

COMMUNITY ASSISTANCE
PLANNING REPORT NO. 278
(3rd Edition)

Preliminary Draft

KENOSHA COUNTY HAZARD MITIGATION PLAN UPDATE: 2017-2021

SEWRPC Community Assistance Planning Report No. 278-3ED

KENOSHA COUNTY HAZARD MITIGATION PLAN UPDATE: 2017-2021

Chapter I

INTRODUCTION AND BACKGROUND

[Blue highlighting indicates additions or revisions to the previous edition of the plan.]

INTRODUCTION

In January 2003, the Southeastern Wisconsin Regional Planning Commission (SEWRPC) and the Kenosha County Division of Emergency Management agreed to cooperatively prepare an all hazards mitigation plan for Kenosha County. The plan was designed to be consistent with the guidelines of the Wisconsin Department of Military Affairs, Division of Emergency Management, and the Federal Emergency Management Agency (FEMA). The plan utilized an “all hazards” mitigation approach which the Wisconsin Division of Emergency Management and FEMA recommend as an option to single hazard mitigation planning. As such, consideration was given to many hazard conditions, including flooding; lakeshore bluff failure episodes; severe weather conditions, including wind storms, tornadoes, periods of extreme heat or cold, and winter storms; terrorism; civil disorder; urban fire or mass casualty; and hazardous materials situations. While the plan considered all of the potential hazards, it was recognized that only limited mitigative actions would be feasible for some of these hazards, since they are not site-specific or repetitious in nature.

The original Kenosha County Hazard Mitigation Plan was adopted and approved by the County in 2005 and was subsequently adopted by the cities and villages within the County. The plan was prepared by the staffs of the Kenosha County Division of Emergency Management, the Kenosha County Division of Planning and Development, and the Southeastern Wisconsin Regional Planning Commission. In preparing the plan, the County involved all appropriate County departments as needed. In addition, the planning was coordinated with the related activities of other concerned units and agencies of government within the County and with the Emergency Management Directors of Racine and Walworth Counties, Kenosha County’s neighboring counties. The plan was developed under the guidance of the Kenosha County Hazard Mitigation Plan Task Force, which was created by the County specifically for plan development purposes and was comprised of elected and appointed officials;

agency and business representatives; and citizens from throughout the County knowledgeable in hazard mitigation matters.

The mitigation planning requirements of 44 *Code of Federal Regulations*, Section 201.6 (d) (44 CFR 201.6(d)) require that local hazard mitigation plans must be reviewed, updated to reflect changes in development, progress in local mitigation efforts, and changes in priorities, and reapproved every five years for local jurisdictions to be able to receive hazard mitigation funding. Thus, in September 2009, Kenosha County in cooperation with its 12 municipalities and the Southeastern Wisconsin Regional Planning Commission began preparation of an update of the initial hazard mitigation plan. The participating municipalities included the City of Kenosha; the Villages of Bristol, Paddock Lake, Pleasant Prairie, Silver Lake, and Twin Lakes; and the Towns of Brighton, Bristol, Paris, Randall, Salem, Somers, and Wheatland. The updated plan was prepared by the staffs of the Kenosha County Division of Emergency Management and the Southeastern Wisconsin Regional Planning Commission. In preparing the updated plan, the County involved all appropriate County departments as needed. In addition, the planning was coordinated with the related activities of other concerned units and agencies of government and was developed under the guidance of the Kenosha County All Hazards Mitigation Plan Task Force, which was created by the County specifically for plan development purposes and was comprised of elected and appointed officials; agency and business representatives; and citizens from throughout the County knowledgeable in hazard mitigation matters.

In March 2015, Kenosha County in cooperation with its 12 municipalities¹ and the Southeastern Wisconsin Regional Planning Commission began preparation of a second update of the Kenosha County hazard mitigation plan. The participating municipalities include the City of Kenosha; the Villages of Bristol, Paddock Lake, Pleasant Prairie, Silver Lake, and Twin Lakes; and the Towns of Brighton, Paris, Randall, Salem, Somers, and Wheatland. The participating jurisdictions are listed in Table I-1. The updated plan was prepared by the staffs of the Kenosha County Division of Emergency Management and the Southeastern Wisconsin Regional Planning Commission. In preparing the updated plan, the County involved all appropriate County departments as needed. In addition, the planning was coordinated with the related activities of other concerned units and agencies of government and was developed under the guidance of the Kenosha County Hazard Mitigation Plan Local Planning Team,² which was formed by the County specifically for plan development purposes and is comprised of

¹*On April 24, 2015, a portion of the Town of Somers incorporated as the Village of Somers. On November 21, 2016 the Wisconsin Department of Administration approved a cooperative plan submitted by the Village of Silver Lake and the Town of Salem. Effective February 14, 2017 the two municipalities merged to become the Village of Salem Lakes. As of February 14, 2017, the two municipalities merged to become the Village of Salem Lakes.*

²*For the development of the initial plan and the 2009-2010 update, this group was called the Kenosha County All Hazards Mitigation Plan Task Force. For the current plan update, the name of this group has been changed to reflect the current terminology used by FEMA.*

elected and appointed officials, agency and business representatives, and citizens from throughout the County knowledgeable in hazard mitigation matters.

In assembling the Kenosha County Hazard Mitigation Plan Local Planning Team, the County Planning and Development Division and Division of Emergency Management sought representatives from a cross-section of community interests. Representatives from each municipality in the County were invited to participate, including elected and appointed officials and representatives of law enforcement agencies, fire departments, public health departments, and public works departments. In addition, representatives from educational institutions, nonprofit agencies, and private sector firms were invited to participate.

The mitigation planning requirements identified in 44 CFR 201.6 call for all jurisdictions participating in a multi-jurisdictional hazard mitigation plan to participate in the planning process. Examples of participation include, but are not limited to, attending planning meetings, contributing research, data, or other information, and commenting on drafts of the plan. Tables 2 and 3 summarize municipal participation in the planning process and outreach activities, respectively, for the updated plan. Table 4 lists hazard mitigation activities undertaken by the municipalities in the County since the first plan update was issued.

For more complete details on the level of participation of local citizens and community groups in the public involvement process, and summary notes for each Local Planning Team meeting, see Appendix A.

The procedures utilized in the plan are based upon guidance provided by FEMA and the Wisconsin Department of Military Affairs, Division of Emergency Management.³ As such, the plan is consistent with the requirements and procedures defined in the Disaster Mitigation Act of 2000. The analysis includes three components: 1) profile and analysis of hazard events; 2) community vulnerability assessments; and 3) development of hazard mitigation strategies.

OVERVIEW OF STUDY AREA

Kenosha County is located in Southeastern Wisconsin, and is bordered on the east by Lake Michigan, on the north by Racine County, on the west by Walworth County, and on the south by Lake and McHenry Counties in Illinois.

³Federal Emergency Management Agency, State and Local Mitigation Planning How-to Guide, “Understanding Your Risks, Identifying Hazards and Estimating Losses,” Publication No. FEMA 386-2, August 2001. Federal Emergency Management Agency, Local Multi-Hazard Mitigation Planning Guidance, July 1, 2008. Federal Emergency Management Agency, Local Mitigation Planning Handbook, March 2013. See also Federal Emergency Management Agency, State and Local Plan Interim Criteria under the Disaster Mitigation Act of 2000, July 11, 2002.

The impacts of urbanization in the greater Milwaukee and Chicago metropolitan areas are increasingly affecting the County.

Kenosha County covers about 278 square miles and contains one city, all or parts of **seven** villages, and **six** towns as shown on Map 1. There are all or parts of five natural watersheds and a total of about 4,800 acres of inland surface waters within the County. The County has a diversified natural resource base, including the Lake Michigan nearshore area, several inland lakes, as well as major river systems.

The majority of the population resides in the eastern portion of Kenosha County, within the City of Kenosha and the Village of Pleasant Prairie. However, population centers are also found in the western communities in the vicinity of the major lakes, including the Villages of Paddock Lake, Silver Lake, and Twin Lakes and in the partially urbanized town areas. Much of the land in the County remains in agriculture, but the dairy industry has steadily declined. The major industries within the County are generally located east of Interstate Highway (IH) 94, with smaller amounts of industrial development being located west of IH 94 and in the other urban centers.

RELATIONSHIP OF HAZARD MITIGATION PLANNING TO EMERGENCY OPERATIONS PLANNING

The focus of this planning effort is upon hazard mitigation measures. Such measures generally involve lasting, often permanent, measures designed to reduce the exposure to, probability of, or potential loss from hazardous events. Such measures tend to focus on actions related to where and how to build structures, education to reduce losses or injury, and programs to improve the safety of identified hazard areas. A hazard mitigation plan outlines the strategy for mitigating the hazards potentially impacting a county or municipality.

The mitigation plan should be distinguished from, but compatible with, an emergency operations plan. Such a plan is defined as a plan which describes how people and property will be protected in disaster and disaster threat situations; details who is responsible for carrying out specific actions; identifies the personnel, equipment, facilities, supplies, and other resources available for use in the disaster; and outlines how all actions will be coordinated. Numerous such plans have been developed at the jurisdictional level, and often involve mutual assistance and cooperation agreements between local units of government in adjoining municipalities, both within and outside of Kenosha County. Plans for mitigating hazards are related to emergency operation activities involving short-term recovery decision-making, since such activities may highlight prospects for implementation of a mitigation strategy aimed at reducing long-term risk to human life and property.

SCOPE AND PURPOSE OF PLAN

This plan updates the 2010 hazard mitigation plan which was an update of the initial 2005 County Hazard Mitigation Plan. The scope of this plan is countywide, and is intended to set forth the most appropriate, feasible, and effective hazard mitigation strategy for Kenosha County and the local units of government within the County. The plan complements, refines, and focuses the *State Hazard Mitigation Plan of Wisconsin*⁴ on local conditions and hazards likely to occur or be experienced within Kenosha County and Southeastern Wisconsin. The plan development process is intended to encourage innovative programming and leadership and to build constructive partnerships with local units of government, business, and other stakeholders with a shared interest and obligation in protecting the safety and economic stability of Kenosha County, and to provide information and guidance to neighboring communities as they develop jurisdictional hazard mitigation plans at the local and subregional levels.

While it is acknowledged that the County can be affected by hazardous incidents that occur outside of the County jurisdiction, the degree of impact—in terms of property damage, injury, and loss of life, and ability of the County to respond, is significantly limited, and frequently unquantifiable. Thus, while some hazards, such as weather-related events, can extend over a wide area, most affect Kenosha County only tangentially, and many result in site-specific impacts. Those that are site-specific in their impact may be best addressed within local level hazard mitigation plans and through local action. Nevertheless, where appropriate, areas of cooperation between jurisdictions have been noted, especially with respect to hazards such as flooding, for example, which commonly affect entire river basins as well as the specific communities located within them. Generally, for the purposes of this plan, hazard mitigation as well as emergency response planning at the local and subregional levels is beyond the scope of this document.

The Kenosha County Hazard Mitigation Plan was developed in 2005, updated in 2009 and 2010, and updated in 2015 and 2016 through a collective effort of a number of agencies, organizations, and business representatives. These efforts were conducted under the guidance of the Kenosha County Local Planning Team which was created by the County specifically for plan development purposes. That committee is comprised of elected and appointed officials and business representatives knowledgeable about, and directly involved in, hazard mitigation matters. The membership, formation, and active participation of the Local Planning Team are documented in Appendix A of this report. In addition to formation and active participation of the Local Planning Team, the plan development process included the following steps:

- Collation and review of all pertinent reports relating to the hazard mitigation activities in Kenosha County;

⁴*Wisconsin Emergency Management, State Hazard Mitigation Plan of Wisconsin, October 2011.*

- Inventory mapping and analysis of hazards pertinent to Kenosha County;
- Identification of the facilities and ongoing programs related to hazard mitigation;
- Assessment of the vulnerability of the County assets to each hazard;
- Identification of and prioritization of needed facilities and programs;
- Consideration of issues relating to neighboring municipalities and units of government likely to be affected or influenced by natural hazards within Kenosha County;
- Development and evaluation of alternatives to address the identified needs;
- The development of plan recommendations and an implementation plan;
- Development of a public informational and educational program and program of public consultation to guide the plan development and implementation program, including a prioritization of the recommended plan elements; and
- Adoption of a strategy for monitoring and refining the plan.

Additional activities conducted as a part of the updating process **for the first plan update** included:

- Collation and review of all pertinent reports relating to the hazard mitigation activities in Kenosha County since adoption of the initial plan;
- Review of materials developed as a part of the multi-jurisdictional comprehensive planning process for Kenosha County;⁵
- Review and updating of inventories developed for the initial plan;
- Review and updating of hazard and risk assessments;
- Review of implementation activities; and
- Review and updating of plan recommendations and the initial implementation plan.

The above bulleted activities were also conducted as part of the updating process for the second plan update; however, it is important to note that during the development of this plan update, no new material was available from the multi-jurisdictional comprehensive planning process for Kenosha County.

PLAN MAINTENANCE AND IMPLEMENTATION ACTIVITIES

Continuing Activities of the Kenosha County Hazard Mitigation Local Planning Team

As part of the recommended plan maintenance process, the first update to the Kenosha County hazard mitigation recommended that the Kenosha County Hazard Mitigation Local Planning Team meet annually to review the Kenosha County hazard mitigation plan and the status of its implementation. As of April 2015, the Local Planning Team has met on three occasions: September 5, 2012; September 18, 2013; and September 23, 2014. These

⁵SEWRPC Community Assistance Planning Report No. 299, A Multi-Jurisdictional Comprehensive Plan for Kenosha County: 2035, April 2010.

meetings are documented in a series of SEWRPC Staff Memoranda that are included in Appendix A⁶ Consistent with the recommendations of the updated plan, the review addressed the following questions:

1. Have any hazards changed in the past year?
2. Have the hazard mitigation goals and objectives changed in the past year?
3. What progress has been made in implementing previously identified hazard mitigation actions?
4. Do any plan elements and their priorities need modification?
5. Are any new plan elements needed?
6. Have applicable funding programs and levels of funding changed?

In addition, the Local Planning Team reviewed several other topics related to particular hazards and hazard mitigation. This included reviewing the impacts of and responses to two hazard incidents—the February 1-3, 2011 blizzard and the June 30, 2011 straight-line windstorm. Other topics reviewed by the team include the Kenosha County Fox River Flood Warning Tool, the status of the Center Creek floodplain relative to the Strawberry Creek development, and a request from the National Weather Service for a change in the flood action stage at the U.S. Geological Survey (USGS) stream gage on the Fox River at New Munster.

Outreach Activities

County Activities

Since the adoption of the initial hazard mitigation plan, the Kenosha County Division of Emergency Management has conducted outreach activities to educate the public about emergency preparedness, including hazard mitigation. As part of these activities, a number of campaigns have been conducted on hazard awareness, including programs related to winter awareness, tornado and severe storm awareness, heat awareness, and flood safety. The Kenosha County Division of Emergency Management makes information and resources related to emergency preparedness, including hazard mitigation, available to the public through its pages on Kenosha County’s website. The resources available on this website include a link to a service providing emergency and weather alerts through text message and information about training and volunteer opportunities. In addition, the website provides a damage hotline which is active during declared emergencies and allows members of the public to report disaster-related damages to the Emergency Management Division via telephone or electronic mail.

⁶SEWRPC Staff Memorandum, “Summary of the Kenosha County Hazard Mitigation Task Force First Annual Meeting to Review the Kenosha County Hazard Mitigation Plan Update,” October 10, 2012; SEWRPC Staff Memorandum, “Summary of the Kenosha County Hazard Mitigation Task Force Second Annual Meeting to Review the Kenosha County Hazard Mitigation Plan Update,” October 14, 2013; and SEWRPC Staff Memorandum, “Summary of the Kenosha County Hazard Mitigation Task Force Third Annual Meeting to Review the Kenosha County Hazard Mitigation Plan Update,” September 24, 2014.

The Kenosha County Department of Planning and Development makes information and resources related to flood protection available to the public through its website, distribution of brochures, and the *Ties to the Land* newsletter that is sent to agricultural producers.

Local Government Activities

Since the adoption of the initial hazard mitigation plan, local municipalities in Kenosha County have conducted outreach activities to educate the public about emergency preparedness, including hazard mitigation. These activities are summarized in Table 3. The most common methods used by the communities include making information available on the municipality's website and mailing or emailing periodic newsletters to residents of the municipality. These methods have been used to distribute information on hazard awareness and preparedness related to topics such as flooding, winter awareness, tornado awareness, hazardous materials awareness, heat awareness, pandemic influenza, and family preparedness. In addition, several municipalities contract with the Root-Pike Watershed Initiative Network to conduct the education and outreach programs required as a condition of their municipal separate storm sewer system discharge permits. Finally, the Village of Pleasant Prairie uses a service that allows public safety officials to send text messages and electronic mail to subscribers in the event of a public safety emergency. The Village also posts emergency information to local cable television providers and *Twitter*[®]. In certain circumstances the Village will also request a reverse 911 call to landline telephones.

Implementation Activities

Since the adoption of the first update to the hazard mitigation plan, Kenosha County and the local municipalities in Kenosha County have conducted several projects intended to implement recommendations of the plan. These projects are summarized in Table 4.

Since May 1, 2013, Kenosha County has participated in the National Flood Insurance Program's (NFIP) Community Rating System (CRS). The CRS is a voluntary program that provides incentives for communities to go beyond the minimum floodplain management requirements to develop extra measures to provide protection from flooding. Based on a community's rating, flood insurance premium rates are discounted to reflect the reduced flood risk resulting from the community actions related to reducing flood damage to insurable property, strengthening and supporting the insurance aspects of the NFIP, and encouraging a comprehensive approach to floodplain management. For CRS participating communities, flood insurance premium rates are discounted in increments of 5 percent, with a Class 1 community receiving a 45 percent premium discount and a Class 9 community receiving a 5 percent discount. The CRS classes for local communities are based on activities related to public information, mapping and regulations, flood damage reduction, and flood preparedness. As of June 1, 2015, Kenosha County was rated as a Class 5 community. This provides a 25 percent discount on NFIP premiums for structures in Kenosha County townships located in a special flood hazard area.

Since 1994, Kenosha County's Fox River Flood Mitigation Program has reduced flood damages and the potential for injury to affected persons by acquiring and demolishing residential structures located in the one-percent-annual-probability floodplain of the Fox River. As a part of this program, all of the acquired dwellings are demolished and the property is permanently maintained as open space. The project area for this program is the one-percent-annual-probability floodplain of the Fox River between **State Trunk Highway** (STH) 50 and **County Trunk Highway** (CTH) F within the Towns of Salem and Wheatland and the Village of Silver Lake. This program's purpose is to reduce the threat to the health and safety of area residents and rescue workers resulting from the frequent and severe flooding of the Fox River. As of the end of **April 2015**, the owners of **103** homes in the project area have participated in this voluntary buyout program. An additional **72** homes are eligible for participation. Funding for this program has been obtained from several sources, including FEMA, the Wisconsin Division of Emergency Management, the Wisconsin Department of Natural Resources, and Federal Community Development Block Grants. The program is administered by the Kenosha County Housing Authority, with staff support provided by SEWRPC.

In 2015, Kenosha County acquired a repetitive loss property along Camp Lake. This property had experienced damages during multiple flood events leading to multiple flood insurance claims. Demolition of this property was completed in April 2015, and the property will be permanently maintained as open space. Funding for this project was provided by the Federal Emergency Management Agency through the Flood Mitigation Assistance Program.

The Kenosha County Land Information Office developed a flood warning tool for a portion of the Fox River in the County. This tool is a predictive model showing the estimated geographical extent of flooding that can be expected for different stages of the Fox River at the USGS gage at New Munster. It is based upon a tool developed for the Fox River in Lake County, Illinois. The tool focuses on the reach of the Fox River in Kenosha County that experiences the greatest flood hazard. The model was developed using detailed land surface elevation data that was acquired in 2010 and was validated using June 15, 2008, River level data collected by staff from the Kenosha County Planning and Development Department using geographical positioning system (GPS) technology. The tool gives flood level estimates for River stages at 0.5-foot intervals. The National Weather Service (NWS) web page for the New Munster gaging station is linked to the tool. The tool is intended to be used internally by County departments for planning purposes. It is not intended as a substitute for detailed engineering studies.

The Kenosha County Division of Health has compiled a list of cooling shelters that are available to provide protection to vulnerable individual during periods of excessive heat. This list is available on the County's website.⁷

In 2012 and 2013, Kenosha County developed a comprehensive bicycle plan.⁸ This plan sets forth a recommended bikeway network for the County. Relative to the recommended strategies for transportation accidents in the previous update of this County hazard mitigation plan, the bicycle plan recommends specific locations for separate bicycle lanes, off-road bicycle routes, and addition of paved shoulders. In addition, the bicycle plan recommends policies and programs to improve safety and reduce the number of transportation accidents involving bicycles.

In 2012, Kenosha County abandoned and removed a small earthen dam topped by a roadway along the Pike River at Petrifying Springs Park. As part of this project, a bridge was installed at the location of the dam. One objective of this project was to alleviate flooding that occurred at this site, especially during the spring. Funding for the project was provided from a number of sources, including Kenosha County, the Wisconsin Department of Natural Resources (WDNR), the Fund for Lake Michigan, the Great Lakes Restoration Initiative, and the Sustain Our Great Lakes Community Grants program.

In fall 2009, the City of Kenosha began a storm and sanitary sewer study for the Forest Park area, which is also directly tributary to Lake Michigan. This study was completed in 2014. The Forest Park area of interest is approximately bordered by 60th to 67th Streets and 45th to 56th Avenues in the City. Significant local stormwater flooding occurred in this area during the June 2009 event. In addition, storm events have periodically caused surface flooding and basement backups. The results of this study, along with associated computer modeling indicate the two systems contribute to basement backups. The study includes public involvement and a condition and capacity analysis of the storm and sanitary sewers. The study recommends several improvements to the sanitary and storm sewer systems to address flooding.

The City of Kenosha has implemented several projects related to the Forest Park area storm and sanitary sewer study. In 2010 the City completed reconstruction of sanitary sewers along sections of 46th Avenue, 47th Avenue, and 51st Avenue and reconstruction and upsizing of sanitary sewers along 61st Street and Pershing Avenue. These projects were implemented to increase the ability of the sanitary sewers to handle rainfall-related inflows in

⁷<http://www.co.kenosha.wi.us/index.aspx?nid=872>.

⁸*Alta Planning+Design, Comprehensive Bike Plan for Kenosha County, July 2013.*

order to reduce basement backups. The City also has ongoing sanitary sewer rehabilitation and manhole rehabilitation programs.

The City of Kenosha has begun development of a city-wide comprehensive stormwater management plan. As of April 2015 this plan was under development. The City also has ongoing storm sewer rehabilitation and storm sewer manhole and inlet rehabilitation programs.

In 2009, the Village of Pleasant Prairie purchased the former Midwest Copier property. Redevelopment goals for the property included alleviating flooding in the area. In 2010, the Village received a Community Development Block Grant for \$725,000 to help alleviate flooding in the area. Elements of the project included demolishing a portion of the building to accommodate stormwater improvements, construction of a swale, and installation of storm sewers of sufficient capacity to handle water volumes in the area. Construction of the stormwater management infrastructure was completed in 2012. The Village plans to improve the building for use as a small business incubator, the Spring Brook Innovation Center.

In 2009 the Village of Twin Lakes completed a hydraulic evaluation to establish Elizabeth Lake levels and to explore spillway changes to discharge more flow at higher lake elevations. Spillway modification design work was completed and the Village accepted a bid for the project in January 2014. The cost of the project was about \$373,000. The spillway modifications were completed in 2014.

In late 2014, the Town of Somers began construction of the Highway E interceptor sewer. This sewer line is intended to address historical sewer backflow and flooding problems in the area between the intersection of CTH E and CTH H and 97th Avenue following rain events. The project includes new sewer lines in area of CTH H, one-half mile south of CTH E, east to CTH EA, north to CTH E, and east to the Somers Elementary School. The estimated cost of the project is \$2.5 million. It is anticipated that the project will be completed during summer of 2015.

As part of a 2014 road reconstruction project, the Town of Somers installed deer caution signs along 47th Avenue to improve the safety of motorists.

In November 2014, the WDNR began reconstruction of Vern Wolf Lake Dam. This low hazard dam is located along Brighton Creek in the Richard Bong State Recreation Area. In spring of 2013, the dam was compromised during a series of heavy rainfalls. During inspections following lake drawdown, it was determined that the dam required extensive repair and renovation. Elements of the project include construction of a new spillway, repairs to the embankment, construction of a new conduit through the existing embankment breach channel, and

placement of new riprap on both the upstream and downstream sides of the spillway. The estimated cost of the renovations is \$285,000.

PLAN DEVELOPMENT REVIEW PROCESS AND ADOPTION

As previously noted, Kenosha County’s initial all hazards mitigation plan was prepared under the guidance of a County advisory Task Force comprised of representatives of all of the communities within the County, as well as County businesses and agency representatives. That Task Force met three times during the plan preparation period to provide input on the types of hazards to be considered, the appropriate mitigation strategies, and to review the draft report chapters with the report chapters then being refined to reflect the comments and recommendations of the Task Force. Following completion of the first two chapters of the plan and after the plan was completed in draft form, public informational meetings were held to review the plan with local officials, businesses and industry, and citizens. Copies of the plan were sent to each of the local units of government requesting adoption of the plan and advising them of the need for such action in order to retain future eligibility for mitigation funding for the FEMA Hazard Mitigation Grant and Pre-Disaster Mitigation Programs administered by the Wisconsin Department of Military Affairs (DMA), Division of Emergency Management (DEM). In addition, County and SEWRPC staffs were available to meet with communities on an individual basis to review the plan and consider adoption and implementation steps.

The first update to the plan was prepared under the guidance of a County advisory Task Force comprised of representatives of all of the incorporated communities within the County, as well as County businesses and agency representatives. Where appropriate, the members of the original Task Force were reappointed for this plan update. The Task Force met three times during the plan preparation period to provide input on the types of hazards to be considered, the appropriate mitigation strategies, and to review the draft report chapters with those chapters then being refined to reflect the comments and recommendations of the Task Force.

This update to the plan was also prepared under the guidance of a County Local Planning Team comprised of representatives of all of the incorporated communities within the County, as well as County businesses and agency representatives. Where appropriate, the members of the original Task Force and/or the Task Force from the first plan update were reappointed for this plan update. The Local Planning Team met four times during the plan preparation period to provide input on the types of hazards to be considered, the appropriate mitigation strategies, and to review the draft report chapters with those chapters then being refined to reflect the comments and recommendations of the Task Force (see Appendix A).

As draft chapters of the updated plan were completed, copies were placed in downloadable form on the SEWRPC website and a webpage was available on this website on which members of the public could ask questions and

submit comment upon the draft plan update. Following completion of updates to the community profiles and the risk and vulnerability assessments sections of the plan and review of drafts of the corresponding chapters by the Local Planning Team, a public informational meeting was held to review these sections of the plan with local officials, business and industry, and citizens and solicit their input.

After the plan was completed in draft form, an additional public informational meeting was held to review the draft plan with local officials, businesses and industry, and citizens. Copies of the draft plan were made available at the offices of Kenosha County Emergency Management, the Kenosha County Housing Authority, and on the SEWRPC website.

Following a finding by FEMA that the plan was approvable after adoption, copies of the plan were sent to each of the local units of government requesting that they adopt the plan in order to retain future eligibility for mitigation funding for the FEMA Hazard Mitigation Grant, Flood Mitigation Assistance, Pre-Disaster Mitigation, Repetitive Flood Claims Grant, and Severe Repetitive Loss Programs administered by the Wisconsin DMA, DEM. Copies of the adopted resolutions approving the plan by the local units of government are included in Appendix M. In addition, County and SEWRPC staffs were available to meet with communities on an individual basis to review the plan update and consider adoption and implementation steps.

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08/28/15, 09/15/15, 10/23/15

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KENOSHA COUNTY HAZARD MITIGATION PLAN UPDATE: 2017-2021

Chapter I

INTRODUCTION AND BACKGROUND

TABLES

[Blue highlighting indicates additions or revisions to the previous edition of the plan.]

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Table I-1

JURISDICTIONS PARTICIPATING IN THE KENOSHA COUNTY ALL HAZARDS MITIGATION PLAN UPDATE: 2015-2016

Civil Division	Jurisdiction Status			
	New to the Plan	Continuing Participation	No Longer Participating	Never Participated
Cities				
Kenosha.....	--	X	--	--
Villages				
Bristol.....	--	X	--	--
Paddock Lake.....	--	X	--	--
Pleasant Prairie.....	--	X	--	--
Silver Lake ^a	--	X	--	--
Somers ^b	X	--	--	--
Twin Lakes.....	--	X	--	--
Towns				
Brighton.....	--	X	--	--
Paris.....	--	X	--	--
Randall.....	--	X	--	--
Salem ^a	--	X	--	--
Somers.....	--	X	--	--
Wheatland.....	--	X	--	--
County				
Kenosha County.....	--	X	--	--

^aOn November 21, 2016 the Wisconsin Department of Administration approved a cooperative plan submitted by the Village of Silver Lake and the Town of Salem. Effective February 14, 2017 the two municipalities merged to become the Village of Salem Lakes. As of February 14, 2017, the two municipalities merged to become the Village of Salem Lakes.

^bOn April 24, 2015, a portion of the Town of Somers incorporated as the Village of Somers. The Town has previously participated in the Kenosha County all hazards mitigation plan.

Source: SEWRPC.

Table I-2

PARTICIPATION IN THE KENOSHA COUNTY ALL HAZARDS MITIGATION PLAN UPDATE PLANNING PROCESS

Civil Division	Attendance at Local Planning Team Meetings				Attendance at Public Meetings		Provision of Data ^a	Review of Report
	April 22, 2015	October 23, 2015	May 5 2016	April, 27, 2017	May, 23 2016	May 2, 2017		
Cities Kenosha	X	X	--	X	--	--	X	X
Villages								
Bristol	X	X	X	--	--	--	X	X
Paddock Lake	X	X	--	--	--	--	X	X
Pleasant Prairie.....	X	X	X	X	--	--	X	X
Silver Lake ^b	--	--	--	--	X	--	X	--
Somers^c	X	--	--	--	--	--	--	X
Twin Lakes	X	X	X	--	--	--	--	X
Towns								
Brighton	X	--	--	--	--	--	--	--
Paris	--	--	--	--	--	--	--	--
Randall	--	--	--	--	--	--	--	--
Salem ^b	--	X	X	--	--	--	X	X
Somers	X	--	--	--	--	--	--	--
Wheatland	X	--	X	--	--	--	--	X
County Kenosha County.....	X	X	X	X	X	X	X	X

NOTE: X indicates participation by at least one representative of the municipality.

^aProvision of data includes providing information on hazards experienced, projects undertaken, and outreach efforts as well as sharing of relevant plans, reports, and concerns.

^bOn November 21, 2016 the Wisconsin Department of Administration approved a cooperative plan submitted by the Village of Silver Lake and the Town of Salem. Effective February 14, 2017 the two municipalities merged to become the Village of Salem Lakes. As of February 14, 2017, the two municipalities merged to become the Village of Salem Lakes.

^cOn April 24, 2015, a portion of the Town of Somers incorporated as the Village of Somers. The Town has previously participated in the Kenosha County all hazards mitigation plan.

Source: SEWRPC.

Table I-3

**OUTREACH ACTIVITIES BY LOCAL COMMUNITIES IN
KENOSHA COUNTY RELATED TO HAZARD MITIGATION: 2009-2014**

Community	Activity
Kenosha County	County Website Fox River Flood Mitigation Program webpages Division of Emergency Government webpages Division of Emergency Government Damage Hotline Ties to the Land Newsletter Contract with Root-Pike WIN for stormwater education and outreach
City of Kenosha	City Website Documentation of floodplain map revisions for Leona's and Strawberry Creek Subdivisions on City Website Contract with Root-Pike WIN for stormwater education and outreach Production and distribution of brochures on stormwater for stormwater utility
Village of Bristol	Village newsletter Village website Contract with Root-Pike WIN for stormwater education and outreach
Village of Paddock Lake	Village newsletter Village website
Village of Pleasant Prairie	Monthly newsletter Village website Text messages and email notifications Contract with Root-Pike WIN for stormwater education and outreach
Village of Silver Lake ^a	Village website Contract with Root-Pike WIN for stormwater education and outreach
Village of Twin Lakes	Village website
Town of Brighton	Public posting at three locations Town website
Town of Paris	Town website
Town of Randall	Town website
Town of Salem ^a	Town website Contract with Root-Pike WIN for stormwater education and outreach Email information notices
Town of Somers	Quarterly newsletter Town website Contract with Root-Pike WIN for stormwater education and outreach
Town of Wheatland	Town website

^aOn November 21, 2016 the Wisconsin Department of Administration approved a cooperative plan submitted by the Village of Silver Lake and the Town of Salem. Effective February 14, 2017 the two municipalities merged to become the Village of Salem Lakes. As of February 14, 2017, the two municipalities merged to become the Village of Salem Lakes.

Source: Kenosha County Division of Emergency Management, Local Municipalities, and SEWRPC.

Table I-4

HAZARD MITIGATION ACTIVITIES IN KENOSHA COUNTY: 2009-2014

Community	Project	Funding Source	Beginning Date	Completion Date
Kenosha County	Fox River Flood Mitigation Program	FEMA, Wisconsin Division of Emergency Management, Federal Community Development Block Grant, WDNR, County	1994	Ongoing
	Participation in National Flood Insurance Program Community Rating System (CRS)	Kenosha County	2013	Ongoing
	List of Cooling Center Sites	Kenosha County Health Department	--	Ongoing
	Petrifying Springs Park Dam Removal and Bridge Construction	Fund for Lake Michigan, WDNR, Great Lakes Restoration Fund, Sustain Our Great Lakes, Kenosha County		2012
	Comprehensive Bike Plan for Kenosha County 2025	Kenosha County	2012	2013
	Camp Lake Repetitive Loss Property Acquisition and Demolition	FEMA	2015	2015
City of Kenosha	Forest Park Area Storm and Sanitary Sewer Study	City	2009	2014
	Forest Park Area Sanitary Sewer Reconstruction Projects	City	--	2010
	Stormwater Management Plan	City	--	Ongoing
	Sanitary Sewer Rehabilitation and Manhole Rehabilitation Programs	City	--	Ongoing
	Storm Sewer Manhole and Inlet Rehabilitation Program	City	--	Ongoing
	Storm Sewer Rehabilitation Program	City	--	Ongoing
Village of Pleasant Prairie	Midwest Copier Property Stormwater Projects	U.S. Department of Housing and Urban Development Community Development Block Grant	2010	2012
Village of Twin Lakes	Elizabeth Lake Dam Spillway Repair	Village	2014	2014
Town of Somers	Highway E Interceptor Sewer	Village	2014	Summer 2015
	47th Avenue Deer Caution Sign Installation	Village	2014	2014

Source: Kenosha County Division of Emergency Management, Local Municipalities, and SEWRPC.

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SEWRPC Community Assistance Planning Report No. 278-3ED
KENOSHA COUNTY HAZARD MITIGATION PLAN UPDATE: 2017-2021

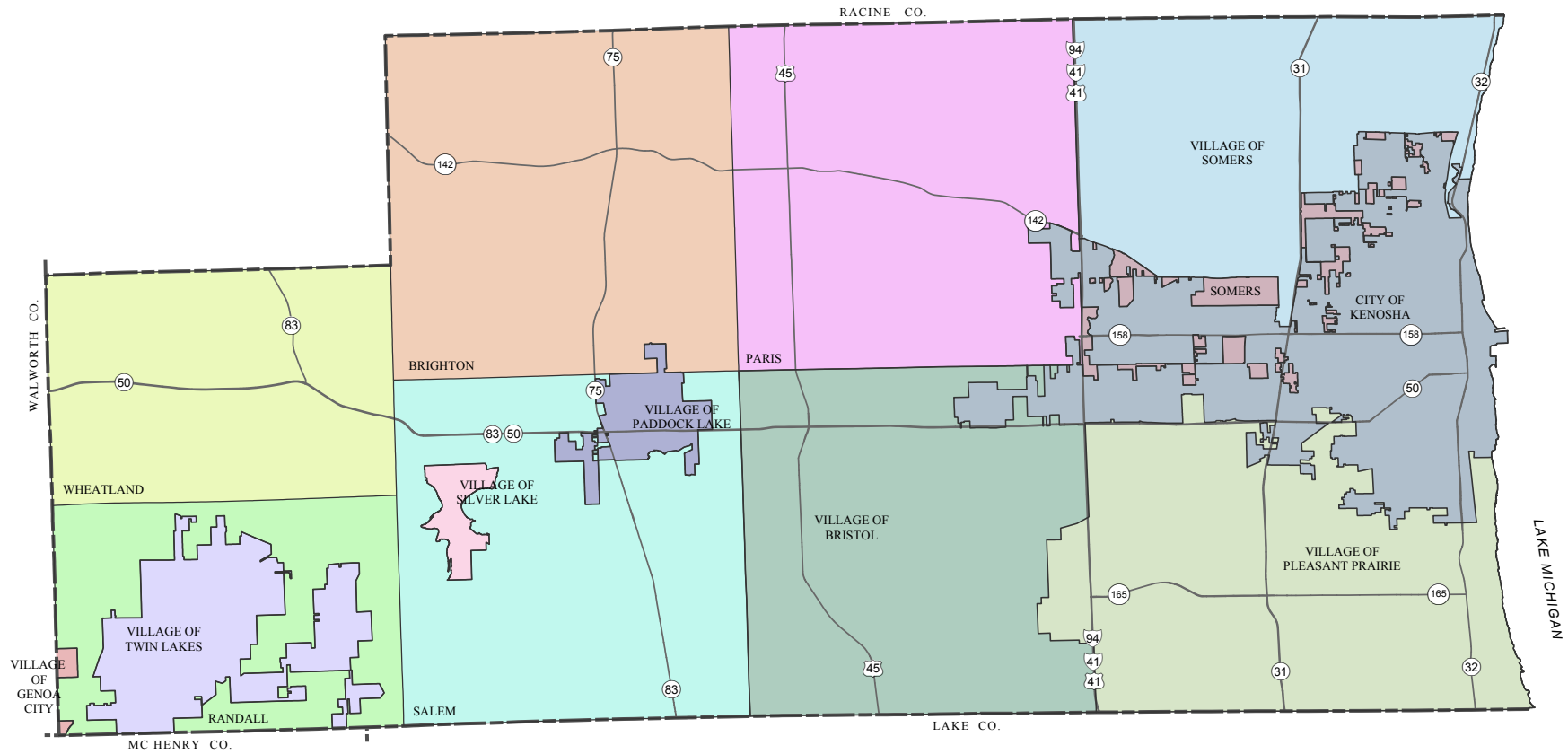
Chapter I

INTRODUCTION AND BACKGROUND

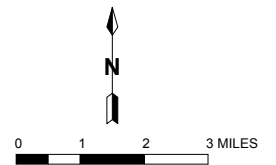
MAPS

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Map I - 1
CIVIL DIVISION BOUNDARIES IN KENOSHA COUNTY: 2016



Source: SEWRPC.



SEWRPC Community Assistance Planning Report No. 278-3ED

KENOSHA COUNTY HAZARD MITIGATION PLAN UPDATE: 2017-2021

Chapter II

BASIC STUDY AREA INVENTORY AND ANALYSIS

[Blue highlighting indicates additions or revisions to the previous edition of the plan.]

INTRODUCTION

Information on certain pertinent natural and built features and aspects of the study area is an important consideration in sound hazard mitigation planning. Accordingly, the collection and collation of definitive information regarding basic demographic characteristics, existing and planned land use, surface water and Lake Michigan shoreline system characteristics, transportation and utility systems, critical community facilities, and existing hazard management programs constitute an important step in the planning process. The resulting information is an important element to the planning process, since sound mitigation approaches cannot be formulated and evaluated without an in-depth knowledge of the relevant conditions in the study area.

CIVIL DIVISIONS

The geographic extent and functional responsibilities of civil divisions and special-purpose units of government are important factors to be considered in hazard mitigation planning, since these local units of government provide the basic structure of the decision-making framework, within which such planning must be addressed. The boundaries of the 14 civil divisions in Kenosha County are shown on Map I-1 in Chapter I of this report. There are six towns in Kenosha County, including Brighton, Paris, Randall, Salem, Somers, and Wheatland. In addition, there are seven villages, which include Bristol, Paddock Lake, Pleasant Prairie, Silver Lake, Somers, and Twin Lakes, and the City of Kenosha located within the County. Three changes in civil divisions have occurred since the adoption of the initial hazard mitigation plan. In December 2009, a portion of the Town of Bristol incorporated as the Village of Bristol. Subsequent to this, the Village of Bristol annexed the remaining portion of

the Town of Bristol. In April 2015, a portion of the Town of Somers incorporated as the Village of Somers.¹ The total land area and proportion of the County within each civil division is presented in Table II-1.

DEMOGRAPHIC AND ECONOMIC CHARACTERISTICS

Population

The area that is now Kenosha County was first included in the Federal census in 1850. Historical population levels in Kenosha County are provided in Table II-2. The resident population was 75,238 persons in 1950. Since then, Kenosha County has steadily continued to increase in population, with the greatest percent increase between the years of 1950 and 1960. As of 2010, there were 166,426 individuals residing in the County (Table II-2). The population in Kenosha County is expected to increase through the year 2035 by approximately 27 percent.

The City of Kenosha is the most populous municipality in the County, with 99,218 residents, or about 60 percent of the County's population, in 2010. The next most populous communities are the Village of Pleasant Prairie, with 19,719 residents and 12 percent of the County's population; and the Town of Salem with 12,067 residents and 7 percent of the County's population; and the Village of Somers, with an estimated 6,970 residents, and 4 percent of the County's population. Based upon the 2010 census data, two communities in Kenosha County experienced a relative population increase of more than 20 percent from 2000 to 2010. These communities include the Village of Pleasant Prairie and the Town of Salem.

Households

Trends in the number of households in the County are shown in Table II-3. The County experienced significant gains in the number of new households between 1970 and 2010. The rate of increase in the number of households has exceeded the rate of population increase. Between 1970 and 2010, the number of households increased by about 77 percent, compared to a population increase of 41 percent. With the number of households increasing at a faster rate than the population, the number of persons per household has decreased.

Employment

Trends in job growth in the County are set forth in Table II-4. The jobs are enumerated at their location and the data thus reflect the number of jobs within the County, including both full- and part-time jobs. A significant increase in the number of jobs may be expected to attract additional residents to the County, thus influencing population growth. As indicated in Table II-4, employment growth was significant in the County between 1970 and 2010, with an increase in the number of jobs from 42,715 to 74,900, or an increase of about 75 percent.

¹On November 21, 2016 the Wisconsin Department of Administration approved a cooperative plan submitted by the Village of Silver Lake and the Town of Salem. Effective February 14, 2017 the two municipalities merged to become the Village of Salem Lakes. As of February 14, 2017, the two municipalities merged to become the Village of Salem Lakes.

It should be noted, however, that of the employed Kenosha County residents—about 12,500 of the 74,900 workers in 2010, or about 17 percent—worked in Wisconsin outside of the County, and a substantial number of employed residents—about 23,700 workers, or about 27 percent of a labor force of 86,819, worked outside of the State.²

Property Value

The value of the real estate and personal property in a municipality reflects the upper end of the potential for property damages in each municipality. The equalized value as of 2014 of the real estate and personal property in Kenosha County and each of the general-purpose units of government in the County is shown in Table II-5.

LAND USE

Land use is an important determinant of the potential impact a particular hazard may have, and of actions which may be taken to mitigate the impacts of the hazard. Accordingly, an understanding of the amount, type, and spatial distribution of urban and rural land uses within the County is an important consideration in the development of a sound hazard mitigation plan. This section presents a description of the land uses in the County.

Existing Land Use

Land use in Kenosha County in 2010 is set forth on Map II-1 and in Table II-6. Urban land uses occupied about 42,581 acres or about 24 percent of the County in 2010. Intensive urban development, including most commercial, industrial, and multi-family residential development, is concentrated within or near the communities of Kenosha, Bristol, Pleasant Prairie, and Somers and along the IH 94 corridor. Much of the single-family residential development also occurred within or surrounding the County's urban centers, while scattered low density development occurred outside these communities amid predominantly rural areas. Single-family residential development was the largest component of urban land uses, encompassing about 19,093 acres, or 45 percent of the urban land uses and 11 percent of the total area of the County.

Land uses categorized as transportation, communication, and utilities constituted the second largest urban land use category in 2010, encompassing about 12,429 acres, or 29 percent of the area of all urban land and 7 percent of the total area of the County.

Major arterial highways serving the County include Interstate Highway (IH) 94/41, USH 45, State Trunk Highways (STH) 31, 32, 75, and 83, which traverse the County in a north-south direction; and STH 50, 142, 158,

²Based on U.S. Census Bureau 2010 American Community Survey estimates.

and 165, which traverse the County in a generally east-west direction. Other uses in the transportation, communications, and utilities category within the County include Metra, a commuter rail service line, Amtrak, three railway freight service lines, and four airports which serve the public, including Kenosha Municipal Airport which is the third busiest airport in the State. **A more detailed description of the County's transportation system is given later in this Chapter.**

Mobile homes can be particularly vulnerable to some hazards such as high winds. Map II-2 shows the locations of mobile home parks and individual mobile homes in Kenosha County. In **2010** there were **2,095** mobile homes located in the County. Most of these were located in 24 mobile home parks. In addition, there were five sites in the County that contained isolated individual mobile homes. Mobile home parks and isolated individual mobile homes are listed in Table II-7.

Planned Land Use

The planned urban areas delineated in the adopted year 2035 regional land use plan and the County comprehensive plan serve as the basis for the identification of all planned urban areas within the County.³ The year 2035 regional land use plan, as it applies to Kenosha County, is shown on Map II-3. Planned urban areas, which are shown on Map II-3, are associated with the City of Kenosha; and adjacent urban areas in the Towns of Randall, Salem, Somers, and the Villages of Bristol, Paddock Lake, Pleasant Prairie, Silver Lake, **Somers**, and Twin Lakes.

ENVIRONMENTAL CORRIDORS

The Southeastern Wisconsin Regional Planning Commission has identified and delineated those areas of Kenosha County having concentrations of natural, recreational, historic, aesthetic, and scenic resources that should be preserved and protected in order to maintain the overall quality of the environment. Such areas normally include one or more of the following seven elements of the natural resource base which are essential to the maintenance of both the ecological balance and the natural beauty of the Region: 1) lakes, rivers, and streams and the associated underdeveloped shorelands and floodplains; 2) wetlands; 3) woodlands; 4) prairies; 5) wildlife habitat areas; 6) wet, poorly drained, and organic soils, and 7) rugged terrain and high-relief topography. The foregoing seven elements constitute integral parts of the natural resource base. There are five additional elements that are important considerations in identifying and delineating areas with scenic, recreational, and educational value. These additional elements are: 1) existing outdoor recreation sites; 2) potential outdoor recreation and related

³*SEWRPC Planning Report No. 48, A Regional Land Use Plan for Southeastern Wisconsin: 2035, June 2006; SEWRPC Community Assistance Planning Report No. 299, A Multi-Jurisdictional Comprehensive Plan for Kenosha County: 2035, April 2010.*

open space sites; 3) historic, archaeological, and other cultural sites; 4) significant scenic areas, and 5) natural and scientific areas.

In southeastern Wisconsin, the delineation of these 12 natural resource and natural resource-related elements on maps result in an essentially linear pattern of relatively narrow, elongated areas which have been termed “environmental corridors” by SEWRPC. Primary environmental corridors include a wide variety of the aforementioned important resource and resource-related elements and are, by definition, at least 400 acres in size, two miles in length, and 200 feet in width. In Kenosha County in 2010 there were 29,176 acres of primary environmental corridors, or about 16 percent of the land area in the County. These generally lie along rivers and streams and adjacent to lakes, or are associated with woodlands, wetlands, or park and open space sites. Secondary environmental corridors generally connect with the primary environmental corridors and are at least 100 acres in size and one mile long. In Kenosha County there are 7,040 acres of secondary environmental corridors, or about 4 percent of the total land area in the County. These are located chiefly along the smaller perennial streams and intermittent streams in the County, including wetlands associated with these streams. In addition, smaller concentrations of natural resource features that have been separated physically from the environmental corridors by intensive urban or agricultural land uses have also been identified. These areas which are at least five acres in size are referred to as isolated natural resource areas. In Kenosha County there are 4,361 acres of isolated natural resource areas, or about 2 percent of the land area of the County. The Kenosha County environmental corridors are shown on Map II-4.

SURFACE WATER RESOURCES AND FLOOD HAZARD AREAS

Surface water resources, consisting of streams and lakes, form a particularly important element of the natural resource base. Surface water resources provide recreational opportunities, influence the physical development of the County, and enhance its aesthetic quality. Watershed boundaries, wetlands, and major streams and lakes within the County are shown on Map II-5.

Major streams are defined as those which maintain, at a minimum, a small continuous flow throughout the year except under unusual drought conditions. There are approximately 110 miles of such streams in Kenosha County, located within four watersheds: the Des Plaines River, Fox (Illinois) River, Pike River, and Root River watersheds. A fifth watershed encompasses those areas adjacent to Lake Michigan which drain directly into the Lake through 55 miles of intermittent streams. The Fox River watershed generally encompasses the western portion of the County and includes the Lower Fox (Illinois) River portion of the watershed. The Des Plaines River watershed covers the central portion from the northern border to the southern border of the County and includes the Des Plaines River, Jerome Creek, Kilbourn Road Ditch, Center Creek, Brighton Creek, and the Dutch Gap Canal. The Root River watershed encompasses a small portion in the northern part of the County and includes the

East Branch of the Root River Canal. The Pike River watershed, in the northeast portion of the County, includes the Pike River and Pike Creek.

There are 20 major lakes—that is, lakes of 50 acres or more—in Kenosha County. The major lakes include Benet Lake, Camp Lake, Center Lake, Cross Lake, Dyer Lake, George Lake, Hooker Lake, Lake Andrea, Lake Benedict, Elizabeth Lake, Lake Mary, Lake Shangri-La, Lilly Lake, Montgomery Lake, Paddock Lake, Powers Lake, Rock Lake, Silver Lake, Vern Wolf Lake, and Voltz Lake. There are eight lake management districts in the County which have responsibilities related to the protection, rehabilitation, and management of 11 lakes. These special-purpose units of government are listed in Table II-8.

Floodplains are the wide, gently sloping areas contiguous to, and usually lying on both sides of, a stream channel. For planning and regulatory purposes, floodplains are normally defined as the areas, excluding the stream channel, subject to inundation by the one-percent-annual-probability (100-year recurrence interval) flood event. There is a 1 percent chance of this event being reached or exceeded in severity in any given year. Floodplain areas are generally not well suited to urban development, not only because of the flood hazard, but also because of the presence of high water tables and, generally, of soils poorly suited to urban uses. Floodplain areas often contain important natural resources, such as high-value woodlands, wetlands, and wildlife habitat and, therefore, constitute prime locations for parks and open space areas.

Floodplains identified by Kenosha County, SEWRPC, and the Federal Emergency Management Agency are shown on Map II-5. Approximately 20,305 acres, or 11 percent of the total area of the County, are located within the one-percent-annual-probability flood hazard area. This total includes about 2,890 acres of approximately delineated floodplains. A consideration in flood hazard mitigation is the potential for increased flooding due to dam failures. Since there are several major and minor dams in Kenosha County, future evaluation of floodplain areas related to dam failure should be considered. Dams in the County that have been identified by the Wisconsin Department of Natural Resources (WDNR) are shown on Map II-6. As shown on Table II-8A, two of the 26 dams identified have been assigned a high hazard rating by the WDNR, indicating the potential for loss of human life as well as economic loss, environmental damage, or disruption of lifeline facilities during failure or misoperation of the dam. Another three dams have been assigned significant hazard ratings indicating the potential for economic loss, environmental damage, or disruption of lifeline facilities. Hazard potentials have not been assessed for 13 of the dams in the County. The unrated dams consist mostly of small dams.

All of the floodplain areas have been mapped on large-scale topographic mapping prepared at a scale of one inch equals 200 feet, with a contour interval of two feet. The floodplain mapping is shown on the FEMA digital flood insurance rate maps for Kenosha County which were finalized in 2012 and are available as a digital file layer for the Kenosha County cadastral mapping system which covers the entire County.

LAKE MICHIGAN SHORELINE EROSION HAZARD AREAS

Shoreline erosion and bluff stability conditions are important considerations in planning for the protection and sound development and redevelopment of lands located along the Lake Michigan shoreline. Shoreline erosion and bluff stability conditions in southeastern Wisconsin were surveyed in 1977⁴ and 1997,⁵ and in Kenosha County in 1989 and 1995. Such conditions can change over time since they are related, in part, to changes in, climate, water levels, the geometry of the onshore beach and nearshore areas, the extent and condition of shore protection measures, the type and extent of vegetation, and the type of land uses in shoreland areas. As of April 2015, water levels in Lake Michigan were about 0.2 foot above average levels, about 1.5 feet below the high levels which occurred in 1997, and about three feet above the low levels that occurred in January 2013. While higher water levels can benefit communities, businesses, and industries that depend on Great Lakes waters for commercial shipping, hydropower, recreational boating, and tourism, they can lead to negative impacts such as coastal erosion, flooding, and property damage along the shoreline. While low water levels have the effect of reducing the shoreline erosion due to scour at the base, there are other situations where the shoreline can be negatively affected by low levels. In addition, low water levels can adversely affect shipping, power generation, and tourism. Given the cyclic nature of the Great Lakes, a return to lower lake levels may occur in the future.

The 1997 Lake Michigan shoreline recession and bluff stability study in southeastern Wisconsin included evaluations of lands along the Lake Michigan shoreline in Kenosha, Milwaukee, Ozaukee, and Racine Counties that directly affect, or are directly affected by shoreline erosion, bluff recession, and storm damage processes. This relatively narrow strip of land along the Lake Michigan shoreline extends approximately 89 miles from the Wisconsin-Illinois state line to the Ozaukee-Sheboygan county line, including 12 miles in Kenosha County. For analytical purposes, the Lake Michigan shoreline was divided into 17 reaches, including three reaches within or partially within Kenosha County, as shown on Map II-7. These reaches were selected to have relatively uniform beach and bluff characteristics. These reaches generally correspond to those utilized in the 1977 shoreline erosion study, with some refinement to reflect 1997 conditions.

During 1995, field surveys were conducted to measure the geometry of the bluff slope at 192 sites in southeastern Wisconsin, including 14 sites in Kenosha County. These measurements provided a basis for site-specific

⁴D.M. Mickelson, L. Acomb, N. Brouwer, T.B. Edil, C. Fricke, B. Haas, D. Hadley, C. Hess, R. Klauk, N. Lasca, and A.F. Schneider, *Shore Erosion Study, Technical Report, Shoreline Erosion and Bluff Stability Along Lake Michigan and Lake Superior Shorelines of Wisconsin, Wisconsin Coastal Management Program, February 1977.*

⁵SEWRPC *Technical Report No. 86, Lake Michigan Shoreline Recession and Bluff Stability in Southeastern Wisconsin: 1995, December 1997.*

assessments of the bluff conditions at the selected locations. In addition, beach and nearshore lakebed conditions were measured for selected sites in Kenosha County.

Based upon the data collected and the assessment and analysis of that data, bluff stability and shoreline erosion conditions were developed and are summarized graphically on Map II-7. Within Kenosha County, at 13 of the 14 sites evaluated, the bluffs were found to be stable with the remaining site having unstable conditions based upon the 1995 survey. Where comparable data existed, the 1995 survey generally found bluff stability had improved compared to 1977 conditions. This is likely due to the construction of shoreline protection measures in areas of development.

Increases in offshore depths can cause increased shore erosion problems. At the five sites in Kenosha County where offshore bathymetry was measured in 1995 and compared to 1977 data, changes in depths were not definitive. However, at the seven sites in neighboring northern Racine County, where offshore bathymetry was measured, four sites showed significant improvement with decreases in depth, while the others showed little change.

The current Lake Michigan shoreline conditions indicate relatively stable conditions for the most part in areas where shoreline development exists. However, there is the potential for shoreline and bluff erosion to impact structures over time. In addition, during severe climatic conditions, such as high water levels or saturated ground conditions, large episodic bluff erosion events could occur. Accordingly, these conditions are an important consideration in the County's hazard mitigation planning.

TRANSPORTATION SYSTEM

The transportation system of Kenosha County provides the basis for movement of goods and people into, out of, through, and within the County. An efficient transportation system is essential to the sound social and economic development of the County and of the Region of which the County is a part. An understanding of the existing transportation system is also a factor to be considered in hazard mitigation planning for the County. Accordingly, this section presents a description of existing transportation facilities in Kenosha County. Included are descriptions of the existing arterial street and highway system, public transit facilities, railway facilities, and airport facilities.

Arterial Streets and Highways

The arterial street and highway system serving Kenosha County is shown on Map II-8. As shown on Map II-8, the existing arterial network in the eastern portion of the County is relatively densely spaced with arterials occurring at about one-mile intervals in both the north-south and east-west directions. IH 94 traverses the entire County in a north-south direction. The existing arterial network in the rest of the County is less-densely spaced, with arterials

occurring at about two- to three-mile intervals. The jurisdictional responsibilities for the arterial street and highway system are also shown on Map II-8.

The traffic-carrying capacity of the arterial street system, while dependent upon a number of factors, is primarily a function of the number of traffic lanes and the type of facility. As shown in Table II-9, a two-lane arterial generally has a design capacity of about 14,000 vehicles per average weekday, a four-lane undivided arterial has a design capacity of about 18,000 vehicles per average weekday, a four-lane arterial with a two-way left turn lane has a design capacity of about 21,000 vehicles per average weekday, a four-lane divided arterial has a design capacity of about 27,000 vehicles per average weekday, a six-lane divided arterial has a capacity of about 38,000 vehicles per average weekday, and an eight-lane divided arterial has a capacity of about 50,000 vehicles per average weekday. The design capacities cited are for urban arterials typically having urban cross-sections with curb and gutter and auxiliary parking lanes, which can also serve as distress lanes and, importantly, serve as bypass lanes at intersections. The traffic capacities of urban arterials are established by the capacity of the intersections with other arterial streets, which are typically controlled by traffic signals. As also shown in Table II-9, a four-lane freeway has a design capacity of about 60,000 vehicles per average weekday, a six-lane freeway has a design capacity of about 90,000 vehicles per average weekday, and an eight-lane freeway has a design capacity of about 120,000 vehicles per average weekday.

Public Transit Facilities

City and County of Kenosha Systems

The City of Kenosha provides central fixed-route bus service within the City of Kenosha and surrounding business parks. Specialized transportation service is available to the elderly and persons with disabilities. Kenosha County, through the Kenosha County Department of Aging, runs the Kenosha County Care-A-Van program: a specialized transportation service available to the elderly and persons with disabilities. In September 2007, the Kenosha County Department of Human Services initiated the operation of public transit services in western Kenosha County which includes fixed-route bus service for the Twin Lakes, Silver Lake, and Paddock Lake areas and advance-reservation door-to-door service for the remaining portions of western Kenosha County or for those who cannot use the bus services because they are disabled.

Since 2000, Kenosha Area Transit has also operated a 1.7-mile streetcar loop in the City of Kenosha's downtown central business district. The electric streetcar line connects the central transfer terminal for the bus routes, the Metra commuter rail station, the Kenosha central business district, and the Harbor Park residential development.

Kenosha-Racine-Milwaukee Service

The City of Kenosha, in a joint effort with the City of Racine and Kenosha and Racine Counties, provides commuter bus service between downtown Milwaukee and the Kenosha and Racine areas. The commuter bus service is provided through a contract with a private transit operator.

Railway Facilities

As of 2015, railway freight service was being provided within Kenosha County by three railway companies operating active mainline railway lines. As shown on Map II-9, the Union Pacific Railroad provided freight service over two parallel segments emanating from Chicago, both segments traversing the eastern tier of communities in a north-south direction. The Canadian Pacific Rail System, formerly known as the Soo Line, provided freight service over a line emanating from Chicago and traversing the entire County east of IH 94 in a north-south direction. The Canadian National Railway, formerly the Wisconsin Central, Ltd., provided freight service over a north-south main line, traversing the western edge of the County.

An intercity passenger rail service, Metra, utilizes the Union Pacific Railway line from downtown Kenosha, starting at 54th Street and traversing the County in a south direction. Metra operates between Kenosha and Chicago. Amtrak operates on the Canadian Pacific Rail line as it runs through Kenosha County along the route from Milwaukee to Chicago.

As previously described, Kenosha Area Transit operates a 1.7-mile streetcar loop in the City of Kenosha's downtown central business district.

Airports

Kenosha County has one publicly owned airport which serves the public: Kenosha Regional Airport, which is owned and operated by the City of Kenosha. This airport is intended to serve all single-engine aircraft, virtually all twin-engine piston and turboprop aircraft, helicopters, and most business and corporate jets. As of 2015, there were a total of 240 aircraft based at this airport and total operations included about 52,900 flights per year. There are also three other airports under private ownership that serve the public: Camp Lake Airport (Town of Salem), Vincent Airport (Town of Randall), and Westosha Airport (Village of Twin Lakes). As of the year 2015, there were a total of 288 aircraft based in Kenosha County, a level which has increased slightly since 2008. The public-use airports in the County are shown on Map II-10. In addition to these public-use airports, there are a number of private airports and heliports in and adjacent to Kenosha County which are also shown on Map II-10.

UTILITY SYSTEMS

Utility systems are among the most important and permanent elements of urban growth and development, as urban development is highly dependent upon utility systems providing electricity, natural gas, communications, water, and sewerage. Because of this reliance, utility systems are an important consideration in hazard mitigation planning.

Public and Private Water Supply Systems

As of the year 2010, about 25 percent of the residents of the County utilized private systems relying on groundwater as a water supply source for domestic use. The remaining 75 percent of County residents have access to public water supply systems, with about 74 percent being served by systems that use surface water as a source of supply and about 1 percent being served by systems that use groundwater as a source of supply. The areas served by public water supply are shown on Map II-11. Of the persons served by public water supply, those residing in the City of Kenosha and portions of the Village of Pleasant Prairie, portions of the Village and Town of Somers, and the northeastern portion of the Village of Bristol receive water from the Kenosha Water Utility, which uses Lake Michigan as its supply.

The public water supply systems serving the northwestern portion of the Village of Bristol and the Paddock Lake Municipal Water Utility utilize groundwater as a supply. In addition, there are several privately owned water systems operating in Kenosha County. These systems provide water primarily to residential subdivisions, apartments and condominium developments, and mobile home parks. These other than municipal community water systems utilize groundwater as a source of supply.

The uses of groundwater, as well as surface water, are summarized in Table II-10. As shown in Table II-10, approximately 13.5 million gallons per day (mgd) of Lake Michigan-derived surface water and about 0.3 mgd of groundwater supply were used by public water utility systems in the County in 2010. Considering all water uses, including industrial, commercial, agricultural, and private water supply, 13.6 mgd of surface water and 3.0 mgd of groundwater were used. The City of Kenosha operates a water treatment plant utilizing Lake Michigan as a source of supply. That plant provides the source of supply for all the areas noted to be served by a surface water supply, as shown on Map II-11. The remaining areas in the County served by public water supplies rely on groundwater pumping and treatment systems as a source of supply.

The protection of the public water supply facilities from potential contamination is a consideration for hazard mitigation planning. As such, well head protection planning and monitoring of water supply intake, treatment, storage, and distribution systems is an important potential plan element.

Sanitary Sewer Service Systems

Much of Kenosha County lying east of IH 94 is served by public sanitary sewer service, as shown on Map II-12. The far-eastern portion of the County has the highest concentration of areas served by public sanitary sewer systems, with other public sanitary sewer service areas located in the Town of Salem, and the Villages of Bristol,

Paddock Lake, Silver Lake, and Twin Lakes. The existing and planned sewer service areas within the County are shown on Map II-12.⁶

Private Utilities

Kenosha County is provided with electric power service by We Energies and **Wisconsin Power and Light**. Electric power service is available on demand throughout the County. In Kenosha County, electric power is generated by the Pleasant Prairie power plant and by the Paris Power Plant, a peak gas-fired facility. Both plants are operated by We Energies. Electric power is also provided to the electric power system from Waste Management's Pheasant Run Landfill Gas-To-Energy facility. American Transmission Company owns, maintains, and operates the major transmission facilities located in Kenosha County. The electric service providers and the areas they serve in Kenosha County are shown on Map II-13.

Natural gas service is provided for the entire County by We Energies Gas Operations. We Energies is the distributor of natural gas. In Kenosha County the main gas supply is primarily provided by ANR Pipeline Company, which owns main and branch gas pipelines in the County and the surrounding area. In addition, the We Energies gas system is connected to other major gas pipelines outside of, but in the vicinity of, Kenosha County. Natural gas service is available on demand throughout Kenosha County.

Liquid petroleum is also transported through Kenosha County by a main line owned and operated by West Shore Pipeline. The natural gas and liquid petroleum pipelines that cross Kenosha County are mainly used as major feeder lines between the cities of Milwaukee and Chicago.

Telephone service within Kenosha County is provided through a number of telephone companies. The service areas of the various operators are shown on Map II-14. In general, telephone service is available on demand throughout the County. There is also an extensive system of cellular telecommunication facilities in Kenosha County.

Solid Waste Disposal

Landfills are a potential factor in hazard mitigation planning. Landfilling and recycling are the primary methods of managing solid wastes generated in Kenosha County. As of **2015**, there is one active, licensed, privately owned and operated sanitary landfill accepting municipal waste, the Waste Management Pheasant Run Recycling and Disposal Landfill within the Town of Paris, and one active, licensed privately owned and operated industrial waste landfill accepting coal combustion by-products, the We Energies, Pleasant Prairie Power Plant Ash landfill

⁶The Village of Pleasant Prairie **has abandoned** the two wastewater treatment plants shown on Map II-12. **As of the end of 2010**, the Village **is** served by the Kenosha wastewater treatment plant.

within the Village of Pleasant Prairie. There are 39 total licensed landfills and other solid waste disposal sites in Kenosha County. Most of the inactive landfill sites have undergone proper closure procedures specified by the Wisconsin Department of Natural Resources. The location of the solid waste disposal sites in Kenosha County are shown on Map II-15. Appendix B lists the location and the owner of these sites.

PUBLIC SAFETY FACILITIES AND SERVICES

The type and location of public safety facilities are an important consideration in hazard mitigation planning because of the potential direct involvement of such facilities in certain hazard situations. The location of the fire stations, emergency medical rescue departments, police stations, sheriff offices, and correctional facilities in Kenosha County are shown on Maps II-16 through II-18. A listing of these facilities is included in Appendix C. The location of these stations in relationship to the floodplain areas are indicated as a basis for further analysis described in Chapter III.

Fire Suppression and Rescue Services

All of the 13 local units of government in Kenosha County either own or contract for fire or emergency medical service suppression services. The locations of each of the fire stations and the fire service areas within Kenosha County are shown on Map II-16. Table II-11 provides information about the working status of fire fighters within each system—that is, whether they are full-time, volunteer, or paid on-call volunteer, or some combination thereof.

A variety of remote fire suppression systems are also present in Kenosha County. Throughout the County, fire departments, municipalities, and schools have installed devices such as fire suppression cisterns and dry hydrants to aid in fire suppression activities.

Each of the fire suppression departments in Kenosha County, except the Towns of Brighton, Randall, and Wheatland, and the Village of Paddock Lake, independently maintains an emergency medical service. Salem Rescue and Silver Lake Rescue provide rescue services in the Town of Brighton. Silver Lake Rescue and Twin Lakes Fire and Rescue provide rescue services in the Towns of Randall and Wheatland. Village of Paddock Lake rescue service is provided by Salem Rescue. In the case of all jurisdictions, except the Village of Silver Lake, (which maintains a private nonprofit rescue service) rescue service is provided by a publicly sponsored fire or fire and rescue department. The emergency medical service areas in Kenosha County are shown on Map II-17.

All of the fire and rescue departments in Kenosha County participate in a mutual aid agreement with each other and numerous other Illinois and State of Wisconsin fire and rescue departments, and through a Mutual Aid Box Alarm System (MABAS) agreement. This agreement enables each department to render assistance to, and receive assistance from, other departments in the County as needed to respond to fire and rescue emergencies. Under the

agreement, departments render assistance without charge to the extent of available resources not required for the protection of their own service areas. This agreement enables individual departments to significantly supplement their own personnel, apparatus, and equipment with that from other departments in responding to emergencies. Importantly, the agreement allows individual departments to access equipment, such as tankers, aerial trucks, and extrication equipment, which they themselves do not possess and which they may only need infrequently.

In addition to the County mutual aid agreement, each department has reciprocal mutual aid agreements with one or more neighboring departments. Some of these are formal, written agreements; others are unwritten. Many departments have indicated that they would respond to any request for mutual aid, whether or not there is a mutual aid agreement, provided that they are able to do so without jeopardizing their own services.

Fire departments in the County participate in several specialized response teams. The Kenosha County Dive team consists of paid and volunteer members of the County's fire, rescue, police and sheriff's departments. This team provides emergency response of trained personnel and equipment in water-related life-threatening situations, recovery of drowning victims, and search and recovery of crime evidence within the jurisdictional waters of Kenosha County. The Confined Space Rescue Team responds to any rescue involving victims trapped or incapacitated in an area having limited or restricted means for entry or exit. The High Angle Rescue Team responds to any rescue that requires rope and related equipment necessary to safely gain access to, and remove victim(s) from, hazardous areas with limited access such as water towers, ravines, high-rise buildings, above or below grade structures or terrain by means of a rope system. The Structural Collapse Rescue Team conducts search and rescue operations for victims at a structural collapse incident. The Trench Rescue Team responds to any incident involving victims trapped in a narrow excavation made below the surface of the ground. The Hazardous Materials Team responds to incidents involving hazardous materials. This team is responsible for identifying hazardous materials, assessing the hazard and risk associated with incidents, implementing control procedures, performing containment and confinement operations, rendering the incident area safe, and performing decontamination procedures.

Law Enforcement

Three of the 13 municipalities in Kenosha County provide for law enforcement through full-time police departments. In the remaining municipalities primary law enforcement is provided through the Kenosha County Sheriff's Department. In addition, the Town of Wheatland provides limited law enforcement through a Town constable and the Town of Salem provides limited law enforcement through public safety and water patrol officers. The University of Wisconsin-Parkside also has a law enforcement agency that patrols County and State roads adjacent to the campus. The location of local law enforcement stations in Kenosha County is shown on Map II-18. That map also shows the location of the State of Wisconsin, Department of Corrections, correctional facilities and County detention centers in Kenosha County.

The law enforcement agencies within Kenosha County have several special-purpose units and teams. The Kenosha County Bomb Squad operates under the authority of the Kenosha County Sheriff's Department and is made up of members from the Sheriff's Department, the City of Kenosha Police Department, and the City of Kenosha Fire Department. Members of this team have specialized training in handling suspected explosive devices, suspicious packages, bomb threats, and fireworks storage and disposal. The Sheriff's Department also has canine, all-terrain vehicle, and marine units. The City of Kenosha Police Department's special teams include a bike patrol and a canine unit. There are two special weapons and tactics (SWAT)-type teams within the County in the Sheriff's Department and City of Kenosha Police Department.

CRITICAL COMMUNITY FACILITIES

In addition to fire stations and law enforcement stations, as described above, other community facilities which are of importance in hazard mitigation planning include schools, government administration buildings, hospitals and major clinics, child day care centers, and nursing homes. Maps II-19 through II-23 show the locations of selected types of critical community facilities within Kenosha County. Because of the need for access to and from these facilities, the hazard mitigation plan includes their location. This relationship is discussed in Chapter III. A listing of the critical community facilities is included in Appendix D.

HAZARDOUS MATERIAL STORAGE AND USE

Public Law 99-499, the Superfund Amendment and Reauthorization Act (SARA/Title III) of 1986, and Wisconsin Act 342 set forth requirements for hazardous material reporting and safety planning. The primary reporting and centralized record-keeping related to hazardous materials is carried out under a partnership program involving the industries and other users of hazardous materials, the Wisconsin Division of Emergency Management, county emergency management departments/local emergency planning committees, and the local fire departments. In 2015, there were 229 identified users of extremely hazardous substances in Kenosha County. Of these facilities, 58 were classified as planning facilities, 118 were classified as reporting facilities, and 53 were classified as both planning facilities and reporting facilities. Reporting facilities are any facility that uses, stores, or produces chemicals at or above 10,000 pounds. Because there is no "hazardous chemical" list, the general assumption is that anything requiring the completion of a material safety data sheet (MSDS) is included as a reporting requirement. Reporting facilities include manufacturers, warehouses, and petroleum storage site operators. Planning facilities include a wide range of users of limited amounts of hazardous materials. In addition to industrial materials, the agricultural industry routinely uses materials considered extremely hazardous. These uses range from individual farm use materials to large chemical storage facilities.

The 229 facilities which are noted above as storing or producing hazardous materials are located throughout Kenosha County, as summarized in Table II-12. A detailed listing of these facilities and location by address is available at the Kenosha County Office of Emergency Management.

Between 2012 and 2014, Kenosha County averaged less than 10 hazardous material spills or releases per year, almost all of which were minor. The majority of these incidents involved diesel fuel, mineral oil, engine waste oil, or other petrochemical substances. Historically, the most serious incidents have involved chlorine, anhydrous ammonia, sulfuric acid, PCBs, pesticides, liquid oxygen, phosgene gas, and nitric acid. A complete file on all spills is maintained by the Kenosha County Office of Emergency Management. These spills have typically been properly handled through local emergency response actions.

HISTORIC SITES

Historic sites in Kenosha County often have important recreational, educational, and cultural value. Certain sites of known historic significance are listed on the National Register of Historic Places. In 2015, there were 23 individual sites, three historic districts, and one mound site⁷ within the County listed on the National Register. The location of sites and districts in Kenosha County listed on the National Register of Historic Places in 2015 are presented on Table II-13 and on Map II-24, respectively.

REGULATIONS AND PROGRAMS RELATED TO HAZARD MITIGATION

The current ordinances and programs which are most directly related to hazard mitigation and plan implementation include general zoning, floodplain zoning, shoreland or shoreland-wetland zoning regulations, stormwater management, and emergency operations programs. The zoning ordinances and operations programs most related to hazard mitigation administered by Kenosha County and the local units of government in the County are summarized in Table II-14, and below.

General Zoning

Cities in Wisconsin are granted general, or comprehensive, zoning powers under Section 62.23 of the *Wisconsin Statutes*. The same powers are granted to villages under Section 61.35 of the *Wisconsin Statutes*. Counties are granted general zoning powers within their unincorporated areas under Section 59.69 of the *Wisconsin Statutes*. However, a county zoning ordinance becomes effective only in those towns that ratify the county ordinance. Towns that have not adopted a county zoning ordinance may adopt village powers and subsequently utilize the city and village zoning authority conferred in Section 62.23 of the *Wisconsin Statutes*. Town zoning, however, is

⁷A historic district is a geographically definable area, urban or rural, that contains a concentration of significant historic sites or structures from the same period of time.

subject to county board approval where a general county zoning ordinance exists. Alternatively, towns may adopt a zoning ordinance under Section 60.61 of the *Wisconsin Statutes* where a general county zoning ordinance has not been adopted, but only after the county board fails to adopt a county ordinance at the petition of the governing body of the town concerned. General zoning is in effect in the unincorporated areas of the County, including all of the towns in the County and is jointly administered by Kenosha County and the towns. General zoning in the City of Kenosha and all of the villages within the County is administered individually by the municipalities.

Floodplain Zoning

Section 87.30 of the *Wisconsin Statutes* requires that counties, with respect to their unincorporated areas, cities, and villages adopt floodplain zoning to preserve floodplain areas and to prevent the location of new flood-damage-prone development in flood hazard areas. The minimum standards that such ordinances must meet are set forth in Chapter NR 116, “**Wisconsin's Floodplain Management Program,**” of the *Wisconsin Administrative Code*. The required regulations govern filling and development within a regulatory floodplain, which is defined as the area subject to inundation by the one-percent-annual-probability (100-year recurrence interval) flood event. Under Chapter NR 116, local floodplain zoning regulations must prohibit nearly all forms of development within the floodway, which is that portion of the floodplain required to convey the one-percent-annual-probability peak flood flow. Local regulations must also restrict filling and development within the flood fringe, which is that portion of the floodplain located outside of the floodway that would be covered by floodwater during the one-percent-annual-probability flood. Permitting the filling and development of the flood fringe area, however, reduces the floodwater storage capacity of the natural floodplain, and may thereby increase stream flood flows and stages. The County Shoreland and Floodplain Zoning Ordinance applies in all of the unincorporated areas of the towns in Kenosha County. All incorporated cities and villages where floodplains have been identified have adopted floodplain zoning ordinances.⁸

Shoreland and Shoreland-Wetland Zoning

Under Section 59.692 of the *Wisconsin Statutes*, counties in Wisconsin are required to adopt zoning regulations within statutorily defined shoreland areas, or, those lands that are within 1,000 feet of **the ordinary high water mark (OHWM) of** a navigable lake, pond, or flowage, or 300 feet of **the OHWM of** a navigable stream, or, to the landward side of the floodplain, whichever distance is greater, within their unincorporated areas. Standards for county shoreland zoning ordinances are set forth in Chapter NR 115, “Wisconsin's Shoreland Protection Program,” of the *Wisconsin Administrative Code*.⁹ Chapter NR 115 sets forth requirements regarding lot sizes and

⁸*It is anticipated that the County ordinance will continue to apply on an interim basis as the Village of Somers organizes following incorporation.*

⁹*The 2015-2017 State Budget (Act 55) changed State law relative to shoreland zoning. Under Act 55 a shoreland zoning ordinance may not regulate a matter more restrictively than it is regulated by a State shoreland-zoning standard unless the matter is not regulated by a standard in Chapter NR 115, “Wisconsin’s Shoreland Protection (Footnote Continued on Next Page)*

building setbacks; restrictions on cutting of trees and shrubbery; and restrictions on filling, grading, lagooning, dredging, ditching, and excavating that must be incorporated into county shoreland zoning regulations. In addition, Chapter NR 115 requires that counties place all wetlands five acres or larger and within the statutory shoreland zoning jurisdiction area into a wetland conservancy zoning district to ensure their preservation after completion of appropriate wetland inventories by the Wisconsin Department of Natural Resources. Aside from wetlands within the shoreland zone, selected wetlands generally five acres and larger are also placed into conservancy zoning outside the shoreland zone in the unincorporated areas of the County.

In 1982, the State Legislature extended shoreland-wetland zoning requirements to cities and villages in Wisconsin. Under Sections 62.231 and 61.351 of the *Wisconsin Statutes* cities and villages, respectively, in Wisconsin are required to place wetlands five acres or larger and located in statutory shorelands into a shoreland-wetland conservancy zoning district to ensure their preservation. Minimum standards for city and village shoreland-wetland zoning ordinances are set forth in Chapter NR 117, “Wisconsin's City and Village Shoreland-Wetland Protection Program,” of the *Wisconsin Administrative Code*.

County shoreland-wetland zoning ordinances are in effect in all unincorporated areas of Kenosha County. All of the incorporated municipalities within the County have adopted their own shoreland-wetland zoning ordinances pursuant to Sections 62.231 and 61.351, respectively, of the *Wisconsin Statutes*.¹⁰

An important element of the Kenosha County and City of Kenosha shoreland zoning ordinances relates to the regulation of land use activities and facilities along the Lake Michigan shoreline where shoreline erosion hazards exist. In the case of the County ordinance, provisions are included related to shoreline erosion protection, including defining pertinent terms, designating the lands to be regulated, specifying the necessary regulation of land use and facility location, specifying the regulation of certain land disturbance activities, designating setback distances, and describing procedures for modifying the extent of the designated setbacks.

The Lake Michigan shoreland protection provisions of the ordinance have been based upon recommendations of a Lake Michigan coastal erosion management technical committee which guided the preparation of a Lake

(Footnote Continued from Previous Page)

Program,” of the Wisconsin Administrative Code. (Examples of unregulated matters may involve wetland setbacks, bluff setbacks, development density, and stormwater standards.) In addition, under Act 55, a local shoreland zoning ordinance may not require establishment or expansion of a vegetative buffer on already developed land and may not establish standards for impervious surfaces unless those standards consider a surface to be pervious if its runoff is treated or is discharged to an internally drained pervious area.

¹⁰*It is anticipated that the County ordinance will continue to apply on an interim basis as the Village of Somers organizes following incorporation.*

Michigan coastal erosion management study for Kenosha County.¹¹ That study recommended, and the current ordinance reflects, different shoreline setbacks for areas designated for development and structural shoreline protection and for areas of limited development where no structural protection measures are envisioned. Additional information on the erosion management study is provided in Chapters III and V.

Emergency Operations Planning

In January 2013, Kenosha County adopted a comprehensive emergency management plan. The County plan includes procedures and protocols to respond to disasters or large-scale emergencies. The purpose and goal of the County emergency operations plan is to assist government in protecting lives, property, and the environment from major emergencies through addressing the areas of mitigation, preparedness, response, and recovery. This basic plan is intended as the core of the Kenosha County emergency operations program. It provides policy for department and agency managers and emergency management professionals to use in planning and actual operations. In response to a disaster or large-scale emergency, all local government forces, including law enforcement, fire, medical, health, public works, and others, will be considered a part of the County's emergency management organization, and will be the first line responders to such an emergency. When the emergency or disaster exceeds the capability of the local governments and the County to respond, the County will request assistance from the State of Wisconsin on behalf of the County and the affected municipalities. The Federal government will provide assistance to the State of Wisconsin when all local and State resources have been exhausted.

In addition, many of the local units of government have developed emergency operations plans and/or programs which complement the County plan and which also sets forth procedures and actions to deal with a range of situations and events.

¹¹SEWRPC Technical Report No. 36, Lake Michigan Shoreline Recession and Bluff Stability in Southeastern Wisconsin: 1995, December 1997.

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SEWRPC Community Assistance Planning Report No. 278-3ED

KENOSHA COUNTY HAZARD MITIGATION PLAN UPDATE: 2017-2021

Chapter II

BASIC STUDY AREA INVENTORY AND ANALYSIS

TABLES

[Blue highlighting indicates additions or revisions to the previous edition of the plan.]

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Table II-1

**AREAL EXTENT OF CIVIL DIVISIONS
IN KENOSHA COUNTY: 2016**

Civil Division	Area (square miles)	Percentage of County Area
Cities		
Kenosha	27.9	10.0
Villages		
Bristol.....	33.1	11.9
Genoa City	0.2	<0.1
Paddock Lake.....	3.1	1.1
Pleasant Prairie	33.6	12.1
Silver Lake ^a	1.4	0.5
Somers ^b	25.3	9.1
Twin Lakes	10.0	3.6
Towns		
Brighton	35.8	12.8
Paris	35.2	12.7
Randall	13.9	5.0
Salem ^a	31.9	11.5
Somers ^b	2.9	1.0
Wheatland	24.1	8.7
Total	278.4	100.0

^aOn November 21, 2016 the Wisconsin Department of Administration approved a cooperative plan submitted by the Village of Silver Lake and the Town of Salem. Effective February 14, 2017 the two municipalities merged to become the Village of Salem Lakes.

^bOn April 24, 2015, a portion of the Town of Somers incorporated as the Village of Somers.

Source: U.S. Bureau of the Census and SEWRPC.

Table II-2

**RESIDENT POPULATION
LEVELS IN KENOSHA COUNTY: 1950-2035**

Year	Population	Change from Preceding Year Listed	
		Absolute	Percent
1950	75,238	--	--
1960	100,615	25,377	33.7
1970	117,917	17,302	17.2
1980	123,137	5,212	4.4
1990	128,181	5,044	4.1
2000	149,577	21,396	16.7
2010	166,426	16,849	11.3
2035 ^a	212,000	45,574	27.4

^aIntermediate growth projection from *SEWRPC Technical Report No. 11, The Population of Southeastern Wisconsin, (5th Edition), April 2013.*

Source: U.S. Bureau of the Census and SEWRPC.

Table II-3

**NUMBER OF HOUSEHOLDS IN
KENOSHA COUNTY: 1970-2035**

Year	Number of Households	Change from Preceding Census	
		Number	Percent
1970	35,468	--	--
1980	43,064	7,596	21.4
1990	47,029	3,965	9.2
2000	56,057	9,028	19.2
2010	62,650	6,593	11.8
2035 ^a	83,100	20,450	32.6

^aIntermediate growth projection from SEWRPC Technical Report No. 11, The Population of Southeastern Wisconsin, (5th Edition), April 2013.

Source: U.S. Bureau of the Census and SEWRPC.

Table II-4

**NUMBER OF JOBS IN KENOSHA
COUNTY: CENSUS YEARS 1970-2010**

Year	Number of Jobs	Change from Previous Time Period	
		Number	Percent
1970	42,715	--	--
1980	54,631	11,916	27.9
1990	52,230	-2,401	-4.4
2000	68,654	16,424	31.4
2010	74,900	6,246	8.3

Source: U.S. Bureau of Economic Analysis and SEWRPC.

Table II-5

EQUALIZED VALUE OF PROPERTY IN KENOSHA COUNTY BY MUNICIPALITY: 2014

Municipality	2014 Equalized Value	Percent Change from 2009
Cities		
Kenosha.....	\$5,524,779,300	-18.7
Subtotal	\$5,524,779,300	-18.7
Villages		
Bristol.....	\$ 514,406,100	-14.8
Paddock Lake.....	220,467,500	-16.9
Pleasant Prairie.....	2,651,867,100	-5.6
Silver Lake ^a	162,893,500	-17.4
Somers.....	- ^b	- ^b
Twin Lakes.....	670,494,500	-24.2
Subtotal	\$4,220,128,700	-11.3
Towns		
Brighton.....	\$ 160,027,200	-22.0
Paris.....	196,604,700	-15.8
Randall.....	468,295,100	-14.9
Salem ^a	990,367,500	-18.6
Somers.....	741,006,700 ^b	-7.5 ^b
Wheatland.....	279,762,100	-20.2
Subtotal	\$2,836,063,300	-15.1
Total^b	\$12,580,971,300	-15.6

^aOn November 21, 2016 the Wisconsin Department of Administration approved a cooperative plan submitted by the Village of Silver Lake and the Town of Salem. Effective February 14, 2017 the two municipalities merged to become the Village of Salem Lakes. As of February 14, 2017, the two municipalities merged to become the Village of Salem Lakes.

