukee	No	No	
April 1973[3]	Blizzard	Countywide	No	No	
April 1973[1,2]	Flooding	Countywide	No	No	
September 1972[1,2]	Flooding	City of Milwaukee Village of Elm Grove	No	No	
August 1969[4]	Tornado	City of Milwaukee	No	No	
July 1964[2]	Flooding	Wauwatosa West Allis	No	No	1 Fatality
August 1964[4]	Tornado	City of Milwaukee	No	No	$250 thousand in damages
September 1964[4]	Tornado	City of Milwaukee	No	No	$250 thousand in damages
July 1962[4]	Tornado	City of Milwaukee	No	No	
October 1962[4]	Tornado	City of Milwaukee	No	No	
August 1960[1]	Flooding	City of Milwaukee	No	No	
March-April 1960[1,2]	Flooding	City of Milwaukee Wauwatosa	No	No	
September 1959[4]	Tornado	City of Milwaukee	No	No	$250 thousand in damages
October 1958[4]	Tornado	City of Milwaukee	No	No	
January 1947[3]	Blizzard	Countywide	No	No	
June 1940[1,2]	Flooding	City of Milwaukee Wauwatosa	No	No	
February 1924[3]	Blizzard	Countywide	No	No	3 Fatalities
June 1917[1,2]	Flooding	City of Milwaukee Wauwatosa	No	No	
March 1912[1]	Flooding	City of Milwaukee	No	No	
March 1897[1,2]	Flooding	Countywide	No	No	

(1) City of Milwaukee Flood Mitigation Plan; (2) Flood Mitigation Plan for the City of Wauwatosa; (3) Milwaukee County Hazard Analysis Study; (4) State of Wisconsin Hazard Analysis; (5) National Weather Service

Hundreds of floods occur each year, making it one of the most common hazards in all 50 states. Floods kill an average of 150 people per year nationwide. Three fatalities have occurred due to flooding in the Kinnickinnic, Menomonee, Milwaukee, Oak Creek, and Root River watersheds. Two occurred in the August 1986 event and the other in July 1964. Typically, flood victims were attempting to cross flooded roads and underestimated the power of the water. Most property damage results from inundation by sediment-laden floodwater. Faster moving floodwater can wash buildings off their foundations and sweep vehicles downstream. Pipelines, bridges, and other infrastructure can be damaged when high water combines with flood debris. Basement flooding can cause extensive damage.

Several factors determine the severity of floods, including rainfall intensity and duration, topography, presence of snow, or the rapid changes in weather. The area most prone to flooding in Milwaukee County is the Milwaukee River. History indicates that major flooding by the Milwaukee River in Milwaukee County has been primarily the result of excessive rainfall. A large amount of rainfall over a short time span can result in flash flood conditions. Flash flooding can also occur when water that is held back by an accumulation of debris or floating ice is suddenly released downstream.

3.1.1.1 Location and Extent of Previous Flood Events

Five watersheds and Lake Michigan are located wholly or partially in Milwaukee County. These watersheds include the Kinnickinnic River, Menomonee River, Milwaukee River, Oak Creek, and Root River. Communities that lie wholly or partially within the Kinnickinnic River watershed are Cudahy, Greenfield, Milwaukee, West Allis, and West Milwaukee. The cities of Greendale, Greenfield, Milwaukee, Wauwatosa, West Allis, and West Milwaukee lie wholly or partially within the Menomonee River watershed. The Milwaukee River watershed wholly or partially includes Bayside, Brown Deer, Fox Point, Glendale, Milwaukee, River Hills, Shorewood, and Whitefish Bay. The Oak Creek watershed contains Cudahy, Franklin, Milwaukee, Oak Creek, and South Milwaukee. The Root River watershed wholly or partially contains Greendale, Greenfield, Franklin, Hales Corners, Milwaukee, and Oak Creek. Communities that border Lake Michigan are Bayside, Cudahy, Fox Point, Milwaukee, Oak Creek, St. Francis, Shorewood, and South Milwaukee. Milwaukee is the municipality that has suffered the greatest damage. Since the flooding of 1997 and 1998, extensive mitigation projects have been undertaken to reduce the impact of flooding in all communities within Milwaukee County.

Milwaukee County has received 6 disaster declarations for flooding to date. They were declared in August 1986, September 1986, June 1993, June and July 1997, and in August 1998. A summary of major flood-events in the region are discussed below as found in the Flood Mitigation Plans for the Milwaukee, Oak Creek, Wauwatosa, Milwaukee County Hazard Assessment, and NWS Monthly Write-ups.

June 1917 –This flood caused extensive damage in the lower Menomonee river watershed, particularly in the Menomonee River industrial valley. The Menomonee river floodplain, below what is now the Wisconsin Avenue viaduct, was subject to serious flooding that drove almost every resident from the area, and damaged several businesses including the Chicago, Milwaukee, St. Paul, and Pacific Railroad, and the Falk Corporation.

June 1940 –Flooding occurred in the Menomonee River watershed, causing damage to areas along the Menomonee River as well as to scattered areas along the Honey Creek, Underwood Creek, and the Little Menomonee River. In Milwaukee, the South 84th Street bridge over Honey Creek was washed out. Near the confluence of the Menomonee and Little Menomonee Rivers in Milwaukee, rising floodwaters forced segments of N. Mayfair Road and W. Hampton Avenue to close.

March/April 1960 –Serious flooding occurred in the Kinnickinnic and Menomonee River watersheds in late March/early April of 1960 due to a snowmelt rainfall event. There was widespread damage in Milwaukee along the Kinnickinnic River and scattered problems in Milwaukee along Wilson Park Creek. The flood caused problems along the Kinnickinnic River as far west as S. 43rd Street and along Wilson Park Creek as far south as General Mitchell Field (now General Mitchell International Airport). Basements of residential and commercial buildings were flooded, collapsing walls in some cases. The Chicago and North Railway were overtopped, and sidewalks were washed out in some areas.

August 1960 –Extensive flooding took place along the Kinnickinnic River downstream of S. 43rd Street. The S. 12th Street Bridge was overtopped and sidewalks were damaged. A portion of the flood flow was

diverted from the stream at W. Montana Street, extended and flowed 5 blocks in an easterly direction along the Chicago and North Western Railway right-of-way to S. 12th Street, where it turned northward and ran for 2 blocks along S. 12th Street, where it rejoined the Kinnickinnic River. West Lincoln Avenue and S. 37th Street were also flooded. Considerable flood damage to basements occurred in these areas.

September 1972 –A relatively large amount of rainfall under the high antecedent moisture conditions caused the flooding event of September 1972. This flood resulted in significant flood damage and disruption in the Kinnickinnic River watershed in Milwaukee. Most of the damage was confined to the reach of the Kinnickinnic River between S. 6th Street and S. 16th Street. The flood problems were restricted to this area mainly because of the considerable channel modifications that had been completed by this time. Floodwaters overtopped the low point of the roadways of the 10 bridges that then crossed the Kinnickinnic River beginning with and including S. 7th Street and extending through S. 15th Street. Overland flooding occurred on both sides of the river between S. 6th Street and S. 15th Street extending as much as 1 city block away from the river. Floodwaters overtopped the S. 43rd Street Bridge crossing the Kinnickinnic River. Damage occurred to residential and commercial buildings.

April 1973 –This flood was the most severe flood event recorded up to that time for Milwaukee County. Certain areas along the Kinnickinnic and Menomonee River watersheds experienced severe flooding, which extended more than 1 city block from the river and overtopped all 11 bridges then crossing the Kinnickinnic. Within the watershed, major damages attributed to the flood were confined to the Kinnickinnic River in Milwaukee. The flooding that occurred was somewhat more serious than what would be expected under the relatively moderate levels of rainfall involved, because of the existence of very wet antecedent moisture conditions, and thus illustrated the extreme sensitivity of rainfall-induced floods.

August 1986 –An August 1986 storm event centered in a 1 to 4 mile wide band extending northwesterly from the City of Oak Creek through General Mitchell International Airport to the northern portion of the City of Wauwatosa. It resulted in a total rainfall of 6.84 inches in 24 hours, the single day record at the General Mitchell International Airport recording station. Widespread flooding occurred at the airport, which was shut down. Severe damage occurred especially along the reach of the Kinnickinnic River between S. 6th Street and S. 16th Street in Milwaukee. Flooding impacts occurred in other areas including along Wilson Park Creek, located in the Kinnickinnic watershed, the near northwestern portion of Milwaukee, along the Menomonee River and Wood Creek, where severe basement flooding occurred due to sewer backup.

June 1997 – Severe flash flooding occurred in Milwaukee County as a result of heavy rainfall amounts of up to nearly 10 inches over a 30-hour period. This flash flooding was greater than a "100 year rainfall" based on rainfall frequency maps. No one was injured or killed by the floodwaters, thanks to superb rescue efforts by local law enforcement officials and firefighters. Firefighters in boats rescued 20 people from their flooded homes. Besides public sector damage in county/city parks, there were widespread private and business damages. The hardest hit areas were the cities of Brown Deer, Wauwatosa, and the Piggsville, Lincoln Creek, Sherman Park, and Menomonee Valley areas of Milwaukee. The earliest flash flooding occurred in Fox Point, with other northern Milwaukee County locations experiencing flash flooding thereafter. On July 7th, Milwaukee County was officially declared a Federal Disaster Area, making county residents and business owners eligible for Federal disaster aid.

A description of the June 1997 flood recounted by the NWS is presented below.

About 9,600 homes in the county had minor damage, 137 had major damage, and 15 were destroyed. Monetary value of reported residential damage was $53.365 million. In the business sector, 7 had minor

damage, 22 had major damage, and 3 were destroyed. Several hundred more businesses had some damage, but never reported it to county emergency managers. Total reported business losses were pegged at $9.665 million. Three farms in the extreme southern part of the county reported flood damages of $18,000. Public sector damages were $1.451 million for debris clearance, $309,400 for protective measures, $1.544 million for road systems, $395,000 for water control, $3.397 million for buildings, $1.555 million for utilities, and $7.0 million for "other." Total public sector damages were pegged at $15.651 million.

Combining Milwaukee County and the surrounding counties in the metro area, about 25,000 customers lost electrical power due to damaged power lines. About 15,000 natural gas customers lost natural gas service and about 4,000 homes or businesses had their telephone service disrupted. Hundreds of people were forced from their homes until repairs or cleanups could be completed. Basement flooding countywide severely damaged or wiped out much personal property. Several hospitals were adversely affected either by lower floor flooding or the loss of electrical service. Many car dealerships and repair shops suffered much damage to new and used vehicles. At least 20 schools sustained major structural damage. Storm sewers simply could not keep up with the deluge and overflowed/backed up in many locations. Raw sewage from sanitary sewers backed up in thousands of homes. Raw sewage also made its way into Lake Michigan due to failure of sanitary sewers. The loss of electrical service prevented the use of sump pumps, which compounded the flooding problems. In the days following this historical flood, the local Red Cross ran out of clean-up kits.

Many roads and underpasses across the county were flooded with several feet of water, resulting in many road closures. Many drivers had to be rescued after their vehicles were swept away by deep, fast water currents over roads. Interstate 43, in extreme northern Milwaukee County, was closed for 14 hours. At one point the water depth on the road was 12 feet. In Milwaukee, a sewer line collapsed in front of the Harley Davidson Motorcycle plant, resulting in a sinkhole 30-feet deep and 60-feet wide.

The Milwaukee Brewers baseball game scheduled for the evening hours was canceled due to water flooding the playing field to a depth of 2 to 3 feet. The last time this happened was in 1986. For the first time in memory, Brown Deer and Green Bay roads in the City of Brown Deer flooded, and fish were observed to be swimming on these roads. A portion of a bluff collapsed in Juneau Park along the Lake Michigan shoreline after soils became saturated. A 50-foot section of the lakeside bluff at Klode Park, in Whitefish Bay, slid into Lake Michigan, taking trees with it. North of Klode Park, a 200-foot strip of private land slid into the lake. There was other scattered damage to stairs along the Lake Michigan bluffs. In addition, many roads in the county had sections of asphalt washed away by the water currents.

Fast flowing, high waters on the Kinnickinnic River in the southern parts of Milwaukee resulted in 4 500-ton barges breaking loose. These barges then drifted downriver and smashed into 21 pleasure crafts just west of 1st Street. Damage to the pleasure craft amounted to $1.2 million. Honey Creek in Wauwatosa reached the highest levels that local residents could ever remember. Water depths on nearby roads and River Parkway reached at least 5 feet. One hundred nearby homes were evacuated. Lowland flooding also occurred along the Root River in the southern part of the county.

Rainfall totals for the 30-hour period were 9.78 inches in Brown Deer (TV-6 studio), 8.99 inches in the northwest corner of Milwaukee, 7.25 inches in Greenfield, and 7.20 inches in Wauwatosa. Nearly all of the remainder of the northern half of Milwaukee County had 6 to 7 inches of rain, while the southern fourth had 3 to 6 inch totals. Mitchell Field recorded 5.25 inches. The bulk of these rainfall totals occurred during a 14-hour period on July 20th and 21st.

The Menomonee River in Wauwatosa crested at a new record level of 16.63 feet on July 21st, or 7.63 feet over floodstage (greater than a 100-year flood). Major flooding occurred near and along its banks. The River went below floodstage mid-morning on July 22nd. The Milwaukee River in Milwaukee crested at a new record level of 10.0 feet during the morning of July 21st, or 3 feet over floodstage (greater than a 100-year flood). The River went below floodstage during the evening hours on July 21st. Lincoln Creek in Milwaukee crested at 20.09 feet on July 21st or 7.09 feet above floodstage. Flooding on this creek was rated as major. Oak Creek in the southern part of Milwaukee crested at 9.72 feet on July 21st, or 2.72 feet above floodstage (approx. 40-year flood). Flooding along this creek was rated as moderate.

August 1998 – In the event of August 6 over six inches of rain fell in northwestern Milwaukee County and eastern Waukesha County, resulting in severe direct overland flooding for a second consecutive year along Lincoln Creek in Milwaukee, as well as along South Branch Creek in the Village of Brown Deer. Significant property damage resulted from overbank flooding. There were numerous occurrences of stormwater drainage and sanitary sewer backup problems.

The NWS Monthly write-up from July 1998 summarizes the event as follows:

The flash flooding quickly exhausted the local resources available in the City of Brown Deer, while the Red Cross opened shelters. One hundred and twenty people in Milwaukee County became homeless due to home damage, while another 215 were evacuated. All together, 3,517 residential structures sustained damage in the county: 3,308 had minor damage, 206 had major damage, and 3 were destroyed. Five businesses reported minor damage and 18 had major damage. Two private utility structures had minor damage, and 7 had major damage. These 3 categories collectively had damage amounts of $20.05 million. There was an additional $2.092 million in damage to the public sector such as road systems, buildings, water control, etc. About 6,500 residential and 50 business places lost power due to various outages.

One 13 year-old boy was injured as he was swept by floodwaters into a culvert and submerged for 15 minutes. Many roads were flooded and closed with water levels reaching 3 to 5 feet. Boats were needed to rescue several people. Highway 45 was closed, while Timmerman Field had minor flooding. A retaining wall in northwest Milwaukee collapsed due to high water levels. As a result of the event, the City of Wauwatosa has decided to purchase homes in the Menomonee River floodplain, and the City of Brown Deer will purchase some homes in the South Branch Creek floodplain to mitigate future damage. Damage estimates were placed at $11.0 million.

July 2000 – During the flood of July 2000, as much as 6.5 inches of rain fell on portions of eastern Waukesha and southern Milwaukee Counties, including 4.42 inches recorded at Mitchell International Airport. The storm associated with this event also produced 1 tornado in southern Milwaukee County, which moved east/northeast through the City of Oak Creek and into Racine County. The most severe flooding occurred in the communities south of Milwaukee, including the cities of Franklin and Oak Creek, and the villages of Greendale and Hales Corners. In Milwaukee reported damages occurred mainly in the Kinnickinnic River and the Oak Creek watersheds, with damages mostly limited to basement flooding due to either sewer backup or inoperable sump pumps caused by power outages. Estimated flood damages were $6.8 million in Milwaukee County.

Table 3-2 presents a summary of dollars spent to repair public property damaged from flooding in Milwaukee County.

TABLE 3-2 PUBLIC PROPERTY DAMAGE FROM MILWAUKEE COUNTY FLOODS		
Year	**Total Damages**	**Inflation Adjusted Dollars (2002)**
1986	$20,000,000	$33,571,929
1997	$78,000,000	$86,113,922
1998	$11,000,000	$11,941,269
2000	$6,800,000	$7,074,611
Source: Milwaukee County Flood Hazard Mitigation Plan (2001) Inflation Adjustor http://www.westegg.com/inflation/		

3.1.1.2 Flood Hazard and Stormwater Mitigation Plans

Currently within Milwaukee County, 13 municipalities have either a Flood Mitigation Plan or a Stormwater Plan. Milwaukee, Oak Creek, Wauwatosa and Brown Deer hold flood Mitigation Plans. Bayside, Brown Deer, Fox Point, Franklin, Glendale, South Milwaukee, West Allis, West Milwaukee, and Whitefish Bay hold Stormwater Plans. These plans were used in the preparation of this Plan and are listed in the reference section of this Plan.

Approximate flood hazard boundaries in Milwaukee County were mapped by the Federal Insurance Administration of the U.S. Department of Housing and Urban Development (HUD). Current maps for Milwaukee County are from the 1970's, lack detail, and are sometimes inaccurate; however, most flood hazard areas in the County are mapped. The Wisconsin Department of Natural Resources has received a grant from FEMA to update floodplain maps for the entire State of Wisconsin. (*WDNR, 2003*)

All 19 jurisdictions within Milwaukee County are enrolled in the National Flood Insurance Program (NFIP), which encourages the principles of floodplain management.

3.1.2 Winter Storms

Winter storms and blizzards follow a seasonal pattern that begins in late fall and lasts until early spring. These storms have the potential to destroy property and kill people. Winter storms may be categorized as sleet, ice storms or freezing rain, heavy snowfall or blizzards, and low temperatures. Blizzards are characterized by low visibility caused by high winds and blowing snow.

A severe winter storm is generally a prolonged event involving snow or ice accumulation and extreme cold. The characteristics of severe winter storms are determined by the amount and extent of snow or ice, air temperature, wind speed, and event duration. Severe winter storms create conditions that disrupt essential regional systems such as public utilities, telecommunications, and transportation routes. Ice storms accompanied by high winds can have destructive impacts, especially to trees, power lines, and utility services.

Winter storms are frequently the precursors to spring flooding; the more snow, the better the chances of floods if a quick warm-up occurs. The NWS reports that to date, a total of 19 lives have been lost due to extreme cold and snow in Milwaukee County.

3.1.2.1 Location and Extent of Previous Winter Storm Events

A synopsis of some of the severe winter storms that have affected the area, as described in the Milwaukee County Hazard Analysis Report and the NWS Memorable Snowstorms in Milwaukee is presented below:

November 5, 1896. 14.6 inches. This was the heaviest snowfall on record for so early in the season. Snow had all melted within 5 days.

January 12, 1908. 16.0 inches. Heavy snow accompanied by high north winds prevailed all day. Snow stuck to trees and wires causing many to break. Streetcar service was crippled.

April 15-16, 1921. 15.0 inches. Snowstorm accompanied by very high winds, which was quite unusual because of the lateness of the season. Three days after the storm had ended only a trace remained on the ground due to rapid melting from warmer temperatures.

March 12, 1923. 13.0 inches. Ranks as third heaviest March snowstorm. Up to $1 million in damages occurred. The lowest barometric pressure reading during the storm was 28.82 inches. Freezing rain occurred with the snowstorm downing wires, awnings, signs, and branches. All objects were coated with ice up to 1-inch thick causing telephone/telegraph poles to go down.

February 4-5, 1924. 20.3 inches. This storm ranks as the most snowfall in a 24-hour period since 1884. This was the most paralyzing blizzard up to that time. There was over $1 million damage caused by the storm. Communication with the outside world was said at the time to be back to the days of the "Indian signal fire". Streetcar and train service was crippled. There were snowdrifts 8 to 10 feet high and considerable ice on trees and wires. Car ferries remained in port. Schools were closed and several plate glass windows broken. Dozens of people were injured and 3 deaths were related to the storm.

February 3-4, 1936. 9.6 inches. This snowfall on top of nearly 10 inches already on the ground was blown about by very high winds that caused huge drifts. In some neighboring communities complete abandonment of snow removal work occurred. Trains were stalled for periods of more than 24 hours and there were reports of automobile travelers being marooned in farm homes for more than a week.

January 28-30, 1947. 18.0 inches. This was arguably the worst snowstorm that ever struck Milwaukee. The 3-day snowfall total from records was 18 inches but this amount is likely to be far below the actual amount that fell due to the considerable blowing and drifting. During the height of the storm the winds were northeast at 25 to 45 mph and visibilities were near zero. Huge snowdrifts as high as 15-feet brought all traffic to a standstill and not until January 31st was partial train and streetcar service restored. All stores, factories, offices, and schools were closed from 2 to 4 days with many people stranded in cars, buses, trains, railroad depots, and hotel lobbies. This snowstorm was perhaps the longest and most costly in Milwaukee history.

March 8, 1961. 11.2 inches. A heavy wet snow fell that accumulated very rapidly during the first several hours and was accompanied by northeast winds well in excess of 30 mph. This caused very serious traffic problems.

April 9, 1973. 13.0 inches. After a relatively mild and snowless winter, a major early spring snowstorm struck with about 1 foot of heavy, wet snow accompanied by thunder, lightning, and winds gusting in excess of 50 mph. The city was virtually shutdown. The storm led to an overhaul in plowing strategy and equipment. (Twelve days later heavy rains on top of snowmelt runoff brought rivers and streams

over their banks. Severe flooding occurred along the Root and Fox rivers in Milwaukee, Waukesha and Racine counties).

December 31, 1978 to January 1, 1979. 4.6 inches. Major snowstorm hit during the New Year's holiday. Winds gusting to 40 mph caused drifts to 6 feet blocking many rural roads.

January 12-13, 1979. 4.3 inches. Another major snowstorm followed the New Year's storm by 2 weeks. Winds gusted to 40 mph caused near blizzard conditions with drifts 6 to 8 feet blocking many roads. Travel became nearly impossible with many snow plows pulled off the roads.

January 23-24, 1979. 9.5 inches. Less than 2 weeks after the January 12-13 storm, another major snowstorm struck the area with near blizzard conditions and blocked roads. After this storm, record snow depths of nearly 3 feet were measured. Accumulated snow on roofs of houses, barns, and other buildings caused the roofs to sag greatly or collapse during the month.

January 3-4, 1982. 8.6 inches. An intense "Lower Mississippi Valley" type winter storm produced very heavy snow in the Milwaukee metro area from the evening of January 3rd to the late morning on January 4th. Temperatures just a few degrees below freezing produced a very high water-content snow, which, coupled with accompanying northeast winds of 30 to 60 mph, caused considerable damage to trees and power lines. Severe drifting snow produced 3 to 5-foot drifts that closed virtually all roads in the metro area. Thunder and lightning occurred for several hours centered around midnight. Total snow amounts included 15 inches on the northwest side of Milwaukee and 8 inches on the southeast side.

December 15, 1987. 13.1 inches. A powerful winter storm caused schools, businesses, airports, and most government offices to close. Numerous accidents were reported along with widespread power outages. The storm began early in the morning and continued for much of the day. At the height of the storm thunder and lightning was observed and winds gusted up to 73 mph. A Greek cargo ship whipped by 10 to 15-foot waves inflicted $100,000 in damage to a Milwaukee harbor pier by repeatedly striking it. Ten people died of heart attacks and there were dozens of cases of severed fingertips caused by people trying to unclog the heavy wet snow from snow blowers.

November 27, 1995. 9.7 inches. A major winter storm struck during the afternoon and evening hours of November 27th. Thunder, lightning, and winds gusting to 50 mph and near zero visibility created the worst traffic "gridlock" in 40 years. What normally would have been a 30-minute commute turned into a 3 to 4 hour nightmare. There were over 1,000 vehicle accidents in the metro area and Milwaukee's Mitchell International Airport was closed for over 12 hours, which added to the burden of travelers. This was the third worst November snowstorm in Milwaukee on record dating back to 1884.

Late January – February 4th, 1996. – Milwaukee had a string of 73 hours below zero. Adding to the misery, wind chills were in the minus 35 to minus 60-degree range many times during this event. There were 4 cold-weather hypothermia deaths reported in Milwaukee County. In addition, 15 people sustained frostbite injuries. Numerous water main pipes burst, and fiber optic cables froze disrupting telephone service. Schools were closed on February 2nd, and 8,000 homes in Southeast Wisconsin lost electrical service as power companies cut back on output. Service stations and AAA were overwhelmed with requests for assistance. New minimum temperature records follow: -20 degrees Fahrenheit in Milwaukee (daily record) on February 2nd, -26 degrees Fahrenheit in Milwaukee (new daily record and tied all-time record anytime) on February 3rd, and -19 degrees Fahrenheit in Milwaukee (daily record) on February 4th.

January 2-3, 2000. 15.4 inches. With the dreaded Y2K "Bug" having come and gone without much fanfare, Milwaukee County turned its attention to the first snowstorm of the millennium, which almost beat the January record for snowfall in a 24-hour period set back in 1918.
December 11-15, 2000. 49.5 inches. This was a major event, which resulted in a Presidential Snow Emergency declaration for Milwaukee County. Milwaukee registered a whopping 49.5 inches for the month of December (old record was 30.7 inches in 1951), and on December 21st, set a new December snow depth record of 32 inches (old record was 18 inches in 1978). The 49.5 inches was 430 percent of normal and 105 percent of the average winter snowfall.

3.1.3 Severe Thunderstorms

The NWS estimates that over 100,000 thunderstorms occur each year in the U.S. Approximately 10 percent are classified as severe. Thunderstorms can produce deadly and damaging tornadoes, hailstorms, intense downbursts, microbursts, winds, lightning, and flash floods. Thunderstorms spawn as many as 1,000 tornadoes each year. Since 1975, severe thunderstorms were involved in 327 Federal disaster declarations.

Hailstorms can also develop from severe thunderstorms. Hailstorms are frequent during the summer months in Wisconsin and the most common severe weather category in Milwaukee County. Nationally, hailstorms cause nearly $1 billion in property and crop damage annually, as peak activity coincides with peak agricultural seasons. Severe hailstorms also cause considerable damage to buildings and automobiles, but rarely result in loss of life. NWS data indicate 70 reports of hail over ¾ of an inch in diameter were recorded in Milwaukee County over the 47 year period of record, with the largest hailstones at 2 inches in diameter falling on July 6, 1987 and September 9, 1991.

Severe thunderstorms can produce damaging straight-line winds in excess of 58 mph. High winds associated with thunderstorms affect areas with significant tree stands, as well as areas with exposed property, major infrastructure, and aboveground utility lines.

Tornadoes are the most concentrated and violent storms produced by the earth's atmosphere. They are created by a vortex of rotating wind and strong vertical motion that possess remarkable strength and can cause widespread damage. The most violent tornadoes are capable of tremendous destruction with wind speeds of 250 mph or more. Southeast Wisconsin experiences tornadoes that can produce significant damage and occasionally cause injury or death. According to the NWS records 26 tornadoes have been verified in Milwaukee County. *(Department of Military Affairs)*

3.1.3.1 Location and Extent of Previous Severe Thunderstorm Events

Numerous severe thunderstorms, hail, and tornado events have affected Milwaukee County. ***Appendix F*** presents the severe summer storm listings from the NWS Storm Events Database. A brief synopsis of selected events as chronicled by local newspapers and NWS monthly write-ups is presented below.

August 1986 – An August 1986 storm event centered in a 1 to 4 mile wide band extending northwesterly from the City of Oak Creek through the General Mitchell International Airport to the northern portion of the City of Wauwatosa. An 11-year-old boy drowned after falling into the Kinnickinnic River. It resulted in a total rainfall of 6.84 inches in 24 hours, the single day record at the General Mitchell International Airport recording station. *(Year was City's 3rd Wettest on Record, Milwaukee Sentinel, 1986).*

April 1997 – Strong gradient winds, enhanced by higher gusts associated with scattered rain and snow showers, periodically resulted in wind damage reports across Milwaukee County. The wind gust was estimated in the 60 to 65 mph range. Throughout the county, hundreds of trees and some power lines were toppled by the high winds. At Milwaukee County Stadium, a partially built roof section was blown off into the parking lot. In northern Milwaukee, a new home under construction was completely destroyed by the high winds. In West Allis, a portion of a credit union's roof was torn off and thrown into traffic. In Whitefish Bay, a toppled tree fell against a home, damaging its siding and awning. In Greenfield, shingles were peeled off a building, a police car's windows were blown in, traffic lights were damaged, and a willow tree fell against a home. Elsewhere, the high winds tore roofing material off a building onto the freeway. *(NWS April 1997 Write-up).*

May 1998– On Sunday May 31st a strong downburst wind event known as a "derecho" occurred in south central and southeastern Wisconsin. Milwaukee County had the greatest monetary value of storm damage ($19.2 million) in all of south central and southeastern Wisconsin. All county cities had some tree or structural damage, but the hardest hit areas were Brown Deer, Greendale, Greenfield, River Hills, South Milwaukee, and Wauwatosa. Peak gusts of 103 mph were measured in Greenfield, 100 mph at the WITI TV-6 station in Brown Deer, 71 mph at the WTMJ TV-12 station on Capitol Drive, and 61 mph at Mitchell International Airport. Based on damage, peak gusts were estimated at 110 -115 mph in isolated spots. At Mitchell International Airport, overhead doors on some of the hangers were blown in and a heating unit was blown off the roof of an airport fire department building. About 300 power poles were downed in the county with power outages lasting 5 to 6 days in some locations. More than 2,000 people were evacuated from their homes in South Milwaukee after a fallen tree branch punctured a 1inch hole in a large propane tank. In Cudahy, stripped roof shingles were found to be embedded edge-first in nearby garage siding. *(NWS May 1998 Write-up.)*

March 2000 – Milwaukee recorded its earliest tornado ever and an extremely large number of reports of large hail from ¾ to 1¾ inches in diameter were relayed to the NWS Sullivan office. Most of the thunderstorms developed gusty winds on the order of 30 to 50 mph, but one managed to generate a gust of 58 knots (67 mph) at the TV-4 station on the north side of Milwaukee.

The tornado touched down about 0.5-mile east/northeast of the terminal building of General Mitchell International Airport, just east of Runway 19. It then moved northeast and crossed East Layton Avenue just east of South Pennsylvania Avenue in Cudahy. From there it continued northeast through St. Francis and dissipated over the northwest corner of Nathanael Greene Park. The tornado caused considerable damage in Cudahy and St. Francis. Fifty-three residential homes sustained minor damage and 11 had major damage. Eight businesses sustained major damage. Many motor vehicles were over-turned, several roofs were partially peeled off of homes, power lines and trees were toppled, and gas leaks were reported. Sixteen people were injured enough to require medical treatment, but there were no fatalities. Most of the people who were injured were in their vehicles. Based on this damage, it is estimated that maximum wind speeds of this tornado were 105 to 110 mph. Preceding the tornado, there were reports of large hail and some tree damage in the parent thunderstorm over St. Francis and the southern part of Milwaukee. The last time a tornado was documented in Milwaukee County was in May 1989. *(NWS March 2000 Write up).*

July 2000 – A super cell moved across southeast Wisconsin producing hail and heavy rainfall, but once it moved over the City of Franklin in southwestern Milwaukee County, a tornado touched down about three-quarter of a mile northwest of the intersection of Highways 41 and 100 (27th St. & Ryan Rd.). This tornado tore east/southeast through Oak Creek, and then exited Milwaukee County where Highway 32 goes south into Racine County. It intensified to an F1 rating as it damaged buildings and turned over several semi-tractor trailers at a truck stop at the intersection of I-94 and Ryan Rd. This tornado

damaged at least 1 dozen homes in Franklin and Oak Creek, as well as 1 business and 1 utility building. Hundreds of trees were uprooted and blown over, but luckily many of them fell between buildings. Sixty power poles were snapped by the tornadic winds in Oak Creek. In Franklin, a 40-foot TV antenna was pushed over into a neighboring home, and a 20-foot camper was severely damaged. An estimated $9 million in damaged was caused and a Presidential Disaster was declared for Milwaukee County.

Twenty-four hour rainfall totals in Milwaukee County were impressive: 6.50 inches in Greenfield, 5.05 inches south side of Milwaukee, 4.75 inches in West Allis, 4 to 6 inches in Franklin, and 4.22 inches at Milwaukee Mitchell International Airport. The 4.42 inches of rain recorded at Milwaukee General Mitchell International Airport on July 2nd set a new record for the day and a new daily record for any day in July. This was also the sixth wettest day for Milwaukee since 1871. Milwaukee would finish the month of July 2000 with 7.12 inches of rain, the third wettest July on record. *(NWS July 2000 Write up).*

3.1.4 Drought

A drought is an extended period of unusually dry weather. Drought is a special type of disaster because its occurrence does not require evacuation of an area nor does it constitute an immediate threat to life or property. People are not suddenly rendered homeless or without food and clothing. The basic effect of a drought is economic hardship, but it does, in the end, resemble other types of disasters in that victims can be deprived of their livelihoods and communities can suffer economic decline.

The effects of drought become apparent with a longer duration because more and more moisture-related activities are affected. Non-irrigated croplands are most susceptible to moisture shortages. Rangeland and irrigated agricultural lands do not feel the effects as quickly as the non-irrigated, cultivated acreage, but their yields can also be greatly reduced due to drought. Reductions in yields due to moisture shortages are often aggravated by wind-induced soil erosion. Under extreme drought conditions, lakes, reservoirs, and rivers can also be subject to severe water shortages, which greatly restrict the use of their water supplies. In periods of severe drought, range fires can destroy the economic potential of the livestock industry, and wildlife habitat in, and adjacent to, the fire areas.

3.1.4.1 Description of Previous Drought Events

Small droughts of short duration have occurred in Wisconsin at an interval of about every 1 to 10 years since the 1930's. Extended, widespread droughts have been infrequent in Wisconsin. The 5 most significant droughts, in terms of severity and duration, are: 1987-1988, 1976-1977, 1955-1959, 1948-1950 and 1929-1934. The history of drought in Wisconsin, as presented in the State of Wisconsin Natural Hazards Mitigation Plan (State of Wisconsin, *2002)* is summarized below:

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

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.

1955-1959 – This drought had a recurrence interval of between 30 and 70 years in all but the northwestern corner of Wisconsin.

1976-1977 – This drought 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. Agricultural losses during this drought were set at $624 million. Sixty-four counties were declared federal drought areas and deemed eligible for assistance under the Federal 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.

1987-1988 – Some believe this drought was the most severe ever experienced in Wisconsin and much of the Midwest. It was characterized not only by below normal precipitation, but also by persistent dry air and above normal temperatures. Stream flow measuring stations indicated a recurrence interval of between 75 and 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 30-60 percent crop loss, with agricultural losses set at $1.3 billion. Fifty-two percent of the state's 81,000 farms were estimated to have crop losses of 50 percent or more, with 14 percent estimated having losses of 70 percent or more. A combination of state and federal drought assistance programs helped the state's farmers recover a portion of their losses. All Wisconsin counties were designated eligible for this drought assistance. The effect of this drought on municipal and private water supplies was not as severe, with only a few reports of individual wells drying up. A number of 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.

3.1.5 Earthquakes

An earthquake is a trembling of the ground that results from the sudden shifting of plates beneath the earth's crust. Earthquakes occur along geologic faults in the earth's crust, which are fractures or fracture zones in the earth across which there may be relative motion. The nearest fault to Wisconsin is the New Madrid fault, which stretches along the central Mississippi Valley in Missouri. Earthquakes may cause landslides and rupture dams. Severe earthquakes destroy power and telephone lines, gas, sewer, or water mains, which, in turn, may set off fires and/or hinder firefighting or rescue efforts. Earthquakes also may cause buildings and bridges to collapse.

The likelihood of an area to experience an earthquake is expressed as a Seismic Risk Zone Value. Seismic Risk Zones are numbered 0 to 4, with a 4 representing the highest likelihood of a serious earthquake. Milwaukee County is rated a 0 on the Seismic Risk Zone scale.

Six earthquakes have occurred in Milwaukee County since 1906 with the last one occurring in 1987. Three have ranged in the magnitude from 3.0 – 3.9 on the Richter scale and the other three have been in the 4.0-4.9 range. A magnitude 4.0 earthquake, centered just south of Milwaukee, shook Milwaukee County on May 6, 1947. Some residents that felt the quake ran into the streets thinking there was a major explosion, damage was limited to some broken windows and glassware that fell from shelves. *(State of Wisconsin, 2002).*

3.1.6 Heat Waves

A heat wave is an extended period of high temperatures or high temperatures and elevated humidity. This natural hazard has become the most deadly disaster in Wisconsin in recent times. During extended periods of very high temperatures individuals can suffer a variety of ailments including heat exhaustion and heat stroke. Heat stoke in particular is a life threatening condition that requires immediate medical attention and the majority of deaths during a heat wave are a result of heat stroke. The elderly, disabled and the debilitated are most susceptible to heat stroke. Large and highly urbanized cities, such as those

in Milwaukee County, can create an island of heat that can raise the temperature by 3 to 5 degrees Fahrenheit. Therefore, communities with large populations of elderly, disabled and debilitated people can face a significant medical emergency. In addition to posing a public heath hazard, periods of excessive heat usually result in high electrical consumption for air conditioning, which can cause power outages or brown outs. (*State of Wisconsin, 2002).*

The most deadly heat wave that occurred in Milwaukee County was during the week of July 15, 1995. This was a natural disaster in terms of illness and deaths caused by excessive heat and humidity. According to the County Medical Examiner, 85 deaths were attributed directly to the heat and humidity. This would make this event one of the highest death counts caused by natural phenomena in Milwaukee's history. (*Milwaukee County Hazard Analysis, 2003).* In response to this disaster, Milwaukee has developed and instituted a plan for excessive heat conditions. This Plan is included in ***Appendix C.***

3.1.7 Coastal Erosion

Coastal erosion is a naturally occurring process that can accelerate during times of high water or wave action. For example, bluff erosion is more likely to occur during a major storm event due to strong wave action upon the shoreline or from heavy precipitation. The effect of erosion is usually greater during times when water levels are high. The freezing and thawing of lake ice can also contribute to erosion. There are 3 types of coastal hazards that can affect Milwaukee County:

- Erosion of coastal bluffs, banks, beaches and near shore lake beds,
- Flooding from upland runoff, high lake levels and storm induced surge,
- Damage to shoreline structures from storm waves

3.1.7.1 Location and Extent of Previous Coastal Hazards Events

Coastal communities in Milwaukee County include Bayside, Cudahy, Fox Point, Milwaukee, Oak Creek, Shorewood, South Milwaukee, St. Francis, and Whitefish Bay. Below is a list of some of the coastal events that have happened in Milwaukee County as chronicled in local newspapers and by the NWS.

March 1987. Northeast winds of 55 to 60 mph created 10-foot high waves that pounded the Lake Michigan shoreline. There was significant shoreline and bluff erosion all along the coast. Waves crashed over Lincoln Memorial Drive leaving up to 1 foot of water over the road in some spots. The new sewage treatment plant at Jones Island was closed due to flooding in the tunnels below the plant. (*Storm Pounds Lakeshore.* Milwaukee Journal, March 9, 1987).

June 1997. During one of the largest rainfall events to ever occur in Milwaukee, a portion of a bluff collapsed in Juneau Park along the Lake Michigan shoreline after soils became over saturated. A 50-foot section of the lakeside bluff at Klode Park, in Whitefish Bay, slid into Lake Michigan, taking trees with it. North of Klode Park, a 200-foot strip of private land slid into the lake. There was other scattered damage to stairways located along the Lake Michigan bluffs.

3.2 HAZARD PRIORITIZATION

Between 1986 and the present, 9 federal and/or state disasters have been declared in Milwaukee County. Declared disasters have included 7 floods, 1 tornado, and 1 excessive snowfall event. Further information on these disaster events is presented in subsequent sections of this Plan.

Hazard prioritization was discusses at public meetings held in the Milwaukee County communities of Brown Deer, Cudahy, Milwaukee, Franklin, and Wauwatosa. Generally, communities of Milwaukee County identified flooding as the hazard of primary concern, followed by tornadoes. Hazards discussed and evaluated during the interviews and public meetings are presented in ***Table 3-3.***

TABLE 3-3
HAZARDS EVALUATED DURING PDM PLAN DEVELOPMENT

Natural Hazards	**Geologic Hazards**
Thunderstorms & Lightning	Earthquakes
Tornadoes	
Windstorms	**Hydrologic Hazards**
Hailstorms	Floods
Severe Winter Storms	
Extreme Heat & Cold	

Hazard prioritization was accomplished by determining which hazards had caused prior fatalities, resulted in property damage, had the potential to cause the most economic hardship within the County, and had the potential to affect Milwaukee County residents in the future. Based on review of the historical record and local knowledge, Milwaukee County identified 4 major hazards that consistently affect this geographic area – flooding, severe winter storms, excessive heat, and severe thunderstorms including high winds, hail and tornadoes.

3.3 ASSESSING VULNERABILITY: IDENTIFYING ASSETS & VULNERABLE POPULATIONS

Assessing vulnerability requires understanding the location and importance of those things that the community value most. For purposes of this risk assessment, building structural values: buildings that house people and critical services to the community were identified as the most valued community resources. To assess the vulnerability of these community assets, a model of their locations and characteristics was developed to be used in conjunction with hazard profiles for performing the risk assessment.

3.3.1 Building Values

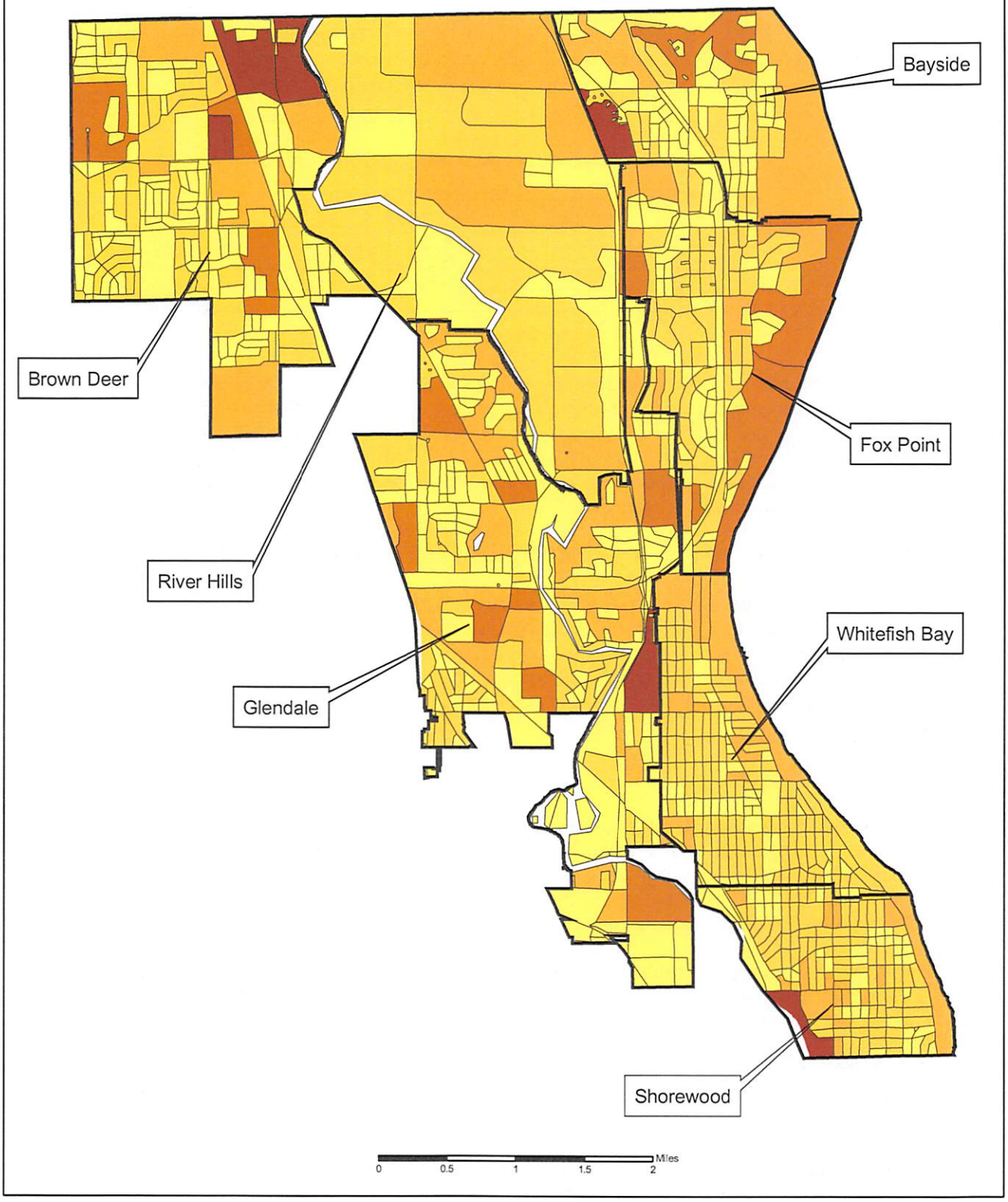
Analysis of building stock values is based on the building stock data available from the FEMA HAZUS software. Building stock data available in HAZUS was compiled at the census block level. ***Map 3-1A*** through ***Map 3-1E*** show building stock values by census block.

3.3.2 Critical Facilities and Infrastructure

Critical facilities are of particular concern because they provide, or are used to provide, essential products and services that are necessary to preserve the welfare and quality of life and fulfill important public safety, emergency response, and/or disaster recovery functions.

Critical facilities are defined as facilities critical to government response and recovery activities (i.e., life safety and property and environmental protection). Critical facilities include: 911 emergency call centers, emergency operations centers, police and fire stations, public works facilities, sewer and water facilities, hospitals, bridges and roads, shelters, and facilities that, if damaged, could cause serious secondary impacts (i.e., hazardous material facility). Critical facilities also include those facilities that are vital to the uninterrupted delivery of community services or have large vulnerable populations. These facilities may include: buildings such as the jail, law enforcement centers, public services buildings,

Communities of Bayside, Brown Deer, Fox Point, Glendale,
River Hills, Shorewood, and Whitefish Bay



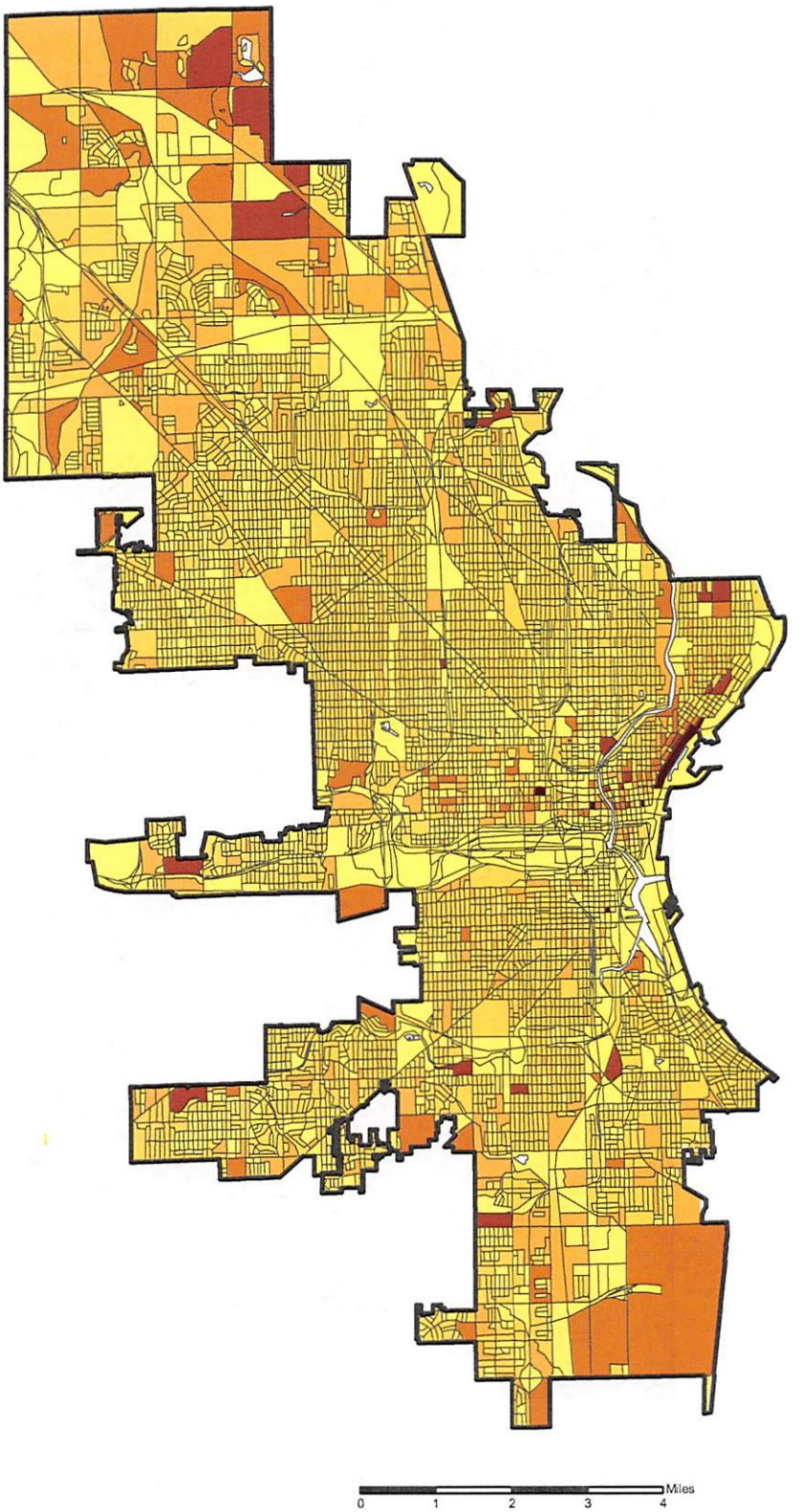
N

Building Stock Dollar Exposure

$0 - $3,210,000	$24,952,000 - $53,936,000
$3,211,000 - $9,758,000	$53,937,000 - $116,389,000
$9,759,000 - $24,951,000	$116,390,000 - $402,923,000

Building Stock Values by Census Bloc
Milwaukee County
Pre-disaster Mitigation
Map 3-1A

City of Milwaukee



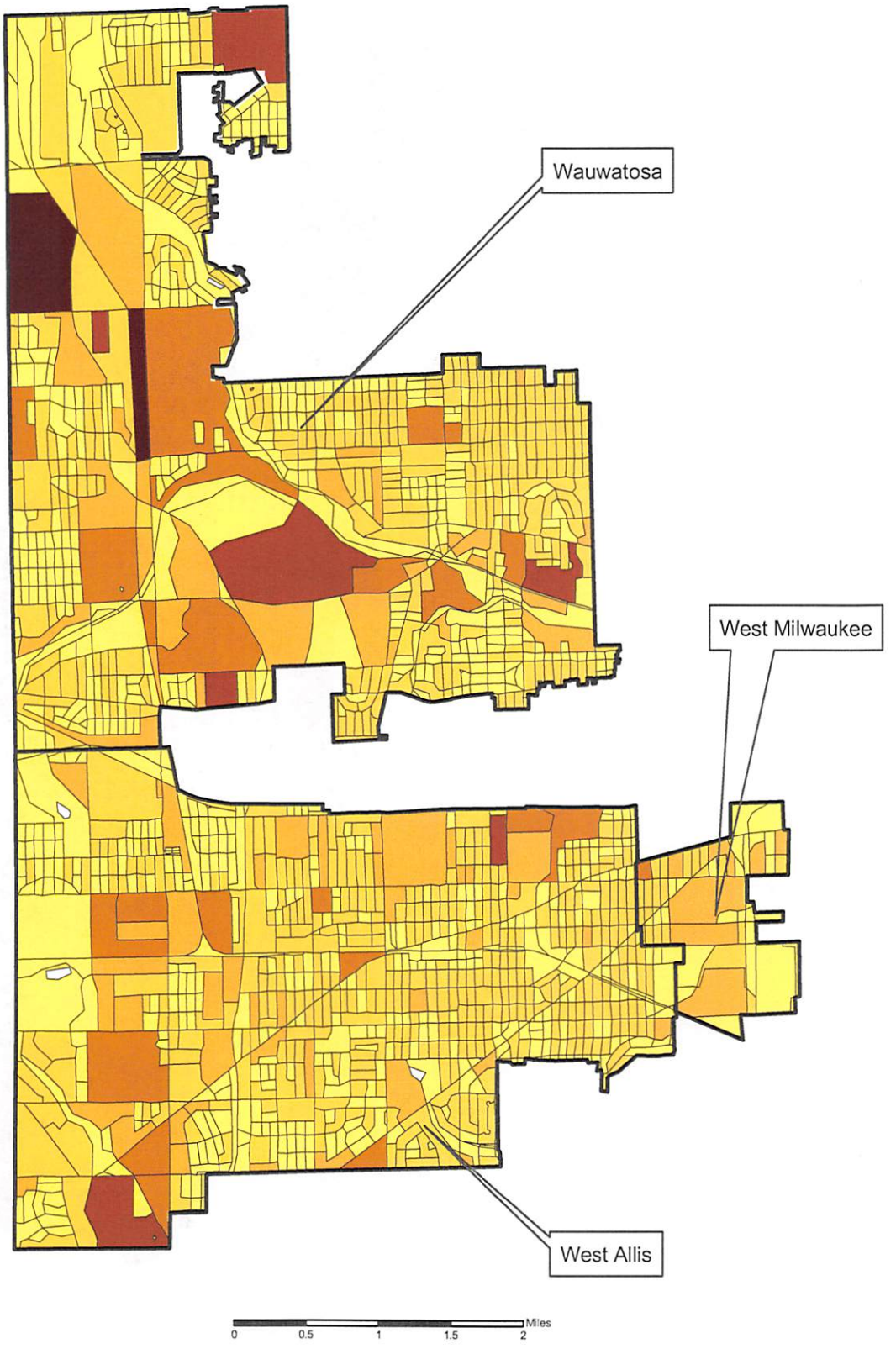
N

Building Stock Dollar Exposure

$0 - $3,210,000	$24,952,000 - $53,936,000
$3,211,000 - $9,758,000	$53,937,000 - $116,389,000
$9,759,000 - $24,951,000	$116,390,000 - $402,923,000

Building Stock Values by Census Block
Milwaukee County
Pre-disaster Mitigation
Map 3-1B

Communities of Wauwatosa, West Allis and West Milwaukee



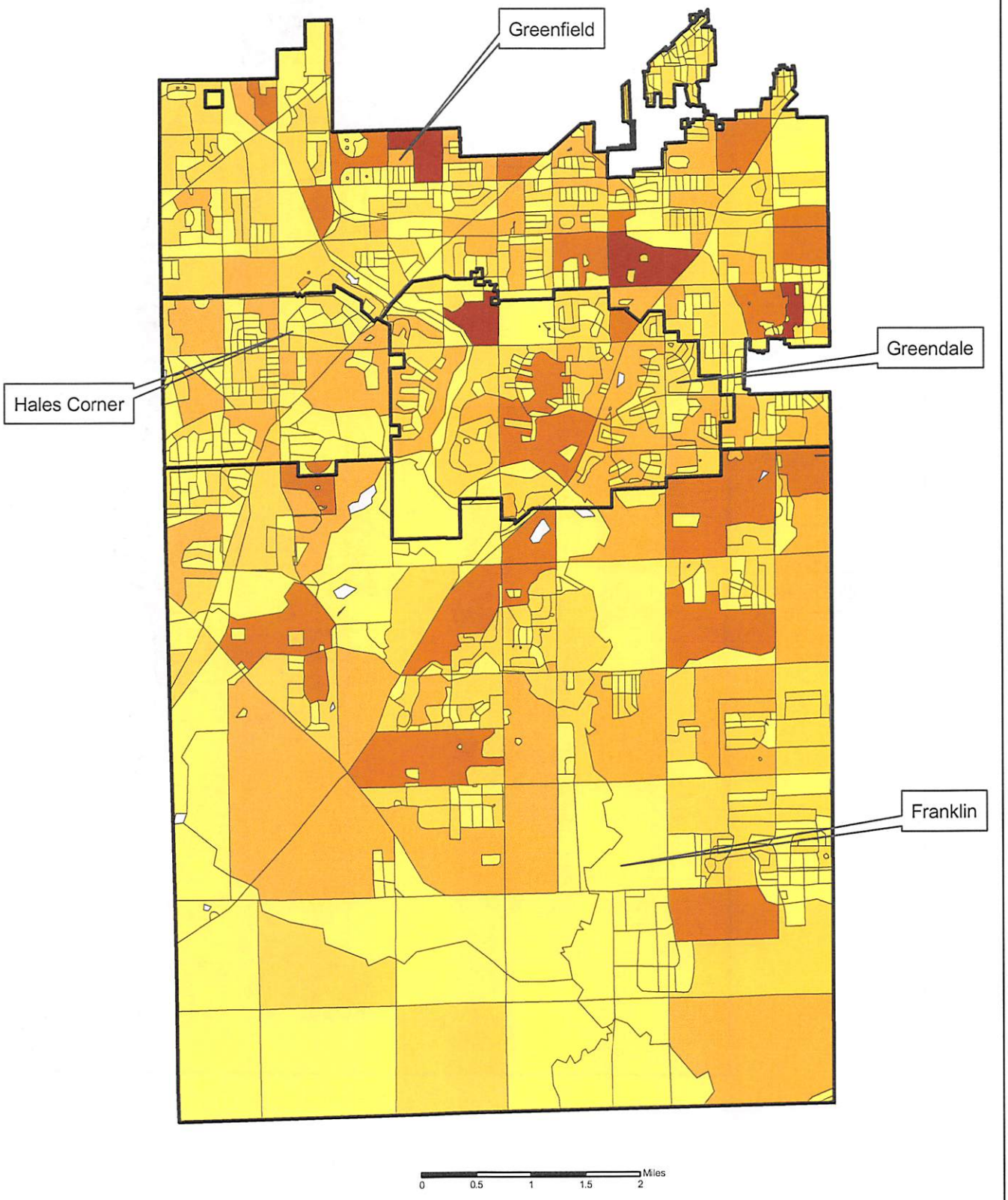
N

Building Stock Dollar Exposure

$0 - $3,210,000	$24,952,000 - $53,936,000
$3,211,000 - $9,758,000	$53,937,000 - $116,389,000
$9,759,000 - $24,951,000	$116,390,000 - $402,923,000

Building Stock Values by Census Bloc
Milwaukee County
Pre-disaster Mitigation
Map 3-1C

Communities of Franklin, Greendale,Greenfield, and Hales Corner



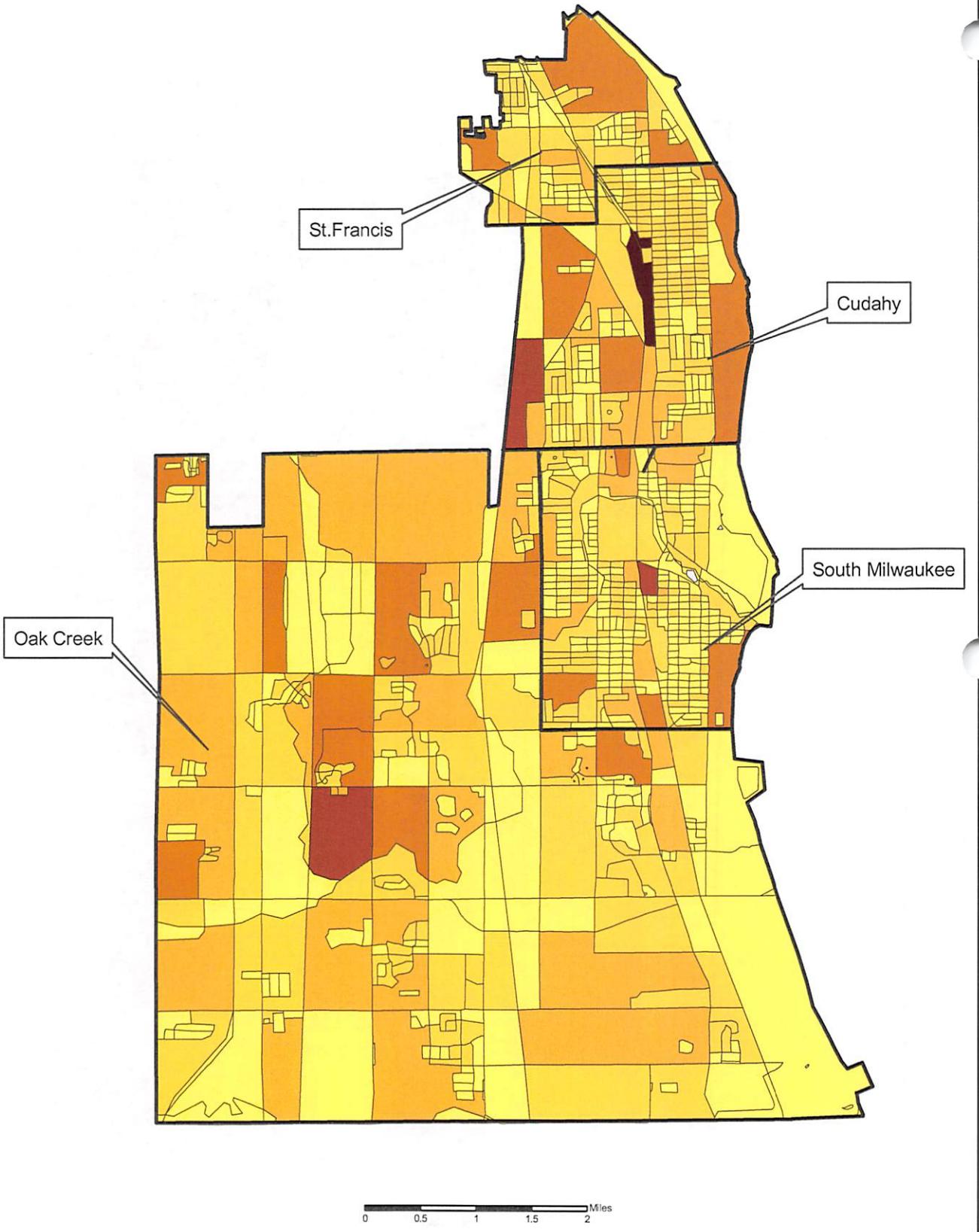
N

Building Stock Dollar Exposure

$0 - $3,210,000	$24,952,000 - $53,936,000
$3,211,000 - $9,758,000	$53,937,000 - $116,389,000
$9,759,000 - $24,951,000	$116,390,000 - $402,923,000

Building Stock Values by Census Block
Milwaukee County
Pre-disaster Mitigation
Map 3-1D

Communities of Cudahy, Oak Creek, South Milwaukee and St.Francis



N

Building Stock Dollar Exposure

- $0 - $3,210,000
- $3,211,000 - $9,758,000
- $9,759,000 - $24,951,000
- $24,952,000 - $53,936,000
- $53,937,000 - $116,389,000
- $116,390,000 - $402,923,000

Building Stock Values by Census Bloc
Milwaukee County
Pre-disaster Mitigation
Map 3-1E

community corrections center, courthouses, and juvenile service buildings and other public facilities such as hospitals. ***Appendix D*** lists critical facilities in Milwaukee County.