^bOn April 24, 2015, a portion of the Town of Somers incorporated as the Village of Somers. This occurred after the Wisconsin Department of Revenue calculated equalized values present in civil divisions for 2014. Based upon the incorporation proposal, it is estimated that the Village has received 73 percent of the equalized value present in the Town prior to incorporation and the remnant town has received 27 percent. Thus, the 2014 equalized value for the Village of Somers is estimated as being \$540,934,900 and the 2014 equalized value of the remnant Town of Somers is estimated as being \$200,071,800.

^bThe total for Kenosha County, including the equalized value of the portion of the Village of Genoa City that is in Kenosha County, is \$12,581,231,400. The Village is predominantly located in Walworth County and is not included under this plan.

Source: Wisconsin Department of Revenue and SEWRPC.

Table II-6

LAND USE IN KENOSHA COUNTY: 2010

Land Use Category ^a	Acres	Percent of Subtotal	Percent of County
Urban			
Residential.....	20,735	48.7	11.6
Commercial.....	1,723	4.0	1.0
Industrial.....	1,888	4.4	1.1
Transportation, Communications, and Utilities ^a	12,429	29.2	7.0
Governmental and Institutional.....	2,039	4.8	1.1
Recreational.....	3,767	8.9	2.1
Subtotal	42,581	100.0	23.9
Nonurban			
Agricultural.....	87,431	64.5	49.0
Woodlands.....	10,168	7.5	5.7
Wetlands.....	18,520	13.6	10.4
Surface Water.....	5,660	4.2	3.2
Extractive.....	324	0.2	0.2
Landfills.....	418	0.3	0.2
Open Lands ^b	13,097	9.7	7.4
Subtotal	135,618	100.0	76.1
Total	178,199	100.0	100.0

^aIncludes parking areas of greater than 10 spaces.

^bOpen lands include lands in rural uses that are not being farmed; land under development, except for single-family residential uses; and other lands that have not been developed including residential lands or outlots attendant to existing urban development that are not expected to be developed.

Source: SEWRPC.

Table II-7

MOBILE HOME PARKS AND MOBILE HOMES IN KENOSHA COUNTY: 2010

Number on Map IV-2	Mobile Home Park Name	Size (acres)	Number of Sites	Number of Mobile Homes	Location
Mobile Home Parks					
1	Bristol Heights	1.8	18	7	Village of Bristol
2	Rainbow Lake Manor	36.6	225	261	Village of Bristol
3	Kenosha Estates ^a	2.7	50	42	Village of Somers
4	Alpine Village Mobile Home Park	4.2	48	43	City of Kenosha
5	Kenosha Estates ^b	1.8	39	36	Village of Somers
6	Maple Lane Court ^c	7.6	100	80	City of Kenosha
7	Mid-City Mobile Home Court	0.7	9	10	Village of Somers
8	Nelson's Hillcrest Mobile Home Park	4.0	50	47	Village of Somers
9	Oakwood Mobile Home Community	21.0	215	210	City of Kenosha
10	Pine Ridge Estates	0.9	2	2	Village of Somers
11	Pleasant Prairie Mobile Home Park	4.0	35	29	Town of Somers
12	Prairie Lake Estates	11.8	70	70	City of Kenosha
13	Scotty's Mobile Home Park	1.3	50	26	Village of Pleasant Prairie
14	Shorecrest Pointe Mobile Home Park	6.7	91	47	City of Kenosha
15	City View Mobile Home Park	11.2	125	111	Village of Pleasant Prairie
16	Timber Ridge Mobile Home Park	13.0	112	137	Village of Pleasant Prairie
17	Westwood Estates	46.8	290	287	Village of Pleasant Prairie
18	Lakewood Estates Mobile Home Park	6.8	24	26	Town of Salem ^d
19	Lake Crest Mobile Home Park	6.2	54	53	Village of Silver Lake
20	Carefree Estates	25.5	152	152	Town of Salem ^d
21	Wheatland Estates Mobile Home Court	26.9	197	187	Town of Wheatland
22	Shady Nook Mobile Home Park	5.9	50	47	Town of Brighton
23	Oakdale Estates	28.3	161	161	Village of Somers
24	--	1.8		19	Village of Bristol
Single Family or Small Groupings					
25	--	0.3		1	Town of Randall
26	--	1.0		1	Town of Salem
27	--	0.7		1	Village of Bristol
28	--	1.5		1	Village of Pleasant Prairie
29	--	0.2		1	City of Kenosha

^aThis mobile home park was previously known as Alford's Park Mobile Home Court.

^bThis mobile home park was previously known as Embassy Mobil Home Park.

^cMaple Lane Court has two licenses with the number of licensed sites totaling 100.

^dOn November 21, 2016 the Wisconsin Department of Administration approved a cooperative plan submitted by the Village of Silver Lake and the Town of Salem. Effective February 14, 2017 the two municipalities merged to become the Village of Salem Lakes.

Source: *Wisconsin Department of Safety and Professional Services* and SEWRPC.

Table II-8

LAKE MANAGEMENT DISTRICTS IN KENOSHA COUNTY: 2015

Name	Lakes	Municipalities
Benedict-Tombeau Lakes Management District	Benedict Lake Tombeau Lake	Town of Randall, Town of Bloomfield ^a
Camp/Center Lake Rehabilitation District	Camp Lake Center Lake	Town of Salem ^b
George Lake Preservation and Rehabilitation District	George Lake	Village of Bristol
Hooker Lake Management District	Hooker Lake	Village of Paddock Lake Town of Salem
Lilly Lake Preservation and Rehabilitation District	Lilly Lake	Town of Wheatland
Paddock Lake Preservation and Rehabilitation District	Paddock Lake	Village of Paddock Lake
Twin Lakes Preservation and Rehabilitation District	Elizabeth Lake Mary Lake	Village of Twin Lakes
Voltz Lake Management District	Voltz Lake	Town of Salem ^b

^aLocated in Walworth County.

^bOn November 21, 2016 the Wisconsin Department of Administration approved a cooperative plan submitted by the Village of Silver Lake and the Town of Salem. Effective February 14, 2017 the two municipalities merged to become the Village of Salem Lakes. As of February 14, 2017, the two municipalities merged to become the Village of Salem Lakes.

Source: University of Wisconsin-Extension, and SEWRPC.

Table II-8a

WISCONSIN DEPARTMENT OF NATURAL RESOURCES DAM INVENTORY INFORMATION: 2015

Number on Map II-6	WDNR Dam Sequence Number	Dam Name		Owner	Township	WDNR Field File Number	Size	Hydraulic Height (feet)	Structural Height (feet)	Impoundment Surface Area (acres)	Maximum Impoundment Storage (acre-feet)	Hazard Potential
		Official	Local									
1	147	Lake Shangri La	--	Town of Bristol	Bristol	30.08	Large	12.0	16.0	172.0	1,200.0	High
2	264	Rock Lake	--	--	Salem	30.10	Large	4.0	8.0	44.0	350.0	Low
3	1034	Bong Recreation Area 8	Wolf Lake Dam	WDNR - Richard Bong Team	Brighton	30.15	Large	8.0	10.0	158.0	900.0	Low
4	1104	Hawke	--	Robert K. Hawke	Brighton	30.14	Small	--	--	3.5	--	--
5	1269	Hooker Lake	Carl Bryzek	Carl Bryzek Farm, LLC	Salem	30.02	Small	1.0	3.0	87.0	180.0	Low
6	1270	Camp Lake	Camp Lake	Kenosha County DPW	Salem	30.03	Large	0.3	7.2	461.0	1,500.0	Low
7	1271	Paddock Lake 3	--	Vince Paddock	Salem	30.04	Small	2.0	3.0	130.0	300.0	Low
8	1272	Silver Lake	Jack Erb	Brian Sullivan	Salem	30.05	Small	1.0	2.0	464.0	920.0	Low
9	1273	Cross Lake	B.J. Corbin	Harbhajan Singh Samra	Salem	30.07	Small	3.0	4.0	87.0	270.0	Significant
10	1274	Lake George	John Haterlein	George Wronowski	Bristol	30.09	Small	4.0	6.0	59.0	290.0	Low
11	1275	Voltz Lake	--	Unknown	Salem	30.11	Small	3.0	5.0	52.0	200.0	Significant
12	1276	Center Lake 2	Center Lake Conservation & Sport Club	Center Lake Cons-Sports	Salem	30.12	Small	1.0	3.0	129.0	390.0	Low
13	1277	Dyer Lake	--	Kenosha Boy Scouts of America	Wheatland	30.13	Small	3.0	6.0	52.0	200.0	Significant
14	1911	Bong Recreational Area 2	Wisconsin Department of Natural Resources	Wisconsin Department of Natural Resources	Brighton	30.00	Small	4.0	9.4	--	10.0	--
15	1912	Bong Recreational Area 3	Wisconsin Department of Natural Resources	Wisconsin Department of Natural Resources	Brighton	30.00	Small	--	6.0	--	--	--
16	1913	Bong Recreational Area 4	Wisconsin Department of Natural Resources	Wisconsin Department of Natural Resources	Brighton	30.00	Small	--	5.0	--	--	--
17	1915	Bong Recreational Area 6	Wisconsin Department of Natural Resources	Wisconsin Department of Natural Resources	Brighton	30.00	Small	--	--	--	--	--
18	1914	Bong Recreational Area 5	Wisconsin Department of Natural Resources	Wisconsin Department of Natural Resources	Brighton	30.00	--	--	6.0	--	--	--
19	1916	Bong Recreational Area 7	Wisconsin Department of Natural Resources	Wisconsin Department of Natural Resources	Brighton	30.00	--	--	2.0	--	--	--
20	2382	Pike Creek	City of Kenosha	City of Kenosha	Somers	30.00	Small	2.0	7.0	1.0	5.0	--
21	2555	Charles Yandre	--	Charles Yandre	Somers	30.00	Small	5.0	8.0	5.0	30.0	--
22	3081	New Munster Wildlife Area	Wisconsin Department of Natural Resources	Wisconsin Department of Natural Resources	Randall	30.00	Small	4.0	7.0	12.0	40.0	--
23	3204	Bong Recreation Area 1	Wisconsin Department of Natural Resources	Wisconsin Department of Natural Resources	Brighton	30.00	Small	5.0	--	--	--	--
24	3692	Pleasant Prairie	--	Village of Pleasant Prairie	Pleasant Prairie	30.00	Small	2.6	4.7	104.0	530.0	--
25	5906	Meyer Material KD Pit	--	Kenosha County	Wheatland	30.16	Small	14.5	--	38.0	535.0	High
26	6177	Marescalco	--	--	Somers	30.18	--	--	--	--	--	--

Source: Wisconsin Department of Natural Resources and SEWRPC.

Table II-9

**ESTIMATED FREEWAY AND SURFACE ARTERIAL FACILITY
DESIGN CAPACITY AND ATTENDANT LEVEL OF CONGESTION^a**

Facility Type	Average Weekday Traffic Volumes (vehicles per 24 hours)			
	Design Capacity and Upper Limit of Level of Service C	Upper Limit of Moderate Congestion and Level of Service D	Upper Limit of Severe Congestion and Level of Service E	Extreme Congestion and Level of Service F
Freeway				
Four-Lane	60,000	80,000	90,000	>90,000
Six-Lane	90,000	121,000	135,000	>135,000
Eight-Lane	120,000	161,000	180,000	>180,000
Standard Arterial				
Two-Lane	14,000	18,000	19,000	>19,000
Four-Lane Undivided	18,000	23,000	24,000	>24,000
Four-Lane with Two-way Left Turn Lane	21,000	29,000	31,000	>31,000
Four-Lane Divided	27,000	31,000	32,000	>32,000
Six-Lane Divided	38,000	45,000	48,000	>48,000
Eight-Lane Divided	50,000	60,000	63,000	>63,000

The level of congestion on arterial streets and highways may be summarized by the following operating conditions:

Freeway			
Level of Traffic Congestion	Level of Service	Average Speed	Operating Conditions
None	A and B	Freeway free-flow speed	No restrictions on ability to maneuver and change lanes
None	C	Freeway free-flow speed	Ability to maneuver and change lanes noticeably restricted
Moderate	D	1 to 2 mph below free-flow speed	Ability to maneuver and change lanes more noticeably limited; reduced driver physical and psychological comfort levels
Severe	E	Up to 10 mph below free-flow speed	Virtually no ability to maneuver and change lanes. Operation at maximum capacity. No usable gaps in the traffic stream to accommodate lane changing
Extreme	F	Typically 20 to 30 mph or less	Breakdown in vehicular flow with stop-and-go, bumper-to-bumper traffic

Surface Arterial			
Level of Traffic Congestion	Level of Service	Average Speed	Operating Conditions
None	A and B	70 to 100 percent of free-flow speed	Ability to maneuver in traffic stream in unimpeded. Control delay at signalized intersections is minimal
None	C	50 to 100 percent of free-flow speed	Restricted ability to maneuver and change lanes at mid-block locations
Moderate	D	40 to 50 percent of free-flow speed	Restricted ability to maneuver and change lanes. Small increases in flow lead to substantial increases in delay and decreases in travel speed
Severe	E	33 to 40 percent of free-flow speed	Significant restrictions on lane changes. Traffic flow approaches instability
Extreme	F	25 to 33 percent of free-flow speed	Flow at extremely low speeds. Intersection congestion with high delays, high volumes, and extensive queuing

^aDesign capacity is the maximum level of traffic volume a facility can carry before beginning to experience morning and afternoon peak traffic hour traffic congestion, and is expressed in terms of number of vehicles per average weekday.

Source: SEWRPC.

Table II-10

**ESTIMATED USE OF WATER IN KENOSHA COUNTY
IN 2010 IN MILLION GALLONS PER DAY**

Usage Category	Water Source	
	Surface Water	Groundwater
Public ^a	13.52	0.26
Industrial.....	--	0.11
Commercial	--	--
Irrigation	0.04	0.39
Agricultural	0.02	0.20
Aquaculture	--	--
Domestic	--	2.08
Total	13.58	3.04

^aIncludes water delivered to residents, industry, and commerce within the served area.

Source: U.S. Geological Survey and SEWRPC.

Table II-11

**WORKING STATUS OF FIRE DEPARTMENTS, EMERGENCY MEDICAL SERVICE PROVIDERS,
AND LAW ENFORCEMENT DEPARTMENTS SERVING KENOSHA COUNTY: 2016**

Fire/Rescue Department Municipally Owned = M Privately Owned = P	Working Status of Fire Suppression Department	Emergency Medical Service Arrangement	Working Status of Law Enforcement Department
City of Kenosha – M	Full Time (Kenosha Fire)	Full Time (Kenosha Fire)	Full-time (City Police Department)
Village of Bristol – M	Full-time and Paid On Call (Bristol Fire)	Full-time and Paid On Call (Bristol Fire)	County Sheriff Department
Village of Paddock Lake – P	Contract with Salem Fire/Rescue (Full-Time and Paid On Call)	Contract with Salem Fire/Rescue (Full-time and Paid On Call)	Full-time (Village Police Contract with County Sheriff Department)
Village of Pleasant Prairie – M	Full-time, Part Time and Paid On Call (Pleasant Prairie Fire)	Full-time, Part Time and Paid On Call (Pleasant Prairie Fire)	Full-time (Village Police Department)
Village of Silver Lake ^a – M	Contract with Salem Fire/Rescue (Full-Time and Paid On Call)	Contract with Salem Fire/Rescue (Full-time and Paid On Call)	County Sheriff Department
Village of Somers ^b	Full-time and Paid On Call (Somers Fire and Rescue)	Full-time and Paid On Call (Somers Fire and Rescue)	County Sheriff Department
Village of Twin Lakes –M	Paid On Call (Twin Lakes Fire and Rescue)	Paid On Call (Twin Lakes Fire and Rescue)	Full-time (Village Police Department)
Town of Brighton – P	Contracts with Salem Fire/Rescue (Full-time and Paid On Call) and Kansasville Fire (Volunteer)	Contracts with Salem Fire/Rescue (Full-time and Paid On Call) and Kansasville Fire (Volunteer)	County Sheriff Department
Town of Paris – M	Paid On Call (Paris Fire and Rescue)	Paid On Call (Paris Fire and Rescue)	County Sheriff Department
Town of Randall –M	Paid On Call and Volunteer (Randall Fire)	Contracts with Silver Lake Rescue (Private, Part-time and Paid On Call) and Twin Lakes Fire and Rescue (Paid On Call)	County Sheriff Department
Town of Salem ^a – M	Full-time and Paid On Call (Salem Fire/Rescue)	Full-time and Paid On Call (Salem Fire/Rescue and Silver Lake Rescue)	County Sheriff Department Part-time Constables
Town of Somers – M	Full-time and Paid On Call (Somers Fire and Rescue)	Full-time and Paid On Call (Somers Fire and Rescue)	County Sheriff Department
Town of Wheatland – M	Volunteer (Wheatland Fire)	Volunteer (Wheatland Fire) Part-time and Paid On Call (Silver Lake Rescue)	County Sheriff Department Part-time Constable
UW Parkside Police	Contract with Kenosha Fire (full time)	Contract with Kenosha Fire (full time)	Full-time (University Police Department)
Wisconsin DNR	--	--	--
Wisconsin State Patrol	--	--	--

^aOn November 21, 2016 the Wisconsin Department of Administration approved a cooperative plan submitted by the Village of Silver Lake and the Town of Salem. Effective February 14, 2017 the two municipalities merged to become the Village of Salem Lakes. As of February 14, 2017 the two municipalities merged to become the Village of Salem Lakes.

^bOn April 24, 2015, a portion of the Town of Somers incorporated as the Village of Somers.

Source: Kenosha County Division of Emergency Management and SEWRPC.

Table II-12

**CIVIL DIVISION LOCATION OF FACILITIES
THAT STORE HAZARDOUS MATERIALS: 2015**

Municipality	Number of Facilities		
	Reporting Only	Planning Only	Reporting and Planning
Cities			
Kenosha	54	21	19
Subtotal	54	21	19
Villages			
Bristol	7	3	3
Paddock Lake	2	0	0
Pleasant Prairie	39	27	26
Silver Lake ^a	1	1	1
Somers ^b	3	1	0
Twin Lakes	2	1	1
Subtotal	54	33	31
Towns			
Brighton	0	0	0
Paris	4	3	2
Randall	0	0	0
Salem ^a	4	1	1
Wheatland	2	0	0
Subtotal	10	4	3
Total	118	58	53

^aOn November 21, 2016 the Wisconsin Department of Administration approved a cooperative plan submitted by the Village of Silver Lake and the Town of Salem. Effective February 14, 2017 the two municipalities merged to become the Village of Salem Lakes.

^bOn April 24, 2015, a portion of the Town of Somers incorporated as the Village of Somers. Total shown is a combined total for both the Village of Somers and the Town of Somers.

Source: Kenosha County Division of Emergency Management.

Table II-13

HISTORIC SITES AND DISTRICTS IN KENOSHA COUNTY ON THE NATIONAL REGISTER OF HISTORIC PLACES: 2014

Number on Map 25	Site Name	Location ^a	Municipality	Year Listed
1	Third Avenue Historic District	T1N, R23E, Section 5	City of Kenosha	1988
2	Library Park Historic District.....	T2N, R23E, Section 31	City of Kenosha	1988
3	Civic Center Historic District.....	T2N, R23E, Section 31	City of Kenosha	1989
4	Justin Weed House	T2N, R22E, Section 25	City of Kenosha	1974
5	Gilbert Simmons Memorial Library.....	T1N, R23E, Section 5	City of Kenosha	1974
6	Kemper Hall	T1N, R23E, Section 5	City of Kenosha	1976
7	Barnes Creek Site	Address restricted	Village of Pleasant Prairie	1977
8	John McCaffary House.....	T2N, R23E, Section 31	City of Kenosha	1978
9	Chesrow Site.....	Address restricted	Village of Pleasant Prairie	1978
10	St. Matthew's Episcopal Church.....	T2N, R23E, Section 31	City of Kenosha	1979
11	Kenosha High School.....	T2N, R23E, Section 31	City of Kenosha	1980
12	Boys and Girls Library.....	T2N, R23E, Section 31	City of Kenosha	1980
13	Manor House.....	T1N, R23E, Section 5	City of Kenosha	1980
14	Kenosha County Courthouse and Jail.....	T2N, R23E, Section 31	City of Kenosha	1982
15	Wehmoff Mound	Address restricted	Town of Wheatland	1985
16	Kenosha Light Station	T2N, R23E, Section 31	City of Kenosha	1990
17	Lucas Site	Address restricted	Village of Pleasant Prairie	1995
18	Rosinco	Address restricted	City of Kenosha	2001
19	Alford Park Warehouse	T2N, R23E, Section 19	City of Kenosha	2002
20	Southport Beach House	T1N, R23E, Section 8	City of Kenosha	2003
21	Simmons Island Beach House.....	T2N, R23E, Section 32	City of Kenosha	2003
22	Washington Park Clubhouse.....	T2N, R22E, Section 25	City of Kenosha	2003
23	Frank and Jane Isermann House.....	T2N, R23E, Section 31	City of Kenosha	2004
24	Library Park.....	T1N, R23E, Section 5	City of Kenosha	2000
25	Anthony and Caroline Isermann House	T2N, R23E, Section 31	City of Kenosha	2004
26	Kenosha North Pierhead Light	T2N, R23E, Section 32	City of Kenosha	2008
27	Wisconsin Shipwreck	Lake Michigan ^b	City of Kenosha	2009

^aIndicates location given in U.S. Public Land Survey Township, Range, and Section.

^bThe shipwreck of the Wisconsin is located in Lake Michigan about 6.5 miles south-southeast of the City of Kenosha.

Source: State Historical Society of Wisconsin, Kenosha County, and SEWRPC.

Table II-14

REGULATIONS AND PROGRAMS WITHIN KENOSHA COUNTY RELATED TO HAZARD MITIGATION

Municipality	Type of Ordinance or Program					
	General Zoning	Floodland Zoning	Stormwater Management	Shoreland or Shoreland Wetland Zoning	Emergency Operations Plan	Floodland and Shoreland Zoning Reference Data
Kenosha County	Adopted	Adopted	Adopted ^a	Adopted	Adopted	Kenosha County General Zoning Shoreland and Floodplain Zoning Ordinance. Revised December 17, 2014. Section 12.18, pages 12-47 through 12-47; 12.26-1, pages 12-158 through 12-158; 12.28-10, pages 12-210 through 12-213; 12-39, pages 12-306 through 12-307; and 12.40, pages 12-307 through 12-309.
City of Kenosha	Adopted	Adopted	Adopted	Adopted	Adopted	Zoning Ordinance for the City of Kenosha, Wisconsin. 1998. Revised effective April 10, 2015. Section 3.0 (3.20, 3.21, and 3.23)
Village of Bristol	Adopted	Adopted	Adopted		Updated version adopted 05/10/2010	Village of Bristol Floodplain Zoning Ordinance January 28, 2013. Title 13-2
Village of Paddock Lake	Adopted	Adopted	Adopted	Adopted	Revised, but not adopted as of 02/19/04	Village of Paddock Lake Zoning Ordinance. April 1994. Section 12.05, pages 69-77. Sections 41-01 through 41-10 pages 1-55
Village of Pleasant Prairie	Adopted	Adopted	Adopted	Adopted	Revised, but not adopted as of 02/19/04	Village of Pleasant Prairie General Zoning and Shoreland/ Floodland Zoning Ordinance. April 18, 2005. Chapter 420
Village of Silver Lake ^b	Adopted	Adopted	Adopted	Adopted	Revised, but not adopted as of 02/19/04	Village of Silver Lake Floodplain/ Shoreland Zoning Ordinance #466. June 2007
Village of Somers	-- ^c	-- ^c	-- ^c	-- ^c	-- ^c	-- ^c
Village of Twin Lakes	Adopted	Adopted	Adopted	Adopted	Revised, but not adopted as of 02/19/04	Village of Twin Lakes Zoning Ordinance. Revised March 2007. Sections 17.37, 17.38, and 17.39
Town of Brighton	County ordinance	County ordinance	--	County ordinance	Revised, but not adopted as of 02/19/04	Kenosha County Ordinance
Town of Paris	County ordinance	County ordinance	--	County ordinance	Revised, but not adopted as of 02/19/04	Kenosha County Ordinance
Town of Randall	County ordinance	County ordinance	--	County ordinance	Adopted	Kenosha County Ordinance
Town of Salem ^b	County ordinance	County ordinance	Adopted	County ordinance	Revised, but not adopted as of 02/19/04	Kenosha County Ordinance Camp Lake/ Center Lake Floodplain Fringe Overlay District. Section 12.26-1.5 and 12.26-1.7, pages 12-143 through 12-150
Town of Somers	County ordinance	County ordinance	Adopted	County ordinance	Adopted	Kenosha County Ordinance
Town of Wheatland	County ordinance	County ordinance	--	County ordinance	Revised, but not adopted as of 02/19/04	Kenosha County Ordinance

^aChapter 17, "Stormwater Management, Erosion Control, and Illicit Discharge Ordinance," was adopted on February 26, 2010. This ordinance only applies to County property and to those towns that have not enacted their own ordinances.

^bOn November 21, 2016 the Wisconsin Department of Administration approved a cooperative plan submitted by the Village of Silver Lake and the Town of Salem. Effective February 14, 2017 the two municipalities merged to become the Village of Salem Lakes. As of February 14, 2017, the two municipalities merged to become the Village of Salem Lakes.

⁹It is anticipated that the County Ordinances and the Town of Somers stormwater management program will continue to apply on an interim basis as the Village of Somers organizes following incorporation.

Source: Kenosha County Division of Emergency Management, Kenosha County Department of Planning and Development, and SEWRPC.

#224150 – KENOSHA CO CH-2 MAPS DRAFTS (TITLES)
500-1112
JEB/mid
09/16/15

SEWRPC Community Assistance Planning Report No. 278-3ED

KENOSHA COUNTY HAZARD MITIGATION PLAN UPDATE: 2017-2021

Chapter II

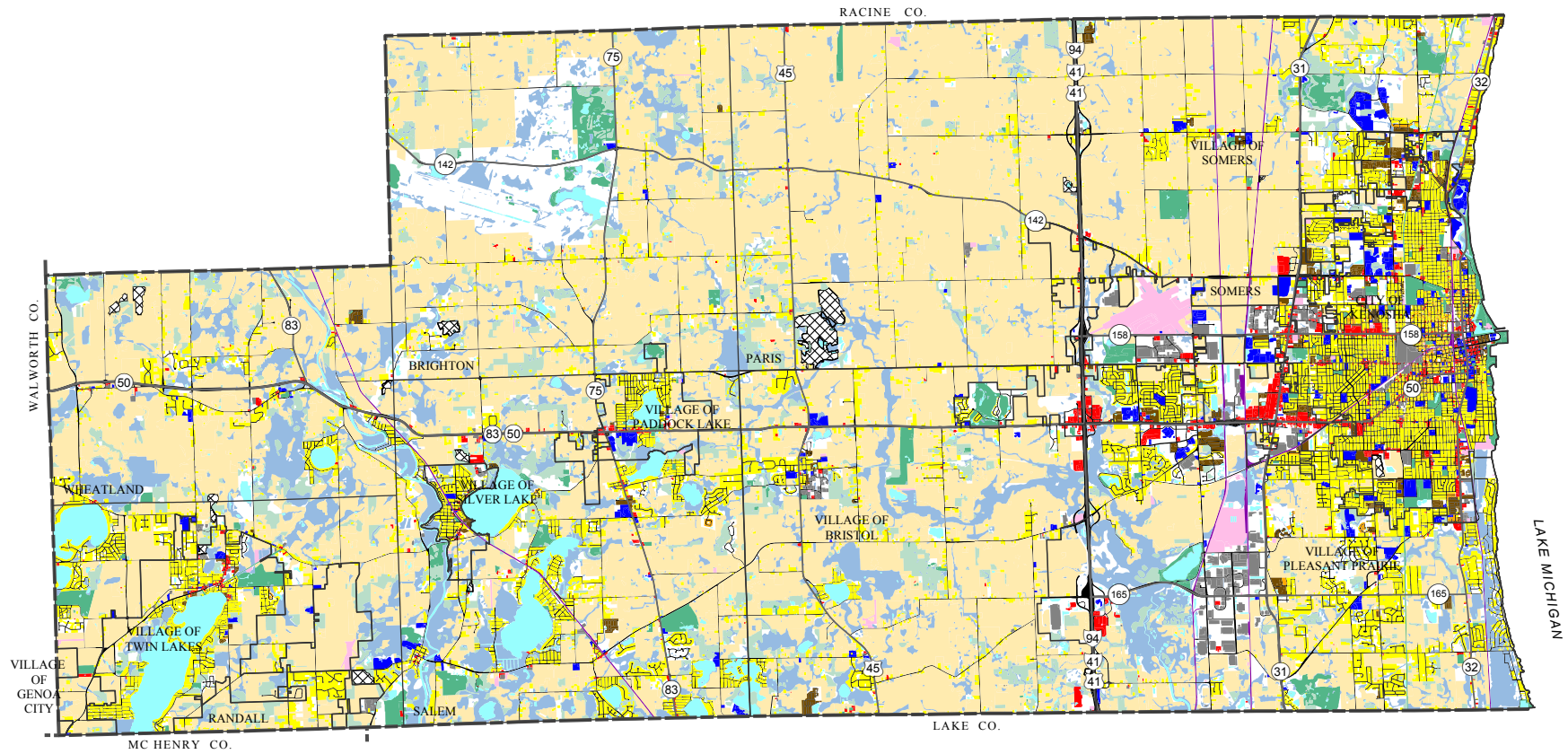
BASIC STUDY AREA INVENTORY AND ANALYSIS

MAPS

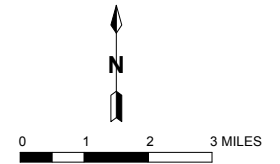
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Map II - 1

EXISTING LAND USE IN KENOSHA COUNTY: 2010

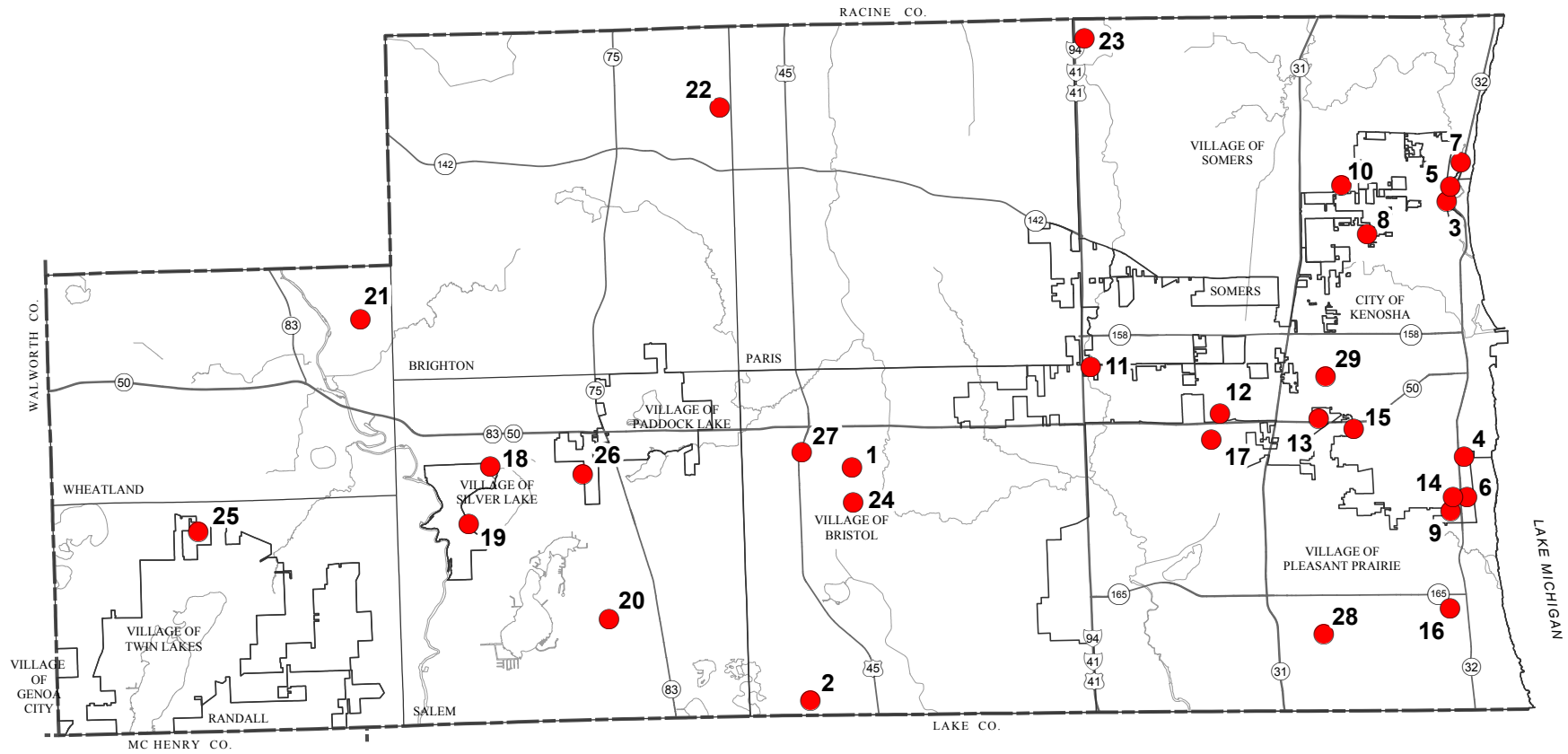


Source: SEWRPC.

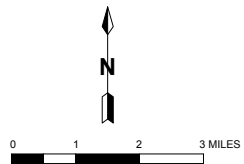


Map II - 2

MOBILE HOMES AND MOBILE HOME PARKS IN KENOSHA COUNTY: 2010

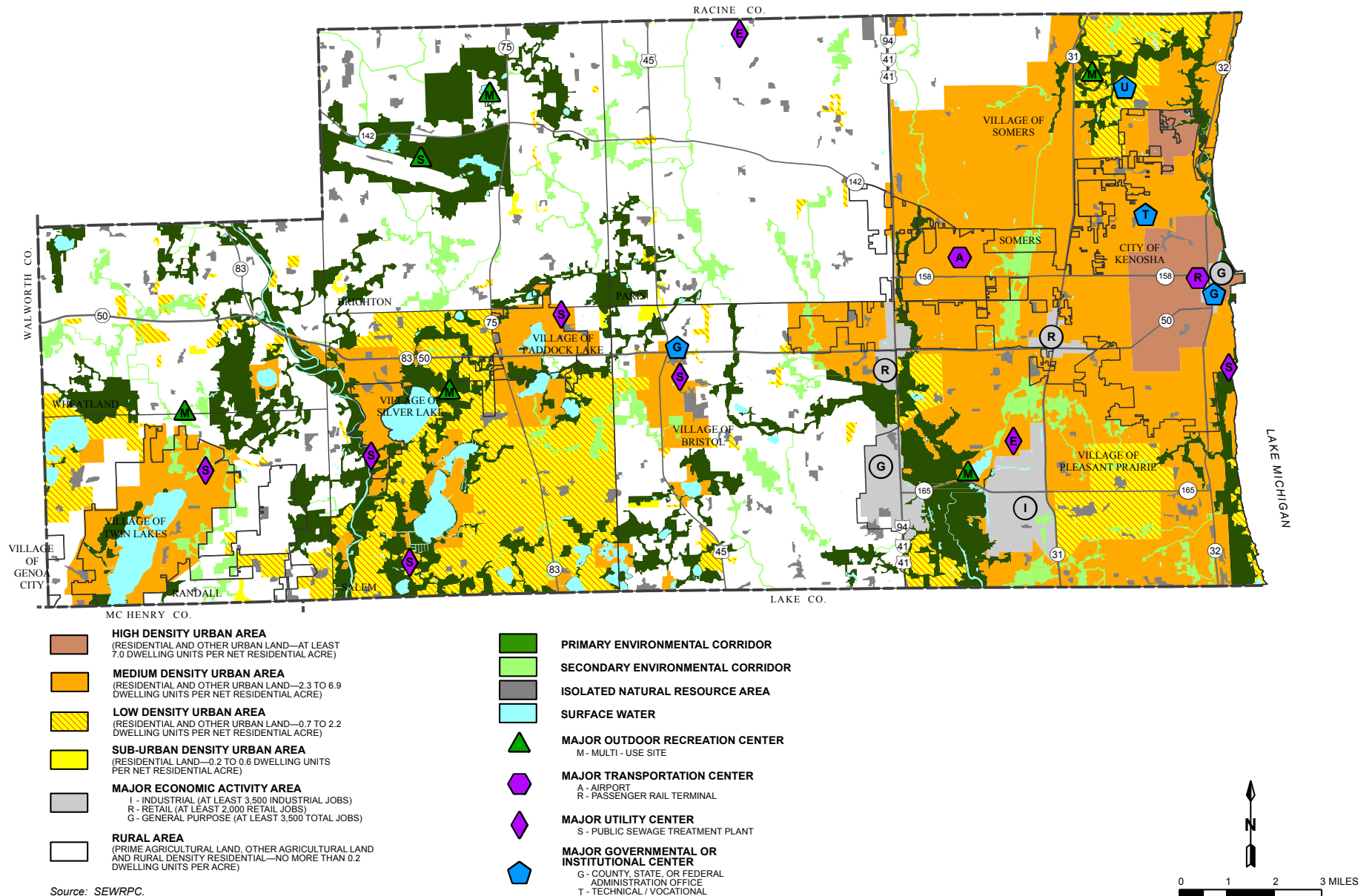


- MOBILE HOME PARK LOCATION
- 22 REFERENCE NUMBER
(SEE TABLE II-7)



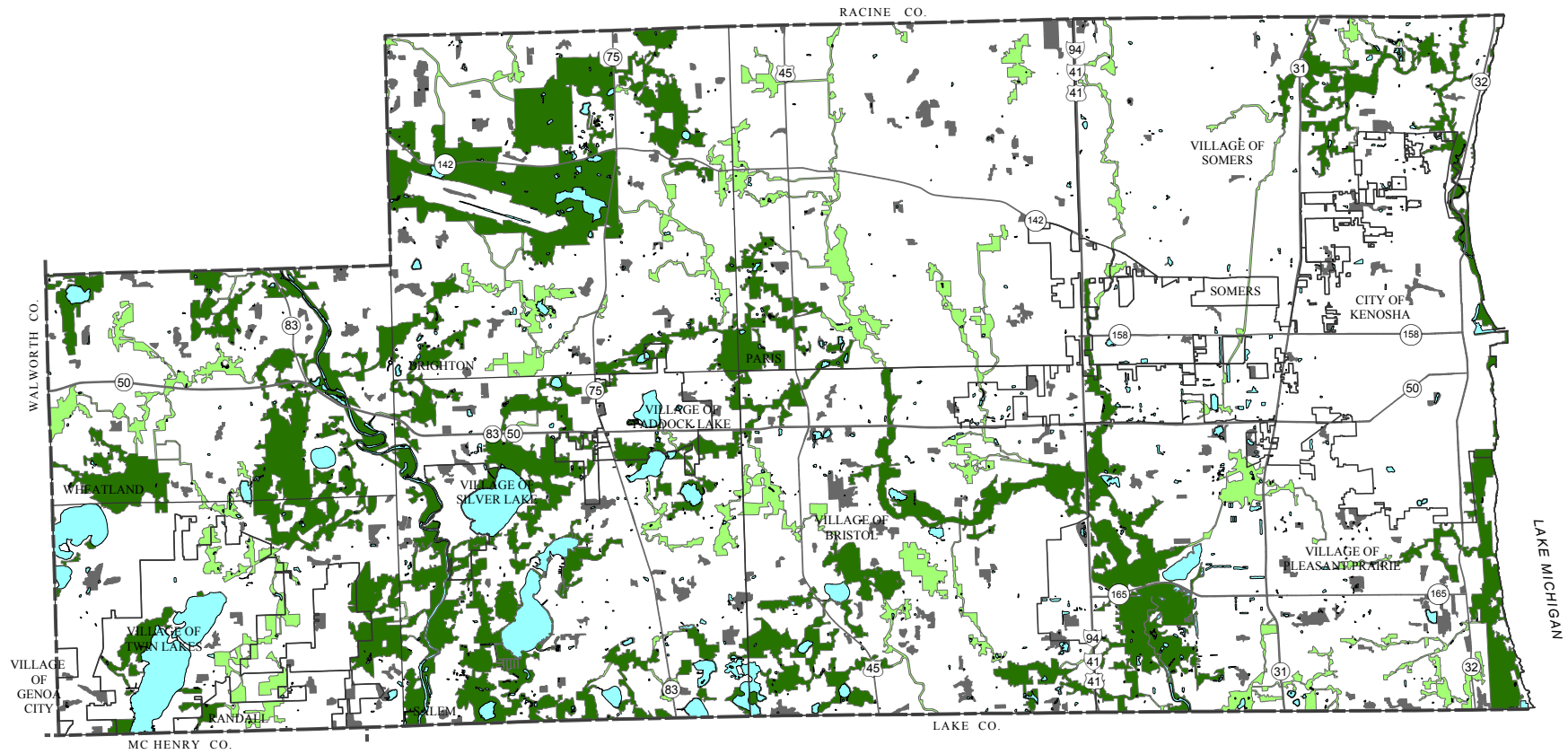
Source: SEWRPC.

Map II - 3 2035 REGIONAL LAND USE PLAN AS IT PERTAINS TO KENOSHA COUNTY



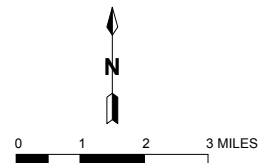
Source: SEWRPC.

Map II - 4
ENVIRONMENTAL CORRIDORS AND
ISOLATED NATURAL RESOURCE AREAS IN KENOSHA COUNTY: 2010



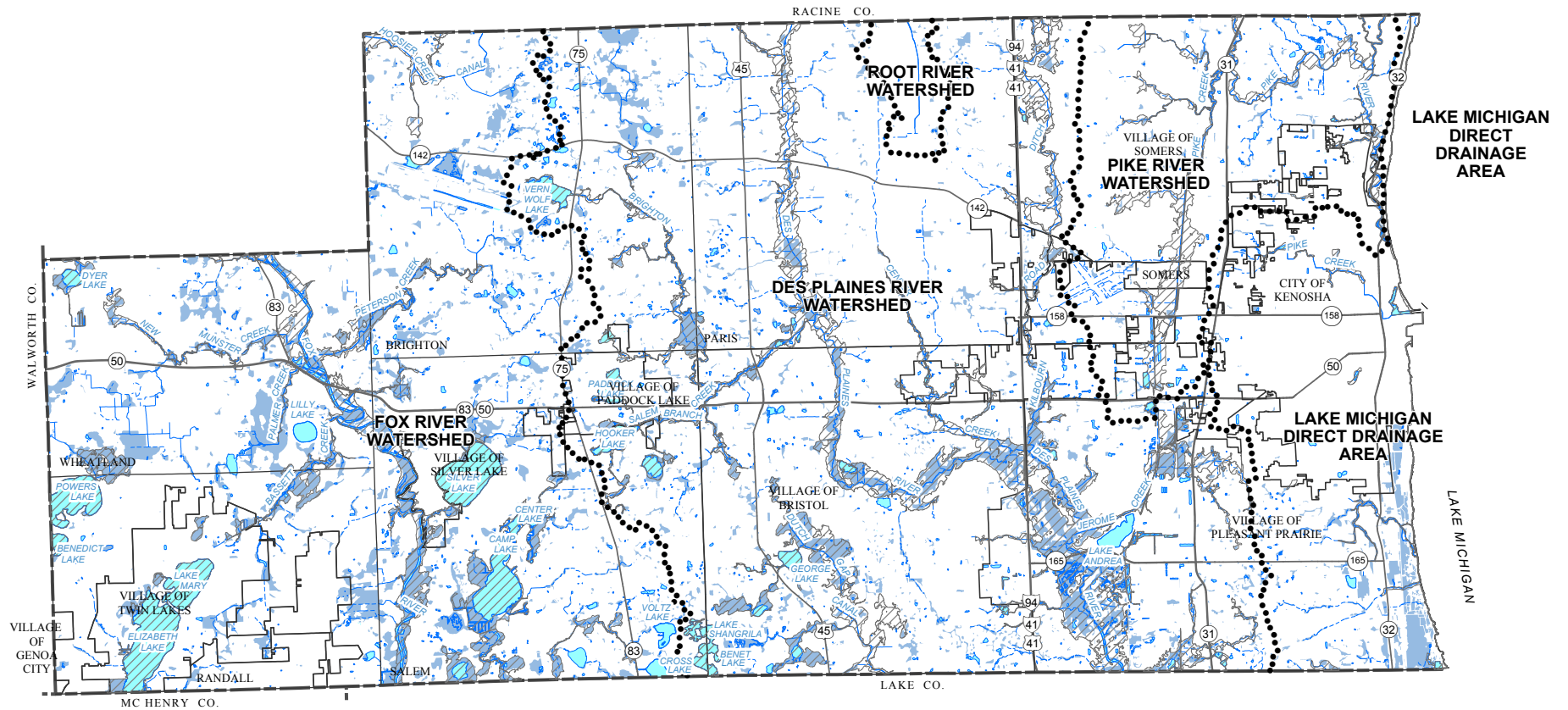
- PRIMARY ENVIRONMENTAL CORRIDORS
- SECONDARY ENVIRONMENTAL CORRIDORS
- ISOLATED NATURAL RESOURCE AREAS
- SURFACE WATER

Source: SEWRPC.



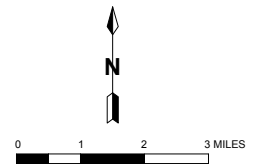
Map II - 5

SURFACE WATERS, WETLANDS, AND FLOODPLAINS IN KENOSHA COUNTY: 2015



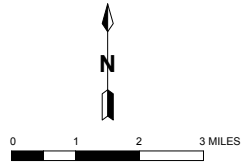
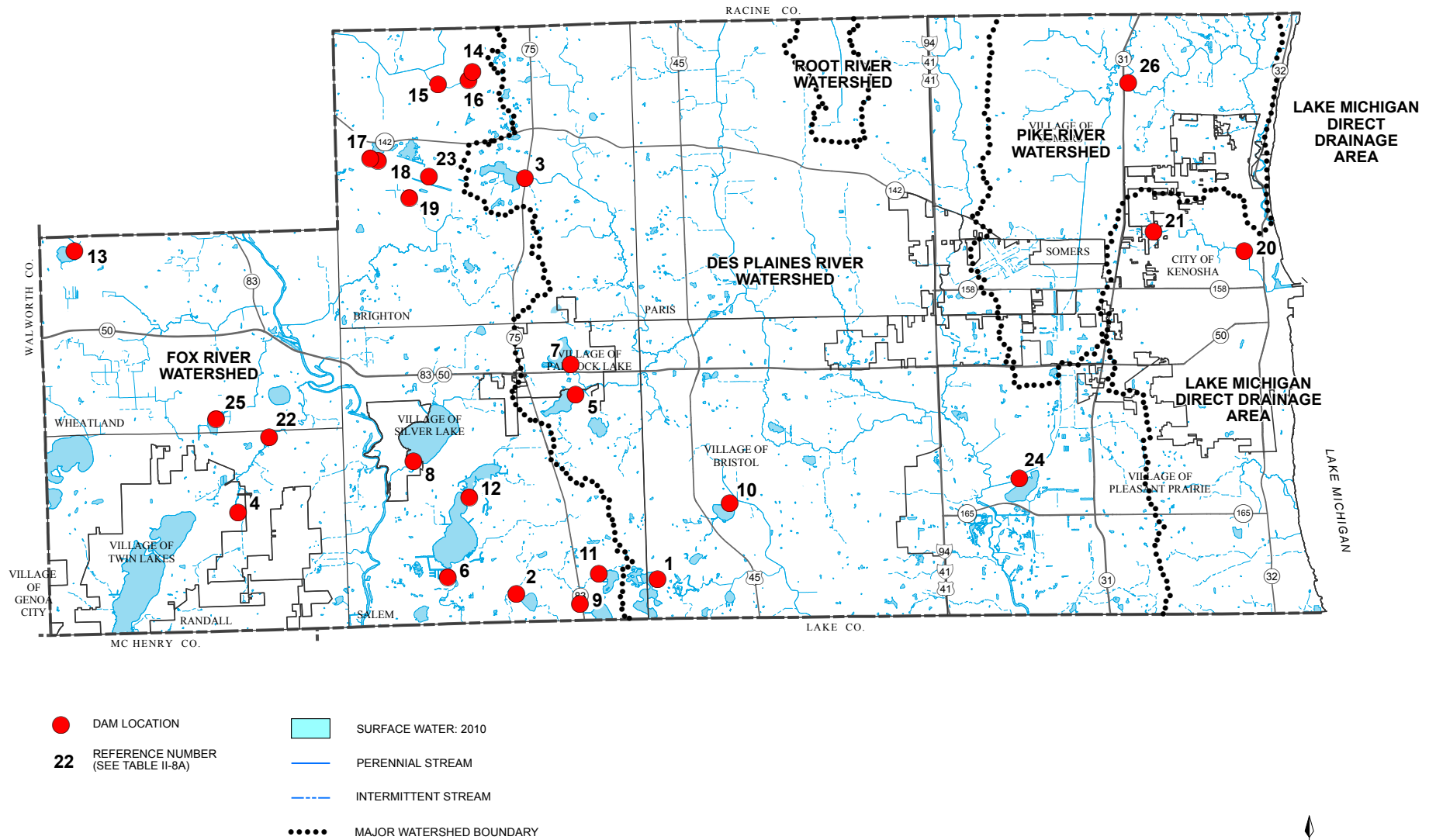
- SURFACE WATER: 2010
- PERENNIAL STREAM
- INTERMITTENT STREAM
- WETLANDS: 2010
- ONE-PERCENT-ANNUAL-PROBABILITY (100-YEAR RECURRENCE INTERVAL) FLOODPLAINS (2012)
- MAJOR WATERSHED BOUNDARY

Source: Federal Emergency Management Agency and SEWRPC.



Map II - 6

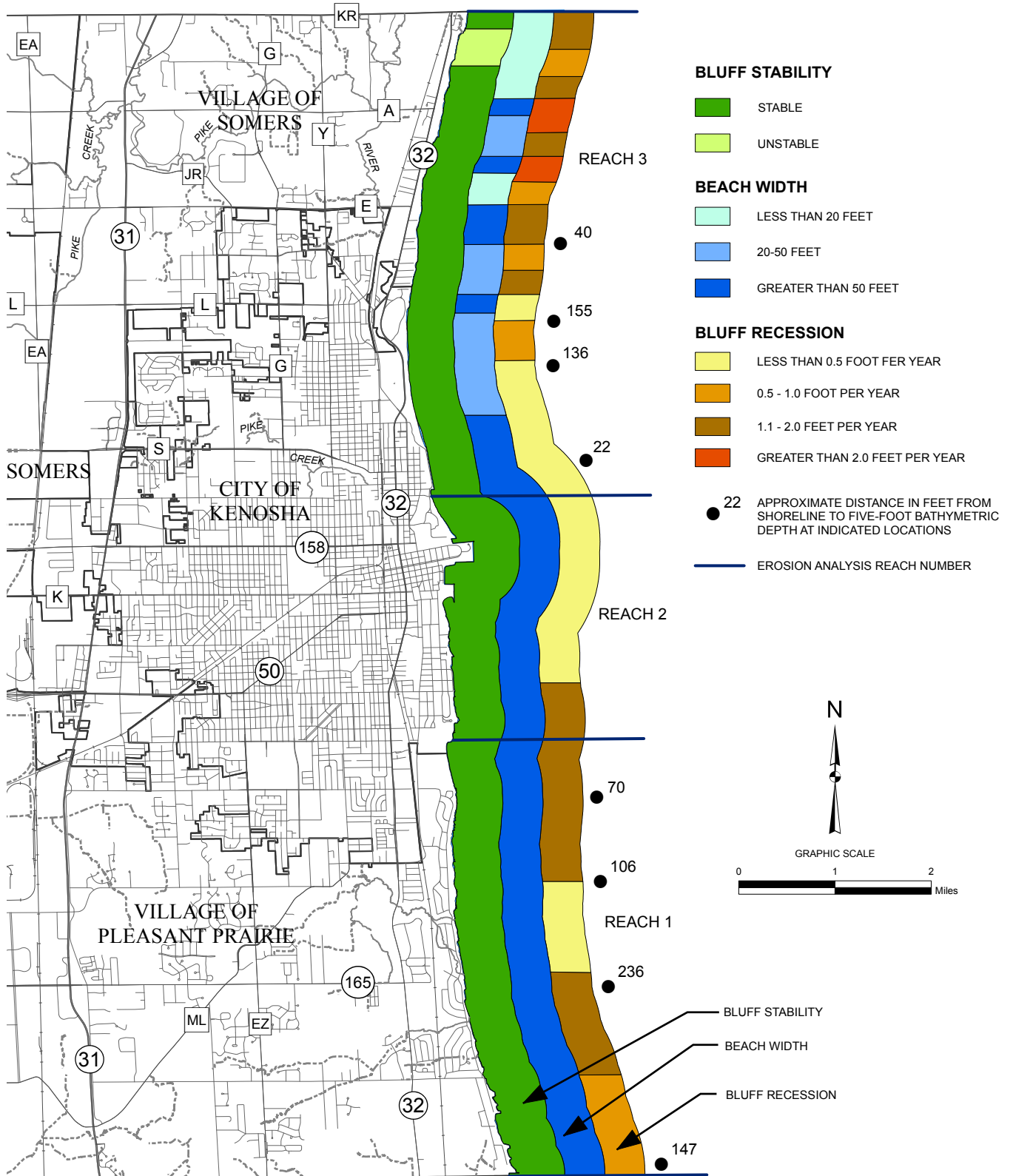
DAMS LOCATED WITHIN KENOSHA COUNTY: 2015



Source: Wisconsin Department of Natural Resources and SEWRPC.

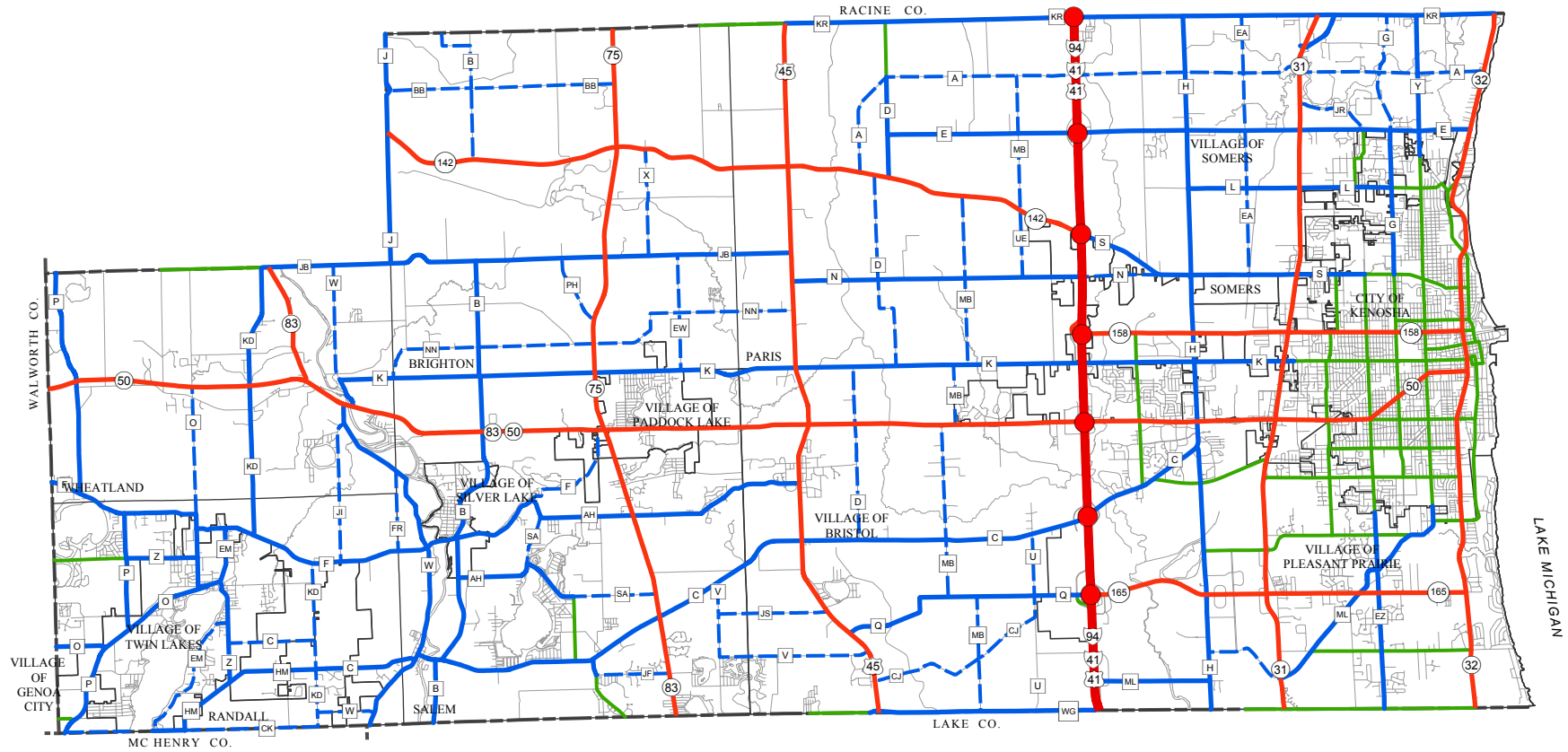
Map II - 7

LAKE MICHIGAN SHORELINE EROSION AND BLUFF STABILITY ANALYSIS FOR KENOSHA COUNTY: 1995



Source: T.B Edil, D.M. Mickelson, J.A. Chapman, and SEWRPC.

Map II - 8
ARTERIAL STREET AND HIGHWAY SYSTEM IN KENOSHA COUNTY: 2005



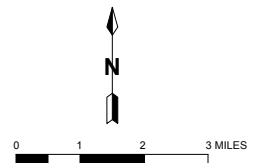
FREEWAY

- STATE TRUNK HIGHWAY
- INTERCHANGE

STANDARD ARTERIAL

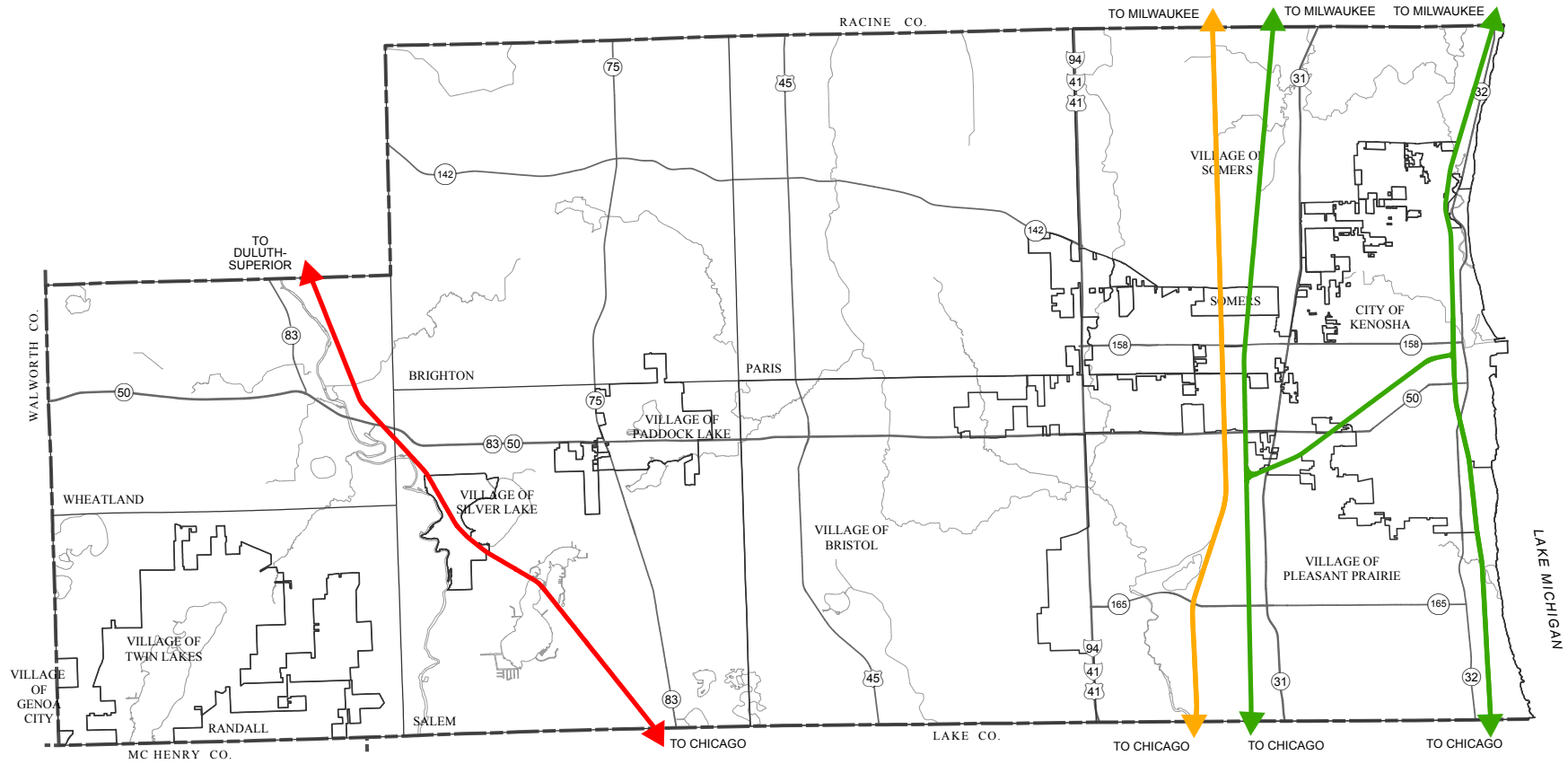
- STATE TRUNK HIGHWAY
- COUNTY TRUNK HIGHWAY
- - - COUNTY TRUNK HIGHWAY (NON-ARTERIAL)
- LOCAL TRUNK HIGHWAY

Source: SEWRPC.



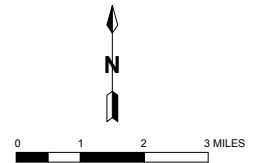
Map II - 9

COMMON CARRIER RAIL FREIGHT LINES IN KENOSHA COUNTY: 2015



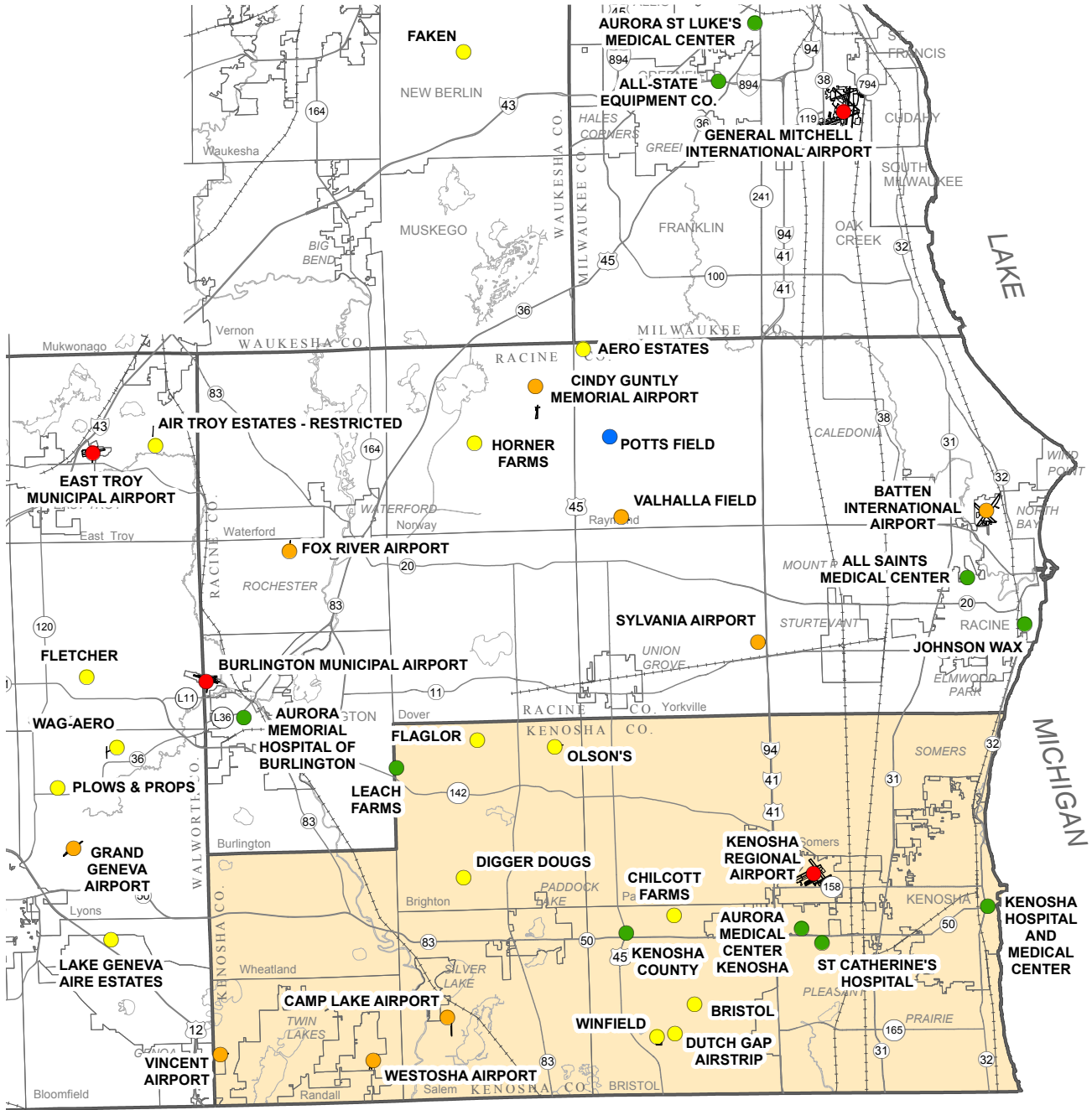
- RAILWAY**
- CANADIAN NATIONAL RAILWAY (CN)
 - UNION PACIFIC RAILROAD (UP)
 - CANADIAN PACIFIC RAILWAY (CP)

Source: Wisconsin Department of Transportation and SEWRPC.



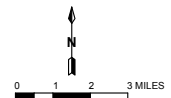
Map II - 10

EXISTING AIRPORTS IN KENOSHA COUNTY AND VICINITY: 2015



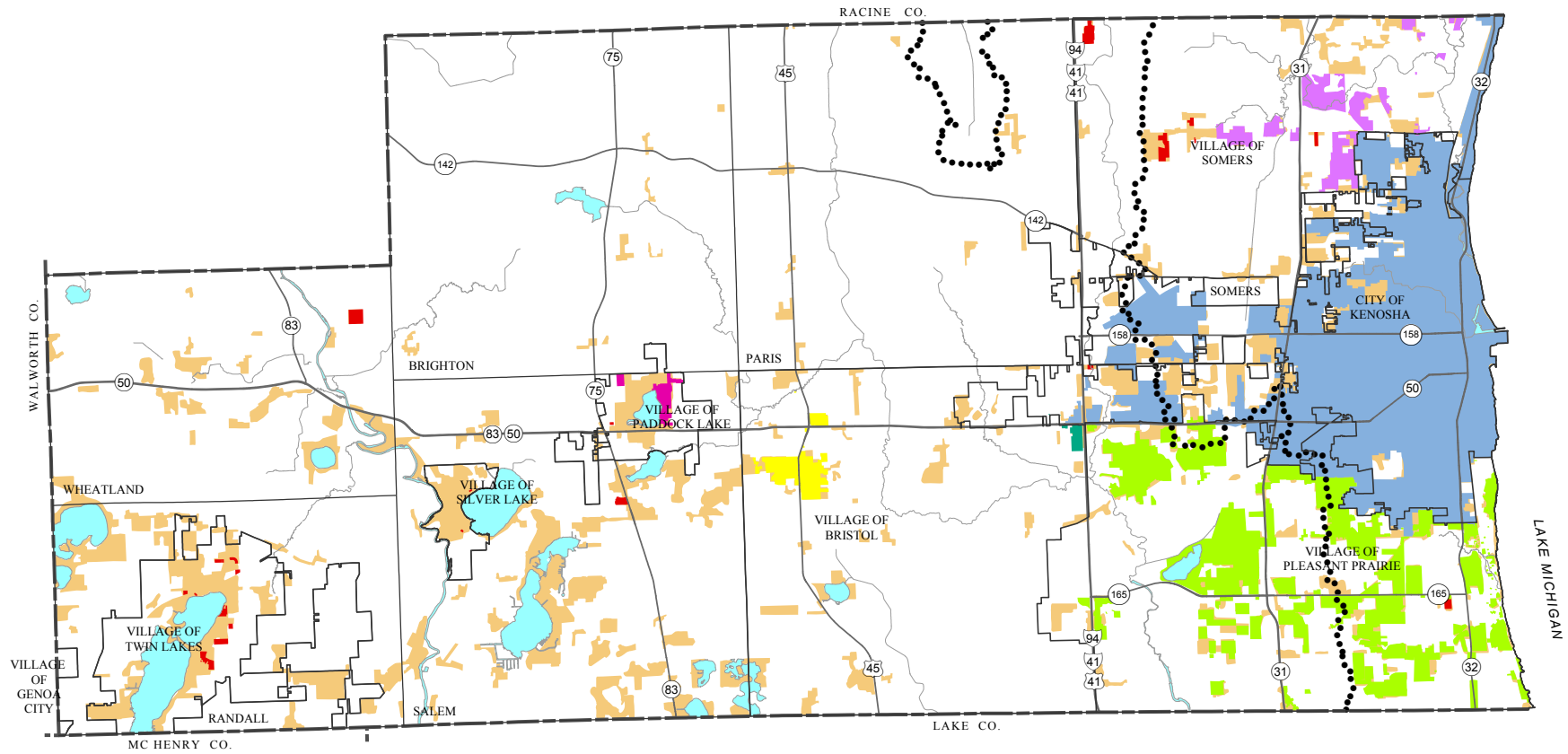
- PUBLIC-USE AIRPORT - PUBLIC OWNERSHIP
- PUBLIC-USE AIRPORT - PRIVATE OWNERSHIP
- PRIVATE-USE AIRPORT - PRIVATE OWNERSHIP
- PRIVATE-USE HELIPORT - PRIVATE OWNERSHIP
- PRIVATE-USE ULTRALIGHT - PRIVATE OWNERSHIP

Source: Wisconsin Bureau of Aeronautics and SEWRPC.



Map II - 11

AREAS SERVED BY PUBLIC AND PRIVATE WATER SUPPLY IN KENOSHA COUNTY: 2005



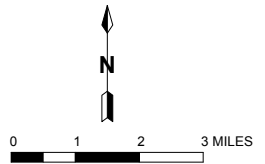
SURFACE WATER SUPPLIED SYSTEMS

- KENOSHA WATER UTILITY SERVICE AREA
- PLEASANT PRAIRIE WATER UTILITY SERVICE AREA
- TOWN OF SOMERS WATER UTILITY SERVICE AREA
- VILLAGE OF BRISTOL UTILITY DISTRICT 3

GROUNDWATER SUPPLIED SYSTEMS

- PADDOCK LAKE MUNICIPAL WATER UTILITY SERVICE AREA
- VILLAGE OF BRISTOL UTILITY DISTRICT 1
- AREA SERVED BY OTHER THAN MUNICIPAL COMMUNITY WATER SYSTEMS USING GROUNDWATER
- EXTENT OF URBAN DEVELOPMENT NOT SERVED BY PUBLIC OR PRIVATE WATER SUPPLY SYSTEMS; INCLUDES URBAN DEVELOPMENT AS IDENTIFIED IN THE REGIONAL PLANNING COMMISSION HISTORIC URBAN GROWTH RING ANALYSIS

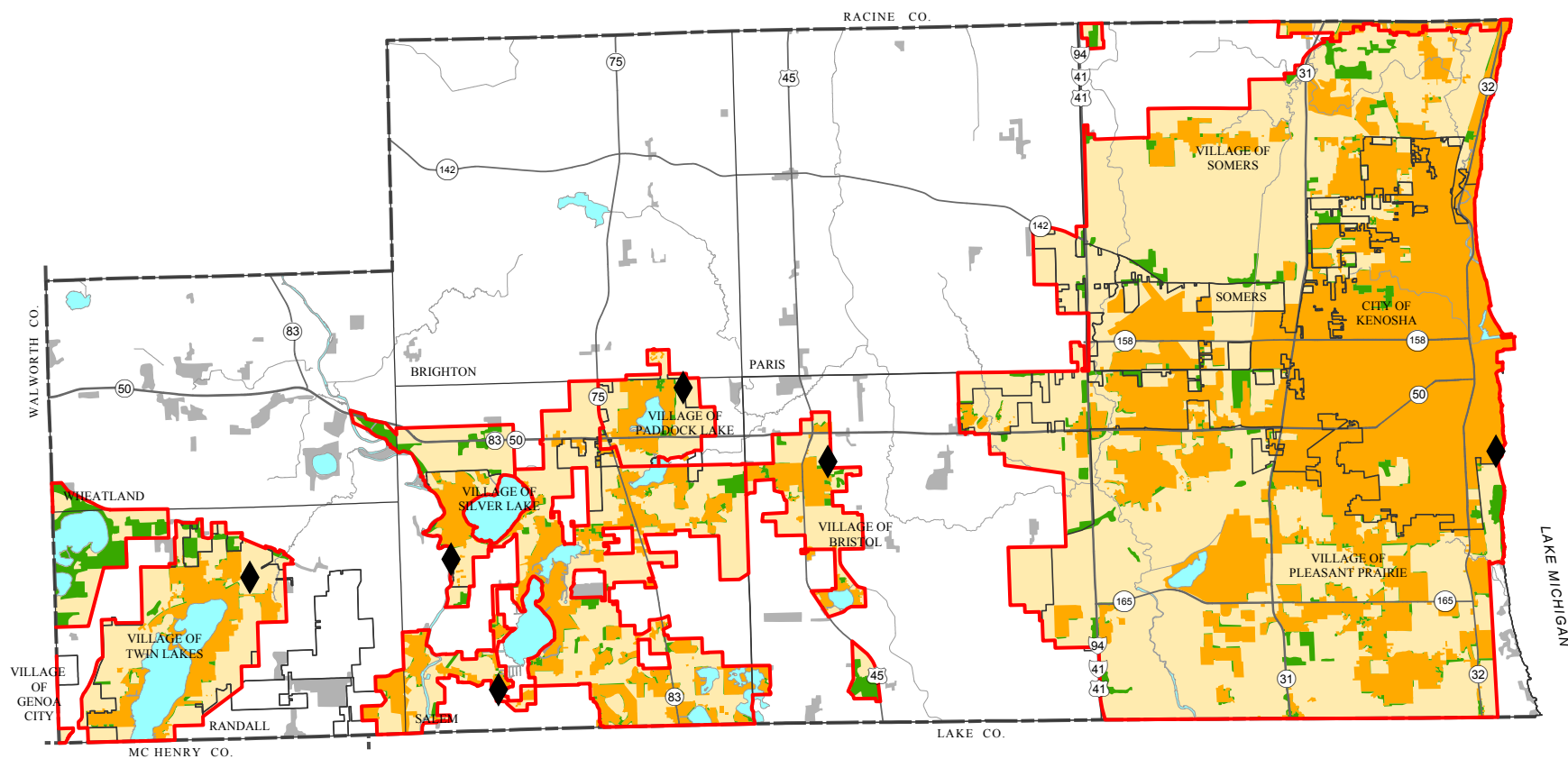
••••• SUBCONTINENTAL DIVIDE



Source: Wisconsin Department of Natural Resources, Wisconsin Public Service Commission, Water Utilities, and SEWRPC.

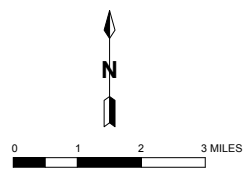
Map II - 12

PLANNED SANITARY SEWER SERVICE AREAS AND AREAS SERVED BY SEWER IN KENOSHA COUNTY



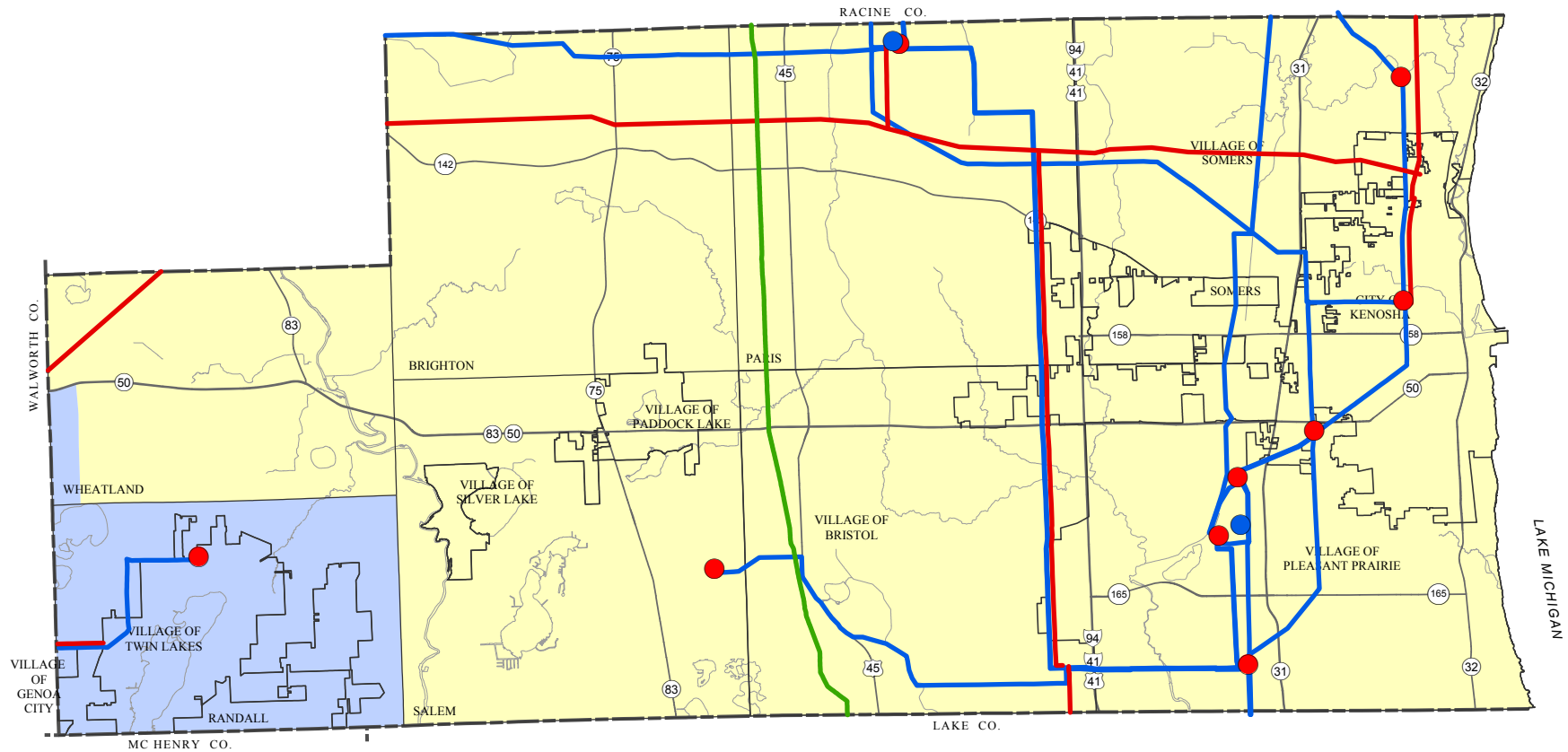
- AREA SERVED BY SANITARY SEWER: 2010
- PLANNED SANITARY SEWER SERVICE AREAS (JUNE 2015)
- PLANNED SANITARY SEWER SERVICE AREA BOUNDARIES (JUNE 2015)
- EXTENT OF URBAN DEVELOPMENT WITHIN PLANNED SANITARY SEWER SERVICE AREAS NOT CURRENTLY SERVED BY PUBLIC SEWERAGE SYSTEMS
- EXTENT OF URBAN DEVELOPMENT NOT SERVED BY PUBLIC SEWERAGE SYSTEMS
- SEWAGE TREATMENT PLANT
- SURFACE WATER

Source: Wisconsin Department of Natural Resources and SEWRPC.

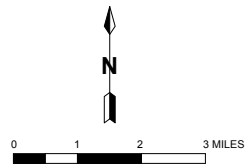


Map II - 13

**ELECTRIC SERVICE PROVIDERS, ELECTRIC TRANSMISSION LINES,
NATURAL GAS PIPELINES, AND PETROLEUM PIPELINES IN KENOSHA COUNTY: 2006**



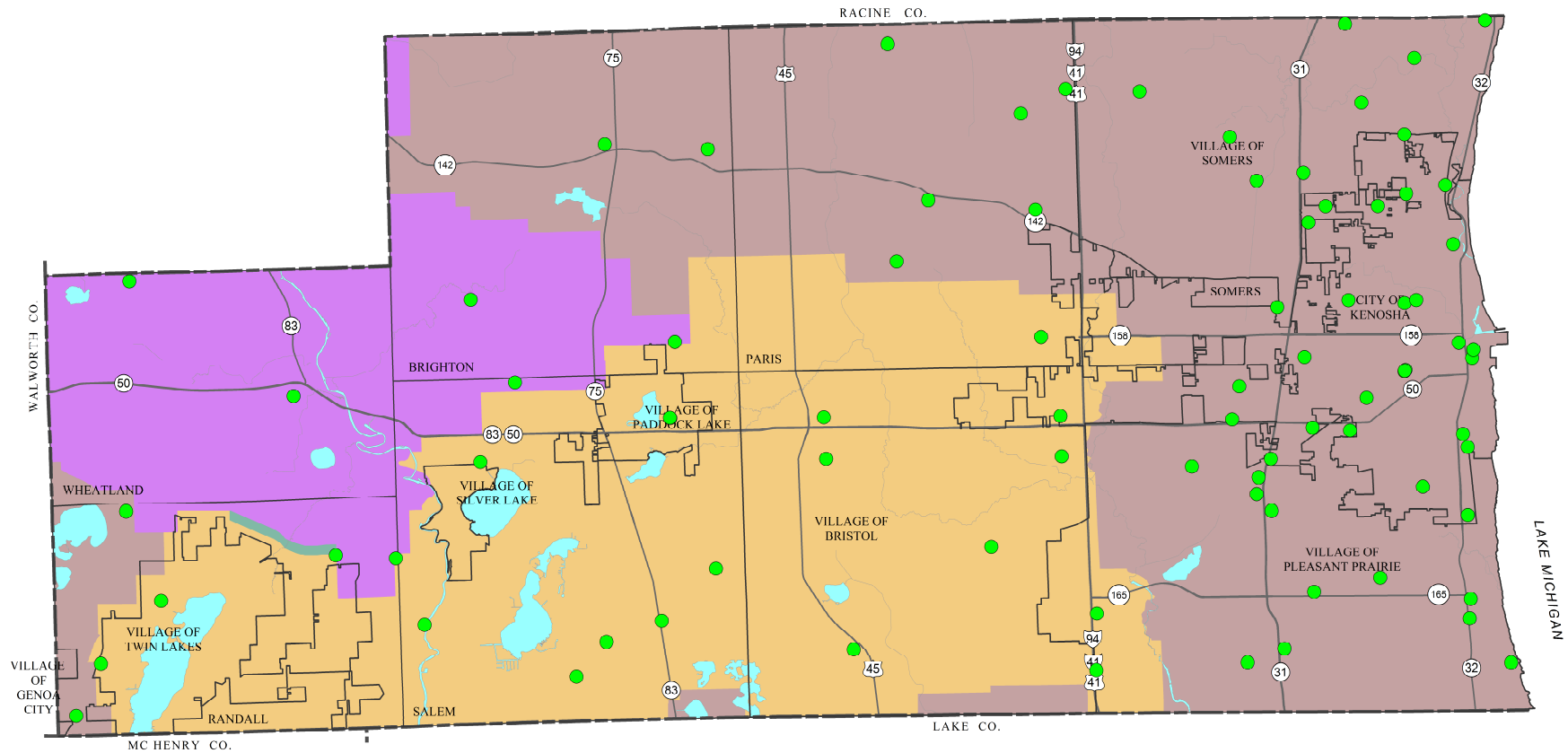
- ELECTRIC TRANSMISSION LINE
- NATURAL GAS PIPELINE
- PETROLEUM PIPELINE
- POWER PLANT
- ELECTRICAL SUBSTATION
- WE ENERGIES SERVICE AREA
- WISCONSIN POWER AND LIGHT SERVICE AREA



Source: Public Service Commission of Wisconsin and SEWRPC.