Critical facilities data were obtained by mapping the FEMA HAZUS critical facilities data and Milwaukee County's Special Facilities database. The maps were reviewed, corrected, and enhanced during public meetings. Accurate location information was not available for some of the critical facilities listed in ***Appendix D***. Only those facilities that could be located accurately were included in the analysis.

3.3.3 Future Growth and Land Use Trends

Milwaukee County has been slowly losing population since 1970. The U.S. Census indicates that Milwaukee County lost 2 percent of its population between 1990 and 2000. According to U.S. Census Bureau, the projected population for Milwaukee County in 2020 is 1,014,293. Manufacturing and retail plays a major role in the economy of Milwaukee County and this trend is not expected to change in the future. Many communities within Milwaukee County have reached the point that no new development can occur. The exceptions to this would be Bayside, the northern part of Milwaukee, River Hills, Franklin and Oak Creek where there are large areas of undeveloped land.

3.3.4 Vulnerable Populations

A significant factor in the impact of any hazard is the effect it has on people. The severity of the impact is related to the intensity of the hazard, the population affected, and the population's ability to protect itself. To model the ability to self-protect and recover from hazards, we used age and indicators of economic well being. The population data used to develop the vulnerability model was derived from the 2000 Census. To model overall vulnerability the following equation was used:

- Score = (societal variable for census tract / total societal variable in jurisdiction) / maximum societal variable for any census tract in the jurisdiction)

This formula creates a score for each variable that is based on the percentage of that variable in the jurisdiction and is normalized to a scale that is the same as the other variables. The societal variables that were used to determine the overall societal vulnerability per census tract were:

- Population Density
- Age > 65
- Age < 18
- Income < Poverty Level
- No High School Diploma
- Population with Disabilities
- Population on Public Assistance

Each census tract was assigned a score for each societal vulnerability and an overall societal vulnerability by adding the individual societal vulnerability scores and dividing by 7, which is the total number of variables evaluated. ***Map 3-2A*** through ***Map 3-2E*** depicts total societal vulnerability by census tract

3.4 HAZARD PROFILES

Hazard profiles define the frequency, location, and intensity of hazards that may impact a community. Profiles were developed for hazards that historically have had the most effect on the community and those that the community identified during public meetings as being of the most concern.

3.4.1 Hazard Frequency

The frequency of past hazard events was calculated to determine the probability of future hazards occurring. Accurate and consistent records have not been kept for many hazards. Data from the National Oceanic and Atmospheric Administration (NOAA) National Climate Data Center Storm Events database was used to compile frequencies of natural hazards. ***Table 3-4*** summarizes this data for Milwaukee County. The complete listing of events from this database can be found in ***Appendix F.***

TABLE 3-4
MILWAUKEE COUNTY HAZARD FREQUENCIES

Hazard	Number of Events	Period of Record (In Years)	Frequency (Events per Year)
Flooding	29	9	3.2
Winter Storms/Extreme Cold	35	10	3.5
Tornadoes	19	45	.42
Wind/Thunderstorms/Hail	219	46	4.8
Extreme Heat	5	7	0.71

3.4.2 Hazard Impact Areas

Hazard impact areas describe the geographic extent a hazard can impact a jurisdiction and are uniquely defined on a hazard-by-hazard basis as discussed below. For purposes of conducting the risk analysis, all the hazard impact areas were defined as the percentage of area in each census block that would be affected.

3.4.2.1 Flooding

The types of floodplain maps required to model flooding in a GIS are vector representations of the floodplain boundaries like the FEMA Q3 maps. The Q3 maps were obtained from Milwaukee County in a GIS format. The flood map area was then intersected with the census blocks in the GIS to define area of impact by block. ***Map 3-3A*** through ***Map 3-3E*** depicts the percentage of area potentially impacted by flooding by census block.

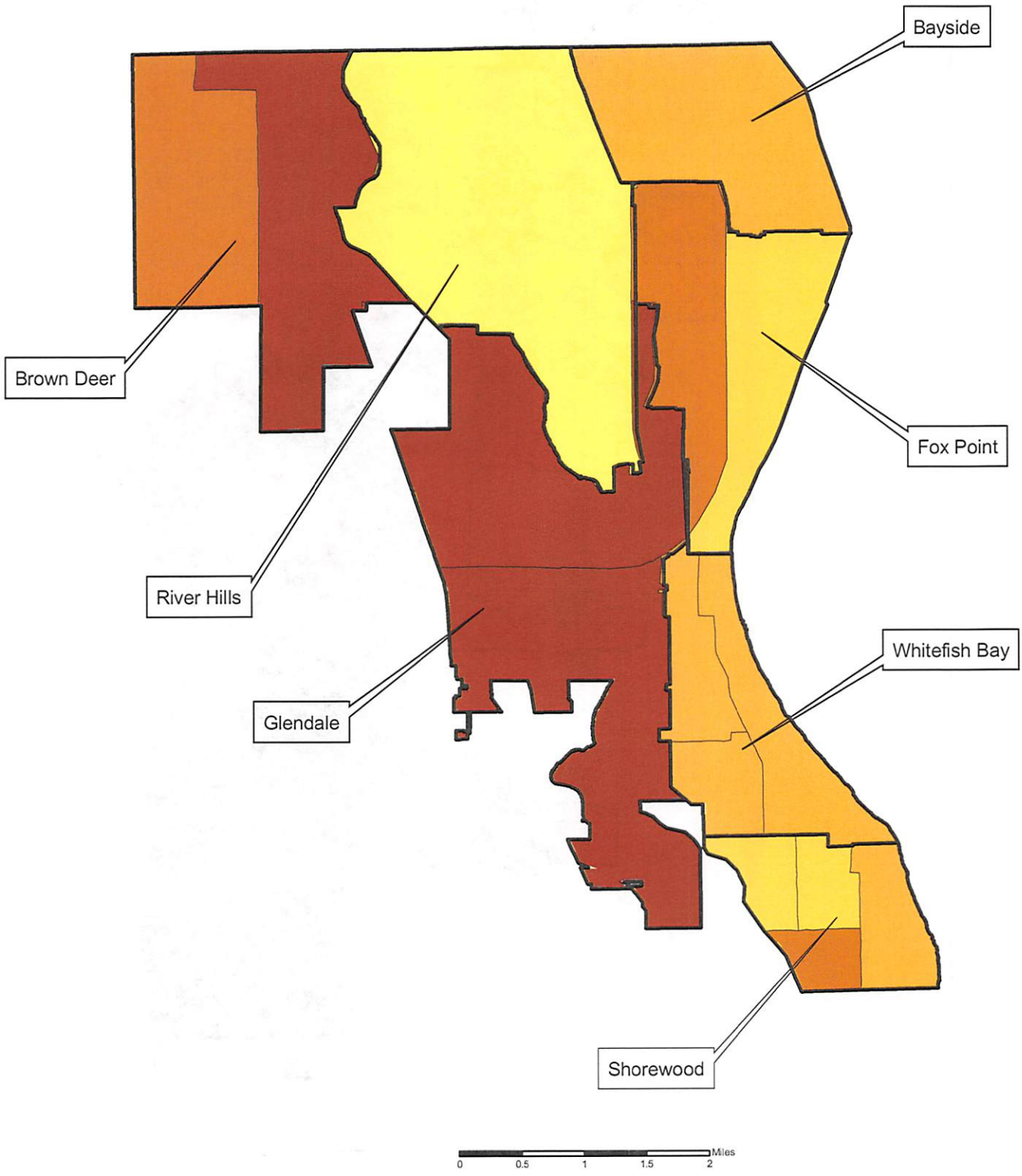
3.4.2.2 Winter Storms

The entire project area is in a single climate region (Dfb) according to the Köppen Climate Classification for the Conterminous United States modified by Glen Trewartha of the University of Wisconsin – Madison. (Introducing Physical Geography, 2003). Characteristics of the Dfb classification are:

- Humid
- No Dry Season
- Coldest Average Temp Less than 26.6 degrees Fahrenheit
- Warmest Average Temp is Less than 71.6 degrees Fahrenheit

Topographically there are no significant features that generate localized climate conditions and present significant changes in hazard risk in the project area. Therefore, the hazard profile area for winter storms is uniform over the entire project area.

Communities of Bayside, Brown Deer, Fox Point, Glendale,
River Hills, Shorewood, and Whitefish Bay



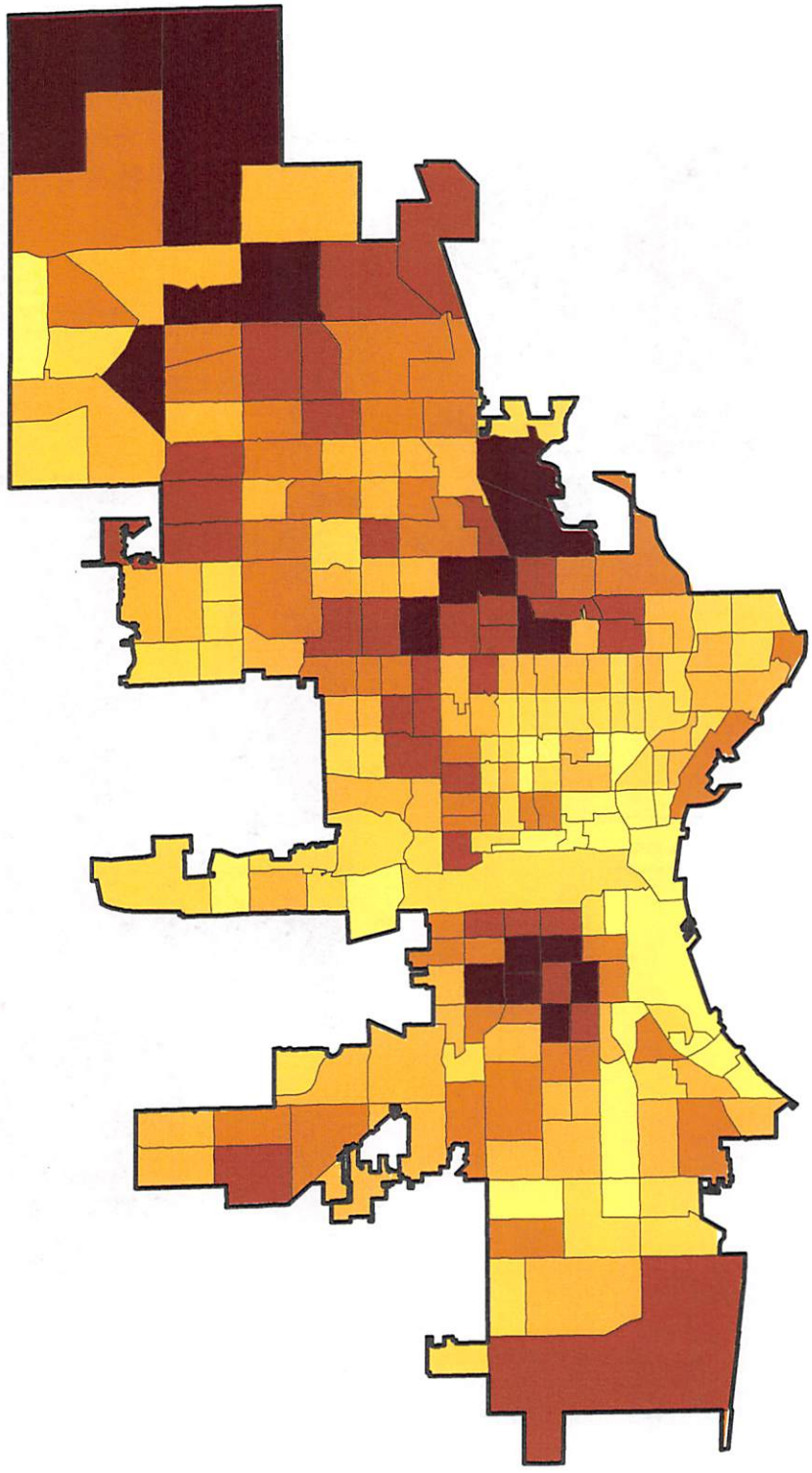
N

Total Societal Vulnerability Score

0 - 0.109136	0.293222 - 0.394700
0.109137 - 0.201403	0.394701 - 0.521829
0.201404 - 0.293221	0.521830 - 0.911788

Total Societal Vulnerability by Census Tract
Milwaukee County
Pre-disaster Mitigation
Map 3-2A

City of Milwaukee



0 1 2 3 4 Miles

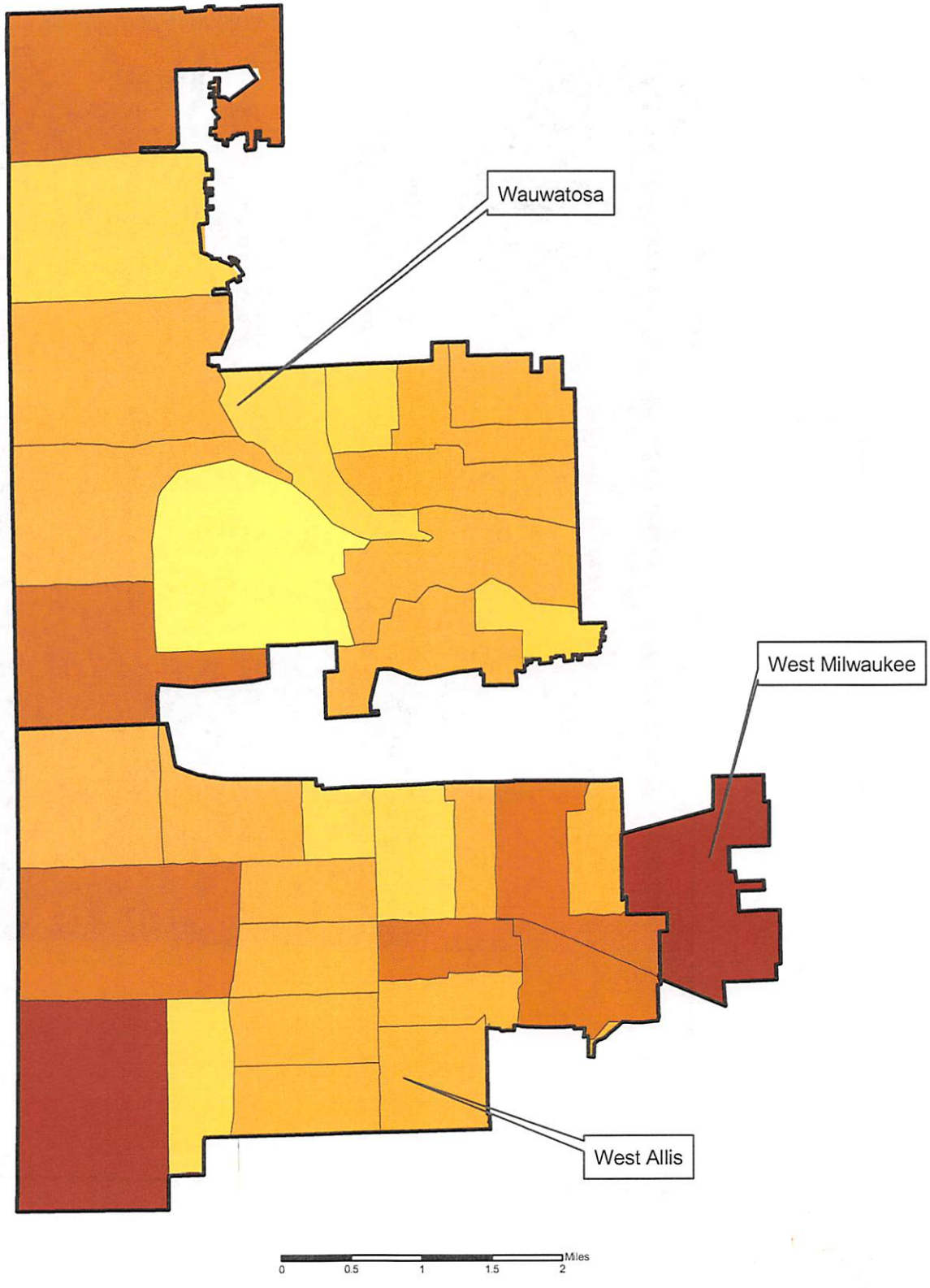
N

Total Societal Vulnerability Score

0 - 0.109136	0.293222 - 0.394700
0.109137 - 0.201403	0.394701 - 0.521829
0.201404 - 0.293221	0.521830 - 0.911788

Total Societal Vulnerability by Census Trac
Milwaukee County
Pre-disaster Mitigation
Map 3-2B

Communities of Wauwatosa, West Allis and West Milwaukee



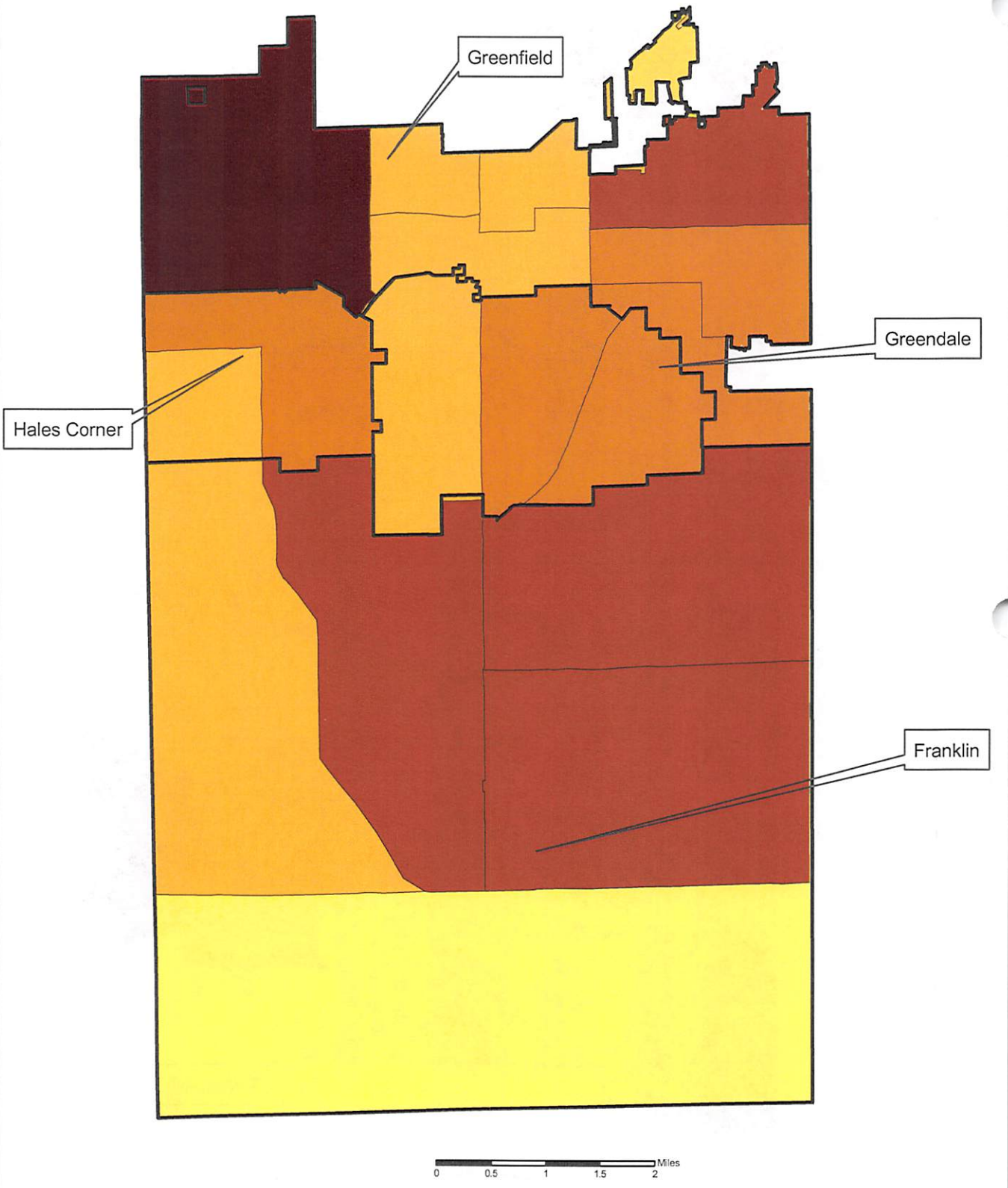
N

Total Societal Vulnerability Score

0 - 0.109136	0.293222 - 0.394700
0.109137 - 0.201403	0.394701 - 0.521829
0.201404 - 0.293221	0.521830 - 0.911788

Total Societal Vulnerability by Census Tract
Milwaukee County
Pre-disaster Mitigation
Map 3-2C

Communities of Franklin, Greendale,Greenfield, and Hales Corner



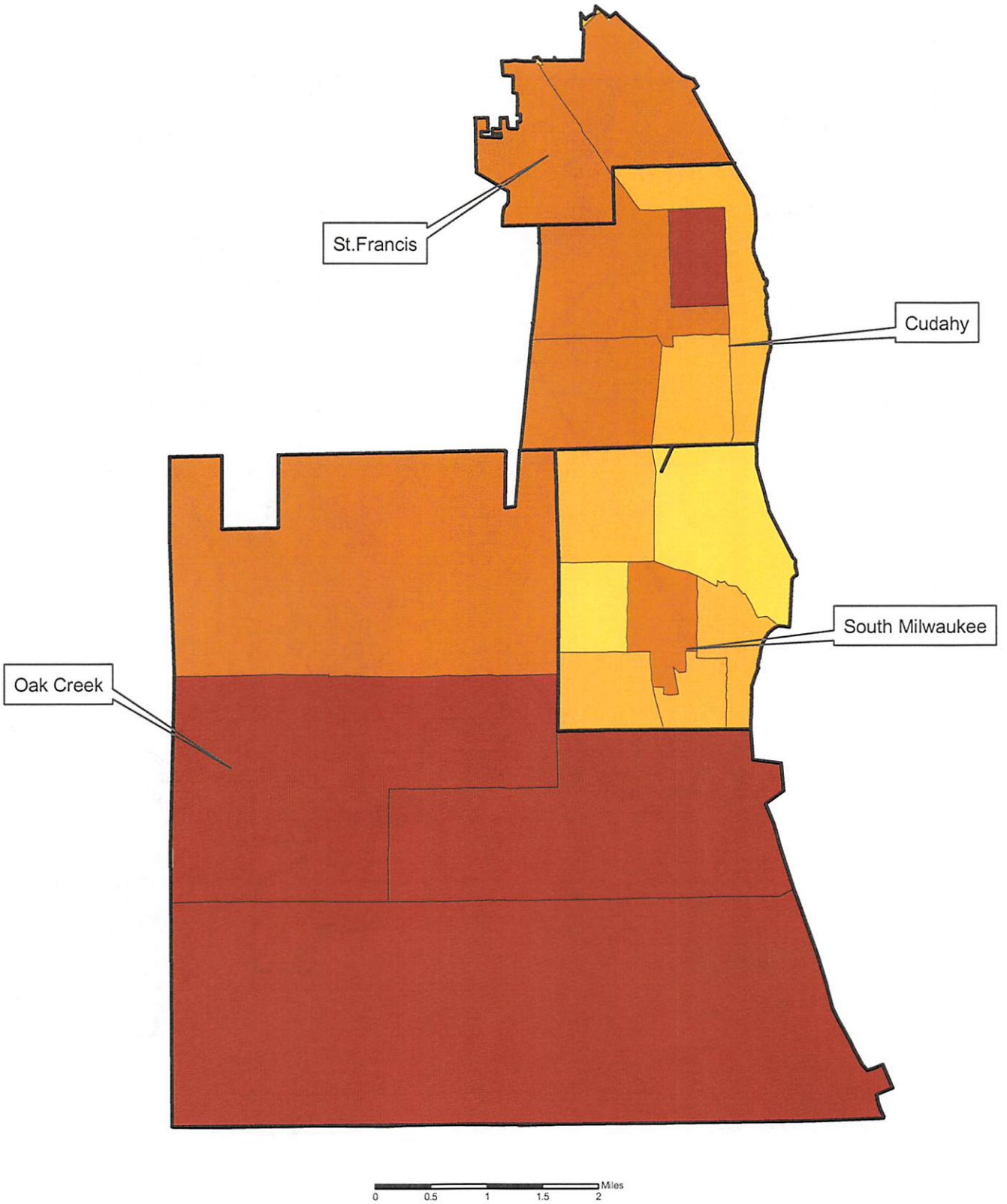
N

Total Societal Vulnerability Score

0 - 0.109136	0.293222 - 0.394700
0.109137 - 0.201403	0.394701 - 0.521829
0.201404 - 0.293221	0.521830 - 0.911788

Total Societal Vulnerability by Census Trac
Milwaukee County
Pre-disaster Mitigation
Map 3-2D

Communities of Cudahy, Oak Creek, South Milwaukee and St.Francis



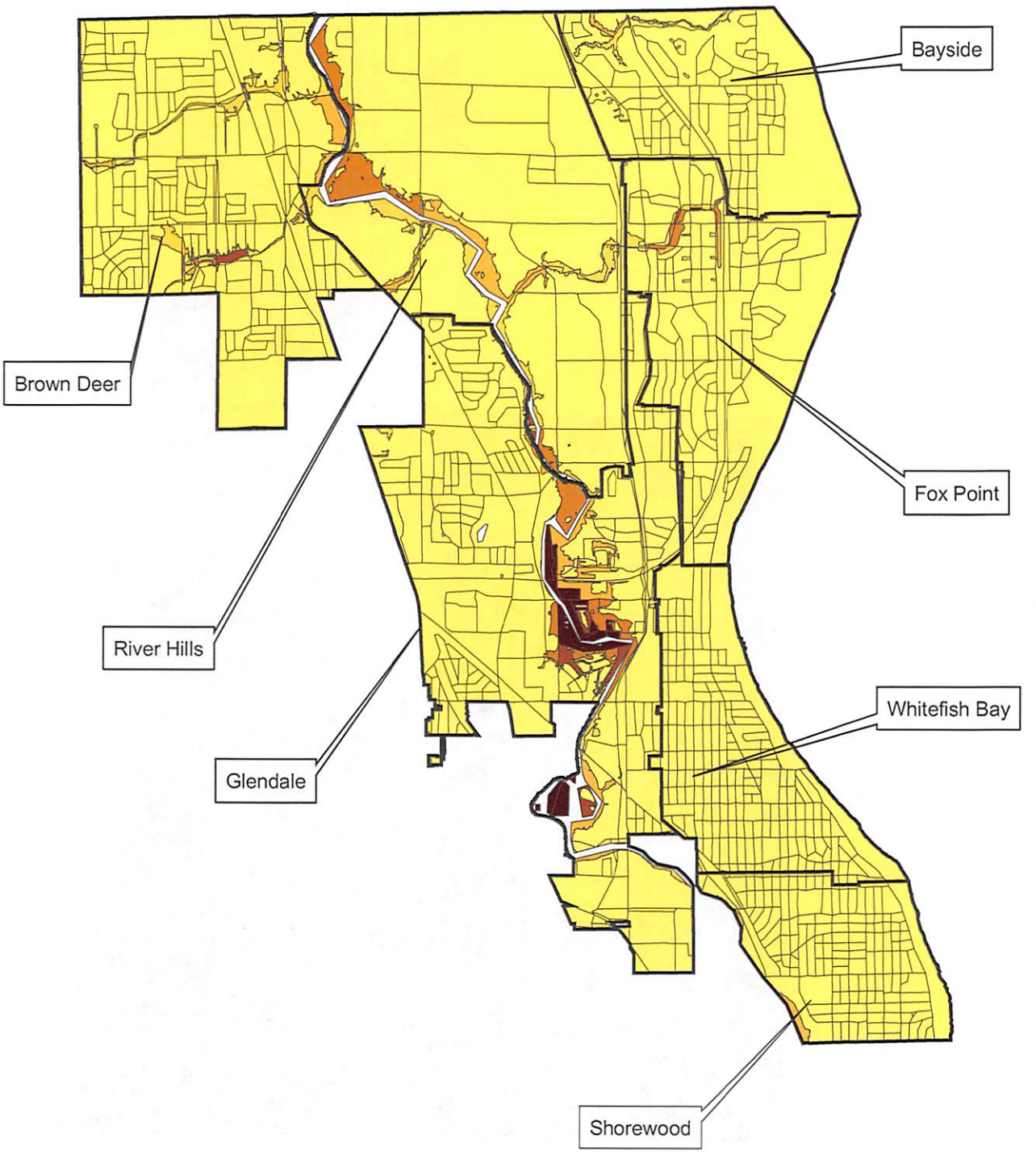
N

Total Societal Vulnerability Score

0 - 0.109136	0.293222 - 0.394700
0.109137 - 0.201403	0.394701 - 0.521829
0.201404 - 0.293221	0.521830 - 0.911788

Total Societal Vulnerability by Census Tract
Milwaukee County
Pre-disaster Mitigation
Map 3-2E

Communities of Bayside, Brown Deer, Fox Point, Glendale,
River Hills, Shorewood, and Whitefish Bay



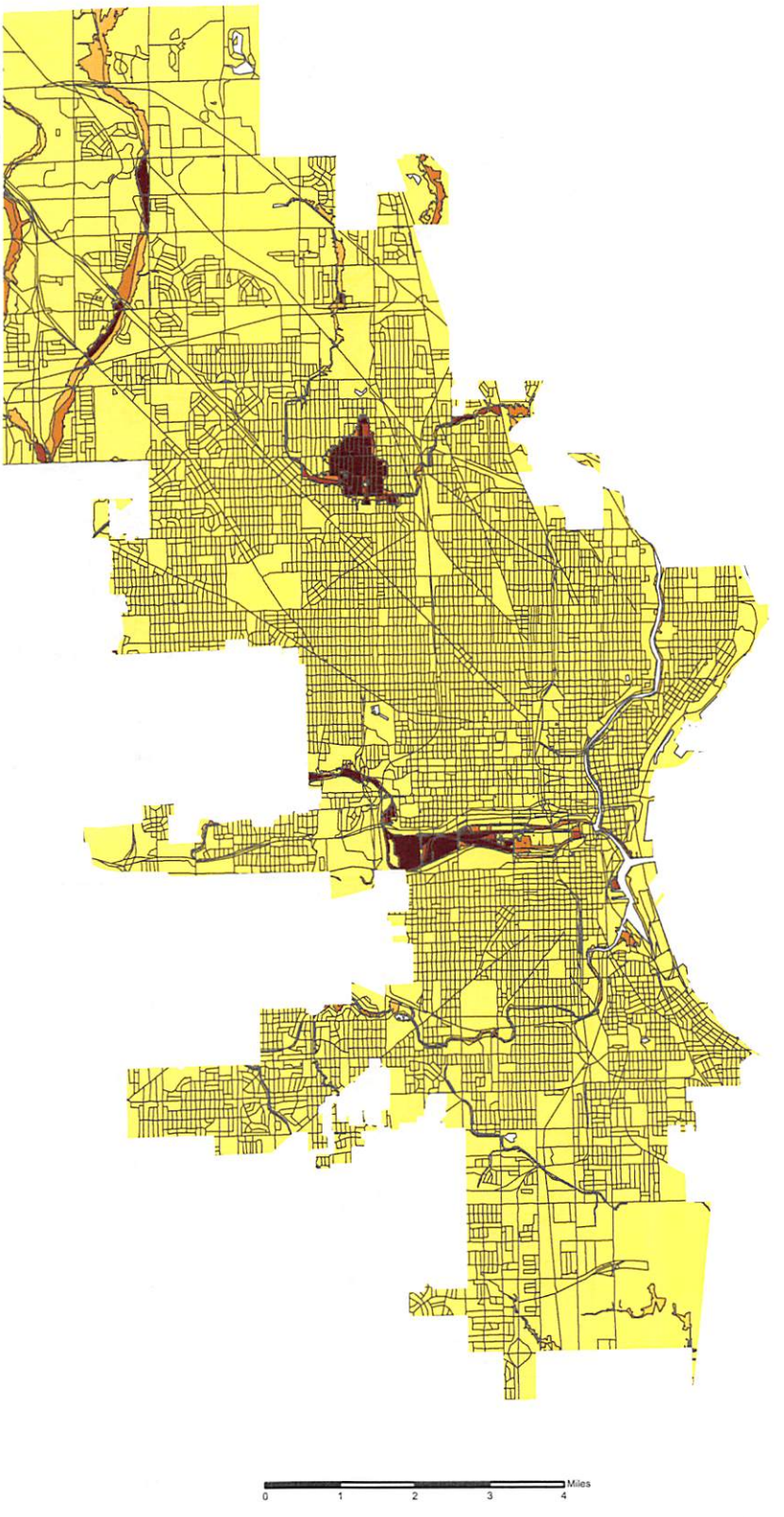
N

Area by Block

0%	40 - 60%
0.01 - 20%	60 - 80%
20- 40%	80 - 100%

Flood Hazard by Census Bloc
Milwaukee County
Pre-disaster Mitigation
Map 3-3A

City of Milwaukee



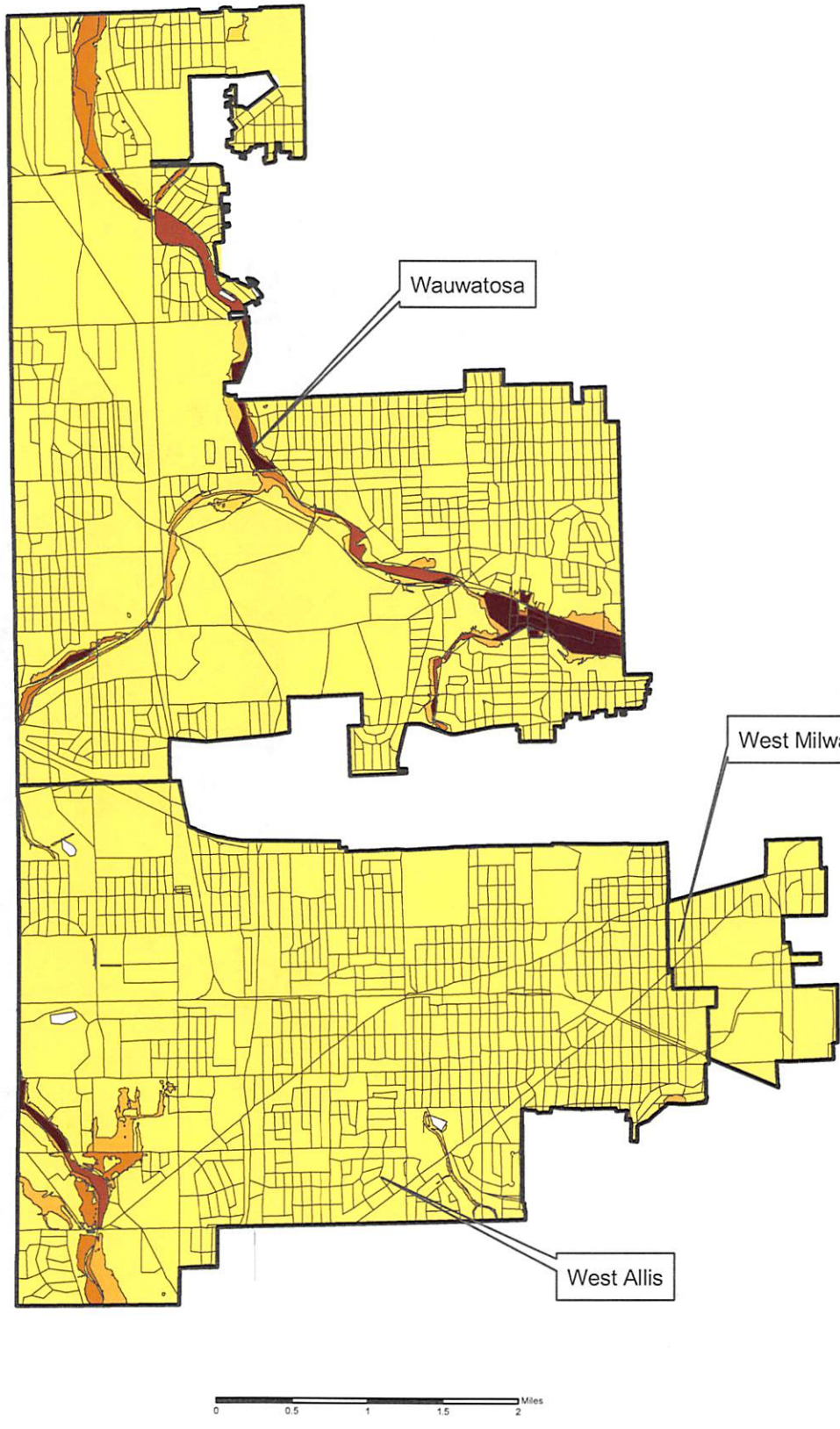
N

Area by Block

- 0%
- 0.01 - 20%
- 20- 40%
- 40 - 60%
- 60 - 80%
- 80 - 100%

Flood Hazard by Census Block
Milwaukee County
Pre-disaster Mitigation
Map 3-3B

Communities of Wauwatosa, West Allis and West Milwaukee



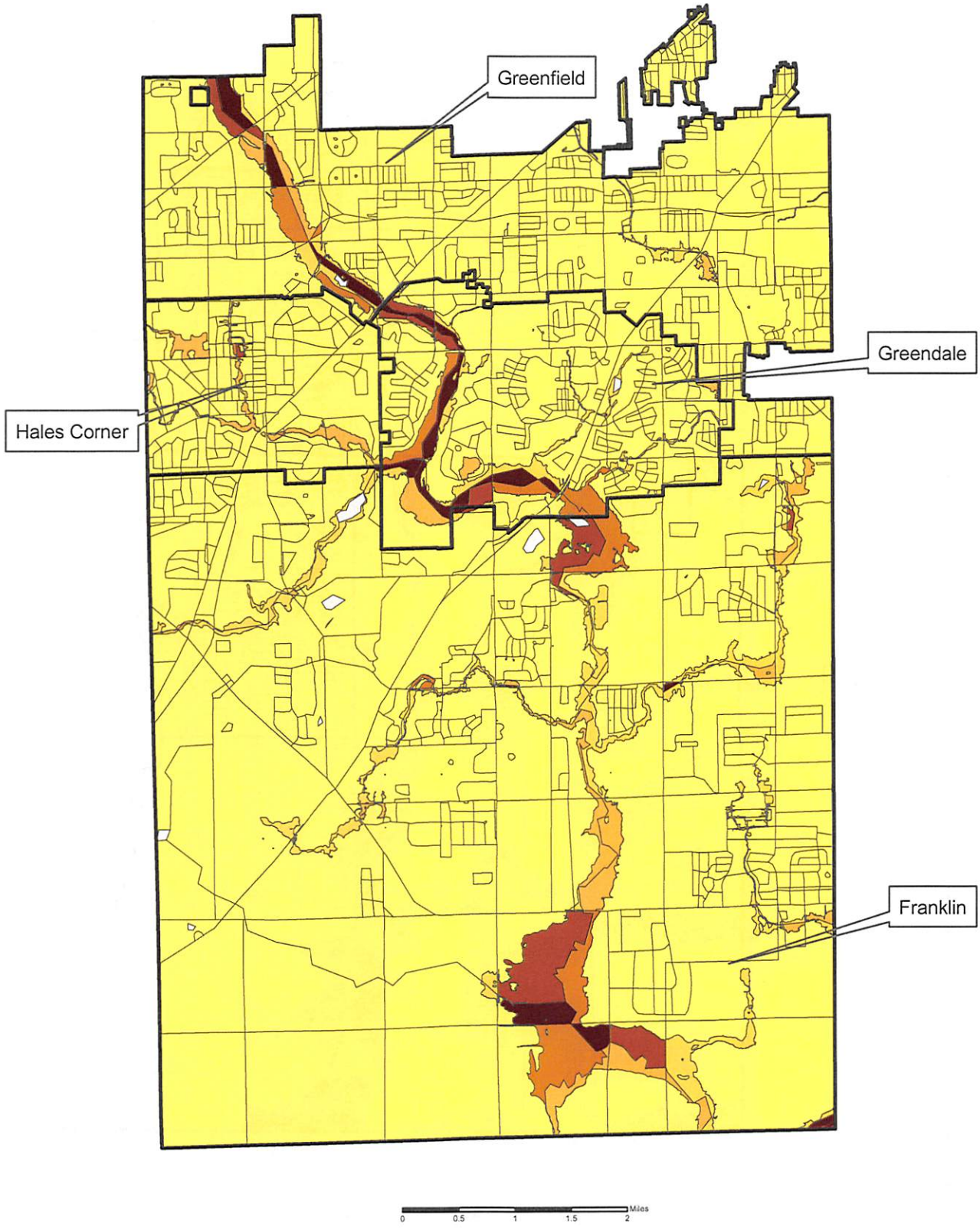
N

Area by Block

0%	40 - 60%
0.01 - 20%	60 - 80%
20- 40%	80 - 100%

Flood Hazard by Census Bloc
Milwaukee County
Pre-disaster Mitigation
Map 3-3C

Communities of Franklin, Greendale,Greenfield, and Hales Corner



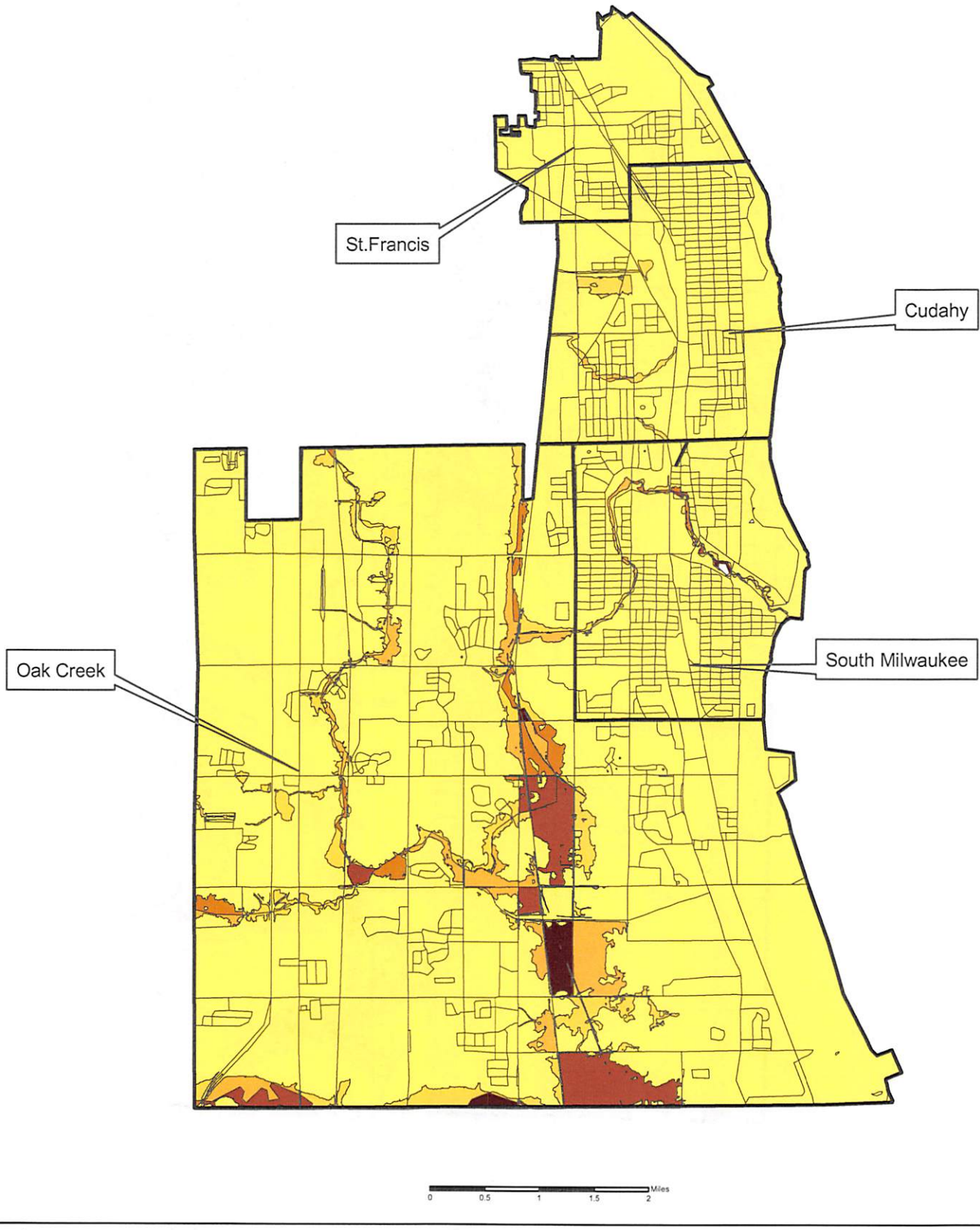
N

Area by Block

0%	40 - 60%
0.01 - 20%	60 - 80%
20- 40%	80 - 100%

Flood Hazard by Census Block
Milwaukee County
Pre-disaster Mitigation
Map 3-3D

Communities of Cudahy, Oak Creek, South Milwaukee and St.Francis



N

Area by Block

0%	40 - 60%
0.01 - 20%	60 - 80%
20- 40%	80 - 100%

Flood Hazard by Census Bloc
Milwaukee County
Pre-disaster Mitigation
Map 3-3E

3.4.2.3 Severe Thunderstorms

According to FEMA's wind zone classifications, the entire project area is in Zone III (200 mph Design Wind Speeds). FEMA also lists Milwaukee County as a single classification for tornado frequency (6-10 per 1,000 square miles). Based on review of weather data and the determinations made for tornadoes, windstorms, and winter storms, the entire project area has been classified with a uniform risk for severe thunderstorms including tornadoes and hail.

Estimating potential losses and calculating risk requires evaluating where hazard areas and vulnerabilities to them coincide, how frequently the hazards occur, and then estimating the magnitude of damage resulting from a hazard event.

3.5 ASSESSING VULNERABILITY: ESTIMATING POTENTIAL LOSSES

3.5.1 Hazard Magnitudes

The percentage of structures or people exposed to a hazard who are negatively impacted is related to the nature of the hazard and intensity of the event and is expressed as the hazard magnitude. The hazard magnitude is required to develop estimates of structures and people impacted by the hazard. For this risk assessment, hazard magnitude estimates were developed by researching historical disaster records and other relevant data related to hazard intensity. Hazard magnitudes are expressed as a percent of structures or population impacted.

3.5.2 Risk Calculations

Risk calculations present a quantitative assessment of the vulnerability of structures, populations, and critical facilities to individual hazards and cumulatively to all hazards. The equation used to develop the overall risk values is:

- Overall Risk = Exposure x Frequency x Hazard Loss Magnitude

Where:

- Exposure = structures, vulnerable populations, or critical facilities at risk as determined in ***Plan Section 3.4.2***
- Frequency = annual number of events determined by calculating the number of hazard events dividing by the period of record as described in ***Plan Section 3.4.1***
- Magnitude = percent of damage expected as described in ***Plan Section 3.5.1*** and presented in ***Table 3-5***

Table 3-5 presents the results of the risk calculations. While the results are presented as dollar values for Building Dollar Risk, numbers of people affected for Societal Risk, and numbers of facilities affected, they should not be interpreted literally as estimates of actual values. Due to data and modeling limitations, the values presented are more appropriately used to evaluate the relative risk posed by the different hazard types.

TABLE 3-5
MILWAUKEE COUNTY HAZARD VULNERABILITY ASSESSMENTS

	Risk Parameters					Overall Risk		
Hazard	**Frequency**	**Magnitude**	**Building Exposure[1]**	**Societal Exposure[2]**	**Critical Facilities Exposure[3]**	**Building Risk**	**Societal Risk**	**Critical Facilities Risk**
Flooding	3.22	30.00%	$15,617,207,000	34467	13	$15,086,221,962	33295.12	12.56
Winter Storms	1.9	2.00%	$54,015,693,000	1920587	103	$2,052,596,334	72982.31	3.91
Tornadoes	0.21	0.50%	$54,015,693,000	1920587	103	$56,716,478	2016.62	0.11
Wind/Hail Thunderstorms	1.7	0.10%	$54,015,693,000	1920587	103	$91,826,678	3265	0.18
Cumulative	NA	NA	$177,742,825,904	5,797,426	322	$17,287,392,868	111,559.52	16.76

1. Estimated dollar value of all buildings at risk for experiencing the corresponding hazard.
2. Estimated number of people at risk for experiencing the corresponding hazard.
3. Estimated number of critical facilities at risk for experiencing the corresponding hazard.

NA Not Applicable

4.0 MITIGATION STRATEGY

Specific mitigation goals and projects were developed for Milwaukee County in conjunction with public meetings and stakeholder interviews. A matrix developed for project ranking emphasizing cost-benefit and input from local officials was used to determine project prioritization. The following is a description of goals and objectives used to mitigate natural and technological hazards that build on the community's existing capabilities. Project implementation and legal framework are discussed at the conclusion of this section.

4.1 LOCAL HAZARD MITIGATION GOALS

The Plan goals describe the overall direction that Milwaukee County agencies, organizations, and citizens can take to work toward mitigating risk from natural and technological hazards. Goals and objectives of the Plan were developed during interviews and meetings with public officials and at public meetings held in Brown Deer, Milwaukee, Cudahy, Franklin and Wauwatosa. Milwaukee County hazard mitigation goals are identified below with reference to the specific jurisdiction identifying each as their goal.

- Reduce Impacts from Flooding – identified goal by communities of Bayside, Glendale and Milwaukee
- Enhance Early Warning Systems – identified goal by Franklin and South Milwaukee
- Enhance Emergency Response Capabilities - identified goal by all communities
- Reduce Impacts of Coastal Erosion – identified by South Milwaukee

4.2 MITIGATION OBJECTIVES AND ACTIONS

A range of potential mitigation activities was considered and is presented in ***Appendix E***. Below is a list of mitigation objectives and the actions (projects) identified by Milwaukee County. Projects marked with an asterisk are response-related actions identified as county priorities. Although these projects may not be eligible for FEMA funding, Milwaukee County may secure alternate funding sources to implement these projects in the future. Mitigation projects specific to individual jurisdictions are noted within the list.

Reduce Impacts from Flooding

- Update Public Information put on website in Whitefish Bay.
- Purchase of repetitive loss structures in Bayside, Glendale, City of Milwaukee, and River Hills.
- Purchase houses within floodplain in Oak Creek.
- Install new culverts where needed in Oak Creek.
- Installation of wet detention ponds in Oak Creek.
- Maintain sewer outlets in Oak Creek.
- Install larger culverts at Laramie Lane at Ironwood intersection in Bayside.
- Provide overland flow from Laramie Lane to Fish Creek in Bayside.
- Replace culvert on Santa Monica Blvd. at N. Regent Rd. intersection in Bayside.
- Construct channel along property lines between Broadmoor Rd. and Fairway Circle in Bayside.
- Construct channel along property lines between Regent Rd. and Fairway Dr. in Bayside.
- Install bypass storm sewer to river in Glendale.
- Remove sediment and debris from Bender Creek in Glendale.
- Increase height of the west bank along Bender Creek to control backyard flooding in Glendale.
- Install and maintain flap gate on the Acacia Rd. storm sewer outlet headwall in Glendale.
- Inspect and clean channel in wooded ravine north of Fairfield Court in Glendale.

- Clean, remove, or replace Milwaukee's grate on Crestwood Creek on the downstream end of the Silver Spring culvert in Glendale.
- Add flap gates to river outlets along Riverview Dr., River Forest Dr., and LaSalle Ave. in Glendale.
- Remove accumulated rocks on Crestwood Creek on the downstream end of the Silver Spring culvert in Glendale.
- Dredging of the Milwaukee River at Lincoln Park in Milwaukee.
- Implement more frequent removal of debris at Estabrook Park in Milwaukee.
- Replace retaining wall on the Blanchard Street pumping Station.*
- Flood proofing of 3 repetitive loss structures in Wauwatosa.

Enhance Early Warning Capabilities

- Reverse 911 Systems for Franklin, Oak Creek, and South Milwaukee.
- Repair or replace siren in South Milwaukee.*
- Purchase additional siren for the St. Martins area in Franklin.*

Enhance Emergency Response Systems

- List of Contractors with heavy equipment in all jurisdictions except Bayside.*
- List of equipment in all jurisdictions except Bayside.*
- Include Public Works Departments in the countywide emergency communications network.*
- Pre-established mutual aid agreements between municipalities for equipment in all jurisdictions.*
- Migrate Special Facilities database from Excel to Internet application.*
- Locate vulnerable facilities in GIS for South Milwaukee.

Prevent Coastal Erosion

- Enhance slope stability for South Milwaukee.

4.3 PROJECT RANKING AND PRIORITIZATION

A cost-benefit matrix was developed to rank the mitigation projects using the following criteria. Each project was assigned a "high", "medium", or "low" rank for *Population Impacted, Property Impacted,* and *Cost.* For the *Population Impacted* category, a "high" rank represents greater than 50 percent of county residents; a "medium" rank represents 20 to 50 percent of county residents; and a "low" rank represents less than 20 percent of county residents. For the *Property Impacted* and *Project Cost* categories, a "high" rank represents greater than $1,00,000, a "medium" rank represents between $500,000 and $1,000,000, and a "low" rank is less than $500,000. The matrix was completed by assigning each rank a numeric value as follows:

TABLE 4-1
COST-BENEFIT SCORING MATRIX

	Population Impacted	Property Impacted	Cost
High	5	5	1
Medium	3	3	3
Low	1	1	5

The overall cost-benefit was then calculated by summing the total score for each project. ***Table 4-2*** presents the Hazard Mitigation Project Cost-Benefit Matrix for Milwaukee County.

Milwaukee County's Emergency Management Administrator, consulting with the Local Emergency Management Directors, also ranked each mitigation project as "high", "medium", and "low" based on community priorities. Projects identified by Milwaukee County as top priorities and their cost/benefit ranking, are presented in ***Table 4-3.***

4.4 PROJECT IMPLEMENTATION AND LEGAL FRAMEWORK

Once the Milwaukee County PDM Plan is formally adopted, the county will use the cost-benefit analysis in the Plan to focus project prioritization. Mitigation projects will be considered for funding through federal and state grant programs and when other funds are made available through the county. The Milwaukee County Sheriff's Emergency Office/ Management Bureau will be the coordinating agency for project implementation. The Emergency Management Bureau has the capacity to organize resources, prepare grant applications, and oversee project implementation, monitoring, and evaluation. Coordinating organizations may include local, county, or regional agencies that are capable of, or responsible for, implementing activities and programs. The Emergency Management Bureau Administrator will be responsible for mitigation project administration.

A number of state and local regulations and policies form the legal framework available to implement Milwaukee County's hazard mitigation goals and projects. A list of these regulations and plans is presented below.

State of Wisconsin

- Wisconsin Smart Growth Comprehensive Planning
- Wisconsin Floodplain Management
- Wisconsin Building Codes
- Wisconsin Shoreland Management Program

Local

- Jurisdictional Flood Hazard Mitigation Plan
- Jurisdictional Flood Plain Regulations
- Jurisdictional Stormwater Management Plans
- Jurisdictional Zoning Ordinances
- Milwaukee Metropolitan Sewer District (MMSD) Rainfall Reduction Program
- MMSD Downspout Disconnect Program

A summary of how the PDM Plan can be integrated into this legal framework is presented below.

- Integrate each jurisdiction's Flood Mitigation Plan and floodplain ordinances into the PDM Plan to help minimize the impacts from flooding.
- Integrate each jurisdiction's Stormwater Management Plan into the PDM Plan to help minimize the impacts from flooding.
- Initiate zoning ordinances in conjunction with flood mitigation projects to prevent development in flood-prone areas.
- Partner with other organizations and agencies with similar goals to promote building codes that are more disaster resistant on the state level.
- Develop incentives for local governments, citizens, and businesses to pursue hazard mitigation projects.
- Allocate county resources and assistance for mitigation projects.
- Partner with other organizations and agencies in southeast Wisconsin to support hazard mitigation activities.