Map II - 14

TELEPHONE EXCHANGE CARRIER SERVICE AREAS AND CELL TOWER LOCATIONS IN KENOSHA COUNTY: 2015

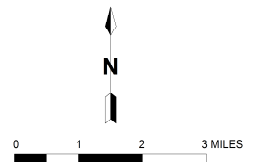


TELEPHONE EXCHANGE CARRIER SERVICE AREAS

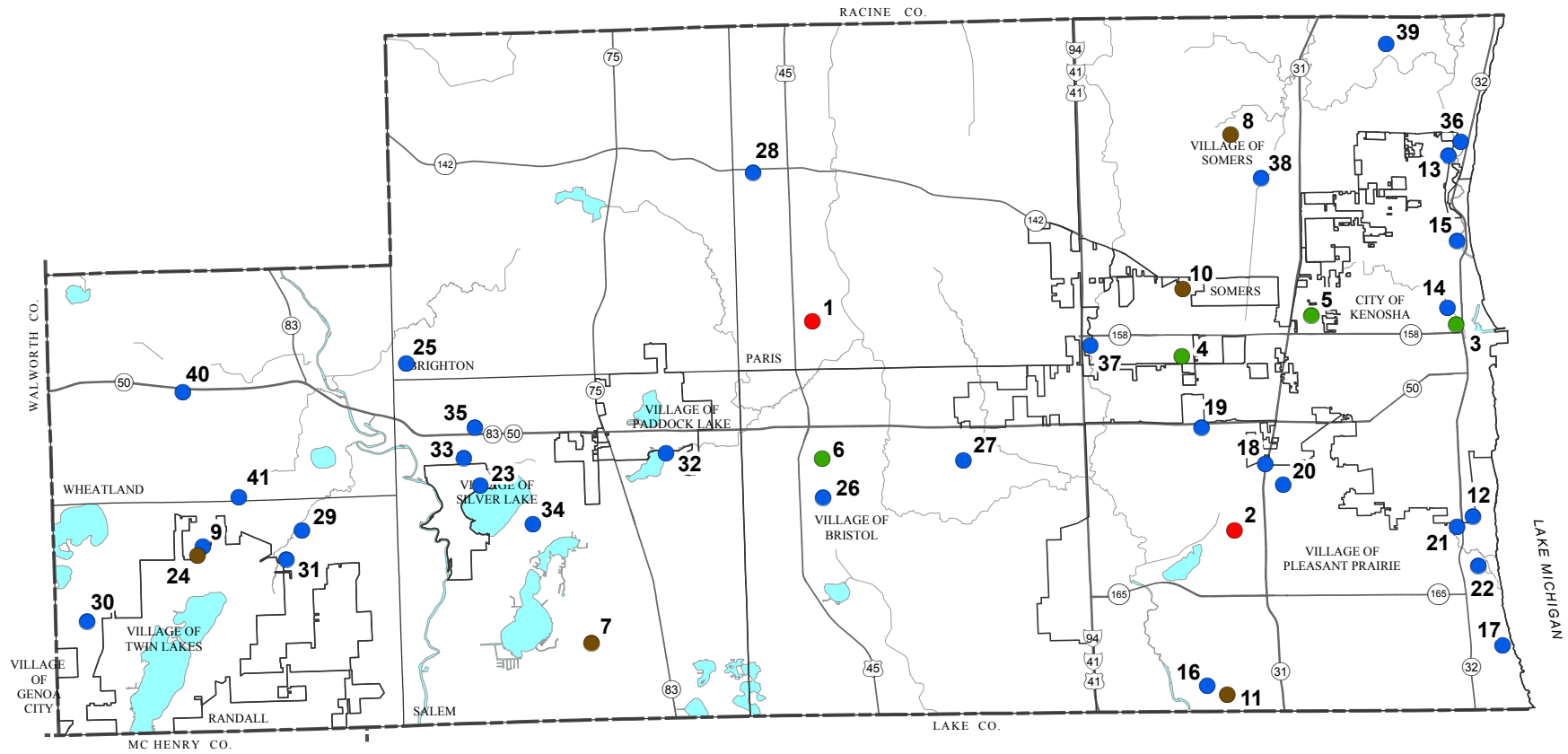
- AT & T
- FRONTIER COMMUNICATIONS COMPANY OF WISCONSIN
- TELEPHONE AND DATA SYSTEMS, INC.
- OPEN TERRITORY

CELL TOWER LOCATIONS

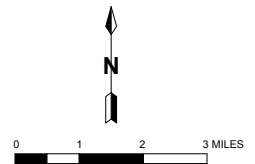
Source: Wisconsin Public Service Commission and SEWRPC.



Map II - 15
SOLID WASTE DISPOSAL SITES IN KENOSHA COUNTY: 2015



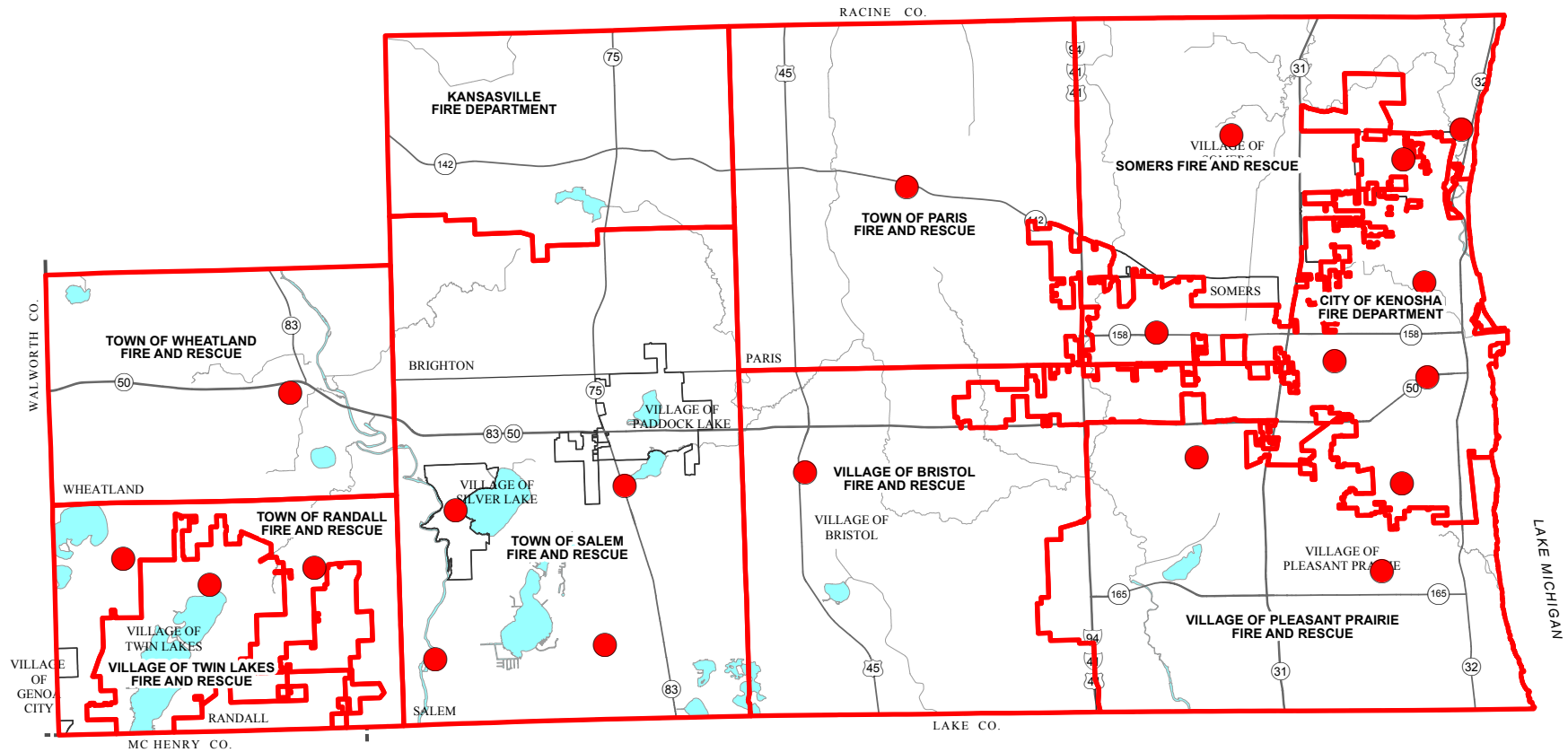
- ACTIVE LANDFILL
- INACTIVE LANDFILL
- COMPOST SITE
- RECYCLING CENTER, TRANSFER FACILITY, OR STORAGE FACILITY
- 31** REFERENCE NUMBER (SEE APPENDIX B)



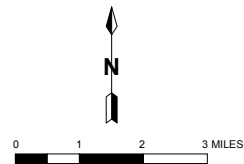
Source: Wisconsin Department of Natural Resources, Kenosha County, and SEWRPC.

Map II - 16

FIRE STATIONS AND FIRE DEPARTMENT SERVICE BOUNDARIES IN KENOSHA COUNTY: 2016



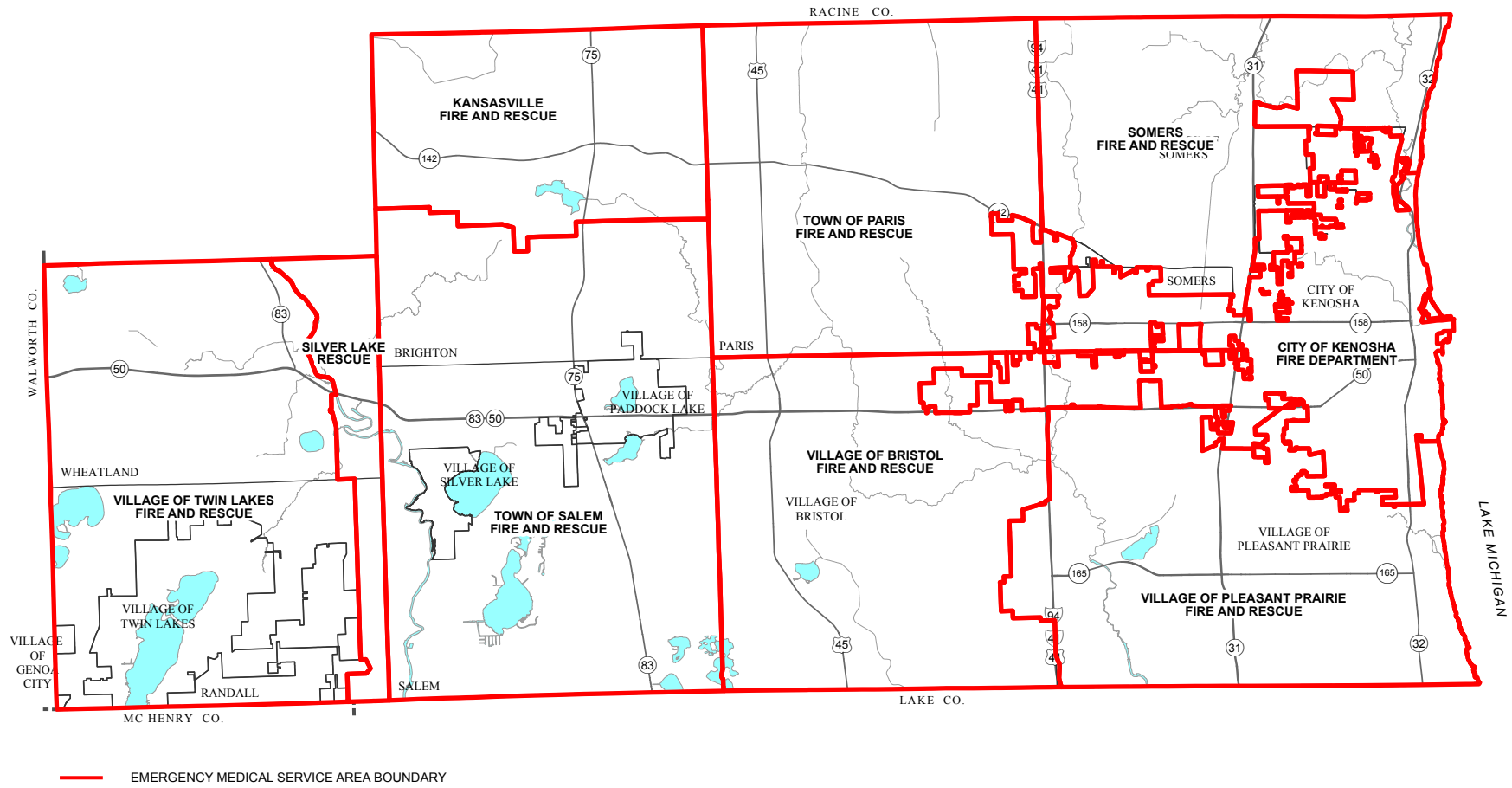
- FIRE DEPARTMENT SERVICE AREA BOUNDARY
- FIRE STATION



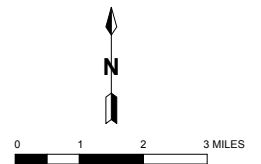
Source: Kenosha County and SEWRPC.

Map II - 17

EMERGENCY MEDICAL SERVICE AREAS IN KENOSHA COUNTY: 2016

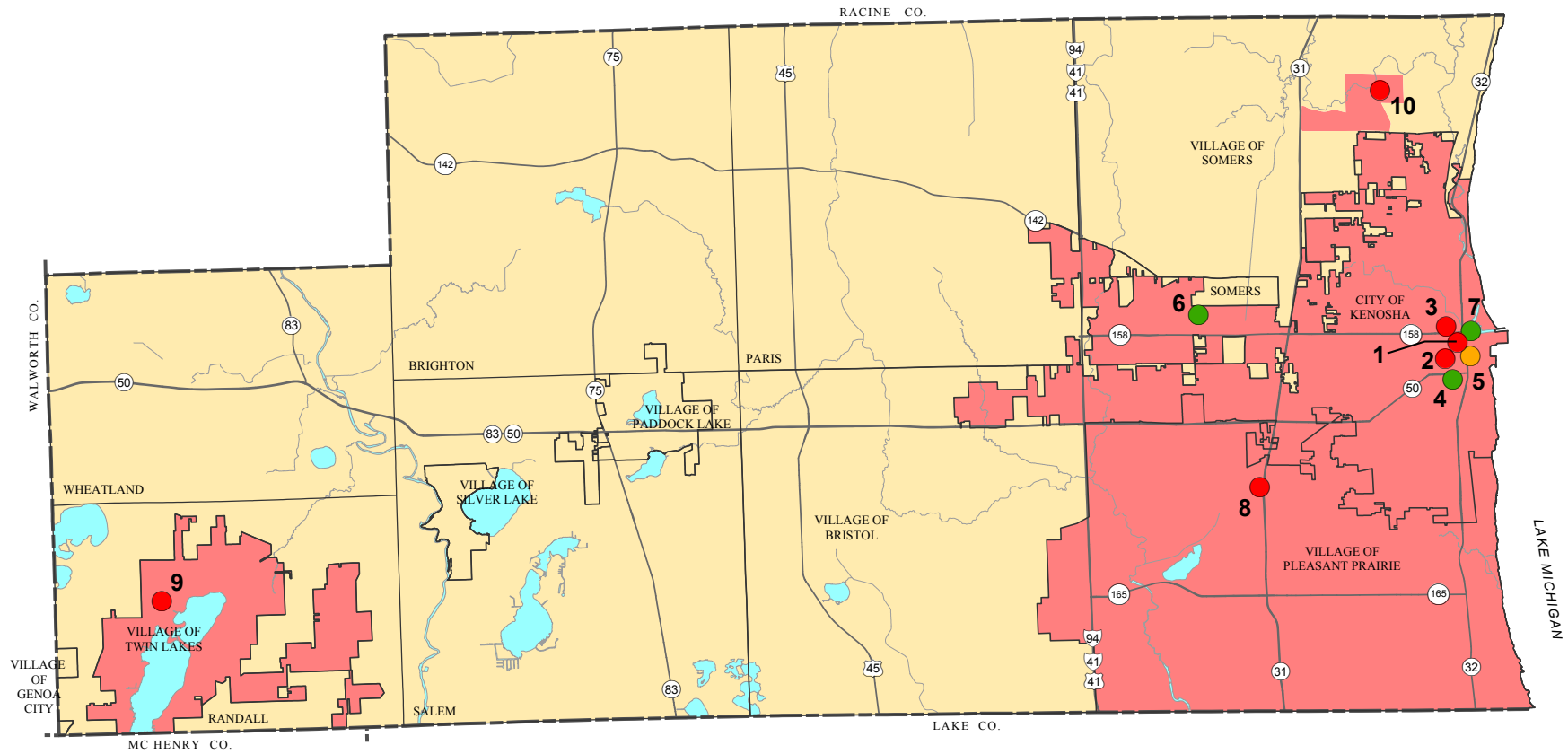


Source: Kenosha County and SEWRPC.

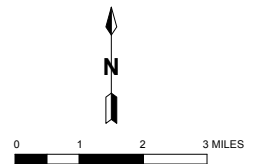


Map II - 18

LAW ENFORCEMENT STATIONS AND SERVICE AREAS IN KENOSHA COUNTY: 2015



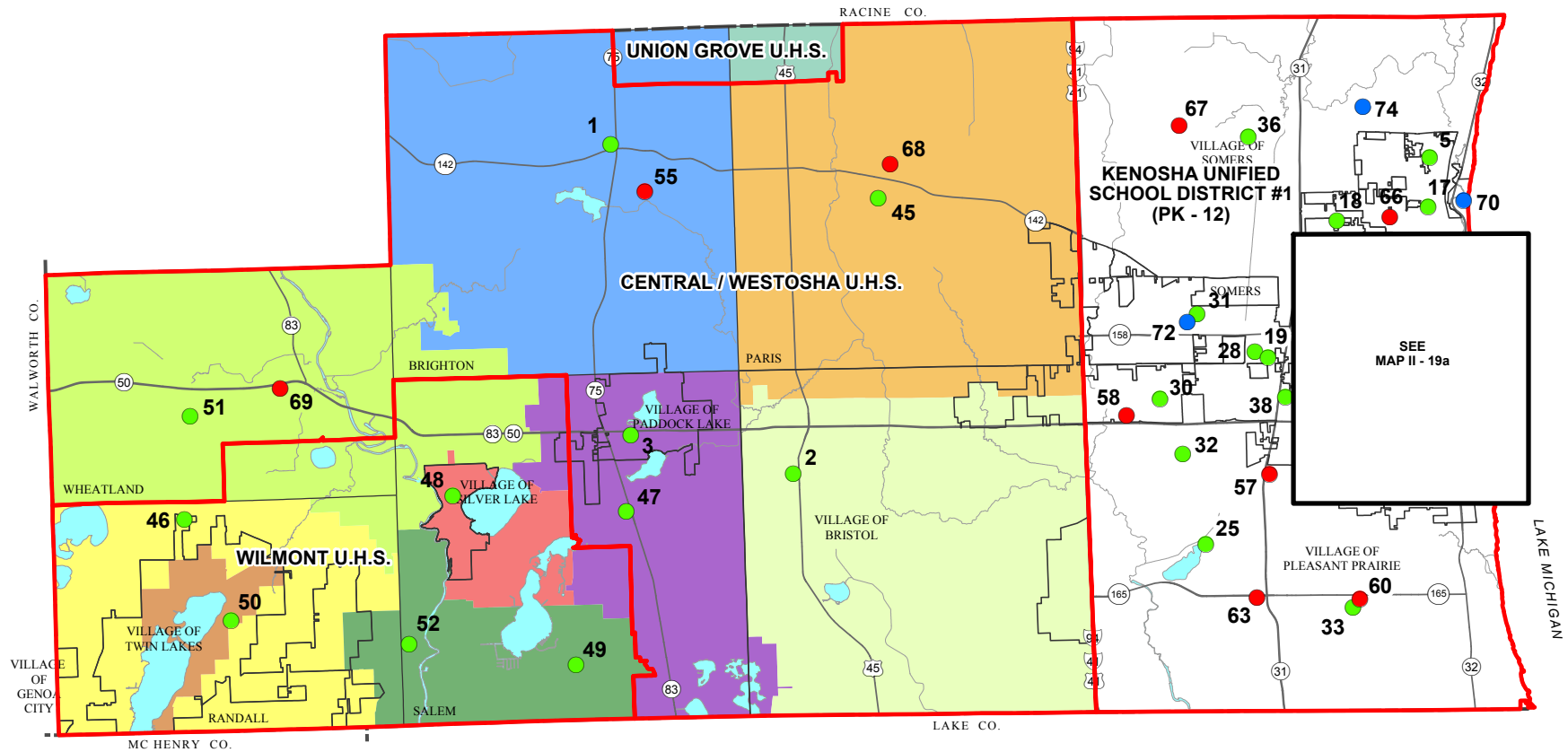
- CITY, VILLAGE, OR UNIVERSITY POLICE STATIONS
- KENOSHA COUNTY SHERIFF'S DEPARTMENT
- CORRECTIONAL FACILITY
- 4** REFERENCE NUMBER (SEE TABLE C-1 IN APPENDIX C)
- CITY, VILLAGE, OR TOWN SERVED BY A LOCAL POLICE DEPARTMENT
- AREA SERVED BY KENOSHA COUNTY SHERIFF'S DEPARTMENT



Source: Wisconsin Department of Justice (WILENET), Racine County, and SEWRPC.
















Map II - 19

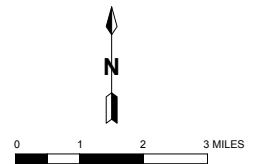
PUBLIC SCHOOL DISTRICTS, PUBLIC AND PRIVATE SCHOOLS, COLLEGES AND UNIVERSITIES IN KENOSHA COUNTY: 2015



SEE
MAP II - 19a

ELEMENTARY SCHOOL DISTRICT AREAS

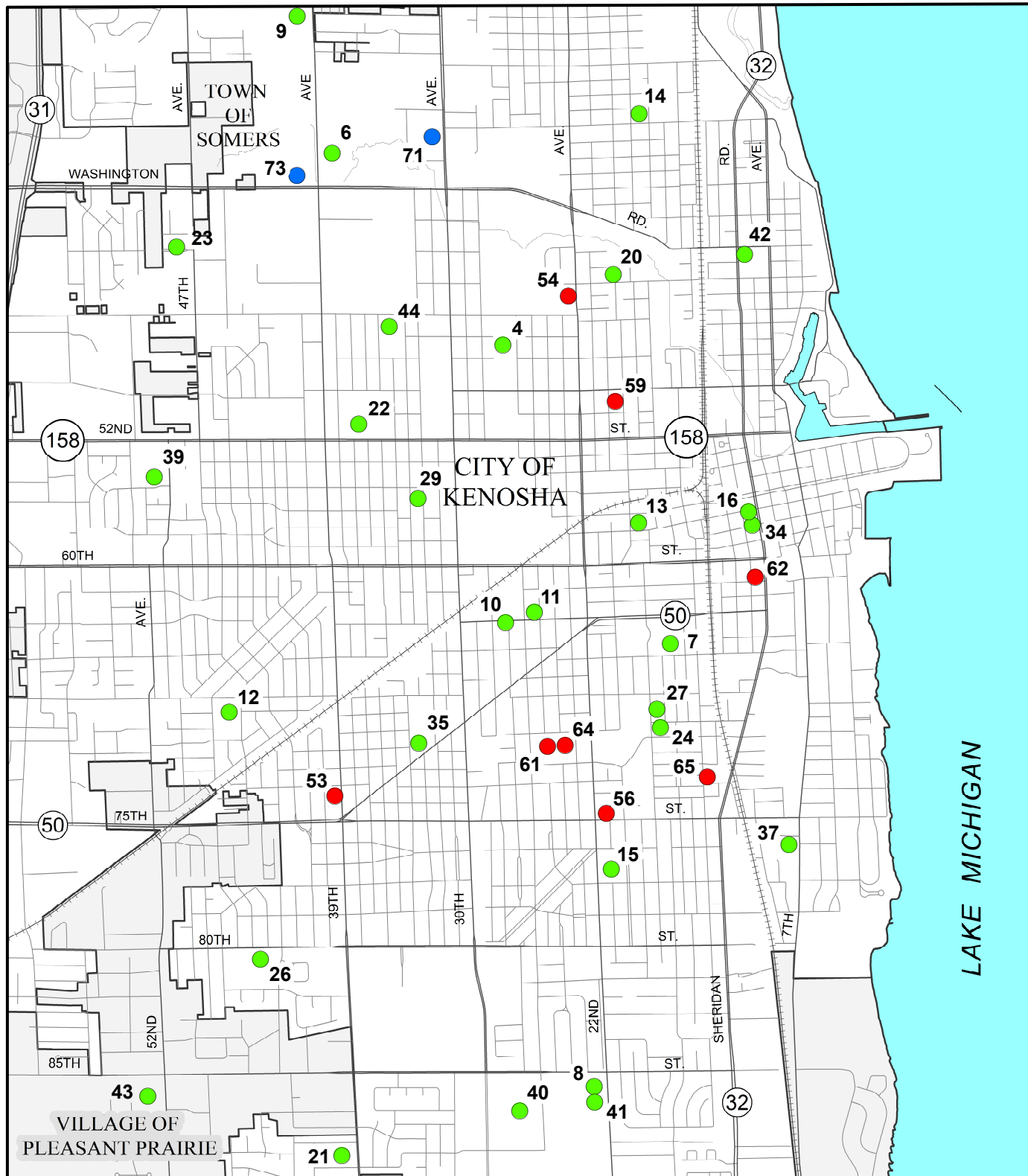
- | | | |
|--|---|--|
|  BRIGHTON SCHOOL DISTRICT #1 |  SILVER LAKE JOINT SCHOOL DISTRICT #1 |  UNIFIED HIGH SCHOOL / K-12 DISTRICT BOUNDARY |
|  BRISTOL SCHOOL DISTRICT #1 |  TREVOR - WILMONT CONSOLIDATED GRADE SCHOOL DISTRICT |  PUBLIC SCHOOL |
|  PARIS JOINT SCHOOL DISTRICT #1 |  TWIN LAKES SCHOOL DISTRICT #4 |  PRIVATE SCHOOL |
|  RANDALL JOINT SCHOOL DISTRICT #1 |  UNION GROVE GRADE AND MIDDLE SCHOOL JOINT DISTRICT |  COLLEGE / UNIVERSITY |
|  SALEM SCHOOL DISTRICT #1 |  WHEATLAND JOINT SCHOOL DISTRICT #1 |  REFERENCE NUMBER (SEE TABLE D-1 IN APPENDIX D) |



Source: Wisconsin Department of Public Instruction, Kenosha County, and SEWRPC.

Map II - 19a

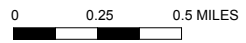
PUBLIC SCHOOL DISTRICTS, PUBLIC AND PRIVATE SCHOOLS, COLLEGES AND UNIVERSITIES IN THE CITY OF KENOSHA: 2015



- PUBLIC SCHOOL
- PRIVATE SCHOOL
- COLLEGE / UNIVERSITY

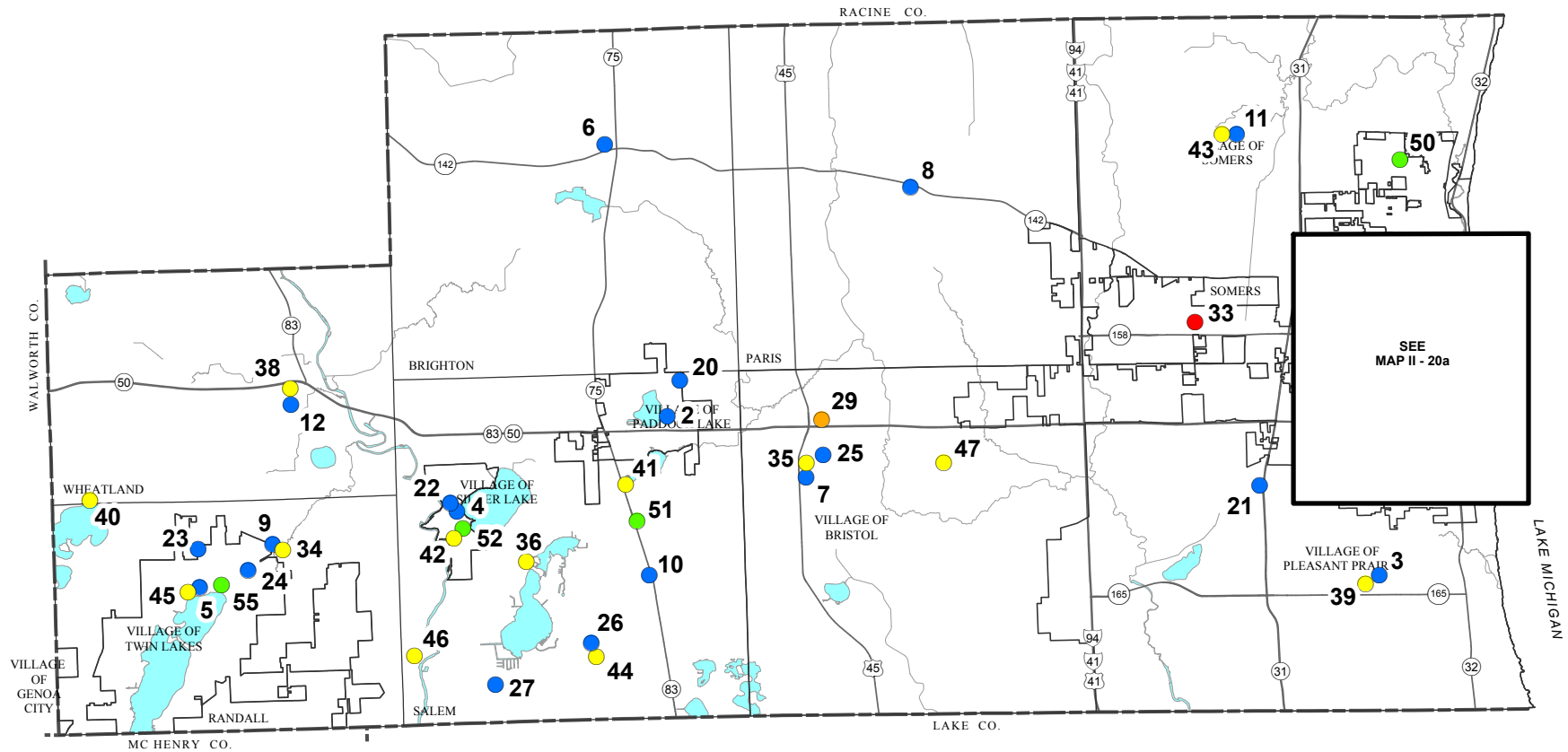
37 REFERENCE NUMBER (SEE TABLE D-1 IN APPENDIX D)

Source: Wisconsin Department of Public Instruction, Kenosha County, and SEWRPC.



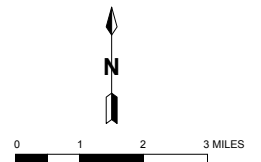
Map II - 20

SELECTED GOVERNMENT ADMINISTRATION BUILDINGS IN KENOSHA: 2015

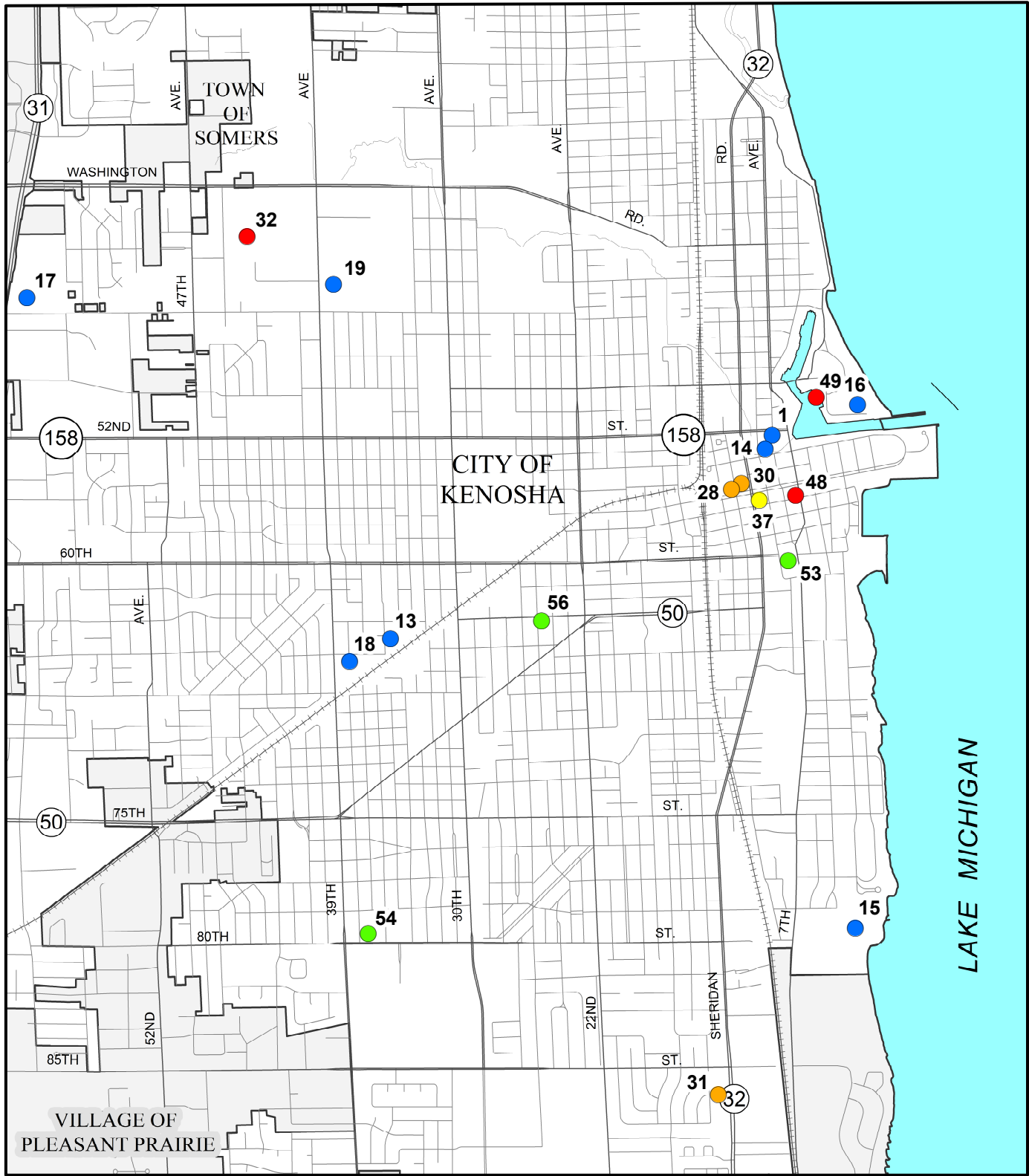


- LOCAL GOVERNMENT FACILITIES
- COUNTY FACILITIES
- STATE OR FEDERAL FACILITIES
- U.S. POST OFFICES
- LIBRARIES
- 25** REFERENCE NUMBER
(SEE TABLE D-2 IN APPENDIX D)

Source: Kenosha County and SEWRPC.



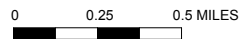
SELECTED GOVERNMENT ADMINISTRATION BUILDINGS IN THE CITY OF KENOSHA: 2015



- LOCAL GOVERNMENT FACILITIES
- COUNTY FACILITIES
- STATE OR FEDERAL FACILITIES
- U.S. POST OFFICES
- LIBRARIES

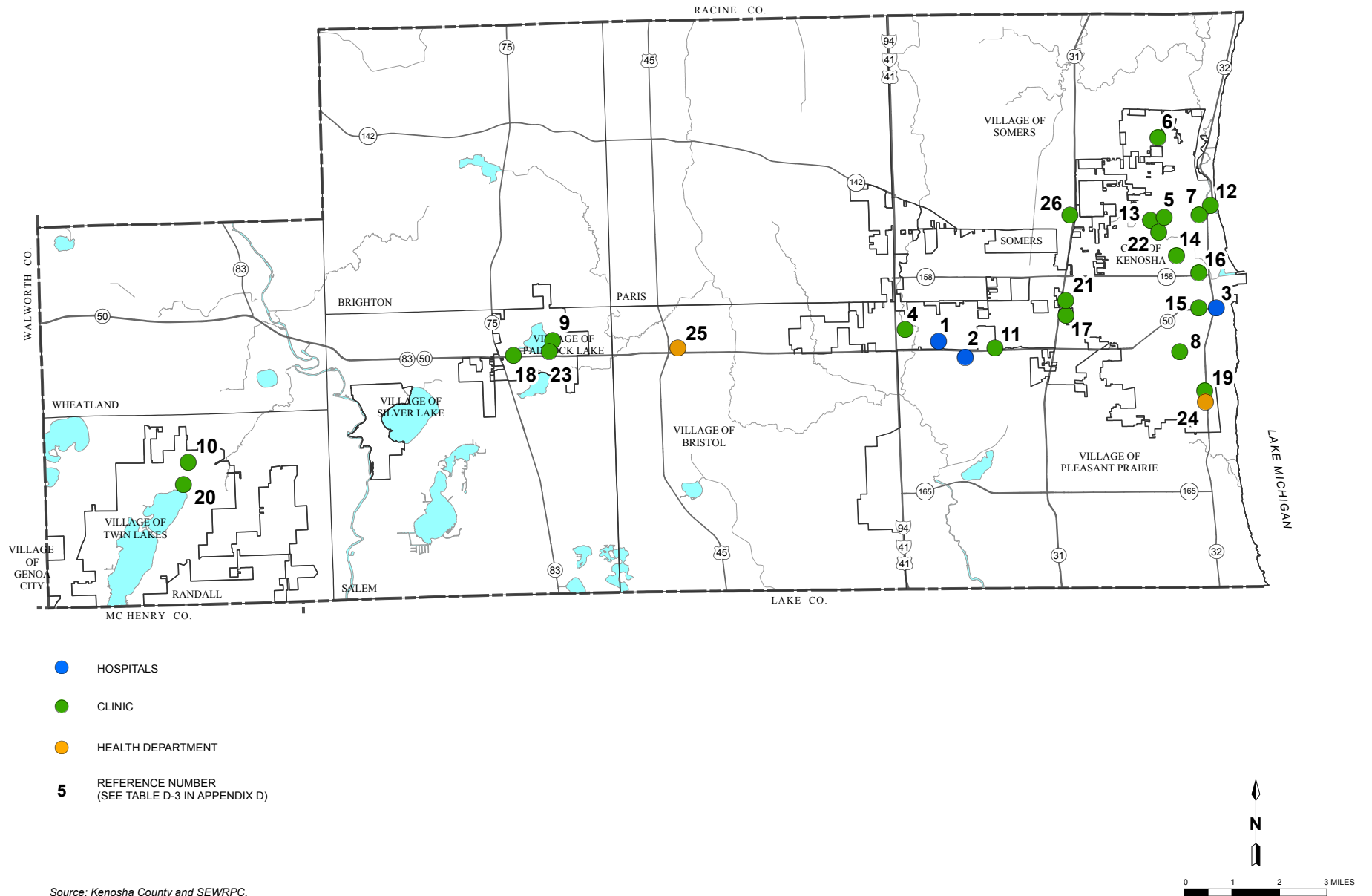
56 REFERENCE NUMBER (SEE TABLE D-2 IN APPENDIX D)

Source: Kenosha County and SEWRPC.



Map II - 21

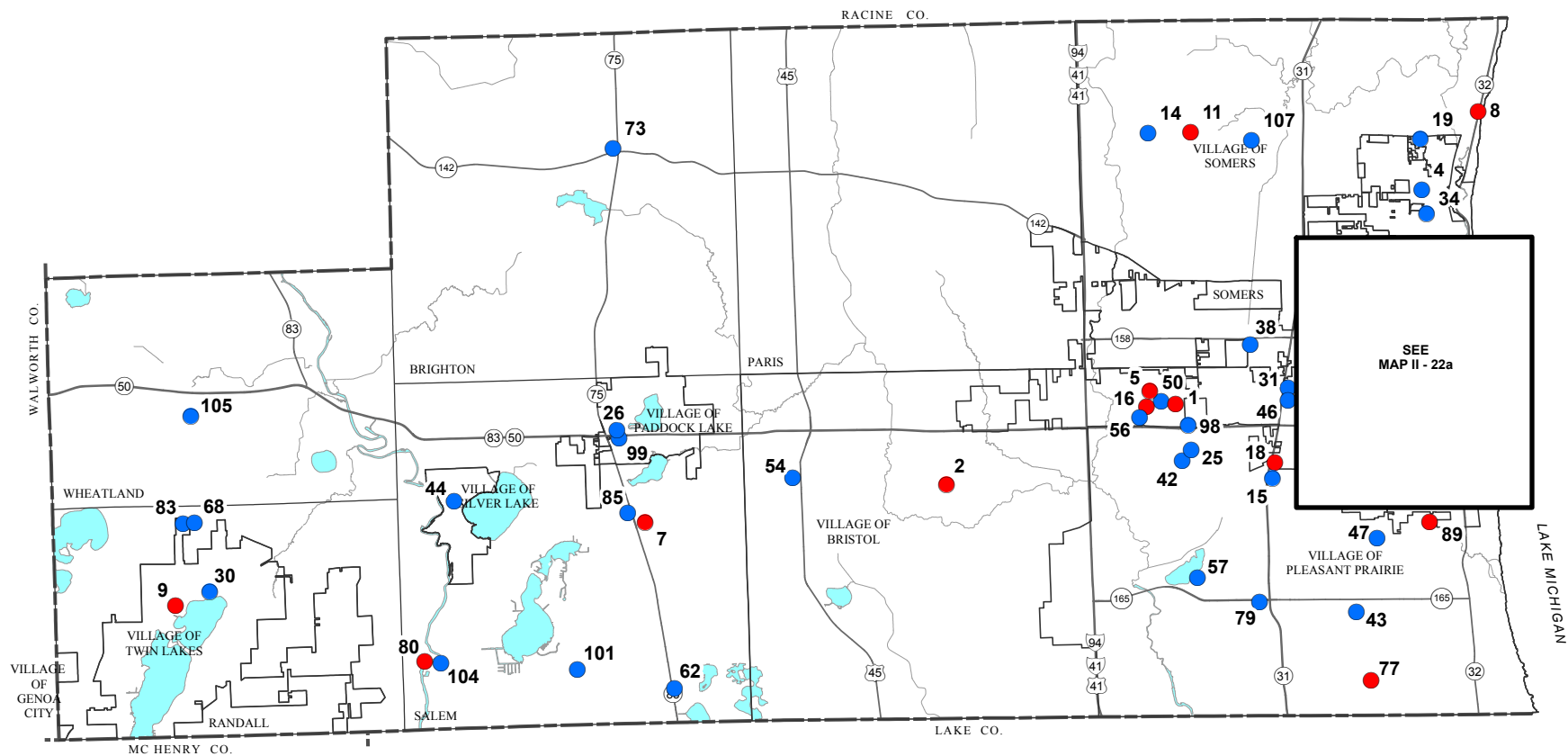
HOSPITALS, MAJOR CLINICS, AND HEALTH DEPARTMENTS IN KENOSHA COUNTY: 2015



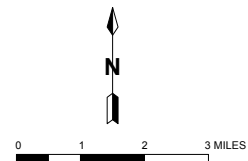
Source: Kenosha County and SEWRPC.

Map II - 22

CHILD CARE CENTERS IN KENOSHA COUNTY: 2015

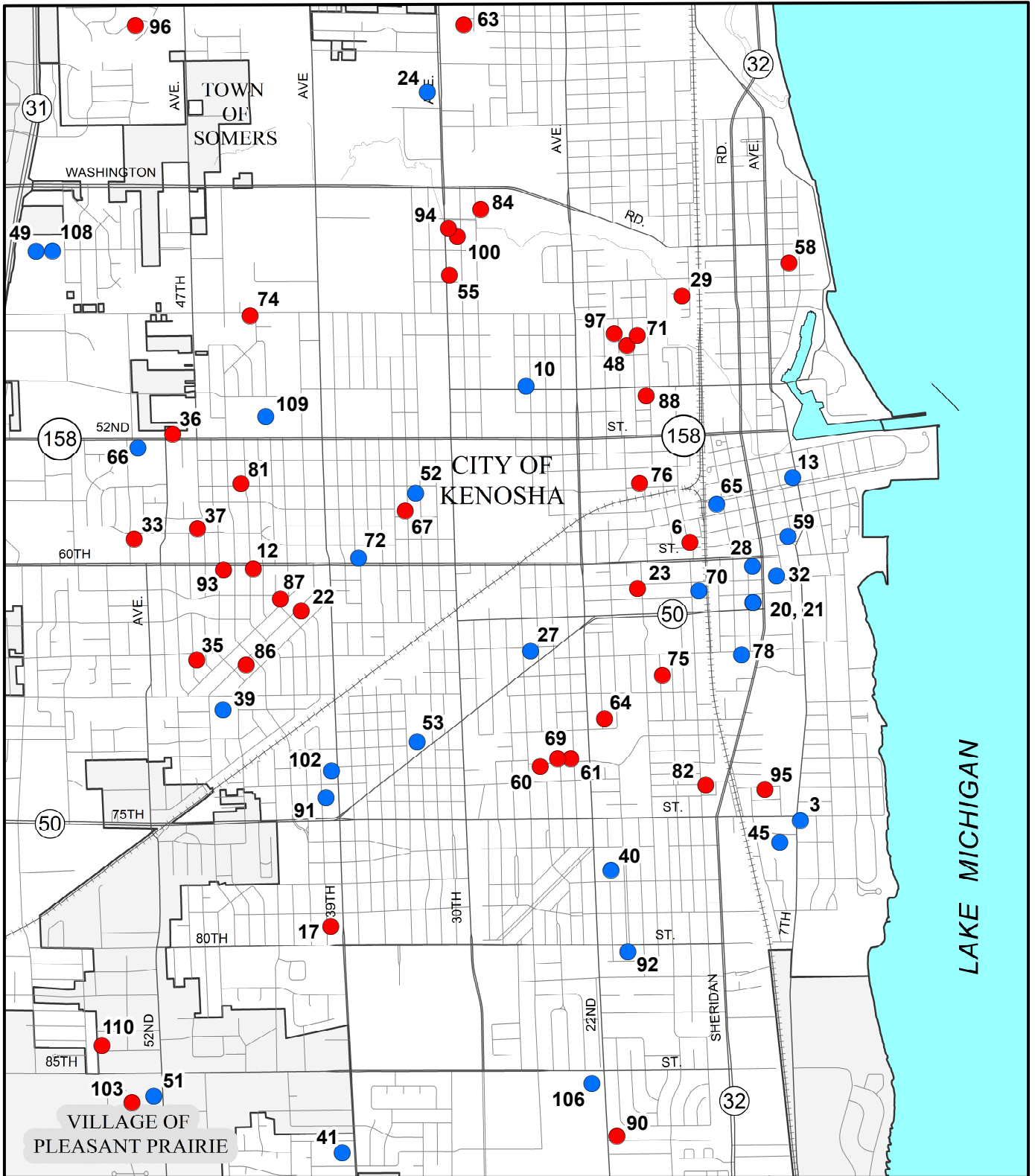


- LICENSED FAMILY CHILD CARE CENTER
(4 TO 8 CHILDREN)
- LICENSED GROUP CHILD CARE CENTER
(9 OR MORE CHILDREN)
- 83** REFERENCE NUMBER
(SEE TABLE D-4 IN APPENDIX D)



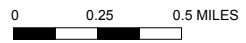
Source: Wisconsin Department of Children and Families and SEWRPC.

CHILD CARE CENTERS IN THE CITY OF KENOSHA: 2015



- LICENSED FAMILY CHILD CARE CENTER (4 TO 8 CHILDREN)
- LICENSED GROUP CHILD CARE CENTER (9 OR MORE CHILDREN)

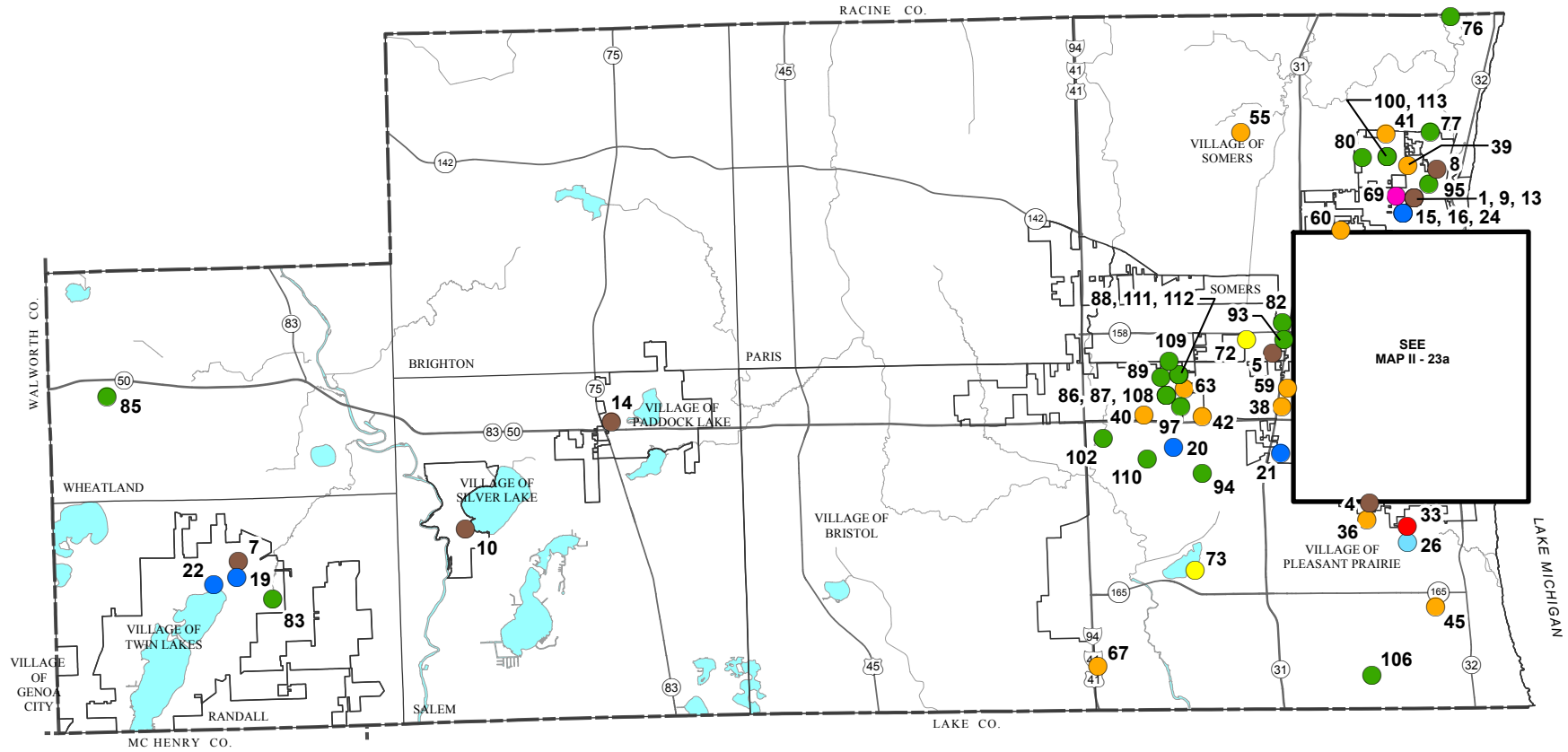
37 REFERENCE NUMBER (SEE TABLE D-4 IN APPENDIX D)



Source: Wisconsin Department of Children and Families and SEWRPC.

Map II - 23

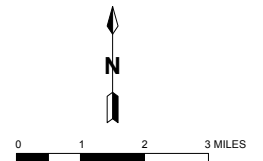
NURSING HOMES, ASSISTED LIVING FACILITIES, INDEPENDANT HOUSING, AND SENIOR APARTMENTS IN KENOSHA COUNTY: 2015



- NURSING HOME
- COMMUNITY BASED RESIDENTIAL FACILITY
- ADULT FAMILY HOME
- ADULT DAY CARE FACILITY
- APARTMENTS FOR SENIORS OR PERSONS WITH DISABILITIES
- AFFORDABLE HOUSING FOR OLDER ADULTS
- DESIGNATED SENIOR APRTMENTS
- RESIDENTIAL CARE APARTMENT COMPLEX

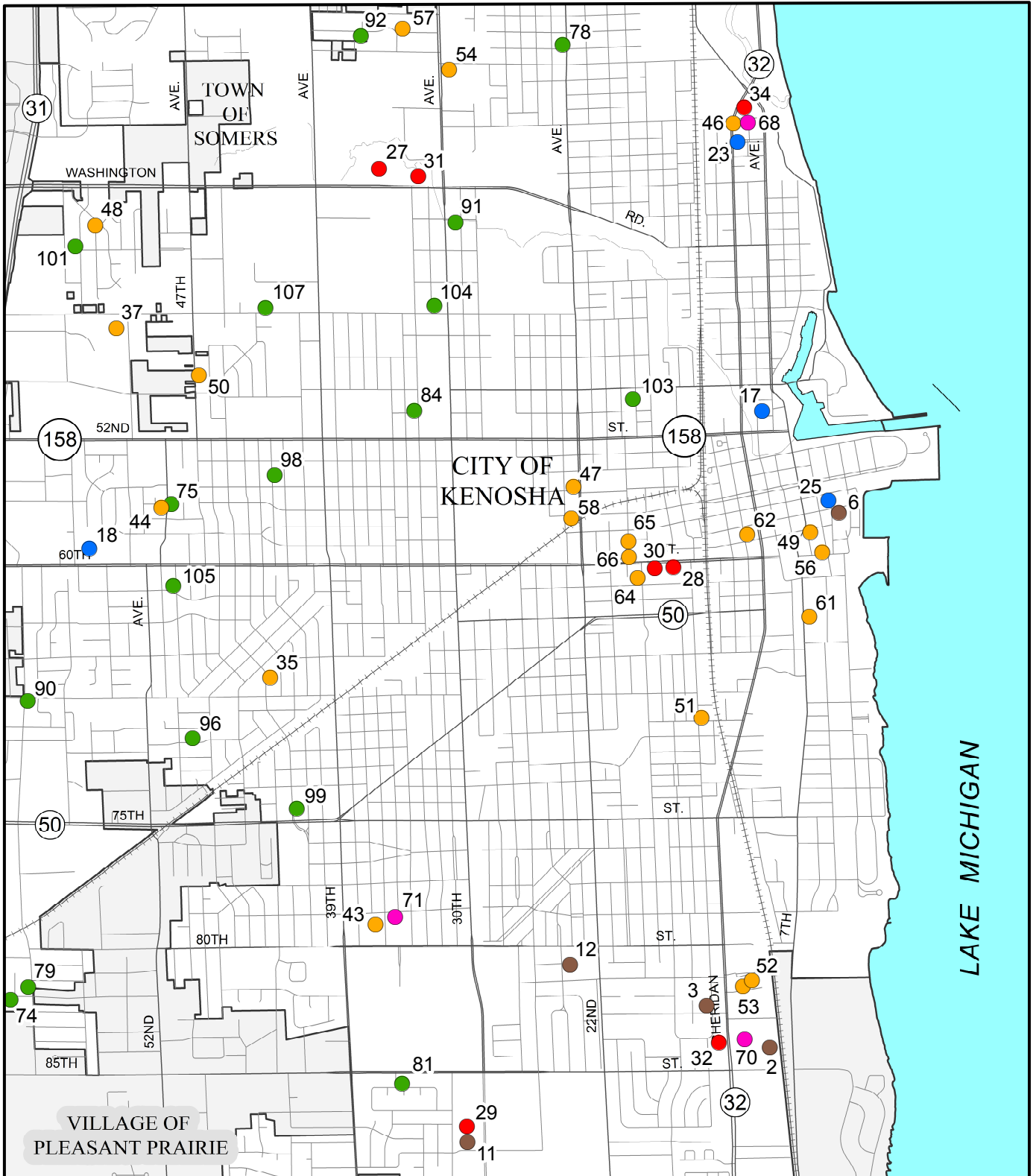
82 REFERENCE NUMBER
(SEE TABLE D-5 IN APPENDIX D)

Source: Kenosha and SEWRPC.



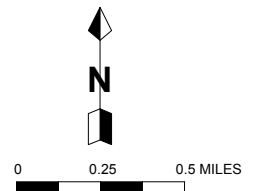
Map II - 23a

NURSING HOMES, ASSISTED LIVING FACILITIES, INDEPENDANT HOUSING, AND SENIOR APARTMENTS IN THE CITY OF KENOSHA: 2015



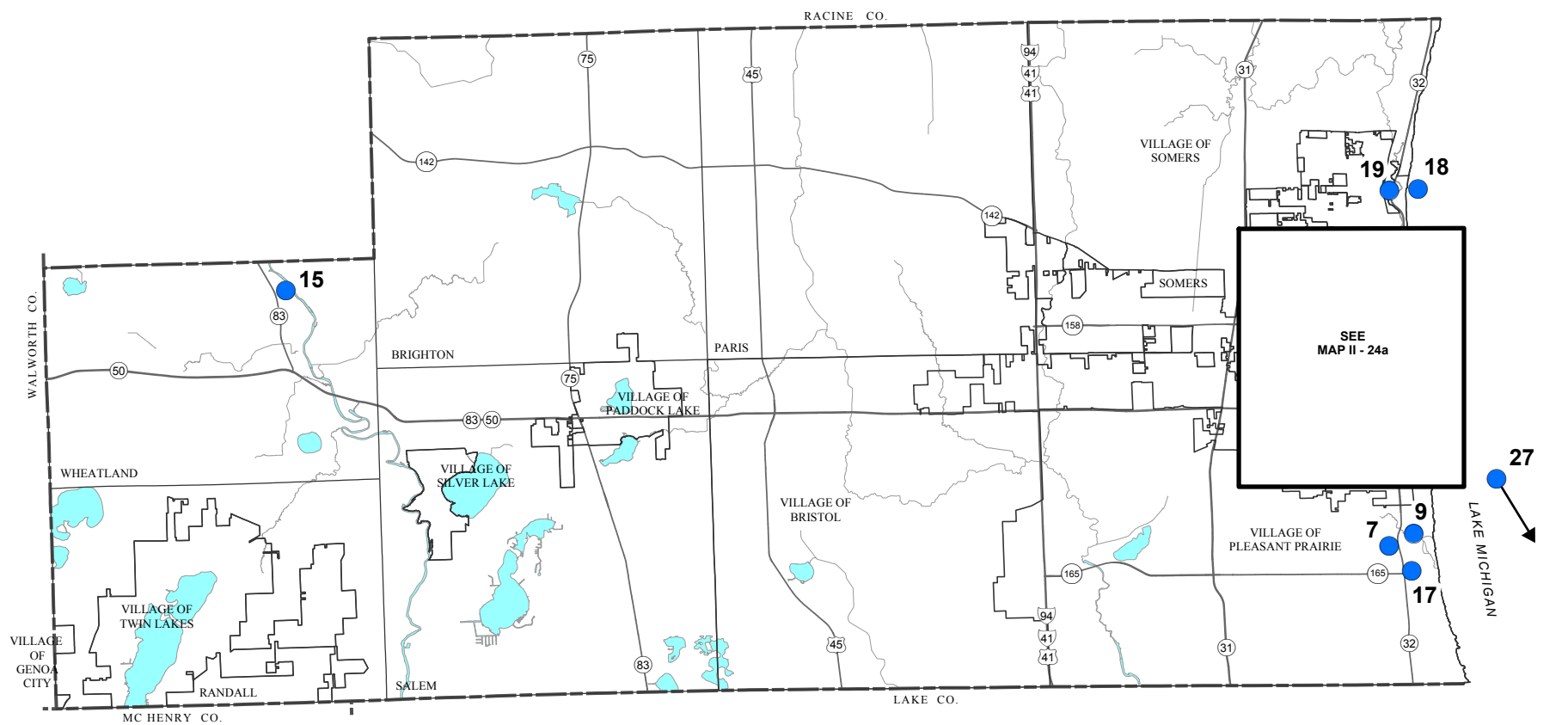
- NURSING HOME
- COMMUNITY BASED RESIDENTIAL FACILITY
- ADULT FAMILY HOME
- APARTMENTS FOR SENIORS OR PERSONS WITH DISABILITIES
- AFFORDABLE HOUSING FOR OLDER ADULTS
- RESIDENTIAL CARE APARTMENT COMPLEX
- 81** REFERENCE NUMBER (SEE TABLE V-13)

Source: Kenosha County and SEWRPC.

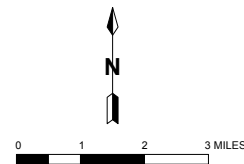


Map II - 24

HISTORIC SITES LISTED ON THE NATIONAL OR STATE REGISTERS OF HISTORIC PLACES IN KENOSHA COUNTY: 2015

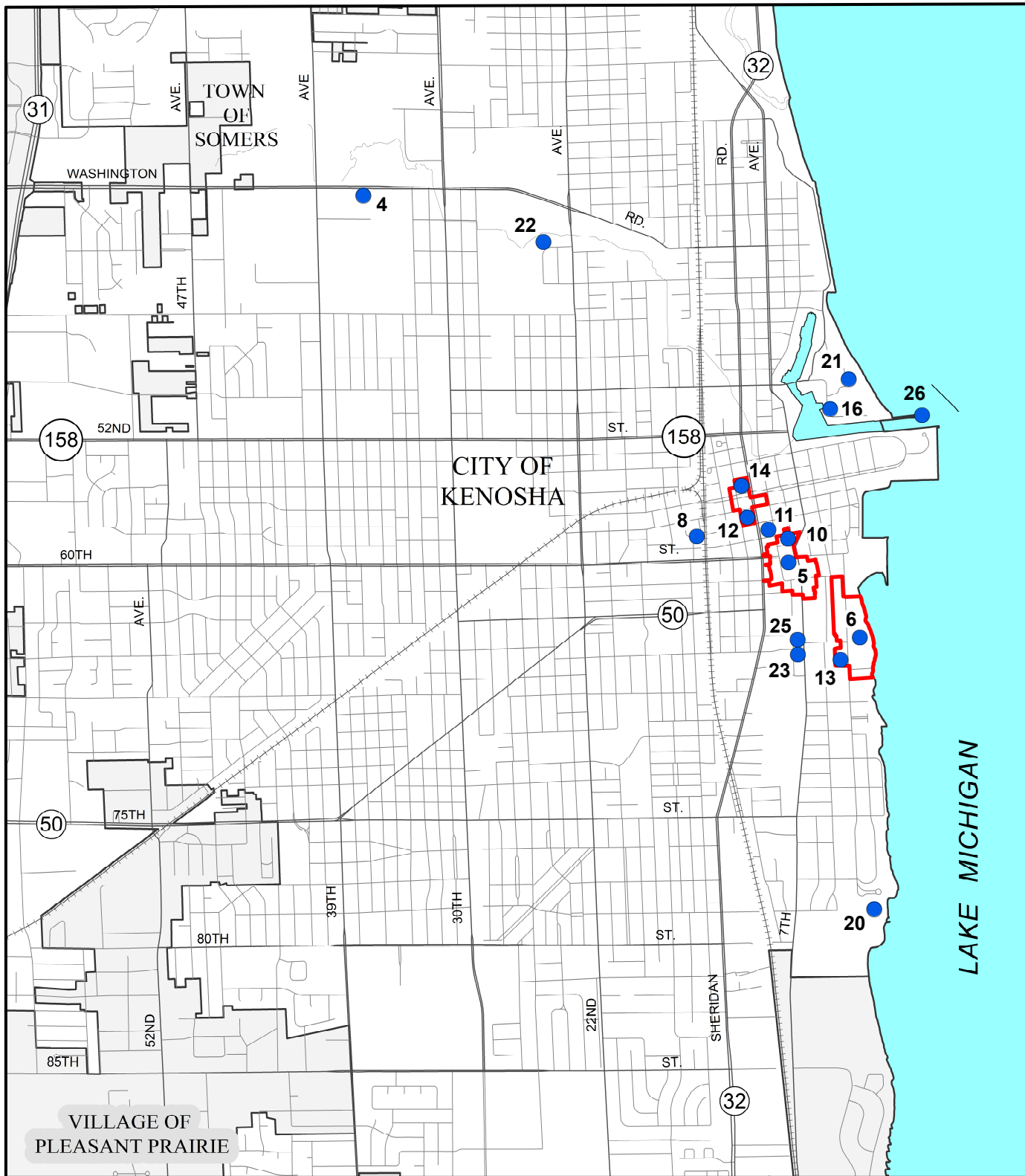


- NATIONAL OR STATE HISTORIC SITE
- 17** REFERENCE NUMBER
(SEE TABLE II-13)



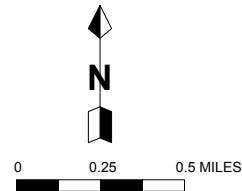
Source: State Historical Society of Wisconsin and SEWRPC.

HISTORIC SITES LISTED ON THE NATIONAL OR STATE REGISTERS
OF HISTORIC PLACES IN THE CITY OF KENOSHA: 2015



- NATIONAL OR STATE HISTORIC SITE
- ▭ HISTORIC DISTRICT BOUNDARY
- 22 REFERENCE NUMBER
(SEE TABLE II-13)

Source: State Historical Society of Wisconsin and SEWRPC.



Chapter III

ANALYSIS OF HAZARD CONDITIONS

To evaluate various potential hazard mitigation alternatives for Kenosha County and select the most effective and feasible hazard mitigation strategies, the existing potential hazard problems in the County must first be analyzed and the vulnerability to such hazards documented. Accordingly, this chapter provides the following:

- Identification of the hazards likely to affect Kenosha County;
- Profiles of the extent and severity of hazard events that have occurred in the County;
- Assessment of the vulnerability and risk associated with each type of hazard; and
- Identification of the potential for changes in hazard severity and risk under future conditions.

The vulnerability assessments focus on the County and community assets described in Chapter II.

In preparing **both the previous update and this current update to the plan**, the analysis of the existing potential hazard problems and the documentation of vulnerability to such hazards were reviewed and updated as warranted by the review. This review and updating included:

- Reevaluation of the identification of the hazards likely to affect Kenosha County;
- Updating of the data upon which the profiles of the extent and severity of hazard events that occurred in the County were based;
- Reassessment in light of the updated data of the vulnerability and risk associated with each type of hazard; and
- Reevaluation as warranted by the updated assessments of the potential for changes in hazard severity and risk under future conditions.

HAZARD IDENTIFICATION

The process of identifying those hazards that should be specifically addressed in the Kenosha County hazard mitigation plan was based upon consideration of a number of factors. The process included input from the Kenosha County Hazard Mitigation Plan **Local Planning Team**,¹ including a priority rank ordering of hazards; review of the hazard identification set forth in the State hazard mitigation plan; review of documentation of past hazard events; and review of related available mapping, plans, and assessments. As part of the updating process, the identification of hazards likely to affect Kenosha County was reviewed and reevaluated. This reevaluation included additional input from the Kenosha County All Hazards Mitigation Plan **Local Planning Team**.

Local Input

The Kenosha County Hazard Mitigation Plan was developed through a collective effort of a number of agencies, organizations, and business representatives under the guidance of the Kenosha County All Hazards Mitigation Plan Task Force, which was created by the County specifically for plan development purposes. That committee is comprised of elected and appointed officials and business representatives from throughout the County knowledgeable about, and directly involved in, hazard mitigation matters.

During the drafting of the initial plan, two meetings of the Kenosha County All Hazards Mitigation Plan Task Force were devoted, in part, to hazard identification. At the first meeting, an initial listing of hazards to be considered was presented. The Task Force was asked to expand upon that listing. Each Task Force member was then given a worksheet and asked to rank the hazards and their risk for damages. At a subsequent meeting, the results of the hazard ranking worksheets were presented to the Task Force and the Task Force voted on which hazards to classify as high and low priority hazards. A list of the hazards identified by the Task Force and their total ranking is shown in Table III-1.

As part of the updating process **for the first plan update**, the Task Force reevaluated the hazards to be considered using a hazard and vulnerability assessment tool. Members of the Task Force indicated the likelihood of each hazard occurring in Kenosha County and evaluated the severity of each hazard on the basis of possible impacts to people, property, and business. Finally, the Task Force evaluated the relative state of preparedness for each hazard. The ratings given by the Task Force for each hazard were used to derive a perceived level of risk posed by

¹*For the development of the initial plan and the 2009-2010 update, this group was called the Kenosha County All Hazards Mitigation Plan Task Force. For the current plan update, the name of this group has been changed to the Kenosha County Hazard Mitigation Plan Local Planning Team to reflect the current terminology used by FEMA. The term Task Force will be used when referring to actions taken during the development of the initial plan and the first plan update.*

each hazard. Following this, the hazards were ranked by perceived level of risk. The results from the assessment tool for the first plan update are summarized in Table III-2.

As part of the updating process for this plan update, the Local Planning Team reevaluated the hazards to be considered using a hazard and vulnerability assessment tool similar to the one used for reviewing hazard identification for the first plan update. A copy of this tool is included in Appendix A. Members of the Task Force indicated the likelihood of each hazard occurring in Kenosha County and evaluated the severity of each hazard on the basis of possible impacts to people, property, and business. Finally, the Task Force evaluated the relative state of preparedness for each hazard. The ratings given by the Task Force for each hazard were used to derive a perceived level of risk posed by each hazard. Following this, the hazards were ranked by perceived level of risk.

Summary of Hazard and Vulnerability Assessment Tool Results

Methods

The assessment tools were completed at the April 22, 2015, meeting of the Kenosha County Hazard Mitigation Plan Local Planning Team, with 22 surveys being returned and analyzed. For each of 45 hazards in each survey, a risk was computed using the formula:

$$\text{Risk(in \%)} = [(\text{Probability}/3) \times (\text{Human impact} + \text{Property impact} + \text{Business impact} + \text{Preparedness})/(4 \times 3)] \times 100$$

Where Probability (likelihood that an event would occur), Human impact (possibility of death or injury), Property impact (physical losses and damages), Business impact (interruption of services), and Preparedness (preplanning) were each assigned a number from 0 to 3, with 0 indicating “not applicable”, 1 indicating low, 2 indicating moderate, and 3 indicating high.

The interpretation of the result returned by this formula is that the perceived threat increases with increasing percentage risk.

For each hazard, an average risk was calculated using the results of all the returned surveys. The hazards were then ranked by average risk, with a rank of 1 indicating the highest perceived risk. For each hazard, minimum and maximum risks were calculated. The results from the assessment tool were analyzed for 45 hazards.

In order to assess the degree of agreement among Task Force members in the assessment of average risk, the interquartile range was calculated for each hazard. This quantity indicates the range of the half of the responses that are in middle. A smaller interquartile range indicates greater agreement among Task Force members as to the level of risk, while a larger interquartile range indicates less agreement.

Results

The results from the assessment tool are summarized in Table III-3. The average level of risk for hazards ranged from 6.2 percent for the lowest ranked hazard (dust storms) to 52.0 percent for the highest ranked hazard (tornadoes), with a mean value of 29.1 percent. Interquartile ranges were between 11 and 44, with a mean value of 25.

All of the 10 highest average risks belonged to natural hazards related to meteorological causes, mostly causes associated with either winter weather, severe storms, or flooding. The interquartile ranges for most of the 10 hazards with the highest average risks tended to be relatively large, indicating a diversity of opinion among Local Planning Team members as to the level of risk posed by each of these hazards. In some instances, such as the hazards posed by tornadoes, there was general agreement among Local Planning Team members that the risk was relatively high, but disagreement as to just how high. The exceptions to this pattern were for thunderstorms and extreme cold. The interquartile ranges associated with these hazards were quite low, indicating a high degree of agreement among Task Force members as to the risks associated with these hazards. It's notable that the lowest interquartile range was associated with hail, which was the eleventh highest ranked hazard. This suggests that there was high level of agreement among members Local Planning Team as to the relatively high risk associated with this hazard.

The 10 lowest average risks belonged to hazards related to a variety of causes, including technological or human induced hazards related to land use, natural hazards related to geological events, such as earthquake, land subsidence, and landslides; hazards related to human behavior, such as civil unrest and correctional center incidents; hazards related to infrastructure, such as loss of sewerage systems and dam failures; hazards related to meteorological events such as dust storms; hazards related to public health, such as large-scale food contamination; and hazards related to transportation, such as aviation accidents. The interquartile ranges for the 10 hazards with the lowest average risks were low, indicating strong agreement among Local Planning Team members as to the level of risk posed by each of these hazards.

Past Hazard Experience

Past experiences with disasters are indications of the potential for future disasters to which Kenosha County would be vulnerable. Accordingly, a review was made of the hazards that have faced Kenosha County in the past and a ranking by risk was made based upon disaster history and emergency management experience. As part of this plan update, the review of hazards faced by the County was updated to include experiences that have occurred since the first plan update was completed and the ranking by risk was reevaluated in light of this updated disaster history.

If disaster damages exceed the capabilities of local communities and State agencies, Federal assistance will be requested. Federal disaster assistance may be offered through a variety of programs. Assistance may be directed to agricultural producers, individuals and families, businesses, or local governments. Table III-4 provides a summary of estimated damages and public assistance from disasters and emergencies in Kenosha County, both Presidential declarations and nondeclared, from 1990 through 2014.

Between 1990 and 2014, Kenosha County has had eight presidential disaster declarations, one secretarial disaster declaration by the U.S. Department of Agriculture, and two presidential emergency declarations. In addition, the total documented estimated damages of these 11 events exceeded \$80 million. It should be noted that the damage estimates generally underestimate the actual damages that occurred. For example, during the year 2000 heavy rain event, damages that significantly exceed the amount set forth in Table III-4 were reported to the Kenosha County Division of Emergency Management. For those events, about \$5.8 million in State and Federal assistance was provided to Kenosha County communities, businesses, individuals, and farmers. In addition, an undetermined amount of damages may have been covered by insurance. Almost every year there are significant weather events causing millions of dollars of damage for which no Federal disaster assistance is requested. Thus, losses from hazards in Kenosha County are significantly greater than the \$81 million estimate shown in Table III-4.

Major indicators of hazard severity are the deaths, injuries, and economic losses resulting from natural hazards and disasters. The National Oceanic and Atmospheric Administration (NOAA) National Climatic Data Center (NCDC) publishes National Weather Service (NWS) data describing recorded weather events and resulting deaths, injuries, and damages. For economic losses resulting from damages to crops, the data from the NCDC can be supplemented with records of crop insurance indemnities from the U.S. Department of Agriculture Risk Management Agency. Since 1959, Kenosha County has experienced 564 weather hazard events, as summarized in Table III-5. Those hazard events were estimated to have caused over \$143 million in damages, with 28 percent of that damage being crop damages.

It is also important to note that the amount of estimated losses reported from major events has been increasing. Based upon the dates of the occurrence of the events summarized in Table III-5, there were about \$75 million in hazard-related property damages and expenses and \$34 million in crop damages reported to be associated with hazards that took place in the years 2000 through 2014. Many of these damages were associated with a small number of tornado and flooding events that took place near the end of the decade from 2001 through 2010. Another possible reason for the increase in reported damage estimates may be improvements in how local community and County officials report damages. However, it is apparent that Kenosha County is experiencing significant rates of loss due to natural hazards.

The NWS and crop insurance data summarized in Table III-5 shows that thunderstorms and high winds, followed by winter storms, fog, hail, temperature extremes, and flooding are the most frequent weather hazards. Floods, followed by thunderstorms and high winds, tornadoes, and lightning are the most damaging weather hazards; and thunderstorms and high winds, followed by extreme temperature, primarily heat, and lightning are the most deadly weather hazards that have occurred over the 65-year period represented in the table. In addition, it should be acknowledged that weather events are often complex and damages may occur from multiple hazards, such as when hail, rain, wind, and tornadoes strike during a single storm.

To illustrate the potential frequency of thunderstorms and tornadoes, a review was made of the warnings historically issued by the National Weather Service (NWS), as shown on Table III-6. Over the period from 1983 through 2014, there have been 469 thunderstorm-related watches or warnings and 111 tornado-related watches or warnings.

Improved weather forecasting and warning systems, as well as improved building codes, help explain why tornado mortality has not been prevalent in the recent past, although tornadoes remain a very serious threat to human life. The sudden emergence of temperature extremes as a cause for mortality is most likely due to a combination of improved recordkeeping by health organizations and the longer life expectancy of individuals. Mortality from heat waves affects the elderly disproportionately.

A similar review can be performed for human-induced and technological hazards. As with the meteorological hazards summarized in Table III-5, the major indicators of hazard severity are the deaths, injuries, and economic losses resulting from hazard events and disasters. Several agencies compile data on individual human-induced and technological hazards and make it available. For example, the Wisconsin Department of Transportation (WisDOT) compiles and publishes data on roadway traffic accidents on an annual basis.² Based upon the four technological hazards for which data are available, since 1975 Kenosha County has experienced 53,515 technological hazard events. These events are summarized in Table III-7. They were estimated to have caused over \$907 million in economic losses.

The data summarized in Table III-7 show that roadway traffic accidents constitute the most frequent, damaging, and deadly technological hazard occurring in Kenosha County. This hazard accounts for over 99 percent of the incidents, injuries, and economic losses and over 94 percent of all of the deaths attributed to technological hazards. Railroad accidents, hazardous material events involving pipelines, and transportation-related hazardous material events accounted for the other reported incidents, deaths, injuries, and economic losses.

²For example, Wisconsin Department of Transportation, 2013 Wisconsin Traffic Crash Facts, July 2015.

Summary and Ranking of Hazards

There are several ways that Kenosha County hazards can be ranked and summarized to be specifically considered in the County hazard mitigation plan. Current guidance for all hazard mitigation plans promotes comprehensive consideration of all natural hazards. These hazards have been ranked by consideration of their frequency, amount of damage, and death and injuries incurred, as well as by the concerns of, and degree of importance assigned by, the Kenosha County All Hazards Mitigation **Local Planning Team**.

In addition, selected hazards other than natural hazards have been identified for consideration in the Kenosha County hazard mitigation plan based upon input from the **Local Planning Team**. The hazards to be specifically considered in the plan and their ranking are summarized in Table III-8, along with qualitative information on the hazard severity. As part of the updating process, the ranking of hazards to be considered in the initial plan was reevaluated giving consideration to data related to the occurrence of hazards since the original plan and to the perceived risk associated with each hazard as summarized in Table III-3.³

Hazard severity can be assessed and ranked in a variety of ways. The purpose of ranking hazards is to help set priorities and direct more resources to address those hazards of the greatest severity. However, the kinds of mitigation actions that will be needed and warranted depend on the type of vulnerability to be addressed. Some hazards, such as excessive heat and lightning, are unlikely to cause a disaster, but can be fatal and, therefore, are serious hazards. Vulnerability to such hazards can best be addressed by preventative measures, such as public information to encourage hazard awareness and personal protection. Other hazards, such as flooding, are pervasive and devastating, and may require a variety of tools—mapping, building codes, zoning laws, insurance, elevation or acquisition of floodprone structures, and public awareness—to effectively reduce the risk of disaster. However, flooding might not result in more fatalities than a heat wave. In general, ranking hazards by the number of deaths that they cause shifts the focus away from major and largely avoidable disasters, such as floods. Weather hazards that have caused past Kenosha County disasters, are probably the hazards that will cause future disasters. However, the types of natural hazards that result in fatalities remain a public health and safety concern.

The summary listing of hazards in Table III-8 does not include some hazards, as originally developed by the Committee, which have been found to have minimal chance of occurring or offer only limited applicable

³The rankings in Table III-8 were assigned by combining rankings of the natural hazards listed based upon the number of occurrences, amount of damages, numbers of fatalities and injuries reported since 1950, and the perceived risk associated with each hazard as identified by the Task Force and summarized in Table III-3. It is important to note that some of the natural hazards listed in Table III-8 represent combinations of hazards listed in Table III-3. For example, while specific risks associated with thunderstorms, such as hail and lightning are listed separately in Table III-3, they are combined into one category in Table III-8.

mitigation options. The identified hazards listed below will either receive less emphasis in the subsequent sections of the report or were incorporated as subelements among existing categories, as summarized in Table III-8.

Natural Hazards

Agricultural Pests

Agricultural pests, such as insect and disease infestations, that threaten Wisconsin's crops, forests, and plant communities are monitored and controlled by the Wisconsin Department of Agriculture, Trade and Consumer Protection (DATCP). DATCP publishes a weekly *Wisconsin Pest Bulletin* during the growing season that provides agricultural producers with information on insect and disease distribution and development, weather data, and pest-related news from regulatory agencies. One pest that DATCP is currently working to control is the gypsy moth, which has become established in the eastern one-third of the State and is migrating westward. In addition, the emerald ash borer was recently found in the County. Due to the limited mitigation options available to Kenosha County, agricultural pests will not be considered further in subsequent sections of this report.

Subsidence

Land subsidence is the lowering of the land-surface elevation from changes that take place underground. Common causes of land subsidence from human activity are pumping water, oil, and gas from underground reservoirs; dissolution of limestone aquifers (sinkholes); collapse of underground mines; drainage of organic soils; and initial wetting of dry soils (hydrocompaction). Due to the limited threat from physical injury and death incidences from subsidence in Kenosha County, this aspect will not be considered further in subsequent sections of this report.

Earthquakes

An earthquake is a shaking or sometimes violent trembling of the earth that results from the sudden shifting of rock beneath the earth's crust. This sudden shifting releases energy in the form of seismic waves or wave-like movement of the earth's surface. Earthquakes can strike without warning and may range in intensity from slight tremors to great shocks lasting a few seconds to over five minutes. The actual movement of the ground during earthquakes is seldom the direct cause of injury or death. Casualties may result from falling objects and debris, and disruption of communications, electrical power supplies, and gas, sewer, and water lines should be expected from earthquakes. The severity of an earthquake can be measured by comparing the peak acceleration associated with the horizontal shaking it produces to the normal acceleration a falling object experiences due to the force of gravity. This is usually expressed as a percentage of *g*, the acceleration due to gravity. The level of risk due to earthquake can be expressed as the percentage of *g* for which there is a 2 percent probability of being exceeded in a 50-year period. Depending on location, sites in Kenosha County have a 2 percent probability of experiencing

earthquakes in a 50-year period in which the peak acceleration associated with horizontal shaking exceeds between 4 percent and 8 percent of g .⁴ These are low values. While these levels of shaking can be noticeable, they are rarely associated with damages to structures. The earthquake threat to the State and Kenosha County is considered low, therefore this aspect will not be considered further in subsequent sections of this report.

Landslides

A landslide is a relatively sudden movement of soil and bedrock downhill in response to gravity. The movement of soil can cause damage to structures by removing the support for the foundation of a building or by falling soil and debris colliding with or covering a structure. Landslides can be triggered by heavy rain, bank or bluff erosion, or other natural causes. In Wisconsin landslides generally are not dramatic. However, there have been instances of bluff slumping along the shore of Lake Michigan. Lake Michigan coastal erosion and the effects of this hazard will be discussed in subsequent sections of this report.

Dust Storms

No dust storm events were reported in Kenosha County during the period from January 1959 through December 2014. Natural hazard events that occurred in the past are likely to reoccur in the future, providing the opportunity to plan for them. A dust storm event in Kenosha County would be atypical, therefore, mitigation strategies will not be recommended for this hazard in the current plan.

Human-Induced Hazards

Loss of Sewerage System

Properly designed, operated, and maintained sanitary sewer systems are meant to collect and transport all of the sewage that flows into them to a publicly owned treatment works (POTW). A loss of a sewerage system creates a stressful and emotional situation for all of the system's users. However, occasional unintentional discharges of raw sewage from municipal sanitary sewers occur in almost every system. These types of discharges are called sanitary sewer overflows (SSOs). SSOs have a variety of causes, including but not limited to severe weather, improper system operation and maintenance, and vandalism. The U.S. Environmental Protection Agency (USEPA) estimates that there are between 23,000 and 75,000 SSOs each year throughout the United States.⁵ The untreated sewage from these overflows can contaminate waters, causing serious water quality problems. In some cases an overflow may cause health and safety concerns as well as significant property loss. Loss of a sewerage

⁴U.S. Geological Survey, "2008 United States National Seismic Hazard Maps," USGS Fact Sheet 2008-3018, April 2008.

⁵U.S. Environmental Protection Agency, "Sanitary Sewer Overflows (SSOs)," <http://www.epa.gov/npdes/sanitary-sewer-overflows-ssos>, accessed January 27, 2016.

system can lead to a sewer backup, which can lead to disease, destruction of valuables, damage to property, and electrical malfunctions. A proper response to a sewer backup can greatly minimize property damage and diminish the threat of illness.

In 2010, about 29,320 acres, or about 16 percent of Kenosha County, was provided with public sanitary sewer service. Over 89 percent of the County's population resided in those areas that are served by public sanitary sewer systems in 2010. The far-eastern portion of the County has the highest concentration of areas served by public sanitary sewer systems, with other sewer service areas located in the Village and Town of Bristol; the Town of Salem; and the Villages of Paddock Lake, Silver Lake, and Twin Lakes. In contrast, as of 2010 less than 11 percent of the Kenosha County population were served by onsite sewage disposal systems. Historically, the onsite disposal systems have included conventional gravity-flow septic systems, mound systems, holding tanks, and a few specialized systems. Due to Kenosha County's limited threat from loss of sewerage systems and the limited mitigation options, it will not be considered further in subsequent sections of this report.

Communicable Disease Outbreak or Epidemic

In the year 2012, there were more than 1,283 reported incidents of communicable infectious diseases within Kenosha County, as shown in Table III-9, based upon data published by the Wisconsin Department of Health Services. The majority of these diseases were sexually transmitted diseases which comprised 995 of these reported cases. These statistics also show that over 99 percent of children in grades K through 12 have received all of the appropriate immunizations. Nonetheless, 169 children were noncompliant and pose a potential health risk in Kenosha County.

Immediately following most disaster situations disease outbreaks are not the primary concern; the main concern regarding disease outbreaks usually occurs about one to two weeks after a disaster event occurs. This is not to say that disease outbreaks cannot occur immediately following a disaster. Several changes brought about by a disaster may increase the risk for such an outbreak. These include changes affecting human and animal populations, changes in housing for humans, the destruction of the health care infrastructure, and the interruption of normal health services geared towards communicable diseases. Due to Kenosha County's limited threat from communicable disease outbreaks or epidemics and the limited mitigation options, it will not be addressed further in subsequent sections of this report.