TABLE 4-2

MILWAUKEE COUNTY COST/BENEFIT RANKING OF HAZARD MITIGATION PROJECTS

JURISDICTION	GOAL	HAZARD MITIGATION PROJECTS	HAZARDS MITIGATED	POPULATION IMPACTED	PROPERTY IMPACTED	PROJECT COST	COST/BENEFIT RANKING
Bayside							
	Enhance Emergency Response	Pre-established mutual aid agreements between municipalities for equipment.	Flooding, Winter Storms, Tornados	High	High	Low	High
	Reduce Impacts from Flooding	Install larger culvert across Laramie Lane at Laramie Lane and Ironwood Lane intersection.	Flooding	Low	Low	Low	Medium
	Reduce Impacts from Flooding	Provide overland Flow from Laramie Lane to Fish Creek.	Flooding	Low	Low	Low	Medium
	Reduce Impacts from Flooding	Construct channel along property lines between Braidmoor Rd and Fairway Circle	Flooding	Low	Low	Low	Medium
	Reduce Impacts from Flooding	Construct channel along property lines between Regent Rd and Fairway Drive	Flooding	Low	Low	Low	Medium
	Reduce Impacts from Flooding	Replace culvert across Santa Monica Blvd. at N. Regent Rd intersection	Flooding	Low	Low	Low	Medium
Brown Deer							
	Enhance Emergency Response	Contractor List of equipment	Flooding, Winter Storms, Tornados	High	High	Low	High
	Enhance Emergency Response	Equipment list by municipality.	Flooding, Winter Storms, Tornados	High	High	Low	High
	Enhance Emergency Response	Pre-established mutual aid agreements between municipalities for equipment.	Flooding, Winter Storms, Tornados	High	High	Low	High
Cudahy							
	Enhance Emergency Response	Contractor List of equipment	Flooding, Winter Storms, Tornados	High	High	Low	High
	Enhance Emergency Response	Equipment list by municipality.	Flooding, Winter Storms, Tornados	High	High	Low	High
	Enhance Emergency Response	Pre-established mutual aid agreements between municipalities for equipment.	Flooding, Winter Storms, Tornados	High	High	Low	High
Fox Point							
	Enhance Emergency Response	Contractor List of equipment	Flooding, Winter Storms, Tornados	High	High	Low	High
	Enhance Emergency Response	Equipment list by municipality.	Flooding, Winter Storms, Tornados	High	High	Low	High
	Enhance Emergency Response	Pre-established mutual aid agreements between municipalities for equipment.	Flooding, Winter Storms, Tornados	High	High	Low	High
Franklin							
	Enhance Emergency Response	Contractor List of equipment	Flooding, Winter Storms, Tornados	High	High	Low	High
	Enhance Emergency Response	Equipment list by municipality.	Flooding, Winter Storms, Tornados	High	High	Low	High
	Enhance Emergency Response	Pre-established mutual aid agreements between municipalities for equipment.	Flooding, Winter Storms, Tornados	High	High	Low	High
	Enhance Early Warning	Add New Siren at St Martins	Flooding, Winter Storms, Tornados	High	High	Low	High
	Enhance Early Warning	Reverse 911	Flooding, Winter Storms, Tornados	High	High	Medium	High
Glendale							
	Enhance Emergency Response	Contractor List of equipment	Flooding, Winter Storms, Tornados	High	High	Low	High
	Enhance Emergency Response	Equipment list by municipality.	Flooding, Winter Storms, Tornados	High	High	Low	High
	Enhance Emergency Response	Pre-established mutual aid agreements between municipalities for equipment.	Flooding, Winter Storms, Tornados	High	High	Low	High
	Reduce Impacts from Flooding	Install and maintain a flap gate on the Acacia Road storm sewer outlet headwall.	Flooding	Low	Low	Low	Low
	Reduce Impacts from Flooding	Inspect and clean channel in wooded ravine north of Fairfield Court	Flooding	Low	Low	Low	Low
	Reduce Impacts from Flooding	Remove sediment and debris from Bender Creek	Flooding	Low	Low	Low	Low
	Reduce Impacts from Flooding	Increase height of the west bank ditch along bender creek to control back yard flooding	Flooding	Low	Low	Low	Low
	Reduce Impacts from Flooding	Install bypass storm sewer to river. Enclose open channel in storm rights of way from railroad to Bender Road.	Flooding	Low	Low	Low	Low

TABLE 4-2

MILWAUKEE COUNTY COST/BENEFIT RANKING OF HAZARD MITIGATION PROJECTS

JURISDICTION	GOAL	HAZARD MITIGATION PROJECTS	HAZARDS MITIGATED	POPULATION IMPACTED	PROPERTY IMPACTED	PROJECT COST	COST/BENEFIT RANKING
	Reduce Impacts from Flooding	Add flap gates on each river outlet along Riverview Dr., and River Forest Dr., and LaSalle Ave.	Flooding	Low	Low	Low	Low
	Reduce Impacts from Flooding	Re-grade and curb all streets along Riverview Dr., and River Forest Dr., and LaSalle Ave.	Flooding	Low	Low	Low	Low
	Reduce Impacts from Flooding	Cleaning, removal or replacement of the City of Milwaukee's grate on the downstream end of the Silver Spring Culvert, near Crestwood Creek and Neighborhood	Flooding	Low	Low	Low	Low
	Reduce Impacts from Flooding	Removal of accumulated rocks downstream of the Silver Spring Drive culvert.	Flooding	Low	Low	Low	Low
	Reduce Impacts from Flooding	Acquire 4 repetitive loss structures	Flooding	Low	Medium	Medium	Medium
Greendale							
	Enhance Emergency Response	Contractor List of equipment	Flooding, Winter Storms, Tornados	High	High	Low	High
	Enhance Emergency Response	Equipment list by municipality.	Flooding, Winter Storms, Tornados	High	High	Low	High
	Enhance Emergency Response	Pre-established mutual aid agreements between municipalities for equipment.	Flooding, Winter Storms, Tornados	High	High	Low	High
Greenfield							
	Enhance Emergency Response	Contractor List of equipment	Flooding, Winter Storms, Tornados	High	High	Low	High
	Enhance Emergency Response	Equipment list by municipality.	Flooding, Winter Storms, Tornados	High	High	Low	High
	Enhance Emergency Response	Pre-established mutual aid agreements between municipalities for equipment.	Flooding, Winter Storms, Tornados	High	High	Low	High
Hales Corner							
	Enhance Emergency Response	Contractor List of equipment	Flooding, Winter Storms, Tornados	High	High	Low	High
	Enhance Emergency Response	Equipment list by municipality.	Flooding, Winter Storms, Tornados	High	High	Low	High
	Enhance Emergency Response	Pre-established mutual aid agreements between municipalities for equipment.	Flooding, Winter Storms, Tornados	High	High	Low	High
Milwaukee							
	Enhance Emergency Response	Contractor List of equipment	Flooding, Winter Storms, Tornados	High	High	Low	High
	Enhance Emergency Response	Equipment list by municipality.	Flooding, Winter Storms, Tornados	High	High	Low	High
	Enhance Emergency Response	Pre-established mutual aid agreements between municipalities for equipment.	Flooding, Winter Storms, Tornados	High	High	Low	High
	Reduce Impacts from Flooding	Sewer renovation	Flooding	High	High	High	High
	Reduce Impacts from Flooding	Dredging at Lincoln Park	Flooding	Medium	High	Medium	High
	Reduce Impacts from Flooding	More Frequent debris removal at Estabrook Park	Flooding	Medium	Medium	Low	Medium
	Reduce Impacts from Flooding	Acquire repetitive loss structures	Flooding	Low	High	High	Medium
Oak Creek							
	Enhance Emergency Response	Contractor List of equipment	Flooding, Winter Storms, Tornados	High	High	Low	High
	Enhance Emergency Response	Equipment list by municipality.	Flooding, Winter Storms, Tornados	High	High	Low	High
	Enhance Emergency Response	Pre-established mutual aid agreements between municipalities for equipment.	Flooding, Winter Storms, Tornados	High	High	Low	High
	Enhance Early Warning	Reverse 911	Flooding, Winter Storms, Tornados	High	High	Medium	High
	Reduce Impacts from Flooding	Installation of new culverts	Flooding	Medium	High	Medium	High
	Reduce Impacts from Flooding	Install wet detention ponds	Flooding	High	High	High	High
	Reduce Impacts from Flooding	Purchase houses in floodplain	Flooding	Low	High	High	Medium
	Reduce Impacts from Flooding	Maintain Storm Sewer Outlets	Flooding	High	High	Low	High
River Hills							
	Enhance Emergency Response	Contractor List of equipment	Flooding, Winter Storms, Tornados	High	High	Low	High
	Enhance Emergency Response	Equipment list by municipality.	Flooding, Winter Storms, Tornados	High	High	Low	High

TABLE 4-2

MILWAUKEE COUNTY COST/BENEFIT RANKING OF HAZARD MITIGATION PROJECTS

JURISDICTION	GOAL	HAZARD MITIGATION PROJECTS	HAZARDS MITIGATED	POPULATION IMPACTED	PROPERTY IMPACTED	PROJECT COST	COST/BENEFIT RANKING
	Enhance Emergency Response	Pre-established mutual aid agreements between municipalities for equipment.	Flooding, Winter Storms, Tornados	High	High	Low	High
	Reduce Impacts from Flooding	Acquire repetitive loss structures	Flooding	Low	Low	Medium	Low
Shorewood							
	Enhance Emergency Response	Contractor List of equipment	Flooding, Winter Storms, Tornados	High	High	Low	High
	Enhance Emergency Response	Equipment list by municipality.	Flooding, Winter Storms, Tornados	High	High	Low	High
	Enhance Emergency Response	Pre-established mutual aid agreements between municipalities for equipment.	Flooding, Winter Storms, Tornados	High	High	Low	High
South Milwaukee							
	Enhance Emergency Response	Contractor List of equipment	Flooding, Winter Storms, Tornados	High	High	Low	High
	Enhance Emergency Response	Equipment list by municipality.	Flooding, Winter Storms, Tornados	High	High	Low	High
	Enhance Emergency Response	Pre-established mutual aid agreements between municipalities for equipment.	Flooding, Winter Storms, Tornados	High	High	Low	High
	Enhance Emergency Response	Locating Vulnerable Facilities in GIS	Flooding, Winter Storms, Tornados	Low	Low	Low	Low
	Enhance Early Warning System	Replace or Repair Siren	Flooding, Winter Storms, Tornados	High	High	Low	High
	Enhance Early Warning System	Reverse 911	Flooding, Winter Storms, Tornados	High	High	Medium	High
	Reduce Effects of Coastal Erosion	Repair Slope Stability	Costal Erosion	Low	Low	Medium	Low
St Francis							
	Enhance Emergency Response	Contractor List of equipment	Flooding, Winter Storms, Tornados	High	High	Low	High
	Enhance Emergency Response	Equipment list by municipality.	Flooding, Winter Storms, Tornados	High	High	Low	High
	Enhance Emergency Response	Pre-established mutual aid agreements between municipalities for equipment.	Flooding, Winter Storms, Tornados	High	High	Low	High
Wauwatosa							
	Enhance Emergency Response	County wide emergency communication system	Flooding, Winter Storms, Tornados	High	High	Medium	High
	Enhance Emergency Response	Contractor List of equipment	Flooding, Winter Storms, Tornados	High	High	Low	High
	Enhance Emergency Response	Equipment list by municipality.	Flooding, Winter Storms, Tornados	High	High	Low	High
	Enhance Emergency Response	Pre-established mutual aid agreements between municipalities for equipment.	Flooding, Winter Storms, Tornados	High	High	Low	High
	Reduce Impacts from Flooding	Replacement of retaining wall on Blanchard Street pumping station.	Flooding	High	High	Medium	High
	Reduce Impacts from Flooding	Flood proofing of 3 repetitive loss structures.	Flooding	Low	Low	Medium	Low
West Allis							
	Enhance Emergency Response	Contractor List of equipment	Flooding, Winter Storms, Tornados	High	High	Low	High
	Enhance Emergency Response	Equipment list by municipality.	Flooding, Winter Storms, Tornados	High	High	Low	High
	Enhance Emergency Response	Pre-established mutual aid agreements between municipalities for equipment.	Flooding, Winter Storms, Tornados	High	High	Low	High
West Milwaukee							
	Enhance Emergency Response	Contractor List of equipment	Flooding, Winter Storms, Tornados	High	High	Low	High
	Enhance Emergency Response	Equipment list by municipality.	Flooding, Winter Storms, Tornados	High	High	Low	High
	Enhance Emergency Response	Pre-established mutual aid agreements between municipalities for equipment.	Flooding, Winter Storms, Tornados	High	High	Low	High
Whitefish Bay							
	Enhance Emergency Response	Contractor List of equipment	Flooding, Winter Storms, Tornados	High	High	Low	High
	Enhance Emergency Response	Equipment list by municipality.	Flooding, Winter Storms, Tornados	High	High	Low	High
	Enhance Emergency Response	Pre-established mutual aid agreements between municipalities for equipment.	Flooding, Winter Storms, Tornados	High	High	Low	High
	Reduce Impacts from Flooding	Stormwater capacity studies	Flooding	High	High	Medium	High
	Reduce Impacts from Flooding	Storm sewer replacement where needed	Flooding	Medium	Medium	High	Medium
	Reduce Impacts from Flooding	Storm sewer upgrades where needed	Flooding	Medium	Medium	Medium	Medium
	Reduce Impacts from Flooding	Update public information/ put on website	Flooding	High	Medium	Low	High

TABLE 4-2

MILWAUKEE COUNTY COST/BENEFIT RANKING OF HAZARD MITIGATION PROJECTS

JURISDICTION	GOAL	HAZARD MITIGATION PROJECTS	HAZARDS MITIGATED	POPULATION IMPACTED	PROPERTY IMPACTED	PROJECT COST	COST/BENEFIT RANKING
Milwaukee County							
	Enhance Emergency Response	Contractor List of equipment	Flooding, Winter Storms, Tornados	High	High	Low	High
	Enhance Emergency Response	Equipment list by municipality.	Flooding, Winter Storms, Tornados	High	High	Low	High
	Enhance Emergency Response	Pre-established mutual aid agreements between municipalities for equipment.	Flooding, Winter Storms, Tornados	High	High	Low	High
	Enhance Emergency Response	Migrate Special Facilities database from excel to internet application.	Flooding, Winter Storms, Tornados	High	High	Low	High
	Enhance Emergency Response	Include Public Works Department in County wide communication network.	Flooding, Winter Storms, Tornados	High	High	Low	High

POPULATION IMPACTED
High = > 50% of Jurisdiction residents
Medium = 20 to 50% of Jurisdiction residents
Low = < 20% Jurisdiction residents

PROPERTY IMPACTED & PROJECT COST
High = > $1,000,000
Medium = $500,000 to $1,000,000
Low = < $500,000

COST BENEFIT FORMULA
High = "5" for Population Impacted & Property
Medium = "3" for Population Impacted & Property
Low = "1" for Population Impacted & Property

COST/BENEFIT RANKING
High = 11 to 15
Medium = 6 to 10
Low = 0 to 5

TABLE 4-3
MILWAUKEE COUNTY HIGH PRIORITY
HAZARD MITIGATION PROJECTS

GOAL	HAZARD MITIGATION PROJECTS	HAZARDS MITIGATED	COUNTY PRIORITY	COST/BENEFIT RANKING
Enhance Emergency Response Systems	Contractor List of equipment	Fire, Flooding, Winter Storms, Tornadoes	High	High
Enhance Emergency Response Systems	Equipment list by municipality.	Fire, Flooding, Winter Storms, Tornadoes	High	High
Enhance Emergency Response Systems	Pre-established mutual aid agreements between municipalities for equipment.	Fire, Flooding, Winter Storms, Tornadoes	High	High
Enhance Emergency Response Systems	Include Public Works Department in County wide communication network.	Fire, Flooding, Winter Storms, Tornadoes	High	High
Enhance Emergency Response Systems	Migrate Special Facilities database from excel to internet application.	Fire, Flooding, Winter Storms, Tornadoes	High	High
Enhance Early Warning System	Repair or replace siren in South Milwaukee.	Fire, Flooding, Winter Storms, Tornadoes	High	High
Enhance Early Warning System	Purchase additional siren for the St. Martins area in Franklin	Fire, Flooding, Winter Storms, Tornadoes	High	High
Reduce Impacts from Flooding	Replacement of retaining wall on Blanchard Street pumping station.	Flooding	High	High

5.0 PLAN MAINTENANCE PROCEDURES

The Plan maintenance section of this document details the formal process that will ensure that the Milwaukee County Pre-Disaster Mitigation Plan remains an active and relevant document. The Plan maintenance process includes a schedule for monitoring and evaluating the Plan and producing a Plan revision every 5 years. This section describes how Milwaukee County will integrate public participation throughout the Plan maintenance process. Also included in this section is an explanation of how Milwaukee County government intends to incorporate the mitigation strategies outlined in this Plan into existing planning mechanisms.

5.1 MONITORING, EVALUATING AND UPDATING THE PLAN

The Milwaukee County Pre-Disaster Mitigation Plan will be reviewed at a minimum of once every 5 years, or as deemed necessary by knowledge of new hazards, vulnerabilities, or other pertinent reasons, and updated accordingly. The Plan review will identify new mitigation projects and evaluate the effectiveness of mitigation priorities and existing programs.

The Emergency Management Bureau Administrator will be responsible for scheduling a meeting of the Milwaukee County Board to review and update the Plan. The meeting will be open to the public and advertised in the local newspaper to solicit public input. The Board, assisted by the Emergency Management Bureau and the public, will review the goals and mitigation projects to determine their relevance to changing situations in the county, as well as changes in state or federal policy, and to ensure they are addressing current and expected conditions. The Board and the public will also review the risk assessment portion of the Plan to determine if this information should be updated or modified, given any new available data. The list of critical facilities will also be reviewed and enhanced with additional details. The Emergency Management Bureau Administrator will give a status report detailing the success of various mitigation projects, difficulties encountered, success of coordination efforts, and which strategies should be revised. The status report will be published in the local newspaper to update local citizens.

The Emergency Management Bureau Administrator will be responsible for the 5 year Plan update of the Plan, and will have 6 months to make appropriate changes to the Plan before submitting it to the Board and public for review and approval. Before the end of the 5-year period, the updated Plan will be submitted to the State Hazard Mitigation Officer and FEMA for acceptance. The Emergency Management Bureau Administrator will notify all holders of the county Plan when changes have been made.

5.2 IMPLEMENTATION THROUGH EXISTING PROGRAMS

Milwaukee County will have the opportunity to implement hazard mitigation projects through existing programs and procedures. Local officials will work with the County departments to ensure hazard mitigation projects are consistent with planning goals and integrate them, where appropriate.

Meetings of the Board will provide an opportunity for local officials to report back on the progress made on the integration of mitigation planning elements into county planning documents and procedures.

5.3 CONTINUED PUBLIC INVOLVEMENT

Milwaukee County is dedicated to involving the public directly in review and updates of the Pre-Disaster Mitigation Plan. The public will have many opportunities to provide feedback about the Plan. Copies of

the Plan will be catalogued and kept at all appropriate agencies in the county, as well as at the public library. The existence and location of these copies will be publicized in the local newspapers. Section 2.0 of the Plan includes the address and the phone number of the Emergency Management Bureau Administrator responsible for keeping track of public comments on the Plan.

A series of public meetings will also be held prior to each 5-year update, or at lesser intervals when deemed necessary by the Emergency Management Bureau Administrator. The meetings will provide the public a forum for which they can express their concerns, opinions, or ideas about the Plan. The Emergency Management Bureau Administrator will be responsible for using county resources to publicize the annual public meetings and maintain public involvement through the newspapers and radio.

6.0 REFERENCES

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APPENDIX A

LETTERS AND RESOLUTIONS

Milwaukee County Wisconsin
Pre-Disaster Mitigation Plan

APPENDIX B

PLANNING DOCUMENTATION

Milwaukee County Wisconsin
Pre-Disaster Mitigation Plan

- *Milwaukee County Contact List*
- *List of Stakeholder Interviews/Meetings*
- *Copy of Press Release and Media Contact List*
- *Public Meeting Sign-In Sheet and Summaries*

Milwaukee County Contact List - Pre - Disaster Mitgation Plan

Jurisdiction	Title	Name	Address	Zip Code	Phone Number	E-mail
City of Cudahy	Health Officer	Carol Wantuch	5050 South Lake Drive	53110-6106	414-769-2239	wantuchc@ci.cudahy.wi.us
City Oak Creek	Health Officer, Oak Creek Health Department	Debbie Schier	8640 South Howell Ave	53154	414-768-6525	Dschier@oakcreekwi.org
City of Milwaukee	American Red Cross	April EagleBoy	The American Red Cross	53288-0711	262-970-7450	eagleboya@usa.redcross.org
City of South Milwaukee	Health Officer, South Milwaukee Health Department	Jackie Ove	2424 15th Ave.	53172	414-762-1965	ove@ci.south-milwaukee.wi.us
Milwaukee County	Milwaukee County Emergency Management	Carl Stenbol	821 West State Street, Rm304	53233	414-278-4709	cstenbol@milwcnty.com
Milwaukee County	Milwaukee County Emergency Management	Rick Hetchler	821 West State Street, Rm304	53233	414-278-4709	rhetchler@milwcnty.com
South East Region WEM	SE Region WEM	Patrick J. O'Conner	21115 Highway 18	53186	262-782-1515	emseo@execpc.com
City of Wauwatosa	Wauwatosa Fire Department	Patrick Nook	1462 Underwood Avenue	53213	414-471-8489	pnook@wauwatosa.net
City of Wauwatosa	Wauwatosa Fire Department	Dean Redman	1463 Underwood Avenue	53213	414-471-8490	dredman@wauwatosa.net
City of St.Francis	St.Francis Fire Department	Frank Lockwood	4235 S. Nicholson Ave	53235	481-2232	FrankI@StFranwi.us
City of Glendale	Glendale Police	Mark Ferguson	5909 N. Milwaukee River Pkwy	53209	414-228-1100	M.ferguson@glendale-wi.org
Village of Hales Corner	Captain Hales Corner Police	Kent Bieganski	5635 S. New Berlin Rd	53130	529-6140	kbieganski@hcpd.net
Village of River Hills	River Hills Village MGN	Tom Tollansen				ttollansen@AOL.com
Village of Bayside	Director of Public Works	Robert Bina	9075 N. Regent Road	53217	414-247-7711	dpw@village.bayside.wi.us
City of Oak Creek	Fire Chief/Em Director	Jerry Hammernik	3950 E. Oakwood Road	53154	414-570-5620	ghammernik@oakcreek.wi.org
City of Greenfield	Fire Chief/Em Director	Roland Poppy	4333 S. 92nd St.	53228	414-545-7946	Roland_p@ci.greenfield.wi.us
City of Milwaukee	Lieutenant Milwaukee Fire Department	Robert Delgadillo	711 West Wells Street	53233-1403	414-286-8948	rdlega@milfire.com
Village of West Milwaukee	Sergeant West Milwaukee	Richard Durica	4755 W. Beloit Road	532214	414-645-2153	richard.dunica@westmilwaukee.org
Village of Brown Deer	Lieutenant Brown Deer Police Department	George King	4800 West Green Brook Drive	53223	414-371-2900	gking@vil.brown-deer.wi.us
Village of Brown Deer	Assistant Village Manager of Brown Deer	Anoy Pederson	4800 West Green Brook Drive	53223	414-371-3050	apederson@vil.brown-deer.wi.us
Village of Fox Point	Chief of Police/Fox Point	Tom Czaja	7300 N. Santa Monica Blvd	53217	414-351-8911	tczaja@vil.fox-point.wi.us
Village of White Fish Bay	Whitefish Bay Police Department	Ron Sudfeld	5300 N. Marlborough Dr	53217	414-962-3830	rsudfeld@vilwhitefishbayWI.org
Village of Greendale	Director Greendale Department of Public Works	Carl Tisonik	6351 Industrial Loop	53129	414-423-2133	govldpw@execpc.com
Village of Greendale	Chief of Police/Greendale	Rob Dams	5911 West Grange Ave	53129	414-423-2121	robdams@yahoo.com
Village of Greendale	Lieutenant Greendale Police	Randy Pruss	5912 West Grange Ave	53129	414-423-2122	randy8852@yahoo.com
Village of Greendale	Chief Greendale fire Department	Gary Fedder	6200 W. Loomis Road	53129	414-423-2131	gfedder@greendale.org
City of West Allis	West Allis Fire Department	Martin M. King	7332 W. National Aveneue	53214	414-302-8900	mking@ci.west-allis.wi.us
North Shore	Deputy Chief North Shore Fire Department	Charlie Myers	4401 W River Lane	53223	357-0113	cmyers@nsfire.org
Village of Shorewood	Shorewood Health Department	Cynthia Tomasello	3930 N. Murray Ave.	53211	414-847-2710	ctomasello@villageofshorewood.org

MILWAUKEE COUNTY
PRE-DISASTER MITIGATION PLAN

STAKEHOLDER INTERVIEW/MEETING LIST

Date	*Persons*	*Affiliation*	*Purpose*
April 15, 2004	Carol Wantuch	City of Cudahy	Project overview, hazard review, possible mitigation projects
April 15, 2004	Debbie Schier Jerry Hammernik	City Oak Creek	Project overview, hazard review, possible mitigation projects
April 15, 2004	April EagleBoy	City of Milwaukee	Project overview, hazard review, possible mitigation projects
April 15, 2004	Jackie Ove Robert Delgadillo	City of South Milwaukee	Project overview, hazard review, possible mitigation projects
April 15, 2004	Carl Stenbol Rick Hetchler	Milwaukee County	Project overview, hazard review, possible mitigation projects
April 15, 2004	Patrick J. O'Conner	South East Region WEM	Project overview, hazard review, possible mitigation projects
April 15, 2004	Patrick Nook Dean Redman	City of Wauwatosa	Project overview, hazard review, possible mitigation projects
April 15, 2004	Frank Lockwood	City of St.Francis	Project overview, hazard review, possible mitigation projects
April 15, 2004	Mark Ferguson	City of Glendale	Project overview, hazard review, possible mitigation projects
April 15, 2004	Kent Bieganski	Village of Hales Corner	Project overview, hazard review, possible mitigation projects
April 15, 2004	Tom Tollansen	Village of River Hills	Project overview, hazard review, possible mitigation projects
April 15, 2004	Robert Bina	Village of Bayside	Project overview, hazard review, possible mitigation projects
April 15, 2004	Roland Poppy	City of Greenfield	Project overview, hazard review, possible mitigation projects
April 15, 2004	Richard Durica	Village of West Milwaukee	Project overview, hazard review, possible mitigation projects

April 15, 2004	George King Anoy Pederson	Village of Brown Deer	Project overview, hazard review, possible mitigation projects
April 15, 2004	Tom Czaja	Village of Fox Point	Project overview, hazard review, possible mitigation projects
April 15, 2004	Ron Sudfeld	Village of White Fish Bay	Project overview, hazard review, possible mitigation projects
April 15, 2004	Carl Tisonik Rob Dams Randy Pruss Gary Fedder	Village of Greendale	Project overview, hazard review, possible mitigation projects
April 15, 2004	Martin M. King	City of West Allis	Project overview, hazard review, possible mitigation projects
April 15, 2004	Charlie Myers	North Shore	Project overview, hazard review, possible mitigation projects
April 15, 2004	Cynthia Tomasello	Village of Shorewood	Project overview, hazard review, possible mitigation projects
June 10, 2004	Bill Kappel	Wauwatosa Director of Public Works	Project overview, hazard review, possible mitigation projects
June 11, 2004	Jim Wojoehowicz	Wauwatosa Water Department	Project overview, hazard review, possible mitigation projects

MILWAUKEE COUNTY HAZARD MITIGATION PROJECT
SUMMARY OF THE WAUWATOSA LIBRARY PUBLIC MEETING
CITY OF WAUWATOSA
6:00 PM MONDAY MAY 24, 2004

HISTORIC DISASTERS

The List of federal and state disasters declarations was presented. Public input was requested on additional historic hazards in the area. No additional weather disasters were identified.

CRITICAL FACILITIES & VULNERABLE POPULATIONS

No additional Facilities or Vulnerable Populations to add.

MITGATION GOAL & PROPOSED MITIGATION PROJECTS

None Given

OTHER CONCERNS

Informed of the Milwaukee County Excessive Heat Plan

MILWAUKEE COUNTY HAZARD MITIGATION PROJECT
SUMMARY OF THE BROWN DEER PUBLIC LIBRARY PUBLIC MEETING
VILLAGE OF BROWN DEER
10:30 AM TUESDAY MAY 25, 2004

HISTORIC DISASTERS

The List of federal and state disasters declarations was presented. Public input was requested on additional historic hazards in the area. No additional weather disasters were identified.

CRITICAL FACILITIES & VULNERABLE POPULATIONS

Public meeting participants identified the following critical facilities/Vulnerable populations, in addition to those listed in the FEMA and Milwaukee County Special Facilities Database.

- West Allis Fire Station #1
- West Allis Fire Station #3
- West Allis Fire Department Administration Building
- Cassy's Family Day Care, West Allis
- Cathy Littlest Angels, West Allis
- Debbies Den, West Allis
- 107th Street House, West Allis
- Jubilee, West Allis
- Next Step in Community Living 10303 W Manitoba St, West Allis
- Nest Step in Community Living 98th St, West Allis
- Options for Community Growth, West Allis
- My School, West Allis
- Little Learner Pre-School, West Allis
- First class Child Care Center, West Allis
- First Unitied Methodist Church Pre Palymates, West Allis
- Karen's Kids Family Day Cate, West Allis
- Kids Just Want to Have Fun, West Allis
- Kinder Care Learning Centers, West Allis
- Klose Family Day Care, West Allis
- The Learning Years, West Allis
- Little Learners Nursery School, West Allis
- My School, West Allis
- Luv-n-Hugs Family Child Care, West Allis
- Magical Memories Home Child Care, West Allis
- Milwaukee School of Arts Enrichment Center, West Allis
- Mt. Calvary's Kids Come First, West Allis
- Nanny's Nursery, West Allis
- SDC HeadStart 2354 S 61st Street, West Allis
- Small Treasures Children's Center 1210 S 61st St, West Allis
- Small Treasures Children's Center 1302 S 60th St, West Allis
- Trinity Evangelical Lutheran Church Early Child Care, West Allis
- Brotoloc West Allis, West Allis
- Crestview IA, West Allis
- Ohio House, West Allis
- Village at Manor Park, West Allis
- West Allis Castle, West Allis
- West park Place, West Allis

Changes to Milwaukee County critical facility list

- Omit West Allis Police Station at 11301 W Lincoln
-

MITGATION GOAL & PROPOSED MITIGATION PROJECTS

None given

MILWAUKEE COUNTY HAZARD MITIGATION PROJECT
SUMMARY OF THE RED CROSS HEADQUARTERS PUBLIC MEETING
CITY OF MILWAUKEE
6:OO PM TUESDAY MAY 25, 2004

No Attendance

MILWAUKEE COUNTY HAZARD MITIGATION PROJECT
SUMMARY OF THE FRANKLIN PUBLIC LIBRARY PUBLIC MEETING
CITY OF FRANKLIN
1:OO PM WEDNESDAY MAY 26, 2004

HISTORIC DISASTERS

The List of federal and state disasters declarations was presented. Public input was requested on additional historic hazards in the area. No additional weather disasters were identified.