School Violence

Youth violence is a high-visibility, high-priority concern in every sector of U.S. society. In the decade extending from 1983 to 1993, an epidemic of violent, often lethal behavior broke out in the U.S., forcing young people and their families to cope with injury, disability, and death. Youth violence is not an intractable problem. We now have the knowledge and tools needed to reduce or even prevent much of the most serious youth violence, with the

added benefit of reducing less dangerous, but still serious problem behaviors and promoting healthy development. An array of intervention programs with well-documented effectiveness is now in place to reduce and prevent youth violence. Due to Kenosha County's limited threat from school violence and the limited mitigation options for this hazard, it will not be addressed further in subsequent sections of this report.

Workplace Violence

Workplace violence can be defined as any act against an employee that creates a hostile work environment and negatively affects the employee, either physically or psychologically. These acts include all types of physical or verbal assaults, threats, coercion, intimidation and all forms of harassment.

Violence in the workplace is a serious safety and health issue. Its most extreme form, homicide, is the third-leading cause of fatal occupational injury in the United States. According to the Bureau of Labor Statistics Census of Fatal Occupational Injuries (CFOI), there were 402 workplace homicides in 2014 in the United States, out of a total of 4,679 fatal work injuries. Both of these totals have decreased since 2001. Homicide is the fifth leading cause of death on the job, following motor vehicle crashes, other transportations accidents, falls to lower building or shop levels, and being struck by objects or equipment.

Factors that place workers at risk for violence in the workplace include interacting with the public, exchanging money, delivering services or goods, working late at night or during early morning hours, working alone, guarding valuable goods or property, and dealing with violent people or volatile situations. Due to Kenosha County's limited threat from workplace violence and the limited mitigation options, it will not be addressed further in subsequent sections of this report.

Nuclear Power Plant

Nuclear power plant incidents involve the uncontrolled release of potentially dangerous radioactive materials into the environment from a commercial nuclear power plant. Nuclear energy provides approximately 7 percent of the electricity produced in Wisconsin.⁶ This amount of energy is produced by one nuclear power plant with two reactors located in the State. These two reactors, Point Beach Unit 1 and Unit 2, are located in Two Rivers, Wisconsin, which is approximately 13 miles north by northwest of Manitowoc. There are also two nuclear power plants, each with two reactors, located in close proximity to Wisconsin, which produce electrical power for Illinois and Minnesota. The Illinois power plants Byron Unit 1 and Unit 2 are located in Byron, Illinois, which is approximately 17 miles southwest of Rockford. The Prairie Island Nuclear Power Plants Unit 1 and 2 are located

⁶U.S. Energy Information Administration, *Wisconsin State Profile and Energy Estimates*, <http://www.eia.gov/state?sid=WI>, accessed January 26, 2016.

in Red Wing, Minnesota, which are approximately 28 miles southeast of Minneapolis. It is likely that a greater threat posed by the plants involves the transportation of radioactive fuel and wastes to and from the plant. The interim and terminal storage of these wastes is an issue that Federal, State and local officials are working to resolve. No commercial nuclear power plant incidents have occurred that have affected the State.

The Kewaunee Nuclear Power plant, located in Carlton, Wisconsin, was permanently shut down on May 7, 2013. The plant's owners submitted their post-shutdown decommissioning activities report (PSDAR) and conducted a public meeting near the site on April 24, 2013. The facility retains its license, but is no longer authorized to operate or place fuel in the reactor vessel. The facility has spent fuel stored in both its spent fuel pool and a generally licensed Independent Spent Fuel Storage Installation (ISFSI). The site is preparing for a significant campaign to offload the remaining spent fuel from the spent fuel pool into dry cask storage at its onsite ISFSI. After offloading the fuel, the licensee plans to enter a long-term safe storage (SAFSTOR) condition. Current planning is to transfer the entire spent fuel pool inventory to dry cask storage by December 2016 and enter the SAFSTOR period in January 2017. Major decommissioning and dismantlement activities are scheduled to begin in 2069. License termination is scheduled in 2073.

There are two additional nuclear power plant (Units 1 and 2 in Zion, Illinois) that were permanently shut down on February 13, 1998.⁷ The fuel was transferred to the spent fuel pool, and the owner submitted the certification of fuel transfer on March 9, 1998. A public meeting was held on June 1, 1998, to inform the public of the shutdown plans. The owner submitted the post-shutdown decommissioning activities report (PSDAR), site-specific cost estimate, and fuel management plan on February 14, 2000. A public meeting to discuss the PSDAR was held on April 26, 2000.⁸ In September 2010, the facility license was transferred from Exelon to ZionSolutions for the express purpose of expediting the decommissioning of the site. Decontamination and dismantling began in 2011. Completion of fuel transfer to the independent spent fuel storage isolation facility was completed in January 2015. Submittal of the License Termination Plan occurred in December 2015 and a public meeting was held in April 2015. License termination is slated for 2020.⁹

A 10-mile Primary Emergency Planning Zone (EPZ) radius and a 50-mile Secondary EPZ radius were established to determine which areas could potentially suffer the greatest consequences of an incident at a nuclear power plant

⁷U.S. Nuclear Regulatory Commission, *Fact Sheet on Decommissioning Nuclear Power Plants*, <http://www.nrc.gov/reading-rm/doc-collections/fact-sheets/decommissioning.html#table1>, May 2004.

⁸Ibid.

⁹U.S. Nuclear Regulatory Commission, "Zion Units 1 & 2," <http://www.nrc.gov/info-finder/power-reactor/zion-nuclear-power-station-units-1-2.html>, accessed March 1, 2016.

and where the State focuses its Radiological Emergency Response Planning and Exercising Program. The southwest corner of Kenosha County is approximately 26 miles outside the Secondary EPZ radius extending from the nuclear power plants Byron Units 1 and 2 in Byron, Illinois. Racine and Kenosha are both host counties that support Walworth County. Host counties are counties that adjoin one of the risk counties and have agreed to “host” a share of the risk county’s population if a nuclear plant incident requires evacuation of the public. Due to Kenosha County’s limited threat from a nuclear power plant incident and the limited mitigation options, it will not be considered further in subsequent sections of this report.

Civil Unrest

The United States has a long history of civil disorders and civil unrest. Unlike other large scale emergencies that bring communities together, civil disorders tend to be divisive. Since the 1960s, this division has primarily been along racial lines. These types of disorders have been classified as "communal" riots because they are direct battles between two or more ethnic groups. The United States has also seen "commodity riots" that stress the economic and political distribution of power among groups.

Looting is the most common activity associated with civil disorders. Fire setting is also quite common and can quickly spread due to slow response times of overwhelmed fire departments. Transportation routes can become blocked making it difficult for nonrioters to leave the area and difficult for emergency response personnel to arrive.

The ability to respond quickly is paramount in these situations. Therefore, emergency response agencies should plan and train for these types of events. They should also be able to predict the types of events that have the highest potential for getting out of control and be in a standby position. Kenosha County does not have an extensive history of civil disorders. Except for labor disputes/strikes, there have been no public demonstrations, riots, or civil disturbances of any consequence in Kenosha County. Due to Kenosha County’s limited threat from civil unrest and the limited mitigation options, it will not be addressed further in subsequent sections of this report.

Air Transportation

The largest airport in Kenosha County is the Kenosha Regional Airport, which is the third busiest airport in the State of Wisconsin and is the only publicly owned airport in the County. This airport has a control tower, and a total of three runways, the longest being 5,500 feet and the shortest being 3,000 feet. The surface of the runways is concrete and the airport is lighted at night. This airport does not have scheduled passenger traffic, but in 2014 there were over 52,900 take offs and landings. The largest planes that can land at the airport are corporate passenger planes. As stated in Chapter II, there are three airports under private ownership that serve the public: Camp Lake Airport (Town of Salem), Vincent Airport (Town of Randall), and Westosha Airport (Town of

Randall). As of the year 2015, there were over 288 aircraft based in Kenosha County. In addition to these public-use airports, there are a number of private airports and heliports in and adjacent to Kenosha County. Due to Kenosha County's limited threat from airway transportation accidents and the limited mitigation options, it will not be addressed further in subsequent sections of this report.

Landfills

Landfills are designed and operated to control potential disease vectors, protect surface water and groundwater sources, control litter, and protect air quality. The U.S. Environmental Protection Agency (USEPA) and State of Wisconsin Department of Natural Resources have each established criteria that municipal solid waste landfills must meet in order to ensure the protection of human health and safety that include: 1) restrictions on the location of such facilities (e.g. a ban on construction in wetlands); 2) operating criteria such as procedures to control disease vectors and a ban on noncontainerized liquids; 3) design criteria; 4) groundwater monitoring and corrective action requirements (e.g., a groundwater monitoring system); and 5) closure and post-closure criteria (e.g., installation and maintenance of the integrity of a final cover).¹⁰

As summarized in Chapter II, as of 2015, there were two active and 32 inactive landfill sites located throughout Kenosha County (see Map II-15 and Appendix B). Most of these sites have gone through proper closure procedures specified by the Wisconsin Department of Natural Resources. The active landfill sites are licensed facilities and meet the required State and Federal public health and safety design, management, and safety programs criteria outlined previously.¹¹ In addition, public access is currently controlled at both active landfill sites in order to ensure public health and safety by controlling illegal dumping, decreasing public exposure to hazards, and controlling unauthorized vehicular traffic. Due to Kenosha County's limited threat from landfill incidents, it will not be considered further in subsequent sections of this report.

Correctional Center Incident

Correctional center incidents are events that occur at correctional centers and institutions that affect the facility's security and might include any of the following inmate actions: protests, hunger strikes, rioting, widespread

¹⁰See *Code of Federal Regulations Title 40, Part 258* (http://www.ecfr.gov/cgi-bin/text-idx?tpl=/ecfrbrowse/Title40/40cfr258_main_02.tpl/), which indicates that each state must meet these criteria in its own rules and regulations; the Wisconsin Administrative Code Chapters NR 500-520 (<http://www.legis.state.wi.us/rsb/code/nr/nr500.html>) contain rules for siting, construction, operation, and closure of municipal and other solid waste landfills. The general rules, which apply to all solid waste landfills, except for small demolition landfills, require licensing of such facilities before they can be constructed and operated.

¹¹See Wisconsin Department of Natural Resources, *Landfills*, <http://dnr.wi.gov/topic/Landfills/>, revised May 18, 2015; Wisconsin Department of Natural Resources, *Managing Waste and Materials*, <http://dnr.wi.gov/topic/waste/>, revised August 20, 2014, and the links included on these pages.

damage or destruction of institutional property, and/or the taking of hostages. The worst-case scenarios include a “takeover” of areas of the facility by inmates or the escape of dangerous inmates into the surrounding area, with subsequent criminal acts against local citizens.

Most correctional center incidents are minor and are handled by the institution’s own security forces, aided by local police and county sheriff departments if requested. Correctional center incidents may occur for a variety of reasons such as overcrowding, perceived poor treatment, inadequate staffing, unpopular staff actions, racial strife, and prisoner unrest. Due to Kenosha County’s limited threat from correctional center incidents, it will not be considered further in subsequent sections of this report.

Waterway Transportation

Transportation by water in Kenosha County is limited to recreational boating. There are three marinas in the County; two in the City of Kenosha and one in the Village of Pleasant Prairie. There is also one international harbor that is currently inactive. Kenosha County has 20 major inland lakes and the eastern side of the County is bordered by Lake Michigan. There are no major ports along the Lake Michigan coastline in Kenosha County, but there are three marinas that have over 200 boat slips and handle charter and recreational vessels in Kenosha County. Due to Kenosha County’s limited threat from waterway transportation accidents and the limited mitigation options, it will not be addressed further in subsequent sections of this report.

Regular Power Plant

Kenosha County is provided with electric power service by We Energies and Alliant Energy. Electric power service is available on demand throughout the County. In Kenosha County, electric power is generated by the We Energies Pleasant Prairie power plant (the largest coal-fired plant in the State of Wisconsin) and a We Energies gas-fired peak plant.

One concern of regular power plant incidents is the loss of power, or power outages, to homes and businesses in Kenosha County. The category of electrical system outages from regular power plants has been addressed in the electrical system outage category.

Dirty Bomb

A dirty bomb, or radiological dispersion device, is a bomb that combines conventional explosives, such as dynamite, with radioactive materials in the form of powder or pellets. A dirty bomb works to blast radioactive material into the area around the explosion. This could possibly cause buildings and people to be exposed to radioactive material. The main purpose of a dirty bomb is to frighten people and make buildings or land unusable for a long period of time.

There has been speculation about where terrorists could get radioactive material to place in a dirty bomb. The most harmful radioactive materials are found in nuclear power plants and nuclear weapons sites. However, increased security at these facilities makes obtaining materials from them more difficult. Because of the dangerous and difficult aspects of obtaining high-level radioactive materials from a nuclear facility, there is a greater chance that the radioactive materials used in a dirty bomb would come from low-level radioactive sources. Low-level radioactive sources are found in hospitals, on construction sites, and at food irradiation plants. The sources found in these areas are used to diagnose and treat illnesses, sterilize equipment, inspect welding seams, and irradiate food to kill harmful microbes.

If low-level radioactive sources were to be used, the primary danger from a dirty bomb would be the blast itself. Gauging how much radiation might be present is difficult when the source of the radiation is unknown. However, at the levels created by most probable sources, not enough radiation would be present in a dirty bomb to cause severe illness from exposure to radiation. This category has been incorporated into the terrorism section of this chapter.

Communication Outage

Communication outages can occur for many reasons; one of those reasons includes power outages. The most recent major power outage in U.S. history was the August 2003 northeastern blackout that affected portions of seven northeastern states and one Canadian province. This power outage disrupted communications for numerous agencies and organizations including: banks, investment funds, business services, manufacturers, hospitals, educational institutions, internet service providers, and Federal and State government units. Due to Kenosha County's limited threat from communications outage and the limited mitigation options, this hazard has been addressed in the electrical system outage section of this chapter.

Fuel Shortage

Fuel shortages can be caused by localized imbalances in supply, i.e. seasonal fuel formula changeovers, strikes, and severe cold weather and/or snowstorms. These imbalances can cause local shortages and shortages in other fuels (propane and heating oils). There have been three fuel shortages and one threat of fuel shortage for Kenosha County since 1973. Due to the County's limited threat from fuel shortages and the limited mitigation options, it will not be addressed further in subsequent sections of this report.

VULNERABILITY ASSESSMENT ANALYSIS METHODS AND PROCEDURES

In the previous section of this report the hazards considered applicable to Kenosha County were identified. This section of the report develops a vulnerability assessment for the identified hazards, including vulnerable asset

description, hazard event profiling, and estimated losses information. This vulnerability assessment provides the basis for developing mitigation strategies that address the identified vulnerabilities.

The procedures utilized in the vulnerability analyses are based upon guidance provided by Federal Emergency Management Agency (FEMA) and the Wisconsin Department of Military Affairs, Division of Emergency Management.¹² The analysis includes three components: 1) profile of hazard events, 2) inventory of assets, and 3) estimation of losses. In addition, where applicable, potential changes in vulnerability under future conditions and the variance of vulnerability among the 13 municipalities within Kenosha County is analyzed.

In general, the procedures utilized in this analysis focus upon the methodology consistent with the Hazard U.S. (HAZUS) software as maintained by FEMA. In many cases, the mapping of assets and problem areas was completed utilizing the detailed mapping and orthophotography available for Kenosha County in both hard copy and digital form, including general base maps, large-scale topographic and cadastral maps, and year 2010 and 2015 large-scale orthophotographs. All of the mapping was done utilizing geographic information system (GIS) ArcGIS software.

With regard to the community assets, the basic Kenosha County inventory data set forth in Chapter II have been used and supplemented with information obtained from the HAZUS software; the National Oceanic Atmospheric Administration, National Climatic Data Center; the Wisconsin Department of Military Affairs, Division of Emergency Management; the U.S. Department of Agriculture Agricultural Risk Management Agency; and more hazard-specific local data, such as building-specific structure values, as the basis for the community asset data base. The profiling of hazard events was developed by utilizing the HAZUS methodology; data available on FEMA, National Oceanic and Atmospheric Administration's National Climatic Data Center, and the U.S. Department of Agriculture Agricultural Risk Management Agency web sites; data provided by the Wisconsin Department of Military Affairs, Division of Emergency Management; and file data provided by the Kenosha County Division of Emergency Management and the Southeastern Wisconsin Regional Planning Commission (SEWRPC).

Data and estimated losses and vulnerability were developed utilizing standard risk assessment methodology as set forth in FEMA and State Division of Emergency Management guidelines for hazard mitigation planning where

¹²*Federal Emergency Management Agency, State and Local Mitigation Planning How-to Guide, "Understanding Your Risks, Identifying Hazards and Estimating Losses," Publication No. FEMA 386-2, August 2001; Federal Emergency Management Agency, Local Multi-Hazard Mitigation Planning Guidance. July 1, 2008; Federal Emergency Management Agency, Local Mitigation Planning Handbook. March 1, 2013. See also Federal Emergency Management Agency, State and Local Plan Interim Criteria under the Disaster Mitigation Act of 2000, July 11, 2002.*

hazards can be estimated spatially and by order of magnitude over a range of events. For hazards that cannot be quantified, alternative approaches have been used relying on qualitative measures.

A vulnerability description has been included for each of the applicable hazards listed in Table III-8.

Assessments of Potential Future Changes in Hazard Conditions Relative to Climate Change

The risk to Kenosha County posed by many of the natural hazards profiled in this plan have been estimated based largely upon the history of occurrence of and impacts attributed to the hazard within the County. For example, the estimates given below for the number of thunderstorms and thunderstorm-related hazards that would be expected to impact the County and the amount of damages to property and crops in the County reflect the average number of occurrences of these storms and the associated damages that were reported over a recent 25-year period. Over the short term, such as the five-year period covered by this plan, estimates of risk and damages derived in this manner should serve as reasonably reliable indicators of the degree of risk associated with various hazards. Over longer periods of time, climate change may render estimates of risk based on historical occurrences and impacts unreliable. Recent assessments have documented changes in Wisconsin's climate over the late 20th century.¹³ Projections of Wisconsin's climate based on downscaled data from 14 global climate models indicate that additional changes will occur through the 21st century.¹⁴ The following subsections describe the changes that have occurred in Wisconsin's climate since 1950 and the changes that are projected to occur by the middle of the 21st century. For those hazards whose frequency of occurrence or impacts are likely to be affected by the changes in climate, these descriptions will form the basis of evaluating potential long-term changes in hazard conditions.

Average annual temperatures in Wisconsin increased over the last half of the 20th century. Between 1950 and 2006, average annual temperature in the State increased by an average of 1.1°F.¹⁵ In Kenosha County the increase was between 1.0°F and 1.5°F. Much of this increase in average temperature occurred in the form of higher nighttime low temperatures. For example over the period 1950 through 2006, the average number of days in Kenosha County in which the daily low temperature fell below 0°F decreased by about 7 days per year. The greatest increase in temperatures occurred during winter and spring months. Depending on location, average winter temperatures in Kenosha County increased by 2.5 to 3.0°F over this period.

¹³For example, Christopher J. Kucharik, Shawn P. Serbin, Steve Vavrus, Edward J. Hopkins, and Melissa M. Motew, "Patterns of Climate Change across Wisconsin from 1950 to 2006," *Physical Geography, Volume 31*, pages 1-28, 2010.

¹⁴Wisconsin Initiative on Climate Change Impacts, Wisconsin's Changing Climate: Impacts and Adaptation, Nelson Institute for Environmental Studies, University of Wisconsin-Madison and Wisconsin Department of Natural Resources, 2011.

¹⁵Kucharik and others, 2010, op. cit.

The consensus from downscaled results from climate models projects that average annual temperatures will continue to increase through the 21st century.¹⁶ Depending on location, it is projected that average temperatures in the State of Wisconsin will increase by between 4.0°F and 9.0°F over the period 1980 through 2055. This increase is projected to be on the order of 5.5°F to 6.0°F in Kenosha County. The greatest changes are projected to occur during winter months, with average winter temperatures being projected to increase by about 7.5°F in Kenosha County. By contrast, average temperatures in Kenosha County during the summer are projected to increase by about 5.5°F. Changes in extreme temperatures will accompany these changes in average temperature. The frequency of extreme daily high temperatures is projected to increase. The average number of days per year with daily high temperatures greater than 90°F is currently about 12 in southern Wisconsin. This is likely to double to about 25 days per year by 2055. By contrast, the frequency of extreme daily low temperatures is projected to decrease. The average number of days per year with daily low temperatures below 0°F is currently about 15 in southern Wisconsin. This is projected to decrease to about nine days per year by 2055.

Average annual precipitation in Wisconsin increased over the last half of the 20th century. Between 1950 and 2006, average annual precipitation in the State increased by an average of about 3.1 inches.¹⁷ It should be noted that there was substantial variability in the change in precipitation across the State, with some areas experiencing increases of up to 7.0 inches and some areas in northern Wisconsin experiencing decreases. In Kenosha County annual precipitation increased over this period by between 0.5 inches and 5.5 inches, with smaller increases occurring in the western portion of the County and larger increases occurring in the eastern portion of the County. Most of the increase in average precipitation occurred during autumn months. In Kenosha County, average precipitation during autumn months increased by between 2.0 inches and 2.5 inches between 1950 and 2006. Increases also occurred during winter and spring in most of the County. Throughout the State, the changes in average precipitation during summer months were highly variable. In Kenosha County, average precipitation during summer months decreased between 1950 and 2006. In most of the County, this decrease was on the order of 0.5 inch to 1.0 inch; however, decreases in average summer precipitation of up to 3.0 inches occurred in extreme western Kenosha County. The frequency and magnitude of heavy precipitation events has also been increasing in Wisconsin. Extreme rainfall patterns in the City of Madison illustrate this trend. In the decade between 2001 and 2010, there were 24 days per decade in which 2.0 inches or more of precipitation fell. This is twice the previous maximum of 12 days in the 1950s.

¹⁶*Wisconsin Initiative on Climate Change Impacts, 2011, op. cit. Downscaling is an analysis approach that enables climatological data generated by Intergovernmental Panel on Climate Change general circulation models developed at a relatively coarse geographic scale (e.g., climate change data for several large regions in an entire state) to be modified to represent a finer geographic scale (e.g., at the scale of a county or smaller).*

¹⁷*Kucharik and others, 2010, op. cit.*

The consensus from downscaled results from climate models projects several changes in precipitation through the 21st century.¹⁸ Most of the models project an increase in average annual precipitation in southeastern Wisconsin of about 1.5 inches to 2.0 inches. The projections indicate that the amount of precipitation falling during winter is likely to increase by about 25 percent. Due to the projected increase in temperatures, it is projected that a greater amount of precipitation occurring during the winter will fall as rain rather than snow.¹⁹ This will be accompanied by both an increase in the likelihood of freezing rain events and decreases in snow depth and snow cover. Model projections also show that Wisconsin will receive more precipitation and more frequent intense precipitation events during the spring, especially during early spring. As in winter, it will become more likely for early spring precipitation to fall as rain rather than snow. The amount of precipitation occurring during the summer is not projected to change much. The projections also indicate that the frequency of intense rainfall events will increase. In southern Wisconsin, the frequency of precipitation events in which two or more inches fall in a 24-hour period is expected to increase from about 12 events per decade to 15 events per decade by the middle of the 21st century. These changes will be concentrated in the spring and fall. The projections indicate that the magnitude of the heaviest precipitation events will also increase. The shift to more heavy rainfall events but little change in total summertime precipitation implies that more dry days will occur in Wisconsin during the summer. More dry days, coupled with higher summer temperatures and the increases in evapotranspiration that are likely to result from higher temperatures, will lead to an increase in the likelihood of summer droughts.

VULNERABILITY ASSESSMENT FOR FLOODING AND ASSOCIATED STORMWATER DRAINAGE PROBLEMS

Flooding is a significant hazard in Kenosha County. As described in Chapter II, there are approximately 110 miles of major streams in the County, located within four watersheds: the Des Plaines River, Fox (Illinois) River, Pike River, and Root River watersheds. There are also 20 major lakes in Kenosha County. Floodplains are the wide, gently sloping areas contiguous to, and usually lying on both sides of, a stream channel. For planning and regulatory purposes, floodplains are normally defined as the areas subject to inundation by the one-percent-annual-probability (100-year recurrence interval) flood event. The floodplains shown on Map II-5 in Chapter II of this report have been identified by Kenosha County, SEWRPC, and FEMA. Approximately 16,120 acres, not including surface water in lakes and existing stream channels, or about 9 percent of the total area of the County, are located within the one-percent-annual-probability flood hazard area. A consideration in flood hazard

¹⁸*Wisconsin Initiative on Climate Change Impacts, 2011, op. cit.*

¹⁹*Michael Notaro, David J. Lorenz, Daniel Vimont, Stephen Vavrus, Christopher Kucharik, and Kristie Franz, "21st Century Wisconsin Snow Projections Based on an Operational Snow Model Driven by Statistically Downscaled Climate Data," International Journal of Climatology, Volume 31, pages 1615-1633, 2011.*

mitigation is the potential for increased flooding due to dam failures. Since there are a number of dams in Kenosha County, including five rated by the State as being a high or significant hazard, future evaluation of floodplain areas related to dam failure should be considered.

All of the floodplain areas have been mapped on large-scale topographic mapping prepared at a scale of one inch equals 200 feet, with a contour interval of two feet. The floodplain mapping is available as a digital file layer for the Kenosha County cadastral mapping system that covers the entire County and is also shown on the FEMA digital flood insurance rate maps for Kenosha County which were finalized June 19, 2012, and which include all of the communities in the County.

Flooding can also be caused by the failure of a dam. As indicated in Table II-8A in Chapter II, there are 26 dams located in Kenosha County. Both dams built according to accepted engineering standards at the time of construction and dams built without application of engineering principles can fail. When a dam fails or is subject to overtopping, large quantities of water can rush downstream with great destructive force. In the State of Wisconsin, the Wisconsin Department of Natural Resources (WDNR) inspects and assigns hazard ratings to dams. Table II-8a in Chapter II indicates that 13 of the existing dams in Kenosha County have been assigned hazard ratings by the WDNR. Two of those dams have been assigned high hazard ratings, three have been assigned significant hazard ratings, and the remaining eight have been assigned low hazard ratings.²⁰ Under Kenosha County's zoning ordinance, dam failure shadows are incorporated into floodplain overlay districts. Because of this they are considered to be part of the floodplain and structures cannot be erected within these areas. It should be noted that between 1990 and 2014 there was no loss of life associated with dam failures in Kenosha County.

In addition to flooding, stormwater drainage problems exist on a scattered basis throughout Kenosha County. The distinction between stormwater drainage, stormwater management, and flood control is not always clear. For the purpose of this report, flood control is defined as the prevention of damage from the overflow of natural streams and watercourses. Drainage is defined as the control of excess stormwater on the land surface before such water has entered stream channels. The term "stormwater management" encompasses both stormwater drainage and nonpoint source pollution control measures. While the focus of this section is on the flooding hazard, the related

²⁰Chapter NR 333, "Dam Design and Construction," of the Wisconsin Administrative Code states that 1) a high hazard "rating must be assigned if loss of human life during failure or mis-operation of the dam is probable," 2) a significant hazard rating would be assigned if "failure or mis-operation of the dam would result in no probable loss of human life but can cause economic loss, environmental damage, or disruption of lifeline facilities," and 3) a low hazard rating would be assigned if "failure or mis-operation of the dam would result in no probable loss of life, low economic losses (losses are principally limited to the owner's property), low environmental damages, (and) no significant disruption of lifeline facilities."

stormwater drainage hazards are also considered because of the interrelationship between those two hazard conditions.

Historical Flooding Problems

As noted earlier in this chapter, a number of major flooding events, including several that caused significant damage, have been recorded in Kenosha County, as well as in the watershed areas partly encompassed within the County.

Des Plaines River Watershed

The majority of the Des Plaines River watershed in Wisconsin is located in Kenosha County and is situated in approximately the middle one-third of the County. The eastern boundary of the watershed forms the subcontinental divide. East of the subcontinental divide, waters drain into the Great Lakes-St. Lawrence River basin, while west of the divide waters drain to the Mississippi River basin. The watershed encompasses 122 square miles, or about 44 percent of the total land area of the County. This area represents about 91 percent of the 134-square-mile watershed that is tributary to streams at the Wisconsin-Illinois state line, with the remainder being located in Racine County and in portions of Illinois that drain into Wisconsin. The downstream portion of the Des Plaines River watershed is located in northern Illinois and becomes part of a much larger watershed that ultimately drains to the Mississippi River Basin, via the Kankakee River, south of Chicago. A comprehensive watershed plan was completed for the watershed in 2003 under the direction of the SEWRPC Des Plaines River Watershed Committee.²¹ The plan described flood events that occurred within the watershed in March 1943, March 1948, June 1954, April 1960, March 1962, April 1973, March 1976, August 1978, March 1979, April, 1983, March 1986, September 1986, April 1993, August 1995, May 1996, and June 2000.

The development of flood mitigation strategies in Chapter V addresses the entire area of the Des Plaines River watershed in Kenosha County in order to insure that consistency with ongoing watershedwide floodplain management planning is maintained.

Fox River Watershed

The Fox River watershed is located in the western one-third of Kenosha County. The watershed begins in Washington County, Wisconsin, and ends in the State of Illinois, where the River then becomes part of a much larger watershed that continues to flow south to its confluence with the Illinois River. The total watershed encompasses about 934 square miles of surface water drainage area in Wisconsin, including about 96 square miles, or about 35 percent of the total land area of Kenosha County. A comprehensive watershed plan was

²¹SEWRPC Planning Report No. 44, A Comprehensive Plan for the Des Plaines Watershed, June 2003.

completed for the watershed in 1969²² under the direction of the SEWRPC Fox River Watershed Committee. The plan was subsequently amended in 1975.²³ The plan and the subsequent 1975 amendment described three major flood events that occurred within the watershed in July 1938, April 1960, and April 1973. The April 1960 flood was caused by a combination of rainfall and snowmelt. Measurements of the snow cover at the U.S. Weather Bureau Station in Milwaukee indicate that the depth of snow on the ground immediately prior to the flood was 24 inches, equivalent to 2.8 inches of water. Studies by the U.S. Weather Bureau²⁴ indicate that a snow cover with this water equivalent has a 4 percent chance of occurring in March. Temperatures, after having been below normal for most of the month, began to rise on the 27th of March and reached a high of 62°F on the 29th. Starting in the evening of the 29th, rain fell intermittently for a period of about 24 hours. It was determined that the average depth of rainfall on the watershed during this 24-hour period was 1.5 inches. Seasonal precipitation studies conducted in 1960 by the U.S. Weather Bureau indicated that a storm of this magnitude has a 5 percent chance of occurring in March. The probability of such rain and snow cover occurring together is the product of their individual probabilities. Therefore, the probability of these two events occurring in combination in late March of any year is 0.2 percent. These two unusual events combined to produce a peak flood flow of 7,520 cubic feet per second (cfs) at the U.S. Geological Survey (USGS) gaging station at Wilmot. A discharge of 2,300 cfs was measured at Waukesha; however, it is believed that this measurement was taken after the peak flow had passed.

The 1960 flood was one of the highest recorded in the 53 years that the U.S. Geological Survey had operated the gaging station at Wilmot.²⁵ However, it was not an event of such rare magnitude or severity in other parts of the watershed. Generally, floods generated by snowmelt are most severe on large rivers. Smaller tributaries are more sensitive to high-intensity rainfalls and generally do not produce record flood peaks as a result of snowmelt.²⁶

²²*SEWRPC Planning Report No. 12, A Comprehensive Plan for the Fox River Watershed, April 1969.*

²³*SEWRPC Community Assistance Planning Report No. 5, Drainage and Water Level Control Plan for the Waterford-Rochester-Wind Lake Area of the Lower Fox River Watershed, May 1975.*

²⁴*U.S. Department of Commerce, Weather Bureau Technical Paper No. 50, "Frequency of Maximum Water Equivalent of March Snow Cover in North Central United States," 1964.*

²⁵*After removal of the Fox River dam at Wilmot the U.S. Geological Survey relocated the gauging station about 11 miles upstream to CTH JB in October 1993.*

²⁶*The flood that occurred in July 1938 is an example of how portions of the watershed may respond to high-intensity rainfalls. The storm that produced this flood appears to have been centered over the Village of Williams Bay in Walworth County where 6.76 inches of rain were recorded in less than 24 hours. The storm began on June 30th and continued into July 1st. Review of the isohyetal map shows that part of the storm covered an area upstream from the Echo Lake dam in the City of Burlington, Racine County. A discharge of 4,140 cfs was measured by the U.S. Geological Survey at the outlet of Echo Lake following this storm. The discharge that* (Footnote Continued on Next Page)

The April 1973 flood event was the largest flood in the memory of farmers questioned in 1975 who were located in the vicinity of the Fox River main stem between the Village of Big Bend in Waukesha County and the Village of Rochester in Racine County and in the area tributary to the Wind Lake Drainage Canal. Agricultural damage due to flooding in those areas was estimated to be \$129,000 in 1975 dollars on an average annual basis over the five-year period 1970 to 1975.

Pike River Watershed

A portion of the Pike River watershed is located in the northeastern part of Kenosha County. The headwaters of the Pike River watershed are located along its two main branches: 1) Upper Pike River located largely in eastern Racine County; and 2) Pike Creek that begins in the vicinity of STH 50 and flows north, entirely in Kenosha County. The Pike River watershed encompasses about 30 square miles, or about 11 percent of the total land area of the County. This area represents about 59 percent of the entire 51-square-mile watershed area. A comprehensive watershed plan was completed for that watershed in 1983²⁷ under the direction of the SEWRPC Pike River Watershed Committee. The plan was subsequently amended in 1996.²⁸ The plan and the subsequent 1996 amendment described major flood events that occurred within the watershed in March 1960, March 1962, April 1965, June 1969, spring and summer of 1972, April 1973, February 1974, March 1976, and the summer of 1976.

The March 1960 flood was caused by a combination of rainfall and snowmelt and was considered the largest flood in the then recent history with a recurrence interval of 40 to 60 years, depending upon the location within the watershed. Because of this flood event in early spring, no significant crop damages were known to have occurred. However, if another flood of the same magnitude as the 1960 flood would occur during the summer growing season, it was estimated that the damages would approximate \$950,000 (1980 dollars) based upon application of the SEWRPC flood economics submodel.

Although the flood of April 21, 1973, was one of the largest ever recorded in some watersheds in southeastern Wisconsin, the recurrence interval for this event was only about two years throughout the Pike River watershed. In the Pike River estuary, in Kenosha County, however, significant flooding occurred caused by a combination of

(Footnote Continued from Previous Page)
occurred at the outlet of Echo Lake during the 1960 flood is not known; however, residents of the area upstream from the dam indicated that the 1938 flood was much more severe.

²⁷SEWRPC Planning Report No. 35, A Comprehensive Plan for the Pike River Watershed, June 1983.

²⁸SEWRPC Amendment to the Pike River Watershed Plan, Kenosha and Racine Counties, March 1996.

factors, including possible backwater effects from a storm-induced seiche on Lake Michigan aggravated by static lake levels about two feet higher than normal, and by backwater from a bar at the mouth of the Pike River at Lake Michigan, as well as by the flood runoff from the watershed itself. Flooding occurred at the Carthage College campus and at the Valley Night Club on STH 32.

Four significant floods occurred in 1978, on July 2, July 21, August 19, and September 13. The September flood was the largest on record for the period 1960 through 1980 at the USGS gaging station on Pike Creek at STH 142 in Kenosha County, while the August flood was the largest on record for the period 1972 through 1980 at the USGS gaging station on the Pike River at the UW-Parkside campus, also in Kenosha County. The recurrence intervals for both of these events were about 10 years based upon the 40 years of simulated streamflow data generated by the SEWRPC flood flow simulation model. Thirty farmers reportedly applied to the U.S. Soil Conservation Service for flood relief assistance. The Kenosha County Park Commission spent \$2,430 for cleanup and repairs at Petrifying Springs Park and estimated revenue losses due to flooding of the park and the golf course are reported to have been \$10,800. Road overtopping occurred at the intersection of Meacham Road and County Line Road during the July 1978 flooding. Damages incurred during the summer floods of 1978, were estimated to total \$500,000, based upon application of the SEWRPC flood economics submodel.

The historic record for the Pike River watershed contains accounts of two incidents in which a total of three people drowned during flood events. One of the incidents occurred in August of 1980 in which two people drowned near the mouth of the Pike River in Kenosha County. The other incident occurred in July of 1968 in which one person drowned, also near the mouth. In both instances the high velocity of the flood and/or ebb flows were an important contributing factor to the loss of life.

Root River Watershed

The Root River watershed has a 196-square-mile drainage area, including three square miles lying in the north central portion of Kenosha County. A comprehensive watershed plan was prepared for that watershed in 1966²⁹ under the direction of the SEWRPC Root River Watershed Committee. That plan and a subsequent 1974 amendment indicated that, up to and including 1974, major floods had occurred within the watershed in August 1940, March 1960, July 1964, September 1972, and April 1973. The March 1960 flood caused by a combination of rainfall and snowmelt, was the most damaging in the watershed within living memory and historical records, as of 1974. This flood was determined to have approximately a one-percent-annual-probability and caused damages totaling about \$370,000 expressed in 1966 dollars.

²⁹SEWRPC Planning Report, No. 9, A Comprehensive Plan for the Root River Watershed, July 1966.

Lake Michigan Direct Drainage Watershed

The Lake Michigan direct drainage watershed in Kenosha County is located in the far eastern edge of the County immediately adjacent to Lake Michigan. The watershed encompasses approximately 27 square miles, or about 10 percent of the total land area of Kenosha County. A plan was prepared for the Chiwaukee Prairie-Carol Beach natural area in 1985.³⁰ This plan recommended preserving a portion of the area through public acquisition while recognizing that certain areas would continue to be used for residential development due to commitments made through publicly sanctioned land subdivisions. Portions of the Chiwaukee Prairie-Carol Beach area that had been developed for residential uses have experienced relatively severe drainage and flooding problems due to the groundwater levels, flat grades, and limited elevation differences between the land surface and the drainageway and Lake Michigan water levels during periods of high lake levels.

Description of Recent Flood Events

Since 1990, there have been 50 flood events reported by the National Climatic Data Center affecting Kenosha County. Those flood events were reported to have caused property damages totaling, in 2014 dollars, about \$31.8 million, and crop damages totaling about \$31.7 million. The most severe recent events occurred in 1993, 1994, 1996, 1999, 2000, 2001, 2004, 2006, 2007, 2008, and 2009. These flood events, which are significant with regard to the current hazard mitigation planning effort for the County, include the following:

- April 1993. Winter snow melt and heavy rains caused the Fox River to overflow with over \$410,000 in damages to homes in the Towns of Wheatland and Salem and the Village of Silver Lake (2014 dollars). The County Executive declared a local emergency and ordered the voluntary evacuation of residents. Over 100 homes were affected by the flooding. The County Sheriff's Department and U.S. Coast Guard provided a boat patrol to control looting and assist with evacuations. A Presidential disaster declaration was issued.
- February 1994. As in April 1993, winter snow melt and heavy rains caused the Fox River to overflow. Ice floes created additional danger for residents and rescue personnel. The Fox River crested at 4.1 feet over flood stage on February 21st with an estimated \$399,000 in damages to homes in the Towns of Wheatland and Salem and the Village of Silver Lake (2014 dollars). The Town of Wheatland declared a local emergency and ordered the voluntary evacuation of residents. Thirty-two families were evacuated. A Presidential disaster declaration was issued.

³⁰SEWRPC Community Assistance Planning Report, No. 88, A Land Use Management Plan for the Chiwaukee Prairie Carol Beach Area of the Town of Pleasant Prairie, Kenosha County, Wisconsin, February 1985.

- June 1996. Heavy rains caused the Fox River to crest at 2.15 feet over flood stage with an estimated \$151,000 in property damages in Kenosha County (2014 dollars).
- April and June 1999. Heavy rains caused the Fox River to rise above flood stage. The June event resulted in a flood crest of 3.68 feet over flood stage and an estimated \$438,000 in property damages in Kenosha County (2014 dollars). Two local emergencies were declared by the County Executive and voluntary evacuations were ordered.
- May and June 2000. Heavy rains caused the Fox River to rise above flood stage. The Fox River crested at 2.76 feet over flood stage on June 2nd. Property damage estimates in Kenosha County of about \$8.0 million were reported for municipal infrastructure and private property, and crop damages were estimated at \$17.1 million (2014 dollars). Three local emergencies were declared by the County Executive and voluntary evacuations were ordered. A Presidential disaster declaration was issued.
- February, May, and June 2001. Flooding occurred on the Fox River as a result of ice floes in February and heavy rains in June. The Fox River was 2.69 feet over flood stage on February 11th and 2.25 feet over flood stage on June 14th. The County Executive issued two local emergency declarations. A Presidential disaster declaration was issued in May. About \$120,000 in property damages were reported as a result of the February flooding (2014 dollars).
- May-June 2004. This event was the result of an extended period of light to moderate rain during the month of May followed by more severe rain occurring in late May and early June. Heavy rains caused the Fox River to crest at 3.72 feet over flood stage on May 24th. Widespread flooding occurred within the County, with minor basement flood damage occurring to 115 homes, and more significant flood damage occurring to an additional 10 homes. Numerous problems of roadway flooding and gravel washouts, along with crop erosion were reported. Public and private sector property damages were estimated at \$5.7 million and crop damages were estimated at \$11.5 million (2014 dollars). A local emergency was declared by the County Executive and voluntary evacuations were ordered. A Presidential disaster declaration was issued.
- September 2006. A series of slow-moving clusters of thunderstorms passing through southern Wisconsin resulted in two to three inches of rain falling on already saturated ground, producing flash floods in Kenosha County, particularly in the City of Kenosha. Problems were associated with flooded and closed roads, flooded basements, and gravel shoulder washouts. Property damages of about \$117,000 were reported (2014 dollars).
- August 2007. A series of heavy thunderstorms occurring on August 19 and 22 resulted in flash flooding within Kenosha County. Significant street flooding was reported in the Village of Paddock

Lake and the Towns of Salem and Somers. Basement flood damage to about 100 homes and major flood damage to at least five businesses was reported. Property damages were estimated at about \$334,000 while crop damages of about \$669,000 (2014 dollars) were reported. Rainfall totals for the month ranged from 10 to 12 inches across the County.

- June 2008. Heavy rains across southern Wisconsin caused flash flooding across much of Kenosha County, with road flooding of up to three feet causing gravel washouts. About 120 homes were damaged, of which 33 sustained major damage and three were destroyed. Private and public damages were reported at \$2.2 million along with an additional \$2.2 million of crop damages (2014 dollars).
- June 2009. Heavy rains falling in the afternoon and evening of June 19 resulted in severe flash flooding in southeastern Kenosha County. Numerous streets were flooded to depths of two to four feet and portions of IH 94 and STH 50 were closed. About 1,200 homes were affected by the resulting flooding, with at least 11 homes sustaining major damage and one reported destroyed. At least one business reported major damage. Total public and private property damages were estimated at about \$13.6 million, with agricultural damages of about \$220,700 (2014 dollars).

Vulnerability and Community Impacts Assessment

In order to assess the vulnerability of Kenosha County to flooding hazards and related stormwater drainage problems, applicable basic inventory asset data described in Chapter II were refined and analyzed. For this purpose, consideration was specifically given to potential structure flooding, including critical facilities, and cropland flood damages.

The floodplain areas, as well as the subwatershed boundaries, within Kenosha County are shown on Map II-5 in Chapter II of this report. These areas are generally located along the major stream system throughout the County. The source of the hydrologic and hydraulic data for each stream reach is shown on Map III-1. All of the floodplain areas for which detailed studies are available have been mapped on large-scale topographic mapping prepared at a scale of one inch equals 200 feet with a contour interval of two feet. Flood flows and stages are currently readily available for 173 miles of the total stream reaches, while the floodplain for about 14 miles of stream is delineated by approximate methods under the Federal Flood Insurance Study for the County.

A review of the community assets described in Chapter II indicate the potential for flooding impacts to: 1) a variety of floodprone residential, commercial, and other developed land uses; 2) agricultural lands; 3) roadway transportation facilities; and 4) critical community facilities. No significant impacts are expected to other infrastructure or utility systems, solid waste disposal sites, or hazardous material storage sites.

The property value data presented by community in Chapter II has been refined to reflect specific floodprone structure information. There are currently 327 structures estimated to be located within the one-percent-annual-probability (100-year recurrence interval) flood hazard areas of Kenosha County. The locations of these structures are shown on Maps III-2 and III-3. There are 281 residential structures; 14 industrial, business, and commercial structures; three agricultural buildings; and 29 residential mobile homes. The specific location of each structure and its relationship to the floodplain is shown on the FEMA digital flood insurance rate maps for Kenosha County which were finalized in 2012.

There are 23 structures in Kenosha County that are considered by FEMA to be a repetitive- or substantial-loss property. All of these are single family residences. Repetitive-loss structures are those that have two or more flood insurance claims of at least \$1,000 each. Five of these structures are located in the Village of Silver Lake and 18 of them are located the Town of Salem. In addition to the 23 structures identified, 16 structures that were previously identified as repetitive- or substantial-loss properties have been purchased and removed either by Kenosha County, the City of Kenosha, or the Town of Wheatland.

Detailed flood hazard data are available for all flood hazard areas identified. Estimated damages are included in Table III-10 for the 10-, 2-, and 1-percent-annual-probability (10-, 50-, and 100-year recurrence interval, respectively) flood events and are also summarized on an average annual basis. In 2015, the total value of the 327 structures that are identified as being subject to flooding or stormwater drainage problems was about \$37.9 million. Damages expected during a one-percent-probability flood event are estimated to be \$4.9 million and annual average damages are estimated to be \$923,000.

It should be noted that, with a few exceptions, all of these structures were identified as being in the floodplain based upon the best available topographic mapping. Field surveys would be required to determine the precise relationship to the floodplain. Some structures may be found to be outside the flood hazard areas based upon detailed field survey data.

Maps III-4 and III-5 show the location of selected types of critical community facilities in Kenosha County, including hospitals, nursing homes, clinics, schools, childcare centers, and community administration facilities (see Map III-4), and fire and police stations (see Map III-5). Only one of these facilities, the U.S. Coast Guard Station, appears to be located within the flood hazard area. Some of these facilities are located in the immediate vicinity of the flood hazard areas. Because of the need for access to and from these facilities, the flood mitigation plan includes their location and shows the relationship to the flood hazard areas. There are 414 buildings identified as critical community facilities in Kenosha County. A listing of those facilities can be found in Appendices B, C, and D. These buildings are geographically distributed throughout the County. However, the

primary shelters are considered to be the 74 schools shown on Map III-4 and listed in Appendix D. These schools are distributed throughout the County. None of these schools are located within the identified flood hazard areas.

As can be seen by review of Maps III-4 and III-5, the floodplain overtops a number of arterial and collector streets in the County. This particular impact occurs in the Towns of Salem and Wheatland and the Village of Silver Lake along the Fox River corridor; the Villages of Bristol, Paddock Lake and Pleasant Prairie and the Towns of Brighton, and Paris in the Des Plaines River watershed; and the Town and Village of Somers in the Pike River watershed. In addition, east to west travel in the County could potentially be restricted during flood events due to overtopping of a number of arterial streets and highways in the Des Plaines, Fox, and the Pike River watersheds. Based upon a review of information from local news outlets, there are several roads in the County that have been reported as being inundated during recent flood events or recent heavy rainfalls. The locations of the reported flooding are shown on Map III-6.

A review of the location of historic sites in Kenosha County, as documented in Chapter II of this report, indicates that none of these sites are located within the flood hazard areas.

A review of the extent and severity of flooding conditions within Kenosha County indicates that there is a significant community impact, in part, as a result of the damages caused by flooding of buildings, primarily basements, and due to disruption of the transportation system during extreme flooding events.

The flooding impacts on the community infrastructure and the need to prepare for major evacuations and other emergency actions are not a significant concern given the isolated nature and the limited severity of the overland flooding problems. However, the ongoing coordinated Kenosha County and local emergency operations planning programs do have provisions for carrying out such actions if needed. Significant flood-related impacts on the community economy and businesses are of an infrequent and short-term nature. The only impacts on County and local government operations that are relatively frequent involve posting and closure of roadways at locations where floodwaters frequently overtop structures and cause short-term roadway flooding. As indicated earlier, east-west travel in the Village of Bristol and Towns of Somers and Wheatland may be restricted due to roadway flooding during severe events. Another potential impact is the need for emergency and police vehicles to consider the need to utilize alternative transportation routes when providing needed services during periods of flooding. In most of the County this is expected to be a rare occurrence. However, in the municipalities lying within the Fox River and Des Plaines River floodplains, where the majority of the floodprone structures exist, there is a need for further mitigative action because of the extent of the flooding and emergency vehicle access concerns.

Agricultural Flood Damages

As noted earlier in this chapter, historically flood damages to agricultural land have been significant, with crop damages totaling about \$31.7 million over the period of 1950 to 2014. Thus, the average annual damages in the County can be approximated at \$488,000 per year. There are 5,185 acres of agricultural land located within the studied floodplain areas. Thus, the average annual flood damage is about \$94 per acre.

One particularly floodprone agricultural area of the County is the agricultural lands lying adjacent to the Des Plaines River in the Village of Bristol and Towns of Bristol and Paris. Specific data on flood damages was developed for these lands under the June 2003 watershed study for the area.³¹ Based on 1990 land use conditions the average amount of agricultural land that may be expected to be flooded annually is approximately 2,160 acres, or about 2,080 acres of cropland and 80 acres of pasture. The expected average annual flood damage of agricultural land in this watershed was estimated to be \$58,000. These damages would be about \$79,738 in 2014 dollars.

Stormwater Drainage Problems

Because of the interrelationship between stormwater management and floodplain management, stormwater management actions are an important consideration of the flood vulnerability assessment. Small area stormwater drainage problems are known to exist in selected urbanized portions of the County. These problems are generally addressed by local site-specific planning and stormwater facility design. Stormwater management plans are typically required by Kenosha County and the local municipalities for new developments. This practice should minimize the creation of new stormwater related problems. Stormwater management planning in Kenosha County is described in the following chapters, and this planning serves as the basis of the assessment of stormwater drainage problem vulnerability. In general, such problems generally impact community facilities by causing nuisance conditions and are not generally a concern for community health and welfare.

Potential Future Changes in Floodplain Boundaries and Problems

Changes in land use can have a direct impact on flood flows and stages and, accordingly, can impact flooding problems. Tabular data on the projected changes in urban land use for each of the five watersheds in Kenosha County—the Des Plaines River, Fox River, Lake Michigan Direct Drainage, Pike River, and Root River watersheds—where flooding occurs is summarized in Table III-11. The changes in urban land use over the 25-year period from 2010 through 2035 range from 27 percent, or about 1 percent per year, in the Fox River watershed to 124 percent, or 5.0 percent per year, in the Pike River watershed. It is expected that these changes will result in an increase in the amounts of impervious surface in these watersheds. In the absence of mitigative

³¹SEWRPC Planning Report No. 44, A Comprehensive Plan For The Des Plaines River Watershed, June 2003.

measures, this could lead to increases in future flood flows and stages, especially in downstream areas. As discussed later in this report, there are a number of programs in place that will tend to mitigate the potential for such increases in flood flows. Nevertheless, it is important that future flood flows and stages be considered as mitigative actions are being considered.

Based upon the above, it can be concluded that the extent and severity of the flooding problem within the County has the potential to become more severe to a limited extent in the near future. This conclusion highlights the importance of carrying out and implementing current floodplain and related ordinances and existing and ongoing stormwater management plans and regulations, as is discussed in Chapters IV and V of this report.

Changes in climate are likely to affect the potential for flooding in Kenosha County during the 21st century. As previously described, model projection show Wisconsin receiving more precipitation and more frequent intense precipitation events. By the mid-21st century, Kenosha County may receive three more precipitation events of two or more inches in 24 hours per decade, roughly a 25 percent increase in the frequency of heavy precipitation events. This is likely to increase the frequency of high flows and high water levels and potentially increase the frequency and severity of flooding. In particular, the expected increases in the magnitude and frequency of large rainfall events will likely increase flood magnitudes in streams and rivers in Wisconsin, although the amount of increase will vary from place to place. The amount of precipitation that falls as rain during winter and early spring months is expected to significantly increase. Winter rain can create stormwater management problems due to icing and runoff over frozen ground which may also lead to increased risk of flooding events.

These changes may lead to several flood- and stormwater-related impacts. Increased rainfall and shifting precipitation patterns that favor more rain during periods of low infiltration and evapotranspiration may lead to more frequent and severe stream and river flooding. Increased precipitation during winter and spring may result in increased occurrence of inland lake flooding. Increased cold-weather precipitation and increased variability in frost conditions may cause a rise in water tables in some areas leading to an increase in groundwater flooding.

The projected increase in the magnitude and frequency of heavy storms could also affect the performance of existing and planned stormwater management and flood mitigation systems. This increase could also expand flood hazard areas, such as the one-percent-annual-probability flood hazard area, beyond their existing boundaries, potentially encompassing existing development. This could lead to an increase in the risk of flood damages and a need for larger stormwater management facilities and programs. The magnitudes of potential increases in flooding are unknown, and there is a complex interrelationship between the climatological factors that will be affected by climate change and the features of watersheds that produce runoff. In some cases, climate change-induced changes in certain climatological factors may offset the changes in other factors relative to their effects on flood flows. In other cases, the effects will reinforce one another. Thus, it is very important to continue

to improve methods for downscaling climatological data, to expand the climatological parameters for which downscaled data can be developed, and to apply hydrologic and hydraulic simulation models to quantify the potential effects on flooding resulting from climate change.

Multi-Jurisdictional Flooding and Stormwater Management Risk Assessment

Flooding and associated stormwater drainage problems have been identified as a significant risk in Kenosha County. As noted earlier and shown on Maps III-4 and III-5, flood hazard areas have been identified within 12 of the 13 general-purpose local units of government in the County. In addition, there are related stormwater drainage problems in selected areas of many communities. Based upon the number of structures potentially impacted (see Maps III-2 and III-3), the extent of the agricultural flood damage potential, and the extent of roadway flooding, 12 of the 13 communities will require special consideration with regard to the selection of mitigation measures for flooding and related stormwater problems. Those communities are noted in Table III-12, along with the basis of special consideration over and above the countywide consideration.

VULNERABILITY ASSESSMENT FOR THUNDERSTORMS, HIGH WINDS, HAIL, AND LIGHTNING

Thunderstorms

Compared to other natural hazards within the State of Wisconsin, thunderstorms are the most common type of severe weather event. A thunderstorm is defined as a severe and violent form of convection produced when warm, moist air is overrun by dry, cool air and as the warm air rises thunderheads (cumulonimbus clouds) form. These thunderheads produce the strong winds, lightning, thunder, hail, and heavy rain that are associated with these storm events. The thunderheads formed may be a towering mass averaging 15 miles in diameter and reach up to 40,000 to 50,000 feet in height. These storm systems may contain as much as 1.5 million tons of water and enormous amounts of energy that often are released in one of several destructive forms, such as high winds, lightning, hail, excessive rains, and tornadoes. Thunderstorms and their related high winds, lightning, and hail hazards are covered within this section. Excessive rains that cause flooding, such as occurred in the storm events in 2004 when the request for Presidential disaster declaration was approved (see Vulnerability Assessment for Flooding and Associated Stormwater Drainage Problems), and tornadoes are covered separately from this hazard analysis (see Vulnerability Assessment for Tornadoes).

A thunderstorm often lasts approximately 30 minutes in a given location, since an individual thunderstorm cell frequently moves at an average velocity that ranges between 30 to 50 miles per hour. However, strong frontal systems may produce more than one squall line composed of many individual thunderstorm cells. In Wisconsin,

these fronts can often be tracked across the entire State from west to east.³² Thunderstorms may occur individually, form clusters, or as a portion of a large line of storms. Therefore, it is possible that several thunderstorms may affect one particular area in the course of a few hours, as well as larger areas of the State or County, within a relatively short period of time.

All thunderstorms are potentially dangerous. However, only about 10 percent of the thunderstorms that occur each year nationwide are classified as severe. According to the National Weather Service, a thunderstorm is considered severe if it produces hail sizes at least one-inch in diameter, wind speeds equal to or greater than 58 miles per hour (measured or implied by tree and/or structural damage), or a tornado.³³ A thunderstorm with wind speeds equal to or greater than 40 miles per hour or hail at least 0.5 inch in diameter is defined as approaching severe. Severe weather event statistics in the State of Wisconsin for the period 1982-2008 indicate that about 56 percent of these storm events are characterized by damaging straight-line winds, 38 percent are hail events, and the remaining 6 percent are made up of tornadoes. Severe thunderstorms can cause injury or death and can also result in substantial property and crop damage. They may cause power outages, disrupt telephone service, and severely affect radio communications, as well as surface and air transportation, which may seriously impair the emergency management capabilities of the impacted areas.

The National Weather Service monitors severe weather for 20 southern Wisconsin counties, including Kenosha County, from its Milwaukee/Sullivan office.³⁴ A thunderstorm watch indicates that conditions are favorable for severe weather, and that persons within the area for which the watches are issued should remain alert for approaching storms. A thunderstorm warning indicates that severe weather has been sighted in an area or indicated by weather radar and persons should seek shelter immediately. These severe thunderstorm watch and warning bulletins and advisories are disseminated over a number of telecommunication channels, including the NOAA Weather Radio, the NOAA Weather Wire, and the State Law Enforcement TIME System. NOAA Weather Radio is available to any individual with a weather alert radio. This system and the other sources are routinely monitored by local media that rebroadcast the weather bulletins over public and private television and radio stations. In addition, the National Weather Service operates a 24-hour weather radio transmitter serving Kenosha and Racine Counties, operating at a frequency 162.450 megahertz (MHz), from a location at CTH KR and Wood Road, Racine County. **Most of the County is also served by a 24-hour weather radio transmitter located**

³²*National Weather Service Forecast Office.*

³³*Prior to 2010, the National Weather Service criteria for severe thunderstorms was production of hail at least 0.75 inch in diameter, wind speeds equal to or greater than 58 miles per hour, or a tornado.*

³⁴*National Weather Service, Milwaukee/Sullivan Weather Forecast Office.*

in Delafield in Waukesha County operated by the National Weather Service that operates at a frequency of 162.400 MHz.

High Winds

High-velocity, straight-line winds that are produced by thunderstorms and widespread nonthunderstorm high winds are the third most destructive natural hazard in Wisconsin and are responsible for most thunderstorm wind-related damages to property.³⁵ Thunderstorm winds can also be fatal. During the period from 1982 to 2008 in the State of Wisconsin, 28 fatalities were attributed to wind from severe thunderstorms. Although distinctly different from tornadoes, straight-line winds produced by thunderstorms can be very powerful, are fairly common, and can cause damages similar to that of a tornado event. Depending upon their intensity, high winds can uproot trees and crops, down power lines, and damage or destroy buildings and infrastructure. Flying debris can cause serious injury and death to humans, livestock, and wildlife in their path. Boats and airplanes are also extremely vulnerable to damage from high winds.

Hail

Hailstorms are also associated with thunderstorms and are the fourth most destructive type of weather hazard in the State of Wisconsin. A hailstorm is a product of strong thunderstorms and unique weather condition where atmospheric water particles form into rounded or irregular masses of ice that fall to earth. Hail normally falls near the center of the moving storm along with the heaviest rain. However, the strong winds at high altitudes can blow the hailstones away from the storm center, causing unexpected hazards at places that otherwise might not appear threatened. Hailstones normally range from the size of a pea to that of a golf ball in the State of Wisconsin. Hailstones form when subfreezing temperatures cause water in thunderstorm clouds to accumulate in layers around an icy core. When strong underlying updraft winds no longer can support their weight, the hailstones fall earthward. Hail tends to fall in swaths that may be 20 to 115 miles long and five to 30 miles wide and can fall continuously or sporadically in a series of hail strikes. Hail strikes are typically one-half mile wide and five miles long. They may partially overlap, but often leave completely undamaged gaps between them.

Hailstorms are considered formidable among the weather and climatic hazards to property and farm crops, because they dent vehicles and structures, break windows, damage roofs, and batter crops to the point that significant agricultural losses result. Falling hailstones can also cause serious injury and loss of human life and livestock. However, these occurrences are rarely associated with hailstorms. In addition to impact damage, thick hail combined with heavy rain can clog storm sewers and contribute to stormwater flooding. Hail sufficiently

³⁵Wisconsin Emergency Management Department of Military Affairs, State of Wisconsin Hazard Mitigation Plan, July 2001.

thick to cover a road will pose a traffic hazard. The peak season for hailstorms is April through August, although hail has been reported with thunderstorms in every month of the year.

Lightning

Every thunderstorm produces lightning, and lightning has been shown to kill more people within the United States each year than tornadoes.³⁶ Lightning is defined as a sudden and violent discharge of electricity from within a thunderstorm due to a difference in electrical charges, and represents a flow of electrical current from cloud to cloud or cloud to ground. Water and ice particles also affect the distribution of electrical charge. Lightning bolts can travel 20 miles before striking the ground. The air near a lightning bolt can be heated to 50,000 degrees Fahrenheit (°F), which is hotter than the surface of the sun. The rapid heating and cooling of the air near the lightning channel causes a shock wave that results in thunder.

Lightning is a significant hazard associated with any thunderstorm and can cause extensive damage to buildings and structures, kill or injure people and livestock, start forest fires and wildfires, and damage electrical and electronic equipment. Lightning is a major cause of damage to farm buildings and equipment, responsible for more than 80 percent of all livestock losses, and is the number one cause of farm fires. Counties in southern Wisconsin have been observed to **experience** a higher number of lightning events **than** other parts of the State due to higher thunderstorm frequency and more thorough documentation by the local media. Statistics have also shown that 92 percent of lightning-related fatalities occur during May through September and 73 percent of these events occur during the afternoon and early evening. Approximately 30 percent of persons struck by lightning die and 74 percent of lightning strike survivors have permanent disabilities. In addition, 63 percent of lightning-associated deaths occur within one hour of injury and persons with cranial burns or leg burns from lightning are at higher risk for death than others struck by lightning.

Historical Thunderstorm, High-Wind, Hail, and Lightning Problems

Historically, the State of Wisconsin averages over 30 days each year with thunderstorms across the northern region to about 40 days per year across the southern region. However, Kenosha County averages only about 10 days per year in which thunderstorms inflict wind, hail, or lightning damage. These thunderstorms and related high winds, hail, and lightning hazards can occur throughout the County during any month of the year, with little or no notice. However, their highest frequency has been shown to occur during the period of May through September and between the hours of noon and 10:00 p.m. Kenosha County is subject to damage caused by thunderstorms and their related hazards, which can be severe and affect large areas of the County at a time, as well as potentially cause substantial loss of life and damage to property.

³⁶*National Oceanic and Atmospheric Administration.*

Description of Recent Thunderstorm, High-Wind, Hail, and Lightning Events

The gravity of any particular thunderstorm and related wind, hail, and lightning hazard events is measured in terms of resulting deaths, injuries, and economic losses. Despite their relatively small size when compared with winter storms, thunderstorms and their related hazard events occur frequently and are dangerous. When combined together, thunderstorms and related hazard events have caused a greater number of deaths and injuries than any other natural hazards examined in Kenosha County, as shown in Table III-5. In addition, thunderstorms and related hazard events are second only to damage associated with floods as the most costly natural hazards to impact Kenosha County.

A total of 130 thunderstorms and 182 high-wind events have been recorded in Kenosha County during the 51-year period from July 1964 through December 2014. These events are shown on Map III-7, and documented in terms of their magnitude and impact in Table III-13, based upon data published by the National Climatic Data Center. As shown in Table III-13 these storms can range from one or two events per year, up to 20 events per year, which demonstrates the high unpredictability of these events. In total, these thunderstorm and high-wind events have resulted in seven deaths, 35 injuries, and about \$51.1 million in property and crop damages within Kenosha County. Much of these damages occurred as a result of a single, widespread, nonthunderstorm, high-wind event that occurred on November 18, 1998. This event struck south-central and southeastern Wisconsin and caused four deaths, 14 injuries, and \$20.0 million (in 2014 dollars) in damages to property and crops. Several examples of recent events follow. On May 21, 2004, an unexpected severe thunderstorm impacted Kenosha County. This storm event released up to 1.76 inches of rain, high wind caused excessive debris accumulation and downed trees, and the storm also caused many in the County to lose electrical power. On June 18, 2007, a powerful macroburst moved northeast through central Kenosha County and significantly damaged or destroyed dozens of trees, and damaged a number of powerlines. The width of the damage path was on the order of five to six miles. Estimated peak wind gusts were probably on the order of 74 knots (85 mph). A large tree in the Town of Bristol fell on a church, resulting in appreciable damage. In the Town of Paris, on CTH D, a 10-foot by 50-foot part of a home's roof was ripped off. Property damages were estimated at \$171,000 (2014 dollars). A bowing mesoscale convective system developed in Iowa ahead of a cold front and pushed eastward into southern Wisconsin during the afternoon of June 18, 2010. This thunderstorm complex event was characterized by gusty winds with minor damage, such as downed trees and power lines, as well as heavy rain. As a result of this storm, over 19,000 We Energies customers lost power, mostly in Kenosha and Racine Counties. Over \$119,000 in property damages (2014 dollars) were reported as resulting from this storm, including downed trees and power lines, a section of roof being blown off a building, and damage to a vehicle from a falling tree. A large supercell thunderstorm, just offshore over Lake Michigan, produced strong outflow winds that moved into far southeastern Milwaukee County, and eastern sections of Racine and Kenosha counties during the evening of June 30, 2011. Law enforcement officials reported numerous trees and power lines down across far eastern Kenosha County from

severe thunderstorm winds that gusted up to 75 mph as estimated by a trained spotter. A 31-year-old man riding a motorcycle was killed when a tree blew over on him in the 7600 block of 25th Avenue in the City of Kenosha. A Pleasant Prairie woman injured her hip when she was struck by debris from a shed. Two other residents of the City of Kenosha were injured when they touched live wires brought down by the strong winds. Many large branches were also broken off by the powerful winds, which also damaged several homes. Officials estimate 500 to 800 trees were destroyed or badly damaged by the winds. At one point, 26,000 customers were without power in southeastern Wisconsin, many for several days. Property damages from this storm were estimated at over \$105,000 (2014 dollars).

From July 1964 to December 2014, 51 major hailstorms were reported in Kenosha County that resulted in significant property damage throughout the southeastern areas of Wisconsin (see Map III-7). In all, the National Climatic Data Center has recorded about \$244,300 (in 2014 dollars) in property damage from these hailstorm events as shown in Table III-13. In addition, over \$61,000 in crop insurance indemnities have been paid in Kenosha County for damage to crops by hail. Most of these damages occurred as a result of a single hailstorm event on June 21, 2007. In this storm, one-inch-diameter hail covered the ground in an area stretching from Wheatland to Paddock Lake, severely damaging at least 600 acres of corn, soybean, and hay. Other damaging hailstorm events occurred on July 12, 1994, May 16, 1999, and September 11, 2000.

From July 1964 to December 2014, 16 lightning events were reported in Kenosha County that resulted in significant property damage throughout the southeastern areas of Wisconsin (see Map III-7). In all, the National Climatic Data Center has recorded \$18.2 million (in 2014 dollars) in property damage, one death, and five injuries from these lightning events, as shown in Table III-13. The most damaging of these events occurred on August 24, 2006. Lightning strikes to several buildings in the City of Kenosha caused structural fires and power outages. A large apartment building was struck by lightning. The resultant fire severely damaged the building, displacing about 125 residents. As a result of these events, about \$16.4 million (in 2014 dollars) in property damages were reported in the City. On the same day, lightning strikes to several buildings caused structural fires and power outages in the Village of Pleasant Prairie, resulting in about \$176,000 in property damages (2014 dollars). On September 29, 2002, lightning struck a cork-producing business in the Town of Salem and may have produced sparks that ignited insulation in the attic. A slow-burning fire resulted, becoming a major fire later in the day. This business sustained significant structural and contents damage. Property damages were estimated at \$1.32 million (in 2014 dollars).

Vulnerability and Community Impacts Assessment

The National Weather Service can forecast and track a line of thunderstorms that may be likely to produce severe high winds, hail, lightning, and tornadoes, but where these related hazards form or touch down and how powerful they might be, remains unpredictable. As can be seen from the distribution of thunderstorm and related hazard

events during the past 50-years as shown on Map III-7, the locations of storm impact points is widely scattered throughout the County.

In order to assess the vulnerability of the Kenosha County area to thunderstorms and related storm hazards, a review of the community assets described in Chapter II indicate the potential for significant thunderstorm and related hazard impacts to: 1) a variety of residential, commercial, and other developed land uses; 2) agricultural lands; 3) roadway transportation system; 4) utilities; 5) critical community facilities; and 6) historic sites. Significant impacts may also be possible to other infrastructure or utility systems, or hazardous material storage sites. On average, the events occurring during the period of record have resulted in about \$204,290 of reported damages per event, consisting of about \$183,957 of damages to property and \$20,333 in damages to crops. However, very few events have been responsible for a large percentage of the total damages. Thus, the average damage cost is considered to be only a very approximate measure of potential damages. On average, there are about five thunderstorm and related storm events per year in Kenosha County.

Over the 25-year period 1990 through 2014 thunderstorms and related storm hazards have resulted in about \$1,839,600 in property damages and about \$203,300 in crop damages per year for average annual total damages of about \$2,042,900. In 2014, the total equalized assessed property value in Kenosha County was estimated at almost \$12.5 billion. Based on the current average estimate of \$1,839,600 in reported property damages per year, it can be expected that approximately 0.015 percent of the value of all property, including buildings and infrastructure, in Kenosha County will be damaged from these events each year. Due to the unpredictability of thunderstorm, high-wind, hail, and lightning events, all buildings, infrastructure, and critical facilities within the County are considered at risk.

Potential Future Changes in Thunderstorm, High-Wind, Hail, and Lightning Conditions

Based upon historical data, Kenosha County can expect to experience an average of 4.9 thunderstorm, high-wind, hail, and/or lightning events per year somewhere in the County. It should be noted that the historical record shows considerable variation among years in the number of events that occurred. While it would be expected that in some years the County will experience either fewer events or more events than the average number, the average annual number of events is not expected to change.

The likely effect of climate change on thunderstorm and high-wind events is not clear. While projections based upon downscaled climate model results indicate that the magnitude and frequency of heavy precipitation events are likely to increase by the middle of the 21st century, they do not address potential trends in wind, hail, or lightning conditions. Modeling studies utilizing the output of multiple climate models suggest that the number of

days per year in which atmospheric environments that are known to support the formation of severe thunderstorms under current climatic conditions will increase between now and the end of the 21st century.³⁷ It should also be noted that wind strengths over the Great Lakes have increased and are expected to continue increasing in the future.³⁸ Surface wind speeds above the Lakes are increasing by about 5 percent per decade, exceeding trends in wind speed over land.

Changes in land use can have an impact on the potential for damage to occur from thunderstorms and related hazards. Such changes relate to the potential future increase in development within the County. Changing land use patterns within Kenosha County, as documented in the adopted regional land use plan, the County comprehensive plan, and County land and water resource management plan, and summarized in Chapter II, indicate a potential increased risk of thunderstorm, high-wind, hail, and lightning damage and related losses in the expanding urbanized areas within the County. Because of the actions that have been taken by the County and local units of government and individuals, the current vulnerability to thunderstorms and related hazards has been decreased in recent years. These ongoing mitigation measures are described further in Chapter V.

Multi-Jurisdictional Thunderstorm, High-Wind, Hail, and Lightning Risk Management

Based upon a review of the historic patterns of thunderstorm, high-wind, hail, and lightning events in Kenosha County, there are no specific municipalities that have unusual risks. Rather, the events are considered to be relatively uniform and of countywide concern.

VULNERABILITY ASSESSMENT FOR TORNADOES

Wisconsin lies along the northern edge of an area of the United States commonly known as “tornado alley.” This area extends northeasterly along an axis extending from Oklahoma and Iowa in the west, to Michigan and Ohio in the east. This corridor is the one of the most tornado-prone areas of the United States reporting 29 violent tornadoes during the year 2001. A tornado is defined as a violently rotating column of air extending from the ground up to the thunderstorm base. It generally lasts for only a short period. The tornado appears as a funnel-shaped column with its lower, narrower end touching the ground and upper, broader end extending into the thunderstorm cloud system. In some cases, the visible condensation cloud may not appear to reach the ground, but meanwhile tornado-force winds may be causing severe destruction (rotating winds can be nearly invisible, except for dust and

³⁷Noah S. Diffenbaugh, Martin Scherer, and Robert J. Trapp, “Robust Increases in Severe Thunderstorm Environments in Response to Greenhouse Forcing,” *Proceedings of the National Academy of Sciences, Volume 110, pages 16,361-16366, 2013.*

³⁸Ankur R. Desai, Jay A. Austin, Val Bennington, and Galen A. McKinley, “Stronger Winds Over a Large Lake in Response to Weakening Air-to-Lake Temperature Gradient,” *Nature Geoscience, Volume 2, pages 855-858, 2009.*

debris). Similar events, not reaching the land surface, are known as funnel clouds. Funnel clouds may be a precursor to a tornado event. In Wisconsin, tornadoes usually occur in company with thunderstorms formed by eastward-moving cold fronts striking warm moist air streaming up from the south. However, it is not possible to predict tornado activity based upon the occurrence of thunderstorms, and, occasionally, multiple outbreaks of tornadoes occur along the frontal boundaries, affecting large areas of the State at one time. Tornadoes generally occur near the trailing edge of a thunderstorm. It is not uncommon to see clear, sunlit skies behind a tornado.

Historically, tornadoes have been categorized based upon the most intense damage along their paths using the Fujita Scale. This scale is shown in Table III-14. Tornado intensities under this scale range from F0 events, representing the tornadoes doing the smallest amount of damage, to F5 events, representing the tornadoes doing the greatest amount of damage. Wind velocities necessary to produce the particular damage are often associated with ratings along the Fujita Scale, but that practice is often misleading. The wind estimates associated with the Fujita Scale are intended to be based upon the expected damage to a well-built residential structure. Poorly built structures can suffer significant structural damage under lesser winds than the Fujita Scale might suggest. Other sorts of structures may or may not experience the same failures under high wind speeds that a house might. Thus the Fujita Scale is largely a residential scale, with much more care required in assessment after wind damage to other sorts of structures. Since February 2007, the Fujita Scale has been replaced by the Enhanced Fujita Scale which retains the same basic design of its predecessor with six strength categories. This scale is shown in Table III-15. The newer scale reflects more refined assessments of tornado damage surveys, more standardization, and consideration of damage over a wider range of structures. Because the National Weather Service has decided not to reclassify tornadoes that occurred prior to the implementation of the Enhanced Fujita Scale, the Fujita Scale classifications have been retained for those storms which occurred prior to February 2007.

The destructive power of the tornado results primarily from its high-wind velocities, wind-driven debris, and uplifting force. These tornado characteristics probably account for 90 percent of tornado-caused damage. Since tornadoes are generally associated with severe storm systems, hail, torrential rain, and intense lightning usually accompany tornado events. In addition, tornadoes may be accompanied by downbursts, events which are characterized by strong downdrafts, initiated by a thunderstorm, and that manifest as straight-line winds on or near the ground. These winds can be powerful, with speeds up to 70 to 100 mph. These winds interact with tornadoes, and can affect the path of the tornado event in such a manner as to make tornadoes somewhat unpredictable. Depending on their intensity, tornadoes can uproot trees and crops, down power lines, and damage or destroy buildings and infrastructure. Flying debris can cause serious injury and death to humans, livestock, and wildlife in their path. An approaching cloud of debris can mark the location of a tornado, even if the classic funnel cloud is not visible. Before a tornado hits, the wind may die down and the air may become very still.

The National Weather Service monitors severe weather nationwide from its Norman, Oklahoma, office. This office is the only entity that can issue a tornado watch. The National Weather Service office in Milwaukee/Sullivan, and the Kenosha County Division of Emergency Management, may also issue tornado warnings. A tornado watch means that tornadoes are possible, and that persons within the area for which the watch is issued should remain alert for approaching storms. A tornado warning means that a tornado has been sighted in an area or indicated as likely to have occurred by weather radar. When tornado warnings are issued for an area, persons near and within that designated area are advised to move to a pre-designated place of safety. Tornado shelters may be identified by appropriate signage in public buildings. The National Weather Service operates a 24-hour weather radio transmitter serving Kenosha and Racine Counties, operating at a frequency 162.450 MHz, from a location at CTH KR and Wood Road, Racine County. **Most of the County is also served by a 24-hour weather radio transmitter located in Delafield in Waukesha County operated by the National Weather Service that operates at a frequency of 162.400 MHz.**

In addition to tornado watches and warnings, severe thunderstorm watches and warnings indicate severe weather conditions that may generate conditions in which tornadoes may occur. Such watches and warnings may be followed by tornado watches and warnings as weather conditions develop.

Historical Tornado Problems

Historically, a devastatingly powerful tornado, classified as an F4 event, occurred on May 18, 1883. This tornado tracked 20 miles through Kenosha and Racine Counties, killing eight people and injuring 85 people before it exited into Lake Michigan. Such a tornado is a relatively rare natural hazard in Kenosha County.

Description of Recent Tornado Events

In the State of Wisconsin, tornado paths historically have averaged 3.5 miles in length and 50 yards in width, although tornadoes of a mile or more in width and 300 miles in length have been known to occur elsewhere in the United States. On average, tornadoes in southeastern Wisconsin move across the land surface at speeds of between 25 and 45 miles per hour, although overland speeds of up to 70 mph have been reported. Tornadoes rarely last more than a few minutes over a single spot or more than 15 to 20 minutes in a 10-mile area, but, in those few minutes, significant devastation may occur.

The gravity of any particular tornado event is measured in terms of resulting deaths, injuries, and economic losses. The magnitudes of the tornadoes recorded in southeastern Wisconsin have been low, primarily F0 or weak F1 events on the Fujita scale (see Table III-14), **or EF0 or EF1 events on the Enhanced Fujita Scale (see Table III-15).**

A total of 13 tornadoes have been recorded in Kenosha County during the 51-year period between July 1963 to December 2014, or about one tornado every four years. Of the tornadoes reported for Kenosha County during that period, four were uncategorized events, five were F0 or EF0 events, three were F1 or EF1 events and one was an F3 event as categorized on the Fujita scale or the Enhanced Fujita scale. These are shown on Map III-8, and documented in terms of their magnitude and impact in Table III-16, based upon data published by the National Climatic Data Center. In total, these 13 tornadoes have resulted in about \$25.4 million in property damages. On average, there are about 25 tornadoes reported each year within the State of Wisconsin.

On January 7, 2008, a warm, moist, unstable air mass, with temperatures rising into the lower 60s, moved into southeastern Wisconsin—setting the stage for a rare January severe weather event. Thunderstorms formed ahead of a stationary front and produced hail, damaging winds, and a few tornadoes. This storm produced two tornadoes in Kenosha County, the northernmost in an outbreak of 48 tornadoes occurring in an area running from southeastern Wisconsin to eastern Oklahoma. The paths of these tornadoes through Kenosha County are shown on Map III-9.

The first January 7, 2008, tornado spun up about two miles northeast of Pell Lake in southeastern Walworth County and tracked to the northeast through the Towns of Wheatland and Brighton. The path of this tornado was about 10.8 miles long, nine of these in Kenosha County. With an estimated duration of 15 minutes, this suggests that the tornado had an average forward speed of 43 miles per hour. Maximum width of the path was about 200 yards. With estimated maximum wind speeds of 150 to 160 miles per hour, this tornado was classified as an EF3 on the Enhanced Fujita Scale. An estimated \$15.1 million (2014 dollars) in property damages resulted from this storm. Included in these damages were 29 homes destroyed, 30 homes which sustained major damage, and 28 homes which sustained minor damage. About 160 persons were left homeless due to residential damage. In addition, 15 persons sustained minor injuries.

The second January 7, 2008, tornado spun up just east of the intersection of CTH L and STH 31 and tracked to the east-northeast through the Town of Somers and the City of Kenosha. The path of this tornado was about two miles and had a maximum width of about 75 yards. With estimated maximum wind speeds of 95 miles per hour, this tornado was classified as an EF1 on the Enhanced Fujita Scale. An estimated \$8.7 million (2014 dollars) in property damages resulted from this storm. Included in these damages were five homes and one church that were destroyed, seven homes which sustained major damage, and 23 homes which sustained minor damage. In addition, dozens of trees were uprooted and several power lines were toppled. No deaths or injuries were reported to have resulted from this storm.

On June 19, 2009, a weak tornado spun up just west of the intersection of IH 94 and CTH N. It moved eastward and dissipated near the northwest runway of the Kenosha Regional Airport. This storm was rated as an EF0 on the Enhanced Fujita Scale. Reported damages were limited to uprooted trees and broken branches.

On October 26, 2010, an EF1 tornado developed about one mile north of Somers, southwest of the intersection of CTH KR and CTH EA (72nd Avenue). The tornado moved northeast just under one-half mile in Kenosha County before crossing into southern Racine County. While in Kenosha County it destroyed a six-vehicle garage and damaged a nearby home, trees, and power lines. Property damages resulting from this storm were estimated at \$108,570 (2014 dollars).

On November 22, 2010, strong low-level shear developed just south of a warm front, leading to an EF0 tornado which touched down in far northern Kenosha County and moved into southern Racine County. This tornado developed north of Brighton, southwest of the intersection of County Line Road and 224th Avenue. It then moved into southern Racine County. A pole shed sustained minor roof and siding damage and trees were damaged along the tornado's path. Property damages resulting from this storm were estimated at \$2,171 (2014 dollars).

Vulnerability and Community Impacts Assessment

In order to assess the vulnerability of the Kenosha County area to tornado and related storm hazards, a review of the community assets described in Chapter II was made which indicates the potential for significant tornado impacts to: 1) a variety of residential, commercial, and other developed land uses; 2) agricultural lands; 3) roadway transportation system; 4) utilities; 5) critical community facilities; and 6) historic sites. Significant impacts may also be possible to other infrastructure or utility systems, solid waste disposal sites, or hazardous material storage sites.

Tornado prediction is not an exact science. The National Weather Service can forecast that a line of thunderstorms may be likely to produce tornadoes, but where they form or touch down, and how powerful they might be, remains unpredictable. In addition, tornadoes may form quickly without ample warning, since Doppler Radar does not see below the cloud base. As can be seen from the distribution of historic tornado events shown on Map III-8, the locations of tornado impact points is widely scattered throughout the County, although the western portion of the County appears to be more susceptible to tornado events than other portions of the County.

The historic tornado events have resulted in about \$25 million of reported damage. On average, the reported tornados have resulted in about \$1,952,800 of reported property damages per event. It should be noted that two events were responsible for most of these damages, so the average damage damages per event may not be representative of the damages that could be expected from a tornado event affecting the County. On average, there

is one tornado event every 3.5 years (or about 0.29 tornado events per year) in Kenosha County. Over this period of record, tornado hazards have resulted in an average of about \$488,200 in property damages per year.

During a tornado, homes, businesses, public buildings, and infrastructure may be damaged or destroyed by high winds, rain, and hail. Airborne debris, carried by the tornado and associated high winds, can break windows and doors, allowing winds and rain access to interior spaces. Fixed infrastructure, such as roads and bridges, also can be damaged by exposure to high winds, although more damage appears to result from washout associated with flash flooding and debris jams as opposed to direct damage due to contact with funnel clouds. In an extreme tornado event, such as an F4 event, the force of the wind, alone, can cause tremendous devastation, uprooting trees, toppling power lines, and inducing the failure of weak structural elements in homes and buildings.

In 2014, the total equalized assessed property value in Kenosha County was estimated at about \$12.6 billion. Based on the current average estimate of \$488,200 in reported damages per year, it can be expected that approximately 0.004 percent of the value of all property, including buildings and infrastructure, in Kenosha County will be damaged from these events each year. Due to the unpredictability of tornado events, all buildings, infrastructure, and critical facilities within the County are considered at risk.

Potential Future Changes in Tornado Conditions

Changes in land use can have an impact on the potential for damage due to tornadoes and related hazards to occur. Such changes relate to the potential future increase in development within the County. As noted above, changing land use patterns within Kenosha County, as documented in the adopted regional land use plan, the County comprehensive plan, and County land and water resource management plan, and summarized in Chapter II, indicate a continuing level of moderate risk of tornado damage and related losses in the County. Because of the actions that have been taken by the County and local units of government and individuals, the current vulnerability to tornadoes and related hazards has decreased in recent years. These ongoing mitigation measures are described further in Chapter V.

The likely effects of climate change on tornado frequency and severity are not clear. The projections based upon downscaled climate model results do not address potential trends in tornado conditions. A recent study that examined trends in tornados rated F1 or EF1 and higher over the period 1954 through 2013 found that the frequency of outbreaks of multiple tornadoes may be changing.³⁹ While the study found no change in the frequency at which tornadoes occur, it found a decrease in the number of days per year on which at least one

³⁹James B. Elsner, Svetoslava C. Elsner, and Thomas H. Jagger, "The Increasing Efficiency of Tornado Days in the United States," *Climate Dynamics*, Volume 45, pages 651-659, 2015.

tornado occurs. At the same time, it found an increase in the number of days per year on which multiple tornadoes occur. Increasing trends were found at several different threshold for defining outbreaks of multiple tornadoes. Thus, the study found that the proportion of tornadoes that occur on “big tornado days” has increased. In addition, the study found that the spatial and temporal density of the tornadoes occurring has increased. The study concluded that the risk of “big tornado days” featuring clusters of densely packed tornadoes is increasing. This trend could potentially increase tornado-related damages.

Multi-Jurisdictional Tornado Risk Management

Based upon a review of the historic patterns of tornado events in Kenosha County, there are no specific municipalities that have unusual risks. Rather, the events are considered to be relatively uniform and of a countywide concern.