CRITICAL FACILITIES & VULNERABLE POPULATIONS

Public meeting participants identified the following critical facilities/vulnerable populations, in addition to those listed in the FEMA and Milwaukee County Special Facilities Database.

- Oak Creek fire Station #2
- Oak Creek Power Plant
- CBRF Facility, Oak Creek
- Meadow Mere Elderly Complex, Oak Creek
- Mitchell Manor Assisted Living, Oak Creek
- Centennial Park Elderly, Oak Creek
- The Cornerstone Elderly Care, Oak Creek
- Booth Manor Elderly, Oak Creek
- The Courts Elderly, Oak Creek
- Lake Forest Apartments, Oak Creek

Changes to Milwaukee County critical facility list

- Change Address of Oak Creek Police Department to 301 W Ryan Rd

MITGATION GOAL & PROPOSED MITIGATION PROJECTS

1) Enhance Emergency Warning Capabilities
   - Add new siren at St Martins in Franklin
   - Reverse 911 for Franklin, Oak Creek and South Milwaukee
   - Enhance or repair siren in South Milwaukee

2) Enhance Emergency Response System
   - Locate Vulnerable Facilities in GIS for South Milwaukee

MILWAUKEE COUNTY HAZARD MITIGATION PROJECT
SUMMARY OF THE CUDAHY PUBLIC LIBRARY PUBLIC MEETING
CITY OF CUDAHY
6:00 PM WEDNESDAY MAY 26, 2004

No Attendance

MILWAUKEE COUNTY HAZARD MITIGATION PROJECT
SUMMARY OF THE LINCOLN PARK PUBLIC MEETING
CITY OF MILWAUKEE
2:OO PM WEDNESDAY JUNE 9, 2004

HISTORIC DISASTERS

The List of federal and state disasters declarations was presented. Public input was requested on additional historic hazards in the area. No additional weather disasters were identified.

CRITICAL FACILITIES & VULNERABLE POPULATIONS

No additions or changes.

MITGATION GOAL & PROPOSED MITIGATION PROJECTS

1) Reduce the Impacts of Flooding
   - Renovate Sewers
   - Dredging of Milwaukee River at River Park
   - More frequent debris pick up at Estrabrook Park

David A. Clarke, Jr.
Sheriff

County of Milwaukee

Office of the Sheriff

May 17, 2004

Tim Tarras
Maxim Technologies, Inc.
555 South 72nd Avenue
Wausau, WI 54401

Dear Mr. ~~Tarras~~ Tim:

Included with this fax is a copy of the fax that went out to the local media here in Milwaukee County. Also included is a list of those outlets that this fax went to. As you can see, it went out to the four main TV stations in the local area, along with the Business Journal, the Community Newspapers, the Milwaukee Journal, the Milwaukee Labor Press, and a periodical called This Week.

If you need anything more concerning this fax, please let me know.

Sincerely,

Rick Hetchler

Rick Hetchler
Municipal Emergency Services Coordinator

Approved by:

Carl Stenbol
Administrator

RH/rh

0015

MILWAUKEE COUNTY
SHERIFF'S OFFICE

OFFICE OF THE SHERIFF
821 WEST STATE STREET
MILWAUKEE, WISCONSIN 53233
PHONE: (414) 278-4700
WEBSITE: http://www.mkesheriff.org

David A. Clarke, Jr.
Sheriff

NEWS RELEASE

Contacts:
Carl Stenbol
Rick Hetchler
Emergency Mgmt Bureau
Office: (414) 278-4709
Email: MCSOEM@milwcnty.com

May 14, 2004

For Immediate Release

Milwaukee County Emergency Management Schedules

Public Meetings For Disaster Mitigation Planning

Residents of Milwaukee County have an opportunity to participate in the development of a Pre-Disaster Mitigation Plan that will reduce the impact on the community if a disaster strikes. Five Public Meetings have been scheduled throughout the County to allow for public participation in plan development. Milwaukee County is vulnerable to a wide range of hazards. Natural hazards such as floods, tornadoes, and storms have caused injuries, loss of life, disruption of services, and property damage. Technological Hazards can cause man-made disasters at industrial or commercial facilities that use, store, or produce hazardous materials. Transportation (highway, railroad, pipelines and airlines) related incidents may cause a hazardous materials emergency that may include exposure to chemicals, explosions, major fires and environmental contamination.

The first phase of developing a Pre-Disaster Mitigation Plan involves a "risk assessment." Understanding the community's "vulnerability" is the second phase of the planning process. The final phase of the Pre-Disaster Mitigation Plan involves identifying specific projects that will reduce the effect of known hazards. Projects may include floodwater retention ponds, flood control structures and developing strategies to minimize danger from known hazards. The Federal Emergency Management Agency (FEMA) can fund up to 75% of the costs of hazard mitigation projects for a County that has an approved Pre-Disaster Mitigation Plan.

Please plan to attend one of the scheduled meetings below and share your ideas with the planning team. We will discuss what types of disasters have occurred in the past? What damage occurred and where? Could it occur again? What damage would it cause now? What's the most serious hazard in the area? What types of facilities are located in the hazard area and how much would it cost to replace them? And what types of new facilities being planned in the area and how much would it cost to replace them?

May 24th 6:00PM (Monday): Wauwatosa Public Library, Firefly Room, 7635 W. North Avenue, Wauwatosa, WI 53213
May 25th 10:30AM (Tuesday): Brown Deer Public Library, 5600 W. Bradley Rd., Brown Deer, WI 53223
May 25th 6:00PM (Tuesday): Red Cross Headquarters, 2600 W. Wisconsin Ave., Milwaukee, WI 53233
May 26th 1:00PM (Wednesday): Franklin Public Library*, 9151 W. Loomis Rd., Franklin, WI 53132
May 26th 6:00PM (Wednesday): Cudahy Public Library, 3500 Library Drive, Cudahy, WI 53110

*This event is not sponsored by the Franklin Public Library.

- 30 -

Milwaukee County Office of the Sheriff
Emergency Management Bureau
Public Meeting For Disaster Mitigation Planning Scheduled

Residents of Milwaukee County have an opportunity to participate in the development of a Pre-Disaster Mitigation Plan that will reduce the impact on the community if a disaster strikes. A Public Meeting has been scheduled to allow for public participation in plan development. Milwaukee County is vulnerable to a wide range of natural hazards.

The first phase of developing a Pre-Disaster Mitigation Plan involves a "risk assessment." Understanding the community's "vulnerability" is the second phase of the planning process. The final phase of the Pre-Disaster Mitigation Plan involves identifying specific projects that will reduce the effect of known hazards. Projects may include floodwater retention ponds, flood control structures and developing strategies to minimize danger from known hazards. The Federal Emergency Management Agency (FEMA) can fund up to 75% of the costs of hazard mitigation projects for a County that has an approved Pre-Disaster Mitigation Plan.

Please plan to attend the meeting listed below and share your ideas with the planning team. We will discuss what types of disasters have occurred in the past? What damage occurred and where? Could it occur again? What damage would it cause now? What's the most serious hazard in the area? What types of facilities are located in the hazard area and how much would it cost to replace them? And what types of new facilities are being planned in the area and how much would it cost to replace them? Please refer any questions to the Emergency Management Office at 278-4709.

MEETING DATE AND LOCATION

Wednesday, June 9, 2004, 2PM – 4PM, Blatz Pavilion in Lincoln Park, 1301 W. Hampton Avenue, Milwaukee, WI

June 6, 2004
Milwaukee
Journal/Sentinel

1 hour N. of Milwaukee JB Realty (920)876-3357

Bar & Grill NW Milwaukee, Must See! Too Many updates to list! Turn-key $275,000 (414)303-9414

Cabinet (Custom)/ Woodworking Shop in Central WI. $275,000 (920)913-6498

Carpet Cleaning Van 1991 Chevrolet 1 ton, low miles, truck mount Hydramaster 4.6, C.D.S. $7800 OBO. (414)329-7360

CARWASHES: 14 LOCS Full service & Self serve PAUL 920-836-2415

CATERING High profit, Gross Sales $1,000,000+. Owner retiring. Greg FNBC 979-0900

CELLULAR PHONE STORE: Eastside, prime location, near UWM, heavy traffic must sell... (414)324-5744

CHILD DEVELOPMENT Growing Franchise. Great suburban location. Gary FNBC 414-979-0900

great history, profitable. Steve FNBC 414-979-0900

LANDSCAPING Commercial Accounts. Many Contracts. RE Incl. Steve FNBC 414-979-0900

MACHINE SHOP Business is Booming! Niche market. RE included Greg FNBC 414-979-0900

MARTINI BAR Trendy downtown location. Net $500k +. Call Steve FNBC 414-979-0900

MOTEL - 1 hour north of Milwaukee. Turn-key operation. 17 rooms + living quarters. Excellent Condition. $239,000 JB REALTY 920-876-3357

National Automotive Franchise Turn-Key operating center w/employees avail. in Milwaukee area. No prior exp. needed. Free brochure. 1-800-935-8863

OFFICE & Rental space. 7630 W. Center St. Great location! 5 BR, 2.5 BA, $224,900. Call for more details 262-695-9130.

BAR SHOP Business equipment contracts. $115K/obo Call Jeff at 262-255-0970

TAVERN--GRILL Bourside near Allen Bradley clock tower, seats 54, great food! Kujath & Assoc., Inc. 414-453-3434

Vacuum Cleaner & Carpet Store Waukesha since 1973, low rent! Retiring 414-771-4972

175 Legal Notices

Milwaukee County Office of the Sheriff Emergency Management Bureau

Public Meeting For Disaster Mitigation Planning Scheduled

Residents of Milwaukee County have an opportunity to participate in the development of a Pre-Disaster Mitigation Plan that will reduce the impact on the community if a disaster strikes. A Public Meeting has been scheduled to allow for public participation in plan development. Milwaukee County is vulnerable to a wide range of natural hazards.

The first phase of developing a Pre-Disaster Mitigation Plan involves a "risk assessment." Understanding the community's "vulnerability" is the second phase of the planning process. The final phase of the Pre-Disaster Mitigation Plan involves identifying specific projects that will reduce the effect of known hazards. Projects may include floodwater retention ponds, flood control structures and developing strategies to minimize danger from known hazards. The Federal Emergency Management Agency (FEMA) can fund up to 75% of the costs of hazard mitigation projects for a County that has an approved Pre-Disaster Mitigation Plan.

Please plan to attend the meeting listed below and share your ideas with the planning team. We will discuss what types of disasters have occurred in the past? What damage occurred and where? Could it occur again? What damage would it cause now? What's the most serious hazard in the area? What types of facilities are located in the hazard area and how much would it cost to replace them? And what types of new facilities are being planned in the area and how much would it cost to replace them? Please refer any questions to the Emergency Management Office at 278-4709.

MEETING DATE AND LOCATION

Wednesday, June 9, 2004, 2PM - 4PM, Blatz Pavilion in Lincoln Park, 1301 W. Hampton Avenue, Milwaukee, WI

the claim as provided by Title 18, United States Code, Section 983(a)(4)(A) and Rule C of the Supplemental Rules for Certain Admiralty and Maritime Claims or suffer entry of judgment by default.

Additional procedures and regulations regarding this forfeiture action are found at 19 U.S.C. §§1602-1619. All persons and entities who have an interest in the defendant properties may, in addition to filing a claim or in lieu of the filing of a claim, submit a Petition for Remission or Mitigation of the forfeiture for a non-judicial determination of this action pursuant to 28, C.F.R. Part 9.

Steven M. Biskupic, United States Attorney, 530 Federal Building, 517 East Wisconsin Avenue, Milwaukee, Wisconsin 53202, telephone 414/297-1700, Attorney for Plaintiff.

MILWAUKEE COUNTY DEPARTMENT OF HUMAN SERVICES REQUEST FOR PROPOSALS

The Milwaukee County Department of Health and Human Services Delinquency and Court Services Division is requesting proposals from qualified agencies and organizations to participate in the Request for Proposal (RFP) process for the Firearms Program.

Application materials will be available for pick-up beginning Monday, June 14, 2004 at the Milwaukee County Children's Court Center reception desk, 10201 West Watertown Plank Road, Wauwatosa, WI 53226. Completed applications in response to the RFP must be received at the above address no later than 4:30 p.m., Monday, August 2, 2004.

A public RFP information session will be held on Thursday, June 24, 2004 from 3 p.m. to 4:30 p.m. in room 1268 of the Children's Court Center, 10201 West Watertown Plank Road, Milwaukee, WI 53226.

PRIVATE INDUSTRY COUNCIL OF MILWAUKEE COUNTY

Announces a Meeting of its Board of Directors to be held at Noon on Tuesday, June 8, 2004 Youth Services Bldg. 2342 N 27th St. Milwaukee, WI 53210

If you have questions regarding the meeting, please call (414) 225-2360 Disabled persons needing accommodation should call the number listed above as soon as possible. The agenda and packet are available for public review at the Private Industry Council.

NOTE: Pursuant to the Wisconsin open meetings law, Wis. Stat. Section 19.85 (1), the Committee reserves the right to go into closed session to discuss personnel matters which require secrecy.

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MUCH MORE
Please Call Julie's 414-649-2940
References Available

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All old plastic models. Monster figures, military, planes, ships by Aurora, Revell, etc (414)481-7706

APPLIANCES Cash paid, working or not! We Pick Up (414)305-6844

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BOOKS Hardcover, ... back, fiction/non-..., magazines, bought-sold 12-7 Mon.-Fri.; 12-5 Sat. Renaissance Books, 8344 N Plankinton 271-6850

BUYING bats, jerseys, Braves, Brewers, Bucks, Packers. Older Sports Illustrated magazines... 4034 W National 672-7777

BUYING Diamonds, Jewelry, Silver, and Gold Coins Derzon Coin Co. 2069 S. 108 St. 543-88333

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PUBLIC MEETING SIGN-IN SHEET

Meeting Location: Wauwatosa Library **Date:** May 24, 2004

Name	~~Address~~ Affiliation	Phone/email
Rick Hetchler	MILW CO.	414.278.4709

PUBLIC MEETING SIGN-IN SHEET

Meeting Location: BROWN DEER LIBRARY **Date:** 5/25/04

Name	Address	Phone/email	AFFILIATION
Gary Streicher	7332 W. National	gstreicher@ci.west-allis.wi.us 414-302-8902	West Alli Fire Dep

PUBLIC MEETING SIGN-IN SHEET

Meeting Location: Red Cross Headquarters **Date:** 5/25/04

Name	Address	Affiliation	Phone/email

PUBLIC MEETING SIGN-IN SHEET

Meeting Location: FRANKLIN LIBRARY **Date:** 5/26/04

Name	Address	Phone/email	AFFILIATION
Tami Mayzik	South Milw 2424 15th Ave	414/768-8047	South Milw
Tom Rosandich	7000 S. 6th St Oak Creek	414/768-6554	Oak Creek
Dan Mayer	8901 W. Drexel Av. Frankl.	414/425-1420	Franklin
James Martins	" " "	" "	"

PUBLIC MEETING SIGN-IN SHEET

Meeting Location: CUDAHY PUBLIC LIBRARY **Date:** 5/26/04

Name	Address	Phone/email	AFFILIATION

PUBLIC MEETING SIGN-IN SHEET

Meeting Location: MTK LINCOLN PARK COMMUNITY CENTER MILWAUKEE **Date:** 6/9/04

Name	Address	Affiliation	Phone/email
Calvin Glenn	3863 N 44st		(414)873-6316
Stephanie Willa	6435 N Teutonia		414 247-1878
Barbara Alexander	3863 North 44		(414)873-6316
Shirley Galbreath	5714 N 99th		(414)535-7263
LISA PEARS	9047 N 75th #G		(414) 365-3138
Ahoma Galbreath	4405 W Spencer PL.		(414) 447-7412
David Guyton	5061 N. 53rd street		(414) 393-1146
Catherine Vickers	2115 W. Villard Ave		(414) 536-1118
Tracy Merriett	2107 W. Villard Ave		414-393-0825
Mildred Turner	5104 N. 19th PLACE	Sew Backup	(414) 228-0797
Bill [illegible]	7725 W. [illegible]	City of Wauwatosa	414-479-3533

PUBLIC MEETING SIGN-IN SHEET

Meeting Location: ____________________ **Date:** ____________________

Name	Address	Affiliation	Phone/email
Kattie Murph[illegible]	1555 W. Chambers		263-7011
Sandy Johnson	4191 N. 14th St.	N.S. Church of God	(414)372-6612
Enoch Dukes	4200 N. 15th St.	"	"
Napoleon White	5044 N. 19th St.	St Mark AME Church	(414) 228-8804
[illegible]	5043 N 19 St		228-1557

Special Event

Neighborhood Strategic Planning SEWER BACK-UP

Lincoln Park Community Center, Inc.
P. O. Box 090225

Lincoln Park Community Center, Inc.

MONTH JUNE 9 **Community** Sign-in Sheet CDBG Milwaukee 2004

	Name	Address	Phone	Date	Purpose
1	Larry O. McClarin	1054 W. Silver Spring	616-0547	6/9/04	
2	Sylvia Ortiz for Matt Fly	2223 S. 59th Alis West	628-7343	6/9/04	Matt Flynn
3	Willie Johnson Jr.	3869 N Humboldt Blvd, 206	962-8856	6/9/04	County Supervisor
4	Connie Kruse	1437 W. Lawn Ave	228-6799	6/9/04	Meeting
5	[illegible]	1503 W. Lawn Ave	228-1183	6/9/04	Meeting
6	[illegible] Benker				
7	Joseph C. Henderson	1631 W Custer	352-4474	6/9/04	Meeting
8	Ashanti Hamilton	200 E. Wells	286-2228	6/9/04	mtg
9	LYNN BURKS	5051 N. 19th St	351-8443	6/9/04	Flooding
0	CASSANDRA BARNES	5020 N. 19th ST.	228-9478	6-9-04	FLOOD
11	Johnnye P. Barnes	5020 N. 19th St	228-9478	6-9-04	Flooding
12	Ronald + Amy Brown	5105 N 19th	228-8580	6-9-04	Flooding
13	Lisa Turner	6700 N. 78th	278-4209	11	Milw. Co. E.M.
14	Bob Bina	9075 N. Regent Rd	247-7711	11	Bayside DPW
15	Cynthia Minott	5200 No 57th	461-1655	11	
16	[illegible] Knight	5043 N 19th St	247-0159		Flooding
17	[illegible]	5043 N 19th St	247-0159		Flooding
18	David Townsend	3050 N 39	(414) 732-5982	6-9-04	FLOODING
19	Monty Shadd for Supervisor White	Court House	278-4257	6-9-04	County Supervisor
20	Sandra Glenn	4137 N. 102 st.	462372[illegible]	6/9/04	flooding
21	Annette McLaughlin	4207 W. Birch	461-2605	6/9/04	flooding
22					

Special Event — Neighborhood Strategic Planning — SEWER BACK-UP

1301 West Hampton Avenue
Milwaukee, WI 53209

Lincoln Park Community Center, Inc.

MONTH. JUNE 9 Community Sign-in Sheet — CDBG Milwaukee 2004

	Name	Address	Phone	Date	Purpose
1	Mildred Turner	5104 N. 19th Place	(414) 228-0797	6/9/04	Sew Back Up
2	Kathy Snyder	5104 N. 19th Place	(414) 228-0797	6/9/04	Sew Back up
3	Gertrude Spivey	1914 W Eggert Pl	(414) 228-1499	6-9-04	Sew Back up
4	Barbara Sanders	3863 N 44 St	8736316		
5	Shirley Galbreath	5714 N 99th	(414) 535-7263	6-9-04	Sew Back Up
6	Stephanie Williams	6935 N Teutonia	414-247-1878	6-9-04	Sew Back Up
7	Thomas Galbreath	4405 W Spencer Pl.	414-447-7412	6-9-04	Sew Back Up
8	LISA FEARS	9042 N 75th St Ct	414 365-3138	6-9-04	SEW BACK UP
9	Calvin Glenn	3863 N 44th St	414-873-6316	6-9-04	Sew-Back up
0	Doe Mayes	1962 W Hampton		6-9-04	
11	Carl Curtis	MCSO EMB	414-278-4709		
12	Rick Hatchler	MCSO/EMB	"	6-9-04	Mitigation
13	Jim Tarras	MAXIM TECHNOLOGIES	715-895-9100	6-9-04	PREDISASTER MITIGATION PLAN
14	Tracy Merriett	2107 W. Villard Ave	414-393-0825	6-9-04	Sew Back up
15	Katherine Vickers	2115 W Villard Ave	414 536-4187	6/9/04	Sew Back up
16	Enoch Dukes	4200 N. 15	(414) 265-3275	6/9/04	Information
17	Sandy L. Johnson	4191 N. 14th St.	(414) 265-2274	6/9/04	Information
18	Kathie Murphy	1555 W. Chambers	263-7011	6-9-04	
19	Hopeson White	5046 N 19th St	228-8804	6-9-04	Sew Back up
20	Juliette Montgomery-Colbert	4863 N. 19th Place	372-0516	6/9/04	Information
21	Jim Wojciechowicz	7725 W. North Ave	479-8965	6-9-04	City of Wauwatosa
22	JOE WHITES	749 W STATE	933-7200	6-9-04	Mil P.D.
23	Dan Smith	1907 W Eggert Pl	221-7316	6/9/04	

APPENDIX C

RELEVANT PLANS AND DOCUMENTS

Milwaukee County Wisconsin
Pre-Disaster Mitigation Plan

MILWAUKEE HEALTH DEPARTMENT and MILWAUKEE HEAT TASK FORCE

PLAN FOR EXCESSIVE HEAT CONDITIONS 2004

GOAL

To reduce the incidence of morbidity and mortality associated with extreme heat events.

SPRING 2004

ROLES AND RESPONSIBILITIES

CITY OF MILWAUKEE HEALTH DEPARTMENT (MHD) WILL:

1. Bring together Task Force partners involved in heat response for a meeting to update the Heat Plan based on changes in capacities or learned strategies.
2. Distribute the updated Heat Plan to all Heat Task Force participants and to other agencies in the county.
3. Prepare and distribute a resource list specific to Milwaukee County regarding heat preparedness with local contacts for information or assistance. Partner organizations should feel free to duplicate and distribute this at will, or alter it for special needs.
4. Update contact lists and test broadcast fax capability for informing Heat Task Force partners of Heat Health Notices and prepare format of notification in advance.
5. Prepare and test Hot Line (286-3616) capability to include:
    1) after-hours continuity (recorded information line and City Hall Operator: 286-2150 or 286-3200)
    2) capacity to handle incoming traffic loads
    3) separate health professional access fax line (286-5164)
    4) capacity to transfer to another site if needed (e.g., County Emergency Management Command Center)
6. Update and maintain media contact list.
7. Prepare a list or map of congregate cooling sites (including public access sites such as shopping malls) that includes typical hours of operation and, when known, accessibility to disabled persons, for dissemination in a Heat Health Notice.

IMPACT WILL:

Provide 24-hour referral service.

DEPARTMENT ON AGING and INTERFAITH WILL:

1. Establish and promote the Gatekeeper Program and ELDERLINK phone line to sensitize and educate citizens who are routinely in contact with the elderly to their special needs and how to assist them in getting them addressed during heat health events.
2. Promote the enrollment of isolated elderly (especially among clients of agencies serving at-risk populations) into their telephone reassurance check-in system.
3. Assist MHD in outreach to elder day care, nutrition and home health services.

AGENCIES SERVING AT-RISK POPULATIONS, including but not limited to: Interfaith, The Salvation Army, Milwaukee County Department on Aging, Milwaukee County Office on Persons with Disabilities, Milwaukee County Adult Services Division, Milwaukee County Mental Health Division, agencies that serve the homeless and mentally ill, home health agencies, organizations with community outreach to low-income, disabled, and elderly **WILL:**

1. Distribute heat emergency preparedness information to staff, volunteers and clients. Modify the MHD information pamphlet to better serve target populations. Translations are encouraged.
2. If outreach or case management services are provided by the agency: seek to identify and enroll at-risk individuals into established and updated registries, if appropriate (see DEPARTMENT ON AGING, above), or establish procedures to log and check-in on at-risk individuals during Heat Health Events using staff or volunteers.
3. Update contact information with MHD to ensure receiving Heat Health Notices.
4. Establish planned response to Heat Health Notices, such as staff changes, extended hours at facilities or other needs specific for their clients.

DHFS – DIV. OF DISABILITY AND ELDER SERVICES – BUREAU OF QUALITY ASSURANCE WILL:

1. Monitor conditions in nursing homes and other licensed facilities on an ongoing basis.
2. Send out an annual communication regarding how these licensed facilities can meet the heat-related health needs of their residents.

WE ENERGIES WILL:

1. Maintain a registry of at-risk individuals dependent on electricity for electrically powered medical equipment.

GENERAL COMMUNITY OUTREACH ORGANIZATIONS including the Milwaukee Police **WILL:**

1. Distribute heat emergency preparedness information to staff, volunteers and clients. Modify the MHD information pamphlet to better serve target populations. Translations are encouraged.
2. Seek to identify and enroll at-risk individuals into established registries, if appropriate (see INTERFAITH and MILWAUKEE COUNTY DEPARTMENT ON AGING, above), or establish procedures to log and check-in on high-risk individuals during Heat Health Events using staff or volunteers.
3. Update contact information with MHD to ensure receiving Heat Health Notices.

THE MEDICAL SOCIETY OF MILWAUKEE COUNTY WILL:

Advise physicians regarding heat health hazards, the availability of check-in registries and encourage caretakers or at-risk individuals to prepare for heat emergencies and enroll in registries.

MEDIA METEOROLOGISTS ARE ENCOURAGED TO:

1. Run stories on heat illness and prevention.
2. Routinely use Heat Index during the summer so people may become as familiar with the concept as they are with the Wind Chill Factor.
3. Review internal systems to respond to Heat Health Notices, including methods to notify the public outside routine meteorological broadcasts.
4. Update contact information with MHD to ensure receiving Heat Health Notices

CITY OF MILWAUKEE DEPARTMENT OF PUBLIC WORKS WILL:

Cooperate with Milwaukee Public Schools on the school-based COOL SPOTS program.

RED CROSS WILL:

Activate 24-hour heat health tips information line for duration of summer.

AURORA BEHAVIORAL HEALTH WILL:

1. Educate inpatients about heat and medications prior to discharge.
2. Include information about heat health in newsletter to providers.
3. Develop crisis plans with patients/families to be discharged, including distribution of available resource handouts, to ensure return to an environment that is safe.

COVENANT BEHAVIORAL HEALTH WILL:

1. Post educational materials about heat health in the Emergency Departments.
2. Educate behavioral health outpatients about keeping cool during heat events. Notify outpatient clients about what to do during a heat event
3. Provide education to inpatients during their stay and prior to discharge.

HEAT HEALTH OUTLOOK
(triggered by NWS HEAT OUTLOOK threshold)

CITY OF MILWAUKEE HEALTH DEPARTMENT WILL:

1. Fax a Heat Health Outlook to all Task Force Participants informing them of the forecast and encouraging them to review the Heat Plan and prepare for implementation.
2. Ensure that all after-hours calls to the City Hall operator (286-2150, 286-3200) regarding critical heat issues are transferred to an appropriate individual 24 hours a day.
3. Establish fax line (414-286-5164) for Health Professionals to report heat related morbidity and mortality.

CITY OF MILWAUKEE DEPARTMENT OF PUBLIC WORKS WILL:

Advise all sponsors of outdoor special events scheduled during the forecast period to consider modifications of activities in light of possible heat.

HEAT HEALTH ADVISORY
(triggered by NWS HEAT ADVISORY

CITY OF MILWAUKEE HEALTH DEPARTMENT WILL:

1. Issue a "Heat Health Advisory" for the Greater Milwaukee Metropolitan area. This will include public information for heat protective actions and will be distributed to the media.
2. Alert Heat Task Force members and other participating agencies with instructions to prepare for full plan implementation within 6 to 24 hours and to prepare to begin check-in procedures for at-risk groups.
3. Begin active surveillance of selected emergency departments and the Medical Examiners Office and encourage referrals by physicians to the Milwaukee County Department on Aging and the Milwaukee County Adult Services Division.
4. Request that the Medical Examiner, Emergency Rooms and Local Public Health Departments report heat-related injuries to MHD via EMSystem or fax line (286-5164).
5. Continue to monitor fax line (286-5164) for Health Professionals to report heat related morbidity and mortality.
6. Open and publicize 24-hour Heat Hot Line (286-3616) to general public.
7. Post Advisory information on EMSystem.
8. Alert State and County agencies that regulate Community-Based Residential Facilities (CBRFs).

EMERGENCY ROOMS, LOCAL HEALTH DEPARTMENTS AND MEDICAL EXAMINER WILL:

1. Report any cases of heat exhaustion, heat stroke or heat related illnesses (such as heat-related angina or exacerbation of chronic heart failure or chronic lung disease) to the MHD and make referrals to the Milwaukee County Department on Aging, Milwaukee County Adult Services Division or Milwaukee County Mental Health Division as appropriate.
2 Activate appropriate internal preparation and response procedures.

DIVISION OF EMERGENCY MANAGEMENT WILL:

1. Notify local communities of the Advisory using emergency management zone radio frequency and procedure.
2. Alert Red Cross to heighten awareness of heat-related needs and to plan for congregate cooling facility availability.
3. Prepare the Safety Building EOC for activation if needed.
4. Respond to requests for emergency assistance.

CITY OF MILWAUKEE DEPARTMENT OF PUBLIC WORKS WILL:

Monitor water usage and consumption in the community as appropriate.