VULNERABILITY ASSESSMENT FOR EXTREME TEMPERATURES

Heat and cold are two of the most underrated, least understood, and deadly of all the natural hazard events that impact Kenosha County. In contrast to the visible, destructive, and violent characteristics associated with floods and tornadoes, extreme high or low temperatures are “silent killers.” Deaths from heat and cold occur quietly, without headline-making destruction. The Centers for Disease Control and Prevention (CDC) reports that nationwide between 2006 and 2010, excessive heat was the underlying cause of death for an average of 407 persons and a contributing cause of death for an average of 326 persons each year.⁴⁰ Over the same time period, the CDC reports that excessive cold was the underlying cause of death for an average of 638 persons and a contributing cause of death for an average of 693 persons each year.⁴¹

Excessive heat has become the most deadly hazard in Wisconsin. According to the National Weather Service, 116 people have died in Wisconsin directly as a result of heat waves from 1982 through 2008. This rate of mortality due to heat events during this period is almost four times greater than the next most deadly natural hazard, cold waves (31 deaths). Temperature data for two selected observation stations in the Cities of Burlington in bordering Racine County and Kenosha in Kenosha County are shown in Table III-17. The Table depicts extreme high and low temperatures and the departure from average temperatures recorded in the period from 1990 through 2014. The average annual high and low temperatures for these two stations are 95.0°F and -11.7°F for the City of Burlington and 95.8°F and -8.2°F for the City of Kenosha during this period. Prolonged exposure to either of these

⁴⁰Jeffrey Berko, Deborah D. Ingram, Shubhayu Saha, and Jennifer D. Parker, “Deaths Attributed to Heat, Cold, and Other Weather Events in the United States, 2006-2010,” National Health Statistics Reports, No. 76, July 30, 2014.

⁴¹Ibid.

temperatures could present a significant danger. It is worth noting that Lake Michigan may be exerting some effect on the average and the extreme cold temperature, but is not appreciably reducing the average extreme high temperature.

Heat and humidity together can create the most severe problems to human health. High humidity makes heat more dangerous because it slows the evaporation of perspiration, which is the body's natural cooling process. **The Heat Index (HI) is** a measure of discomfort and the level of risk posed to people in high risk groups **by heat and humidity. It** is expressed in degrees Fahrenheit (°F) and **incorporates an** adjustment to the air temperature **for relative humidity (RH)**. For example, if the air temperature is 94°F and the RH is 55 percent; the HI would equal 106°F (see Table III-18). Since HI values were devised for shady, light wind conditions, exposure to full sunshine can increase HI values by up to 15°F. The level of risk to people in high-risk groups associated with different levels of the HI is shown in Table III-19.⁴² The NWS will initiate alert procedures (advisories or warnings) when the Heat Index is expected to have a significant impact on public safety. The expected severity of the heat wave determines whether advisories or warnings are issued. High temperature periods are often also accompanied by the related air quality problems related to ground-level ozone that can be harmful, especially to sensitive groups, such as active children and adults with respiratory problems. **For example,** during 2001 and 2002, there were 10 and 11 days, respectively, when weather conditions were forecast in southeastern Wisconsin that could result in unhealthy levels of ozone (the main component of smog).

The following definitions/criteria are used for the 20 counties in south-central and southeastern Wisconsin served by the Milwaukee/Sullivan Weather Forecast Office:

- **Outlook Statement**—Issued two to seven days prior to time that minimal Heat Advisory or Excessive Heat Warning conditions are expected. Serves as a long-term “heads-up” message;
- **Excessive Heat Watch**—Issued 24 to 48 hours in advance when Excessive Heat Warning conditions are expected;
- **Heat Advisory**—Issued six to 24 hours in advance of any 24-hour period in which daytime heat indices are expected to be 100° to 104°, or 95° to 99° for four or more consecutive days, and nighttime heat indices are greater than or equal to 75°. Advisories are issued for less serious conditions that cause significant inconvenience and, if caution is not exercised, could lead to situations that may threaten life; and

⁴²High-risk groups include the very young, the old, and persons with chronic health conditions.

- **Excessive Heat Warning**—Issued six to 24 hours in advance of any 24-hour period in which daytime heat indices are expected to exceed 105° for three or more hours, and nighttime heat indices are greater than or equal to 75°. In addition if Heat Advisory conditions are expected to persist for four or more days, an Excessive Heat Warning will be issued. Warnings are issued for weather conditions posing a threat to life.

During extended periods of very high temperature, coupled with high humidity levels, individuals can suffer a variety of ailments, including heat cramps (muscular pains and spasms due to heavy exertion). Although heat cramps are the least severe, they are an early signal that the body is having trouble with the heat. Heat exhaustion typically occurs when people exercise heavily or work in a hot, humid place where body fluids are lost through heavy sweating. Blood flow to the skin increases, causing blood flow to decrease to the vital organs. This results in a form of mild shock. If not treated, the victim may suffer heat stroke. Heat stroke is life threatening and requires immediate medical attention. The victim's temperature control system, which produces sweating to cool the body, stops working. The body temperature can rise so high that brain damage and death may result if the body is not cooled quickly. Sunstroke is another term for heat stroke. In addition to posing a public health hazard, periods of excessive heat usually result in high electrical consumption for air conditioning, which can cause power outages and brown outs.

Extreme cold is also a deadly hazard. Exposure to extreme cold temperatures can cause a number of health conditions and can lead to loss of fingers and toes; or cause permanent kidney, pancreas, and liver injury, and even death. These health impacts often result from a combination of cold temperatures, winds, and precipitation. As a result, winter storms can pose substantial risks because they can last for several days and be accompanied by high winds, freezing rain or sleet, heavy snowfall, and cold temperatures. In addition, when deaths and injuries due to cold-related vehicle accidents and fatalities, fires due to dangerous use of heaters, and other winter weather fatalities are considered, the impact of severe cold periods become even greater.

Frostbite and hypothermia are two major health risks associated with severe cold. Frostbite is injury caused by freezing of the skin and underlying tissues. Frostbite causes a loss of feeling and a white or pale appearance in extremities. Mild frostbite, frostnip, does not cause permanent skin damage and can be treated with first-aid measures. More severe frostbite can damage skin and underlying tissues and requires medical attention. Potential complications of severe frostbite include infection and nerve damage. Frostbite is most common on fingers, toes, nose, ears, face, and chin. While exposed skin in cold, windy weather is most vulnerable to frostbite, this injury can occur on skin covered by gloves or other clothing.

Hypothermia is a condition brought on when the core body temperature drops to less than 95°F. It occurs when the body loses heat more quickly than it is able to produce it. Relative to temperature extremes, this occurs due to

exposure to cold or frigid environments. As with frostbite, wind or wetness can contribute to producing hypothermia. Symptoms of mild hypothermia can include shivering, dizziness, hunger, nausea, fatigue, increased heart and respiration rates, lack of coordination, and difficulty speaking. As hypothermia worsens, shivering may end. Symptoms of moderate to severe hypothermia include lack of coordination, slurred speech, confusion, drowsiness, progressive loss of consciousness, weak pulse, and shallow breathing. Hypothermia may cause lasting kidney, liver, and pancreas problems or death. Members of certain populations are particularly vulnerable to hypothermia. These include older adults, infants and very young children, the homeless, persons using alcohol or other drugs, and persons taking certain medications.

Wind chill is an index used to evaluate the risk posed by the combination of cold temperatures and wind. It is based on a combination of temperature and wind speed. Table III-20 shows the wind chill table used by the National Weather Service. Wind chill is not the actual temperature, but rather a measure of how wind and cold feel on exposed skin. As the wind increases, heat is carried away from the body at an accelerated rate, driving down the body temperature. This combination can strongly affect the risks associated with exposure to the temperature. For example, a wind chill of -20°F will cause frostbite on exposed skin in just 30 minutes.

The National Weather Service issues wind chill advisories when wind chill temperatures are potentially hazardous and wind chill warnings when wind chill temperatures are life threatening. A wind chill advisory is issued when wind chill values will reach -5°F to -19°F, with wind speeds around 10 mph or more. A wind chill warning is issued when wind chill values will reach -20°F or colder, with wind speeds around 10 mph or more. In addition, a wind chill watch is issued when these conditions may be met 12 to 48 hours in the future.

What constitutes extreme cold varies in different parts of the country. In the south, near freezing temperatures are considered extreme cold. Freezing temperatures can cause severe damage to citrus fruit crops and other vegetation. Pipes may freeze and burst in homes that are poorly insulated or without heat. In the north, extreme cold means temperatures well below zero. Winter residents in Kenosha County may see heavy snow, strong winds/blizzards, extreme wind chill, lake-effect snow, and ice storms. The public can stay informed by listening to NOAA Weather Radio, commercial radio, or television for the latest winter storm warnings and watches.

Historical Extreme Temperature Problems

Historically, most of the all-time maximum daily temperatures in Wisconsin were recorded during the Dust Bowl years between 1934 and 1936. The highest temperature ever recorded in Wisconsin was 114°F, which occurred on July 13, 1936, at the Wisconsin Dells. A severe heat wave in the summer of 1995 affected most of Wisconsin and resulted in 154 fatalities, 82 direct and 72 indirect. In addition, approximately 400 people received medical treatment due to heat-related causes. The 1995 summer heat wave was a rare and, in some respects, unprecedented

event in terms of both unusually high maximum and minimum temperatures and the accompanying high relative humidity.

On December 9, 1999, bitter-cold arctic air swept into Wisconsin on northwest winds of 20 to 40 mph. Temperatures dropped as much as 15°F in 15 minutes as the strong front moved through. Wind chill values ranged from -25°F to -50°F. In Milwaukee County, north of Kenosha County, two people died directly from hypothermia, while hypothermia was a secondary cause indirectly related for one death in Dane County and one death in Kenosha County. An episode of extreme cold, which started in late January 1996, continued through the first four days of February across south-central and southeastern Wisconsin. Wind chills were in the -35°F to -60°F range many times during this event that resulted in four cold-weather hypothermia deaths. In addition, there were 18 reported cases of sustained frostbite in Milwaukee County.

Description of Recent Extreme Temperature Events

Extreme temperatures that affect Kenosha County are not localized events, as they usually encompass the entire south-central to southeastern portion of the State and may continue for several days or weeks. Table III-21 lists the extreme and record high and low temperature events that affected Kenosha County during the period January 1994 through December 2014.

Extreme Heat

A recent heat wave occurred in the summer of 2006. A period of very hot and humid weather began on the evening of July 30, 2006, and continued into August 2nd. Depending on the day, overnight temperatures fell to between 70°F and the lower 80s during this stretch. Afternoon temperatures peaked in the 95 to 100 degree range. With dew points in the low to mid-70s, heat index values dropped to only about 75 overnight on July 30th and peaked in the 105 to 100 degree range across south-central and southeast Wisconsin during the afternoons. The oppressive conditions continued during the overnight hours of August 1st with low temperatures around 80°F before a cold front swept through during the afternoon, ending the heat wave. Two deaths in Milwaukee County were attributed to this heat wave and an estimated 40 people in Milwaukee County were hospitalized due to heat-related symptoms. No deaths or injuries attributable to this heat wave were reported in Kenosha County.

On July 24, 2005, a mid-summer heat wave developed across the Midwest and Great Lakes. High temperatures ranged from the middle 90s to around 100 across parts of south-central and southeast Wisconsin. A maximum temperature of 99°F was reported at Kenosha with an associated heat index of 110. There were no reports of heat-related fatalities or injuries associated with this heat wave. In 2002 seven rounds of excessive heat in April, June, and July affected most of southeastern Wisconsin, including Kenosha County. Heat index temperatures reached 110°F, three people died, and numerous people suffered from heat-related sicknesses. Excessive heat also struck southeastern Wisconsin during the months of July and August in 2001. During this heat wave six people died,

including two in Kenosha County. During the last two weeks of July 1999, an oppressive heat wave enveloped Kenosha County, peaking during the four days of July 28 through 31, 1999. Throughout these four days, high humidity and temperatures in the 90s and 100s produced heat index values from 110°F to as high as 125°F. The heat wave was directly and indirectly responsible for 20 deaths in Wisconsin, one of which was a 59-year-old man who died in his home in the City of Racine. During this time, there was record peak daily electric power demand in the Milwaukee area, and for that summer there was a record set for the Midwest region for electrical demand.

July 2012 was the second warmest July on record. There were four periods of heat or excessive heat during this month: July 3 through 6, July 16 through 17, July 23, and July 25 (see Table III-21). Two of these periods are described below.

The July 3 through 6, 2012, heat wave was one of the three worst heat waves to affect Wisconsin. Locally a hot air mass settled over southern Wisconsin on July 3, 2012, bringing 100-degree heat to many locations for multiple days. While humidity levels were relative low, maximum heat indices reached between 100 and 115 during this hot spell. Daily maximum temperatures at the Kenosha Regional Airport reached 105°F on July 4, 106°F on July 5, and 102°F on July 6. Numerous new daily record highs were set as well as record high daily minimum temperatures. Deaths directly related to the heat were reported in Dane and Milwaukee Counties and deaths in which heat was a contributing factor were reported in Rock and Walworth Counties. Based on news reports hundreds of people received medical treatment at hospitals or clinics due to heat-related illnesses; however, the exact number is unknown. Buckled road pavements were noted and wildlife specialists reported some fish and bird die-offs as water temperatures in inland lakes and rivers increased.

Another round of dangerous heat affected southern Wisconsin on July 25, 2012. High temperatures of between 98 and 101 degrees combined with dew points near 70 to produce heat index values between 100 and 108 across all of south-central and southeastern Wisconsin. This heat wave resulted in the sixth day in 2012 with maximum temperatures reaching or exceeding 100 degrees in several counties. The maximum heat index value in Kenosha County reached 109.

Most heat-related deaths occur in cities. Large urban areas become “heat islands.” Brick buildings, asphalt streets, and tar roofs store heat and radiate it like a slow burning furnace. Heat builds up in a city during the day and cities are slower than rural areas to cool down at night. The amount of sunshine is an important contributing factor in urban heat waves. In addition, the stagnant atmospheric conditions associated with a heat wave trap ozone and other pollutants in urban areas. The worst heat disasters, in terms of loss of life, happen in large cities when a combination of high daytime temperatures, high humidity, warm nighttime temperatures, and an abundance of sunshine occurs for a period of several days. There are also socioeconomic problems that make some urban populations at greater risk. The elderly, disabled, and debilitated are especially susceptible to heat-related illness

and death. During the 1995 nationwide heat wave, 67 percent of the fatalities occurred in the 60-year-old to 89 year-old age group (see Table III-22).

Extreme Cold

An arctic high-pressure ridge, fresh, deep snow cover, clear skies, and light winds allowed temperatures to plunge on January 5, 1999, to well below zero across south-central and southeastern Wisconsin. Several new low temperature records were set, -23°F at Janesville (Rock County) and -20°F in the City of Kenosha.

Very cold wind chill values affected all of south-central and southeast Wisconsin during the evening hours of February 17, 2006, and through the morning hours of February 18, 2006, in the wake of the winter storm on the previous two days. After daytime maximum readings were mostly in the mid-20s over the southeast corner of the State on the afternoon of February 17, temperatures dropped overnight. The lowest temperature recorded in the vicinity of Kenosha County during the early morning hours of February 18 was -10°F at Racine. Brisk west to northwest winds gusted to 17 to 23 mph and wind chills dropped to between -20°F and -34°F. Several outdoor activities and other social functions were cancelled.

Extreme cold temperatures and wind chills occurred over the four-day period of February 3-6, 2007, as a massive arctic high pressure system pushed southeast through the Western Great Lakes Region. Minimum air temperatures tumbled to -5°F to -14°F on February 3rd, with the Lone Rock Airport (Sauk County) registering the -14°F. The lowest minimum temperatures of the four-day period occurred on February 5th, ranging from -11°F in Milwaukee to -26°F at the Lone Rock Airport. Afternoon maximum temperatures on February 4th never reached the zero mark, ranging from -1°F at Milwaukee to -3°F at Madison. On February 3rd and 4th, west to northwest winds were generally 15 to 30 mph, which generated wind chill values of -20°F to -30°F. Lower wind speeds of five to 20 mph were noted on February 5th. The counties of Sheboygan, Sauk, Iowa, Waukesha, Racine, and Kenosha experienced Extreme Cold/Wind Chill event conditions (wind chills of -35°F to -38°F) for several hours during the early morning hours of February 5th. Newspaper accounts indicated that plumbers answered numerous frozen-pipe calls.

Two periods of extreme cold temperatures and wind chills occurred at the end of January 2008. Very cold air settled in over southeastern Wisconsin on January 25, 2008. This was a significant factor in the death of a 44-year-old woman in the City of Kenosha who died from exposure after her vehicle struck a tree. The low temperature in Kenosha was -6°F to -7°F and maximum temperatures in the afternoon only reached around 10°F. On January 30, 2008, extreme cold temperatures and wind chills returned to Kenosha County. In the wake of a powerful winter storm, strong northwest winds and bitter cold air combined to generate low wind chill values across parts of south-central and southeast Wisconsin. Air temperatures were in the -3°F to -8°F range and

northwest winds were on the order of 12 to 21 mph with peak gusts of 23 to 31 mph. Wind chill values dropped to -28°F to -35°F for three hours or more.

One of the coldest arctic blasts in 10 to 15 years affected residents of south-central and southeastern Wisconsin on January 15 and 16, 2009. Minimum air temperatures during the morning of January 15 ranged from -10°F in Sheboygan to -24°F in Sauk City. Maximum air temperatures on January 15 ranged from -8°F at Monroe to +1°F in the several locations in Washington and Milwaukee Counties. Minimum air temperatures during the pre-dawn hours of January 16 were even colder, ranging between -11°F in Sheboygan to -35°F at the Lone Rock Airport. Dangerous wind chill values accompanied the arctic blast that occurred during the pre-dawn hours of January 16 and ranged from -35 in West Bend to -42.5 in Middleton. Numerous schools closed down on January 15 and 16, and many civic clubs activities were cancelled.

On January 21, 2013, arctic air spread into southern Wisconsin behind deep low pressure that tracked to the north of the state. High winds combined with surface temperatures in the single digits below zero to produce wind chills between -20 to -30. The frigid wind chills began the morning of January 21 across far northern southeastern Wisconsin and most of south-central Wisconsin then spread across the remainder of southern Wisconsin during the evening of January 21 and continued everywhere into the morning hours of January 22. An interesting side note to this cold outbreak was the fact that it was one of the relatively few times Milwaukee recorded a low temperature below zero without having a snow cover.

An arctic cold wave affected southern Wisconsin during the period of January 27 through 29, 2014. West to northwest winds of 10 to 20 mph with the passage of an arctic cold front brought wind chill temperatures of -20 below to -38 beginning in the early morning of January 27. These wind chills did not end until the morning of January 29. The coldest period was the morning of January 28 when wind chills ranged from -30 to -38. Widespread school and business closings occurred during this time. The Governor declared a state of emergency due to a propane shortage across the state. Numerous water main breaks and frozen laterals continued to occur throughout the entire month of January.

Between January 1994 and December 2014, about \$16,200 in property damages and \$81,400 in crop damages, in 2014 dollars, have been reported as a result of extreme cold.

Vulnerability and Community Impacts Assessment

Temperature extremes are primarily a public health concern. The poor and elderly are much more susceptible to temperature-related deaths and injury. Education, improved social awareness, and community outreach programs have likely helped to reduce the number of individuals killed or injured by extreme temperature events. Those at greatest risk are the very young, the very old, and the sick. Most deaths during a heat wave are the result of heat

stroke. Large and highly urbanized cities can create an island of heat that can raise the area temperature by 3°F to 5°F. Therefore, urban communities with substantial populations of elderly, disabled, and debilitated people could face a significant medical emergency during an extended period of excessive heat. Some residents in high crime areas, especially the elderly, are afraid to open windows or go out to cooling shelters. As neighborhoods change, some older residents become isolated because of cultural, ethnic, and language differences.

High demands for electricity can result in black outs and brown outs. Loss of water pressure can result from opening of fire hydrants in urban areas. Stagnant atmospheric conditions that occur with heat waves are also favorable for trapping ozone and other pollutants in urban areas. Pets and livestock can suffer from prolonged exposure to excessive heat.

Property and crop damages have occasionally been reported as resulting from extreme temperature events. Table III-21 shows that between 1994 and 2014, extreme temperature events have been reported as causing about \$16,200 in property damages and \$81,400 in crop damages (2014 dollars) in Kenosha County. Most of these damages were reported for a small number of events. On average, the reported extreme temperature events have resulted in about \$265 of reported property damages and \$1,330 of reported crop damages per event or a total of about \$1,595 per event. On average, there are about 2.9 extreme temperature events per year in Kenosha County. Over this period of record, extreme temperature hazards have resulted in about \$770 in property damages and about \$3,870 in crop damages per year for average annual total damages of about \$4,640.

A review of the community assets described in Chapter II indicate the potential for extreme temperature hazard events to impact: 1) residents at a countywide level, especially the poor, elderly, and sick; 2) agricultural croplands; 3) pets and livestock; 4) municipal water and electric utilities; and 4) natural surface and groundwater reserves. No specific cost data are estimated for temperature extreme events, because the nature of such events does not readily permit direct cost analysis.

Potential Future Changes in Extreme Temperature Conditions

Based upon historical data, Kenosha County can expect to experience an average of 2.9 extreme temperature events per year. On average, these occur as 1.7 extreme heat events and 1.2 extreme cold events per year. It should be noted that the historical record shows considerable variation among years in the number of events that occurred. While it would be expected that in some years the County will experience either fewer events or more events than the average number, the average annual number of events is not expected to change over the five-year term of this plan update.

The projections based on downscaled results from climate models indicate that there will likely be substantial changes in the frequencies of extreme cold and extreme heat events over the 21st century.

Extreme heat events are likely to occur more frequently and to be more severe by the middle of the century. As previously described, average summertime temperatures in Kenosha County are projected to increase by 5.5 to 6.0°F by year 2055. The number of days per year in which temperatures in southern Wisconsin exceed 90°F is expected to double from about 12 to about 25 by 2055. Given that much of the documented increases in average temperature since 1950 have occurred through increases in night-time low temperatures, it is likely that there will be fewer night-time breaks in the heat during extreme heat events in the future. This could result in some extreme heat events persisting longer. Heat waves have direct impacts on human health, especially among sensitive populations such as the young children and the elderly. In the absence of mitigative measures, the projected increase in the frequency, duration, and severity of heat waves will be likely to cause increases in fatalities and illnesses related to extreme heat.

By contrast, the frequency of extreme cold events may decrease by the middle of the century. The projected warming trends are expected to be greatest during the winter. Average winter temperatures in Kenosha County are projected to increase by about 7.5°F. This may result in a reduction of some risks associated with extreme cold.

Multi-Jurisdictional Extreme Temperature Risk Management

Based upon a review of the historic patterns of extreme temperature events in Kenosha County, there are no specific municipalities that have unusual risks. Rather, the events are of a uniform countywide concern.

VULNERABILITY ASSESSMENT FOR LAKE MICHIGAN COASTAL HAZARDS

The Lake Michigan coast in Kenosha County consists of 15.6 miles of shoreline, encompassing portions of three local units of government, including the City of Kenosha, the Village of Pleasant Prairie, and the Village of Somers. The portion of the Lake Michigan shoreline lying within the jurisdiction of each of these general-purpose local units of government, is shown in Table III-23. The land uses along the shoreline are documented in Chapter II.

There are three types of Lake Michigan coastal hazards that potentially affect Kenosha County, including:

- Erosion of coastal bluffs, beaches, and nearshore lakebeds;
- Flooding from high lake levels and storm-induced surge (temporary water level changes); and
- Damage to shoreline structures, such as residences, businesses, and public facilities, from storm waves, including wave runup.

The focus of the vulnerability assessment is on the first type of hazard noted above—erosion of bluffs, beaches, and nearshore lakebeds—as that phenomenon is a documented hazard in Kenosha County where bluff recession rates exceeding 10 feet per year have been reported.⁴³ The second hazard, flooding from high lake levels, is being considered, along with flooding in other areas of the County. As shown on Maps III-2 and III-3, there are seven structures identified in the floodplain associated with Lake Michigan. Those floodplain areas are delineated on the County large-scale topographic maps. With regard to the third hazard, storm wave damage, there are hazards in the County, primarily in the City of Kenosha, that are protected by riprap revetments, groin-beach systems, bulkheads, and breakwater systems. However, the designs of these shore protection structures, most notably those protecting the City sewage treatment and water plants, and the marina facilities, have applied standards suitable for major public and private facilities. In addition, the structures are maintained as needed.

Historical Coastal Hazard Conditions

Coastal hazard problems have been most evident in Kenosha County during high-water periods. These have occurred in recent history on Lake Michigan in the early 1950s, the early 1970s, and the mid-1980s, with record high levels occurring in 1986, surpassing the previous record high level set in 1886.

Low water levels can cause problems with shore protection structures, such as rotting of normally submerged timber pilings when they are exposed to air, and they can significantly affect shipping and boating and marina activity. Lake Michigan levels, as of April 2015 were about three inches above average levels, but well below the historic record high levels set in 1986.

On February 8, 1987, high winds resulted in surging waves which damaged roads, a home, and a marina along the Lake Michigan shoreline.⁴⁴ Winds gusts associated with this event exceeded 50 miles per hour. Ice marks on trees showed that waves in some locations were 20 feet high. Waves also damaged roads in the Town of Pleasant Prairie (now the Village of Pleasant Prairie). In addition, waves inundated a home in the 12400 block of 1st Avenue and hurled 20- to 60-pound pieces of ice and stone onto the property. Waves also moved a bell weighing about one ton a distance of 30 feet. Trident Marina experienced extensive damages. These included about one-third of a parking lot washing away, damages to many slips, and ponded water on the property. Total damages caused by this event were estimated at \$833,500.⁴⁵

⁴³*SEWRPC Technical Report No. 36, Lake Michigan Shoreline Recession and Bluff Stability in Southeastern Wisconsin: 1995, December 1997.*

⁴⁴*Jim Higgins, "Surging Waves Cause \$400,000 Damage in Kenosha County," Milwaukee Sentinel, Page 5, Part 1, February 10, 1987.*

⁴⁵*Damages are expressed in 2014 dollars.*

On March 9, 1987, 45- to 60-mile per hour winds created 10-foot waves that damaged beaches, flooded roads, and tossed debris onto the shore along the Lake Michigan shoreline.⁴⁶ Damages caused by this event included the flooding of a home in the 12400 block of 1st Avenue and severe damage to steel flood walls, a parking lot, and docks at Trident Marina. In addition, some property owners along 1st Avenue in Pleasant Prairie reported to Town officials that waves had washed away as much as 10 feet of their land. Damages caused by this event were estimated at \$1,250,000.⁴⁷

A 1997 report of Lake Michigan shoreline erosion and bluff stability⁴⁸ noted the potential for damming of the mouth of the Pike River by littoral drift in Lake Michigan. During storms on Lake Michigan, when onshore winds prevail, littoral drift rates increase landward of the surf zone and the mouth of the River can be dammed by the formation of a foreshore beam (known to be up to six feet above the normal water level of the River). Sudden breaching of the berm by the River has, on several occasions, caused deaths by drowning of people who were swept into Lake Michigan from the beach at the mouth of the Pike River.

Description of Recent Coastal Hazard Conditions

As described in Chapter II, a 1997 study was prepared by SEWRPC and others in cooperation with the Wisconsin Coastal Management Program to evaluate shoreline erosion and bluff stability conditions along the Lake Michigan shoreline in southeastern Wisconsin, including Kenosha County.⁴⁹ That study found erosion rates of up to nine feet per year over the period 1963 to 1995, with an average of 1.8 feet per year. Similarly, erosion rates of up to eight feet per year, with an average of 1.1 feet per year were found for the period 1975 to 1995.

The 1997 Lake Michigan shoreline evaluation reported relatively stable conditions for the most part in areas where shoreline development exists in Kenosha County. However, there is the potential for shoreline and bluff erosion to impact structures over the long term. One area with an unstable bluff was found to be located on the shoreline in the northern part of the County. In addition, during severe climatic conditions, such as high water levels or saturated ground conditions, larger episodic bluff erosion events could occur. The 1997 study also noted the importance of offshore lake depths, as increases in offshore depths can cause increased shore erosion

⁴⁶Don Behm, "Lake Michigan Waves Batter Pleasant Prairie," *Milwaukee Journal*, Page 4A, March 10, 1987.

⁴⁷Damages are expressed in 2014 dollars.

⁴⁸SEWRPC *Technical Report No. 36*, Lake Michigan Shoreline Recession and Bluff Stability in Southeastern Wisconsin: 1995, December 1995.

⁴⁹Ibid.

problems. At the five sites in Kenosha County where offshore bathymetry was measured in 1995 and compared to 1977 data, changes in depths were not definitive. However, at the seven sites in neighboring northern Racine County where offshore bathymetry was measured, four sites showed significant improvement in shore erosion conditions with decreases in depth, while the others showed little change.

Strengthening low pressure over the lower peninsula of Michigan in conjunction with a strong push of cold air over the relatively warm waters of Lake Michigan resulted in strong winds affecting the nearshore waters of Lake Michigan on October 31, 2014. Wind gusts were frequently between 39 and 49 miles per hour over nearshore waters, with gusts of 54 miles per hour being reported at the City of Kenosha. These winds produced 20-foot high waves which caused considerable damage along the lakefront in the City of Kenosha. The waves pushed rocks and debris onto Kennedy Drive. While City crews were able to clean up the area, some sections of the revetment needed to have larger boulders restacked in order to obtain the required height. The cost of construction for doing this was estimated at \$50,000 to \$75,000 (2014 dollars). At Southport Marina, waves undermined a boat storage facility, causing its concrete floor to collapse. Waves also damaged a concrete overlook at Harborpark and a cobblestone walkway along the harbor. The costs of construction for repairing the overlook were estimated at \$150,000 (2014 dollars). The greatest damage occurred at Southport Park, where waves impacted about 500 feet of shoreline. Damages included dislodging of riprap, severe erosion, and the failure of a stone revetment wall. The estimated cost to rebuild about 450 feet of stone revetment wall and install additional protection against erosion at Southport Park was about \$500,000 to \$550,000 (2014 dollars).

Vulnerability and Community Impacts Assessment

A review of the community assets described in Chapter II indicate the potential for coastal hazard impacts to: 1) a variety of floodprone residential, commercial, and other developed land uses; 2) agricultural lands; 3) a very limited extent of the roadway transportation system; 4) utilities associated with the potentially impacted roadways; 5) critical community facilities; and 6) some utilities located immediately along the lakeshore. No significant impacts are expected to other infrastructure or utility systems, solid waste disposal sites, or hazardous material storage sites.

A potential utility problem relates to the potential impact of extreme high lake levels on the City of Kenosha wastewater treatment plant outfall and related facility hydraulic capacity. That vulnerability and the potential vulnerability of other public facilities are understandable, given historic and current Lake Michigan design levels. J. Philip Keillor (formerly Coastal Engineer, with the University of Wisconsin-Sea Grant Institute, personal communication) reported that, since 1920, the U.S. Army Corps of Engineers used a method of selecting design high water elevation for Lake Michigan based upon a 20-year average of highest mean monthly water levels, plus a value for a short-term rise. It seems likely that most municipalities and their consulting engineers would have been influenced by Corps practice in selecting design water elevations for lakeside plants. A design high water

elevation selected in 1930-1950 would have been significantly lower than a design high water elevation selected after 1970. The Corps of Engineers Lake Michigan Potential Damages Study has produced a set of high and low lake levels anticipated in Lake Michigan over the next 50 years.

In addition to major facility impacts, it is possible that local utilities located in road rights-of-way could be impacted if Lake erosion were to be severe enough to endanger portions of the street.

A review of the Lake Michigan lakeshore erosion conditions within Kenosha County indicates that there is a significant potential community impact as a result of the potential loss of land improvements and infrastructure in selected areas due to lakeshore erosion. However, with proper surveillance, the need to prepare for major evacuations and other emergency actions are not a significant concern given the isolated nature and the limited severity of the problems.

Potential Future Changes in Coastal Hazard Conditions

Changes in land use can have an impact on the potential for coastal erosion hazards to occur. Such changes relate to the potential future increase in development within the erosion hazard areas, particularly when not accompanied by proper shore protection measures. Enforcement of the current zoning procedures that are in place in the coastal communities in Kenosha County call for the use of shoreline protection, bluff stabilization structural measures, and bluff setbacks for new development along portions of the Lake Michigan shoreline where urban shoreline development exists or is envisioned and for areas of limited development where no structural protection measures are envisioned.

As discussed in the sections above, Lake Michigan water levels have risen more than three feet since January 2013. This has caused some residents in the Villages of Caledonia and Mount Pleasant in Racine County to experience significant erosion and bluff recession issues. In addition, climate change may lead to more drastic fluctuations in Lake Michigan water levels. Over the five-year period covered by this plan update, Lake Michigan water levels are expected to fluctuate but are currently higher than average. Potential future fluctuations in Lake Michigan water levels could lead to continued bluff failures, particularly in areas that have no shoreline protection, where shoreline protection structures are not maintained adequately, or where shoreline protection structures are not built to sufficient specifications to protect against fluctuating water levels. Mitigation measures to protect areas along the Lake Michigan coast are described further in Chapter V.

Changes over the 20th century and projections based on downscaled results from climate models indicate that there will likely be changes affecting coastal conditions over the 21st century. Coastal areas have experienced, and are projected to experience, increases in air temperatures; increases in precipitation, especially during fall, winter, and spring months; and increases in the frequency of heavy precipitation events. Wind strengths have

increased over the Great Lakes and are expected to continue increasing into the future.⁵⁰ In addition, wind patterns over Lake Michigan have shifted. Prevailing winds during summer months shifted from coming from the southwest during the 1980s to coming from the east after 1990.⁵¹ These climatic changes are expected to influence Lake levels, coastal erosion, flooding, and shoreline stability, sometimes in complex ways.

For example, Lake Michigan is likely to be impacted by trends that act both to increase and to decrease water levels. Increased precipitation⁵² will increase water contributions to the Lake. At the same time, increases in temperatures will lead to increases in evaporation of water from the Lake. The temperature increase will also result in reduced ice cover over the winter. This affects evaporation because ice cover on the Lake acts as a cap, reducing evaporation by preventing water vapor from escaping into the air. As a result of both of these processes, evaporation from the Lake is projected to increase. It is expected that the increases in evaporation will eventually be greater than the increases in precipitation. As a result, average water levels in Lake Michigan are expected to decrease by about 0.8 to 1.4 feet by the end of the 21st century. It should be noted that water levels in the Lake vary widely about their average, with high-water and low-water decades occurring. This variability is expected to continue. By the end of the century it is expected that highest and lowest water levels will be slightly lower than they have been over the past 100 years.

While the hazard impacts associated with water level variations should be similar in type to those impacts currently resulting from water level variations, there may be some increase in the magnitude of these impacts. While low water levels may allow beaches and beach ridges to build and beach-anchoring vegetation to move toward the Lake, they may also adversely impact shipping, power generation, and tourism. It should be noted that long periods of low water levels may lead to erosion of the lakebed, which may allow storm-generated waves to reach farther inland when water levels rise. While high water levels may benefit communities, businesses, and industries that depend upon Great Lakes waters for commercial shipping, recreational boating, and tourism, higher water levels with increased storm frequency and intensity could increase shoreline and bank erosion. This could increase damages to lakefront property and reduce the area of beaches.

Several other elements of climate change may also act to intensify shoreline erosional processes. Increases in wind strength over the Lake and changes in prevailing wind direction are likely to lead to greater offshore wave

⁵⁰Desai, Austin, Bennington, and McKinnley, 2009, op.cit.

⁵¹James T. Waples and J. Val Klump, "Biophysical Effects of a Decadal Shift in Summer Wind Direction over the Laurentian Great Lakes," *Geophysical Research Letters*, Volume 29, pages 43-1 through 43-4, 2009.

⁵²Wisconsin Initiative on Climate Change Impacts, 2011, op. cit. The WICCI report indicates there is a 75 percent probability that average annual precipitation will increase under mid-century climate change conditions.

development. This will produce higher waves along the coast. Changes in several elements of climate may affect the stability of bluffs along the lakeshore. The amount of water contained in bluff soils is an important factor determining their stability. Friction between soil particles hold them in place. As water fills the spaces between these particles the friction between soil particles decreases, causing the soil to become more fluid and less stable. Higher Lake levels and increases in 1) precipitation, 2) the frequency of heavy storms, and 3) the number of freeze-thaw cycles will all contribute to shoreline bluffs becoming less stable and more susceptible to slumping. Prolonged dry periods and droughts may also contribute to reduced stability of coastal bluffs. As bluff soils dry out, cracks in the soil can form, weakening the surface soil. During long-term droughts, these cracks can develop into deep fractures. Such fractures can allow surface water to penetrate deep into bluff soils. If heavy rainfall events occur following a drought, they may cause rapid saturation of dry, fractured bluff soils. This could cause a major slope failure.

Multi-Jurisdictional Coastal Hazard Conditions Risk Assessment

Coastal erosion and bluff stability hazards have been identified as a moderate risk in Kenosha County. As shown on Map II-7 in Chapter II, hazard areas have been identified within three of the 13 general-purpose local units of government in the County: the City of Kenosha, the Village of Pleasant Prairie, and the Village of Somers. In addition, there is a need for continued surveillance of coastal conditions in those municipalities: the City of Kenosha, the Village of Pleasant Prairie, and the Village of Somers (see Table III-24).

VULNERABILITY ASSESSMENT FOR WINTER STORMS

Winter storms can vary in size and strength and include heavy snow storms, blizzards, freezing rain, sleet, ice storms, and blowing and drifting snow conditions. Extremely cold temperatures accompanied by strong winds can result in wind chills that cause bodily injury, such as frostbite and death. A variety of weather phenomena and conditions can occur during winter storms. For clarification, the following are National Weather Service approved descriptions of winter storm elements:

- **Heavy Snowfall**—The accumulation of six or more inches of snow in a 12-hour period or eight or more inches in a 24-hour period;
- **Blizzard**—An occurrence of sustained wind or frequent gusts of 35 mph or higher accompanied by falling or blowing snow, and visibilities of one-quarter mile or less, for three or more hours;
- **Ice Storm**—An occurrence of rain falling from warmer upper layers of the atmosphere to the colder ground, freezing upon contact with the ground and exposed surfaces, resulting in ice accumulations of one-quarter inch or more within 12 hours or less;

- **Freezing Drizzle/Freezing Rain**—The effect of drizzle or rain freezing upon impact on objects that have temperature of 32 degrees Fahrenheit or below;
- **Sleet**—Solid grains or pellets of ice formed by the freezing of raindrops or refreezing of largely melted snowflakes. This ice does not cling to surfaces; and
- **Wind Chill**—An apparent temperature that describes the combined effect of wind and low air temperatures on exposed skin.

Much of the snowfall in Wisconsin occurs in small amounts of between one and three inches per occurrence. Heavy snowfalls that produce at least eight to 10 inches of widespread accumulation happen on the average only once per winter season across southern Wisconsin. In addition, a snowfall event of six to eight inches usually occurs once per winter. The northwestern portion of Wisconsin receives most of its snow during early and late season storms, while southwestern and southeastern counties receive heavy snows more often in mid-winter. Snowfall amounts in Kenosha County average between 30 and 40 inches per season.

Historical Winter Storm Problems

True blizzards are not common in Wisconsin. However, when they do occur, they tend to affect the eastern counties near Lake Michigan. Due to less frictional drag over Lake Michigan, northwest wind storms can reach higher speeds. Blizzards are more likely to occur in northwestern Wisconsin than in southern portions of the State, even though heavy snowfalls are more frequent in the southeast. Blizzard-like conditions often exist during heavy snowstorms when gusty winds cause severe blowing and drifting of snow. Heavy snow and ice storms have been a part of nearly every winter in Kenosha County history. There have been 105 winter storm events reported since 1994. All of these storms contained some form of snow, sleet, freezing rain, or slippery road conditions (see Table III-25). A heavy snowstorm may cause schools and businesses to close, delay or cancel airline flights, and create treacherous roadway travel conditions.

Ice and sleet storms can occur at any time throughout the winter season from October into April. The majority of these storms occur in west-central to east-central Wisconsin, based on data from 1982-2014. In a typical winter season there are three to five light freezing rain events. A major ice storm occurs about once every other year somewhere in the State, once every seven years over southeastern Wisconsin, and about once in every four years in west-central Wisconsin. If one-half inch of rain freezes on trees and utility wires, extensive damage can occur, especially if accompanied by high winds that compound the effects of the added weight of the ice. There are also between three and five instances of glazing (less than one-quarter of an inch of ice) throughout the State during a normal winter.

In March 1976 a disastrous ice storm occurred in the southern portion of the State. This storm was of such magnitude and caused such a significant amount of damage that a Presidential disaster declaration was obtained. This storm affected 22 counties, resulted in extensive power outages, and caused over \$50 million in damage.

Near-blizzard conditions occurred in January 1979 when record snowfalls were recorded in many areas of the State and winds gusted to over 30 mph. Many persons were isolated from assistance and services as roads drifted shut and highway crews were unable to keep them open. Conditions were extremely hazardous in the nearby City of Milwaukee and Racine County where a Presidential emergency declaration was obtained to assist in snow removal operations. During the winter of 1981-82 a storm event occurred with extremely cold temperatures accompanied by high winds gusting to 50 mph. Wind chill factors reached 100 degrees below zero and severely affected the health and safety of those who ventured outdoors.

Description of Recent Winter Storm Events

Generally, the winter storm season in Wisconsin runs from October through March. Severe winter weather has occurred, however, as early as September and as late as the latter half of April and into May in some locations in the State. The average annual duration of snow cover in Kenosha County is approximately 85 days.

The winter of 1998-99 was quite mild; however, a heavy snowfall occurred on January 1-3, 1999. More than 10 inches fell in most southern counties with parts of Kenosha, Milwaukee, Ozaukee, Walworth, Washington, and Waukesha Counties receiving more than 18 inches of snow. A statewide blizzard occurred December 2-4, 1990, depositing 10 or more inches of snow across the central and southern portions of the State. This excessive snowfall throughout such a large area of the State severely taxed capabilities to clear and remove snow.

December 2000 was one of the 10 coldest Decembers on record for most of the State. In addition, record or near record snow depths of 15 to 34 inches occurred in much of southern Wisconsin during that month. Kenosha County was included in a Presidential emergency declaration area, receiving a total of \$346,000 in Federal funds for extraordinary expenses associated with clearing roads and emergency response efforts.

Two heavy snowfalls occurred in Kenosha County during January 2005. Over the period January 4-6, 2005, low pressure in the southwestern United States pulled large amounts of moisture from the Gulf of Mexico and eastern Pacific Ocean over a stationary front located over Illinois, Iowa, and Missouri. Widespread heavy snow developed in northern Illinois and moved into southern Wisconsin, resulting in heavy snowfall in Kenosha County. Accumulations of snow were between 10 and 12 inches in most of the County, with a total of 13.6 inches being reported at the City of Kenosha wastewater treatment plant. Heavy snow also developed in southeastern Wisconsin on the evening of January 21, 2005, and persisted into January 22. Snowfall rates overnight were in the two to three inch per hour range at times. Total snow accumulations generally ranged from seven to 11 inches,

with heaviest accumulations near Lake Michigan. After the storm was over, lake effect snow produced an additional three to four inches of snow across the Region for a two-day total accumulation of 10 to 16 inches. In addition to heavy snow, winds began to strengthen to 20 to 30 miles per hour, with gusts up to 45 miles per hour, by the morning of January 22. This produced considerable blowing and drifting snow and blizzard conditions at times. Although hundreds of traffic accidents were reported, the storm swept through on a Friday night and road crews had an easier time clearing roadways without the presence of rush hour traffic on Saturday.

The 2007-2008 winter season in Wisconsin was “one-for-the-ages.” Numerous winter storms, including a couple blizzards and four ice storms, pounded the southern half of the State. Winter snowfall totals of 70 to 122 inches across the southern counties established new all-time winter snowfall records at many locations. Portions of central Kenosha County received in excess of 90 inches of snow during this winter. These totals were roughly 200 to 240 percent of normal, and many communities ran out of salt, or were unable to purchase additional supplies due to increased demand. The worst storm of the winter occurred on February 5-6, 2008, southeast of a line from Dubuque, Iowa to Madison to Sheboygan where 12 to 21 inches of snow were deposited. About 15 inches were reported from several locations in Kenosha County. Several roads in southeast Wisconsin were closed by the intense snowfalls and blowing snow. Kenosha County was included in a Presidential Emergency Declaration area, receiving a total of \$617,849 in Federal funds for extraordinary expenses associated with clearing roads and emergency response efforts.

During the overnight hours of February 1 to February 2, 2011, a powerful low pressure center passing south of Wisconsin produced blizzard conditions across much of southern Wisconsin. Snow associated with the system began in the mid-afternoon hours in far southern Wisconsin and pushed northward into the State through the evening. Twenty-four hour snowfall totals were between 20 and 26 inches, with 24 inches of snow reported by a cooperative observer near the City of Kenosha. This was in addition to several inches of snow that had fallen on January 31. In Kenosha, this storm set new two-day and three-day snowfall records, with snowfalls of 25.3 inches and 27.3 inches, respectively. Very strong winds were associated with this storm for an extended period of time. Sustained northeast winds of 30 to 40 mph were common through the event, with peak wind gusts between 45 and 65 mph. Strong wind gusts were reported near Lake Michigan, with the lakeshore observation site at Kenosha reporting a gust of 64 mph. The combination of high winds and heavy snow created widespread sustained visibilities of less than one-quarter mile, with frequent whiteout conditions and near zero visibilities. Many locations saw blizzard conditions beginning early during the evening of February 1 and continuing through the early morning hours of February 2. Snow drifts of three to 10 feet were common, with reports of some drifts reaching 12 to 15 feet in open rural areas. Drifting snow closed highways and roads with many stranded motorists having to be rescued from vehicles buried in the drifting snow. Due to the large number of vehicles and operators caught in the storm on February 2, the Kenosha Police Department and the National Guard collaborated in assisting stranded motorists. Officers responded to over 121 calls from motorists for assistance. This represents

about 61 percent of the calls that the Department received on that day. About 100 National Guardsman were mobilized statewide to help rescue motorists and run emergency shelters at armories in response to the Governor's emergency declaration for 29 counties. At the height of the storm, We Energies reported 5,200 customers were without power across Southeast Wisconsin. A presidential disaster declaration was issued for 11 Wisconsin Counties, including Kenosha County, as a result of the Groundhog Day Blizzard of 2011. Kenosha County received about \$640,368 in public assistance under this declaration.

Vulnerability and Community Impacts Assessment

Prior to 1994, the reports of winter storms in the NCDC database are spotty. Between 1994 and 2014, 105 winter storms affected Kenosha County. Based on this, it is estimated that Kenosha County experiences an average of five winter storm events per year. It should be noted that historically there has been considerable variation around this average, with the County experiencing as few as zero winter storm events in some years and as many as 21 winter storm events in other years (Table III-25).

The NCDC database contains few reports of property damages and crop damages for winter storms. For Kenosha County, no crop damages have been reported as having been caused by winter storms and property damages were reported for only two winter storms. Since 1994, about \$42,800 (2014 dollars) in property damages have been reported as having been caused by winter storms affecting Kenosha County. Given that the County received over \$640,000 in public assistance under the disaster declaration related to the Groundhog Day blizzard of 2011, the reported damages in the NCDC database clearly represent an underestimate of the potential damages associated with severe winter storms impacting Kenosha County.

Winter storms present a serious threat to the health and safety of affected citizens and can result in significant damage to property. Snow and ice are the major hazards associated with winter storms and are the eighth most destructive natural hazard in Wisconsin. Snow and ice can cause traffic accidents, cause telephone and power lines to collapse, damage trees, impede transportation, burst water pipes, and can tax the public's capabilities for snow removal during heavy storms. A major winter storm can have a serious impact on a community. Loss of heat and mobility are key complications that contribute to winter storm fatalities.

Ice storms and freezing rain are less common than snow, but produce road conditions that can make travel hazardous (see Table III-25). Even fog or mist on cold roads can produce a glaze of ice that makes travel slippery and dangerous. Accumulated ice can cause the structural collapse of buildings, bring down trees and power lines, and cause property damage, loss of power, and isolate people from assistance or services. Even with all of the dangers that are caused by winter storm and ice events, on average, there are zero deaths and injuries per year related to these storms in Kenosha County.

A review of the community assets described in Chapter II indicates there is a potential for winter storm hazard events to impact: 1) residents at a countywide level; 2) roadway transportation system; 3) utilities; and 4) the operation of critical community facilities.

Potential Future Changes in Winter Storm Conditions

Based upon historical data, Kenosha County can expect to experience an average of **five** severe winter storm events per year. It should be noted that the historical record shows considerable variation among years in the number of events that occurred. While it would be expected that in some years the County will experience either fewer events or more events than the average number, **over the five-year term of this plan update** the average annual number of events is not expected to change.

Changes over the 20th century and projections based on downscaled results from climate models indicate that there will likely be changes in winter storm conditions affecting Kenosha County over the 21st century. It is projected that by 2055, the average amount of precipitation that Kenosha County receives during the winter will increase by about 0.5 to 1.0 inch, an increase of about 25 percent. Due to increasing winter temperatures, the amount of precipitation that falls as rain during the winter rather than as snow is projected to increase significantly. It is also projected that freezing rain will be more likely to occur.

It should also be noted that the likelihood of lake effect snow occurring could be affected by climate change. A lack of ice cover over Lake Michigan during the winter promotes the development of lake effect snow. Rising temperatures during the winter will reduce the frequency and extent of ice cover over the Lake. Because the increase in temperature may also result in some of this precipitation falling as rain, it is not clear whether this will lead to an increase in the frequency of lake effect snow events.

Multi-Jurisdictional Winter Storm Risk Management

Based upon a review of the historic patterns of winter storm events in Kenosha County, there are no specific municipalities that have unusual risks. Rather, the events are of a uniform countywide concern.

VULNERABILITY ASSESSMENT FOR DROUGHT

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

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

A drought's severity depends on several factors, including its duration, its intensity, its geographic extent, and the demands for water for use by both humans and vegetation.

Drought can be difficult to define in exact terms. This is partly due to its multi-dimensional nature and partly due to the ways it differs from other natural hazards. There is no exact and universally accepted definition of what constitutes a drought. The onset and end of a drought are difficult to determine due to the slow accumulation of its impacts and the lingering of its effects after its apparent end. The impacts of drought are less obvious than those of some other hazards and may be spread over a larger geographic area. These characteristics have hindered the preparation of drought contingency or mitigation plans by many governments and can make it difficult to perform an accurate risk assessment analysis.

Droughts can have several impacts. They can reduce water levels and flows in surface waterbodies and groundwater. This can cause shortages of water for human and industrial consumption, hydroelectric power, recreation, and navigation. Water quality may also decline and the number and severity of wildfires may increase during a drought. Severe droughts may result in reduced yields or the loss of agricultural crops and forest products, undernourished wildlife and livestock, and lower land values.

Wisconsin is most vulnerable to agricultural drought. The State has approximately 14.6 million acres of farmland on 70,000 farms.⁵³ Even small droughts of limited duration can significantly reduce crop growth and yields, adversely affecting farm incomes and local economies. Droughts significantly increase the risk of forest fires and wildfires. Additionally, the loss of vegetation in the absence of sufficient water can result in flooding, even from average rainfall, following drought conditions.

⁵³U.S. Department of Agriculture National Agricultural Statistics Service, 2012 Census of Agriculture: Wisconsin State and County Data, Volume 1, Geographic Area Series, Part 49, May 2014.

Historical Drought Problems

Small droughts of shortened duration have occurred in Wisconsin at an interval of about once every 10 years since the 1930s. Extended, widespread droughts have been infrequent in Wisconsin. The five most significant droughts, in terms of severity and duration, are 1987-1988, 1976-1977, 1955-1959, 1948-1950 and 1929-1934.

The 1929-1934 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 100-year recurrence interval in certain areas. The severe economic impact of the Depression compounded its effects. The drought continued with somewhat decreased effect until the early 1940s in some parts of the State.

The drought that occurred during 1948-1950 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. The drought of 1955-1959 had a recurrence interval of between 30 and 70 years in all but the northwestern corner of Wisconsin.

The drought of 1976-1977 was most severe in a wide band stretching from north to south across the State. Stream flow measuring stations recorded low flow recurrence intervals from 10 to 30 years. Agricultural losses during this drought were set at \$624 million. Sixty-five counties throughout the State were declared Federal drought areas and deemed eligible for assistance under the Disaster Relief Act. Additionally, numerous private and municipal wells went dry due to the lowered groundwater tables. Federal assistance was also obtained to assist communities in drilling new wells and obtaining new water supplies.

In 1987 and 1988 Wisconsin experienced one of the most severe droughts in recent history. It was characterized not only by below normal precipitation, but also by persistent dry air and above normal temperatures throughout the Midwest. Streamflow measuring stations indicated low flow recurrence intervals of between 75 and 100 years. The drought's effects were most severe in north central and northeastern Wisconsin. The drought occurred early in the growing season and resulted in a 30 to 60 percent crop loss statewide, with agricultural losses set at \$1.3 billion. Fifty-two percent of the State's farms were estimated to have crop losses of 50 percent or more, with 14 percent estimated having losses of 70 percent or more. Agricultural operators in Kenosha County received about \$284,000 in crop insurance indemnities for losses caused by drought in 1988 (2014 dollars, see Table III-26). In addition to crop losses, fish, birds, and wildlife were adversely affected. The amount of electric power generated by hydroelectric plants was reduced by as much as 80 percent as a result of the low water levels associated with this drought. 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 and

imposed some type of water-use reduction rules or restrictions, usually involving the limitation of lawn sprinkling and yard watering.

Description of Recent Drought Events

Estimates of agricultural losses experienced in Kenosha County due to drought over the period 1980 through 2014 are shown in Table III-26. These estimates come from two sources: event descriptions in the NCDC storm events database and records of indemnities paid to agricultural operators by Federal crop insurance programs. For those years in which loss estimates were available from both the NCDC and crop insurance indemnities, the larger value was used to estimate losses due to drought for that year. This reflects several factors that affect the estimate of losses. First, crop losses often go unreported. Second, Federal crop insurance policies offer coverage to only certain types of crops in any particular year. Third, agricultural operators generally insure only a portion of their crops when purchasing Federal crop insurance. Thus, loss estimates derived from these two sources are likely to represent underestimates of actual losses. It should be noted that indemnities for drought-related losses were paid out in most years. This probably reflects variability in rainfall causing localized crop losses. Based on these sources, it is estimated that Kenosha County experienced crop damages in excess of \$3.8 million (2014 dollars) between 1980 and 2014. Based on this, average annual crop losses due to drought in Kenosha County are estimated to be about \$107,300.

The summer of 2002 was a drought period in south-central and southeastern Wisconsin. Mild drought began in early July, and intensified in early August. Most locations received less than one inch of rain for the first 11 days of August, with General Mitchell International Airport in Milwaukee reporting only 0.24 inch during this period. This drought affected much of the country, with about 45 percent of the territory in the country's contiguous states experiencing a severe or extreme drought. Crop yields were reduced due to this drought. Many farmers reported that their corn crops had withered and that soybeans had stopped growing. Newspaper reports indicated that agricultural experts expected substantial reductions in crop yields, with reductions on the order of 50 to 67 percent expected for corn and soybeans. Drought-related crop losses of about \$658,000 (2014 dollars) were reported in Kenosha County.

Drought conditions continued in Kenosha County during 2003. For much of the year, the jet stream and associated low pressure systems stayed north of Wisconsin resulting in few cold front passages. As a result, precipitation was far below normal for the year. For example, at General Mitchell International Airport in Milwaukee, 22.3 inches of precipitation were recorded for the year—about 12.5 inches less than normal—making 2003 the driest year since 1963. By October, soils in southeastern Wisconsin were reported to be dry to depths of 18 to 30 inches. The drought resulted in estimated losses of 25 to 50 percent of the corn crop and about 50 percent of the soybean crop. On July 28, 2003, Governor Doyle declared a statewide drought emergency. This emergency declaration included provisions permitting the WDNR to grant farmers' requests for permits to irrigate dry crops

by diverting streams or lakes. Subsequently, the U.S. Department of Agriculture designated 59 counties in the State of Wisconsin as primary agricultural disaster areas due to damages and losses caused by drought conditions over the period May 1, 2003 through October 31, 2003, and the Federal Small Business Administration (SBA) declared 70 Wisconsin counties as disaster areas. Both of these declarations included Kenosha County. Monetary estimates of crop losses in Kenosha County due to this drought were not available; however about **\$288,000 (2014 dollars)** in indemnities were paid to farmers in the County from Federal crop insurance programs in 2003 for damages related to drought.

Drought conditions developed in southeastern Wisconsin during the summer and fall of 2005, following a persistent dry spell which began in March and lasted most of the year coupled with warm dry air. By mid-July, only 12.5 inches of precipitation had been recorded for the year at General Mitchell International Airport—about 9.5 inches less than normal. By July 19, the drought in Kenosha County had worsened to extreme drought conditions. Some relief was provided by heavy rains in September; however, severe drought conditions persisted in Kenosha County into November. On July 15, 2005, Governor Doyle declared a statewide drought emergency. This emergency declaration included provisions permitting the WDNR to grant farmers' requests for permits to irrigate dry crops by diverting streams or lakes. The U.S. Department of Agriculture issued a Secretarial Disaster Declaration for portions of Wisconsin, including Kenosha County, for the period March 1, 2005 through September 30, 2005. In addition, the SBA made Federal disaster loans available to nonfarm agriculture-related business for drought-related losses from the period March 1, 2005 through September 30, 2005. The drought resulted in estimated losses of 35 to 40 percent of the corn crop and about 50 percent of the soybean crop. Monetary estimates of crop losses in Kenosha County due to this drought were not available; however about **\$687,000 (2014 dollars)** in indemnities were paid to farmers in the County from Federal crop insurance programs in 2005 for damages related to drought.

A lack of rain over south-central and southeastern Wisconsin during June 2012 allowed a drought to slowly develop. The intensity of this drought increased rapidly. By July 10 conditions in Kenosha County had progressed from abnormally dry to severe drought. By July 17, Kenosha County was experiencing extreme drought. The drought was moderated by several rounds of thunderstorms that moved through the area during the latter half of July; however, this rain came too late for much of the corn crop, which had passed the critical pollination stage. In addition, not enough precipitation was deposited by these storms to end the drought. Severe drought conditions continued in Kenosha County until late August and moderate drought conditions persisted until the end of October. Conditions remained abnormally dry in Kenosha County into March 2013. The drought reduced crop yields. Agricultural operators in Kenosha County received over \$750,000 in crop insurance indemnities in 2012 due to drought (Table III-26). The drought also forced sell offs of some dairy and beef cattle herds. Farmers also reported that heat impacts to cows reduced milk production, in some instances by as much as 20 percent. In

response to this drought, the Governor declared a drought emergency and authorized the WDNR to expedite permit applications for water withdrawals from lakes and streams for the purpose of watering crops.

Vulnerability and Community Impacts Assessment

Kenosha County is vulnerable to agricultural drought as there are about 87,431 acres of farmland comprising 49.0 percent of the land in the County. Even small droughts of limited duration can significantly reduce crop growth and yields, adversely affecting farm income. More substantial events can decimate croplands and result in total loss, hurting the local economy. Due to the importance of agriculture to the Kenosha County economy and the potential for large crop losses, drought is a major natural hazard threat. There are also 110 miles of major streams, 20 major and numerous smaller lakes, and 18,520 acres of wetlands (10.4 percent of the land in the County) that can also be negatively impacted due to drought conditions. In addition, groundwater levels can be affected by drought conditions. This is most important in the portion of the County west of IH 94, as well as limited areas of development east of IH 94 that rely on groundwater as a source of water supply. Severe droughts may only happen on average every 25 or 50 years, but the 1976 drought proves that, while severe droughts are rare, they can be devastating to agriculture, damaging to the local economy, and negatively impact the natural surface water system and groundwater supply system.

In 2012, the most recent year for which data are available, the market value of agricultural products sold by farms in Kenosha County was about \$68.9 million. This was comprised of about \$48.3 million in crops and \$20.6 in livestock, poultry, and their products.⁵⁴ Based on the current average estimate of \$107,300 in crop losses per year, it can be expected that approximately 0.22 percent of the market value of all crops or about 0.15 percent of the market value of all agricultural products sold by farms in the County will be lost to drought each year. It is also expected that there will be considerable variation among years in the amount of losses experienced.

The ample supply of fresh water available in the Great Lakes and the Mississippi River basins help to minimize water supply problems in Kenosha County. However, during a severe drought some wells, mainly private wells, will go dry. Agriculture is vulnerable to drought, as many farms in Kenosha County do not irrigate.

A review of the community assets described in Chapter II indicate the potential for drought hazard events to impact: 1) residents at a countywide level; 2) agricultural croplands; 3) livestock; 4) municipal water utilities; and 5) natural surface and groundwater reserves.

⁵⁴U.S. Department of Agriculture National Agricultural Statistics Service op. cit.

Potential Future Changes in Drought Conditions

Based upon recent historical data, Kenosha County has about a 40 percent probability of drought conditions occurring during a portion of any given year. The statewide historical record indicates that severe droughts can be expected to occur at roughly 10-year intervals. It is not expected that the probability of drought will change during the five-year term of this plan update.

Changes over the 20th century and projections based on downscaled results from climate models indicate that there will likely be changes in drought conditions affecting Kenosha County over the 21st century. By mid-century, average temperatures are projected to rise, leading to longer summers and shorter winters. The temperature increase will also lead to a longer growing season and increased rates of evapotranspiration during summer and early fall months. While the amount of rain during the summer is not projected to change, a greater proportion of precipitation is projected to fall in heavy rainfall events. This will result in a greater number of dry days during the summer. More dry days, coupled with higher summer temperatures and increases in evapotranspiration rates, will increase the likelihood of summer droughts occurring.

Multi-Jurisdictional Drought Risk Management

Based upon a review of the potential impacts of droughts in Kenosha County, the areas most susceptible to hazard conditions are the agricultural communities, the municipalities served by public water supply that use groundwater as a source of supply, and those communities that have the largest numbers of private wells. This includes all of the communities in the County, except the City of Kenosha and portions of the Village of Pleasant Prairie and the Village of Somers. Rather, the events are of a uniform countywide concern, with those communities with largely agricultural land uses being the most vulnerable to risk.

VULNERABILITY ASSESSMENT FOR FIRES

A forest fire is an uncontrolled fire occurring in a forest or woodland outside the limits of incorporated villages or cities. A wildfire is any instance of uncontrolled burning in brush, marshes, grasslands, or field lands. An urban fire is any fire natural or manmade occurring in an urban environment. The causes of these fires include lightning, human carelessness, and arson.

Forest fires and wildfires can occur at any time of day and during any month of the year, but the peak fire season in Wisconsin is normally March through November. The season length and peak months may vary appreciably from year to year. Land use, vegetation, amount of combustible materials present, and weather conditions such as wind, low humidity, and lack of precipitation are the chief factors determining the number of fires and acreage burned. Generally, fires are more likely when vegetation is dry from a winter with little snow and/or a spring and summer with sparse rainfall.

Forest fires and wildfires are capable of causing significant injury, death, and damage to property. In Kenosha County 10,168 acres, or about 5.7 percent of the County, is covered in woodland. The potential for property damage from fire increases each year as more recreational properties are developed on wooded land and increased numbers of people use these areas. Fires can extensively impact the economy of an affected area, especially the recreation and tourism industries. Major direct costs associated with forest fires or wildfires are the salvage and removal of downed timber and debris and the restoration of the burned area. If burned-out woodlands and grasslands are not replanted quickly, soil erosion, landslides, and mudflows could result, compounding the damage.

Historical Fire Problems

The 1976 drought created the most severe fire danger conditions in Wisconsin forests and grasslands since the 1930s. During 1976, a total of 4,144 fires occurred, the greatest number in any one-year since 1971, when detailed recordkeeping began. Likewise, the fire season of 1988 is also remembered as one of the driest on record. A total of 3,242 fires occurred that year, but just 9,740 acres burned, an extraordinarily low number considering the severity of the threat.

According to records maintained by the Kenosha County Division of Emergency Management, from 1986 through 1995 seven urban commercial fires occurred at Kenosha County businesses. In 1986, the Bode Brothers building in downtown Kenosha was destroyed by fire. Over \$250,000 of damage was incurred by this fire, and several firemen responding to the fire were injured. This fire also threatened the adjacent American Motors Lakefront Plant. In 1988, the City of Kenosha business of Southport Lumber was destroyed by fire. The fire caused \$2,000,000 in damage to the building, machinery, and supplies. Additionally, the American Brass/Outokumpu fire of 1992 located in the City of Kenosha caused \$250,000 worth of damage. Two urban fires occurred in 1993, one at Badger Cork in Trevor and one at Maurer Lawn and Garden Center in the City of Kenosha. These fires caused over \$500,000 each in damage. In 1994, Lawter International in the Village of Pleasant Prairie experienced a chemical explosion and fire. This event caused over \$1,000,000 in damage and two plant workers were injured. Finally, in 1995 an explosion of a steam pipe at the We Energies power plant in Pleasant Prairie caused two workers to lose their lives. On August 24, 2006, lightning strikes to several buildings in the City of Kenosha caused structural fires and power outages. A large apartment building was struck by lightning. The resultant fire severely damaged the building, displacing about 125 residents. As a result of these events, about \$16.5 million (in 2014 dollars) in property damages were reported in the City.

On January 10, 2011, an explosion in a house in the City of Kenosha destroyed the house and damaged houses and businesses within a two-block radius. The explosion was apparently caused by a natural gas leak that was created when someone broke into the house and cut away copper tubing in the house's basement. The explosion

damaged several homes. In addition, two businesses were damaged. An automobile dealership adjacent to the house had the windows blown out of most of the cars on its lot. In addition, the dealership suffered damages to its showroom. A gymnasium located across from the house was described in news reports as a total loss.

No wildfires or forest fires have been reported by the National Climatic Data Center for Kenosha County from January 1950 through December 2014.

Vulnerability, Community Impacts, and Multi-Jurisdictional Assessment

Forest fires, wildfires, and urban fires present a serious threat to the health and safety of affected citizens and can result in significant damage to property. Fires can cause destruction to buildings and infrastructure, damage to trees and wildlife, and can also cause death and injuries to humans. A major fire can have a serious impact on a community.

Based upon a review of the historic patterns of fire events in Kenosha County, the risk of fires is higher in the urban areas of the County. Urban land uses comprise 21.4 percent of the total land in the County.

Changes in climate may have direct and indirect effects on fire regimes. As previously described, changes in climate affect weather patterns such as droughts, which are conducive to fire ignition and spread. Less directly, changes in temperature and precipitation can cause shifts in plant communities which may favor or discourage the growth of fire-adapted species. As previously described, the changes in temperature and precipitation that are projected to occur between now and the middle of the century are likely to cause an increase in the likelihood of summer drought. As a result, the likelihood of wildfires is projected to increase between now and 2055.

VULNERABILITY ASSESSMENT FOR TRANSPORTATION ACCIDENTS

Geographically, Kenosha County is located in a relatively good position with regard to continued growth and development. It is bounded on the east by Lake Michigan, which provides an ample supply of fresh water for both domestic and industrial uses and is an integral part of a major international transportation network. It is in close proximity to the expanding metropolitan region in northeastern Illinois to the south and the Milwaukee metropolitan area to the north. Kenosha County is also surrounded on the west and further north, beyond Milwaukee, by fertile agricultural lands and desirable agricultural areas of the rest of the State of Wisconsin. Many of the most important industrial areas and heaviest population concentrations in the Midwest lie within a 250-mile radius of the Southeast Region of Wisconsin.⁵⁵ Hence, the transportation system of Kenosha County

⁵⁵SEWRPC Planning Report No. 49, A Regional Transportation System Plan for Southeastern Wisconsin: 2035, June 2006.

serves both personal and goods movements for a variety of private business, public transport, and recreational purposes. The transportation system within Kenosha County consists of an arterial street and highway system, public transit facilities, railway facilities, and airport facilities.

Transportation accident categories addressed in this section were divided among arterial street and highway systems and railway systems, which include crashes or collisions involving trains and any type of motorized vehicles, or involving railroad cars. Transportation accidents can result from a number of causes, including but not limited to, human error, mechanical failure, weather conditions, and sabotage. All of these issues are addressed within this section, except for the issue of sabotage, which is included within the terrorism section below. Recreational boating and shipping accidents were not considered within the scope of this plan. In addition, transportation accidents involving hazardous materials incidents are addressed separately within the following hazardous materials incidents section.

Roadways

As described in Chapter II, the existing arterial street network in the eastern portion of the County is relatively densely spaced, with arterials occurring at about one-mile intervals in both the north-south and east-west directions (see Map II-8 in Chapter II). IH 94 traverses the entire County in a north-south direction. The existing arterial network in the rest of the County is less-densely spaced, with arterials occurring at about two- to three-mile intervals.

Within the State of Wisconsin, the fatality rate per 100 million miles of travel was 1.02 in the year 2012, with a total of 601 persons being killed in Wisconsin motor vehicle traffic crashes. Of those crashes with fatalities, 37 percent involved alcohol, 28 percent involved speed, and 10 percent involved both alcohol and speed as primary contributing factors. Crashes that occurred on County trunk highways and local roads accounted for 57 percent of all crashes within Wisconsin. The fatalities in Wisconsin during the year 2012 included 44 pedestrians, 11 bicyclists, and 112 motorcyclists.⁵⁶

Railways

As described in Chapter II, railway freight service is provided within Kenosha County by three railway companies operating active mainline railway lines (see Map II-9 in Chapter II). The Union Pacific Railroad provided freight service over two parallel segments emanating from Chicago, both segments traversing the eastern tier of communities in a north-south direction. The Canadian Pacific Rail System, formerly known as the Soo Line, provided freight service over a line emanating from Chicago and traversing the entire County east of IH 94 in a

⁵⁶Wisconsin Department of Transportation, 2012 Wisconsin Traffic Crash Facts, March 2014.

north-south direction. The Canadian National Railway, formerly the Wisconsin Central, Ltd., provided freight service over a north-south main line, traversing the western edge of the County.

An intercity passenger rail service, Metra, utilizes the Union Pacific railway line and operates between Kenosha and Chicago. In addition, Amtrak operates on the Canadian Pacific railway line.

Railway crashes/accidents were separated into several basic categories, including collisions, derailments, train yard accidents, railway-crossing incidents, and other incidents. Within the United States from 1995 through 2014 there were approximately 190 collisions, 1,800 derailments, 1,350 train yard accidents, and 2,600 railway-crossing incidents per year. These averages hide one important trend: The number of railway-crossing incidents has decreased steadily at an average rate of slightly more than 2 percent per year, from about 12,000 incidents per year in the mid-to-late-1970s to about 1,800 incidents per year in over the period 2010 through 2014. Despite this decrease, the risk of railway accidents is generally greatest at railway crossings, where one or more railroad tracks cross a highway, road, street, sidewalk, pathway, or private drive. Approximately 89 percent of the railway crossings in the State of Wisconsin are at-grade crossings.⁵⁷ The remaining railway crossings are grade-separated overpasses or underpasses. Within the State of Wisconsin, from 1995 through 2014, there were an average of 192 train accidents (not including railway-crossing incidents) per year and 75 railway-crossing incidents per year. In addition, from 1995 to 2014 there was an average of nine trespasser-related casualties per year in Wisconsin. These averages obscure trends toward fewer railway accidents in the State. Over the period 2010 through 2014, there were an average of 122 train accidents (not including railway-crossing incidents) and 43 railway-crossing incidents per year. Over the same period, there was an average of about eight trespasser-related casualties per year in Wisconsin.

Description of Recent Transportation Accident Events

Roadways

From 1999 to 2013, there were an average of 3,549 motor vehicle crashes reported within Kenosha County as indicated in Table III-27, based upon data published by the Wisconsin Department of Transportation. These crashes were responsible for an average 21 fatalities per year, 1,938 injuries per year, and were responsible for over \$59.9 million in economic losses per year. Table III-27 indicates that the number of accidents and fatalities increased during the first half of this period, peaking in 2008. The data show that during the period 1999 through 2003, there were an average of 3,569 accidents per year and an average of 22 fatalities per year in Kenosha County. The averages for the County over the period 2004 through 2008 were 3,789 accidents per year and 25 fatalities per year. Since this period the number of crashes and fatalities in the County has decreased. The averages for the

⁵⁷U.S. Department of Transportation, National Highway-Rail Crossing Inventory File, April 12, 2009.

period 2009 through 2013 were 3,280 accidents per year and 16 fatalities per year. Kenosha County data for the years 1999-2013, provided by the Wisconsin Department of Transportation, further indicated that the total number of fatalities associated with vehicle crashes is greatest during the summer months of May through July and the fall and winter months of November and December as compared to other months of the year. Based upon data from 1999-2013, the average number of vehicle crashes involving injuries and associated injuries were lowest during the months of February through April and highest during the summer months of June through August. During this period the number of vehicle crashes involving injuries and associated injuries in Kenosha County ranged from lows of 64 crashes in February 2001 and 95 injuries in February 2010 to highs of 168 crashes and 251 injuries in June 2005.

In 2013, the accidents reported in three of the largest municipalities in Kenosha County, the City of Kenosha and the Villages of Pleasant Prairie and Twin Lakes, resulted in a total of six deaths and 962 injuries, and an estimated economic loss of about \$48.2 million in total damages (see Table III-28). In total, 298 of these accidents were speed-related, 119 were alcohol-related, 34 involved motorcyclists, 35 involved bicycles, and 25 involved pedestrians.

Railways

From 1975 through 2014 there were a total of 212 reported railway accidents reported within Kenosha County. These events are documented in terms of their type of accident and casualties in Table III-29, based upon data published by the Federal Railroad Administration. As shown in Table III-29, the annual number of accidents ranged from zero to 18 events per year. These accidents included 159 collisions at railway crossings, 35 train derailments, five side collisions, and five fires or violent ruptures of railroad cars. In total, these accident events have resulted in 15 deaths and 49 injuries within Kenosha County since 1975. In addition, the 53 accidents that did not involve collisions at railway crossings caused about \$4.8 million in damages to railway property.

On February 8, 2010, 24 cars from a 113-car train derailed on the Union Pacific Railroad in the Village of Pleasant Prairie. While most of the cars that derailed were empty, one car contained chlorine residues and another car contained potassium hydroxide residues. No releases of these substances occurred and there were no evacuations resulting from this accident. No injuries were reported. As a result of this accident, about 850 feet of mainline railroad track were damaged and required rebuilding.

On December 20, 2012 a 20-year-old automobile driver was killed when his vehicle collided with an Amtrak train at a crossing at CTH A in the Town of Somers. Evidence indicated that the driver attempted to brake before reaching the crossing; however, the vehicle slid on the snow-covered road, entered a ditch, and drove onto the

tracks where it was struck by the train. The Kenosha County Sheriff's Department indicated that speed and weather conditions were contributing factors in this accident.⁵⁸

A man was injured when his vehicle struck a train stopped at the crossing at 88th Avenue in the Village of Pleasant Prairie at around midnight on June 26, 2014. A second vehicle collided with a train at this crossing just after 4:30 a.m. on July 8, 2014. Neither driver was seriously injured. This crossing does not have lights or signals. Both accidents occurred during nighttime conditions.

Vulnerability, Community Impacts, and Multi-Jurisdictional Assessment

There are several factors that should be considered when attempting to identify the potential number and vulnerability in terms of motor vehicle transportation-related accidents within specific areas of Kenosha County, which include type of vehicle, density of traffic, type of roadway, type of driver, road conditions, weather conditions, and safety equipment. In 2012, the age group with the greatest fatalities and injuries for males and females was 15 to 24 years of age in the State of Wisconsin. This age group accounted for about 26 percent of the traffic-related fatalities and injuries that occurred in 2012. In addition, traffic-related accidents are the leading cause of death to children in America. The highest numbers of fatalities throughout the State of Wisconsin in the year 2012 occurred on Saturdays between the hours of 2:00 p.m. to 10:00 p.m., followed by Tuesdays between the hours of 2:00 p.m. to 10:00 p.m. and Saturdays between the hours of 10:00 p.m. to 6:00 a.m. During the week from Monday through Friday the greatest risk of an accident is between the 2:00 p.m. and 10:00 p.m.

Traffic safety problems are typically identified by reviewing a five year history of traffic crash records and determining the crash rate—the number of crashes per 100 million vehicle-miles of travel—on a road segment. Using the traffic crash history of the freeway and state trunk highway surface arterial systems over a recent five year period of 2008 through 2012, the traffic crash rate for each segment of the freeway system and state trunk highway surface arterial system in Kenosha County was estimated. The estimated traffic crash rate for each freeway segment within Kenosha County was compared to the average crash rate for freeway segments within the County, the Southeastern Wisconsin Region, and the State of Wisconsin. Similar comparisons were made for the average crash rate for each segment of the state trunk highway surface arterial system within Kenosha County.

The average crash rate on freeway segments in Kenosha County over the period 2008-2012 was 45.7 crashes per 100 million vehicle miles.⁵⁹ This average was lower than the average crash rate for freeway segments in the

⁵⁸Annyssa Johnson, "Kenosha Man Killed in Collision with Train Identified," Milwaukee Journal Sentinel, December 21, 2012.

⁵⁹It should be noted that in all of the crash rates presented, only crashes that have occurred in years since a roadway segment was last reconfigured are included in the crash rate.

Southeastern Wisconsin Region--72.5 crashes per 100 million vehicle miles--and the average crash rate for freeway segments in the State of Wisconsin--58.6 crashes per 100 million vehicle miles. The average crash rate on segments of the state trunk highway surface arterial system in Kenosha County over the same period was 255.6 crashes per 100 million vehicle miles. This average was slightly lower than the average crash rate for segments of the state trunk highway surface arterial system in the Southeastern Wisconsin Region--265.0 crashes per 100 million vehicle miles, and considerably greater than the average crash rate for segments of the state trunk highway surface arterial system in the State of Wisconsin--149.8 crashes per 100 million vehicle miles.

Map III-10 shows those freeway and state trunk highway surface arterial segments in Kenosha County with average crash rates which exceed the average crash rate for the County. On the freeway system, some of these segments are located at on and off ramp locations, with the most dangerous freeway segments located near the IH 94 interchanges with the STH 50, STH 158, STH 165/CTH Q E, and CTH C intersections. On the state trunk highway surface arterial system, these segments are found mostly in the eastern and central portions of the County. Several of the most dangerous state trunk highway surface arterial segments are located in the City of Kenosha along STH 32, STH 50, and STH 158.

Weather conditions can also significantly contribute to the numbers of vehicle-related accidents and associated injuries and deaths as shown in Tables III-30 and III-31. Rain and snow were associated with some of the highest numbers of fatalities, injuries, and property damages. Fog-related accidents also seem to be a significant contributing factor in vehicle-related accidents in Wisconsin in 2013, in terms of fatalities, which were associated with 12 fatalities and 327 injuries (see Table III-30). In dry road conditions, foggy weather is also associated with some of the greatest number of vehicle accidents compared to other weather conditions, as shown in Table III-31. However, snow and slush road conditions, combined with snowy weather, are associated with the greatest numbers of vehicle-related accidents within Wisconsin in 2013.

Trains can travel through Kenosha County at any hour of the day and on any day of the week. The cargo carried by freight trains passing through the County includes crude oil and other hazardous substances. Amtrak passenger trains run on the same tracks as the freight trains transporting commodities. The combined presence of dangerous commodities and passenger transport on the same tracks results in a substantial risk exposure for both suburban and rural areas of the County in the event of an accident or derailment. In addition, there are impediments to emergency response for rail emergencies. These include, but are not limited to, tracks passing through areas that are difficult-to-access or that have limited available water supply and seasonal impacts. These impediments can affect emergency response times and the availability of first responders for the initial response.

All of the communities of the County are vulnerable to roadway-related accidents. The areas east of IH 94 and the far western portions of Kenosha County along the major freight railways are obviously the more vulnerable to

railway-related accidents. Vulnerable communities include the City of Kenosha, the Villages of Pleasant Prairie and Silver Lake, and the Towns of Salem and Somers.

Potential Future Changes in Transportation Accident Conditions

Transportation-related accidents are not expected to change significantly in the future. Changes in land use can have an influence on the potential for increased incidents to occur. Such changes relate to the potential future increase in development and population growth within the County. Changing land use patterns within Kenosha County, as documented in Chapter II, would result in a potential increased risk of damage and related losses due to transportation accidents in the expanding urbanized areas within the County. However, this increase in population growth and associated increased risk of transportation accidents may also be offset by improvements in roadways, railway intersections, education, or some other related feature.

Changes in climate may result in changes in transportation accident frequencies. As previously described, the changes in temperature and precipitation that are projected to occur between now and the middle of the century are likely to cause a greater proportion of precipitation during winter to fall as rain rather than as snow. This could potentially lead to increased rates of automobile crashes during the winter. A national study indicates that wet weather is more hazardous than winter weather.⁶⁰ The reason for this rather counterintuitive prediction is related to driver behavior during inclement weather. Driving on wet pavement is riskier than driving on dry pavement because pavement friction is lower on wet pavement than dry pavement. Studies have shown that when precipitation is not falling, motorists tend to reduce their speed only slightly when driving on wet pavement.⁶¹ They tend to reduce speed more during rainfall⁶² and snowfall.⁶³ In addition, traffic volumes are lower during snow events than clear weather.⁶⁴ Despite these national findings, State of Wisconsin data for the year 2013 as set

⁶⁰Paul A. Pisano, Lynette C. Goodwin, and Michael A. Rossetti, "U.S. Highway Crashes in Adverse Road Weather Conditions," Paper presented at the 85th annual meeting of the American Meteorological Society, New Orleans, Louisiana, January 20-24, 2008.

⁶¹Ruediger Lamm, Elias M. Choueiri, and Theodor Mailaender, "Comparison of Operating Speeds on Dry and Wet Pavements of Two-Land Rural Highways," Transportation Research Record, No. 1280, pages 199-207, 1990; Lin Zhang and Panos Prevedouros, "Motorist Perceptions on the Impact of Rainy Conditions on Driver Behavior and Accident Risk," Paper presented at the 84th annual meeting of the Transportation Research Board, Washington, D.C., January 9-13, 2005.

⁶²Zhang and Prevedouros 2005, op. cit.

⁶³Daniel Eisenberg and Kenneth E. Warner, "Effects of Snowfalls on Motor Vehicle Collisions, Injuries, and Fatalities," American Journal of Public Health, Volume 95, pages 120-124, 2005.

⁶⁴Aemal Khattak and Keith Knapp, "Interstate Highway Crash Injuries during Winter Snow and Non-Snow Events," Transportation Research Record, No. 1746, pages 30-36, 2001; Wael M. ElDessouki, John N. Ivan, Emmanouil N. Anagnostou, Adel, W. Sadek, and Chen Zhang, "Using Relative Risk Analysis to Improve (Footnote Continued on Next Page)

forth in Table III-31, indicate that during snow/slush or icy road conditions the number of accidents was greater than during wet road conditions. In the absence of mitigation, these differences in driver behavior under adverse weather conditions could increase the risks of crashes occurring under the winter conditions projected to occur by the middle of the 21st century.

VULNERABILITY ASSESSMENT FOR FOG

Fog is a cloudlike mass or layer of minute water droplets or ice crystals near the surface of the earth, appreciably reducing visibility. Fog appears when the air becomes saturated and cannot hold any additional moisture. As a result, the water vapor in the air condenses to liquid droplets or crystals or ice, resulting in fog. Very light winds are usually a prerequisite for fog. This is one of the reasons that a slow moving pressure system over the Midwest can be a fog producer. When the winds become stronger the atmosphere usually mixes drier air with the moist air and the chances of fog occurring decrease. When warmer, moist air flows above snow, the cold snow reduces the temperature near the ground to near the dew point resulting in saturation. This often produces wide areas of advection fog. The snow itself can add moisture to the air increasing the chances for fog. This is a process called sublimation that results in ice changing over to vapor without first changing to liquid.

There are four basic types of fog: radiation, advection, evaporation, and upslope. Each of these types of fog, except for upslope fog, has the potential to occur in Kenosha County. Radiation fog is caused by cooling close to the earth's surface. The earth gives off long wave radiation that on a clear night travels out into space. If the temperature drops to the dew point close to the ground, radiation fog can form. Radiation fog is also known as ground fog. Advection fog results from the movement of warm, moist air from the south over a colder land mass. During the winter, this type of fog is common when snow covers much of the Midwest. Evaporation fog is caused by cold air crossing over warmer bodies of water. On cold days, this fog looks like steam over Lake Michigan, inland lakes, and rivers. Upslope fog is common near the Rocky Mountains. If the winds are out of the east, the air flows up as it rises in elevation approaching the mountains, this can cool the air to its dew point and result in widespread fog.

Dense fog occurs during every month of the year in Wisconsin. It is more common during the cooler months of September through April. During the fall and spring months, dense fog favors the early morning hours, while during the winter months dense fog can occur just about any time if certain weather conditions come together. Dense fog can be hazardous because it can restrict surface visibility. According to the National Weather Service,

(Footnote Continued from Previous Page)

Connecticut Freeway Traffic Safety Under Adverse Weather Conditions," Report to U.S. Department of Transportation, October 11, 2004.

fog becomes hazardous when it obscures visibility to one-quarter mile or less. This results in decreased response time for operators of motor vehicles. Severe fog incidents can close roads, cause vehicle accidents, cause airport delays, and impair the effectiveness of emergency response.

Historical Fog Problems

Blamed on dense fog, one of the worst traffic accidents in Wisconsin history occurred on October 11, 2002. On IH 43 near Sheboygan, the accident killed 10 people, injured at least 38, and involved 45 motorists.

Between December 1999 and December 2014, 76 fog events were reported in Kenosha County. No deaths, injuries, property damages, or crop damages were reported as being directly caused by these events. In 2013 fog, smog, or smoke played a role in 732 traffic accidents in the State of Wisconsin, with 12 fatalities and 327 injuries (see Table III-30). Most of these accidents occurred during wet road conditions.

Vulnerability, Community Impacts, and Multi-Jurisdictional Assessment

Fog events affect the transportation systems within Kenosha County. Based upon a review of the historical patterns of fog events in Kenosha County, there are no specific municipalities that have unusual risks. Rather, the events are of a uniform countywide concern.

Potential Future Changes in Fog Conditions

The climate projections based on downscaled results from global climate models did not address the frequency of dense fog events. Because of this, an assessment of long-term changes in fog-related hazard conditions cannot be made.

VULNERABILITY ASSESSMENT FOR CONTAMINATION OR LOSS OF WATER SUPPLY

Water supply systems are among the most important infrastructure facilities affecting the economic development and environmental quality of Kenosha County. Such systems directly affect the health and welfare of the resident and transient populations of an area, and the viability of commercial and industrial activities in an area. Accordingly, the availability of an ample supply of high-quality water for domestic, commercial, and industrial use and the protection and wise use of the available sources of supply were ranked high in priority by the Kenosha County All Hazards Mitigation Plan Task Force for the original plan. The Local Planning Team members for development of this plan update ranked contamination or loss of water supply as having the 26th highest perceived risk among 45 possible hazard event types.

As noted in Chapter II, about 13.6 million gallons per day (mgd) of surface water and 3.0 mgd of groundwater are utilized as the source of supply by all water users in the County. An ample supply of clean, wholesome water is

essential to urban development. Indeed, without a reliable water supply, urban areas become unhealthy places in which to live and work, subject to epidemics of such waterborne diseases as cholera, dysentery, typhoid fever, and parasitic infections, such as *Cryptosporidium*. In addition to providing safe drinking water, a reliable water supply system is also essential in other ways to good sanitation in urban areas. An adequate and reliable water supply system is essential for bathing, laundering, and other forms of cleaning and washing, and provides the basis for the water carriage system of sanitary sewage conveyance essential to a high level of quality in urban life. An adequate and reliable water supply system is essential to good fire protection, and is also essential to all types of commercial and industrial development. Table III-32 lists the active public and community private water supply systems in Kenosha County.

Water Supply Issues Related to Groundwater

Groundwater serves as the source of supply for two municipal water utilities in Kenosha County—the Village of Bristol Utility District No. 1, which serves an area in the western portion of the Village of Bristol, and the Village of Paddock Lake Municipal Water Utility, which serves portions of the Village of Paddock Lake (see Map II-11 in Chapter II). Groundwater is also the primary source of water supply for most of the other than municipal community water systems in the County and for most of the self-supplied residential, industrial, commercial, institutional, recreational, and agricultural water supply systems in the County.

Groundwater Quality

Approximately 68 percent of Wisconsin's residents use groundwater, so the knowledge of the chemical character of groundwater and its variations is crucial for effective planning, management, and protection of groundwater resources. Systematic gathering of information on groundwater chemistry provides the base for determining future changes in groundwater quality; however, the available data are not adequate to fully describe groundwater quality and its trends. Systematic studies of groundwater chemistry have not been conducted in Kenosha County, but some data are available from sampling of wells in the County which are summarized on a county basis in the Wisconsin Department of Natural Resources GRN database. It is important to note that the data summarized in this database represent the number of wells that have been sampled, the number of wells in which the substance was detected, and the number of wells in which the concentrations detected exceeded groundwater quality criteria established by the State of Wisconsin. In addition, the summaries do not indicate whether an individual well was sampled more than once, and, if a well was sampled more than once, whether the pattern of detections and exceedence of standards for the compound of interest was the same in all samplings. Beyond being located in Kenosha County, the summaries do not indicate the locations of the wells sampled. Because of this, the summaries do not indicate whether exceedances of groundwater quality criteria represent conditions in a limited local area, conditions in a larger portion of the County, or conditions over the entire County. Similarly, the summaries do not indicate from which aquifers the wells sampled draw water. Finally, for most substances of concern, the number of wells sampled is small.

Additional groundwater quality data should be collected and assessed in the future in order to fully address groundwater quality issues within the County.

The chemical composition of groundwater largely depends on the composition and physical properties of the soil and rocks it is in contact with, the length of the groundwater flow path, the residence time of the water, and the antecedent water quality. The composition of groundwater in the County is primarily a result of its movement through and interaction with Pleistocene unconsolidated materials (glacial drift) and Paleozoic rocks containing large amounts of dolomite, $\text{CaMg}(\text{CO}_3)_2$, which is dissolved by water passing through it. In general, groundwater quality tends to be relatively uniform within a given aquifer basin, both spatially and temporally, but in different locations major contrasts in natural quality of groundwater can be observed. The current quality of groundwater in both the shallow and deep aquifers through the County is generally good and suitable for most uses, although localized water quality problems occur.

Water Quality Concerns

Some water quality problems are caused by natural factors, which cannot be controlled. For example, the abundant dolomite material in the County releases calcium and magnesium, which form about one-half of all ions in groundwater and are the principal components of hardness. Therefore, hardness is objectionably high in groundwater in most of the County and softening is required for many water uses. Additionally, radioactivity from radium is also a potential concern in Kenosha County for groundwater supplies utilizing the deep aquifer.

There are several potential water quality concerns that affect groundwater that are created from human activities. Specifically, these include bacteria, nitrate, pesticides, and volatile organic chemicals (VOCs). The first three can affect quality of water in the private wells, but generally they do not cause major problems in the County. Volatile organic chemicals are also a water quality concern that stems from landfills, leaking underground storage tanks, and spills from hazardous substances. Generally, groundwater quality in Kenosha County is good. There are not widespread problems with VOCs, bacteria, or agri-chemical contamination in groundwater supplies.

Potential sources of groundwater contamination are many and varied. In addition to some natural processes, human-installed facilities or structures and many human activities have the potential to eventually contribute to groundwater quality problems. Many of the sources of contamination are summarized according to their place of origin in Table III-33.

Recent Instances of Groundwater Contamination in Kenosha County

On October 24, 2012, the WDNR issued a drinking water advisory for the Lincoln Crest Apartments in the Village of Twin Lakes. This other than municipal community water system serves about 32 residents (Table III-32). The advisory was issued because a regularly scheduled test indicated that the water provided by the well serving this system contained high levels of methyl tertiary-butyl ether, a gasoline additive. Residents had to be

provided with bottled water for several months until the well was replaced with a deeper well with a special casing.

Contamination of wells with molybdenum has also been reported in eastern Kenosha County. Molybdenum is a metallic element that is naturally present, usually at low levels, in the earth's crust. Naturally-occurring levels of molybdenum in groundwater are low; the USGS found a median value of 1 microgram per liter ($\mu\text{g}/\text{l}$) nationwide. Trace amounts of molybdenum are necessary for human health, and are obtained from common foods in the diet such as leafy vegetables, legumes, grains, and organ meats. Higher concentrations have been found in soil or groundwater, typically in conjunction with spills or some historic waste disposal practices. In 2009, the WDNR reported 18 private wells in the City of Oak Creek in Milwaukee County and the Village of Caledonia in Racine County that had exceeded the Wisconsin Groundwater Enforcement Standard of 40 $\mu\text{g}/\text{l}$ for molybdenum during routine water sampling at least once since 1993. In 2010, the WDNR in collaboration with the Wisconsin Department of Health Services tested private wells from an additional 120 homes in the area. Additional testing was conducted over the period 2011 through 2013. Testing included wells located in eastern Kenosha County.

Map III-11 shows results from testing of wells in Kenosha County through August 2013. The data are presented by U.S. Public Land Survey sections. Samples were collected from wells located in 14 sections in Kenosha County. In 11 of these sections, at least one sample was collected that had concentrations of molybdenum equal to or greater than 90 $\mu\text{g}/\text{l}$. These sections contain portions of the City of Kenosha, the Village of Somers, and the Towns of Paris and Somers. In all of the samples collected from wells located in three other sections, concentration of molybdenum were less than 90 $\mu\text{g}/\text{l}$.

At the request of the WDNR, the Wisconsin Department of Health Services reviewed the published information on molybdenum toxicity in light of the requirements for establishing groundwater quality enforcement standards under Chapter 160, "Groundwater Protection Standards," of the *Wisconsin Statutes*. Based upon their review of the toxicological literature and the fact that Wisconsin's molybdenum enforcement standard was developed using a value recommended by the USEPA that in 2013 was under active review, the Wisconsin Department of Health Services recommended that the WDNR use an interim health advisory level of 90 $\mu\text{g}/\text{l}$ when advising about the safety of private drinking water supplies.⁶⁵ This interim health advisory level was developed using methods consistent with Wisconsin law.

⁶⁵Charles J. Warzecha, Wisconsin Department of Health Services, "Response to Request for Review of Molybdenum Toxicity Information," Letter to Jill D. Jonas, Wisconsin Department of Natural Resources, August 2, 2013.

The source of the molybdenum has not been definitively determined. Based upon relationships between concentrations of molybdenum measured in wells and the distances to sites where coal ash has been disposed of in reuse projects such as structural fill, embankments, and road base, one study attributes the source of the molybdenum to the reuse of unencapsulated coal ash.⁶⁶ Another study analyzed samples collected from private water supply wells and from groundwater monitoring wells located near ash fill areas and near the Hunts Disposal Landfill, a remediated Superfund site located in the Village of Caledonia in Racine County. In this study, samples of water, ash, and leachate were collected and tested in an attempt to determine the source or sources of the elevated molybdenum concentrations. Samples were analyzed for a suite of organic and inorganic parameters, as well as for tritium and for isotopes of boron, strontium, and molybdenum. These isotopes have been used in other studies to help identify contaminant sources. The investigation did not succeed in identifying the source of the molybdenum. It did rule out the Hunts Landfill as a likely source based on the fact that the concentrations of molybdenum leachate from the landfill are much lower than those in the area's groundwater. The study also found that the tritium data suggested that most of the water in the private water supply wells may be older than 1953. This could indicate that molybdenum may have entered the water before ash from the Oak Creek power plant was disposed of on the We Energies property; however, mixing of older and younger water may complicate interpretation of the tritium results.⁶⁷

Water Supply Issues Related to Surface Water

Surface water serves as the source of supply for four municipal water utilities in Kenosha County—the Kenosha Water Utility, which serves the City of Kenosha; the Village of Pleasant Prairie Water Utility, which serves portions of the Village of Pleasant Prairie; the Village of Somers Water Utility, which serves the Village of Somers; and the Village of Bristol Utility District No. 3, which serves a small area in the eastern portion of the Village of Bristol (see Map II-11 in Chapter II). The water for these utilities is all drawn from Lake Michigan by the Kenosha Water Utility which has water intakes in the Lake and a treatment plant. The other three utilities purchase surface water from the Kenosha Water Utility as wholesale customers.

Supplies of surface water can potentially be interrupted by anything that would partially or fully obstruct flow of water into the utility's surface water intake. Because of this, surface water intakes are designed and sited in ways intended to minimize obstruction problems. Despite this, obstructions can sometimes occur. An example of this is formation of ice in water intakes. This happens during extremely cold weather when the water temperature is near

⁶⁶Tyson Cook, Paul Mathewson, and Katie Nekola, Don't Drink the Water: Groundwater Contamination and the "Beneficial Reuse" of Coal Ash in Southeast Wisconsin, *Clean Wisconsin*, November 2014.

⁶⁷Joe Lourigan and William Phelps, Caledonia Groundwater Molybdenum Investigation, Southeast Wisconsin, Wisconsin Department of Natural Resources, PUB-WA 1625, January 2013.

32°F. This ice formation can cause the level of water in the utility's raw water pump station to drop and can make it difficult to maintain the flow rates necessary to operate the treatment plant. This happened at the Kenosha Water Utility's main intakes in Lake Michigan several times during the winter of 2013-2014. During one instance, frazil ice, a slush-like ice, formed and was drawn into the utility's two main intakes, blocking them. During this event, the utility relied upon an emergency intake.

Other Water Supply Issues

Temporary losses of water supply can also be caused by other factors. Breaks in water mains can interrupt water supply. Depending on the size and location of the main, the effects of a break can either be local or can have a large effect on a portion of the distribution system.

Because of the intense cold associated with the polar vortex, the Kenosha Water Utility experienced an exceptionally high number of breaks in water mains during the winter of 2013 to 2014. During the months of January through March 2014, the Utility had at least 135 breaks. This is about 2.5 times the 10-year average for these months.

Frozen service laterals can also interrupt water supply to individual buildings. The Kenosha Water Utility reported that they provided assistance to about 225 homes with frozen laterals during the winter of 2013 to 2014.

Vulnerability and Community Impacts Assessment

The potential for water supplies to be interrupted could be due to the following factors:

- Contamination of a groundwater source;
- Contamination of the Lake Michigan surface water source in the vicinity of the water supply intakes used;
- Major facility malfunction or shutdown;
- Blockage of surface water supply intake; and
- Large numbers of water main breaks or breaks of particularly important water mains.

Groundwater monitoring by State agencies to determine the extent of groundwater contamination in Wisconsin and identify the sources of contamination has found that the primary contaminants of concern are volatile organic compounds, pesticides, and nitrates.

There are several factors that affect the contamination potential of groundwater resources. Many of those factors are related to soil physical properties and to the proximity of groundwater to the soil surface. Some of the soil properties that can affect groundwater quality include permeability of the subsoil, depth of the soil above the water table, clay and silt content in the soil profile, and the drainage conditions of the soil. Soils that have a high infiltration rate and high permeability with a low percentage of silt and clay, increase the contamination potential of the groundwater. The potential of contamination is further enhanced when these soil conditions are coupled with a naturally occurring high water table or are shallow overlying bedrock conditions.

The areas in Kenosha County that are naturally the most vulnerable to groundwater contamination primarily occur in the Towns of Randall and Wheatland, along the lakeshore of Lake Michigan, and in major river valleys (see Map III-12). These areas have soils that consist of glacial sand and gravel outwash material that is very permeable, of limited thickness, and has a shallow water table, shallow to bedrock conditions, or a combination of these conditions. There are approximately 89 square miles of land, or about 32 percent of the County, that has a high potential for groundwater contamination; about 42 square miles or about 15 percent of the County, has a moderate potential for groundwater contamination; and approximately 144 square miles or slightly over 50 percent of the County, has a low potential for groundwater contamination.⁶⁸

Lake Michigan has historically been a source of safe drinking water. However, no one can guarantee that an accident will not happen, and a mishap can have serious consequences. In 1993, the City of Milwaukee's public water supply became contaminated with *Cryptosporidium*, a parasite found in animal wastes. Nearly half of the 850,000 consumers were infected, 4,400 people were hospitalized, and at least 69 people died, making this the largest documented waterborne outbreak in U.S. history (Wisconsin Division of Health, 1996). The exact source of the *Cryptosporidium* that caused this outbreak is still uncertain.

Typically, water supply facilities have a history of safe operation with very minimal malfunctions or shutdowns. The industry has been known for providing continuous service due to the use of high-quality and redundancy in equipment. However, the facilities are always subject to the potential for an unanticipated event that could interrupt services. Since 2002, water utilities and related organizations, such as the American Water Works Association have increased efforts to evaluate vulnerability of water supply facilities to a wide range of hazards, including acts of terrorism. The focus of these efforts has been directed toward preparation of vulnerability assessments and emergency response and mitigation plans for each facility.

⁶⁸*D.I. Siegel, Geochemistry of the Cambrian-Ordovician aquifer system in the northern Midwest, United States (Regional Aquifer-system Analysis report). U.S. Geological Survey Professional Paper 1405-D, 1989.*

Multi-Jurisdictional Water Supply Risk Management

Those water supply systems serving the largest urban areas and populations would be of the most concern with regard to hazard risk. However, each municipality will have to evaluate any special water supply needs that could be a more serious problem if the water supplies were interrupted.

VULNERABILITY ASSESSMENT FOR HAZARDOUS MATERIALS INCIDENTS

This type of hazard occurs with the uncontrolled release or threatened release of hazardous materials or substances from a fixed site or during transport that may adversely impact public health and safety and/or the environment.

Understanding the potential health effects associated with exposure to a hazardous material contaminant can be complicated and involves determining who may be exposed, how they may be exposed, and how long the exposures may last. Individuals are also known to react differently to chemical exposures depending upon their age and health. In addition, different effects may occur depending on whether a chemical is ingested versus being inhaled and the duration of exposure. There are several ways in which chemicals may enter the human body and cause detrimental health effects as summarized below:

- Inhalation-breathing the chemical into the lungs;
- Ingestion-swallowing contaminated food, water, or medication, or other chemicals;
- Absorption-assimilation through direct contact with the skin, lungs, and eyes, or indirect contact with clothing or other contaminated items; and
- Injections-penetration through the skin, much less common than other modes of exposure, but can possibly occur due to an explosion or some other type of accident.

In dealing with chemical contaminants, there are two types of exposure, namely, acute and chronic exposure. Acute exposure is defined as short-term, high-level exposure and the effects are usually immediate, whereas chronic exposure is defined as long-term, lower-level exposure and the effects may take years to appear. Both are dangerous and have immediate and long-term health implications. General symptoms of toxic exposure can include, but are not limited to, dry and red skin upon contact, irritation of the eyes or lungs, headache, nausea, drowsiness, dizziness, insomnia, confusion, and tremors. This plan only addresses acute exposure.

Fixed Facilities

Over the past several decades, the use of chemicals has increased in nearly every sector of the economy. As a result, hazardous materials are present in quantities of concern in business and industry, agriculture, universities,

hospitals, utilities, and other facilities in the State. There are no areas of the State that are exempt from a possible hazardous material incident. Despite extensive precautions taken to ensure careful handling during manufacture, transport, storage, use, and disposal, accidents and inadvertent releases are bound to occur. The potential impacts of such releases include short and/or long-term health hazards to those exposed, explosions, fires, and environmental contamination. An incident may also necessitate short- or long-term evacuation, which disrupts the social and economic aspects of the affected area.

The Emergency Planning and Community Right-to-Know Act (EPCRA) of 1986 also known as SARA Title III, brings industry, government, and the general public together to address emergency preparedness for accidental chemical releases.

The EPCRA program requires communities to prepare for hazardous chemical releases through emergency planning. This plan provides essential information for emergency responders and creates a database of hazardous chemical storage information for the community. The community right-to-know aspect increases public awareness of chemical hazards in their community and allows the public and local governments to obtain information about these chemical hazards.

In Wisconsin, facilities that use, store, or produce chemicals at or above the threshold quantities are required to submit a Tier II Reporting Form to the State Emergency Response Board (SERB), Local Emergency Planning Committee (LEPC), and the local fire department.⁶⁹ This form is usually a one or two page document, depending on the number of chemicals being reported. Basic information asked for includes the facility name and address, emergency contact person and phone number, chemical names, and quantities. The SERB sends the forms out by mid-January each year and they are due back by March 1st. Failure to receive a form does not absolve a facility from their reporting obligations. A facility can be a factory, school, gas station, community center, or hospital. Farm Co-ops are exempt from reporting fertilizers and retailers are exempt from reporting goods packaged for resale. Although there are some exemptions, mainly for retailers, any facility that uses, stores, or produces hazardous chemicals may have to report the chemicals stored. However, it should also be noted that the Federal government no longer requires retail gas stations to report. As noted in Chapter II, in Kenosha County there are 229 facilities that either report their inventory of hazardous materials and/or provide notification that they have an extremely hazardous substance under the requirements of EPCRA.

⁶⁹*Wisconsin Emergency Management, Emergency Planning and Community Right-to-Know Act Section. Planning Threshold: Facility has an extremely hazardous substance present at any one time in an amount equal or exceeding the chemical-specific threshold planning quantity (TPQ). Reporting Threshold: Facility has 10,000 pounds of a hazardous substance or either 500 pounds or the threshold planning quantity of an extremely hazardous substance present at any one time and is not exempt from reporting requirements.*

Under EPCRA, a hazardous material is defined as any chemical that is a physical hazard or health hazard for which the Occupational Safety and Health Administration (OSHA) requires a facility to maintain a Material Safety Data Sheet (MSDS). Under EPCRA there is no specific list of hazardous materials, but some of the most common hazardous chemicals include propane, kerosene, fuel oil, motor oil, and gasoline. If a facility stores 10,000 pounds or more of these products the owners are required to file a report. Under the law, there are two categories of regulated chemicals: hazardous substances and extremely hazardous substances (EHS). EHS chemicals are found on an Environmental Protection Agency list of approximately 366 substances. Common EHS chemicals include chlorine, sulfuric acid, anhydrous ammonia, and nitric acid. Unlike the more common hazardous substances, the minimum reporting quantities will vary depending on the chemical. **A recent examination of hazardous material commodity flow through Kenosha County found that fixed facilities in the County that are required to file Tier II Reporting forms reported using, storing, or producing 75 different hazardous chemicals.**⁷⁰

Transportation

The list of hazardous materials is extensive. However, the bulk of products being transported are petroleum products (gasoline, diesel fuel, jet fuel, fuel oil, asphalt, creosote, and propane), chemicals used for industrial or manufacturing processes (anhydrous ammonia, sulfuric acid, and chlorine) and waste products (industrial waste, food waste, medical waste, and animal waste). There are numerous other hazardous materials routinely transported in smaller quantities, such as pesticides, herbicides, and specialized industrial chemicals. The majority of releases are the result of transportation accidents. However, many minor releases are the result of illegal dumping of waste materials.

Demand for established and new chemical substances in all walks of life results in extensive hazardous materials shipments within and through Wisconsin communities daily. The major overland modes of transportation are highways, railroads, and pipelines.

Highways

Trucks are the most common way of transporting hazardous materials, accounting for more than 90 percent of all hazardous materials shipments nationwide according to the U.S. Department of Transportation. Various fuels are the most common cargo that is classified as hazardous. Every roadway in Wisconsin is a potential route for hazardous material transport. IH 94 spans the eastern portion of Kenosha County between the densely populated

⁷⁰***Kenosha County Local Emergency Planning Committee, Hazardous Materials Commodity Flow and Responder Training Assessment for Kenosha County (WI), April 2016.***

Milwaukee-Chicago corridor. Large tankers conducting inter- and intra-state transportation of hazardous materials and substances use this highway extensively.

Rail

There are three railroad companies that operate in Kenosha County, as shown on Map II-8 in Chapter II. Rail is used for the transport of hazardous materials because of large-load capabilities. Rail transport routes pass through the areas east of IH 94 and the far western portions of the County.

It should be noted that the shipment of crude oil by rail has increased as domestic oil production has increased. The typical train carrying crude oil is over a mile long and consists of 100 or more cars. Each of these cars typically carry 30,000 gallons of crude oil. Much of the increased domestic crude oil production consists of Bakken crude oil. This oil comes from a rock formation located in the States of North Dakota and Montana and the Canadian Provinces of Manitoba and Saskatchewan. Derailments and incidents involving trains carrying crude oil may pose challenges for responding organizations. Such an incident could potentially involve the release and/or ignition of thousands of gallons crude oil. Responses to crude oil incidents may require specialized outside resources that will take time to arrive to the site of the incident. This could be especially the case because crude oil is not a uniform substance and its physical and chemical properties can vary based upon where it was produced. Crude oil often contains flammable gases, whose presence can reduce the effectiveness of traditional firefighting techniques.

On May 1, 2015, the U.S. Department of Transportation issued rules related to enhanced tank car standards and operational controls for high-hazard flammable trains.⁷¹ Key provisions include enhanced braking systems for trains considered high-hazard flammable trains (HHFT), enhanced design standards for new tank cars, retrofitting of existing tank cars, and operating speeds of HHFTs being limited to 50 mph in most areas and 40 mph in high-threat urban areas.

Pipeline

Natural gas service is provided for the entire Kenosha County by the We Energies Gas Operations, and We Energies is the distributor of natural gas. In Kenosha County, the main gas supply is primarily provided by ANR Pipeline Company, which owns main and branch gas pipelines in Kenosha County and the surrounding area. In addition, the We Energies natural gas system is connected to other major gas pipelines outside of, but in the vicinity of, Kenosha County. A petroleum pipeline also runs through the western portions of the Village of Bristol and the Town of Paris.

⁷¹49 Code of Federal Regulations, *Parts 171, 172, 173, 174, and 179.*

It should be noted that natural gas service and selected other hazards could be vulnerable to events, such as an earthquake or an act of terrorism. Such possibilities should be considered as facility and system redundancy is carried out.

An incident involving any one of the above modes of hazardous material transport could result in a local emergency, with the potential to affect large numbers of people. The potential effects include health hazards to those exposed to the hazardous materials, explosions, major fires, and environmental contamination. An incident may necessitate short- or long-term evacuation that would disrupt the affected area. Accidents on major transport arteries can disrupt or stop traffic for extended periods of time. In the State of Wisconsin there were 10,632 transportation-related hazardous material incidents reported over the period 1971 through 2014.⁷² These resulted in 11 deaths and 308 injuries. In about 75 percent of these incidents, there was no damage to property. Property damages in those incidents that had damages ranged up to about \$6.8 million. The total damages reported as resulting from these incidents were about \$61.6 million and the average amount of reported damages per incident was about \$5,800.⁷³

Description of Recent Hazardous Materials Incident Events

Between 2012 and 2014, Kenosha County averaged less than 10 hazardous material spills or releases per year, almost all of which were minor. The majority of these incidents involved diesel fuel, mineral oil, engine waste oil, or other petrochemical substances. Historically, the most serious incidents have involved chlorine, anhydrous ammonia, sulfuric acid, PCBs, pesticides, liquid oxygen, phosgene gas, and nitric acid. A complete file on all spills is maintained by the Kenosha County Office of Emergency Management.

Over the period 1971 through 2014, 59 transportation-related hazardous materials incidents were reported in Kenosha County.⁷⁴ All were relatively minor. All of these incidents were related to roadways except for a single incident involving a railroad. The majority of these incidents involved releases of flammable or combustible liquids such as fuel oil, acetone, gasoline, paint or paint thinner, or resin solutions. Other incidents involved corrosive materials, flammable solids, oxidizing agents, or other hazardous materials. Hazardous materials were released in 50 incidents. In incidents involving liquids, the amounts released ranged between 0.25 and 7,100

⁷²U.S. Department of Transportation Pipeline and Hazardous Materials Safety Administration Incident Report Database, accessed on December 8, 2015.

⁷³Damages are expressed in 2014 dollars.

⁷⁴U.S. Department of Transportation Pipeline and Hazardous Materials Safety Administration Incident Report Database, accessed on December 8, 2015.

gallons, with an average volume released of about 220 gallons. Releases of solid materials were rare. When they occurred, the amounts released ranged between 2.5 and 500 pounds. These hazardous material incidents resulted in no deaths. One incident in 1990 resulted in an injury that did not require hospitalization. Property damage was reported for 20 incidents, with the total damages reported being about \$28,600 in 2014 dollars.

In contrast, a total of five pipeline incidents were recorded in Kenosha County during the 39-year period between the years 1976 through 2014. These events are documented in terms of their magnitude and impact in Table III-34, based upon data published by the Federal Department of Transportation, Office of Pipeline Safety. In total, pipeline incidents have resulted in three deaths, four injuries, and about \$3.3 million in property damages within Kenosha County.

The most deadly pipeline incident in Kenosha County occurred on August 29, 1976, when a contractor cleaning a blocked sewer lateral with a machine-driven auger ruptured a 2-inch diameter plastic gas main in the City of Kenosha. Gas from the main entered the house through the sewer line and was ignited by an unknown source. The house was destroyed by the resulting explosion and fire and two adjacent houses were damaged. Two persons were killed and four persons injured. Property damages were estimated at \$295,402 in 2014 dollars.

The data indicate that hazardous material incidents are relatively rare, but can cause considerable property damage and can result in some loss of human life or injury.

Vulnerability, Community Impacts, and Multi-Jurisdictional Assessment

There are several factors that should be considered when attempting to identify the scope, magnitude and vulnerability in terms of transportation-related hazardous materials incidents within specific areas of Kenosha County. One factor is the density of traffic and development. Certain pipeline sections, as certain major highways, rail lines, or pipelines may handle more hazardous material traffic than others. Therefore, the eastern and western portions of Kenosha County are more vulnerable than the central areas, due to the presence of major highways, rail lines, and pipelines. The condition of the transport routes and seasonal weather effects should also be considered, as well as predominant wind patterns within the County. Developing communication between planning agencies and storage site and transportation system owner/operators can be beneficial in determining the possible risks associated with transporting hazardous materials into or through a particular community.

In 2016, Kenosha County examined the flow of hazardous materials through the County via several elements of the County's transportation network, including highways, railways, waterways, and airports.⁷⁵ As part of this

⁷⁵*Kenosha County Local Emergency Planning Committee, April 2016, op. cit.*

study, random observations of traffic were conducted on highways at eight locations in the County. These observations noted the information displayed on the required hazardous material placards shown on vehicles carrying hazardous material cargo. The study found that the number of vehicles displaying placards that passed these sites ranged between 0 vehicles per hour and 5.43 vehicles per hour, with an average of 2.18 vehicles per hour. Vehicles transporting hazardous materials were observed more frequently on IH-94 than on State trunk highways. Average numbers of vehicles observed transporting hazardous materials on IH-94 and State trunk highways were 4.19 vehicles per hour and 0.92 vehicles per hour, respectively. The placards observed indicate that vehicles traveling on highways in the County carry a variety of hazardous substances. Specific placards for 32 different substances were observed, including placards for 18 substances reported as being used, stored or produced by fixed facilities in the County through their Tier II reports. Specific placards were also observed for 14 substances not reported on Tier II reports from any facilities in the County. Placards giving general descriptions of seven categories of hazardous substances were also observed on vehicles traveling along highways in the County.

The study made written requests to railroads providing freight service through the County for manifest information regarding hazardous materials carried along their lines. The railroads' responses indicated that hazardous materials from all classes within the U.S. Department of Transportation's hazard classification are transported through Kenosha County by rail. These classes include explosives, flammable and non-flammable gases, flammable and combustible liquids, flammable solids, spontaneously combustible materials, water-reactive substances, oxidizing agents, organic peroxides, toxic substances, radioactive materials, corrosive substances, and miscellaneous hazardous materials. In addition, the Canadian Pacific Railway indicated that they ship three to five train-loads of Bakken crude oil through the County per week. The Union Pacific Railway responded that their shipments of crude oil through the County are below the one million gallon per week threshold requiring specific reporting.

The study also found that there is minimal flow of hazardous materials through Kenosha County by water or air. The U.S. Coast Guard indicated that there are no bulk shipments of dangerous goods being transported by water on Lake Michigan that would come near the Kenosha County shoreline. Staff at the Kenosha Regional Airport reported that they have not had to deal administratively with any hazardous material cargo.

Kenosha County recently assessed the levels of training that first response personnel in the County have received relative to discovering and responding to releases of hazardous substances.⁷⁶ Federal regulations set forth in 29 CFR 1910.120(q)(6) of the *Code of Federal Regulations* require that emergency responders receive training on

⁷⁶Ibid.

responding to releases of hazardous substances. These regulations specify that the level of training an emergency responder receives is to be based upon the responder's duties and functions within the response organization. The regulations also specify that emergency responders receive annual refresher training. Section SPS 332.50 of the *Wisconsin Administrative Code* adopts the regulations set forth in 29 CFR 1910 by reference.

The regulations specify five levels of training for first responders:

- Awareness level training for responders who are likely to witness or discover a hazardous material release and report it to the appropriate authorities;
- Operations level training for responders who are likely to respond to a hazardous material release as part of the initial response and who, from a safe distance, function to keep the response contained and prevent it from spreading;
- Technician level training for responders who approach the point of release and seek to stop the release;
- Specialist level training consisting of more directed or specific knowledge of the substances to be contained for responders who provide support for technician level responders and act as site liaisons with other governmental authorities regarding site activities; and
- Incident commander level training for responders who will assume control of the incident scene beyond the first responder awareness level.

Individuals who respond to a hazardous material incident are required to be trained to the minimum of an Operations level. Any sort of offensive operation relative to an incident, such as closing vessel valves, plugging leaks, or installing over pack drums, requires personnel trained to the Technician level.

The study surveyed fire, law enforcement, emergency medical service (EMS),⁷⁷ and public works agencies within Kenosha County to assess the level of initial training and status of refresher training received by their personnel. Most of the agencies in the County responded. Fire departments within the County that replied to the survey indicated that all of their responders had received Awareness level training. In addition, about 84 percent of these responders had received Operations level training and about 9 percent had received Technician level training. The fire departments that replied to the survey reported that about 68 percent of their responders had received refresher training within the past year. The law enforcement, EMS, and public works agencies that replied to the

⁷⁷Assessment of EMS personnel only addresses those EMS services that are not a part of a fire department or a combined fire and rescue department. EMS personnel who are part of a fire department or a combined fire and rescue department are included in the assessment of fire department.

survey reported that all of their responders had received Awareness level training. None of these agencies reported having personnel who were trained to the Operations or Technician levels. Law enforcement agencies reported that about 40 percent of their responders had received refresher training within the past year. EMS services reported that about 22 percent of their responders had received refresher training within the past year. Public works agencies reported that none of their employees had received refresher training within the past year.

On average, there are less than 10 hazardous material incidents per year from fixed facilities in Kenosha County. Estimated damages caused by these incidents were not available. Over a 44-year period, there was an average of about 1.3 transportation-related hazardous material incidents per year in Kenosha County. These incidents caused about \$500 in property damages per incident. On average, it would be expected that transportation-related hazardous material incidents would cause about \$650 in property damages per year. Over a 39-year period, an average of 0.13 pipeline-related hazardous material incidents occurred per year. This is about one incident every eight years. These incidents cause an average of \$662,800 in property damages per incident. On average, it would be expected that pipeline-related hazardous material incidents would cause an average of \$85,600 in property damages per year. When transportation-related incidents are combined with pipeline-related incidents, it would be expected that hazardous material incidents would cause an average of \$86,250 in property damages per year.

In 2014, the total equalized assessed property value in Kenosha County was estimated at about \$12.6 billion. Based on the current average estimate of \$86,250 in reported damages per year, it can be expected that approximately 0.0007 percent of the value of all property, including buildings and infrastructure, in Kenosha County will be damaged from hazardous material events each year. Due to the unpredictability of hazardous material events, all buildings, infrastructure, and critical facilities within the County are considered at risk.

Potential Future Changes in Hazardous Materials Incident Conditions

Although significant hazardous materials incidents are not expected to change in the future, changes in land use can have an influence on the potential magnitude of any particular hazardous materials incidents that occur. Such changes relate to the potential future increase in development within the County. Changing land use patterns within Kenosha County, as documented in Chapter II of this report, indicate a small potential increased risk of exposure to hazardous materials incidents, damage, and related losses in the expanding urbanized areas within the County.

VULNERABILITY ASSESSMENT FOR TERRORISM

Terrorism can be defined as acts that are violent or dangerous to human life that violate Federal or state law and that appear intended to intimidate or coerce a civilian population; influence the policy of a government by intimidation or coercion; or affect the conduct of a government by mass destruction, assassination, or

kidnapping.⁷⁸ The Federal Bureau of Investigation categorizes two types of terrorism in the United States: domestic terrorism that involves groups or individuals whose activities are directed at elements of our government or population without foreign direction; and international terrorism that involves groups or individuals who are foreign based and/or directed by countries or groups outside the United States, or whose activities transcend national boundaries. Additionally, some acts conducted by gangs, people involved in civil unrest, radical splinter groups or activists, and people involved in illegal drug trade could also be described as terrorism.

An act of terrorism can take several forms, depending on the technological means available to the terrorist, the nature of the political issue motivating the act, and the points of weakness of the terrorism target. **Based on guidelines provided by the U.S. Department of Homeland Security, terrorism refers to the use of weapons of mass destruction (WMD), including biological, chemical, nuclear, and radiological weapons; arson, incendiary, explosive, and armed attacks; industrial sabotage and intentional hazardous material releases; and “cyber-terrorism.”**⁷⁹ Several terrorist action possibilities are listed and briefly described below.

Terrorist Action Possibilities *Incendiary Devices and Arson*

Most terrorist incidents in the United States have involved bombs or incendiary devices, including detonated and undetonated explosive devices, tear gas, pipe and firebombs, and rocket attacks. Often the capacity existed for large-scale damage and/or mass casualties. An example of this would be the bombing of the Federal Building in Oklahoma City in April 1995. The type of materials and method of delivery utilized in the bombing of the Murrah Federal Building are readily accessible to a potential terrorist. Because of the ready availability of such materials, the potential for mass damage and casualties, and experiences to date in the nation, it is anticipated that of the various types of Weapons of Mass Destruction (WMD) and explosive weapons have a high potential for use in the United States.

FEMA defines arson and incendiary attack as the initiation of fire or of explosion on or near a target either through direct contact or remotely by other means. Generally, the extent of damage can be determined by type or quantity of accelerant and the materials present at or near the target. Arson can be further defined as any willful or malicious burning or attempt to burn, with or without intent to defraud, a dwelling, public building, motor vehicle, or other properties. Fires of suspicious or unknown origin are not classified as arson. Nationally, an estimated

⁷⁸*Title 19 Section 2331 of the United States Code.*

⁷⁹*Federal Emergency Management Agency, State and Local Mitigation Planning How-to Guide, Integrating Manmade Hazards into Mitigation Planning, Version 2.0, September 2003.*

19,000 fires were intentionally set in 2014. These arson incidents resulted in 157 civilian deaths and were responsible for \$729 million in property losses in 2014.⁸⁰

Airline Attack

After the events of September 11, 2001, questions were raised regarding the effectiveness of airport and airline security at the time. Since the September 11 attacks, security at airports and onboard airliners has been escalated. Specific changes include the oversight and supervision of passenger and baggage screening by the Transportation Security Administration, access to airplane boarding areas being restricted to passengers, restrictions being set on the articles that can be taken onboard an airliner, deployment of additional Federal air marshals on airliners, and improvements to cockpit security. Despite these efforts, it is possible that incidents may occur. Such incidents could include airplane bombing, sabotage or hijacking, airport bombings or shootings, or the tampering with air navigation and control systems, resulting in plane crashes or collisions.

Weapons of Mass Destruction: Chemical/Biological/Nuclear/Radiological Attack

Terrorists can use chemical and biological agents or weapons to either extort or deliberately try to kill in order to further political goals. Toxins or even some radiological materials, such as water-soluble plutonium chloride, could become a credible threat to municipal water supplies. An example of this would be the gas attack on the Tokyo subway system that occurred in March 1995.

Hostage Taking

The taking of hostages can provide terrorist groups publicity for their political or social objectives, allow negotiation for furtherance of their aims or result in events that are designed to invoke sympathy for their causes. The main goal of response agencies is to end the incident, with the absolute minimum loss of innocent lives. **The common belief that most response agencies are willing to agree to any demand to prevent endangering the safety of the hostages is not a true statement in all cases.**

Infrastructure Attack

An individual or group of terrorists could coordinate an attack against utilities and other public services such as the water supply, electric power generation and transmission, or telephone service. Another form of infrastructure attack is against computer resources such as networks, databanks, and software by infiltrating computer networks and altering, stealing, or destroying programs and data. As society becomes more dependent on computers, this form of cyber-terrorism is a legitimate concern.

⁸⁰Hylton J.G. Haynes, Fire Loss in the United States during 2014, *National Fire Protection Association, September 2015*.

Response to Terrorism Incidents

The emergency management community in the United States must accept that national security and intelligence organizations may not always be successful in preventing terrorist incidents. It is up to State and local emergency management personnel and services to respond should these attacks occur. The ramifications of responding to a terrorist incident may not be the same as traditional large-scale emergencies. The safety of emergency service providers must be an early, primary consideration. The media will take an active interest in this type of incident. The public has high expectations for emergency managers and service providers in a terrorist situation and extraordinary efforts are demanded. Federal and State government agencies depend directly on local managers and emergency response personnel and their initial and follow-on actions during any terrorist incident.

Historical Terrorism Problems

There are no reports of historical terrorism incidents occurring in Kenosha County. Several historical incidents occurred in the State of Wisconsin.

One of the deadliest cases of domestic terrorism in the State occurred in the City of Milwaukee on November 24, 1917. A bomb suspected of having been planted by anarchists was discovered by children and brought to a police station in the Third Ward. It detonated in the police station, killing nine police officers.

A global database of terrorism incidents lists 25 incidents that occurred in the State of Wisconsin during the period 1970 through 1989.⁸¹ Several of these occurred during the early 1970s and were related to protests against the Vietnam War.

In 1970, there was a series of five pipe bombings and fire bombings in the City of Milwaukee that were attributed to suspected leftist revolutionaries. Targets included two industrial research laboratories, a building containing Federal offices, a military reserve headquarters, and a fuel line at a petroleum terminal in the Milwaukee Harbor. While some of these incidents caused property damage, there were no fatalities or injuries reported.

On August 24, 1970, a stolen van containing 2,000 pounds of explosives detonated on the campus of the University of Wisconsin in Madison. This bomb was placed by an anti-war group known as the New Year's Gang and targeted the campus' Army Mathematics Research Center in Sterling Hall. A postdoctoral researcher was killed in the blast. In addition, three persons were injured. The explosion caused extensive damage to Sterling Hall and damaged 26 other buildings on the campus. The estimated damages to the University exceeded \$12.8 million (2014 dollars).

⁸¹National Consortium for the Study of Terrorism, *Global Terrorism Database*, <http://www.start.umd.edu/gtd>, accessed January 20, 2016.

Description of Recent Terrorism Events

Since 2000 there have been three terrorism incidents documented in Kenosha County. Kenosha County experienced a terrorist incident involving an Anthrax threat in September 2000. The substance involved was not Anthrax and did not pose an actual threat. The perpetrator was apprehended and later confessed to the crime. In late January and early February of 2002, after anthrax hoaxes/incidents occurred on the east coast of the United States, numerous incidents involving white powder were reported throughout the County. All were sent to a State lab for testing; all turned out to be negative for anthrax. In May 2003, the City of Kenosha Clerk's office and the Kenosha Area Chamber of Commerce received letters with green powder postmarked from Brazil stating that people were now exposed to anthrax. The substance was sent to a State lab for testing, where it turned out to be negative for anthrax.

Additional terrorism incidents have occurred elsewhere in Wisconsin. On July 19, 2000, a former Air National Guard pilot broke into the 128th Air Refueling Wind airbase at General Mitchell International Airport in Milwaukee, placing a bomb, as well as scrawling graffiti calling for an end to U.S. intervention in Kosovo. The bomb failed to explode and the perpetrator was arrested. No injuries or fatalities occurred as a result of this incident and only minor property damage was reported. On April 1, 2012, an assailant set fire to a Planned Parenthood clinic in the Town of Grand Chute in Outagamie County. There were no casualties. The clinic suffered minor damage to an examination room. On August 5, 2012, a member of a white supremacist group attacked a Sikh temple in the City of Oak Creek. The assailant killed six persons and wounded four others before being shot by a responding police officer. The assailant subsequently died from a self-inflicted gunshot wound. A global database of terrorism incidents lists 12 incidents that occurred in the State of Wisconsin since 1989.⁸²

Vulnerability, Community Impacts, and Multi-Jurisdictional Assessment

The groups that have conducted terrorism, the issues that they are concerned with, and their objectives are widely varied. The groups and individuals responsible for or participating in terrorist incidents in Wisconsin between 1970 and 2014 have cited a variety of issues for their actions including antiwar activism, extreme left wing revolutionary activities, extreme right wing revolutionary activities, antiabortion activities, animal rights, and white supremacist activities. Because the objectives of these groups and individuals are so widely varied, there are numerous potential targets of terrorist action. Any public facility, utility, element of infrastructure, or gathering place could be a potential target for terrorist activity. In addition, certain types of businesses and governmental institutions may be more prone to terrorist activities due to the specific nature of their business or size. For example, businesses such as banks, financial institutions, health care facilities, or businesses engaged in

⁸²Ibid.

controversial activities are likely to be at risk. In addition, local, State and Federal government facilities; public schools; and colleges and universities are also potential terrorist targets.

As previously indicated, three terrorism incidents have occurred in Kenosha County. Over a 45-year period, 37 incidents have been documented in the State of Wisconsin. While the probability that County will experience a terrorism incident and the frequency at which such incidents are likely to occur in the County are unknown, they are assumed to be very low.

A review of the community assets described in Chapter II indicates a limited potential for terrorism-related impacts to:

1. A variety of residential, commercial, and other developed land uses;
2. The roadway and other transportation systems;
3. Utility infrastructure;
4. Critical community facilities; and
5. Historic sites in the vicinity of the incident.

It is safe to assume that any type of facility on which a terrorist attack could generate desired publicity or further terrorism objectives could be classified as a potential target for terrorist activity, including large-scale public events. Based on past events, the probability of a terrorist attack occurring in Kenosha County is low.

In 2014, the total equalized assessed property value in Kenosha County was estimated at about \$12.6 billion. Due to the unpredictability and lack of precedent concerning terrorism events in Kenosha County, all buildings, infrastructure, and critical facilities within the County are considered at risk.

VULNERABILITY ASSESSMENT FOR POWER OUTAGES

Electrical system outages are primarily caused by lightning and other weather-related hazard events, and, to a lesser extent, by equipment problems, fallen trees, animal contact, and human error.⁸³ Hence, this category was also considered to be a significant potential component of and, therefore, incorporated as part of the appropriate

⁸³*Federal Emergency Management Agency, State and Local Mitigation Planning How-to Guide, "Understanding Your Risks, Identifying Hazards and Estimating Losses," Publication No. FEMA 386-2, August 2001. See also Federal Emergency Management Agency, State and Local Plan Interim Criteria Under the Disaster Mitigation Act of 2000, July 11, 2002.*

natural and human-induced hazards as potential utility damages among the hazard categories previously analyzed. In addition, because of the importance of this type of incident to the Kenosha County All Hazards Mitigation Plan Task Force, both during development of the original plan and during development of **the first plan** update, this section of the report specifically analyzes vulnerability to power outages. Power outages in this context are those that last for some extended period of time. Momentary outages generally are a sign that the power supply system is working. Brief outages occur when the system detects a problem that affects the flow of electricity on a power line. The brief automatic interruption is designed to prevent hazards and equipment damage. In most cases, power is restored within a few seconds.

Description of Power Outage Events

An online search for media reports of power outages affecting Kenosha County found 29 reports of outages that occurred during the years 2010 through 2015. Estimates of the number of customers affected by a given outage were available for 26 of these incidents and ranged from fewer than five customers to about 5,700 customers. The average number of customers affected by these outages was about 2,000. Estimates of duration of the outage were available for 20 outages and ranged from less than one hour to 15 hours. The average duration of these outages was about five hours. Reported causes of outages included damage from storms and other weather-related events, equipment failure or malfunction, and traffic accidents affecting utility poles. We Energies indicates that 29 percent of outages are caused by normal wear and tear on electricity generation, transmission, and distribution equipment; 27 percent are caused by weather such as lightning, wind, rain, snow, heat, cold, and ice; 20 percent are caused by fallen trees and tree growth; 11 percent are caused by animal contact; 7 percent are caused by human actions, including accidents and vandalism; and 7 percent are caused by other events.

Power outages in Kenosha County occur periodically and are usually the most widespread when caused by weather-related events. The most recent severe event occurred on **June, 30, 2014. A large-scale bow echo raced across southern Wisconsin, causing straight line wind damage in many areas. The winds associated with this event downed trees and power lines. The damage caused by these winds and by lightning resulted in large power outages. We Energies reported a maximum power outage affecting 110,000 Wisconsin customers, which is the largest outage since 2005. Another large outage occurred on** August 9, 2009. Thunderstorm winds left a three-mile-wide swath of damage through the City of Kenosha. Numerous trees were uprooted and tree debris knocked down several power-lines. At least 28,000 customers in southeast Wisconsin lost electrical power. It was reported that 140 power-lines came down due to tree debris, and at least one to two dozen utility poles snapped. Another major outage occurred beginning May 21, 2004, when a morning storm of wind, lightning, and thunderstorm events knocked out power to about 24,000 We Energies customers in southeastern Wisconsin. Another 4,000 homes and businesses in the region lost power when a second storm hit the same day in the evening.

Most of the recent power outage events affecting Kenosha County have been short term, lasting from about a few hours to, at most, a few days. Long-term events can happen. Two examples from outside Wisconsin illustrate this. In January 1998, an ice storm hit the Montreal, Canada area. The power outages resulting from this storm impacted over four million residents. Portions of the Montreal area were without power for over three weeks. Similarly, an ice storm hit the State of Kentucky in January 2009. At the peak of this storm, about 700,000 customers were without power. Two weeks after the storm 50,000 customers were still without power. It took 38 days to restore power to all of the affected customers.

Vulnerability and Community Impacts Assessment

While likely to be rare, the impacts of a long-term power outage event affecting Kenosha County could be large. Such an event would likely involve many downed trees and power lines. Downed power lines can present safety hazards for residents, travelers, and emergency responders. The response to such an event would be hampered by roads blocked by power lines and debris.

Given experiences like the Montreal and Kentucky events, it is possible that a significant portion of Kenosha County's population and facilities could be without power for one to three weeks, should a particularly severe event occur. Following the 2009 Kentucky ice storm, about 37 percent of affected customers were without power one week after the storm. About 7 percent were still without power after two weeks. The Kentucky event resulted in 36 fatalities. The largest cause of death related to this event was carbon monoxide poisoning resulting from improper generator use. Given that the average high and low temperatures in Kenosha County during the winter are considerably colder than those in Kentucky,⁸⁴ the impacts on human life of an ice storm causing a power outage of similar severity in Kenosha County may be even greater.

A review of the community assets described in Chapter II indicates the potential for significant, yet short-term, power outage impacts to a variety of residential, commercial, and other developed land uses; including critical community facilities. Significant impacts may also be possible to other infrastructure or utility systems. During a power outage, the normal operation of homes, businesses, public buildings, and other critical community facilities may be interrupted.

Potential Future Changes in Power Outage Conditions

Changes in land use can have an impact on the potential for power outage events and related hazards to occur. Such changes relate to the potential future increase in development within the County. As noted above, changing

⁸⁴For example, average high temperatures during January are 43°F and 30°F, respectively, in Louisville and Kenosha. Average low temperatures during January are 27°F and 16°F, respectively, in Louisville and Kenosha.

land use patterns within Kenosha County, as documented in the adopted regional land use plan, the County comprehensive plan, and County land and water resource management plan, and summarized in Chapter II, indicate a continuing level of moderate risk of power outages in the County. Because of the actions that have been taken by the power companies and individuals, the current vulnerability to power outages may have been decreased somewhat. These ongoing mitigation measures are described further in Chapter V.

Multi-Jurisdictional Power Outage Risk Management

Based upon a review of the historic patterns of power outage events in Kenosha County, there are no specific municipalities that have unusual risks. Rather, the events are considered to be relatively uniform and of a countywide concern.

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Chapter III

ANALYSIS OF HAZARD CONDITIONS

TABLES

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Table III-1

HAZARD IDENTIFICATION SUMMARY BASED UPON KENOSHA COUNTY ALL HAZARDS MITIGATION PLAN TASK FORCE INPUT: 2004

Total Score from Hazard Identification Worksheets	Hazard Types
--	Natural Hazards
--	A. Winter Storms
173	Snowstorms
138	Blizzard or extreme snowfall
135	Ice Storm
--	B. Flooding and Stormwater Drainage Problems
154	Riverine flooding
136	Stormwater flooding
104	Lake Flooding
--	C. Extreme Temperatures
141	Extreme heat
140	Extreme cold
--	D. Thunderstorms, Hail, and Lightning
138	Thunderstorms
125	Lightning
118	Hail
154	E. Tornado or high straight-line wind event
112	F. Lake Michigan Coastal Erosion
99	G. Drought
92	H. Fog
88	I. Fires

Total Score from Hazard Identification Worksheets	Hazard Types
--	Man-Made Hazards
119	A. Electrical System Outage
--	B. Hazardous Material Incidents
112	HAZMAT fixed facility incidents
96	HAZMAT roadway incidents
73	HAZMAT pipeline
62	HAZMAT railway
--	C. Transportation Accidents
112	Transportation roadway
77	Transportation railway
--	D. Terrorism Incidents
91	Terrorism incident (biological, bomb threat, hostage situation)
91	Biological contaminants (anthrax, smallpox, etc.)
90	E. Contamination or loss of water supply system

Source: Kenosha County All Hazards Mitigation Plan Task Force.

Table III-2

PERCEIVED RISKS OF HAZARDS AS DETERMINED BY HAZARD AND VULNERABILITY ASSESSMENT TOOL: 2009

Event	Minimum (percent) ^a	Maximum (percent) ^a	Average (percent) ^a	Rank	Interquartile Range (percent) ^b
Riverine Flooding	33.3	83.3	61.5	1	25
Stormwater Flooding	33.3	75.0	55.6	5	17
Lake Flooding	0.0	66.7	26.6	24	17
Tornado or High Straight-Line Wind Event	13.9	91.7	56.1	4	35
Earthquake	0.0	25.0	12.1	45	19
Lake Michigan Coastal Erosion	0.0	58.3	17.5	39	22
Snow Storm	27.8	91.7	59.6	2	23
Blizzard or Extreme Snowfall	16.7	91.7	58.1	3	27
Ice Storm	13.9	91.7	53.3	6	14
Extreme Heat	0.0	75.0	26.7	23	23
Extreme Cold	16.7	83.3	38.7	11	32
Lightning	13.9	75.0	44.3	9	22
Thunderstorm	13.9	83.3	46.3	7	8
Hail	13.9	58.3	33.1	15	17
Fog	8.3	58.3	37.8	13	21
Drought	11.1	75.0	30.6	19	21
Dust Storm	0.0	37.8	12.0	46	13
Contamination or Loss of Water Supply	0.0	66.7	27.4	22	22
Loss of Sewerage System	0.0	75.0	24.0	30	14
Loss of Telecommunication	2.8	50.0	24.2	29	19
Electrical System Outage	8.3	75.0	38.1	12	17
Computer System Incident/Cyber Attack	0.0	50.0	23.6	31	25
Hazardous Materials Railroad Incident	13.9	83.3	35.2	14	19
Hazardous Materials Roadway Incident	13.9	83.3	31.5	17	22
Hazardous Materials Pipeline Incident	0.0	44.4	19.1	37	8
Hazardous Materials Fixed Facilities	8.3	75.0	29.8	20	22
Aircraft (flight path)	8.3	44.4	20.6	34.5	14
Roadway Transportation Accidents	13.9	83.3	44.4	8	25
Railway Transportation Accidents	13.9	66.7	32.2	16	38
Correctional Center Incident	0.0	44.4	11.5	47	17
Civil Unrest	0.0	44.4	16.7	40	11
Terrorism Incident	0.0	50.0	22.0	32	10
Biological Contaminants (anthrax, small pox, etc.)	0.0	50.0	21.7	33	8
Contamination Or Loss Of Water Supply System	0.0	55.6	24.6	28	24
Workplace Violence	0.0	66.7	20.1	36	8
School Violence	11.1	66.7	28.2	21	25

Event	Minimum (percent) ^a	Maximum (percent) ^a	Average (percent) ^a	Rank	Interquartile Range (percent) ^b
Radon Gas	2.8	50.0	20.6	34.5	14
Communicable Disease Outbreak or Epidemic	0.0	58.3	30.6	18	19
Major Fire (structure(s), or rural area wild fire or grain field fire)	13.9	75.0	40.6	10	29
Explosion	13.9	55.6	26.2	25	11
Mass Casualty Incident	0.0	83.3	24.8	27	8
Building Collapse or Cave-In	8.3	61.1	26.2	26	14
Quarries	0.0	50.0	13.9	43	13
Landfills	0.0	50.0	13.9	44	19
Wild Animals	0.0	58.3	14.1	42	11
Insects	0.0	50.0	14.9	41	17
Recreational Vehicles (snowmobiles)	0.0	58.3	18.8	38	6

^aPerceived threat increases with percentage.

^bInterquartile range acts as a measure of agreement upon the perceived level of threat with a smaller interquartile range indicating stronger agreement and a larger interquartile range indicating weaker agreement.

Source: SEWRPC.

Table III-3

PERCEIVED RISKS OF HAZARDS AS DETERMINED BY HAZARD AND VULNERABILITY ASSESSMENT TOOL: 2015

Event	Minimum (percent) ^a	Maximum (percent) ^a	Average (percent) ^a	Rank	Interquartile Range (percent) ^b
Riverine Flooding	0.0	83.3	39.4	9	28
Stormwater Flooding	0.0	83.3	43.4	8	38
Lake Flooding	0.0	66.7	19.4	27	19
Tornado	15.3	91.7	52.0	1	39
Earthquake	0.0	44.4	13.3	42	25
Thunderstorm	27.8	83.3	48.5	3	17
High Straight-Line Wind	27.8	75.0	45.6	5	25
Lightning	13.9	75.0	44.3	4	22
Hail	16.7	66.7	38.1	11	11
Heavy Snow Storm	27.8	83.3	49.6	2	25
Blizzard	13.9	83.3	44.1	7	25
Ice Storm	13.9	66.7	38.5	10	22
Extreme Cold	13.9	83.3	44.6	6	17
Extreme Heat	11.1	58.3	32.1	19	17
Drought	0.0	66.7	28.8	23	22
Fog	8.3	58.3	31.7	20	20
Dust Storm	0.0	27.8	6.2	45	17
Lake Michigan Coastal Erosion	0.0	75.0	35.4	17	20
Contamination or Loss of Water Supply	0.0	66.7	26.4	26	20
Loss of Sewerage System	0.0	44.4	19.4	36	28
Loss of Telecommunication	0.0	58.3	21.6	31	39
Electrical System Outage	2.8	75.0	37.0	13	28
Computer System Incident/Cyber Attack	0.0	83.3	27.7	24	44
Hazardous Materials Railroad Incident	0.0	91.7	36.5	14	36
Hazardous Materials Roadway Incident	13.9	66.7	35.1	18	31
Hazardous Materials Pipeline Incident	0.0	44.4	19.6	35	11
Hazardous Materials Fixed Facilities	16.7	91.7	36.1	15	17
Railway Transportation Accidents	0.0	83.3	35.9	16	31
Roadway Transportation Accidents	13.9	66.7	38.0	12	22
Aviation Accidents	0.0	55.6	18.9	37	20
Correctional Center Incident	0.0	91.7	13.9	41	17
Civil Unrest	0.0	50.0	14.1	40	22
Terrorism Incident	13.9	83.3	29.2	22	14
Workplace Violence	0.0	66.7	22.0	30	39
School Violence	0.0	83.3	21.2	32	33
Communicable Disease Outbreak or Epidemic	0.0	66.7	23.5	28	44
Large-scale Food Contamination	0.0	66.7	16.2	38	22

Event	Minimum (percent) ^a	Maximum (percent) ^a	Average (percent) ^a	Rank	Interquartile Range (percent) ^b
Wildfire	0.0	66.7	27.3	25	28
Large Structure Fire	0.0	83.3	29.8	21	19
Explosion	0.0	83.3	22.0	29	28
Mass Casualty Incident	0.0	66.7	20.2	33	28
Building Collapse or Cave-In	0.0	83.3	19.9	34	28
Dam Failure	0.0	58.3	14.3	39	22
Landslide	0.0	25.0	8.0	44	17
Land Subsidence	0.0	33.3	8.7	43	17

^aPerceived threat increases with percentage.

^bInterquartile range acts as a measure of agreement upon the perceived level of threat with a smaller interquartile range indicating stronger agreement and a larger interquartile range indicating weaker agreement.

Source: SEWRPC.

Table III-4

**SUMMARY OF ESTIMATED DISASTER DAMAGES AND ASSISTANCE IN KENOSHA COUNTY FOR
SELECTED FEDERALLY DECLARED AND NONDECLARED DISASTERS AND EMERGENCIES: 1990-2014**

Date of Disaster	Estimated Damages (property and crop)	State and Federal Assistance		
		Public Assistance	Individual Assistance	Total Assistance
1993 – Flooding (DR-994).....	\$ 550,000	\$ 816,175	\$ 1,400	\$ 817,575
1996 – Flooding.....	100,000	0	0	0
1998 – Flooding.....	N/A	979,929	0	979,929
2000 – Heavy Rains/Severe Storms/Flooding (DR-1332) .	18,350,000	1,072,372	77,865	1,150,237
2000 – Snow (EM-3163)	N/A	334,804	0	334,804
2004 – Severe Storms/Flooding (DR-1526)	26,825,000	571,636	146,165	717,801
2007 – Severe Storms/Flooding (DR-1719).....	900,000	N/A	225,418	225,418
2008 – Snow (EM-3285)	N/A	617,849	0	617,849
2008 – Severe Storms/Tornadoes/Flooding (DR-1768).....	21,640,000	611,567 ^a	439,524	1,051,091
2009 – Flooding.....	12,495,000	N/A	2,200,800	2,200,800
2011 – Severe Winter Storm/Snowstorm (DR-1966)	20,000	747,096	0	747,096
Total	\$80,880,000	\$5,751,428	\$3,091,172	\$8,842,600

NOTE: N/A indicates data not available.

^aIn 2009, Kenosha County was awarded a grant through the Hazard Mitigation Grant Program for \$1,751,449 as a result of the June 2008 flooding.

Source: Wisconsin Emergency Management and SEWRPC.

Table III-5

**WEATHER HAZARD EVENTS RECORDED IN KENOSHA COUNTY, WISCONSIN
FROM 1959 THROUGH DECEMBER 2014 (SORTED BY NUMBER OF EVENTS)**

Event	Total	Deaths ^a	Injuries ^a	Property Damage ^b	Crop Damage ^b
Dust Storms.....	0	0	0	\$ 0	\$ 0
Wild Fires/Forest Fires	0	0	0	0	0
Tornado.....	13	0	15	25,386,789	0
Lightning.....	16	1	5	18,201,588	0
Drought.....	17	0	0	0	3,757,011
Flood	50	0	0	31,756,707	31,716,566
Temperature Extremes.....	51	4	11	16,163	81,363
Hail	51	0	0	244,327	61,204
Fog	76	0	0	0	0
Winter Storms, Snow, and Ice.....	105	0	1	42,762	0
Thunderstorms/High Winds.....	185	6	30	27,534,248	5,021,965
Total	564	11	53	\$103,182,584	\$40,638,109

^aDeaths and injuries reported were, in some cases, based upon a geographic area impacted by the hazard event that affected Kenosha County and had a larger area of impact than the County itself.

^bDollar values were adjusted to year 2014 by using the average annual Consumer Price Index (CPI) values from the U.S. Department of Labor, Bureau of Labor Statistics.

Source: The National Climatic Data Center (NCDC) a part of the Department of Commerce, National Oceanic and Atmospheric Administration (NOAA), the National Environmental Satellite, Data and Information Service (NESDIS), and the U.S. Department of Agriculture Risk Management Agency.

Table III-6

KENOSHA COUNTY SEVERE WEATHER HISTORY: 1983-2014

Year	Severe Thunderstorm		Tornado	
	Watch	Warning	Watch	Warning
1983	6	2	1	1
1984	8	7	7	0
1985	4	3	6	0
1986	6	2	5	0
1987	4	3	2	1
1988	0	2	2	0
1989	10	4	2	0
1990	5	2	4	0
1991	10	1	2	0
1992	3	2	3	0
1993	12	6	4	1
1994	10	3	2	0
1995	10	8	2	2
1996	5	4	10	1
1997	9	4	1	1
1998	10	11	2	0
1999	8	9	0	0
2000	8	13	3	0
2001	10	13	1	0
2002	7	4	1	0
2003	9	5	3	0
2004	15	14	5	0
2005	11	5	0	1
2006	19	12	3	0
2007	2	8	3	0
2008	9	15	5	4
2009	7	8	1	1
2010	11	7	1	8
2011	14	10	0	2
2012	7	7	0	0
2013	6	5	2	2
2014	8	8	1	1
Total	262	207	85	26

Source: National Oceanic and Atmospheric Administration National Climatic Data Center, National Weather Service, and Kenosha County Division of Emergency Management.

Table III-7

**TECHNOLOGICAL HAZARD EVENTS RECORDED IN KENOSHA COUNTY,
WISCONSIN FROM 1975 THROUGH DECEMBER 2014 (SORTED BY NUMBER OF EVENTS)**

Event ^a	Total	Deaths	Injuries	Property Damage ^b	Crop Damage ^b
Hazardous Material Events (Pipeline)	5	3	4	\$ 3,314,101	\$0
Hazardous Material Events (Transportation) .	57	0	1	28,584	0
Railroad Accidents	212	15	49	4,780,633	0
Roadway Traffic Accidents ^c	53,241	319	29,068	898,879,898	0
Total	53,515	337	29,122	\$907,003,216	\$0

^aThe table lists only those hazards for which data were available.

^bDollar values were adjusted to year 2014 by using the average annual Consumer Price Index (CPI) values from the U.S. Department of Labor, Bureau of Labor Statistics.

^cData for roadway traffic accidents were only available for the years 1999 through 2013.

Source: U.S. Department of Transportation Office of Pipeline Safety, Federal Railroad Administration, Wisconsin Department of Transportation, and SEWRPC.

Table III-8

SUMMARY OF HAZARDS TO BE CONSIDERED IN THE KENOSHA COUNTY HAZARD MITIGATION PLAN

Hazard	Risk of Occurrence (high, medium, or low)	Warning Time (short, medium, or long)	Damage to Property (high, moderate, or low)	Threat to Life Safety (high, medium, or low)	Duration of Impact (long, moderate, or short)	Size of Area Affected (large, medium, or small)
Natural Hazards						
Winter Storms	Medium	Medium	Low	Medium	Moderate	Large
Flooding and Stormwater Drainage Problems	High	Medium	High	Low	Moderate	Large
Extreme Temperatures	Medium	Long	Low	High	Long	Large
Thunderstorms, Hail, and Lightning	High	Short	High	High	Long	Large
Tornadoes	Low	Medium	High	Medium	Short	Small
Lake Michigan Coastal Erosion	Low	Long	Medium	Low	Long	Small
Drought	Medium	Medium	Low	Low	Long	Large
Fog	Medium	Short to medium	Low	Low	Short	Medium
Fires	Low	Short	High	High	Short	Small
Man-Made Hazards						
Electrical System Outage	Medium	Short	Low	Low	Short	Small to medium
Hazardous Material Incidents	High	Short	Low	Medium	Moderate	Small
Transportation Accidents	Medium	Short	Moderate	High	Short	Small
Terrorism Incident	Low	Short	Moderate to high	High	Short	Small to medium
Contamination or Loss of Water Supply System	Low	Short	Moderate	Medium	Moderate	Medium

Source: Kenosha County Division of Emergency Management, Kenosha County All Hazards Mitigation [Local Planning Team](#), and SEWRPC.

Table III-9

REPORTED CASES OF SELECTED COMMUNICABLE DISEASES REPORTED IN KENOSHA COUNTY: 2012

Disease	Number of Reported Cases
Campylobacter Enteritis.....	31
Giardiasis.....	<5
Hepatitis Type A.....	0
Hepatitis Type B ^a	6
Hepatitis Type NANB/C	94
Legionnaire's Disease.....	5
Lyme.....	<5
Measles.....	0
Meningitis, Meningococcal	<5
Meningitis, Bacterial.....	<5
Mumps.....	<5
Pertussis.....	72
Salmonellosis.....	23
Shigellosis.....	<5
Tuberculosis.....	<5
E. coli, Shiga Toxin-producing.....	<5
Babesiosis.....	0
Cryptosporidiosis.....	13
Streptococcus pneum. Invasive.....	14
All Streptococcal diseases.....	15
Blastomycosis.....	<5
Haemophilus influenzae, Invasive ...	5
Ehrlichiosis/Anaplasmosis.....	0
Influenza A, Novel.....	10
Arboviral Illness, West Nile Virus.....	<5
Sexually Transmitted Diseases	
Chlamydia trachomatis.....	822
Gonorrhea.....	163
Syphilis.....	10
Immunizations (children in grades K-12) by Compliance	
Compliant.....	29,141
Noncompliant.....	169
Percent Compliant.....	99.4

^aIncludes all positive HBsAg test results.

Source: Wisconsin Department of Health Services Bureau of Health, "Public Health Profiles Wisconsin 2012," August 2014.

Table III-10

STRUCTURE FLOOD DAMAGE SUMMARY: KENOSHA COUNTY, WISCONSIN

Annual Probability of Flood Occurrence	Number of Structures in Floodplain	Flood Damages		
		Direct	Indirect	Total
1 Percent	329	\$4,197,880	\$788,430	\$4,986,310
2 Percent	245	2,498,490	432,810	2,931,300
10 Percent	139	1,252,310	187,880	1,440,080
Average Annual	--	\$ 797,475	\$125,142	\$ 922,617

Source: Kenosha County Department of Planning and Development and SEWRPC.

Table III-11

SUMMARY OF PLANNED CHANGES IN LAND USE IN THE MAJOR WATERSHEDS OF KENOSHA COUNTY

Watershed ^a	Total Watershed ^b Area (square miles)	Area in Urban Use ^b				Percent Increase
		2010		2035		
		Area (square miles)	Percent of Total	Area (square miles)	Percent of Total	
Des Plaines River.....	133.0	21.3	16.0	39.3	29.5	85
Fox River.....	934.0	216.9	23.2	276.0	29.6	27
Lake Michigan Direct Drainage.....	N/A	N/A	N/A	N/A	N/A	N/A
Pike River.....	51.0	19.3	37.9	43.3	84.9	124
Root River.....	197.6	65.1	32.9	98.5	49.8	51

^aIncludes the watersheds located within Kenosha County where flooding conditions occur.

^bIncludes entire Wisconsin watershed area within and beyond Kenosha County.

Source: SEWRPC.

Table III-12

**COMMUNITIES IN KENOSHA COUNTY
WITH SPECIAL FLOOD AND RELATED
STORMWATER DRAINAGE CONSIDERATIONS**

Community	Reason for Special Consideration
City of Kenosha	Eight structures estimated to be in flood hazard area
Village of Bristol	12 structures estimated to be in flood hazard area
Village of Paddock Lake	27 structures estimated to be in flood hazard area
Village of Pleasant Prairie	27 structures estimated to be in flood hazard area
Village of Silver Lake ^a	43 structures estimated to be in flood hazard area, Village contains five repetitive loss structures
Village of Somers	19 structures estimated to be in flood hazard area
Village of Twin Lakes	Two structures estimated to be in flood hazard area
Town of Paris	Substantial agricultural flood damages
Town of Randall	Seven structures estimated to be in flood hazard area
Town of Salem ^a	124 structures estimated to be in flood hazard area, Town contains 18 repetitive loss structures, localized stormwater drainage problems related to new development on narrow lake-frontage lots, and need for stormwater management planning to address existing and planned development
Town of Somers	19 structures estimated to be in flood hazard area
Town of Wheatland	39 structures estimated to be in flood hazard area

NOTE: See Maps III-2 and III-3.

^aOn November 21, 2016 the Wisconsin Department of Administration approved a cooperative plan submitted by the Village of Silver Lake and the Town of Salem. Effective February 14, 2017 the two municipalities merged to become the Village of Salem Lakes.

Source: SEWRPC.

Table III-13

THUNDERSTORM, HIGH-WIND, HAIL, AND LIGHTNING EVENTS REPORTED IN KENOSHA COUNTY FROM JULY 1964 THROUGH DECEMBER 2014

Number on Map III-7	Date	City/Village/Town	Event Type				Magnitude	Reported Damages ^a			
			Thunderstorm	High Winds	Hail	Lightning		Deaths	Injuries	Property Damage ^b	Crop Damage ^b
1	07/20/1964	Kenosha County	X	X	--	--	0 knots	0	0	--	--
2	07/22/1964	Kenosha County	--	--	X	--	1.75 inches	0	0	--	--
3	09/04/1965	Kenosha County	X	X	--	--	60 knots	0	0	--	--
4	06/06/1971	Kenosha County	X	X	--	--	0 knots	0	0	--	--
5	04/12/1974	Kenosha County	--	--	X	--	1.75 inches	0	0	--	--
6	06/20/1974	Kenosha County	X	X	--	--	0 knots	0	0	--	--
7	07/02/1974	Kenosha County	X	X	--	--	74 knots	0	0	--	--
8	07/08/1977	Kenosha County	--	--	X	--	1.00 inches	0	0	--	--
9	06/07/1978	Kenosha County	--	--	X	--	1.00 inches	0	0	--	--
10	06/16/1978	Kenosha County	X	X	--	--	52 knots	0	0	--	--
11	07/26/1978	Kenosha County	X	X	--	--	0 knots	0	0	--	--
12	08/05/1979	Kenosha County	--	--	X	--	1.00 inches	0	0	--	--
13	04/14/1980	Kenosha County	X	X	--	--	0 knots	0	0	--	--
14	07/16/1980	Kenosha County	X	X	--	--	0 knots	0	0	--	--
15	07/20/1980	Kenosha County	X	X	--	--	52 knots	0	0	--	--
16	08/04/1980	Kenosha County	X	X	--	--	80 knots	0	0	--	--
17	09/25/1980	Kenosha County	--	--	X	--	1.00 inches	0	0	--	--
18	07/17/1983	Kenosha County	X	X	--	--	0 knots	0	0	--	--
19	07/19/1983	Kenosha County	X	X	--	--	0 knots	0	0	--	--
20	07/19/1983	Kenosha County	X	X	--	--	0 knots	0	0	--	--
21	07/19/1983	Kenosha County	X	X	--	--	0 knots	0	0	--	--
22	04/29/1984	Kenosha County	X	X	--	--	50 knots	0	0	--	--
23	04/29/1984	Kenosha County	X	X	--	--	0 knots	0	0	--	--
24	06/06/1984	Kenosha County	X	X	--	--	0 knots	0	0	--	--
25	06/17/1984	Kenosha County	X	X	--	--	0 knots	0	0	--	--
26	08/07/1984	Kenosha County	X	X	--	--	64 knots	0	0	--	--
27	07/06/1986	Kenosha County	X	X	--	--	60 knots	0	0	--	--
28	07/06/1986	Kenosha County	X	X	--	--	0 knots	0	0	--	--
29	08/16/1987	Kenosha County	X	X	--	--	0 knots	0	0	--	--
30	10/01/1987	Kenosha County	X	X	--	--	0 knots	0	0	--	--
31	05/25/1989	Kenosha County	X	X	--	--	0 knots	0	0	--	--
32	07/27/1989	Kenosha County	X	X	--	--	0 knots	0	0	--	--
33	03/27/1991	Kenosha County	X	X	--	--	0 knots	0	0	--	--
34	06/17/1992	Kenosha County	X	X	--	--	66 knots	0	0	--	15,433.80
35	06/17/1992	Kenosha County	X	X	--	--	75 knots	0	0	--	15,433.80
36	06/25/1992	Kenosha County	--	--	X	--	0.75 inches	0	0	--	--
37	08/25/1992	Kenosha County	X	X	--	--	0 knots	0	0	--	--
38	04/18/1994	Town of Salem	X	X	--	--	70 knots	0	0	--	2,525.49
39	04/18/1994	Kenosha County	--	--	X	--	1.75 inches	0	0	--	--
40	04/18/1994	Kenosha County	X	X	--	--	0 knots	0	0	79,870.00	--
41	07/12/1994	Kenosha County	X	X	--	--	50 knots	0	0	--	--
42	07/12/1994	Kenosha County	--	--	X	--	0.75 inches	0	0	798.70	--
43	07/21/1994	Kenosha County	X	X	--	--	0 knots	0	0	7,987.00	7,987.00
44	04/18/1995	Village of Silver Lake	--	--	X	--	1.00 inches	0	0	--	--
45	04/18/1995	Village of Twin Lakes	--	--	X	--	1.00 inches	0	0	--	--
46	06/07/1995	Kenosha County	X	X	--	--	0 knots	0	0	--	18,125.07

Table III-13 (continued)

Number on Map III-7	Date	City/Village/Town	Event Type				Magnitude	Reported Damages ^a			
			Thunderstorm	High Winds	Hail	Lightning		Deaths	Injuries	Property Damage ^b	Crop Damage ^b
47	07/15/1995	Kenosha County	X	X	--	--	55 knots	0	0	--	--
48	07/15/1995	Kenosha County	X	X	--	--	65 knots	0	0	77,670.00	--
49	07/27/1995	New Munster	X	X	--	--	0 knots	0	0	--	--
50	07/27/1995	Kenosha County	X	X	--	--	0 knots	0	0	--	--
51	07/27/1995	Pleasant Prairie	--	--	X	--	1.75 inches	0	0	--	--
52	07/27/1995	Kenosha County	--	--	--	X	N/A	0	0	15,534.00	--
53	08/28/1995	Kenosha County	X	X	--	--	0 knots	0	0	--	--
54	08/28/1995	Town of Salem	X	X	--	--	0 knots	0	0	--	--
55	03/20/1996	Kenosha County	X	X	--	--	0 knots	0	1	48,281.60	--
56	04/14/1996	Village of Twin Lakes	--	--	--	X	N/A	0	1	--	--
57	04/19/1996	Village of Twin Lakes	--	X	--	--	0 knots	0	0	1,056,160.00	--
58	04/19/1996	Village of Pleasant Prairie	X	X	--	--	0 knots	0	0	1,659,680.00	--
59	05/11/1996	Kenosha County	--	--	--	X	N/A	0	0	7,544.00	--
60	06/21/1996	Kenosha County	X	X	--	--	0 knots	0	0	3,017.60	384,163.11
61	07/24/1996	Town of Bristol	X	X	--	--	0 knots	0	0	15,088.00	3,055.32
62	10/16/1996	Kenosha County	--	--	--	X	N/A	0	0	22,632.00	--
63	10/29/1996	Village of Pleasant Prairie	X	X	--	--	0 knots	0	0	15,088.00	--
64	10/29/1996	Village of Paddock Lakes	X	X	--	--	0 knots	0	0	30,176.00	--
65	04/06/1997	Town of Somers	--	X	--	--	67 knots	0	2	442,500.00	--
66	06/20/1997	Kenosha County	--	--	--	X	N/A	1	0	--	--
67	07/18/1997	Village of Twin Lakes	X	X	--	--	0 knots	0	9	1,475,000.00	--
68	07/26/1997	Slades Corners	X	X	--	--	0 knots	0	0	2,950.00	--
69	09/29/1997	Village of Twin Lakes	X	X	--	--	0 knots	0	0	737.50	--
70	03/08/1998	Kenosha County	--	X	--	--	0 knots	0	0	28,387.16	--
71	05/28/1998	Village of Twin Lakes	X	X	--	--	0 knots	0	0	14,524.00	4,078.34
72	05/31/1998	Kenosha County	X	X	--	--	0 knots	0	0	2,904.80	4,078.34
73	06/18/1998	Trevor	X	X	--	--	0 knots	0	0	2,904.80	110.38
74	06/25/1998	City of Kenosha	X	X	--	--	50 knots	0	0	--	110.38
75	06/25/1998	Village of Silver Lake	X	X	--	--	0 knots	0	0	72,620.00	110.38
76	06/25/1998	Town of Bristol	X	X	--	--	0 knots	0	0	290,480.00	110.38
77	07/20/1998	Village of Silver Lake	X	X	--	--	0 knots	0	0	7,262.00	--
78	07/21/1998	Kenosha County	X	X	--	--	87 knots	0	0	290,480.00	290,480.00
79	11/18/1998	Kenosha County	--	X	--	--	0 knots	4	14	19,965,135.76	3,070,182.00
80	05/16/1999	Town of Wheatland	X	X	--	--	0 knots	0	0	53,998.00	32,278.02
81	05/16/1999	Kenosha County	--	--	X	--	1.75 inches	0	0	1,421.00	--
82	06/06/1999	Village of Twin Lakes	X	X	--	--	0 knots	0	0	1,421.00	37,490.24
83	07/23/1999	Village of Twin Lakes	X	X	--	--	0 knots	0	0	4,263.00	--
84	03/08/2000	Town of Bristol	--	--	X	--	0.75 inches	0	0	--	--
85	05/17/2000	Town of Somers	--	--	X	--	1.00 inches	0	0	--	--
86	05/18/2000	Town of Somers	--	--	X	--	0.75 inches	0	0	--	--
87	05/18/2000	Kenosha County	--	--	X	--	0.75 inches	0	0	--	--
98	05/18/2000	Kenosha County	--	--	--	X	N/A	0	0	109,984.00	--
89	05/24/2000	Kenosha County	--	X	--	--	0 knots	0	0	5,156.39	--
90	06/13/2000	Powers Lake	X	X	--	--	0 knots	0	0	1,374.80	12,998.73
91	06/13/2000	Powers Lake	X	X	--	--	0 knots	0	0	6,874.00	12,998.73
92	08/05/2000	Village of Twin Lakes	X	X	--	--	0 knots	0	0	1,374.80	--
93	09/11/2000	Kenosha County	--	--	X	--	1.00 inches	0	0	13,748.00	--
94	04/07/2001	Kenosha County	--	X	--	--	57 knots	0	1	--	--
95	05/14/2001	Village of Silver Lake	--	--	X	--	1.00 inch	0	0	--	--

Table III-13 (continued)

Number on Map III-7	Date	City/Village/Town	Event Type				Magnitude	Reported Damages ^a			
			Thunderstorm	High Winds	Hail	Lightning		Deaths	Injuries	Property Damage ^b	Crop Damage ^b
96	05/14/2001	Village of Twin Lakes	--	--	X	--	1.00 inches	0	0	--	38,539.73
97	05/14/2001	Town of Somers	--	--	X	--	1.00 inches	0	0	--	16,478.84
98	06/11/2001	Village of Twin Lakes	X	X	--	--	52 knots	0	0	20,050.50	--
99	07/22/2001	Village of Twin Lakes	X	X	--	--	52 knots	0	0	--	490.57
100	07/22/2001	Village of Twin Lakes	--	--	--	X	N/A	0	4	--	--
101	08/09/2001	Kenosha County	X	X	--	--	52 knots	0	0	33,417.50	--
102	09/19/2001	Kenosha County	--	X	--	--	0 knots	0	0	--	--
103	10/23/2001	Town of Paris	--	--	X	--	0.75 inches	0	0	--	--
104	10/25/2001	City of Kenosha	--	X	--	--	56 knots	0	0	--	--
105	12/05/2001	City of Kenosha	--	X	--	--	0 knots	0	0	170,692.94	--
106	03/09/2002	City of Kenosha	--	X	--	--	0 knots	0	0	114,985.84	--
107	04/18/2002	Village of Silver Lake	X	X	--	--	52 knots	0	0	5,263.60	--
108	06/03/2002	Village of Twin Lakes	X	X	--	--	56 knots	0	0	98,692.50	1,171.15
109	06/03/2002	Kenosha County	--	X	--	--	50 knots	0	0	--	--
110	06/03/2002	Kenosha County	--	--	X	--	0.88 inches	0	0	--	--
111	08/21/2002	Village of Twin Lakes	X	X	--	--	56 knots	0	0	--	--
112	09/29/2002	Trevor	--	--	--	X	N/A	0	0	1,315,900.00	--
113	05/11/2003	Kenosha County	--	X	--	--	50 knots	0	0	64,330.00	--
114	07/06/2003	Village of Silver Lake	X	X	--	--	52 knots	0	0	--	--
115	07/06/2003	Kenosha County	X	X	--	--	52 knots	0	0	--	--
116	07/15/2003	New Munster	X	X	--	--	52 knots	0	0	--	--
117	07/15/2003	Kenosha County	--	--	--	X	N/A	0	0	46,031.00	--
118	08/25/2003	Town of Paris	--	--	X	--	1.00 inches	0	0	--	--
119	11/12/2003	Kenosha County	X	X	--	--	39 knots	0	0	78,283.18	--
120	03/07/2004	Kenosha County	--	X	--	--	49 knots	0	0	3,446.30	--
121	03/14/2004	Kenosha County	--	X	--	--	39 knots	0	0	3,258.32	--
122	04/18/2004	Kenosha County	--	X	--	--	43 knots	0	0	17,544.80	--
123	05/08/2004	Kenosha	--	--	X	--	0.75 inches	0	0	--	--
124	05/20/2004	Paddock Lake	X	X	--	--	61 knots	0	0	31,330.00	240,980.33
125	05/20/2004	Salem	--	--	X	--	1.00 Inches	0	0	--	--
126	05/20/2004	Pleasant Prairie	--	--	X	--	1.50 inches	0	0	--	--
127	05/20/2004	Pleasant Prairie	--	--	X	--	1.00 inches	0	0	--	--
128	05/21/2004	Kenosha	X	X	--	--	52 knots	0	0	--	240,980.33
129	05/21/2004	Twin Lakes	--	--	X	--	52 knots	0	0	--	--
130	05/28/2004	Kenosha	--	--	X	--	0.75 inches	0	0	--	--
131	08/27/2004	Twin Lakes	X	X	--	--	56 knots	0	0	12,532.00	--
132	08/27/2004	Paddock Lake	X	X	--	--	61 knots	0	0	--	--
133	10/29/2004	Kenosha	X	X	--	--	52 knots	0	0	--	--
134	12/12/2004	Kenosha County	--	X	--	--	40 knots	0	0	2,130.44	--
135	03/30/2005	Kenosha	X	X	--	--	52 Knots	0	0	3,636.60	--
136	06/04/2005	Trevor	X	X	--	--	52 Knots	0	0	--	--
137	06/04/2005	Paris	X	X	--	--	52 Knots	0	0	--	--
138	06/05/2005	Kenosha	--	--	X	--	1.75 inches	0	0	--	--
139	07/23/2005	New Munster	X	X	--	--	52 knots	0	0	1,212.20	--
140	07/23/2005	Silver Lake	X	X	--	--	52 knots	0	0	1,212.20	--
141	07/23/2005	Silver Lake	X	X	--	--	52 knots	0	0	1,212.20	--
142	07/23/2005	Silver Lake	X	X	--	--	52 knots	0	0	1,212.20	--
143	09/22/2005	Twin Lakes	--	--	X	--	1.75 inches	0	0	--	--
144	09/22/2005	Powers Lake	--	--	X	--	1.75 inches	0	0	--	--

Table III-13 (continued)

Number on Map III-7	Date	City/Village/Town	Event Type				Magnitude	Reported Damages ^a			
			Thunderstorm	High Winds	Hail	Lightning		Deaths	Injuries	Property Damage ^b	Crop Damage ^b
145	09/22/2005	Twin Lakes	--	--	X	--	1.50 inches	0	0	--	--
146	10/02/2005	Pleasant Prairie	--	--	--	X	N/A	0	0	6,061.00	--
147	01/24/2006	Kenosha County	--	X	--	--	39 knots	0	0	5,871.50	--
148	03/13/2006	Kenosha County	--	X	--	--	56 knots	0	0	--	--
149	03/31/2006	Kenosha County	--	X	--	--	39 knots	0	0	3,131.47	--
150	05/11/2006	Kenosha County	--	X	--	--	36 knots	0	0	1,346.99	--
151	05/17/2006	Twin Lakes	--	--	X	--	0.75 inches	0	0	--	--
152	05/24/2006	Kenosha	--	--	--	X	N/A	0	0	1,174.30	--
153	07/09/2006	Kenosha	X	X	--	--	56 knots	0	0	58,715.00	--
154	07/09/2006	Silver Lake	X	X	--	--	52 knots	0	0	--	--
155	07/09/2006	Somers	X	X	--	--	52 knots	0	0	--	--
156	07/09/2006	Kenosha	--	--	X	--	0.75 inches	0	0	--	--
157	07/17/2006	Twin Lakes	X	X	--	--	52 knots	0	0	5,871.50	--
158	07/17/2006	Kenosha	X	X	--	--	56 knots	0	0	23,486.00	--
159	07/20/2006	Paddock Lake	X	X	--	--	52 knots	0	0	11,743.00	--
160	07/27/2006	Twin Lakes	X	X	--	--	52 knots	0	0	5,871.50	--
161	08/24/2006	Kenosha	--	--	X	--	0.75 inches	0	0	--	--
162	08/24/2006	Pleasant Prairie	--	--	X	--	0.88 inches	0	0	--	--
163	08/24/2006	Kenosha	--	--	--	X	N/A	0	0	16,440,200.00	--
164	08/24/2006	Pleasant Prairie	--	--	--	X	N/A	0	0	176,145.00	--
165	10/02/2006	Kenosha Regional Airport	X	X	--	--	52 knots	0	0	--	--
166	10/20/2006	Bristol	--	--	X	--	0.75 inches	0	0	--	--
167	03/21/2007	Downtown Kenosha	--	--	X	--	0.75 inches	0	0	--	--
168	03/21/2007	Somers	--	--	X	--	0.75 inches	0	0	--	--
169	06/18/2007	Benet Lake	X	X	--	--	74 knots	0	0	171,270.00	--
170	06/21/2007	Wheatland	--	--	X	--	1.00 inches	0	0	228,360.00	3,092.57
171	06/21/2007	Silver Lake	--	--	X	--	0.88 inches	0	0	--	3,092.57
172	07/09/2007	Twin Lakes	X	X	--	--	52 knots	0	0	34,254.00	--
173	07/09/2007	Kenosha Regional Airport	X	X	--	--	50 knots	0	0	86,635.00	--
174	07/10/2007	Bristol	X	X	--	--	50 knots	0	0	--	--
175	07/10/2007	Somers	--	--	--	X	N/A	0	0	3,425.40	--
176	08/14/2007	Brighton	--	--	--	X	N/A	0	0	45,672.00	--
177	12/23/2007	Kenosha County	--	X	--	--	50 knots	0	0	2,283.60	--
178	04/06/2008	Kenosha	--	X	--	--	41 knots	0	0	5,497.50	--
179	06/05/2008	Bristol	X	X	--	--	56 knots	0	0	21,990.00	17,320.42
180	06/08/2008	Silver Lake	X	X	--	--	56 knots	0	0	27,487.50	17,320.42
181	06/08/2008	Somers	X	X	--	--	56 knots	0	0	--	17,320.42
182	06/20/2008	Camp Lake	--	--	X	--	0.88 inches	0	0	--	--
183	06/28/2008	Paddock Lake	X	X	--	--	50 knots	0	0	--	17,320.42
184	06/28/2008	Downtown Kenosha	X	X	--	--	56 knots	0	0	54,975.00	17,320.42
185	10/26/2008	Kenosha County	--	X	--	--	0 knots	0	0	2,199.00	--
186	03/24/2009	Downtown Kenosha	X	X	--	--	56 knots	0	0	--	26,486.30
187	06/08/2009	Downtown Kenosha	X	X	--	--	50 knots	0	0	--	26,486.30
188	06/18/2009	Downtown Kenosha	X	X	--	--	56 knots	0	0	--	26,486.30
189	06/19/2009	Downtown Kenosha	X	X	--	--	56 knots	0	0	--	26,486.30
190	06/19/2009	Downtown Kenosha	X	X	--	--	56 knots	0	0	5,517.50	26,486.30
191	06/19/2009	Pleasant Prairie	--	--	X	--	1.00 inches	0	0	--	--
192	06/19/2009	Downtown Kenosha	--	--	X	--	1.00 inches	0	0	--	--
193	07/23/2009	Silver Lake	--	--	X	--	1.00 inches	0	0	--	--

Table III-13 (continued)

Number on Map III-7	Date	City/Village/Town	Event Type				Magnitude	Reported Damages ^a			
			Thunderstorm	High Winds	Hail	Lightning		Deaths	Injuries	Property Damage ^b	Crop Damage ^b
194	08/09/2009	Downtown Kenosha	--	--	X	--	1.00 inches	0	0	--	--
195	09/27/2009	Kenosha County	--	X	--	--	27 knots	0	0	5,517.50	--
196	10/06/2009	Kenosha County	--	X	--	--	48 knots	0	0	5,517.50	--
197	05/05/2010	Kenosha County	--	X	--	--	39 knots	0	0	10,857.00	--
198	05/26/2010	Paddock Lake	--	--	--	X	N/A	0	0	16,285.50	--
199	06/18/2010	Kenosha Airport	X	X	--	--	51 knots	0	0	--	--
200	6/18/2010	Downtown Kenosha	X	X	--	--	65 knots	0	0	108,570.00	3,013.36
201	6/18/2010	Downtown Kenosha	X	X	--	--	65 knots	0	0	10,857.00	3,013.36
202	6/18/2010	Downtown Kenosha	X	X	--	--	52 knots	0	0	--	3,013.36
203	07/18/2010	Kenosha Airport	X	X	--	--	50 knots	0	0	--	3,013.36
204	07/18/2010	Kenosha Airport	X	X	--	--	52 knots	0	0	54,285.00	--
205	09/07/2010	Kenosha County	--	X	--	--	45 knots	0	0	5,428.50	--
206	09/21/2010	Bristol	--	--	X	--	1.75 inches	0	0	--	--
207	09/21/2010	Silver Lake	X	X	--	--	52 knots	0	0	--	--
208	09/24/2010	Kenosha County	--	X	--	--	39 knots	0	0	1,085.70	--
209	10/26/2010	Kenosha County	--	X	--	--	50 knots	0	0	32,571.00	--
210	10/26/2010	Kenosha Airport	X	X	--	--	59 knots	0	0	--	6,303.57
211	01/01/2011	Kenosha County	--	X	--	--	38 knots	0	0	4,209.60	--
212	02/18/2011	Kenosha County	--	X	--	--	27 knots	0	0	2,104.80	--
213	04/15/2011	Kenosha County	--	X	--	--	35 knots	0	0	3,157.20	--
214	05/15/2011	Kenosha County	--	X	--	--	30 knots	0	0	5,262.00	--
215	05/22/2011	Silver Lake	X	X	--	--	70 knots	0	0	105,240.00	211,315.61
216	06/15/2011	Kenosha County	--	X	--	--	58 knots	0	0	10,524.00	--
217	06/30/2011	Somers	X	X	--	--	65 knots	1	3	105,240.00	14,054.80
218	07/11/2011	Salem	X	X	--	--	56 knots	0	0	--	--
219	07/11/2011	Downtown Kenosha	X	X	--	--	53 knots	0	0	--	--
220	08/02/2011	Twin Lakes	X	X	--	--	50 knots	0	0	--	--
221	08/02/2011	Pleasant Prairie	X	X	--	--	55 knots	0	0	--	--
222	09/29/2011	Kenosha County	--	X	--	--	46 knots	0	0	2,104.80	--
223	10/19/2011	Kenosha County	--	X	--	--	53 knots	0	0	10,524.00	--
224	11/13/2011	Kenosha County	--	X	--	--	43 knots	0	0	1,052.40	--
225	11/29/2011	Kenosha County	--	X	--	--	40 knots	0	0	1,052.40	--
226	01/01/2012	Kenosha County	--	X	--	--	39 knots	0	0	2,062.20	--
227	03/10/2012	Kenosha County	--	X	--	--	39 knots	0	0	2,062.20	--
228	04/15/2012	Kenosha County	--	X	--	--	43 knots	0	0	1,031.10	--
229	04/16/2012	Kenosha County	--	X	--	--	41 knots	0	0	1,031.10	--
230	04/16/2012	Kenosha County	--	X	--	--	43 knots	0	0	1,031.10	--
231	04/16/2012	Kenosha County	--	X	--	--	41 knots	0	0	1,031.10	--
232	06/18/2012	Kenosha County	--	X	--	--	39 knots	0	0	10,311.00	--
233	09/04/2012	Wheatland	X	X	--	--	50 knots	0	0	5,155.50	--
234	09/04/2012	Benet Lake	X	X	--	--	50 knots	0	0	5,155.50	--
235	10/30/2012	Kenosha County	--	X	--	--	38 knots	0	0	5,155.50	--
236	11/11/2012	Kenosha County	--	X	--	--	43 knots	0	0	3,093.30	--
237	01/18/2013	Kenosha County	--	X	--	--	39 knots	0	0	5,081.00	--
238	01/19/2013	Kenosha County	--	X	--	--	50 knots	0	0	15,243.00	--
239	04/11/2013	Kenosha County	--	X	--	--	38 knots	0	0	4,064.80	--
240	08/30/2013	Twin Lakes	X	X	--	--	55 knots	0	0	3,048.60	--
241	08/30/2013	Paddock Lake	X	X	--	--	50 knots	0	0	1,016.20	--
242	11/17/2013	Bristol	X	X	--	--	51 knots	0	0	28,453.60	--

Table III-13 (continued)

Number on Map III-7	Date	City/Village/Town	Event Type				Magnitude	Reported Damages ^a			
			Thunderstorm	High Winds	Hail	Lightning		Deaths	Injuries	Property Damage ^b	Crop Damage ^b
243	11/17/2013	Kenosha County	--	X	--	--	42 knots	1	0	--	--
244	02/20/2014	Kenosha County	--	X	--	--	36 knots	0	0	--	--
245	04/12/2014	Kenosha County	--	--	X	--	0.88 inches	0	0	--	--
246	04/13/2014	Kenosha County	--	--	X	--	0.75 inches	0	0	--	--
247	06/30/2014	Downtown Kenosha	X	X	--	--	50 knots	0	0	3,000.00	84,048.70
248	07/12/2014	Truesdell	X	X	--	--	87 knots	0	0	70,000.00	39,891.50
249	07/29/2014	Salem	X	X	--	--	50 knots	0	0	3,000.00	39,891.50
250	08/26/2014	Salem	--	--	--	X	N/A	0	0	5,000.00	--
--	Total	--	130	182	51	16	--	7	35	45,989,163.69	5,083,168.34

^aDeaths, injuries, and property damages reported were based upon a geographic area impacted by the hazard event, which affected Kenosha County and, in some cases, a larger area of impact than the County itself, generally within the southeast regional area of Wisconsin.