AGENCIES SERVING AT-RISK POPULATIONS, including but not limited to: Interfaith, The Salvation Army, Milwaukee County Department on Aging, Milwaukee County Office on Persons With Disabilities, Milwaukee County Adult Services Division, Milwaukee County Mental Health Division, agencies that serve the homeless and mentally ill, home health agencies, organizations with community outreach to low-income, disabled, and elderly **WILL:**

1. Prepare to activate daily check-in with registered clients if this service is performed. Begin daily check-in if Heat Index reaches 105.
2. Communicate generally with their staff, volunteers and client base to ensure they are aware of the current weather situation and advise them of recommended protective actions and how to obtain further information or assistance.
3. Continue assessment of clients referred for safety risks and respond as needed.
4. Share information on the general condition of their client base with MHD.
5. Prepare to open any special Congregate Cooling Sites under their control, such as Senior Centers, and prepare for extended hours operations if the demand dictates (utilizing volunteer or Red Cross resources as indicated). Open centers if Heat Index reaches 105.
6. Plan for staff or volunteers to assist with cooling centers and/or transportation of persons to cooling centers if possible.

MILWAUKEE COUNTY MENTAL HEALTH WILL:

Respond to calls to psychiatric crisis line as needed.

RED CROSS WILL:

Plan for opening Congregate Cooling centers if they become necessary or to provide trained shelter staff to extend the hours of existing Congregate Cooling facilities.

WE ENERGIES WILL:

1. Temporarily cease shut-off of electric power for non-payment until Heat Advisories are ended.
2. Monitor power consumption patterns and availability.

HEAT HEALTH WATCH or WARNING
Based on NWS EXCESSIVE HEAT WATCH or WARNING

MILWAUKEE HEALTH DEPARTMENT WILL:

1. Issue a "Heat Health Warning" for the Greater Milwaukee Metropolitan area. This will include medical and health information for heat protective actions and will be distributed to the media.
2. Continue above activities and consider enhancing response as needed.
3. Continue to post information on the EMSystem.
4. Report unmet needs to County Emergency Government and State Division of Emergency Management and other Heat Task Force Partners and find ways to address them.
5. Consider establishing an Emergency Operations Center with representatives of relevant Task Force Agencies if greater cross-agency coordination is required.
6. Evaluate efficiency of Heat Health Plan and take corrective action as needed.

DIVISION OF EMERGENCY MANAGEMENT WILL:

1. Continue above activities.
2. Open EOC if needed.

RED CROSS WILL:

Perform surveys of possible additional emergency cooling sites if needed.

GENERAL OUTREACH PROGRAMS including the Milwaukee Police Department **WILL:**

Continue efforts to have block captains or local staff make more frequent contacts with vulnerable at-risk individuals in their areas.

WE ENERGIES WILL:

Continue to monitor power consumption patterns and availability.

ALL OTHER TASK FORCE PARTNERS WILL:

1. Continue above activities.
2. Report operations problems to MHD for possible cross-agency resolution.

APPENDIX D

CRITICAL FACILITIES

Milwaukee County Wisconsin
Pre-Disaster Mitigation Plan

MILWAUKEE COUNTY HAZARD MITIGATION PLAN
LISTING OF CRITICAL FACILITIES
MILWAUKEE COUNTY

Bayside

9075 W. Regent Rd
City Department of Public Works
9075 N. Regent Rd
Bayside Police Dept

Brown Deer

8717 N. 43rd St.
City Department of Public Works
4800 W. Green Brook Dr.
Brown Deer Dept. of Public Safety

Cudahy

5900 S. Lake Dr.
Saint Luke's So Shore Hospital
5050 S. Lake Dr.
Cudahy Police

Fox Point

7200 N. Santa Monica
City Department of Public Works
7300 N. Santa Monica
Fox Point Dept. of Public Safety

Franklin

7979 W. Ryan Rd.
City Department of Public Works
9229 W. Loomis Rd.
Franklin City Hall
Franklin Police
8885 S. 68th St.
Milwaukee County House of Correction

Glendale

5900 N. Glen Park Rd
City Department of Public Works
5908 N. Milwaukee River Pkwy
City Hall
5909 N. Milwaukee River Pkwy
Glendale Police

Greendale

6351 Industrial Loop
City Department of Public Works
5911 W. Grange Ave
Greendale Police

Greenfield

4120 W. Loomis Rd.
Gambro Health Care
4551 S. 52nd St.
City Department of Public Works
5330 W. Layton Ave.
Fire Station 1
4333 S. 92nd St
Fire Station 2
7325 W. Forest Home Ave.
Greenfield City Hall
Library
5300 W. Layton Ave
Greenfield Police
7353 W. Forest Home
Greenfield Post Office
6007 W. Layton Ave
Military Recruiting Office
4500 W. Loomis Rd.
Southpoint Care Center
5015 S. 110th St.
Vencor Milwaukee

Hales Corners

5635 S. New Berlin Rd
Hales Corners Police

Milwaukee

841 N. Broadway
City Department of Public Works
2711 W. Wells St.
City Department of Public Works
2025 E. Newport Ave.
Columbia Hospital
1545 S. Layton Blvd
Sacred Heart Rehabilitation Hospital
3237 S. 16th St.
Saint Francis Hospital
5000 W. Chambers
Saint Joseph Hospital
2900 W. Oklahoma
Saint Luke's Medical Center

Milwaukee (count.)

2323 N. Lake Drive
Saint Mary's Hospital

2400 W. Villard Ave
Saint Michaels Hospital

950 N. 12th St
Sinai Samaritan Medical Center

5000 W. National Ave
Veterans Administration Medical Center

949 N. 9th St
Milwaukee County Criminal Justice System

1004 N. 10th St
Milwaukee County HOC Adult Correction Center

245 W. Lincoln
Milwaukee 2nd District

4715 W. Vliet
Milwaukee 3rd District

6929 W. Silver Spring
Milwaukee 4th District

2920 N. 4th St.
Milwaukee 5th District

3006 S. 27th St.
Milwaukee 6th District

3626 W. Fond Du Lac
Milwaukee 7th District

749 W. State St.
Milwaukee City Police

6680 N. Teutonia Ave.
Milwaukee Police Training Academy

Oak Creek

800 W. Puetz Rd
City Department of Public Works

8640 S. Horwell Ave
City Hall

301 W Ryan Rd
Oak Creek Police Department

4801 E Elm Rd
Oak Creek Power Plant

240 E Puetz Rd
Oak Creek Fire Station 1

3950 E Oakwood Rd
Oak Creek Fire Station 2

7000 S 6th St
Oak Creek Fire Station 3

River Hills

7650 N. Pheasant Lane
River Hills Police

Saint Francis

4235 S. Nicholson Ave.
Saint Francis Police

Shorewood

3801 N. Morris Rd.
City Department of Public Works
3930 N. Murray Ave
Village Hall
3936 N. Murray Ave
Shorewood Police

South Milwaukee

2425 15th Ave
City Department of Public Works
2424 15th Ave
South Milwaukee Health Department
South Milwaukee Police

Wauwatosa

7725 W. North Ave
City Hall
Health Department
10000 W. Bluemound Rd
Heart Hospital of Wisconsin
201 N. Mayfair Rd
St. Joseph's Outpatient Center
1465 Underwood Ave
Wauwatosa Fire Department Administration
Fire Station No. 1
4187 N. Mayfair Rd
Wauwatosa Fire Station No. 2
10525 Watertown Plank Rd
Wauwatosa Fire Station No. 3
7500 W Milwaukee Ave
Wauwatosa East High School (Red Cross Shelter)
7300 W. Blanchard St
Blanchard Street Pumping Station
108 N. Glenview Ave
Glenview Avenue Pumping Station
11000 W. Potter Rd
Potter Reservoir
Potter Road Pumping Station

Wauwatosa (count.)

2630 N. 64th St
- N 64th Street Reservoir
- N. 64th Street Pumping Station

11525 W. Burleigh
- Burleigh Elevated Tank

12001 W. Feerick St
- Feerick Elevated Tank

108 N. Glenview Ave
- Glenview Elevated Tank

1502 N. Alice St
- Alice Reservoir

11100 W. Walnut Rd
- City Department of Public Works

9000 W. Wisconsin Ave
- Children's Hospital of Wisconsin

9200 W. Wisconsin Ave
- Froedtert Memorial Lutheran Hospital

8700 W. Wisconsin Ave
- Milwaukee County Medical Complex

9455 Watertown Plank Rd
- Milwaukee County Mental Health Complex

1200 Dewey Ave
- Milwaukee Psychiatric Hospital

1700 N. 116th St.
- Wauwatosa Police Administration and Station
- Wauwatosa Police and Fire Dispatch Center
- Primary Emergency Operation Center (EOC)

West Allis

8901 W. Lincoln Ave
- West Allis Memorial Hospital

6300 W. McGeoch Ave
- City Department of Public Works

11101 W. Lincoln Ave
- Charter Hospital of Milwaukee

11301 W Lincoln Ave
- West Allis Police Station

7300 W National Ave
- West Allis Fire Station #1

10830 W Lapham St
- West Allis Fire Station #3

7332 W National Ave
- West Allis Fire Department Administration Building

West Milwaukee

4755 W. Beloit Rd

West Milwaukee Police

Whitefish Bay

5300 N. Marlborough Dr

Whitefish Bay Police

APPENDIX E

MITIGATION STRATEGIES AND PROJECT LISTS

Milwaukee County Wisconsin
Pre-Disaster Mitigation Plan

PRE-DISASTER MITIGATION PLANNING
MILWAUKEE COUNTY
HAZARD MITIGATION MEASURES

FLOODING

Prevention

- Create planning and zoning guidelines for development within the floodplain
- Create planning and zoning guidelines to preserve open space within the floodplain
- Create floodplain ordinances
- Develop stormwater management guidelines
- Perform maintenance on drainage systems

Property Protection

- Relocate residences outside floodplain
- Relocate furnaces, hot water heaters, and electrical panels from flood-prone areas
- Acquire and demolish residences in flood-prone areas
- Elevate residences above flood elevation on a new foundation
- Construct barriers and wet or dry floodproofing
- Create structural openings in foundation walls allowing floodwaters in and out, thus avoiding collapse
- Protect sewers from backing up by:
  - Installing backflow valves or plugs in drains and toilets to prevent floodwaters from entering home
  - Purchasing and installing sump pumps with back-up power
- Purchase National Flood Insurance or basement backup insurance

Natural Resource Protection

- Protect wetlands
- Employ erosion and sediment control
- Employ best management practices

Structural Projects

- Reservoirs
- Diversions
- Levees/floodwalls/seawalls
- Storm sewers
- Channel modifications, including:
  - Dredging
  - Drainage modifications

Emergency Services

- Develop flood warning system
- Establish flood response activities
  - Activate emergency operations center
  - Sandbag certain areas
  - Close streets or bridges
  - Shut off power to threatened areas
  - Release children from school
  - Order evacuation
  - Open evacuation shelters
  - Monitor water levels
  - Guard sandbag walls and other protection measures
- Protect critical facilities, including:
  - Locations vital to flood response effort
  - Locations that if flooded, would create secondary disasters
- Perform health and safety maintenance
  - Patrol evacuated areas to prevent looting
  - Provide safe drinking water
  - Vaccinate residents for tetanus
  - Clear streets
  - Clean up debris and garbage

Public Information

- Provide map information
- Create outreach projects, including:
  - Mass mailings or newsletters to all residents
  - Notices directed to floodplain residents
  - Displays in public buildings, shopping centers
  - Newspaper articles and special sections
  - Radio and TV news releases and interview shows
  - Local floodproofing video for cable TV programs or to loan to organizations
  - Detailed property owner handbook tailored for local conditions
  - Presentations at meetings of neighborhood groups
- Provide for real estate disclosure
- Provide technical assistance
- Provide environmental education
- Provide appropriate documents in library

From: Clancy Philipsborn, May 1996.

PRE-DISASTER MITIGATION PLANNING
MILWAUKEE COUNY
MITIGATION MEASURES

TORNADO/WIND

- Develop strategies for managing overhead utility lines
  - Provide higher grade poles for electrical distribution
  - Provide guy wires on poles subject to failure
  - Protect traffic lights from high winds
  - Analyze communication lines on power poles; if they cause unacceptable loads, remove when possible
- Support/encourage electrical utilities to use underground construction methods where possible to reduce power outages from windstorms
- Provide emergency back-up power to critical facilities; emergency generators, secondary feeds, portable generators with standard camlock connections
- Develop and implement programs to keep trees from threatening lives, property, and public infrastructure during windstorm events
  - Develop partnerships between utility providers and county & local agencies to identify potentially hazardous trees
  - Thin trees to reduce wind damages and plant species of plants that are more resistant to wind damage
  - Make sure right-of-way around power lines is free of trees or limbs that may cause damage
  - Develop strategies for clearing roads of fallen trees, and clearing debris from public and private property
- Structurally analyze all buildings or rooms identified as shelters and strengthen these as necessary
- Encourage development and enforcement of wind resistant buildings and construction codes
  - Evaluate current building codes for efficiency in protecting structures from wind damage
  - Install shutters on windows and doors or otherwise protect building openings from wind damage
  - Ensure that roof-mounted equipment is securely mounted
  - Install additional tie downs to resist wind loads
  - Reinforce existing unreinforced masonry walls with the addition of reinforced columns and bond beams
- Increase public awareness of windstorm mitigation activities
  - Map and publicize locations that have the highest incidence of extreme windstorms
  - Distribute educational materials to organizations and county residents regarding preparedness for no power situations

SEVERE WINTER STORMS

- Enhance strategies for debris management for severe winter storm events
  - Develop coordinated management strategies for de-icing roads, plowing snow, clearing roads of fallen trees, and clearing debris from public and private property
- Develop and implement programs to coordinate maintenance and mitigation activities to reduce risk to public infrastructure from severe winter storms
  - Partner with responsible agencies and organizations to design and implement programs that reduce risk to life, property, and utility systems
  - Develop partnerships between utility providers and county and local public works agencies to document known hazard areas
- Increase public awareness of severe winter storm mitigation activities
  - Collect information on public education materials for protecting life, property, and the environment from severe winter storm events
  - Distribute educational materials to county/tribal residents and public and private sector organizations regarding evacuation routes during road closures
  - Target the vulnerable populace for disseminating preparedness information
- Enhance weather monitoring to attain earlier severe winter storm warnings
- Increase public awareness of severe winter storm mitigation activities
  - Coordinate with appropriate organizations to evaluate the need for more weather stations and/or weather instrumentation

From: Clancy Philipsborn, May 1996 and
Clackamas County Oregon Natural Hazards Mitigation Plan, September 2002.

PRE-DISASTER MITIGATION PLANNING
MILWAUKEE COUNTY
MITIGATION MEASURES

DROUGHT

➢ *Assessment Programs*

- Develop criteria or triggers for drought-related actions
- Develop early warning system/monitoring program
- Conduct inventories of data availability
- Establish new data collection networks
- Monitor vulnerable public water suppliers

➢ *Public Awareness/Education Programs*

- Organize drought information meetings for the public and media
- Implement water conservation awareness programs
- Publish and distribute pamphlets on water conservation techniques and agricultural drought management strategies
- Organize workshops on special drought-related topics
- Prepare sample ordinances on water conservation
- Establish a drought information center

➢ *Legislation/Public Policy*

- Prepare position papers for legislature on public policy issues
- Examine statutes governing water rights for possible modification during water shortages
- Pass legislation to protect instream flow
- Pass legislation providing guaranteed low-interest loans to farmers
- Impose limits on urban development

➢ *Technical Assistance*

- Provide advice on potential new sources of water
- Evaluate water quantity and quality from new sources
- Advise water suppliers on assessing vulnerability of existing supply systems
- Recommend that suppliers adopt water conservation measures

➢ *Water Supply Augmentation*

- Issue emergency permits for water use
- Provide pumps and pipes for distribution
- Propose and implement programs to rehabilitate reservoirs to operate at design capacity
- Undertake water supply vulnerability assessments
- Inventory self-supplied industrial water users for possible use of their supplies for emergency public water supplies
- Inventory and review reservoir operation plans

➢ *Emergency Response Programs*

- Establish alert procedures for water quality problems
- Stockpile pumps, pipes, water filters, and other equipment
- Establish water hauling programs for livestock
- List livestock watering locations
- Establish hay hotline
- Fund water system improvements, new systems, and new wells
- Fund drought recovery programs
- Lower well intakes on reservoirs for rural water supplies
- Extend boat ramps and docks in recreational areas
- Issue emergency irrigation permits for using state waters for irrigation
- Create low-interest loan and aid programs for agricultural sector
- Create drought property tax credit program for farmers

➢ *Demand Reduction/Water Conservation Programs*

- Establish stronger economic incentives for private investment in water conservation
- Encourage voluntary water conservation
- Improve water use and conveyance efficiencies
- Implement water metering and leak detection programs

➢ *Water Use Conflict Resolution*

- Resolve emerging water use conflict
- Negotiate with irrigators to gain voluntary restrictions on irrigation in areas where domestic wells are likely to be affected
- Clarify state law regarding sale of water
- Clarify state law on changes in water rights
- Suspend water use permits in watersheds with low water levels
- Investigate complaints of irrigation wells interfering with domestic wells

➢ *Drought Contingency Plans*

- Establish statewide contingency plan
- Recommend that water suppliers develop drought plans
- Evaluate worst-case drought scenarios for possible further actions
- Establish natural hazard mitigation council

From: National Drought Mitigation Center, 2002.

PRE-DISASTER MITIGATION PLANNING
MILWAUKEE COUNTY
MITIGATION MEASURES

EARTHQUAKE

Prevention

- Develop planning and zoning guidelines to keep critical facilities away from fault line
- Develop planning/zoning ordinances and building codes for areas below steep slopes and soils subject to liquefaction
- Adopt building codes to prohibit loose masonry, overhangs,

Property Protection

- Acquire and clear high hazard areas
- Retrofit structures; add braces, remove overhangs, provide flexible utility connections and tie downs
- Structurally retrofit unreinforced masonry buildings
- Structurally retrofit roofs during re-roofing
- Replace brittle equipment in electrical substations
- Acquire earthquake insurance riders

Structural Projects

- Stabilize slopes
- Analyze/strengthen water towers
- Retrofit bridges, overpasses, and other critical transportation links
- Provide shut-off valves in distribution lines for water and gas service
- Add seismic connections such as bolting
- Add shearwalls in buildings
- Brace equipment that could block building exits or kill or injure people
- Brace parapet walls on buildings; brace or demolish outdoor shelters that pose collapse hazards
- Brace equipment (such as mechanical equipment, generators) whose failure may disrupt the operation of a critical facility such as a hospital.
- Brace equipment (such as sprinkler piping) whose failure could lead to increase building damages

Emergency Services

- Prepare earthquake response plans to account for secondary problems; fires and hazardous materials spills
- Provide emergency back-up power to critical facilities; emergency generators, secondary feeds
- Harden critical wireless emergency communication systems

Public Information

- Provide maps of vulnerable areas
- Create outreach projects on hazard mitigation measures
- Provide real estate disclosure
- Provide technical assistance on retrofitting

From: Clancy Philipsborn, May, 1996.

APPENDIX F

NOAA NATIONAL CLIMATE DATA CENTER
STORM EVENTS LISTINGS
Milwaukee County Wisconsin
Pre-Disaster Mitigation Plan

- ***NOAA National Climate Data Center - Storm Event Database***

Query Results

372 event(s) were reported in **Milwaukee County, Wisconsin** between **01/01/1950** and **12/31/2003 (High Wind limited to speed greater than 0 knots).**

Click on Location or County to display Details.

Mag: Magnitude
Dth: Deaths
Inj: Injuries
PrD: Property Damage
CrD: Crop Damage

Wisconsin

Location or County	Date	Time	Type	Mag	Dth	Inj	PrD	CrD
1 MILWAUKEE	07/11/1956	1756	Hail	0.75 in.	0	0	0	0
2 MILWAUKEE	08/07/1958	1458	Hail	0.75 in.	0	0	0	0
3 MILWAUKEE	08/07/1958	1458	Tornado	F2	0	4	25K	0
4 MILWAUKEE	09/26/1959	1828	Tornado	F2	0	3	250K	0
5 MILWAUKEE	06/28/1960	1700	Hail	1.75 in.	0	0	0	0
6 MILWAUKEE	07/22/1960	1600	Tstm Wind	0 kts.	0	0	0	0
7 MILWAUKEE	07/22/1960	1630	Tstm Wind	0 kts.	0	0	0	0
8 MILWAUKEE	08/04/1961	1730	Hail	0.75 in.	0	0	0	0
9 MILWAUKEE	06/17/1962	1930	Tstm Wind	55 kts.	0	0	0	0
10 MILWAUKEE	07/22/1962	1245	Tstm Wind	52 kts.	0	0	0	0
11 MILWAUKEE	07/22/1962	1248	Tornado	F2	0	0	25K	0
12 MILWAUKEE	09/13/1962	1115	Hail	1.00 in.	0	0	0	0
13 MILWAUKEE	10/04/1962	1520	Tornado	F1	0	0	25K	0
14 MILWAUKEE	03/19/1963	0800	Hail	1.00 in.	0	0	0	0
15 MILWAUKEE	03/19/1963	0900	Hail	1.50 in.	0	0	0	0

16 MILWAUKEE	06/08/1963	2025	Hail	2.00 in.	0	0	0	0
17 MILWAUKEE	06/08/1963	2100	Tstm Wind	63 kts.	0	0	0	0
18 MILWAUKEE	06/09/1963	1540	Tstm Wind	55 kts.	0	0	0	0
19 MILWAUKEE	07/31/1963	1530	Hail	0.75 in.	0	0	0	0
20 MILWAUKEE	08/01/1963	1530	Hail	0.75 in.	0	0	0	0
21 MILWAUKEE	04/06/1964	1945	Hail	0.75 in.	0	0	0	0
22 MILWAUKEE	06/19/1964	1630	Tstm Wind	0 kts.	0	0	0	0
23 MILWAUKEE	06/19/1964	1630	Tstm Wind	52 kts.	0	0	0	0
24 MILWAUKEE	07/22/1964	1300	Hail	1.75 in.	0	0	0	0
25 MILWAUKEE	07/22/1964	1300	Hail	1.75 in.	0	0	0	0
26 MILWAUKEE	08/22/1964	1600	Tornado	F1	0	0	250K	0
27 MILWAUKEE	09/03/1964	1720	Tornado	F2	0	0	250K	0
28 MILWAUKEE	09/03/1964	1720	Tstm Wind	0 kts.	0	0	0	0
29 MILWAUKEE	05/08/1965	1430	Tstm Wind	65 kts.	0	0	0	0
30 MILWAUKEE	06/27/1965	2315	Tstm Wind	0 kts.	0	0	0	0
31 MILWAUKEE	07/13/1965	1632	Hail	0.75 in.	0	0	0	0
32 MILWAUKEE	07/26/1967	0900	Tstm Wind	50 kts.	0	0	0	0
33 MILWAUKEE	06/11/1968	0000	Tstm Wind	63 kts.	0	0	0	0
34 MILWAUKEE	06/18/1968	1600	Tstm Wind	0 kts.	0	0	0	0
35 MILWAUKEE	06/29/1968	0805	Hail	0.75 in.	0	0	0	0
36 MILWAUKEE	06/30/1968	2050	Tstm Wind	53	0	0	0	0

				kts.				
37 MILWAUKEE	04/17/1969	1500	Tstm Wind	0 kts.	0	0	0	0
38 MILWAUKEE	06/29/1969	1930	Tstm Wind	61 kts.	0	0	0	0
39 MILWAUKEE	08/11/1969	1450	Tornado	F1	0	153	250K	0
40 MILWAUKEE	08/11/1969	1530	Hail	1.00 in.	0	0	0	0
41 MILWAUKEE	06/19/1971	2156	Tstm Wind	66 kts.	0	0	0	0
42 MILWAUKEE	09/16/1972	2337	Tstm Wind	51 kts.	0	0	0	0
43 MILWAUKEE	09/18/1972	0016	Tstm Wind	56 kts.	0	0	0	0
44 MILWAUKEE	06/16/1973	1415	Tstm Wind	60 kts.	0	0	0	0
45 MILWAUKEE	08/09/1973	1753	Tstm Wind	70 kts.	0	0	0	0
46 MILWAUKEE	05/21/1974	1414	Tstm Wind	65 kts.	0	0	0	0
47 MILWAUKEE	07/03/1974	1936	Tstm Wind	52 kts.	0	0	0	0
48 MILWAUKEE	08/11/1974	1345	Tstm Wind	50 kts.	0	0	0	0
49 MILWAUKEE	01/10/1975	2130	Tstm Wind	0 kts.	0	0	0	0
50 MILWAUKEE	06/13/1975	1751	Tstm Wind	0 kts.	0	0	0	0
51 MILWAUKEE	06/13/1975	1830	Tstm Wind	0 kts.	0	0	0	0
52 MILWAUKEE	08/25/1975	0211	Tornado	F1	0	0	3K	0
53 MILWAUKEE	08/25/1975	0212	Tornado	F2	0	0	25K	0
54 MILWAUKEE	11/09/1975	2330	Tstm Wind	0 kts.	0	0	0	0
55 MILWAUKEE	06/13/1976	0000	Tstm Wind	0 kts.	0	0	0	0
56 MILWAUKEE	07/30/1976	1922	Tstm Wind	55 kts.	0	0	0	0

57 MILWAUKEE	07/30/1976	1930	Tstm Wind	0 kts.	0	0	0	0
58 MILWAUKEE	04/02/1977	1425	Tornado	F2	0	0	25K	0
59 MILWAUKEE	06/24/1977	1915	Tstm Wind	0 kts.	0	0	0	0
60 MILWAUKEE	07/06/1977	1930	Tstm Wind	0 kts.	0	0	0	0
61 MILWAUKEE	07/06/1977	1930	Tstm Wind	55 kts.	0	0	0	0
62 MILWAUKEE	08/04/1977	1415	Tornado	F	0	0	0K	0
63 MILWAUKEE	08/04/1977	1417	Tstm Wind	52 kts.	0	0	0	0
64 MILWAUKEE	09/04/1977	1620	Hail	0.75 in.	0	0	0	0
65 MILWAUKEE	06/07/1978	1700	Tstm Wind	0 kts.	0	0	0	0
66 MILWAUKEE	06/17/1978	1230	Hail	1.75 in.	0	0	0	0
67 MILWAUKEE	05/18/1979	1508	Hail	0.75 in.	0	0	0	0
68 MILWAUKEE	06/20/1979	1606	Tstm Wind	0 kts.	0	0	0	0
69 MILWAUKEE	06/05/1980	0950	Hail	1.75 in.	0	0	0	0
70 MILWAUKEE	06/05/1980	1100	Tstm Wind	0 kts.	0	0	0	0
71 MILWAUKEE	06/05/1980	1117	Hail	1.75 in.	0	0	0	0
72 MILWAUKEE	06/07/1980	0716	Hail	1.00 in.	0	0	0	0
73 MILWAUKEE	07/15/1980	0800	Tstm Wind	52 kts.	0	0	0	0
74 MILWAUKEE	08/04/1980	1730	Tornado	F2	0	0	250K	0
75 MILWAUKEE	08/04/1980	1835	Tstm Wind	0 kts.	0	0	0	0
76 MILWAUKEE	08/04/1980	1858	Hail	1.75 in.	0	0	0	0
77 MILWAUKEE	08/04/1980	1958	Tstm Wind	0 kts.	0	0	0	0

78 MILWAUKEE	09/09/1980	0250	Tstm Wind	54 kts.	0	0	0	0
79 MILWAUKEE	07/12/1981	1730	Tstm Wind	0 kts.	0	0	0	0
80 MILWAUKEE	07/20/1981	1430	Tornado	F1	0	0	25K	0
81 MILWAUKEE	07/20/1981	1445	Tstm Wind	51 kts.	0	0	0	0
82 MILWAUKEE	07/06/1982	1550	Tstm Wind	60 kts.	0	0	0	0
83 MILWAUKEE	08/03/1982	2230	Tstm Wind	0 kts.	0	0	0	0
84 MILWAUKEE	07/19/1983	1958	Tstm Wind	50 kts.	0	0	0	0
85 MILWAUKEE	07/19/1983	2006	Tstm Wind	0 kts.	0	0	0	0
86 MILWAUKEE	08/16/1983	2210	Tstm Wind	0 kts.	0	0	0	0
87 MILWAUKEE	06/17/1984	1948	Hail	0.75 in.	0	0	0	0
88 MILWAUKEE	07/10/1984	0000	Tstm Wind	70 kts.	0	0	0	0
89 MILWAUKEE	07/10/1984	0015	Tstm Wind	70 kts.	0	0	0	0
90 MILWAUKEE	07/23/1984	1535	Tstm Wind	53 kts.	0	0	0	0
91 MILWAUKEE	08/09/1984	1320	Hail	1.00 in.	0	0	0	0
92 MILWAUKEE	08/09/1984	1340	Hail	1.25 in.	0	0	0	0
93 MILWAUKEE	10/16/1984	2330	Tstm Wind	0 kts.	0	0	0	0
94 MILWAUKEE	08/12/1985	2245	Tstm Wind	50 kts.	0	0	0	0
95 MILWAUKEE	08/17/1985	1922	Tornado	F1	0	0	0K	0
96 MILWAUKEE	07/06/1986	1930	Tstm Wind	52 kts.	0	0	0	0
97 MILWAUKEE	07/19/1986	1730	Tstm Wind	0 kts.	0	0	0	0
98 MILWAUKEE	07/27/1986	2240	Tstm Wind	0	0	0	0	0

				kts.				
99 MILWAUKEE	07/27/1986	2255	Tstm Wind	0 kts.	0	0	0	0
100 MILWAUKEE	07/27/1986	2310	Tstm Wind	0 kts.	0	0	0	0
101 MILWAUKEE	09/28/1986	1731	Tstm Wind	50 kts.	0	0	0	0
102 MILWAUKEE	05/11/1987	1135	Hail	0.75 in.	0	0	0	0
103 MILWAUKEE	05/21/1987	1926	Hail	1.00 in.	0	0	0	0
104 MILWAUKEE	05/21/1987	2040	Hail	0.75 in.	0	0	0	0
105 MILWAUKEE	07/06/1987	1615	Hail	2.00 in.	0	0	0	0
106 MILWAUKEE	07/06/1987	1640	Tstm Wind	0 kts.	0	0	0	0
107 MILWAUKEE	07/12/1987	1130	Tstm Wind	0 kts.	0	0	0	0
108 MILWAUKEE	07/29/1987	1438	Tstm Wind	52 kts.	0	0	0	0
109 MILWAUKEE	08/15/1987	1925	Tstm Wind	52 kts.	0	0	0	0
110 MILWAUKEE	08/16/1987	1900	Tstm Wind	0 kts.	0	0	0	0
111 MILWAUKEE	08/16/1987	1900	Tstm Wind	0 kts.	0	0	0	0
112 MILWAUKEE	08/21/1987	2353	Tstm Wind	50 kts.	0	0	0	0
113 MILWAUKEE	05/08/1988	1835	Tstm Wind	0 kts.	0	0	0	0
114 MILWAUKEE	08/04/1988	1930	Tstm Wind	52 kts.	0	0	0	0
115 MILWAUKEE	08/04/1988	2010	Tstm Wind	0 kts.	0	0	0	0
116 MILWAUKEE	08/08/1988	1600	Tstm Wind	0 kts.	0	0	0	0
117 MILWAUKEE	05/24/1989	2310	Tornado	F0	0	0	250K	0
118 MILWAUKEE	06/26/1989	1253	Hail	1.00	0	0	0	0

				in.				
119 MILWAUKEE	07/27/1989	1312	Hail	0.75 in.	0	0	0	0
120 MILWAUKEE	07/27/1989	1422	Tstm Wind	52 kts.	0	0	0	0
121 MILWAUKEE	07/27/1989	1422	Tstm Wind	52 kts.	0	0	0	0
122 MILWAUKEE	08/04/1989	2154	Tstm Wind	56 kts.	0	0	0	0
123 MILWAUKEE	03/13/1990	1615	Hail	1.75 in.	0	0	0	0
124 MILWAUKEE	06/29/1990	0000	Tstm Wind	0 kts.	0	0	0	0
125 MILWAUKEE	09/10/1990	0147	Tstm Wind	55 kts.	0	0	0	0
126 MILWAUKEE	03/27/1991	1450	Tstm Wind	77 kts.	0	0	0	0
127 MILWAUKEE	03/27/1991	1453	Tstm Wind	67 kts.	0	0	0	0
128 MILWAUKEE	04/08/1991	1810	Hail	0.88 in.	0	0	0	0
129 MILWAUKEE	07/07/1991	1508	Tstm Wind	63 kts.	0	0	0	0
130 MILWAUKEE	07/22/1991	1625	Tstm Wind	0 kts.	0	0	0	0
131 MILWAUKEE	09/09/1991	1702	Hail	1.00 in.	0	0	0	0
132 MILWAUKEE	09/09/1991	1729	Hail	2.00 in.	0	0	0	0
133 MILWAUKEE	06/17/1992	1225	Hail	1.00 in.	0	0	0	0
134 MILWAUKEE	06/17/1992	1225	Hail	1.00 in.	0	0	0	0
135 MILWAUKEE	06/17/1992	1251	Tstm Wind	59 kts.	0	0	0	0
136 MILWAUKEE	06/17/1992	1309	Tstm Wind	50 kts.	0	0	0	0
137 MILWAUKEE	04/20/1993	0000	Flood	N/A	0	0	0	0
138 Milwaukee	08/30/1993	1730	Waterspout	N/A	0	0	0	0