^bDollar values were adjusted to year 2014 by using the average annual Consumer Price Index (CPI) values from the U.S. Department of Labor, Bureau of Labor Statistics.

Source: The National Climatic Data Center (NCDC) a part of the Department of Commerce, National Oceanic and Atmospheric Administration (NOAA), the National Environmental Satellite, Data and Information Service (NESDIS), and the U.S. Department of Agriculture Risk Management Agency.

Table III-14

FUJITA SCALE CHARACTERISTICS

F-Scale	Wind Speed (miles per hour) ^a	Character of Damage	Relative Frequency (percent)
F0 (weak)	40-72	Light damage	29
F1 (weak)	73-112	Moderate damage	40
F2 (strong)	113-157	Considerable damage	24
F3 (strong)	158-206	Severe damage	6
F4 (violent)	207-260	Devastating damage	2
F5 (violent)	261-318	Incredible damage (rare)	<1

^aEquivalent wind speeds associated with the Fujita Scale represent the fastest one-quarter mile wind.

Source: National Oceanic and Atmospheric Administration.

Table III-15

ENHANCED FUJITA SCALE CHARACTERISTICS

EF-Scale	Wind Speed (miles per hour) ^a	Character of Damage	Relative Frequency (percent)
EF0 (weak)	65-85	Light damage	53
EF1 (weak)	86-110	Moderate damage	32
EF2 (strong)	111-135	Considerable damage	11
EF3 (strong)	136-165	Severe damage	3
EF4 (violent)	166-200	Devastating damage	1
EF5 (violent)	> 200	Incredible damage (rare)	<1

^aEquivalent wind speeds associated with the Enhanced Fujita Scale represent a three-second gust of wind.

Source: National Oceanic and Atmospheric Administration.

Table III-16

TORNADO EVENTS REPORTED IN KENOSHA COUNTY: JULY 1963 THROUGH DECEMBER 2014

Number on Map III-8	Date	City/Town/Village	Magnitude (Fujita)	Length (miles)	Width (yards)	Deaths	Injuries	Property Damage ^a	Crop Damage ^a
1	July 19, 1963	Village of Twin Lakes	F0	11	33	0	0	193,443.00	0.00
2	June 9, 1974	Town of Somers	F1	2	50	0	0	1,201,033.16	0.00
3	March 28, 1994	Kenosha County	N/A	N/A	N/A	0	0	0.00	0.00
4	July 24, 1996	Wilmot – Town of Salem	F0	7	50	0	0	0.00	0.00
5	July 18, 1997	Wilmot – Town of Salem	N/A	N/A	N/A	0	0	0.00	0.00
6	July 18, 1997	Village of Twin Lakes	N/A	N/A	N/A	0	0	0.00	0.00
7	June 6, 1999	Town of Salem	N/A	N/A	N/A	0	0	0.00	0.00
8	August 25, 2001	Town of Paris	F0	0	30	0	0	132,371.72	0.00
9	January 7, 2008	Town of Wheatland	EF3	9 ^b	200	0	15	15,063,150.00	0.00
10	January 7, 2008	Town of Somers	EF1	2	75	0	0	8,686,050.00	0.00
11	June 19, 2009	City of Kenosha	EF0	1	50	0	0	0.00	0.00
12	October 26, 2010	Town of Somers	EF1	<1	100	0	0	108,570.00	0.00
13	November 22, 2010	Town of Brighton	EF0	<1	125	0	0	2,171.40	0.00
Total	--	--	--	--	--	0	15	25,386,789.28	0.00

NOTE: N/A indicates data not available.

^aDollar values were adjusted to year 2014 by using the average annual Consumer Price Index (CPI) values from the U.S. Department of Labor, Bureau of Labor Statistics.

^bPath length in Kenosha County. When the portion of Walworth County in this tornado's path is included, total path length was 10.8 miles.

Source: National Climatic Data Center and SEWRPC.

Table III-17

**AVERAGE AND DEPARTURE FROM AVERAGE TEMPERATURE
CHARACTERISTICS WITHIN KENOSHA COUNTY: 1990-2014**

Date	Burlington Inland Site				Kenosha Lakeshore Site			
	High Temperature (°F)	Low Temperature (°F)	Average Annual Temperature (°F)	Departure from Average Temperature ^a (°F)	High Temperature (°F)	Low Temperature (°F)	Average Annual Temperature (°F)	Departure from Average Temperature ^a (°F)
1990	N/A	N/A	N/A	N/A	96	-8	46.5	-1.5
1991	98	-10	-- ^b	-- ^a	98	-5	48.8	0.8
1992	90	-15	45.9	0.0	89	-9	46.3	-1.7
1993	92	-13	45.1	-0.8	94	-5	46.3	-1.7
1994	96	-26	45.6	-0.3	94	-24	47.3	-0.7
1995	105	-8	45.9	0.0	103	-7	47.0	-1.0
1996	95	-27	43.5 ^b	-2.4	94	-23	45.0	-3.0
1997	93	-13	44.5	-1.4	94	-11	46.7	-1.3
1998	94	-7	49.4	3.5	96	-3	51.3 ^c	3.3
1999	100	-22	47.2 ^b	1.3	104	-14	49.6	1.6
2000	96	-15	46.1 ^b	0.2	90	-5	48.7	0.7
2001	94	-8	-- ^b	-- ^a	97	1	49.6	1.6
2002	97	-9	47.1	1.2	98	-7	49.7	1.7
2003	94	-- ^b	-- ^b	-- ^a	98	-5	47.2	-0.8
2004	90	-13	45.7	-0.2	91	-10	48.6	0.6
2005	95	10	46.9	1.0	101	-2	49.6	1.6
2006	95	14	47.6	1.6	98	11	49.9	1.9
2007	90	-19	46.5 ^c	0.6	94	-13	48.9	0.9
2008	92	-10	44.3	-1.6	90	-8	46.7 ^c	-1.3
2009	92	-23	44.4	-1.6	91	-17	46.3	-1.7
2010	91	-8	47.5	1.6	92	-13	49.4	1.4
2011	97	-14	46.4 ^c	0.5	100	-9	48.6 ^c	0.6
2012	102	-4	48.6 ^c	2.7	105	0	51.8	3.8
2013	94	-10	44.2 ^c	-1.7	96	-5	46.6 ^c	-1.4
2014	87	-19	42.6	-3.3	91	-14	44.8	-3.3
Average	95.0	-11.7	45.9	0.0	95.8	-8.2	48.0	0.0

NOTE: N/A indicates data not available.

^aThe average temperature is for the period 1990 through 2014.

^bTen or more daily values missing.

^cAverage and/or total values computed with one to nine daily values missing.

Source: National Oceanic and Atmospheric Administration and SEWRPC.

Table III-18
HEAT INDEX CHART

Temperature (°F)	Relative Humidity (percent)												
	100	95	90	85	80	75	70	65	60	55	50	45	40
	Heat Index (°F)												
80	87.2	86.4	85.6	84.9	84.2	83.6	83.0	82.4	81.8	81.3	80.8	80.3	79.9
82	94.5	93.0	91.5	90.1	88.8	87.6	86.4	85.4	84.4	83.6	82.8	82.5	81.5
84	102.7	100.3	98.0	95.9	94.0	92.2	90.5	88.9	87.5	86.3	85.1	84.1	83.3
86	111.5	108.3	105.3	102.5	99.8	97.3	95.1	93.0	91.1	89.4	87.9	86.6	85.4
88	121.2	117.1	113.2	109.6	106.3	103.1	100.2	97.6	95.1	93.0	91.0	89.4	87.4
90	131.6	126.6	121.9	117.5	113.3	109.5	105.9	102.7	99.7	97.0	94.6	92.5	90.7
92	142.8	136.9	131.3	126.0	121.0	116.4	112.2	108.3	104.7	101.4	98.5	96.0	93.8
94	154.8	147.9	141.3	135.2	129.4	124.0	119.0	114.4	110.2	106.3	102.9	99.8	97.2
96	167.5	159.6	152.1	145.0	138.3	132.1	126.4	121.0	116.1	111.7	107.6	104.0	100.9
98	181.0	172.0	163.5	155.5	147.9	140.9	134.3	128.2	122.6	117.4	112.8	108.6	104.9
100	195.3	185.2	175.7	166.7	158.2	150.2	142.8	135.9	129.5	123.6	118.3	113.5	109.3
102	210.4	199.2	188.5	178.5	169.0	160.1	151.8	144.1	136.9	130.3	124.3	118.8	113.9
104	226.2	213.8	202.1	191.0	180.5	170.7	161.4	152.8	144.8	137.4	130.6	124.4	118.9
106	242.7	229.2	216.4	204.2	192.6	181.8	171.6	162.0	153.1	144.9	137.3	130.4	124.2
108	260.1	245.4	231.3	218.0	205.4	193.5	182.3	171.1	161.9	152.8	144.4	136.7	129.8
110	278.2	262.2	247.0	232.5	218.8	205.8	193.5	182.0	171.2	161.2	152.0	143.4	135.7

Source: National Weather Service.

Table III-19

LEVEL OF RISK FOR PERSONS IN HIGH RISK GROUPS ASSOCIATED WITH THE HEAT INDEX

Heat Index (degrees Fahrenheit)	Category	Possible Heat Disorders for Persons in High-Risk Groups
80-90	Caution	Fatigue possible with prolonged exposure and/or physical activity
90-105	Extreme Caution	Sunstroke, muscle cramps, and/or heat exhaustion possible with prolonged exposure and/or physical activity
105-129	Danger	Sunstroke, muscle cramps and/or heat exhaustion likely. Heatstroke possible with prolonged exposure and/or physical activity
130 or Above	Extreme Danger	Heat stroke or sunstroke likely

Source: National Weather Service.

Table III-20
WIND CHILL TEMPERATURES^a

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

^aWind Chill (°F) = 35.74 + 0.6215T - 35.75(V^{0.16}) + 0.4275T(V^{0.16}), where T = air temperature (°F) and V = wind speed (mph). The wind chill temperature is only defined for temperatures at or below 50°F and wind speeds above 3 mph. Bright sunshine may increase wind chill temperature by 10°F to 18°F.

Frostbite times associated with wind chills:

- 30 minutes
- 10 minutes
- 5 minutes

Source: National Weather Service.

Table III-21

EXTREME TEMPERATURE EVENTS IN KENOSHA COUNTY:
 JANUARY 1994 THROUGH DECEMBER 2014

Beginning Date	End Date	Type	Deaths	Injuries	Property Damage (dollars) ^a	Crop Damage (dollars) ^a
January 13, 1994.....	January 20,1994	Cold	0	0	0.00	0.00
June 14, 1994.....	June 23, 1994	Heat wave	0	0	0.00	0.00
October 12, 1995.....	October 12, 1995	Record warmth	0	0	0.00	0.00
December 9, 1995.....	December 9, 1995	Extreme cold	0	0	0.00	0.00
January 30, 1996.....	January 30, 1996	Extreme wind chill	1	0	0.00	0.00
January 31, 1996.....	January, 31, 1996	Extreme cold	0	0	0.00	65,544.29
February 1, 1996.....	February 4, 1996	Extreme cold	0	0	0.00	15,773.00
January 17, 1997.....	January 17,1997	Extreme cold	0	1	1,843.75	0.00
March 26, 1998.....	March 26,1998	Record warmth	0	0	0.00	0.00
July 19, 1998.....	July 19, 1998	Excessive heat	0	10	0.00	0.00
November 23, 1998.....	November 30, 1998	Excessive heat	0	0	0.00	0.00
December 1, 1998.....	December 6, 1998	Excessive heat	0	0	0.00	0.00
January 5, 1999.....	January 5, 1999	Extreme cold	0	0	0.00	0.00
July 4, 1999.....	July 5, 1999	Excessive heat	0	0	0.00	0.00
July 23, 1999.....	July 24, 1999	Excessive heat	0	0	0.00	0.00
July 29, 1999.....	July 31, 1999	Excessive heat	0	0	0.00	0.00
November 8, 1999.....	November 10, 1999	Record warmth	0	0	0.00	0.00
November 13, 1999.....	November 13, 1999	Record warmth	0	0	0.00	0.00
January 22, 2000.....	January 22, 2000	Extreme cold	0	0	13,748.00	0.00
July 21,2001.....	July 22, 2001	Excessive heat	0	0	0.00	0.00
July 31, 2001.....	July 31, 2001	Excessive heat	0	0	0.00	0.00
August 6, 2001.....	August 9, 2001	Excessive heat	2	0	0.00	0.00
April 15, 2002.....	April 18, 2002	Excessive heat	0	0	0.00	0.00
June 20, 2002.....	June 20, 2002	Excessive heat	0	0	0.00	0.00
June 22, 2002.....	June 25, 2002	Excessive heat	0	0	0.00	0.00
June 30, 2002.....	June 30, 2002	Excessive heat	0	0	0.00	0.00
July 1, 2002.....	July 3, 2002	Excessive heat	0	0	0.00	0.00
July 8, 2002.....	July 8, 2002	Excessive heat	0	0	0.00	0.00
July 21, 2002.....	July 21, 2002	Excessive heat	0	0	0.00	0.00
July 24, 2005.....	July 24, 2005	Excessive heat	0	0	0.00	0.00
December 18, 2005.....	December 19, 2005	Cold/wind chill	0	0	0.00	0.00
February 17, 2006.....	February 18, 2006	Cold/wind chill	0	0	0.00	0.00
February 18, 2006.....	February 19, 2006	Cold/wind chill	0	0	0.00	0.00
July 16, 2006.....	July 17, 2006	Heat	0	0	0.00	0.00
July 30, 2006.....	July 31, 2006	Heat	0	0	0.00	0.00
August 1, 2006.....	August 2, 2006	Heat	0	0	0.00	0.00
February 3, 2007.....	February 5, 2007	Cold/wind chill	0	0	0.00	0.00
February 5, 2007.....	February 5, 2007	Extreme cold/wind chill	0	0	570.90	0.00
February 5, 2007.....	February 6, 2007	Cold/wind chill	0	0	0.00	0.00
January 19, 2008.....	January 20, 2008	Cold/wind chill	0	0	0.00	0.00
January 25, 2008.....	January 25, 2008	Cold/wind chill	1	0	0.00	0.00
January 30, 2008.....	January 30, 2008	Cold/wind chill	0	0	0.00	0.00
February 10, 2008.....	February 10, 2008	Extreme cold/wind chill	0	0	0.00	0.00
December 15, 2008.....	December 15, 2008	Cold/wind chill	0	0	0.00	0.00
December 21, 2008.....	December 22, 2008	Cold/wind chill	0	0	0.00	0.00
January 14, 2009.....	January 15, 2009	Cold/wind chill	0	0	0.00	0.00
January 15, 2009.....	January 16, 2009	Extreme cold/wind chill	0	0	0.00	0.00
June 23, 2009.....	June 23, 2009	Heat	0	0	0.00	0.00
January 1, 2011.....	January 1, 2011	Cold/wind chill	0	0	0.00	0.00
July 17, 2011.....	July 18, 2011	Heat	0	0	0.00	0.00
July 20, 2011.....	July 21, 2011	Heat	0	0	0.00	0.00
June 28, 2012.....	June 28, 2012	Heat	0	0	0.00	0.00
July 3, 2012.....	July 6, 2012	Excessive Heat	0	0	0.00	0.00
July 16, 2012.....	July 17, 2012	Heat	0	0	0.00	0.00
July 23, 2012.....	July 23, 2012	Heat	0	0	0.00	0.00
July 25, 2012.....	July 25, 2012	Heat	0	0	0.00	0.00
January 21, 2013.....	January 22, 2013	Cold/wind chill	0	0	0.00	0.00

Beginning Date	End Date	Type	Deaths	Injuries	Property Damage (dollars) ^a	Crop Damage (dollars) ^a
July 16, 2013	July 19, 2013	Excessive Heat	0	0	0.00	0.00
August 30, 2013	August 30, 2013	Heat	0	0	0.00	0.00
January 6, 2014	January 7, 2014	Extreme cold/wind chill	0	0	0.00	46.00
January 27, 2014	January 29, 2014	Cold/wind chill	0	0	0.00	0.00
Total	--	--	4	11	16,162.65	81,363.29

^aDollar values were adjusted to year 2014 by using the average annual Consumer Price Index (CPI) values from the U.S. Department of Labor, Bureau of Labor Statistics.

Source: National Climatic Data Center and U.S. Department of Agriculture Risk Management Agency.

Table III-22

1995 NATIONWIDE HEAT-RELATED FATALITIES BY AGE AND GENDER

Age Group	Female	Male	Total	Percent of Total
0 to 9 Years Old.....	6	6	12	1
10 to 19 Years Old.....	0	2	2	<1
20 to 29 Years Old.....	2	3	5	<1
30 to 39 Years Old.....	7	27	34	3
40 to 49 Years Old.....	15	64	79	8
50 to 59 Years Old.....	22	73	95	9
60 to 69 Years Old.....	50	129	179	18
70 to 79 Years Old.....	131	122	253	25
80 to 89 Years Old.....	145	96	241	24
90 Years Old and Older.....	51	10	61	6
Unknown.....	6	54	60	6
Total	435	586	1,021	100
Percent	43	57	100	--

Source: National Weather Service and SEWRPC.

Table III-23

**LAKE MICHIGAN SHORELINE LENGTH OF
CIVIL DIVISIONS IN KENOSHA COUNTY**

Civil Division	Lake Michigan Shoreline Length (estimated feet)	Percent of County Total
City of Kenosha	18,744	22.7
Village of Pleasant Prairie.....	36,250	43.9
Village of Somers	27,636	33.4
Total	82,630	100.0

Source: SEWRPC.

Table III-24

**COMMUNITIES IN KENOSHA COUNTY WITH
SPECIAL COASTAL HAZARD CONDITIONS**

Community	Reason for Special Consideration
City of Kenosha	Portions of the shoreline have been shown to recede one to two feet per year Damming of the mouth of the Pike River by littoral drift in Lake Michigan
Village of Pleasant Prairie	Portions of the shoreline have been shown to recede one to two feet per year
Village of Somers	One bluff site deemed unstable south of CTH KR Portions of the shoreline have been shown to recede one to two feet per year, and two specific sites have recession rates of more than two feet per year

NOTE: See Map II-7 in Chapter II of this report.

Source: SEWRPC.

Table III-25

WINTER STORM AND ICE STORM EVENTS IN KENOSHA COUNTY: JANUARY 1994 THROUGH DECEMBER 2014

Date	Location (description)	Type	Deaths	Injuries
January 5, 1994	Central and southern Wisconsin	Heavy snow	0	0
January 26, 1994	All but far northwest Wisconsin	Heavy snow/ice storm	0	0
February 7, 1994	Southern and eastern Wisconsin	Heavy snow	0	0
February 12, 1994	Southeast Wisconsin	Heavy snow	0	0
February 22, 1994	Southern half of Wisconsin	Heavy snow	0	0
February 25, 1994	Southern half of Wisconsin	Heavy snow	0	0
December 5, 1994	Southern Wisconsin	Heavy snow	0	0
January 19, 1995	Southeast Wisconsin	Heavy snow	0	0
February 26, 1995	Southern Wisconsin	Ice storm	0	0
December 13, 1995	Southern Wisconsin	Glaze	0	0
December 25, 1996	Southeast Wisconsin	Heavy snow	0	0
January 8, 1998	Eastern one-third of Wisconsin	Winter storm	0	0
March 9, 1999	Southeast Wisconsin	Winter storm	0	0
February 18, 2000	Southern Wisconsin	Winter storm	0	0
April 7, 2000	Southeast Wisconsin	Winter storm	0	0
December 11, 2000	Southeast Wisconsin	Heavy snow	0	0
December 18, 2000	South-central and Southeast Wisconsin	Heavy snow	0	0
January 31, 2002	Southeast Wisconsin	Heavy snow	0	0
March 2, 2002	South-central and Southeast Wisconsin	Heavy snow	0	0
February 3, 2003	South-central and Southeast Wisconsin	Winter weather/ mix	0	0
April 4, 2003	South-central and Southeast Wisconsin	Winter weather/ mix	0	0
April 7, 2003	South-central and Southeast Wisconsin	Winter weather/ mix	0	0
January 4, 2004	South-central and Southeast Wisconsin	Winter weather/ mix	0	0
January 16, 2004	South-central and Southeast Wisconsin	Winter weather/ mix	0	0
February 8, 2004	South-central and Southeast Wisconsin	Winter weather/ mix	0	0
November 30, 2004	South-central and Southeast Wisconsin	Winter weather/ mix	0	0
December 18, 2004	Southern Wisconsin	Winter weather/ mix	0	0
January 6, 2005	Southern Wisconsin	Winter Storm	0	0
January 22, 2005	Southern Wisconsin	Winter Storm	0	0
January 21, 2006	Far Southeastern Wisconsin	Heavy Snow	0	0
February 13, 2007	Far Southeastern Wisconsin	Winter weather	0	0
February 23, 2007	Far Southeastern Wisconsin	Winter weather	0	0
January 21, 2008	Kenosha Forecast Zone	Winter weather	0	0
January 29, 2008	Kenosha Forecast Zone	Winter weather	0	0
January 31, 2008	Kenosha Forecast Zone	Winter storm	0	0
February 1, 2008	Kenosha Forecast Zone	Winter storm	0	0
February 3, 2008	Far Southeastern Wisconsin	Winter weather	0	0
February 5, 2008	Kenosha Forecast Zone	Winter storm	0	0
February 9, 2008	Kenosha Forecast Zone	Winter weather	0	0
February 11, 2008	Kenosha Forecast Zone	Winter weather	0	0
February 17, 2008	Kenosha Forecast Zone	Winter weather	0	0
February 25, 2008	Southern Wisconsin	Winter weather	0	0
March 21, 2008	Kenosha Forecast Zone	Winter storm	0	0
November 24, 2008	Kenosha Forecast Zone	Winter weather	0	0
November 30, 2008	Kenosha Forecast Zone	Winter storm	0	0
December 1, 2008	Kenosha Forecast Zone	Winter storm	0	0
December 3, 2008	Kenosha Forecast Zone	Winter weather	0	0
December 16, 2008	Kenosha Forecast Zone	Winter weather	0	0
December 18, 2008	Kenosha Forecast Zone	Winter storm	0	0
December 21, 2008	Kenosha Forecast Zone	Winter storm	0	0
December 23, 2008	Kenosha Forecast Zone	Winter weather	0	0
December 24, 2008	Kenosha Forecast Zone	Winter weather	0	0
December 25, 2008	Kenosha Forecast Zone	Winter weather	0	0
January 3, 2009	Kenosha Forecast Zone	Winter weather	0	0

Date	Location (description)	Type	Deaths	Injuries
January 9, 2009.....	South-central and Southeast Wisconsin	Winter weather	0	0
January 12, 2009.....	Kenosha Forecast Zone	Winter weather	0	0
January 13, 2009.....	Kenosha Forecast Zone	Winter weather	0	0
January 14, 2009.....	Kenosha Forecast Zone	Winter storm	0	0
February 21, 2009.....	Kenosha Forecast Zone	Winter storm	0	0
February 26, 2009.....	Kenosha Forecast Zone	Winter weather	0	0
March 28, 2009.....	Kenosha Forecast Zone	Winter storm	0	0
December 8, 2009.....	Kenosha Forecast Zone	Winter storm	0	0
December 23, 2009.....	Kenosha Forecast Zone	Winter weather	0	0
January 7, 2010.....	Kenosha Forecast Zone	Winter storm	0	1
January 9, 2010.....	Kenosha Forecast Zone	Winter storm	0	0
February 24, 2010.....	Kenosha Forecast Zone	Winter weather	0	0
March 19, 2010.....	Kenosha Forecast Zone	Winter weather	0	0
December 3, 2010.....	Kenosha Forecast Zone	Winter weather	0	0
December 9, 2010.....	Kenosha Forecast Zone	Winter weather	0	0
December 12, 2010.....	Kenosha Forecast Zone	Winter weather	0	0
December 20, 2010.....	Kenosha Forecast Zone	Winter weather	0	0
December 25, 2010.....	Kenosha Forecast Zone	Winter weather	0	0
December 25, 2010.....	Kenosha Forecast Zone	Winter storm	0	0
January 17, 2011.....	Kenosha County	Lake effect snow	0	0
February 1, 2011.....	Kenosha Forecast Zone	Blizzard	0	0
February 21, 2011.....	Kenosha Forecast Zone	Winter weather	0	0
December 29, 2011.....	Kenosha Forecast Zone	Winter weather	0	0
January 12, 2012.....	Kenosha Forecast Zone	Winter weather	0	0
January 17, 2012.....	Kenosha Forecast Zone	Winter weather	0	0
January 20, 2012.....	Kenosha Forecast Zone	Winter weather	0	0
February 23, 2012.....	Kenosha Forecast Zone	Winter weather	0	0
March 2, 2012.....	Kenosha Forecast Zone	Winter storm	0	0
January 27, 2013.....	Kenosha Forecast Zone	Winter weather	0	0
January 30, 2013.....	Kenosha Forecast Zone	Winter weather	0	0
February 7, 2013.....	Kenosha Forecast Zone	Winter storm	0	0
February 22, 2013.....	Kenosha Forecast Zone	Winter weather	0	0
February 26, 2013.....	Kenosha Forecast Zone	Winter storm	0	0
March 5, 2013.....	Kenosha Forecast Zone	Winter storm	0	0
March 18, 2013.....	Kenosha Forecast Zone	Winter weather	0	0
November 25, 2013.....	Kenosha Forecast Zone	Winter weather	0	0
December 8, 2013.....	Kenosha Forecast Zone	Winter weather	0	0
December 19, 2013.....	Kenosha Forecast Zone	Winter weather	0	0
December 22, 2013.....	Kenosha Forecast Zone	Winter storm	0	0
December 31, 2013.....	Kenosha Forecast Zone	Winter weather	0	0
January 1, 2014.....	Kenosha Forecast Zone	Winter weather	0	0
January 10, 2014.....	Kenosha Forecast Zone	Winter weather	0	0
January 14, 2014.....	Kenosha Forecast Zone	Winter weather	0	0
January 24, 2014.....	Kenosha Forecast Zone	Winter weather	0	0
January 26, 2014.....	Kenosha Forecast Zone	Winter weather	0	0
January 26, 2014.....	Kenosha Forecast Zone	Winter weather	0	0
February 4, 2014.....	Kenosha Forecast Zone	Winter weather	0	0
February 13, 2014.....	Kenosha Forecast Zone	Winter weather	0	0
February 17, 2014.....	Kenosha Forecast Zone	Winter storm	0	0
March 4, 2014.....	Kenosha Forecast Zone	Winter weather	0	0
November 22, 2014.....	Kenosha Forecast Zone	Winter weather	0	0
--	--	Total	0	1

Source: National Climatic Data Center.

Table III-26

ESTIMATES OF CROP LOSSES DUE TO DROUGHT IN KENOSHA COUNTY: 1980-2014

Year	NCDC Loss Estimate (dollars) ^a	Crop Insurance Indemnity Paid (dollars) ^a	Loss Estimate Used in Risk Assessment (dollars) ^{a,b}
1980	--	--	--
1981	--	--	--
1982	--	--	--
1983	--	--	--
1984	--	--	--
1985	--	11,605.53	11,605.53
1986	--	--	--
1987	--	--	--
1988	--	284,142.19	284,142.19
1989	--	2,638.51	2,638.51
1990	--	--	--
1991	--	206,315.95	206,315.95
1992	--	59,025.25	59,025.25
1993	--	--	--
1994	--	31,301.85	31,301.85
1995	--	61,135.61	61,135.61
1996	--	15,655.31	15,655.31
1997	--	--	--
1998	--	694.25	694.25
1999	--	97,730.70	97,730.70
2000	--	11,794.41	11,794.41
2001	--	111,543.60	111,543.60
2002	657,850.00	335,853.21	657,850.00
2003	--	288,460.87	288,460.87
2004	--	40,368.08	40,368.08
2005	--	686,627.66	686,627.66
2006	--	8,507.80	8,507.80
2007	--	3,139.95	3,139.95
2008	--	324,460.25	324,460.25
2009	--	22,587.54	22,587.54
2010	--	--	--
2011	--	397.39	397.39
2012	--	753,219.58	753,219.58
2013	--	77,809.21	77,809.21
2014	--	--	--
Total	657,850.00	3,435,014.70	3,757,011.49

^aDollar values were adjusted to year 2014 by using the average annual Consumer Price Index (CPI) values from the U.S. Department of Labor, Bureau of Labor Statistics.

^bFor those years in which loss estimates were available from both the NCDC and crop insurance indemnities, the larger value was used.

Source: National Climatic Data Center (NCDC), the U.S. Department of Agriculture Risk Management Agency, and SEWRPC

Table III-27

**MOTOR VEHICLE RELATED-ACCIDENTS, FATALITIES, AND
ECONOMIC LOSSES REPORTED IN KENOSHA COUNTY: 1999-2013**

Year	Registered Vehicles	Automobile Accidents	Fatalities	Injuries	Economic Losses (2014 dollars) ^a
1999	115,473	3,415	14	2,009	49,185,626
2000	118,192	3,798	24	2,163	58,063,028
2001	122,157	3,399	30	2,151	63,503,944
2002	124,702	3,599	20	2,170	63,134,908
2003	128,428	3,633	24	2,171	62,509,461
2004	130,750	3,797	26	2,199	67,908,402
2005	131,052	3,792	25	2,286	66,925,562
2006	132,743	3,505	25	2,044	72,023,107
2007	135,627	3,865	20	2,083	68,165,232
2008	135,220	3,984	28	1,904	64,921,297
2009	138,860	3,567	16	1,744	54,732,386
2010	136,954	3,214	12	1,579	49,022,612
2011	137,391	3,165	19	1,561	58,724,551
2012	137,634	3,174	17	1,518	51,044,193
2013	139,908	3,334	19	1,486	49,015,289
Total	--	53,241	319	29,068	898,879,898
Average	131,908	3,549	21	1,938	59,925,327

^aThe Wisconsin Department of Transportation reports economic losses for only those accidents occurring in incorporated municipalities with populations of 5,000 or more. Thus, the losses reported here represent a minimum estimate for economic losses related to traffic accidents occurring in Kenosha County.

Source: Wisconsin Department of Transportation and SEWRPC.

Table III-28

MOTOR VEHICLE ACCIDENT TYPES, FATALITIES, INJURIES, AND ECONOMIC LOSSES REPORTED AMONG MUNICIPALITIES WITHIN KENOSHA COUNTY: 2013

Municipality	Types of Accidents					Losses			
	Bike	Pedestrian	Motorcycle	Alcohol	Speed	Fatalities	Injuries	Property Damage Accidents	Total Estimated Economic Loss ^a
Village of Pleasant Prairie.....	3	0	7	26	93	2	286	292	\$13,401,300
Village of Twin Lakes.....	1	1	0	5	8	0	14	22	721,600
City of Kenosha	21	24	27	88	198	4	662	1,132	34,111,000
Total	25	25	34	119	298	6	962	1,446	\$48,233,900

^aEconomic loss was calculated using 2012 National Safety Council estimates plus 3.0 percent to account for inflation. Cost multipliers used were: Fatality, \$1,452,000; Incapacitating injury, \$74,800; Nonincapacitating injury, \$24,100; Possible injury, \$13,600; and Property damage, \$9,200.

Source: Wisconsin Department of Transportation and SEWRPC.

Table III-29

RAILWAY ACCIDENTS REPORTED WITHIN KENOSHA COUNTY: 1975-2014

Year	Type of Accident						Losses		
	Track, Road Bed and Structures	Signals and Communication	Mechanical or Electrical Failure	Human Error	Railway Crossing	Other	Fatalities	Injuries	Damages to Railway Property (2014 dollars) ^a
1975	0	0	2	2	0	1	0	0	53,538.45
1976	0	0	1	1	15	1	2	7	34,874.15
1977	0	0	1	0	15	1	1	2	48,831.25
1978	0	0	0	1	7	1	1	1	50,106.42
1979	1	0	0	1	14	1	1	3	1,096,492.91
1980	1	0	0	0	8	0	0	0	12,928.50
1981	1	0	0	0	8	1	1	6	72,136.67
1982	2	0	0	0	2	1	1	1	431,868.69
1983	2	0	1	0	2	1	0	1	209,426.28
1984	0	0	0	0	8	0	0	2	0.00
1985	0	0	0	0	3	1	0	1	18,692.05
1986	1	0	0	0	5	1	0	1	522,128.16
1987	0	0	1	0	4	2	0	2	255,083.95
1988	1	0	0	2	8	0	0	3	64,435.42
1989	1	0	0	0	6	0	1	3	19,092.00
1990	0	0	1	0	1	0	0	0	10,505.54
1991	0	0	0	0	3	1	3	0	13,035.75
1992	0	0	0	0	2	0	0	2	0.00
1993	0	0	1	0	3	0	0	1	12,287.25
1994	0	0	0	0	4	0	1	0	0.00
1995	1	0	0	0	2	0	0	0	79,223.40
1996	1	0	1	0	4	0	0	1	142,795.85
1997	0	0	0	0	1	0	0	0	0.00
1998	0	0	0	0	2	0	0	1	0.00
1999	0	0	1	0	3	0	0	3	22,844.00
2000	0	0	0	0	3	0	2	0	0.00
2001	0	0	0	0	1	0	0	0	0.00
2002	1	0	0	1	2	0	0	1	46,930.26
2003	0	0	1	2	2	0	0	2	118,235.97
2004	0	0	0	1	7	0	0	1	40,725.24
2005	0	0	1	0	3	0	0	1	10,269.76
2006	0	0	0	0	1	0	0	0	0.00
2007	1	0	0	0	3	0	0	1	20,498.74
2008	0	0	0	0	0	0	0	0	0.00
2009	0	0	0	0	0	0	0	0	0.00
2010	1	0	0	0	0	1	0	0	1,373,646.01
2011	0	0	0	0	1	0	0	0	0.00
2012	0	0	0	0	1	0	1	0	0.00
2013	0	0	0	0	1	0	0	0	0.00
2014	0	0	0	0	4	0	0	2	0.00
Total	15	0	12	12	159	14	15	49	4,780,632.74

^aDollar values were adjusted to year 2014 by using the average annual Consumer Price Index (CPI) values from the U.S. Department of Labor, Bureau of Labor Statistics.

Source: Federal Railroad Administration and SEWRPC.

Table III-30

SUMMARY OF ROADWAY ACCIDENT FATALITIES, INJURIES, AND PROPERTY DAMAGES AMONG WEATHER CONDITIONS REPORTED WITHIN THE STATE OF WISCONSIN: 2013

Weather Conditions	Fatal Crashes	Injury Crashes	Property Damage Crashes	Total Crashes	Total	
					Fatalities	Injuries
Clear	271	14,501	31,588	46,360	287	20,248
Cloudy	137	8,764	20,836	29,737	150	12,140
Snow.....	33	2,399	10,130	12,562	38	3,282
Rain	22	2,225	5,238	7,485	23	3,065
Fog/Smog/Smoke	12	246	474	732	12	327
Sleet/Hail	8	318	1,284	1,610	8	434
Blowing Sand/Dirt/Snow	3	145	478	626	3	204
Severe Crosswinds.....	0	21	54	75	0	23
Other.....	0	10	13	23	0	14
Unknown.....	5	118	18,921	19,044	6	134
Total	491	28,747	89,016	118,254	527	39,872

Source: Wisconsin Department of Transportation Bureau of Transportation Safety and SEWRPC.

Table III-31

TOTAL NUMBER OF ROADWAY ACCIDENTS AMONG WEATHER AND ROAD CONDITIONS REPORTED WITHIN THE STATE OF WISCONSIN: 2013

Weather Conditions	Road Conditions							Total
	Dry	Wet	Snow/Slush	Ice	Sand/Mud/Dirt/Oil	Other	Unknown	
Clear	40,907	1,423	2,417	1,356	115	70	72	46,360
Cloudy	19,306	4,660	3,864	1,757	68	29	53	29,737
Snow.....	61	693	10,525	1,264	0	2	17	12,562
Rain.....	60	6,880	166	366	6	3	4	7,485
Fog/Smog/Smoke.....	234	356	48	84	2	2	6	732
Sleet/Hail	4	153	502	947	1	1	2	1,610
Blowing Sand/Dirt/Snow	3	12	361	248	1	1	0	626
Severe Crosswinds.....	28	12	14	20	0	1	0	75
Other.....	9	4	3	5	0	0	2	23
Unknown.....	202	38	99	25	5	2	18,673	19,044
Total	60,814	14,231	17,999	6,072	198	111	18,829	118,254

Source: Wisconsin Department of Transportation Bureau of Transportation Safety and SEWRPC.

Table III-32

ACTIVE COMMUNITY WATER SUPPLY SYSTEMS IN KENOSHA COUNTY^a

Water System Name	Population Served	Primary Water Source Type
425 Holy Hill Apartments	28	Groundwater
52nd Avenue Water Group	35	Groundwater
Bella Villa Apartments	30	Groundwater
Bristol Heights MHP	45	Groundwater
Village of Bristol Waterworks	598	Groundwater and purchased surface water
Carefree Estates MHP	300	Groundwater
Colonial View Apartments	30	Groundwater
Country Charm Estates Unit 3	35	Groundwater
Country Charm Estates Unit 1	45	Groundwater
Eagle Chateau Apartments	125	Groundwater
Elizabeth Manor Apartments	30	Groundwater
Holy Hill Apartments	50	Groundwater
Kenosha Waterworks	99,218	Surface water
Knolls Water Cooperative	400	Groundwater
Lake View Apartments	30	Groundwater
Lakecrest Mobile Home Park	57	Groundwater
Lakewood Village Apartments	125	Groundwater
Lincoln Crest Apartments	32	Groundwater
Meadowview Village Apartments	46	Groundwater
Oakdale Estates MHP	220	Groundwater
Paddock Lake Waterworks	945	Groundwater
Pleasant Prairie MHP	35	Groundwater
Pleasant Prairie Water Utility	10,754	Purchased surface water
Prairie Apartments 1 & 2	150	Groundwater
Prairie Apartments 3 & 4	125	Groundwater
Rainbow Lake Manor MHP	350	Groundwater
Residences on Main	26	Groundwater
Shady Nook Mobile Home Park 1	50	Groundwater
Shady Nook Mobile Home Park 2	50	Groundwater
Silver Oaks Apartments	60	Groundwater
Silvercrest Apartments	80	Groundwater
Somers Water Utility	1,930	Purchased surface water
Tan Oak Apartments	325	Groundwater
Twin Lakes Complex	50	Groundwater
Twin Lakes Park Water Coop	40	Groundwater
Village Plaza Apartments	28	Groundwater
Wheatland Estates	450	Groundwater
Whispering Pines Apartments	30	Groundwater
--	116,957	--

^aThe St. Benedicts Abbey water system is listed as being considered a private non-transient non-community system as of August 7, 2015. The Van Woods Estates water system is listed as being inactive effective December 16, 2014.

Source: U.S. Environmental Protection Agency, Safe Drinking Water Information System, August 7, 2015 and Wisconsin Department of Natural Resources Public Water Supply System Database, August 7, 2015.

Table III-33

**HUMAN ACTIVITIES THAT MAY CREATE GROUNDWATER
QUALITY PROBLEMS IN KENOSHA COUNTY**

Originating on the Land	Originating Below Land Surface
<p>Above-Ground Storage Tanks</p> <p>Accidental Spills</p> <p>Agricultural Activities: Animal Feedlots Fertilizer and Pesticide Storage, Mixing, and Loading Fertilizer and Pesticide Application Irrigation Return Flow Silage and Crop Residue Piles</p> <p>Highway Deicing</p> <p>Liquid waste Spreading or Spraying (sewage, sludge, septage, whey)</p> <p>Stockpiles (chemicals, salt), Dumps</p> <p>Infiltration of Contaminated Surface Water or Precipitation</p>	<p>Above Water Table</p> <p>Animal waste storage facilities</p> <p>Landfills</p> <p>Leakage: Underground storage tanks Underground pipelines Sewers</p> <p>Septic tanks</p> <p>Surface wastewater impoundments</p> <p>Sumps, dry wells</p> <p>Waste disposal in dry excavations</p> <p>Below Water Table</p> <p>Groundwater development: Abandoned wells and holes Improper well construction Overpumping</p> <p>Illegal drainage or disposal wells</p> <p>Waste disposal in wet excavations</p>

Source: Wisconsin Geological and Natural History Survey and SEWRPC.

Table III-34

PIPELINE TRANSMISSION AND DISTRIBUTION ACCIDENTS IN KENOSHA COUNTY: 1976-2014

Date	Municipality	Accident Type	Fatalities	Injuries	Property Damage ^a
August 29, 1976	City of Kenosha	Natural Gas Distribution	2	4	\$ 295,402
February 6, 1985	Village of Twin Lakes	Natural Gas Distribution	0	0	2,200,099
July 20, 1986	City of Kenosha	Natural Gas Distribution	1	0	151,190
December 2, 2002	Village of Bristol	Hazardous Liquid	0	0	526,360
January 30, 2014	Village of Twin Lakes	Natural Gas Distribution	0	0	141,050
Total	--	--	3	4	\$3,314,101

^aDollar values were adjusted to year 2014 by using the average annual Consumer Price Index (CPI) values from the U.S. Department of Labor, Bureau of Labor Statistics.

Source: U.S. Department of Transportation Office of Pipeline Safety and SEWRPC.

Chapter III

ANALYSIS OF HAZARD CONDITIONS

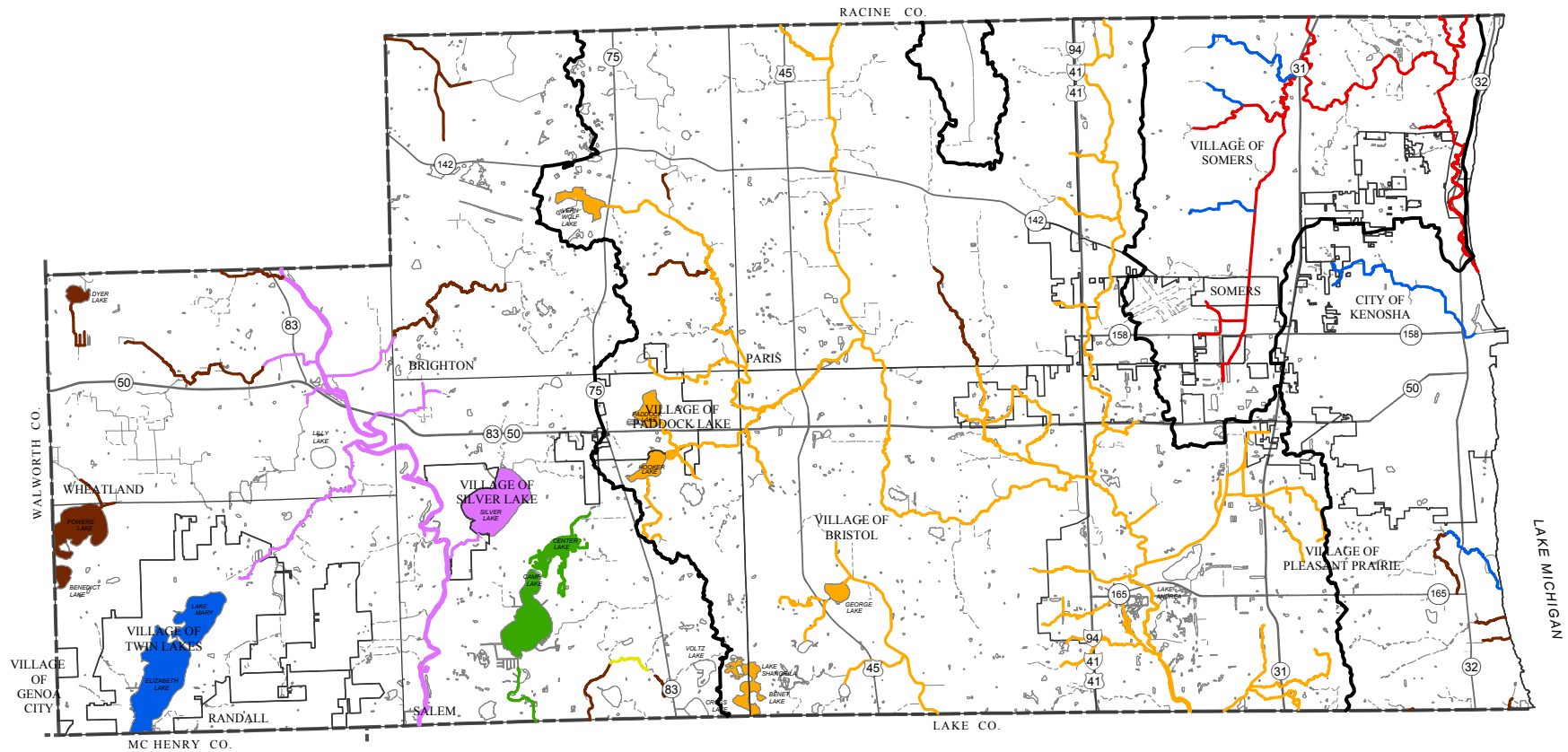
MAPS

KENOSHA CO CH-1 TABLES DRAFT (00224144).DOC
500-1112
LLK/JEB
03/16/16, 04/04/16

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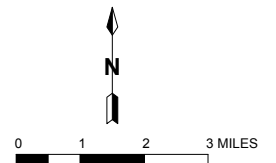
Map III - 1

SOURCES OF FLOOD HAZARD DATA FOR STREAM REACHES IN KENOSHA COUNTY: 2015



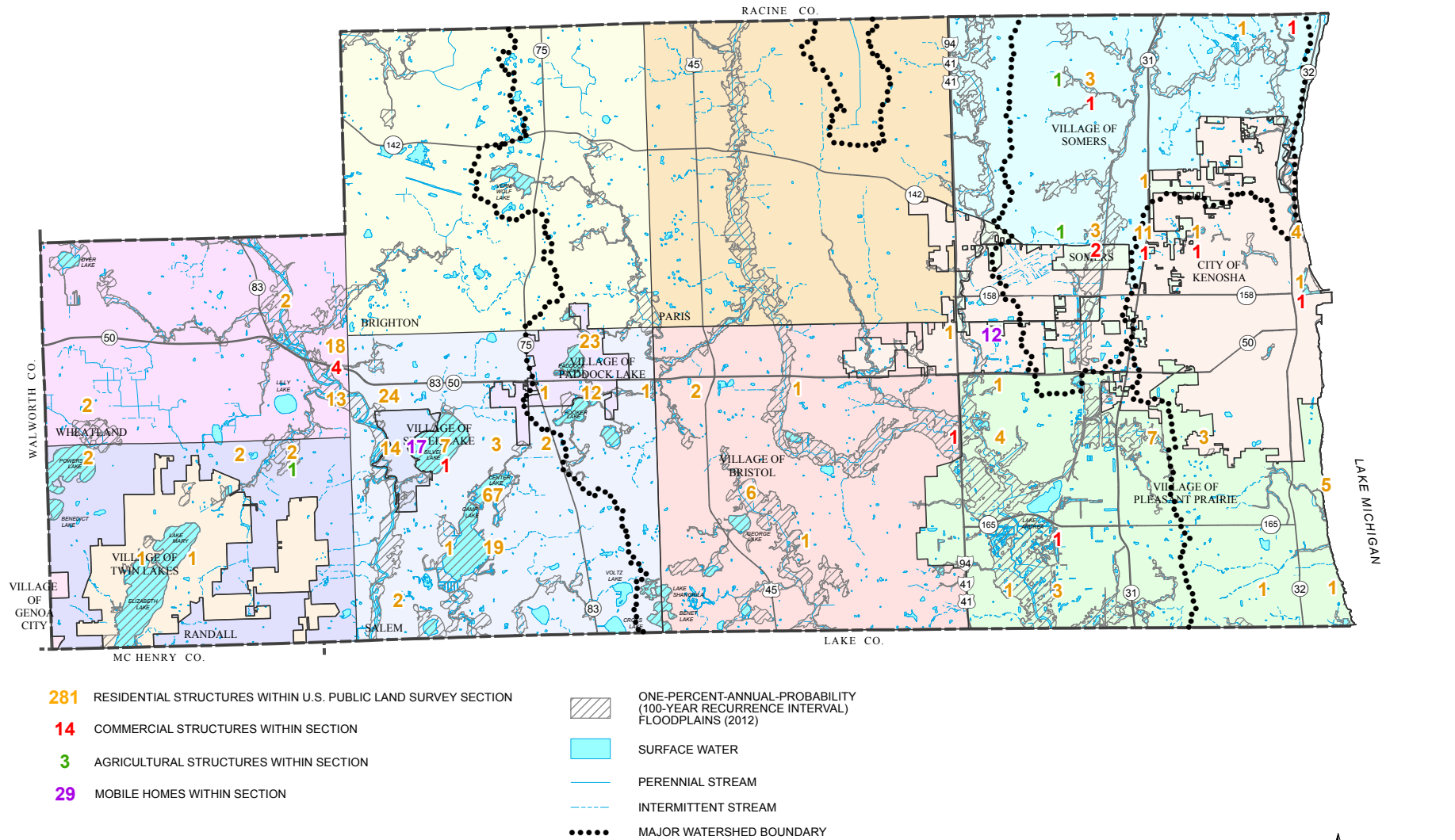
- STREAM REACHES FOR WHICH FLOOD FLOWS AND STAGES WERE DEVELOPED UNDER THE DES PLAINES RIVER WATERSHED STUDY - INCORPORATED IN FLOOD INSURANCE STUDY (FIS)
- STREAM REACHES FOR WHICH FLOOD FLOWS AND STAGES WERE DEVELOPED UNDER THE FOX RIVER WATERSHED STUDY AND INCORPORATED IN THE FIS
- STREAM REACHES FOR WHICH FLOOD FLOWS AND STAGES WERE DEVELOPED UNDER THE PIKE RIVER WATERSHED STUDY - INCORPORATED IN THE FIS
- STREAM REACHES FOR WHICH FLOOD FLOWS AND STAGES WERE DEVELOPED UNDER A SPECIAL STUDY CONDUCTED BY THE COMMISSION AND WERE THEN INCORPORATED IN THE FIS
- STREAM REACHES FOR WHICH FLOOD FLOWS AND STAGES WERE DEVELOPED UNDER A SPECIAL STUDY REVIEWED BY THE COMMISSION AND INCORPORATED IN THE FIS
- STREAM REACHES FOR WHICH FLOOD FLOWS AND STAGES WERE DEVELOPED UNDER THE FIS
- APPROXIMATE DELINEATIONS UNDER THE FIS
- WATERSHED BOUNDARY

Source: Federal Emergency Management Agency and SEWRPC.








Map III - 2

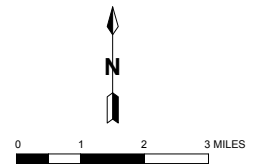
NUMBER OF STRUCTURES WITHIN FLOOD HAZARD AREAS BY CIVIL DIVISION IN KENOSHA COUNTY: 2015



- 281** RESIDENTIAL STRUCTURES WITHIN U.S. PUBLIC LAND SURVEY SECTION
- 14** COMMERCIAL STRUCTURES WITHIN SECTION
- 3** AGRICULTURAL STRUCTURES WITHIN SECTION
- 29** MOBILE HOMES WITHIN SECTION

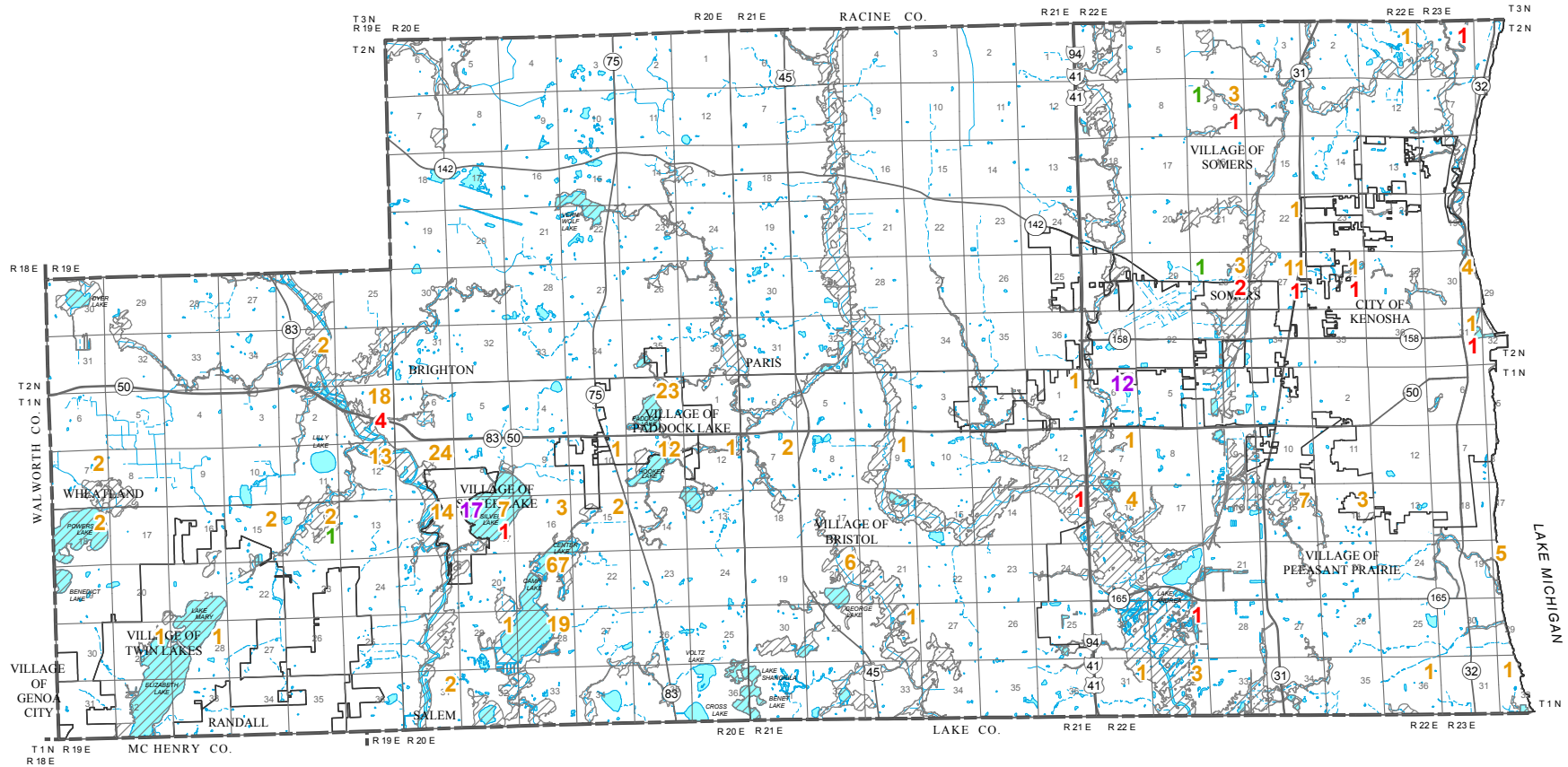
-  ONE-PERCENT-ANNUAL-PROBABILITY (100-YEAR RECURRENCE INTERVAL) FLOODPLAINS (2012)
-  SURFACE WATER
-  PERENNIAL STREAM
-  INTERMITTENT STREAM
-  MAJOR WATERSHED BOUNDARY

Source: Kenosha County and SEWRPC.








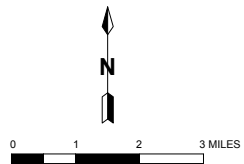
Map III - 3

NUMBER OF STRUCTURES WITHIN FLOOD HAZARD AREAS BY U.S. PUBLIC LAND SURVEY SECTION IN KENOSHA COUNTY: 2015



- 281** RESIDENTIAL STRUCTURES WITHIN U.S. PUBLIC LAND SURVEY SECTION
- 14** COMMERCIAL STRUCTURES WITHIN SECTION
- 3** AGRICULTURAL STRUCTURES WITHIN SECTION
- 29** MOBILE HOMES WITHIN SECTION

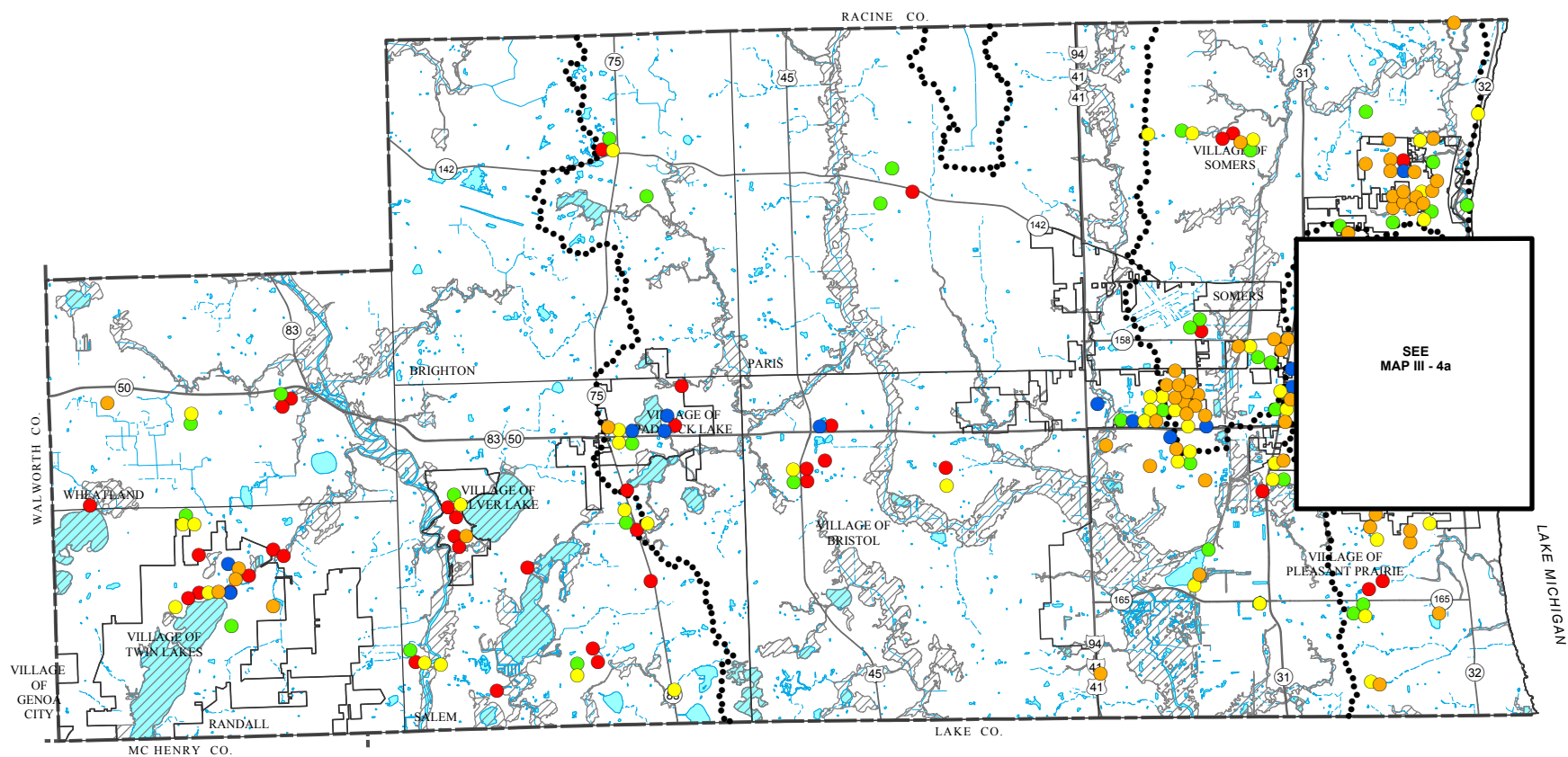
-  ONE-PERCENT-ANNUAL-PROBABILITY (100-YEAR RECURRENCE INTERVAL) FLOODPLAINS (2012)
-  SURFACE WATER
-  PERENNIAL STREAM
-  INTERMITTENT STREAM
-  MAJOR WATERSHED BOUNDARY



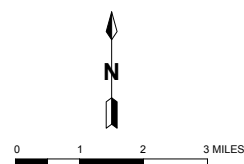
Source: Kenosha County and SEWRPC.

Map III - 4

LOCATIONS OF CRITICAL FACILITIES IN RELATION TO FLOODLANDS IN KENOSHA COUNTY: 2015

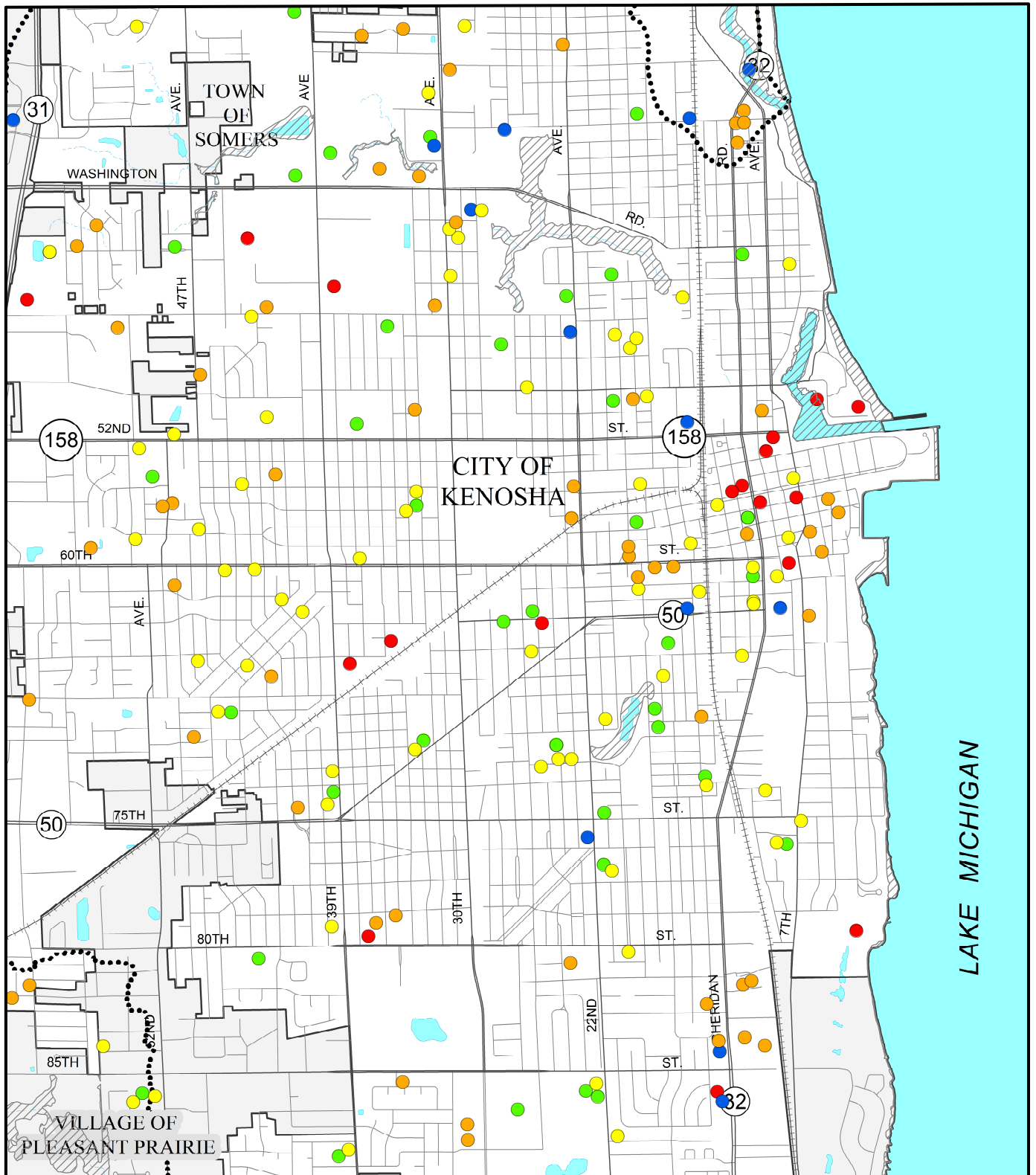


- GOVERNMENT BUILDING
- SCHOOL
- HOSPITAL, CLINIC, OR HEALTH DEPARTMENT
- CHILD - CARE CENTER
- NURSING HOME OR ASSISTED LIVING FACILITY
- ONE-PERCENT-ANNUAL-PROBABILITY (100-YEAR RECURRENCE INTERVAL) FLOODPLAINS (2012)
- SURFACE WATER
- PERENNIAL STREAM
- INTERMITTENT STREAM
- MAJOR WATERSHED BOUNDARY



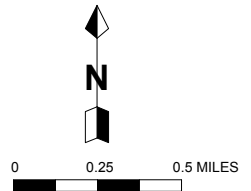
Source: Wisconsin Department of Children and Families, Wisconsin Department of Public Instruction, Kenosha County, and SEWRPC.

LOCATIONS OF CRITICAL FACILITIES IN RELATION TO FLOODLANDS IN THE CITY OF KENOSHA: 2015



- GOVERNMENT BUILDING
- SCHOOL
- HOSPITAL, CLINIC, OR HEALTH DEPARTMENT
- CHILD - CARE CENTER
- NURSING HOME OR ASSISTED LIVING FACILITY

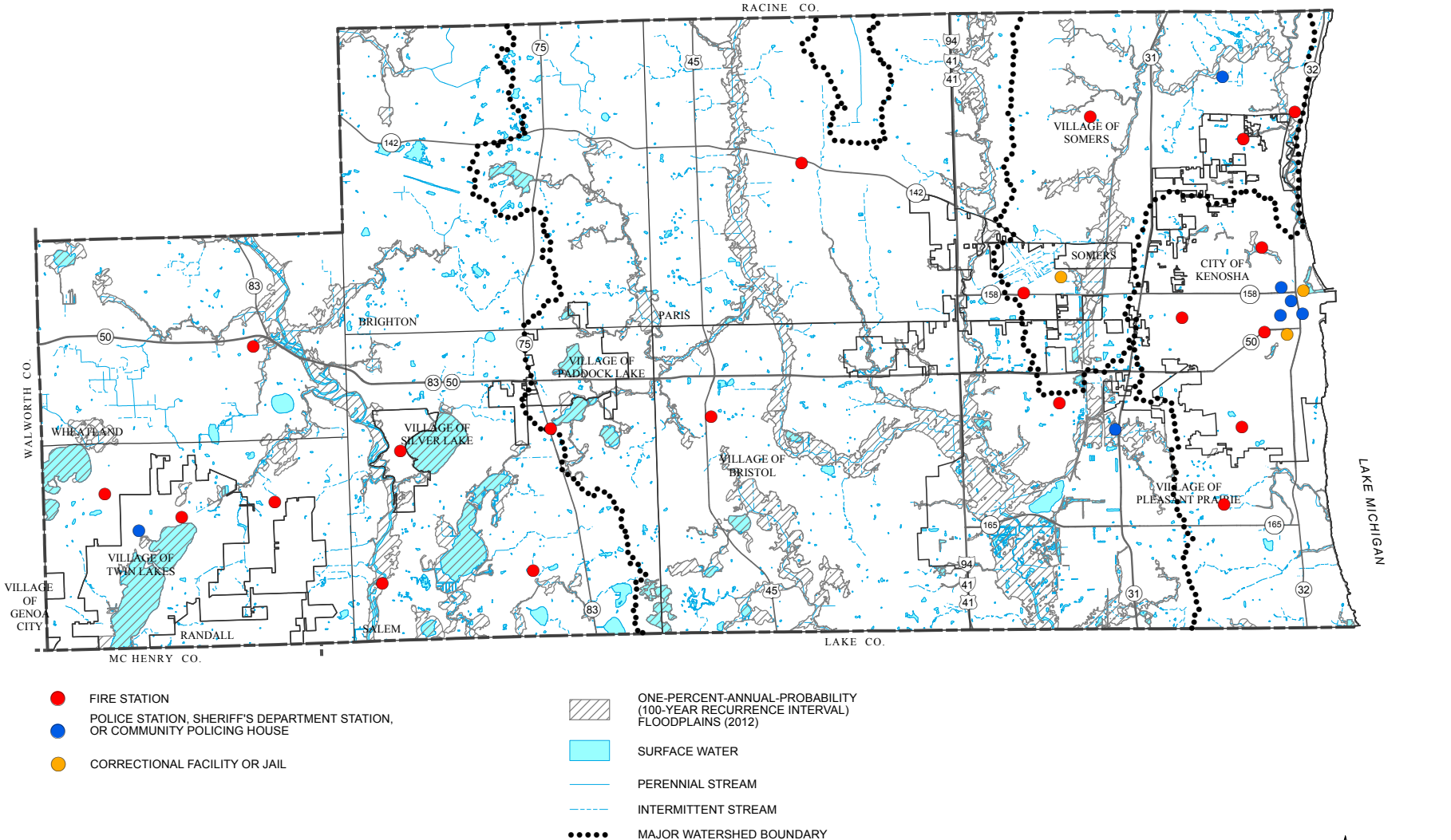
- ▨ ONE-PERCENT-ANNUAL-PROBABILITY (100-YEAR RECURRENCE INTERVAL) FLOODPLAINS (2012)
- SURFACE WATER
- PERENNIAL STREAM
- - - INTERMITTENT STREAM
- MAJOR WATERSHED BOUNDARY



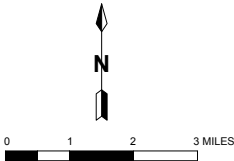
Source: Wisconsin Department of Children and Families, Wisconsin Department of Public Instruction, Kenosha County, and SEWRPC.

Map III - 5

LAW ENFORCEMENT AND FIRE STATIONS IN RELATION TO FLOODLANDS IN KENOSHA COUNTY: 2015

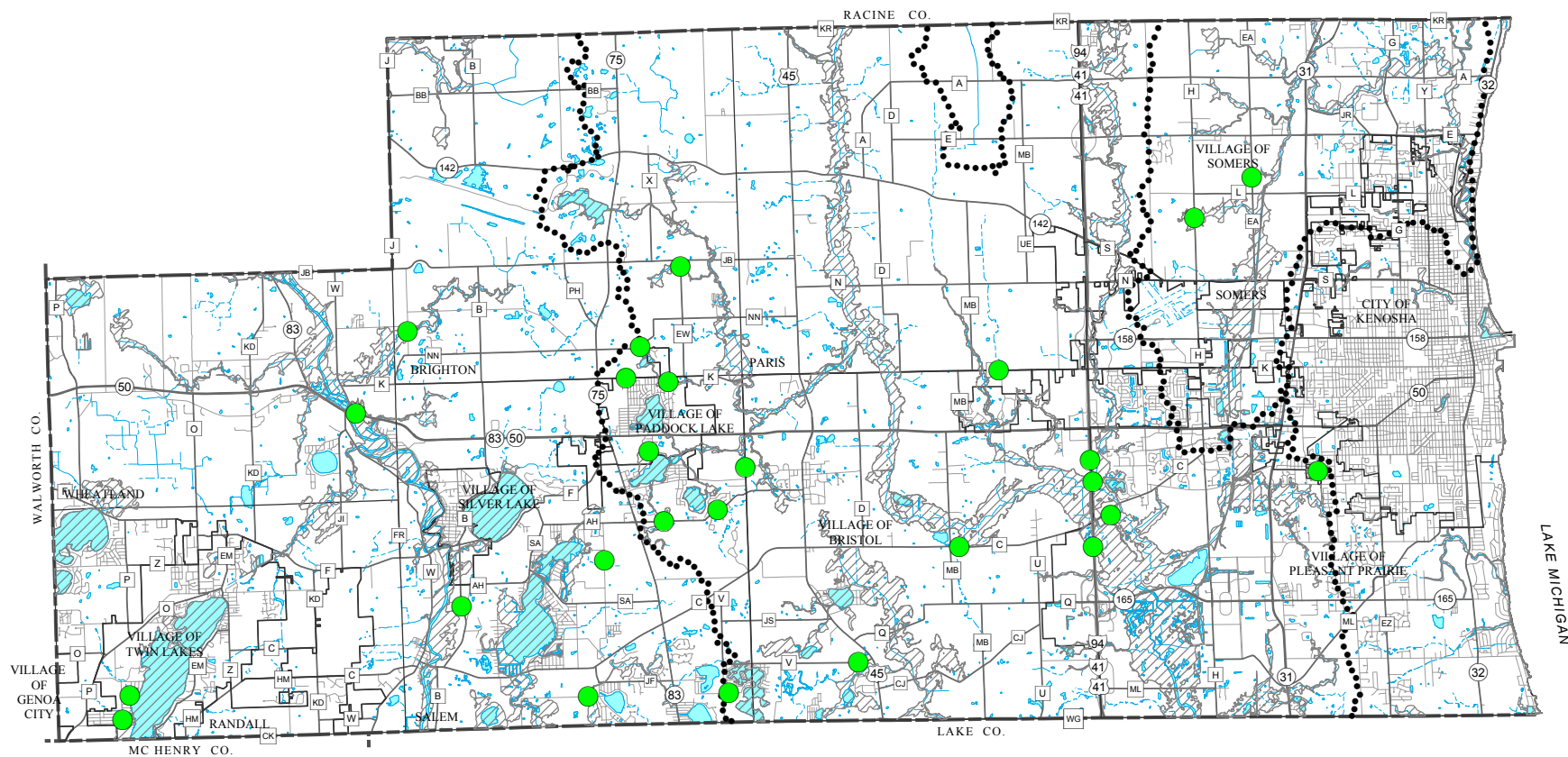


Source: Wisconsin Department of Justice, Kenosha County, and SEWRPC.