139 Milwaukee	08/30/1993	1745	Thunderstorm Winds	N/A	0	0	50K	5K
140 MILWAUKEE	11/28/1993	0300	Heavy Snow	N/A	0	0	0	0
141 Central And Southern	01/05/1994	1200	Heavy Snow	N/A	0	0	0	0
142 All But Far Northwest	01/26/1994	2000	Heavy Snow/ice Storm	N/A	0	0	0	0
143 Southern And Eastern	02/07/1994	1600	Heavy Snow	N/A	0	0	0	0
144 Southeast Wisconsin	02/12/1994	0900	Heavy Snow	N/A	0	0	0	0
145 Franklin	02/20/1994	0000	Flood	N/A	0	0	0	0
146 Southern Half Of Wisc	02/22/1994	1800	Heavy Snow	N/A	0	0	0	0
147 Southern Half Of Wisc	02/25/1994	0600	Heavy Snow	N/A	0	0	0	0
148 River Hills	07/04/1994	1630	Thunderstorm Winds	N/A	0	0	5K	5K
149 Milwaukee	07/04/1994	1651	Thunderstorm Winds	N/A	0	0	0	0
150 Bayside	07/04/1994	1655	Thunderstorm Winds	N/A	0	0	5K	5K
151 Fox Point	07/04/1994	1655	Thunderstorm Winds	N/A	0	0	5K	5K
152 Whitefish Bay	07/04/1994	1655	Thunderstorm Winds	N/A	0	0	5K	5K
153 Milwaukee	07/11/1994	1936	Thunderstorm Winds	N/A	0	0	0	1K
154 WIZ054 - 058>072	12/05/1994	2100	Heavy Snow	N/A	0	0	0	0
155 WIZ039 - 040 - 045>052 - 056>060 - 062>072	01/19/1995	0600	Heavy Snow	N/A	0	0	0	0
156 Greenfield	04/18/1995	1540	Hail	0.75 in.	0	0	0	0
157 Franklin	04/18/1995	1550	Hail	0.75 in.	0	0	0	0
158 Wauwatosa	05/13/1995	1916	Hail	0.88	0	0	0	0

				in.				
159 Franklin	06/06/1995	1500	Lightning	N/A	0	0	8K	0
160 Wauwatosa	06/07/1995	1842	Hail	0.75 in.	0	0	0	0
161 WIZ005>072 -	07/13/1995	0800	Extreme Heat	N/A	57	0	0	0
162 Brown Deer	07/15/1995	1030	Lightning	N/A	0	0	0	0
163 Brown Deer	07/15/1995	1100	Thunderstorm Winds	N/A	0	0	0	0
164 Wauwatosa	07/15/1995	1100	Urban Flood	N/A	0	0	0	0
165 Milwaukee	07/15/1995	1302	Hail	0.75 in.	0	0	0	0
166 Wauwatosa	07/15/1995	1900	Lightning	N/A	0	0	0	0
167 Oak Creek	07/15/1995	1925	Thunderstorm Winds	N/A	0	0	0	0
168 St. Francis	07/27/1995	1820	Thunderstorm Winds	N/A	0	0	0	0
169 MILWAUKEE	08/04/1995	1700	Urban Flood	N/A	0	0	0	0
170 Plum City	08/06/1995	1415	Heavy Rain	N/A	0	0	0	0
171 River Hills	08/28/1995	0830	Thunderstorm Winds	N/A	0	0	0	0
172 Milwaukee City	08/28/1995	0835	Urban Flood	N/A	0	0	0	0
173 Milwaukee Airport	08/28/1995	0843	Thunderstorm Winds	N/A	0	0	0	0
174 Statewide	10/12/1995	1400	Record Warmth	N/A	0	0	0	0
175 Southeast Wisconsin	11/07/1995	2300	Cold	N/A	1	0	0	0
176 Central And Southern	11/26/1995	2000	Heavy Snow	N/A	0	1	0	0
177 Northeast/central/sou	12/08/1995	1500	Blowing Snow	N/A	0	0	0	0
178 WIZ005 - 010>013 - 017>022 - 029>072	12/09/1995	0300	Cold	N/A	2	21	0	0
179 Southern Wisconsin	12/13/1995	1000	Glaze	N/A	0	0	0	0
180 WIZ060 - 066 -	01/05/1996	11:00	Heavy Snow	N/A	0	0	0	0

071		AM						
181 WIZ059>060 - 064>066 - 069>072	01/16/1996	08:00 AM	Freezing Rain	N/A	0	0	0	0
182 WIZ056>058 - 063>066 - 069>072	01/23/1996	04:00 AM	Freezing Rain	N/A	0	0	0	0
183 WIZ046>047 - 051>052 - 056>060 - 062>072	01/29/1996	05:00 AM	Blizzard	N/A	0	0	0	0
184 WIZ046>047 - 051>052 - 056>060 - 062>072	01/30/1996	02:00 AM	Extreme Windchill	N/A	2	0	0	0
185 WIZ046>047 - 051>052 - 056>060 - 062>072	01/31/1996	12:00 AM	Extreme Cold	N/A	0	10	0	0
186 WIZ046>047 - 051>052 - 056>060 - 062>072	02/01/1996	12:00 AM	Extreme Cold	N/A	4	18	0	0
187 Brown Deer	06/02/1996	04:58 PM	Tstm Wind	0 kts.	0	0	3K	0
188 WIZ066	06/17/1996	07:00 PM	Flood	N/A	0	0	75K	0
189 WIZ066	06/29/1996	11:00 AM	Heat Wave	N/A	0	70	0	0
190 Brown Deer	07/18/1996	09:12 PM	Tstm Wind	0 kts.	0	0	12K	0
191 North Milwaukee	08/19/1996	02:15 PM	Tstm Wind	0 kts.	0	0	11K	0
192 West Allis	10/29/1996	05:15 PM	Hail	0.88 in.	0	0	0	0
193 WIZ052 - 058>060 - 063>066 - 069>072	01/16/1997	02:00 AM	Other	N/A	0	0	0	0
194 WIZ046>047 - 051>052 - 056>060 - 062>072	01/17/1997	12:00 AM	Extreme Cold	N/A	0	3	20K	0
195 WIZ066	04/06/1997	10:00 AM	High Wind	0 kts.	0	0	300K	0
196 WIZ058>060 - 065>066	05/05/1997	06:05 PM	High Wind	0 kts.	0	0	29K	0
197 Fox Pt	06/21/1997	02:30	Flash Flood	N/A	0	0	78.7M	18K

		AM						
198 West Allis	06/24/1997	05:22 PM	Tstm Wind	52 kts.	0	2	5K	0
199 Milwaukee	06/24/1997	05:38 PM	Tstm Wind	50 kts.	0	0	0	0
200 South Milwaukee	06/30/1997	01:30 PM	Lightning	N/A	0	0	20K	0
201 Shorewood	07/02/1997	06:00 PM	Lightning	N/A	0	0	25K	0
202 WIZ052 - 066	07/16/1997	05:00 PM	Excessive Heat	N/A	1	0	0	0
203 Milwaukee	07/16/1997	07:42 PM	Tstm Wind	0 kts.	0	0	1K	0
204 Milwaukee	07/21/1997	03:00 AM	Lightning	N/A	0	0	1.0M	0
205 Milwaukee	07/26/1997	05:18 PM	Tstm Wind	0 kts.	0	0	1K	0
206 Glendale	09/29/1997	09:00 AM	Strong Winds	N/A	0	0	1K	0
207 WIZ051 - 063 - 065>066 - 068	10/03/1997	03:00 PM	Record Heat	N/A	0	0	0	0
208 WIZ066	10/12/1997	06:00 AM	Record Heat	N/A	0	0	0	0
209 WIZ066	11/30/1997	11:30 AM	Extreme Cold	N/A	1	0	0	0
210 WIZ066	11/30/1997	11:30 AM	Extreme Cold	N/A	1	0	0	0
211 WIZ052 - 066 - 069	01/02/1998	12:00 PM	Record Heat	N/A	0	0	0	0
212 WIZ051>052 - 058>060 - 064>066 - 069>072	01/08/1998	01:30 PM	Winter Storm	N/A	0	0	0	0
213 WIZ051>052 - 059>060 - 064>066 - 069>072	03/08/1998	06:00 PM	High Wind	0 kts.	0	0	215K	0
214 WIZ051 - 066 - 071>072	03/26/1998	06:00 AM	Record Warmth	N/A	0	0	0	0
215 West Allis	05/28/1998	09:24 PM	Tstm Wind	61 kts.	0	0	4K	0

216 Brown Deer	05/28/1998	09:45 PM	Tstm Wind	0 kts.	0	0	1K	0
217 Countywide	05/31/1998	02:00 AM	Tstm Wind	87 kts.	0	0	19.2M	0
218 Milwaukee	06/18/1998	07:00 PM	Tstm Wind	55 kts.	0	0	0	0
219 Fox Pt	06/18/1998	07:15 PM	Lightning	N/A	0	0	3K	0
220 WIZ066	06/25/1998	06:00 AM	Excessive Heat	N/A	0	21	0	0
221 St Francis	06/28/1998	12:30 AM	Lightning	N/A	0	0	20K	0
222 Milwaukee	07/20/1998	06:10 PM	Tstm Wind	0 kts.	0	1	1K	0
223 Milwaukee	08/05/1998	10:00 AM	Urban/sml Stream Fld	N/A	0	0	20K	0
224 Wauwatosa	08/06/1998	02:30 PM	Flash Flood	N/A	0	1	22.1M	0
225 WIZ063 - 065>066 - 069	09/27/1998	03:00 PM	Excessive Heat	N/A	0	0	0	0
226 WIZ046>047 - 051>052 - 056>060 - 062>072	11/10/1998	09:00 AM	High Wind	0 kts.	4	14	10.4M	1.6M
227 WIZ046>047 - 051>052 - 056>060 - 062>072	11/23/1998	12:00 PM	Excessive Heat	N/A	0	0	0	0
228 WIZ046>047 - 051>052 - 056>060 - 062>072	12/01/1998	12:00 AM	Excessive Heat	N/A	0	0	0	0
229 WIZ051>052 - 058>060 - 064>066 - 069>072	01/02/1999	09:00 AM	Blizzard	N/A	0	5	11K	0
230 WIZ046>047 - 051>052 - 056>060 - 062>072	01/05/1999	12:00 AM	Extreme Cold	N/A	0	0	0	0
231 Milwaukee	02/11/1999	02:30 PM	Urban/sml Stream Fld	N/A	0	0	1K	0
232 Milwaukee	02/11/1999	03:15 PM	Tstm Wind	61 kts.	0	3	25K	0
233 WIZ051 - 063 -	02/11/1999	12:00	Excessive	N/A	0	0	0	0

066 - 069		PM	Heat					
234 WIZ052 - 060 - 066 - 071>072	03/09/1999	02:00 AM	Winter Storm	N/A	0	0	0	0
235 Wauwatosa	04/03/1999	04:00 AM	Urban/sml Stream Fld	N/A	0	0	0	0
236 Milwaukee	04/23/1999	10:00 PM	Urban/sml Stream Fld	N/A	0	0	0	0
237 Milwaukee	05/16/1999	06:00 PM	Lightning	N/A	0	0	4K	0
238 Milwaukee	05/16/1999	06:00 PM	Lightning	N/A	0	0	4K	0
239 Milwaukee	05/16/1999	06:30 PM	Flash Flood	N/A	0	0	25K	0
240 Oak Creek	05/16/1999	06:55 PM	Tstm Wind	54 kts.	0	0	1K	0
241 Greenfield	05/17/1999	01:30 AM	Lightning	N/A	0	0	50K	0
242 Milwaukee	06/06/1999	04:34 PM	Tstm Wind	0 kts.	0	0	200K	0
243 Milwaukee	06/10/1999	02:30 PM	Flash Flood	N/A	0	0	75K	0
244 WIZ065>066 - 068 - 070>072	06/13/1999	08:00 AM	Flood	N/A	0	0	900K	0
245 Milwaukee	06/28/1999	03:45 PM	Urban/sml Stream Fld	N/A	0	0	0	0
246 WIZ046>047 - 051>052 - 056>060 - 062>072	07/04/1999	03:00 AM	Excessive Heat	N/A	0	0	0	0
247 West Allis	07/20/1999	11:20 PM	Lightning	N/A	0	0	75K	0
248 Countywide	07/21/1999	12:30 AM	Flash Flood	N/A	0	0	40K	0
249 WIZ057>060 - 063>064 - 066 - 069>072	07/23/1999	02:00 AM	Excessive Heat	N/A	0	0	0	0
250 Milwaukee	07/23/1999	03:30 PM	Tstm Wind	0 kts.	0	0	30K	0
251 WIZ046>047 - 051>052 - 056>060 - 062>072	07/29/1999	08:00 AM	Excessive Heat	N/A	8	0	0	0

252 Milwaukee	08/10/1999	12:40 AM	Hail	0.75 in.	0	0	0	0
253 WIZ063 - 066	12/01/1999	12:01 AM	Other	N/A	0	0	0	0
254 WIZ064>066	12/03/1999	01:00 AM	Fog	N/A	0	0	0	0
255 WIZ063 - 066	01/02/2000	01:00 PM	Record Warmth	N/A	0	0	0	0
256 WIZ046>047 - 051>052 - 056>060 - 062>072	01/09/2000	12:00 AM	Fog	N/A	0	0	0	0
257 WIZ051 - 063 - 066 - 069	02/23/2000	12:00 PM	Record Warmth	N/A	0	0	0	0
258 WIZ046>047 - 051>052 - 056>060 - 062>072	02/25/2000	12:00 AM	Fog	N/A	0	0	0	0
259 WIZ063 - 066	03/04/2000	12:00 PM	Record Warmth	N/A	0	0	0	0
260 Greenfield	03/08/2000	06:02 PM	Hail	1.25 in.	0	0	0	0
261 Milwaukee Mtchell Ar	03/08/2000	06:10 PM	Tornado	F1	0	16	4.6M	0
262 Milwaukee	03/08/2000	07:35 PM	Hail	1.00 in.	0	0	0	0
263 Milwaukee	03/08/2000	07:52 PM	Tstm Wind	58 kts.	0	0	0	0
264 WIZ051>052 - 058>060 - 064>066 - 070>072	03/21/2000	01:00 AM	Fog	N/A	0	0	0	0
265 WIZ051>052 - 058>060 - 064>066 - 070>072	04/07/2000	09:00 AM	Winter Storm	N/A	0	0	0	0
266 WIZ066	05/06/2000	05:00 AM	Record Warmth	N/A	0	0	0	0
267 Greenfield	05/08/2000	06:57 PM	Hail	1.00 in.	0	0	0	0
268 Milwaukee	05/08/2000	07:00 PM	Lightning	N/A	0	0	5K	0
269 Milwaukee	05/11/2000	10:40 PM	Tstm Wind	0 kts.	0	0	1K	0

270 Milwaukee	05/11/2000	11:43 PM	Tstm Wind	65 kts.	0	0	50K	0
271 Franklin	05/12/2000	12:00 AM	Urban/sml Stream Fld	N/A	0	0	0	0
272 North Portion	05/17/2000	08:15 PM	Flash Flood	N/A	0	0	200K	0
273 North Milwaukee	05/18/2000	02:01 PM	Hail	0.75 in.	0	0	0	0
274 West Allis	05/18/2000	08:15 AM	Hail	1.75 in.	0	0	20K	0
275 Wauwatosa	05/18/2000	10:28 AM	Hail	0.75 in.	0	0	0	0
276 WIZ046>047 - 051>052 - 056>060 - 062>072	05/24/2000	02:00 PM	Strong Winds	N/A	0	0	3K	0
277 Milwaukee	06/01/2000	06:45 PM	Hail	0.75 in.	0	0	0	0
278 Fox Pt	06/01/2000	07:00 PM	Flash Flood	N/A	0	0	50K	0
279 Countywide	07/02/2000	05:00 PM	Urban/sml Stream Fld	N/A	0	0	0	0
280 Milwaukee Mtchell Ar	07/02/2000	05:30 PM	Tornado	F1	0	0	1.5M	0
281 South Portion	07/02/2000	07:00 PM	Flash Flood	N/A	0	0	6.8M	151K
282 Franklin	07/02/2000	07:50 PM	Lightning	N/A	0	0	15K	0
283 Franklin	07/02/2000	07:55 PM	Lightning	N/A	0	0	10K	0
284 WIZ066	07/02/2000	12:00 AM	Record Rainfall	N/A	0	0	0	0
285 Countywide	08/05/2000	04:00 PM	Urban/sml Stream Fld	N/A	0	0	0	0
286 WIZ051>052 - 060 - 066 - 071>072	08/23/2000	03:00 AM	Fog	N/A	0	0	0	0
287 WIZ051>052 - 059>060 - 066 - 071>072	08/23/2000	09:00 PM	Fog	N/A	0	0	0	0
288 Countywide	08/26/2000	09:10 AM	Lightning	N/A	0	0	50K	0

289 Milwaukee	09/11/2000	04:15 PM	Lightning	N/A	0	0	30K	0
290 Milwaukee	09/11/2000	07:00 PM	Tstm Wind	0 kts.	0	0	2K	0
291 Wauwatosa	09/11/2000	08:00 PM	Flash Flood	N/A	0	0	100K	0
292 WIZ063 - 066	09/11/2000	12:00 AM	Record Rainfall	N/A	0	0	0	0
293 West Allis	09/22/2000	10:30 PM	Urban/sml Stream Fld	N/A	0	0	0	0
294 WIZ051>052 - 059>060 - 066	10/24/2000	02:00 AM	Fog	N/A	0	0	0	0
295 WIZ051>052 - 052 - 058>060 - 065>066	10/24/2000	04:00 PM	Fog	N/A	0	0	0	0
296 WIZ051>052 - 059>060 - 065>066 - 071>072	12/11/2000	11:00 AM	Heavy Snow	N/A	0	0	0	0
297 WIZ052 - 059>060 - 065>066 - 071>072	12/18/2000	03:00 PM	Heavy Snow	N/A	0	0	0	0
298 WIZ056>059 - 063>066	01/14/2001	05:00 PM	Fog	N/A	0	0	0	0
299 WIZ057>060 - 063>066 - 068>072	02/09/2001	06:00 AM	Flood	N/A	0	0	325K	0
300 WIZ046>047 - 051>052 - 056>060 - 063>066 - 069>072	02/24/2001	09:30 PM	Fog	N/A	0	0	0	0
301 WIZ066 - 068	02/25/2001	08:00 AM	High Wind	0 kts.	0	0	82K	0
302 WIZ052 - 060 - 066 - 071>072	03/12/2001	02:00 PM	Fog	N/A	0	0	0	0
303 WIZ046>047 - 051>052 - 056>060 - 062>072	04/07/2001	01:00 PM	High Wind	57 kts.	0	1	0	0
304 WIZ046>047 - 056>059 - 062>072	04/07/2001	02:00 AM	Fog	N/A	0	0	0	0
305 West Allis	05/14/2001	12:10 PM	Hail	0.75 in.	0	0	0	0
306 WIZ065>066 -	05/24/2001	09:00	Fog	N/A	0	0	0	0

070>072		PM						
307 WIZ052 - 060 - 066 - 071>072	05/25/2001	08:30 PM	Fog	N/A	0	0	0	0
308 Wauwatosa	06/11/2001	08:24 PM	Lightning	N/A	0	0	25K	0
309 Countywide	06/11/2001	09:10 PM	Tstm Wind	61 kts.	0	0	50K	0
310 West Allis	06/18/2001	01:15 AM	Hail	0.88 in.	0	0	0	0
311 WIZ052 - 060 - 066 - 071>072	07/18/2001	10:00 PM	Fog	N/A	0	0	0	0
312 WIZ052 - 060 - 066 - 071>072	07/18/2001	12:00 AM	Fog	N/A	0	0	0	0
313 WIZ059 - 064>066 - 068>072	07/21/2001	12:00 AM	Excessive Heat	N/A	2	0	0	0
314 WIZ051>052 - 058>060 - 064>066 - 069>072	07/30/2001	03:00 AM	Fog	N/A	0	0	0	0
315 WIZ056 - 058>060 - 062 - 064>072	08/03/2001	12:00 AM	Fog	N/A	0	0	0	0
316 WIZ046>047 - 051>052 - 056>060 - 062>072	08/06/2001	11:00 AM	Excessive Heat	N/A	4	0	0	0
317 West Allis	08/09/2001	04:50 PM	Tstm Wind	52 kts.	0	1	75K	0
318 Milwaukee	08/09/2001	05:00 PM	Urban/sml Stream Fld	N/A	0	0	0	0
319 Milwaukee	08/22/2001	12:30 PM	Urban/sml Stream Fld	N/A	0	0	0	0
320 WIZ060 - 066 - 071>072	08/23/2001	01:00 AM	Fog	N/A	0	0	0	0
321 Milwaukee Mtchell Ar	09/18/2001	08:00 PM	Heavy Rain	N/A	0	0	0	0
322 WIZ058>060 - 064>066 - 069>072	09/19/2001	01:30 AM	Strong Wind	N/A	0	0	0	0
323 WIZ066 - 069 - 072	10/25/2001	12:00 AM	High Wind	56 kts.	0	0	0	0
324 WIZ066 - 070>072	12/02/2001	04:00 AM	Fog	N/A	0	0	0	0

325 WIZ046>047 - 051>052 - 056>060 - 062>072	12/05/2001	12:00 PM	Strong Winds	N/A	0	0	105K	0
326 WIZ046>047 - 051>052 - 056>060 - 062>072	02/20/2002	02:00 AM	Fog	N/A	0	0	0	0
327 WIZ046>047 - 051>052 - 056>060 - 062>072	03/02/2002	12:00 AM	Heavy Snow	N/A	0	0	0	0
328 WIZ046>047 - 051>052 - 056>060 - 062>072	04/13/2002	01:00 AM	Fog	N/A	0	0	0	0
329 WIZ046>047 - 051>052 - 056>060 - 062>072	04/15/2002	01:00 PM	Excessive Heat	N/A	1	0	0	0
330 Brown Deer	04/18/2002	09:32 PM	Tstm Wind	53 kts.	0	0	0	0
331 Milwaukee	06/03/2002	06:00 AM	Urban/sml Stream Fld	N/A	0	0	0	0
332 Milwaukee	06/10/2002	07:30 PM	Urban/sml Stream Fld	N/A	0	0	0	0
333 Greendale	06/10/2002	07:40 PM	Hail	0.75 in.	0	0	0	0
334 Greendale	06/10/2002	07:50 PM	Tstm Wind	56 kts.	0	0	0	0
335 Timmerman Arpt	06/15/2002	03:59 PM	Hail	0.75 in.	0	0	0	0
336 General Mitchell Arp	06/15/2002	04:23 PM	Hail	0.75 in.	0	0	0	0
337 General Mitchell Arp	06/15/2002	04:29 PM	Hail	0.75 in.	0	0	0	0
338 Oak Creek	06/15/2002	04:32 PM	Hail	0.75 in.	0	0	0	0
339 WIZ065>066 - 070>072	06/20/2002	12:00 AM	Excessive Heat	N/A	1	0	0	0
340 WIZ059>060 - 064>066 - 069>072	06/22/2002	12:00 PM	Excessive Heat	N/A	1	0	0	0
341 WIZ046>047 - 051>052 - 056>060 - 062>072	06/30/2002	12:00 AM	Excessive Heat	N/A	0	0	0	0

342 WIZ046>047 - 051 - 056>060 - 062>072	07/01/2002	06:00 AM	Excessive Heat	N/A	0	0	0	0
343 Brown Deer	07/08/2002	07:42 PM	Tstm Wind	56 kts.	0	0	0	0
344 WIZ046>047 - 051>052 - 056>060 - 062>072	07/08/2002	11:00 AM	Excessive Heat	N/A	0	0	0	0
345 WIZ046>047 - 051 - 056>058 - 062>072	07/21/2002	12:00 AM	Excessive Heat	N/A	0	0	0	0
346 WIZ066	07/26/2002	10:00 AM	Excessive Heat	N/A	0	0	0	0
347 WIZ046>047 - 051>052 - 056>060 - 062>072	08/01/2002	12:00 AM	Drought	N/A	0	0	0	4.4M
348 Wauwatosa	08/12/2002	07:30 PM	Flash Flood	N/A	0	0	10K	0
349 Countywide	08/13/2002	01:30 PM	Urban/sml Stream Fld	N/A	0	0	0	0
350 West Allis	08/21/2002	07:12 PM	Tstm Wind	56 kts.	0	0	50K	0
351 Timmerman Arpt	08/21/2002	07:15 PM	Tstm Wind	70 kts.	0	0	5.1M	0
352 Cudahy	08/21/2002	07:30 PM	Tstm Wind	65 kts.	0	0	100K	0
353 Fox Pt	08/21/2002	09:00 PM	Lightning	N/A	0	0	500K	0
354 White Fish Bay	08/21/2002	09:00 PM	Lightning	N/A	0	0	1K	0
355 WIZ046>047 - 051>052 - 056>060 - 062>072	02/03/2003	12:00 AM	Winter Weather/mix	N/A	0	0	0	0
356 WIZ063>066	02/11/2003	03:00 PM	Winter Storm	N/A	0	0	0	0
357 WIZ065>066	03/04/2003	03:00 PM	Heavy Snow	N/A	0	0	0	0
358 WIZ046>047 - 051>052 - 056>060 - 062>072	03/20/2003	12:00 AM	Dense Fog	N/A	0	0	0	0

359 WIZ063>066 - 070>072	04/04/2003	03:00 PM	Winter Weather/mix	N/A	0	0	0	0
360 WIZ062>072	04/07/2003	06:00 AM	Winter Weather/mix	N/A	0	0	0	0
361 WIZ066 - 071	05/11/2003	08:00 AM	Strong Wind	N/A	0	0	30K	0
362 Timmerman Arpt	07/04/2003	06:10 AM	Tstm Wind	60 kts.	0	0	0	0
363 Brown Deer	07/04/2003	06:25 AM	Tstm Wind	56 kts.	0	0	3K	0
364 Fox Pt	08/01/2003	04:30 AM	Tstm Wind	50 kts.	0	0	0	0
365 WIZ057>060 - 062>072	08/01/2003	12:00 AM	Drought	N/A	0	0	0	0
366 Greenfield	08/03/2003	12:45 PM	Lightning	N/A	0	0	10K	0
367 WIZ046>047 - 051>052 - 056>060 - 062>072	09/01/2003	12:00 AM	Drought	N/A	0	0	0	0
368 WIZ046>047 - 051>052 - 056>060 - 062>072	10/01/2003	12:00 AM	Drought	N/A	0	0	0	0
369 WIZ046>047 - 051 - 051 - 056>060 - 062>072	11/01/2003	12:00 AM	Drought	N/A	0	0	0	0
370 Milwaukee	11/01/2003	12:00 AM	Heavy Rain	N/A	0	0	0	0
371 WIZ046>047 - 051>052 - 056>060 - 062>063 - 065>068 - 071>072	11/12/2003	12:00 PM	Strong Wind	N/A	0	0	52K	0
372 WIZ046>047 - 051>052 - 056>060 - 062>072	12/01/2003	12:00 AM	Drought	N/A	0	0	0	0
				TOTALS:	90	348	155.312M	6.205M

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