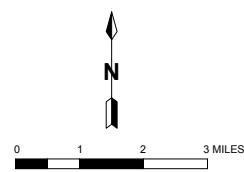
Map III - 6

ROADWAYS WITH REPORTED FLOODING IN KENOSHA COUNTY: 2015



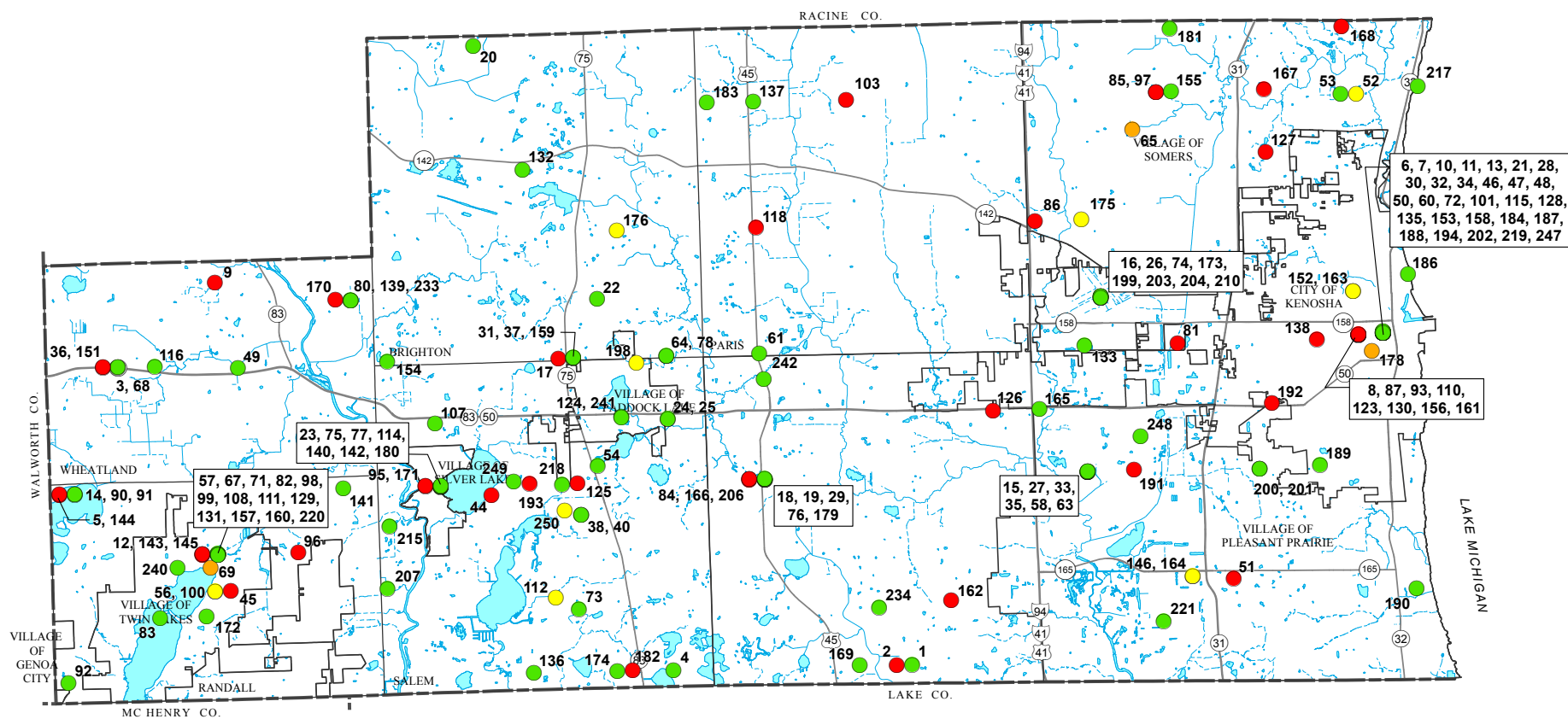
- REPORTED SITE OF ROAD FLOODING
- ONE-PERCENT-ANNUAL-PROBABILITY (100-YEAR RECURRENCE INTERVAL) FLOODPLAINS (2012)
- SURFACE WATER
- PERENNIAL STREAM
- INTERMITTENT STREAM
- MAJOR WATERSHED BOUNDARY

Source: SEWRPC.



Map III - 7

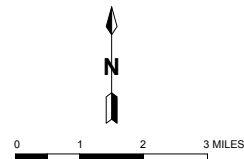
THUNDERSTORM, HIGH - WIND, HAIL, AND LIGHTNING EVENTS REPORTED WITHIN KENOSHA COUNTY, JULY 1964 - DECEMBER 2014



- THUNDERSTORM AND HIGH WINDS
- HIGH WIND
- HAIL
- LIGHTNING
- 68 REFERENCE NUMBER
(SEE TABLE III-13)

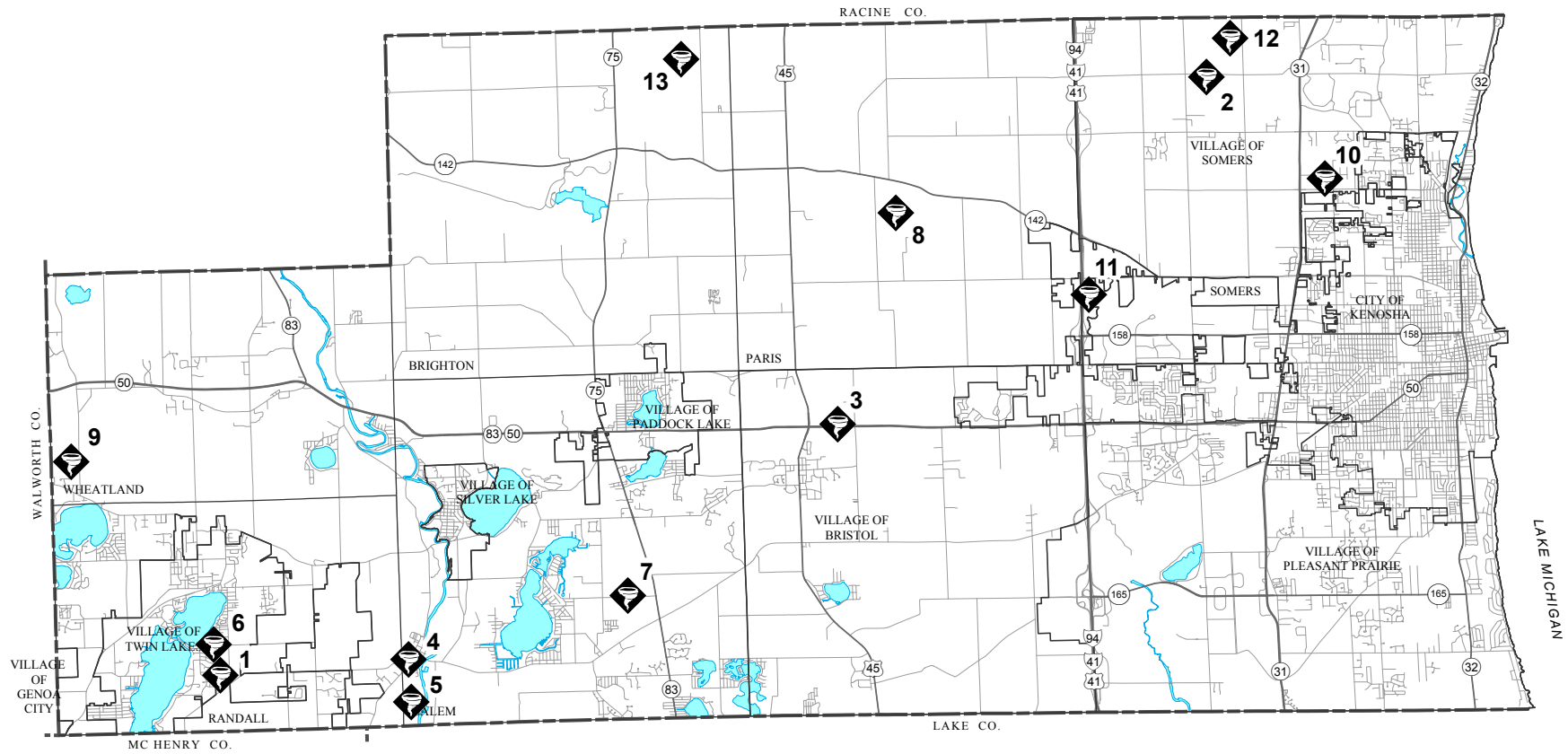
NOTE: THE NATIONAL CLIMATIC DATA CENTER INDICATES THAT THE EVENTS LISTED BELOW AFFECTED ALL OF KENOSHA COUNTY:


- 41, 43
- 55, 70, 79, 89, 94, 102, 104, 105, 106, 109, 113, 119, 121, 122, 134, 147, 148, 149, 150, 177, 185, 195, 196, 197, 205, 208, 209, 211, 212, 213, 214, 216, 222, 223, 224, 225, 226, 227, 228, 229, 230, 231, 232, 235, 236, 237, 238, 239, 243, 244
- 39, 42, 245, 246
- 59, 62, 66, 88, 117

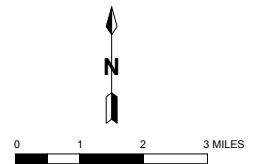


Source: National Climatic Data Center and SEWRPC.

Map III - 8
TORNADO EVENTS IN KENOSHA COUNTY: JULY 1963 - DECEMBER 2014



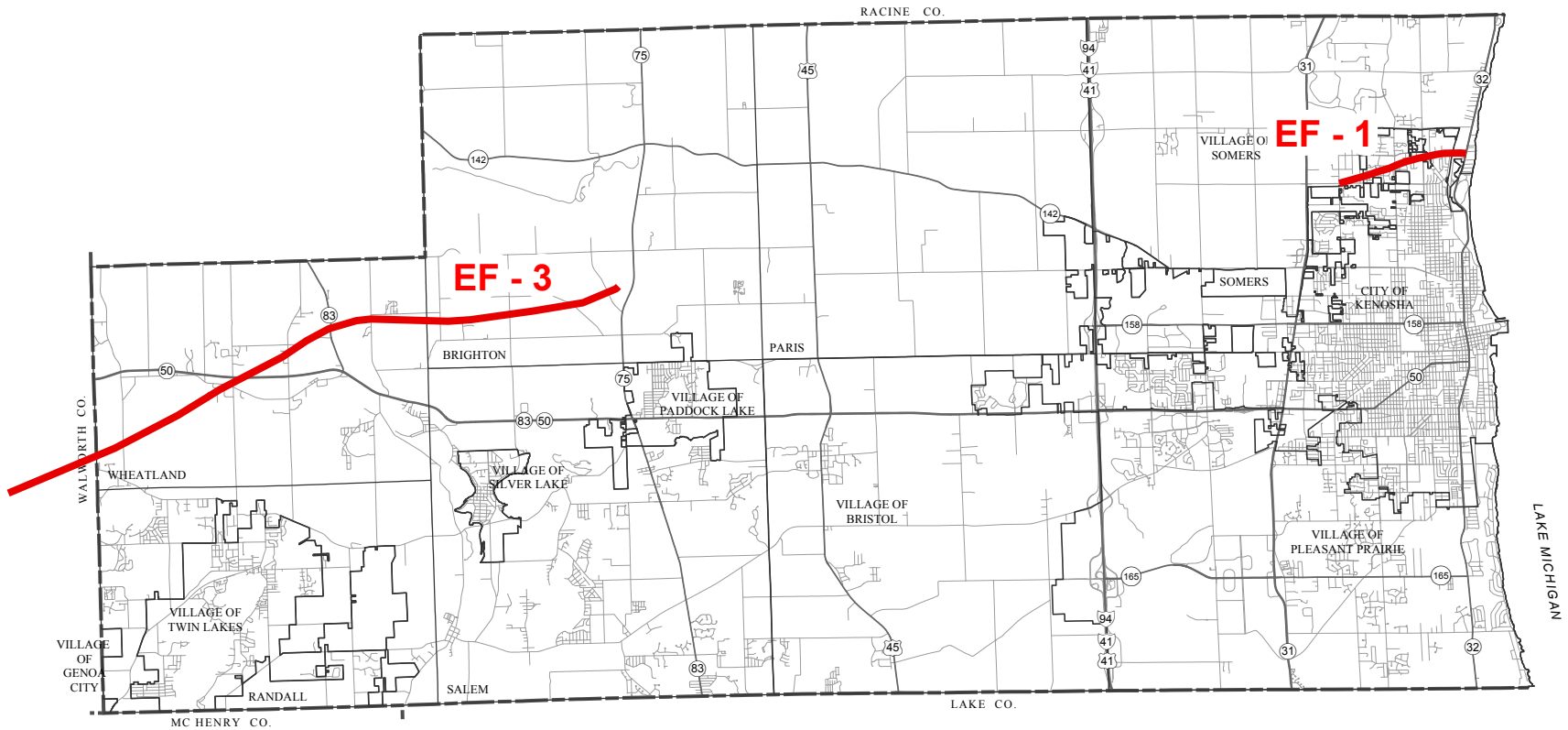
 REPORTED TORNADO SIGHTING AND REFERENCE NUMBER (SEE TABLE III - 16)



Source: National Climatic Data Center and SEWRPC.

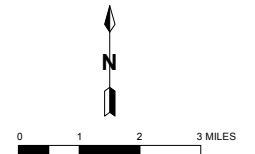
Map III - 9

PATHS OF THE JANUARY 7, 2008 TORNADOES THROUGH KENOSHA COUNTY



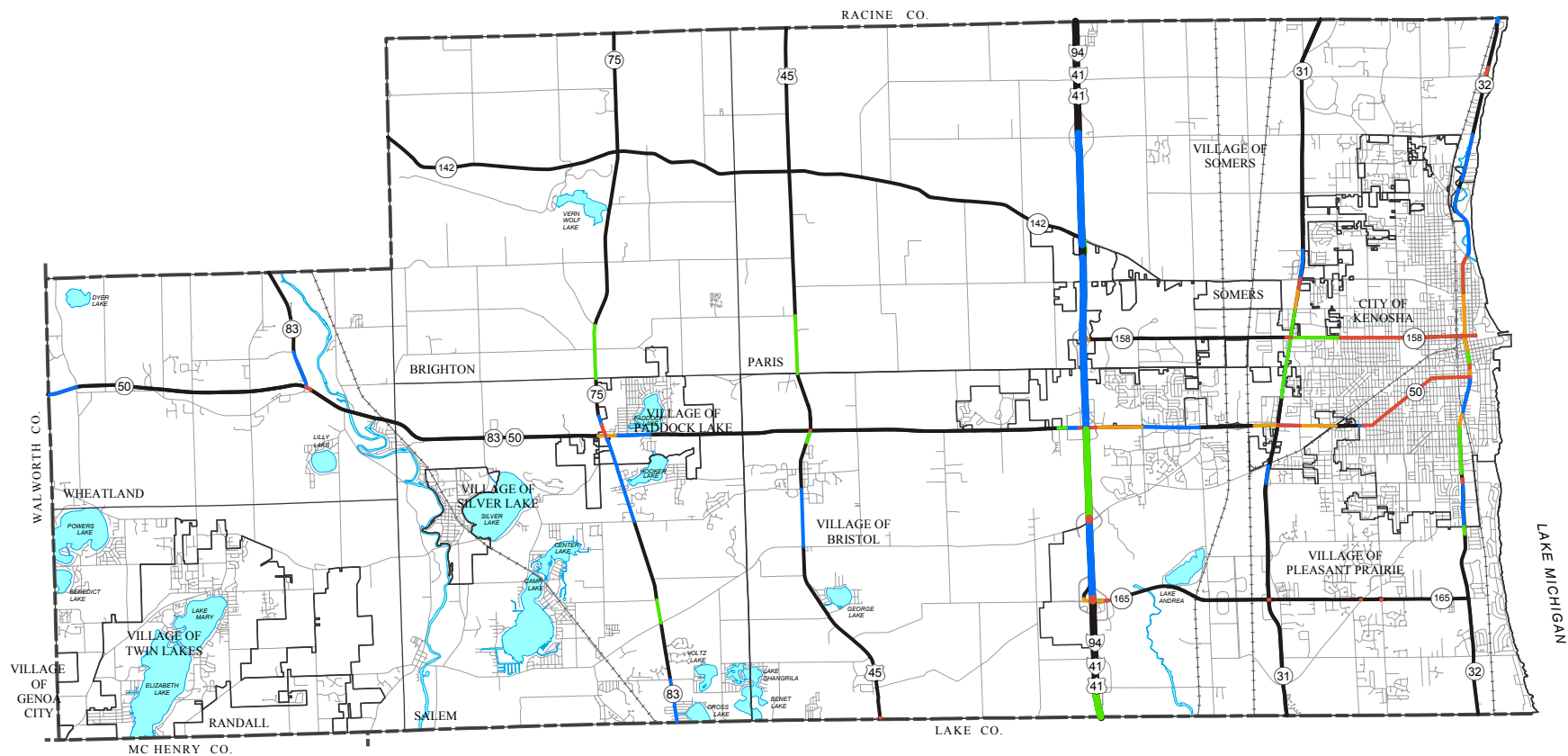
APPROXIMATE PATHS OF JANUARY 7, 2008 TORNADOES

Source: National Climatic Data Center and SEWRPC.



Map III - 10

AVERAGE VEHICULAR CRASH RATE OF STATE TRUNK HIGHWAYS IN KENOSHA COUNTY: 2008-2012



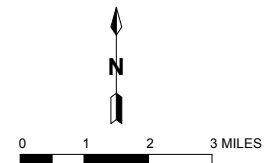
- STATE TRUNK HIGHWAY**
- FREEWAY
 - SURFACE ARTERIAL
- PERCENT OF COUNTYWIDE AVERAGE CRASH RATE**
- AT OR BELOW COUNTYWIDE AVERAGE
 - 1 PERCENT TO 50 PERCENT ABOVE
 - 51 PERCENT TO 100 PERCENT ABOVE
 - 100 PERCENT TO 200 PERCENT ABOVE
 - MORE THAN 200 PERCENT ABOVE

NOTE: 1. THE AVERAGE CRASH RATE ON THE STATE TRUNK HIGHWAY NETWORK IN KENOSHA COUNTY FROM 2008 THROUGH 2012 WAS 45.7 CRASHES PER 100 MILLION VEHICLE MILES FOR FREEWAYS AND 255.6 CRASHES PER 100 MILLION VEHICLE MILES FOR SURFACE ARTERIALS.

2. A SEPARATE CRASH RATE IS CALCULATED FOR EACH DIRECTION FOR DIVIDED HIGHWAYS. THE SIDE OF THE DIVIDED HIGHWAY HAVING THE WORST CRASH RATE IS DISPLAYED ON THE MAP.

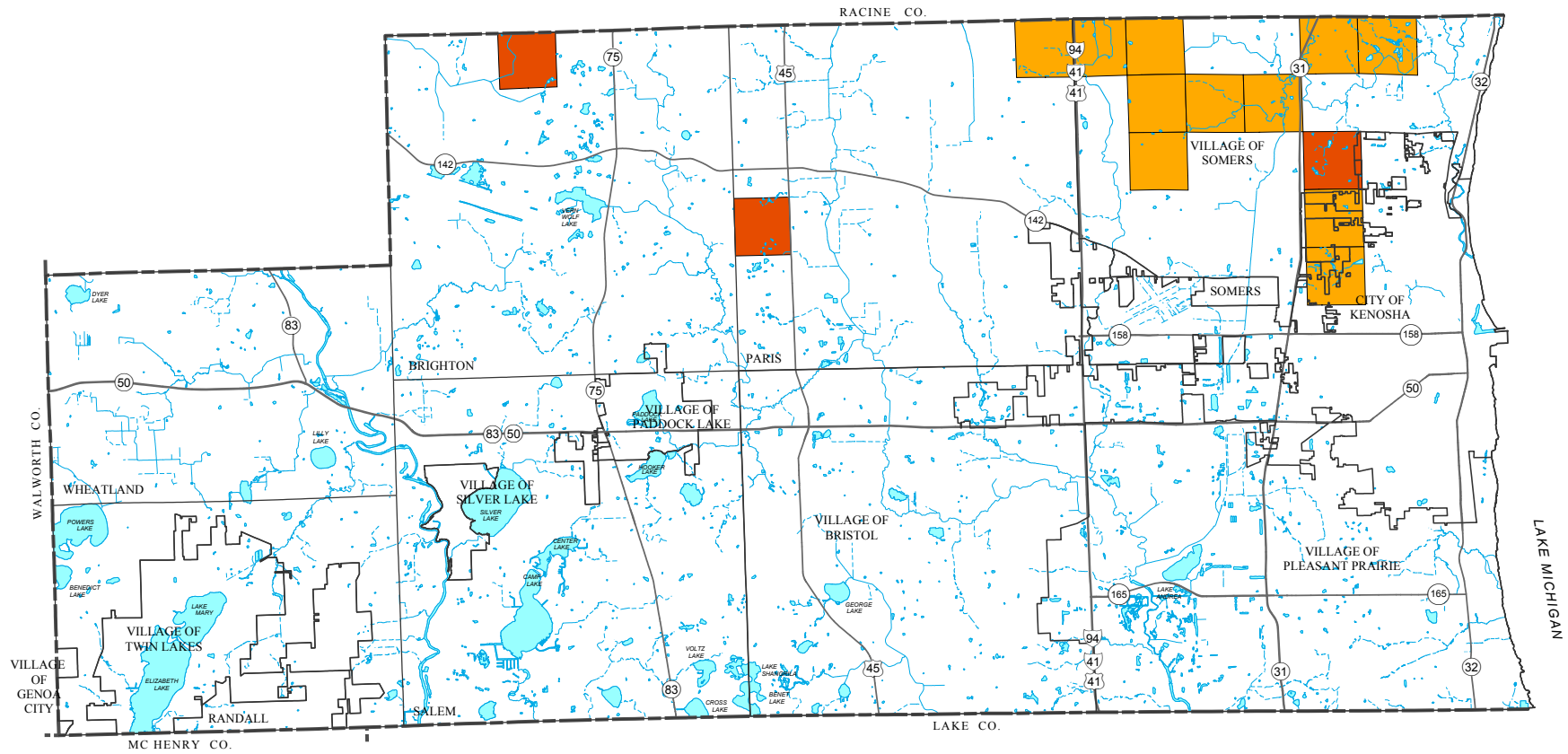
3. ONLY CRASHES THAT OCCURED IN YEARS SINCE THE ROADWAY WAS LAST RECONFIGURED ARE INCLUDED IN THE CRASH RATES SHOWN.

Source: Wisconsin Department of Transportation and SEWRPC.



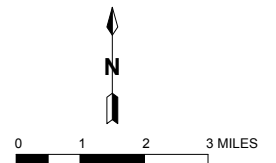
Map III - 11

TEST RESULTS FOR MOLYBDENUM IN PRIVATE WELLS IN KENOSHA COUNTY: 2013



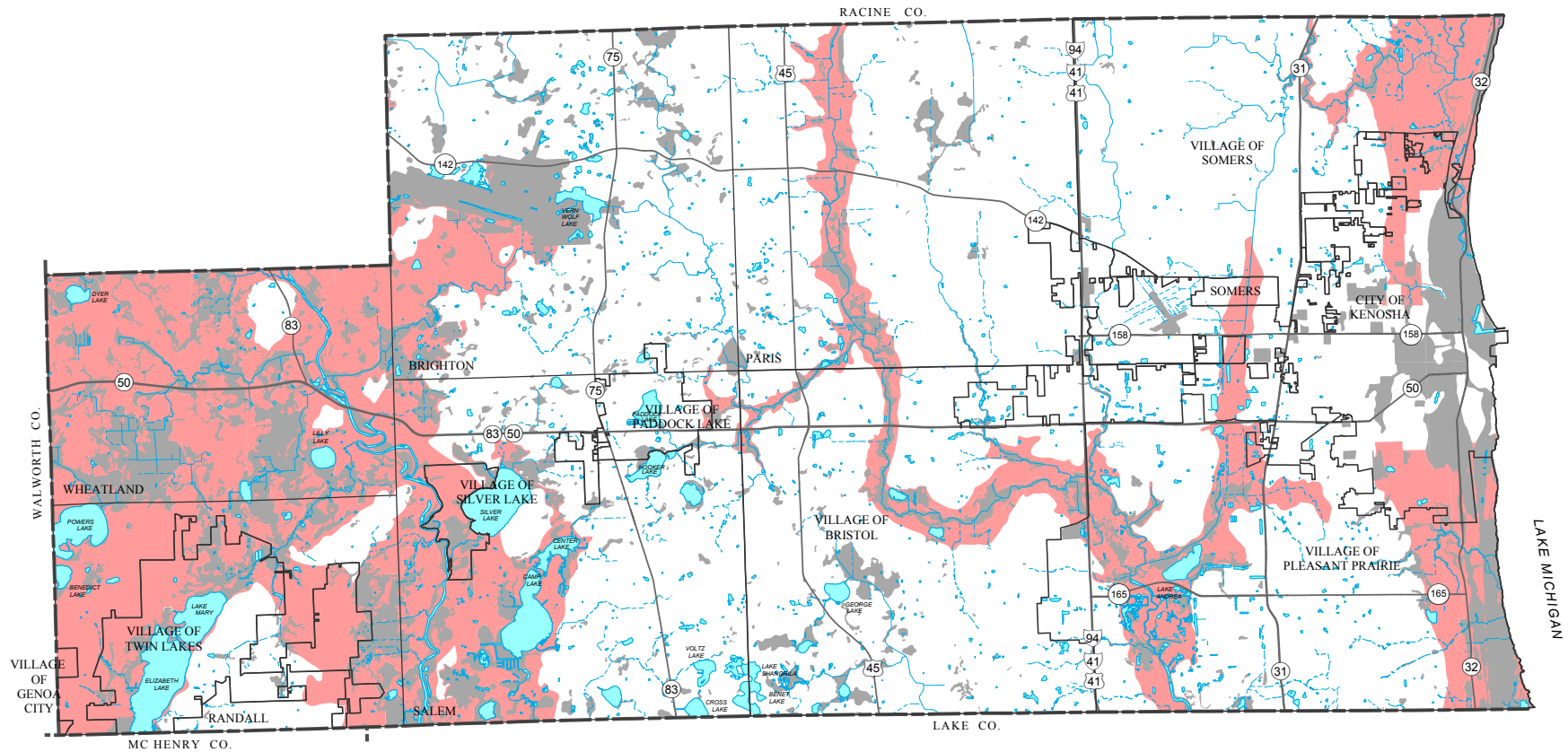
- SECTION WITH AT LEAST ONE MOLYBDENUM SAMPLE WITH A CONCENTRATION GREATER THAN OR EQUAL TO 90 MICROGRAM PER LITER
- SECTION WITH ALL MOLYBDENUM SAMPLES HAVING CONCENTRATIONS LESS THAN 90 MICROGRAM PER LITER

Source: Wisconsin Department of Natural Resources and SEWRPC.



Map III - 12

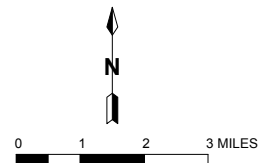
AREAS NATURALLY VULNERABLE TO GROUNDWATER CONTAMINATION IN KENOSHA COUNTY



- AREAS WITH A HIGH CONTAMINATION POTENTIAL BASED UPON A COMBINATION OF FACTORS
- AREAS WHERE SOIL ATTENUATION OF POLLUTANTS IS CATEGORIZED AS LOW
- SURFACE WATER

NOTES: GROUNDWATER CONTAMINATION POTENTIAL IS RELATED TO SOIL PHYSICAL PROPERTIES AND TO THE PROXIMITY OF GROUNDWATER TO THE SOIL SURFACE. ACTIVITIES THAT MAY CREATE GROUNDWATER QUALITY PROBLEMS ARE LISTED IN TABLE III-33.

Source: Wisconsin Geological and Natural History Survey and SEWRPC.



Chapter IV

HAZARD MITIGATION GOALS

Planning may be defined as a rational process for formulating and meeting goals and objectives. Consequently, the formulation of goals and objectives is an essential task that must be undertaken before plans can be prepared. This chapter sets forth hazard mitigation goals and objectives for use in the consideration of alternative hazard mitigation strategies for Kenosha County and in the selection of recommended strategies from among those alternatives.

In formulating and setting forth goals and objectives, their differing natures and purposes must be kept in mind. In this regard, the definition of goals and objectives used herein is as promoted by the Federal Emergency Management Agency (FEMA). Goals are general guidelines that explain what a community desires to achieve. Based upon the selected goals, a community can then develop the specific objectives or standards needed to attain the goals. Objectives and standards more narrowly define strategies for meeting the selected goals and are more specific than goals.

RELATIONSHIP OF HAZARD MITIGATION GOALS AND OBJECTIVES TO OTHER RELEVANT PLANNING EFFORTS

Kenosha County and nine of its local governments have prepared a comprehensive plan that will provide a basis for broad-based decision-making on land use-related matters by County and local government officials, and will increase the awareness and understanding of County, city, village, and town planning goals and objectives by landowners, developers, and other private interests.¹ Following incorporation, the Village of Somers adopted that multi-jurisdictional comprehensive plan as its comprehensive plan. That plan incorporates and updates elements from other pertinent County and Regional Plans as appropriate. In addition, the Town of Randall, and the Villages

¹SEWRPC Community Assistance Planning Report No. 299, A Multi-Jurisdictional Comprehensive Plan for Kenosha County: 2035, April 2010.

of Paddock Lake and Twin Lakes have adopted their own comprehensive plans, which will be incorporated into the County comprehensive plan.

Kenosha County has prepared and adopted a park and open space plan² to guide the County and local units of government in preserving and developing recreational and other open space uses. Kenosha County has also assisted communities in developing land use plans that are prepared within the framework of the regional land use plan.³ In addition, comprehensive watershed plans⁴ have been developed for four of the five major watershed areas that include areas in Kenosha County. These plans included evaluation of alternatives and recommended flood mitigation plans developed on a comprehensive watershedwide basis. As comprehensive planning, park and open space planning, land use, and floodplain management planning is carried out in Kenosha County and in the related watersheds, an integration and coordination of the goals and objectives has taken place. Park and open space and land use planning goals and objectives are integrated and coordinated with floodplain management planning. This is accomplished at the watershed level by developing comprehensive watershed plans that include floodplain management, land use, park and open space, and water quality planning in one integrated planning program. These watershed plans form a potential framework for subwatershed-level planning programs. As an example, the comprehensive watershed planning objectives, principles, and standards for the comprehensive plan for the Pike River watershed⁵ include six specific objectives and supporting standards related to land use and park and open space use, as well as objectives and standards relating to flood control. Similarly, the Kenosha County park and open space plan contains a specific plan element for wetland and floodplain preservation.

HAZARD MITIGATION GOALS AND OBJECTIVES

The following goals have been established for the Kenosha County hazard mitigation planning program. The goals have been established based, in part, upon goals previously established in watershed, park and open space, and land use planning programs.

²*SEWRPC Community Assistance Planning Report No. 131, A Park and Open Space Plan for Kenosha County (second edition), April 2012.*

³*SEWRPC Planning Report No. 48, A Regional Land Use Plan for Southeastern Wisconsin: 2035, June 2006.*

⁴*SEWRPC Planning Report No. 9, A Comprehensive Plan for the Root River Watershed, July 1966; SEWRPC Planning Report No. 12, A Comprehensive Plan for the Fox River Watershed, Volume One, Inventory Findings and Forecasts, April 1969, and Volume Two, Alternative Plans and Recommended Plan, February 1970; SEWRPC Planning Report No. 35, A Comprehensive Plan for the Pike River Watershed, June 1983; and SEWRPC Planning Report, No. 44, A Comprehensive Plan for the Des Plaines River Watershed, June 2003.*

⁵*SEWRPC Planning Report No. 35, A Comprehensive Plan for the Pike River Watershed, June 1983.*

1. A spatial distribution of the various land uses that minimizes hazards and dangers to health, welfare, and safety as well as further enhancing the economic base of the County, and will result in a compatible arrangement of land uses properly related to the existing and proposed supporting transportation, utility, public safety systems, and public facility systems.
2. A spatial distribution of the various land uses that maintains biodiversity and that will result in the protection and wise use of the natural resources of the County, including its soils, inland lakes and streams, groundwater, wetlands, woodlands, wildlife, and natural areas and critical species habitats.
3. An integrated transportation system that, through its location, capacity, and design, will safely, economically, and effectively serve the existing and proposed land use pattern and promote the implementation of the land use plan, meeting the current and anticipated travel demand and minimizing the potential for accidents and the associated toll on life and property damage.
4. The provision of facilities necessary to maintain a high quality of fire and police protection and emergency medical services throughout the County.
5. The development of a stormwater and floodplain management system that reduces the exposure of people to drainage- and flooding-related inconvenience and to health and safety hazards and that reduces the exposure of real and personal property to damage through inundation resulting from flooding and inadequate stormwater drainage.
6. The identification of high erosion risk Lake Michigan shoreline areas and the development of a coastal erosion management program that reduces the exposure of people and real and personal property to shoreline erosion and bluff recession.
7. The identification and development of programs that complement County and local emergency operations plans to mitigate the potential exposure to health and safety and the exposure of real and personal property resulting from a broad range of hazards that are unpredictable and not geographically specific in nature.
8. Communications interoperability throughout the County among all First Responders, so as to be able to quickly and effectively respond to any incident to prevent the loss of life and to save property.

Complementing each of these goals is a set of objectives and standards that can be used to define more-specific actions or strategies to achieve the goals. The goals, objectives, and standards that are set forth in Table IV-1 incorporate the goals, objectives, and related County planning programs, where there was the most direct relationship to hazard mitigation planning. There are a number of other objectives and standards associated with

the stated goals that are relevant to other planning activities, but not specifically to hazard mitigation planning. However, these have not been restated herein, but are documented in the referenced reports.

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Chapter IV

HAZARD MITIGATION GOALS

TABLES

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Table IV-1

GOALS AND OBJECTIVES FOR KENOSHA COUNTY HAZARD MITIGATION PLAN

GOAL NO. 1

A spatial distribution of the various land uses that minimizes hazards and dangers to health, welfare, and safety as well as further enhancing the economic base of the County, and will result in a compatible arrangement of land uses properly related to the existing and proposed supporting transportation, utility, public safety systems, and public facility systems.

OBJECTIVES AND STANDARDS

1. Urban high-, medium-, and low-density residential uses should be located within planning units that are served with centralized public sanitary sewerage and water supply facilities and contain, within a reasonable walking distance, necessary supporting local service uses, such as neighborhood parks, local commercial, and educational facilities, and should have reasonable access through the appropriate component of the transportation system to employment, commercial, cultural, and governmental centers, and elementary and secondary schools and higher educational facilities; and should be provided with readily available fire and police protection and emergency medical services.
2. Rural- and suburban-density residential uses should have reasonable access through the appropriate component of the transportation system to local service uses; employment, commercial, cultural, and governmental centers; and elementary and secondary schools and higher educational facilities and should have reasonable access to fire and police protection and emergency medical services.
3. Industrial uses should be located to have direct access to arterial street and highway facilities and reasonable access through an appropriate component of the transportation system to residential areas and to railway, seaport, and airport facilities, and should not be intermixed with commercial, residential, governmental, recreational, or institutional land uses; and should be provided with readily available fire and police protection and emergency medical services.
4. Major commercial uses should be located in centers of concentrated activity on only one side of an arterial street and should be afforded direct access to the arterial street system; and should be provided with readily available fire and police protection and emergency medical services.

GOAL NO. 2

A spatial distribution of the various land uses that maintains biodiversity and will result in the protection and wise use of the natural resources of the County, including its soils, inland lakes and streams, groundwater, wetlands, woodlands, wildlife, and natural areas and critical species habitats.

OBJECTIVES AND STANDARDS

1. Floodplains should not be allocated to any urban development that would cause or be subject to flood damage.
2. No unauthorized structure or fill should be allowed to encroach upon and obstruct the flow of water in perennial stream channels.
3. The types and distribution of land uses should be developed considering the potential impacts on flood flows, on surface water quality, and on groundwater quality and quantity.
4. All remaining undeveloped lands within the designated primary environmental corridors in the County should be preserved in essentially natural, open uses.
5. All remaining undeveloped lands within the designated secondary environmental corridors and isolated natural resource areas in the County should be considered for preservation as urban development proceeds and used as drainageways, floodwater storage areas, and parks.
6. All wetlands adjacent to streams or lakes, all wetlands within areas having special wildlife or other natural values, and all wetlands having an area of five acres or greater should not be allocated to any urban development, except limited recreational use, and should not be drained or filled. In addition, County and local units of government may choose to preserve all wetlands.

Table IV-1 (continued)

GOAL NO. 3

An integrated transportation system that, through its location, capacity, and design, will safely, economically, and effectively serve the existing and proposed land use pattern and promote the implementation of the land use plan, meeting the current and anticipated travel demand and minimizing the potential for accidents and the associated toll on life and property damage.

OBJECTIVES AND STANDARDS

1. Because accidents take a heavy toll on life and cause property damage and human suffering, contribute substantially to overall transportation costs, and increase public costs for police and welfare services, every attempt should be made to reduce both the incidence and severity of accidents through proper design and operation of the arterial street and highway system.
2. The total number of accidents, and the severity of traffic accidents, on arterial highways should be minimized by the identification and improvement of those facilities that exhibit above average accident rates based upon accepted standards.

GOAL NO. 4

The provision of facilities necessary to maintain a high quality of fire and police protection and emergency medical services throughout the County.

OBJECTIVES AND STANDARDS

1. Because adequate fire and police protection and emergency medical services are essential to the protection of the public health and safety and of real property values, and is a public service that enhances the economic development potential of an area, fire and police stations and emergency medical equipment should be developed and distributed based upon the accepted standards for such services.

GOAL NO. 5

The development of a stormwater and floodplain management system that reduces the exposure of people to drainage- and flooding-related inconvenience and to health and safety hazards and that reduces the exposure of real and personal property to damage through inundation resulting from flooding and inadequate stormwater drainage.

OBJECTIVES AND STANDARDS

1. In order to prevent significant property damage and safety hazards, the major components of the stormwater management system and the floodplain management system should be designed to accommodate runoff from a 100-year recurrence interval storm event.
2. In order to provide for an acceptable level of access to property and of traffic service, the minor components of the stormwater management system should be designed to accommodate runoff from a storm event to be determined appropriate by each community.
3. In order to provide an acceptable level of access to property and of traffic service, the stormwater management system should be designed to provide two clear 10-foot lanes for moving traffic on existing arterial streets, and one clear 10-foot lane for moving traffic on existing collector and land access streets during storm events up to and including the 10-year recurrence interval event.
4. Flow of stormwater along and across the full pavement width of collector and land access streets shall be acceptable during storm events exceeding a 10-year recurrence interval when the streets are intended to constitute integral parts of the major stormwater drainage system.
5. Plan components shall be designed to comply with the requirements of Chapter NR 116 of the *Wisconsin Administrative Code*.
6. All new and replacement bridges and culverts over waterways shall be designed so as to accommodate, according to the categories listed below, the designated flood events without overtopping of the related roadway or railway track.

Table IV-1 (continued)

- a. Minor and collector streets used or intended to be used primarily for access to abutting properties: a 10-year recurrence interval flood discharge.
 - b. Arterial streets and highways, other than freeways and expressways, used or intended to be used primarily to carry heavy volumes of through traffic: a 50-year recurrence interval flood discharge.
 - c. Freeways and expressways: a 100-year recurrence interval flood discharge.
 - d. Railways: a 100-year recurrence interval flood discharge.
7. All new and replacement bridges and culverts along waterways shall be designed so as not to inhibit fish passage in areas that are supporting, or that are capable of supporting, valuable recreational sport and forage fish species.
 8. Provide for the capability to provide fire and police protection and emergency medical services and for adequate operation of wastewater treatment facilities during a 100-year recurrence interval flood event.

GOAL NO. 6

The identification of high erosion risk Lake Michigan shoreline areas and the development of a coastal erosion control program that reduces the exposure of people and real and personal property to shoreline erosion and bluff recession.

OBJECTIVES AND STANDARDS

1. Erosion risk areas and structure setback distances from the Lake Michigan shoreline should be established based upon the recommendations included in the Lake Michigan shoreline recession and bluff stability study.^a

GOAL NO. 7

The identification and development of programs that complement County and local emergency operations plans to mitigate the potential exposure to health and safety and the exposure of real and personal property resulting from a broad range of hazards that are unpredictable and not geographically specific in nature.

GOAL NO. 8

Communications interoperability throughout the County amongst all First Responders, so as to be able to quickly and effectively respond to any incident to prevent the loss of life and to save property.

OBJECTIVES AND STANDARDS

1. Provide communications interoperability to fire, emergency medical service, law enforcement, public health, public works, dispatch, emergency management, and hospitals to assure the adequate operations of prevention and response.

^aSEWRPC Technical Report No. 86, Lake Michigan Shoreline Recession and Bluff Stability in Southeastern Wisconsin: 1995, December 1997.

Source: SEWRPC

Chapter V

HAZARD MITIGATION STRATEGIES

Hazard mitigation planning may be defined as the systematic evaluation of the nature and vulnerability of hazards present, along with the development and implementation of sustained actions to reduce or eliminate long-term risks from hazards and their effect. Specific purposes of hazard mitigation include eliminating loss of life, reducing danger to human health and safety, minimizing monetary damage to private and public property, reducing the cost of utilities and services, and minimizing disruption in community affairs. Hazard mitigation also involves both avoiding intensifying existing hazards and creating new hazards.

The preparation of an all hazards mitigation plan for Kenosha County involves the development and evaluation of alternative mitigation measures plan elements and the synthesis of the most effective elements into an integrated plan. Some of the mitigative measures described are ongoing or committed actions, which do not require the evaluation of alternative measures, but are proposed to be integrated into the mitigation plan as such. For other hazards, there may be only one or a number of integrated viable options. In these cases, alternatives are not presented and cost-effectiveness is not specifically addressed, but is implied by the nature of the mitigation measures. In other instances, where there are viable alternatives, such alternatives are described and evaluated. This chapter describes the hazard mitigation measures considered to resolve the identified hazard problems within Kenosha County.

Measures have been identified and evaluated for each of the hazards for which a vulnerability analysis was developed as set forth in Chapter III.

In preparing **updates to** the plan, the Kenosha County Hazard Mitigation **Local Planning Team** reviewed and reevaluated the hazard mitigation goals for the County (see Chapter IV of this report). This review included consideration of whether the goals of the initial plan were still applicable and whether additional goals should be added. In addition the **Local Planning Team** also reviewed and reevaluated hazard conditions within the County (see Chapter III of this report). This review included reevaluation of the identification of the hazards likely to

affect the County, updating the data upon which the profiles of the extent and severity of hazard events which occurred in the County were based, reassessment in light of the updated data of the vulnerability and risk associated with each type of hazard, and reevaluation as warranted by the updated assessments of the potential for changes in hazard severity and risk under future conditions. This review and reevaluation of hazard mitigation goals and hazard conditions, along with considerations of changes in conditions within Kenosha County since the drafting of the initial plan (see Chapter II of this report) and progress in implementing the initial hazard mitigation plan, served as the basis for the **Local Planning Team's** review and reevaluation of viable measures to reduce vulnerability to hazards identified in the updated risk assessment and its selection of priority mitigation measures to address those hazards. The activities of the Kenosha County Hazard Mitigation Plan **Local Planning Team** are documented in Appendix A of this report.

HAZARD MITIGATION PLAN COMPONENT FOR FLOODING AND RELATED STORMWATER DRAINAGE PROBLEMS

The flooding and related stormwater drainage problem mitigation plan for Kenosha County consists of five elements: a **floodplain** and environmentally sensitive lands preservation element, a **floodplain** management element, a stormwater management element, a public information and education element, and a secondary plan element. Each element of the plan is an important component of the overall strategy for reducing flood risk and flood damage. Some aspects of the overall plan are already being implemented in the form of existing and ongoing activities being carried out by the County and local units of government that contribute toward realizing the flood mitigation goals and objectives.

Floodplain and Environmentally Sensitive Lands Preservation Element

Floodplain management regulations and programs perform critical roles toward assuring that flood mitigation efforts are properly implemented. As detailed in Chapter II, Kenosha County and the municipalities within the County currently have several pertinent **floodplain** management regulations and programs in place, most notably in the form of zoning regulations and other ordinances, environmentally sensitive area and open space preservation policies, and a flood mitigation program along the Fox River in the Towns of Salem and Wheatland and the Village of Silver Lake. **A** significant portion of the environmentally sensitive lands within the County, including wetlands, woodlands, and **floodplains**, are under protective ownership and/or zoning.

Floodplain Zoning and Wetland Preservation Zoning

As summarized in **Table II-14** in Chapter II of this report, floodplain management regulations include the floodplain district zoning ordinances and shoreland or shoreland wetland zoning ordinances.¹ The floodplain zoning ordinances are intended to preserve the floodwater conveyance and storage capacity of floodplain areas to prevent flood-damage-prone development in flood hazard areas. The wetland preservation zoning ordinance seeks to maintain the stormwater and floodwater storage capacity of wetlands in the County and prohibits certain land uses detrimental to wetland areas. More information regarding each of these ordinances is set forth in Chapter II of this report. Implementation of these ordinances on an ongoing basis is an integral part of the County flood mitigation strategy.

Environmentally Sensitive Area and Open Space Preservation Actions

As noted in Chapter II of this report, the preservation of environmental corridors and important natural features can assist in the prevention of increased flood flows and associated problems. These areas often include the most significant floodplains and wetlands within a given area. The preservation of wetlands is of particular importance because wetlands often afford floodwater storage. In addition, the intrusion of intensive urban land uses into environmentally sensitive areas may result in the creation of serious and costly problems, such as failing foundations for pavements and structures, wet basements, excessive operation of sump pumps, excessive clear-water infiltration into sanitary sewerage systems, and poor drainage. Destruction of ground cover may result in soil erosion, stream siltation, more rapid runoff, and increased flooding.

The regional land use plan described in Chapter II of this report includes provisions to preserve the environmental corridors and isolated natural resource areas. This regional plan forms the framework for local land use planning that is carried out by the local units of government in the County. In Kenosha County, in **2010**, there were **44** park and open space sites **with 40 acres or more of area**, encompassing **11,552** acres. Of these park and open space sites, **seven** were owned and maintained by the County; **16** were owned and maintained by **State departments, including the** Wisconsin Department of Natural Resources, **the Wisconsin Department of Transportation, and the University of Wisconsin;** and **21** were owned and maintained by **local units of government, including cities,**

¹*The 2015-2017 State Budget (Act 55) changed State law relative to shoreland zoning. Under Act 55 a shoreland zoning ordinance may not regulate a matter more restrictively than it is regulated by a State shoreland-zoning standard unless the matter is not regulated by a standard in Chapter NR 115, “Wisconsin’s Shoreland Protection Program,” of the Wisconsin Administrative Code. (Examples of unregulated matters may involve wetland setbacks, bluff setbacks, development density, and stormwater standards). In addition, Under Act 55, a local shoreland ordinance may not require establishment or expansion of a vegetative buffer on already developed land and may not establish standards for impervious surfaces unless those standards consider a surface to be pervious if its runoff is treated or is discharged to an internally drained pervious area.*

villages, towns, school districts, and lake management districts. The 1987 County park and open space plan,² amended in 1999³ and updated in 2012,⁴ provides for the preservation of environmental corridors and isolated natural resource areas. The open space preservation element of that plan is summarized on Map V-1. This element recommends that 4,150 acres be acquired by Kenosha County, the State of Wisconsin, local governments within the County, and nonprofit conservation organizations operating in the County. The outdoor recreation element of that plan is summarized on Map V-2. The current status of ownership of park and open space sites by the County and State is shown on Map V-3. Kenosha County has been active in promoting and assisting local units of government in the County in preparing land use plans that are consistent with the Regional and County objectives for preservation of environmentally sensitive lands. In addition, all of the municipalities with significant areas of environmental corridors and/or isolated natural resource areas, have local land use and/or park and open space plans completed or underway that are consistent with the Regional and County plans with regard to preservation of environmentally sensitive lands. A listing of those plans is included in Appendix E.

Floodplain Management Element

Mitigation measures specifically pertaining to floodland management in each watershed in the County are described in the following subsections of this report and are shown on Maps V-4 and V-5. It should be noted that, as reported in Chapter III, as of December 2015 there are 23 structures considered by the Federal Emergency Management Agency (FEMA) to be repetitive- or substantial-loss properties in Kenosha County. These are all single family residences.

Beginning with the 2016 fiscal year, the Kenosha County Board resolved to allow the Division of Planning and Development to use specific funds from within the Division budget to cover the cost of acquisition and incidental related expenditures of properties that are located within the one-percent-annual-probability floodplain. This resolution will enable the Division of Planning and Development to purchase floodplain residences and vacant floodplain parcels from willing sellers, real estate agents, auctions, and sheriff sales as they become available. In addition, Kenosha County is taking applications from landowners who wish to donate their vacant property in the Fox River Flood Mitigation Program Area or the Floodplain Overlay (FPO) District which encompasses those areas that may be covered by floodwater during the regional flood as shown on the FEMA Flood Insurance Rate Maps. Donation of these floodprone lands will reduce infrastructure maintenance costs, help maintain overbank

²SEWRPC Community Assistance Planning Report No. 131, A Park and Open Space Plan for Kenosha County, November 1987.

³SEWRPC Amendment to A Park and Open Space Plan for Kenosha County, October 1999.

⁴SEWRPC Community Assistance Planning Report No. 131, A Park and Open Space Plan for Kenosha County (2nd Edition), April 2012.

storage areas along watercourses, protect water quality, preserve wildlife habitat, provide recreational opportunities, and preserve open space.

All floodplain property acquired by Kenosha County under these programs will have certain conditions and restrictions that shall apply in perpetuity to the property and are attached to the deed and shall be binding upon all subsequent owners of such real estate. The Property shall be dedicated and maintained in perpetuity as open space for conservation of natural floodplain functions, including such uses as parks for outdoor recreational activities; wetlands management; nature reserves; cultivation; grazing; camping (except where adequate warning time is not available to allow evacuation); unimproved unpaved parking lots; buffer zones; and other uses consistent with FEMA guidance for open space acquisition. No new structures or improvements shall be erected on the property.

Floodplain Management Plan for the Fox River Watershed

In 1970, SEWRPC adopted a comprehensive plan for the physical development of the Wisconsin portion of the Fox River watershed.⁵ In preparing that plan a concerted effort was made to offer for public evaluation a full range of physically feasible alternative plan elements that might satisfy one or more agreed-upon watershed development objectives. Each alternative plan element was evaluated in terms of technical, economic, and legal feasibility, and public acceptability, as well as with respect to satisfaction of the watershed development objectives. The alternative plan elements can best be conceptualized in terms of various combinations of land use patterns and water control facilities.

As a follow-up to the preparation and adoption of the SEWRPC plan, the U.S. Army Corps of Engineers prepared a feasibility study that evaluated alternative plans for flood damage reduction along the entire length of the Fox River in both Wisconsin and Illinois. The study is document in two reports.⁶ This feasibility study evaluated nine structural and nonstructural alternatives for flood damage reduction within the Fox River watershed. The evaluation was based on the economic, environmental, and social impacts of the proposed alternatives.

A number of alternatives incorporating both structural and nonstructural measures were explored in the preparation of the SEWRPC plan and the Army Corps of Engineers update. The flood control alternatives considered by SEWRPC for the Kenosha County portion of the Fox River watershed include structure floodproofing or removal. The U.S. Army Corps of Engineers determined that structural measures were not

⁵SEWRPC Planning Report No. 12, A Comprehensive Plan for the Fox River Watershed, *Volume One*, Inventory Findings and Forecasts, April 1969, and *Volume Two*, Alternative Plans and Recommended Plan, February 1970.

⁶U.S. Army Corps of Engineers, Stage 2 Documentation Report, Fox River, Illinois-Wisconsin Flood Control, September 1981. U.S. Army Corps of Engineers, Final Feasibility Study for Fox River and Tributaries, Illinois and Wisconsin, August 1984.

economically viable and the only viable alternatives were nonstructural floodproofing, the protection of floodplain areas through floodland regulations, and limited acquisition of homes.

Recent Local Actions

Since 1994, Kenosha County's Fox River Flood Mitigation Program has reduced flood damages and the potential for injury to affected persons by acquiring and demolishing residential structures located in the one-percent-annual-probability floodplain of the Fox River in a project area between State Trunk Highway (STH) 50 and County Trunk Highway (CTH) F within the Village of Silver Lake and the Towns of Salem and Wheatland. Between the end of 2009 and the end of April 2015, the owners of 15 homes have participated in this voluntary buyout program. In total, the owners of 106 homes have participated in this program since its inception. An additional 70 homes are eligible for participation. Funding for this program has been provided by several sources, including FEMA, the Wisconsin Division of Emergency Management (WEM), the Wisconsin Department of Natural Resources (WDNR), Federal Community Development Block Grants, and Kenosha County.

In 2015, Kenosha County acquired a repetitive loss property along Camp Lake which had experienced damages during multiple flood events leading to multiple flood insurance claims. Demolition of this property was completed in April 2015 and the property will be permanently maintained as open space. Funding for this project was provided by FEMA through the Flood Mitigation Assistance Program.

In 2009, the Village of Twin Lakes completed a hydraulic evaluation to establish Elizabeth Lake levels and to explore spillway changes to discharge more flow at higher lake elevations. Spillway modifications were completed in 2014 at an estimated cost of \$373,000.

In 2009, the Hoosier Creek Drainage District received authorization from the Racine County Board of Drainage Commissioners to pursue a \$250,000 assessment to clear brush in Hoosier Creek and its tributaries. The District includes 117 parcels in the Town of Brighton. Assessment charge first appeared on December 2009 tax bills and the work was completed in 2010. As of 2016, the District was seeking permits to do additional brush clearing in the Creek and its tributaries.

In 2009, FEMA completed a Loss Avoidance Study for flooded buildings along the Fox River in Kenosha County that have been acquired and demolished.⁷ The purpose of the study was to evaluate the cost effectiveness of property acquisitions completed by local governments in Kenosha County with Federal and State assistance. A

⁷Federal Emergency Management Agency, Loss Avoidance Study, Wisconsin, Property Acquisition and Structure Demolition, September 2009.

total of 73 repetitive loss properties were acquired on the Fox River from 1989 to 2008 at a cost of \$8.1 million (2009 dollars). FEMA calculated the value of the losses that had been avoided with the acquisition of the properties for 14 historical storms from June 1996 to May 2009. The total losses avoided for these storms on the Fox River were \$8.3 million, demonstrating the cost-effectiveness of the selected acquisitions. Over time, as large flood events occur, the cost-effectiveness of the acquisitions will increase because the flood damages avoided through acquisition, demolition, and removal of structures will increase.

Priority Mitigation Measures

After consideration of the technical and economic feasibility of the various alternatives, a final strategy for alleviating problems due to flooding in the Kenosha County portion of the Fox River watershed was developed and adopted by the Fox River Watershed Committee and the U.S. Army Corps of Engineers. The measures were then adapted for use in the current hazard mitigation planning program. As shown on **Map V-4**, the following activity related to floodland management in the Fox River watershed is included as a priority mitigation measure in the hazard mitigation plan for Kenosha County:

- Preservation of the remaining primary environmental corridor lands along the Fox River and its major tributaries in essentially natural open space uses. The corridors are to be preserved by a combination of public acquisition for parkway purposes and floodland and open space zoning.
- Removal of up to **205** structures that have been identified as potentially being located in one-percent-annual-probability (100-year recurrence interval) floodplains on the County large-scale topographic maps. This activity would be a continuation of the flood mitigation program initiated in 1993 to acquire and remove structures in the one-percent-annual-probability floodplain of the Fox River. As of **April 2015**, a total of **103** dwellings have been acquired and demolished by Kenosha County and the Town of Wheatland. Field surveys should be made of those structures identified on the County large-scale topographic maps as being located within one-percent-annual-probability floodplains in order to obtain a more definitive assessment of their flood hazard status. This plan element is presented as an option, subject to the preference of the individual property owner. As noted previously, there are **23** structures still considered by FEMA to be a repetitive- or substantial-loss property in Kenosha County. All 23 structures are located in the Fox River Watershed.

In addition to the measure outlined above, the floodland management element contains several accessory measures to meet special needs within the watershed. These include: 1) the standards set forth in Chapter IV relative to bridge replacement to ensure that major streets and highways remain operable during flood events; 2) participation in the Federal Flood Insurance Program; 3) continuation of desirable lending institution policies concerning the sale of riverine properties; 4) the maintenance of a skeleton stream-gaging network in the watershed; and 5) enforcement of floodland regulations in the watershed.

As shown in **Table V-1**, the estimated capital cost of implementing the Fox River watershed floodland management plan element would be **\$31.4 million** (in **2014** dollars). **Table V-1** also shows the current implementation status of each plan element. **The capital cost of implementing those elements that remain to be implemented is about \$31.3 million.**

Floodplain Management Plan for the Root River Watershed

In 1966, SEWRPC adopted a comprehensive plan for the Root River watershed.⁸ In preparing that plan, a concerted effort was made to offer for public evaluation a full range of physically feasible alternative plan elements that might satisfy one or more agreed-upon watershed development objectives. Each alternative plan element was evaluated in terms of technical, economic, and legal feasibility, and public acceptability, as well as with respect to satisfaction of the watershed development objectives. The alternative plan elements can best be conceptualized in terms of various combinations of land use patterns and water control facilities. A number of alternatives incorporating both structural and nonstructural measures were explored in the preparation of the plan. The flood control alternative considered was channel clearing and maintenance.

Recent Local Actions

In 2013 a private landowner removed brush from a section of channel of the East Branch of the Root River Canal immediately adjacent to CTH KR.

Priority Mitigation Measures

After consideration of the technical and economic feasibility of the various alternatives, a final strategy for alleviating problems due to flooding in the Kenosha County portion of the Root River watershed was developed and adopted by the Root River Watershed Committee (see Appendix A for committee member list). These mitigation measures were subsequently adapted for use in the current hazard mitigation planning program. As shown on **Map V-4**, the following activity related to floodland management in the Root River watershed is included as a priority mitigation measure in the hazard mitigation plan for Kenosha County:

- Channel clearing and maintenance on the East Branch of the Root River Canal. The Kenosha County portion of the plan proposes channel debrushing and clearing along 2.0 miles of the East Branch of the Root River Canal from CTH E north to the County line. The plan does not contemplate any major channel deepening or widening, but would improve the operation of agricultural drain tiles and, to a limited extent, reduce agricultural flood damages.

⁸SEWRPC *Planning Report No. 9, A Comprehensive Plan for the Root River Watershed, July 1966.*

In addition to the measure outlined above, the floodland management element contains several accessory measures to meet special needs within the watershed. These include: 1) the standards set forth in Chapter IV relative to bridge replacement to ensure that major streets and highways remain operable during flood events; 2) participation in the Federal Flood Insurance Program; 3) continuation of desirable lending institution policies concerning the sale of riverine properties; 4) the maintenance of a skeleton stream-gaging network in the watershed; and 5) water pollution control measures.

As shown in **Table V-2**, the estimated capital cost of implementing the Root River watershed portion of the Kenosha County floodland management plan element would be **\$62,200 (2014 dollars)**. **Table V-2** also shows the current implementation status of the plan element.

Floodplain Management Plan for the Pike River Watershed

In 1983, SEWRPC adopted a comprehensive plan for the physical development of the Pike River watershed.⁹ That plan was further amended as it relates to Kenosha County in 1987¹⁰ and 1996.¹¹ In the preparation of these plans, a concerted effort was made to offer for public evaluation a full range of physically feasible alternative plan subelements that might satisfy one or more agreed-upon watershed development objectives. Each alternative floodland management subelement was evaluated in terms of technical and economic impact, financial and legal feasibility, and public acceptability, as well as with respect to satisfaction of the watershed development objectives.

In a manner similar to that used in the preparation of the plans for the Fox and Root River watersheds, a number of alternatives were explored in the preparation of the floodland management element of the Pike River watershed plan. A total of five structural floodland management measures were identified for possible application, whether individually or in various combinations, to specific floodprone reaches of the watershed: 1) storage; 2) floodwater diversion; 3) dikes and floodwalls; 4) channel modification and enclosure; and 5) bridge and culvert alteration or replacement. A total of 12 nonstructural measures were likewise identified for possible inclusion in the floodland management element of the watershed plan: 1) reservation of floodlands for recreational and related open space use; 2) floodland regulations; 3) control of land use outside of floodlands; 4) community education programs; 5) flood insurance; 6) lending institution policies; 7) realtor policies; 8) community utility policies; 9) emergency programs; 10) structure floodproofing; 11) structure removal; and 12) channel maintenance. Various

⁹SEWRPC *Planning Report No. 35, A Comprehensive Plan for the Pike River Watershed, June 1983.*

¹⁰SEWRPC *Amendment to the Pike River Watershed Plan, City of Kenosha/Town of Somers, June 1987.*

¹¹SEWRPC *Amendment to the Pike River Watershed Plan, Kenosha and Racine Counties, March 1996.*

combinations of structural and nonstructural management measures were evaluated for each of the most floodprone reaches in the watershed.

Recent Local Actions

In 2012, Kenosha County abandoned and removed a small earthen dam topped by a roadway along the Pike River in Petrifying Springs Park. As part of this project a bridge was installed at the location of the dam. One objective of this project was to alleviate flooding that occurred at this site. Funding for this project was provided by several sources including, Kenosha County, the WDNR, the Fund for Lake Michigan, the Great Lakes Restoration Initiative, and the Sustain Our Great Lakes Community Grants program.

In 2009, the Town of Somers completed a project to clean and debrush a short section of Somers Branch from Highway H east to the Canadian Pacific Railway tracks at a cost of \$5,000. In late 2009, the Town cleared a flow constriction on a tributary to Somers Branch at an estimated cost of \$12,000.

The Town of Somers received FEMA grant money for Pike River flood mitigation following the 2005 and June 2008 events. Repair work included road shoulders, a lift station, and other minor roadway repair work. The total FEMA reimbursement for this mitigation effort was \$25,400.

Priority Mitigation Measures

After consideration of the technical and economic feasibility of the various alternatives, a final strategy for alleviating problems due to flooding in the Kenosha County portion of the Pike River watershed was developed and adopted by the Pike River Watershed Committee (see Appendix A for committee member list). These mitigation measures were subsequently adapted for use in the current hazard mitigation planning effort. This plan, as it affects Kenosha County, was further refined in 1987 and 1996. As shown on Map V-4, the following activities related to floodland management in the Pike River watershed are included as priority mitigation measures in the hazard mitigation plan for Kenosha County:

- Preservation of the remaining primary environmental corridor lands along the Pike River and its major tributaries in essentially natural open space uses. The corridors are to be preserved by a combination of public acquisition for parkway purposes and floodland and open space zoning.
- Channel widening and deepening on Upper Pike River from CTH KR to river mile 10.80.
- Bridge replacements on the Upper Pike River at STH 31 and CTH KR.
- Aquatic habitat restoration on the Upper Pike River from CTH KR to river mile 10.80.

- Acquisition and demolition or floodproofing of up to eight structures identified as potentially being located in the one-percent-annual-probability floodplain on the County large-scale topographic maps. Note that an additional 18 structures were identified in the regulatory floodplain, but these would be removed from the floodplain if the recommended work on Pike Creek were implemented. Field surveys should be made of those structures identified on the County large-scale topographic maps as being located within the one-percent-annual-probability floodplain in order to obtain a more definitive assessment of their flood hazard status. Furthermore, this plan element is presented as an option, subject to the preference of the individual property owner.
- Channel improvements, floodwater detention storage, bridge replacements, and aquatic habitat restoration on Pike Creek.
- Channel improvements, bridge replacement, and aquatic habitat restoration on Airport Branch and the tributary to Airport Branch.

In addition to the measures outlined above, the floodland management element contains several accessory measures to meet special needs within the watershed. These include: 1) the standards set forth in Chapter IV relative to bridge replacement to ensure that major streets and highways remain operable during flood events; 2) participation in the Federal Flood Insurance Program; 3) continuation of desirable lending institution policies concerning the sale of riverine properties; and 4) the maintenance of a skeleton stream-gaging network in the watershed.

As shown in **Table V-3**, the estimated capital cost of implementing the Pike River watershed portion of the Kenosha County floodland management plan element would be **\$19.8 million (2014 dollars)**. **Table V-3** also shows the current implementation status of each plan element.

Floodplain Management Plan for the Des Plaines River Watershed

In 2003, SEWRPC adopted a comprehensive plan for the physical development of the Des Plaines River watershed.¹² In the preparation of that plan, a concerted effort was made to offer for public evaluation a full range of physically feasible alternative plan elements that might satisfy one or more agreed-upon watershed development objectives. Each alternative floodland management subelement was evaluated in terms of technical and economic impact, financial and legal feasibility, and public acceptability, as well as with respect to satisfaction of the watershed development objectives.

¹²SEWRPC *Planning Report No. 44, A Comprehensive Plan for the Des Plaines River Watershed, June 2003.*

In a manner similar to that used in the preparation of the plans for the other watersheds in Kenosha County, a number of alternatives were explored in the preparation of the floodland management element of the Des Plaines River watershed plan. A total of five structural floodland management measures were identified for possible application, whether individually or in various combinations, to specific floodprone reaches of the watershed: 1) storage; 2) diversion; 3) dikes and floodwalls; 4) channel modification and enclosure; and 5) bridge and culvert alteration or replacement. A total of 11 nonstructural measures were likewise identified for possible inclusion in the floodland management element of the watershed plan: 1) reservation of floodlands for recreational and related open space use; 2) floodland regulations; 3) control of land use outside of floodlands; 4) community education programs; 5) flood insurance; 6) lending institution policies; 7) community utility policies; 8) emergency programs; 9) structure floodproofing; 10) structure removal; and 11) channel maintenance. Various combinations of structural and nonstructural management measures were evaluated for each of the most floodprone reaches in the watershed.

Recent Local Actions

The Village of Paddock Lake approved a plan in 2009 to buy and tear down as many as seven homes that frequently flood on the Unnamed Tributary No. 6 to Brighton Creek; however, the plan was not implemented. In 2012, the Village conducted cleaning and made some modifications to a nearby stormwater basin. Despite heavy storms since completion of this project, the homes along this tributary have not experienced flooding.

The Town of Brighton replaced the 18th Street crossing of Brighton Creek in 2006 at a cost of \$87,000. The deteriorated culverts were replaced with reinforced concrete culverts of the same size. In 2009 the Town began to replace the deteriorated high flow relief pipes at this same location. The deteriorated pipe was a 64-inch corrugated steel pipe that the Town replaced with a plastic pipe. The project was completed in May 2010 at a cost of \$44,007.

Consistent with the recommendations of the Des Plaines River watershed study, in 2009 the Town of Bristol and Kenosha County began pursuing the voluntary buyout or floodproofing of seven homes on Lake George. The homes are located on the north side of the lake on 190th to 192nd Avenues south of 101st Street. The estimated value of the seven homes is \$1.27 million (2014 dollars). The Town will be pursuing a State grant through the Wisconsin Department of Commerce for this effort.

In 2009, the Town of Bristol completed channel riprap work to provide erosion protection along 700 feet of Center Creek. The riprap section was approximately a quarter mile south of STH 50. The cost of the project was approximately \$19,300 (2014 dollars). In 2010 or 2011, the Town plans to replace the culverts at 144th Avenue and Center Creek to provide adequate hydraulic capacity as recommended under the Des Plaines River watershed study.

The Town of Salem indicated that the 83rd Street culvert on the Unnamed Tributary No. 1 to Hooker Lake was replaced by the Wisconsin Department of Transportation in 2006 as part of the STH 83 project. The Town's 10 percent match for the culvert replacement was estimated at \$5,000.

Priority Mitigation Measures

After consideration of the technical and economic feasibility of the various alternatives, a strategy for alleviating problems due to flooding in the Kenosha County portion of the Des Plaines River watershed was developed and adopted by the Des Plaines River Watershed Committee (see Appendix A for committee member list). These mitigation measures were subsequently adapted for use in the current hazard mitigation planning program. As shown on [Map V-5](#), the following activities related to floodland management in the Des Plaines River watershed are included as priority mitigation measures in the hazard mitigation plan for Kenosha County:

- Watershedwide.
 - Preservation of the remaining primary environmental corridor lands along the Des Plaines River and its major tributaries in essentially natural open space uses. The corridors are to be preserved by a combination of public acquisition for parkway purposes and floodland and open space zoning.
 - Provision of onsite detention storage facilities for planned new development. Facilities would be designed to limit peak discharges for the 50- and one-percent-annual-probability storm events based on the following release rates: 0.04 cfs per acre of development for the 50-percent event, and 0.30 cfs per acre of development for the one-percent event.
 - Restoration of prairie conditions on 6.0 square miles on agricultural land.
 - Restoration of wetland conditions on 3.1 square miles of agricultural land in the one-percent-annual-probability floodplain.
 - Floodproofing 42 residential, commercial, and agricultural structures.
 - Elevation of three residential structures.
 - Removal of 13 residential and agricultural structures.
 - Sediment monitoring along the Upper Des Plaines River.
- Unnamed Tributary No. 6 to Brighton Creek.

- Provision of a centralized detention storage facility north of CTH K.
- Storm sewer improvements in the Village of Paddock Lake.
- Removal of seven residential structures. Note that an additional 16 structures were identified in the regulatory floodplain of Unnamed Tributary No. 6 to Brighton Creek, but these would be removed from the floodplain if the recommended detention and storm sewer work were implemented.

In addition to the measures outlined above, the floodland management element contains the following accessory measures to meet special needs within the watershed:

- Application of the standards set forth in Chapter IV relative to bridge replacement to ensure that major streets and highways remain operable during flood events.
- Preparation of detailed subwatershedwide stormwater management system plans for the City of Kenosha, the Villages of **Bristol**, Paddock Lake, Pleasant Prairie, **and Somers**, and the urban areas of the Towns of Salem and Somers.
- Encouraging the use of floodland areas for outdoor recreation and related open space activities. This is especially true for the floodprone agricultural areas lying adjacent to the Des Plaines River in the **Village** of Bristol and **Town of** Paris.
- Continued participation in the National Flood Insurance Program.
- Adoption of the one-percent-annual-probability flood profiles and floodland maps developed for planned land use conditions under the watershed plan. Also updating of Federal Flood Insurance Studies to reflect these flood profiles and maps.¹³
- Amendment of local floodland zoning ordinances to require the provision of compensatory floodland storage to offset the effects of the placement of fill in the floodplain.
- Purchase of Federal flood insurance by property owners in floodprone areas.

¹³*The Village of Pleasant Prairie adopted the pertinent Des Plaines River watershed study floodplains for local zoning purposes in 1998, and Kenosha County adopted the floodplains in 2003. In June 2010, FEMA updated the digital flood information rate maps based on the floodplain delineations and flood profiles developed under the Des Plaines River watershed study.*

- Determination by lending institutions of the floodprone status of properties prior to granting a mortgage.
- Formulation, or continuation, of governmental and agency policies such that the location, use, and size of public utilities and facilities are consistent with the floodprone status of riverine areas identified in the watershed plan.
- Consideration by local communities of the potential hydrologic impact of proposed development or redevelopment and recognition that planned development should occur according to the land use plan presented in the watershed study, as subsequently revised under the comprehensive plans for the County and municipalities within the County.
- Revising local policies and regulations to encourage low impact source controls and stormwater management practices designed to maintain pre-development hydrologic conditions.
- Providing property owners with information regarding the extent of flood hazard areas.
- Incorporating channel maintenance functions in the operations of responsible governmental units.
- Maintaining the U.S. Geological Survey stream gage on the Des Plaines River at Russell, Illinois, and adding, establishing, and maintaining a continuous recording gage on the Des Plaines River near CTH K in Kenosha County.

In addition, the City of Kenosha's proposed 2017-2021 capital improvement plan includes a provision for seeking a modification to the flood insurance rate map for Unnamed Tributary 1 to Center Creek located in the northeast portion of the Strawberry Creek subdivision. This modification would reflect the presence of a stormwater basin that was installed as part of this development.

As shown in Table V-4, the estimated capital cost of implementing the Des Plaines River watershed floodland management plan element would be \$102.5 million (2014 dollars). The capital cost of implementing those elements that remain to be implemented is about \$102.4 million. Those amounts represent the costs of implementing measures in both Racine and Kenosha Counties.

Floodplain Management for the Lake Michigan Direct Drainage Watershed

The Lake Michigan direct drainage watershed in Kenosha County is primarily located in the eastern one-half of the Village of Pleasant Prairie and most of the City of Kenosha, with a narrow section extending northward into the Village of Somers, immediately adjacent to the Lake. There are three subbasins in the watershed, which

include Pike Creek, Barnes Creek, and the direct drainage areas. The watershed encompasses approximately 27 square miles, or about 10 percent of the total land area of Kenosha County.

A comprehensive plan for the physical development of the Direct Drainage watershed has not been completed. In identifying the need for floodland management in this watershed, the one-percent-annual-probability floodplains along Pike Creek, Barnes Creek, and the direct drainage areas, including the Chiwaukee-Prairie/Carol Beach area in the Village of Pleasant Prairie, were evaluated.

Land use in the Lake Michigan direct drainage watershed is predominately urban. However, there are recreational and natural areas, and scattered pockets of agricultural land. The Chiwaukee Prairie-Carol Beach area is a natural area, which provides unique and valuable wildlife habitat. This area is characterized by an unusual microtopography, dominated by a ridge-and-swale wetland-prairie complex that offers habitat for several rare and endangered plant and animal species. A 1985 plan¹⁴ for the area recommended preserving a portion of the area through public acquisition while recognizing that certain areas would continue to be used for residential development due to commitments made through publicly sanctioned land subdivisions. The land acquisition recommendations are being implemented with 659 acres, or 94 percent of the preservation areas now being held by the Wisconsin Department of Natural Resources, the Nature Conservancy of Wisconsin, or the University of Wisconsin. This area is located east of STH 32 in the Village of Pleasant Prairie. There are approximately 1,100 acres of wetlands in this watershed, which includes the Chiwaukee Prairie and Carol Beach State natural areas.

Portions of the Chiwaukee Prairie-Carol Beach area that had been developed for residential uses have experienced relatively severe drainage and flooding problems due to high groundwater levels, flat grades, and limited elevation differences between the land surface and the drainageway and Lake Michigan water levels during periods of high lake levels. The problems involve flooding and standing water in ditches, roadways, and yards. This is especially true in the area known as Carol Beach Unit 2 Subdivision. Costs, environmental considerations, and the general physical conditions in the area make the development of solutions to such problems difficult to design and implement.

A total of 11 nonstructural measures were identified for possible inclusion in the floodland management element: 1) reservation of floodlands for recreational and related open space use; 2) floodland regulations; 3) control of land use outside of floodlands; 4) community education programs; 5) flood insurance; 6) lending institution

¹⁴*SEWRPC Community Assistance Planning Report, No. 88, A Land Use Management Plan for the Chiwaukee Prairie-Carol Beach Area of the Town of Pleasant Prairie, Kenosha County, Wisconsin, February 1985.*

policies; 7) community utility policies; 8) emergency programs; 9) structure floodproofing; 10) structure removal; and 11) channel maintenance.

Recent Local Actions

In 2009, the Village of Pleasant Prairie submitted a U.S. Environmental Protection Agency Great Lakes Restoration Initiative proposal for a study on Tobin Creek to review flows and slope stabilization needs. Total study cost was \$117,000. The Village's project was not selected for funding.

Priority Mitigation Measures

After consideration of the technical and economic feasibility of the various alternatives, a strategy for alleviating problems due to flooding in the Kenosha County portion of the Direct Drainage watershed was developed for use under the hazard mitigation planning program. As shown on [Map V-4](#), the following activities related to floodland management in the Lake Michigan Direct Drainage watershed are included as priority mitigation measures in the hazard mitigation plan for Kenosha County:

- Removal of up to 13 structures identified in the one-percent-annual-probability floodplain of Pike Creek based upon delineations on County large-scale topographic maps. [Review of 2015 aerial photographs show that six of these structures are still present in the floodplain.](#) In this regard, field surveys should be made of those structures identified on the County maps as being located within the floodplain in order to obtain a more definitive assessment of their flood hazard status. Furthermore, this plan element is presented as an option, subject to the preference of the individual property owner.

In addition to the measures outlined above, the floodland management element contains the following accessory measures to meet special needs within the watershed:

- Use of the standards set forth in Chapter IV relative to bridge replacement to ensure that major streets and highways remain operable during flood events.
- Encouraging the use of floodland areas for outdoor recreation and related open space activities.
- Continued participation in the National Flood Insurance Program.
- Amendment of local floodland zoning ordinances to require the provision of compensatory floodland storage to offset the effects of the placement of fill in the floodplain.
- Revision of local policies and regulations to encourage low impact source controls and stormwater management practices designed to maintain pre-development hydrologic conditions.

- Providing property owners with information regarding the extent of flood hazard areas.

As shown in **Table V-5**, the estimated cost of implementing the Lake Michigan Direct Drainage watershed floodland management element would be \$11.5 million. **The capital cost of implementing those elements that remain to be implemented is about \$2.0 million.**

Stormwater Management Element

Because of the relationship between stormwater management and floodland management, stormwater management actions are an important element of the flood mitigation plan. This element of the plan includes the status of stormwater management planning and stormwater ordinances and related regulations.

Stormwater Management Plans

Chapter 283 of the *Wisconsin Statutes* and Chapter NR 216 of the *Wisconsin Administrative Code* requires certain municipalities to obtain State stormwater discharge permits to discharge stormwater to receiving streams and watercourses from municipal storm sewer systems. The *State Statutes* and implementing *Administrative Code* require municipalities to file applications for the State permits. The permit applications must demonstrate that the municipality concerned has the legal authority to control pollutant contributions to storm sewer systems from various sources. The permit application must provide stormwater management-related data, most of which would be provided through a properly prepared, technically sound, stormwater management system plan.

Within Kenosha County, certain municipalities are required to obtain State stormwater discharge permits. Those municipalities with approved permits include Kenosha County, the City of Kenosha, the Villages of **Bristol**, Paddock Lake, Pleasant Prairie, Silver Lake, **Somers**, and Twin Lakes, and the Towns of **Randall and Salem**. **In addition, the University of Wisconsin-Parkside has an approved stormwater discharge permit.** The Des Plaines River watershed study recommends that Kenosha County and each incorporated municipality within the watershed adopt stormwater management ordinances. As part of the permit application process, the County and the municipalities with stormwater discharge permits have adopted such ordinances.¹⁵

The Des Plaines River watershed plan specifically recommends that stormwater management plans be prepared for areas of significant existing and/or planned urban development with priority given to those subwatersheds which experience serious drainage problems and those which are expected to develop first. It is recommended that stormwater management system plans be prepared for: 1) the Jerome Creek subwatershed in the Village of

¹⁵Within unincorporated areas of Kenosha County, new development requires a stormwater management plan pursuant to Chapter 17 of the County Code of Ordinances, "Stormwater Management, Erosion Control, and Illicit Discharge Ordinance," effective March 5, 2010.

Pleasant Prairie; 2) the Lower Des Plaines River subwatershed in the Village of Pleasant Prairie and the Town of Bristol; 3) the lower portion of the Kilbourn Road Ditch subwatershed in the City of Kenosha, the Village of Pleasant Prairie, and the Town of Somers; 4) urbanizing areas in the lower portion of the Center Creek subwatershed in the City of Kenosha and the Town of Bristol; 5) the Salem Branch of Brighton Creek subwatershed in the Village of Paddock Lake and the Towns of Bristol and Salem; and 6) the upper portion of the Kilbourn Road Ditch subwatershed in the Village of Mt. Pleasant and Town of Yorkville (Racine County). For those subwatersheds which are located in more than one community, it is recommended that the preparation of the stormwater management plans be a joint effort of the communities concerned.

The City of Kenosha has adopted a stormwater management policy. The City developed a stormwater and sanitary sewer management plan for the Forest Park area in 2014. It has also begun development of a city-wide comprehensive stormwater management plan. The Villages of Paddock Lake and Pleasant Prairie adopted stormwater management plans in 2009 and 2006, respectively.

The Town of Salem adopted a Storm Water Management Plan in June 2010. The plan includes recommendations related to flooding and drainage, water quality, public information, implementation, and financing. The plan includes projects to address seven priority flooding and drainage problems at a total estimated construction cost of \$3.1 million dollars. The plan also proposes to utilize more stringent post-development runoff release rates for all new development in the Fox River Watershed. The recommended release rates of 0.04 cfs/acre for the 50-percent-annual-probability (two-year recurrence interval) event and 0.30 cfs/acre for the one-percent-annual-probability (100-year recurrence interval) event match the rates currently applied in the Des Plaines River watershed portion of the Town. The Town of Salem created a storm water utility in 2008, and the utility will be the primary funding source for the implementation of this plan, including construction of recommended projects, facility maintenance, and water quality programs. The total plan cost is estimated at \$7.5 million dollars for 2010-2020 (2014 dollars).

The remaining urban communities in the County are also encouraged to prepare such plans. In those towns that are anticipated to remain mostly rural under the adopted land use plan, stormwater management planning is considered to be needed only for certain site-specific areas where urbanization is expected or where isolated urban areas already exist and stormwater-related problems have developed.

Recent Local Actions

In fall of 2009, the City of Kenosha began a storm sewer study for the Forest Park area which is directly tributary to Lake Michigan. The Forest Park area of interest is approximately bordered by 60th and 67th Streets and 45th and 56th Avenues in the City. Significant local stormwater flooding occurred in this area during the June 2009 event. The study includes public involvement and a condition and capacity analysis of the stormwater pipes. The study will prioritize storm sewer improvements to address flooding. The study was completed in 2014.

The City of Kenosha has begun development of a city-wide comprehensive stormwater management plan. As of April 2015, the plan was under development. The City also has ongoing storm sewer rehabilitation and storm sewer manhole and inlet rehabilitation programs.

The City of Kenosha completed the Shagbark Basin in 2009 at a cost of \$518,000. This basin was a stormwater mitigation project and it is located in the 3500 block of 39th Avenue, directly tributary to Lake Michigan. The project enlarged an undersized dry basin to reduce local stormwater flooding.

In 2009, the Village of Pleasant Prairie applied for three Community Development Block Grants (CDBG) to mitigate stormwater flooding in the Des Plaines River watershed and the watershed directly tributary to Lake Michigan. The first project is the Spring Brook Innovation Center where the grant will be used to demolish buildings, daylight a channel, and complete sewer work at a cost of \$730,000. The second project is Chateau Eau Plaines which includes land acquisition and stormwater pond construction at a cost of \$1.5 million. As of 2017, the Village is doing design work for storm sewers to address stormwater issues in the Chateau Eau Plaines subdivision. The third project is for sewer system improvements in Carol Beach Unit 1 at a cost of \$790,000. Since 2009, the Village has not pursued storm sewer system improvements in Carol Beach Unit 1. The Village learned in early 2010 that the CDBG awarded \$69,000 to elevate one residence and \$725,000 for the Spring Brook project. The buildings in question were demolished in 2010 and the site is currently a Village park. The other two projects did not receive CDBG funding, but the Village may resubmit in upcoming years.

Stormwater-Related Regulations

In 2002, the Wisconsin Department of Natural Resources issued Chapter NR 151 of the *Wisconsin Administrative Code*, outlining standards governing stormwater runoff from both agricultural and nonagricultural lands. Those standards include controls primarily on the quality of runoff from newly developed and redeveloped lands. These rules will be administered by the Department through the Chapter NR 216 stormwater discharge permit system. As noted previously, Kenosha County, the City of Kenosha, the Villages of Bristol, Paddock Lake, Pleasant Prairie, Silver Lake and Twin Lakes, and the Towns of, Salem and Somers have adopted stormwater management ordinances as part of their discharge permit program. The County ordinance applies to all unincorporated areas. In those Towns that also have a stormwater management ordinance, it is recommended that the County and the Towns work to ensure that the objectives of each ordinance are met in a coordinated manner.

Public Information and Education Element

Public information, education, and participation constitute an integral aspect of Kenosha County's flood mitigation and related efforts. This element includes two subelement activities to be carried out, namely public

education activities and public information programming and coordination associated with detailed stormwater and floodland management plans.

Public Education Activities

This subelement involves preparation and distribution of educational and self-help materials and provision of educational programs. With regard to this subelement, Kenosha County and the various municipalities will, as needed, collaborate to prepare and distribute various public informational and educational materials, including materials oriented toward homeowners and designed to help them consider and potentially undertake actions to mitigate damage caused by stormwater flooding and sanitary sewer backups. Information may be disseminated through cable television, pamphlet development, individual seminars, the World Wide Web, and community speaking engagements. In addition, when flooding occurs the University of Wisconsin-Extension distributes materials to the public on appropriate actions in response to flooding incidents. Appendix F shows an example of a flooding toolkit for citizens that was prepared by the Wisconsin Department of Health Services and a handout prepared by WEM.

The Kenosha County Emergency Management Division provides a targeted emergency alert notification service to County residents. County residents can sign up with an alert provider to receive notification of emergency situations and severe weather alerts. Subscribers provide location information, which permits the service to target alerts to specific geographic areas. The service allows subscribers to specify their preferred contact method, including electronic mail, text messages through mobile phone or pages, and voice alerts through telephone. The service also allows subscribers to specify the severe weather situations for which they wish to receive alerts. Severe weather situations for which alerts can be received include flooding. The Village of Pleasant Prairie provides a similar service to its residents.

Similarly, county emergency management representatives from southeastern Wisconsin have worked with computer science students from the University of Wisconsin-Parkside's "App Factory" to develop the *Ready Badger* app for wireless devices.¹⁶ The app is designed to speed the process of sharing and gathering hazard-related information. This app allows emergency managers to send custom-made alerts for any type of emergency, including flooding events. It also provides users with access to emergency preparedness information specific to their county. Users can also use the app to submit digital damage reports to County emergency managers, allowing them to assess damages and respond to disasters more quickly.

¹⁶The *Ready Badger* app can be downloaded for free in the Apple App Store and Android Google Play Store.

Public Participation Activities and Coordination with Other Agencies and Units of Government

The second subelement of this program involves direct public participation and coordination with other agencies during detailed stormwater and floodland management plan development. One example of this is the active participation of local citizens and community groups in the technical advisory committees that were formed to oversee the development of the four comprehensive watershed plans referenced above. In some of those watersheds, those committees, listed in Appendix A, continue to serve to help guide the implementation and refinement of those watershed plans. In the other watersheds, the Commission would reconstitute the committees as needed. In addition, public hearings were held to allow for public input into each of the four plans.

Toward further informing the public regarding flood mitigation, stormwater and floodland management, and related issues, this hazard mitigation plan update calls for concerned units and agencies of government, including Kenosha County and all cities and villages within the County, to involve members of the general public and to seek public input in the preparation and implementation of recommendations regarding such issues.

Secondary Plan Element

In addition to the above-recommended measures, several secondary measures are included in the floodland management element. These secondary measures are described below.

National Flood Insurance Program and Floodplain Map Updating Efforts

Kenosha County and all cities and villages, with exception of the Village of Somers, have been designated by FEMA as having flood hazard areas and have taken the steps needed to make residents eligible to participate in the National Flood Insurance Program (NFIP).¹⁷ Initial Flood Insurance Studies (FIS) have been completed by FEMA for Kenosha County and all municipalities identified by FEMA as having flood hazards. This plan calls for the continued participation of Kenosha County and the municipalities in the NFIP. The plan also calls for the appropriate County or incorporated municipality to request FEMA to revise, as necessary, the local flood insurance studies to reflect new flood hazard data when such data become available. The plan also calls for owners of property in Kenosha County to purchase flood insurance to provide some financial relief for losses sustained in floods that may occur in floodprone areas where no flood control measures are called for or in other floodprone areas before the implementation of any flood mitigation measures called for in the plan. As of April 30, 2016, 241 flood insurance policies were in force in Kenosha County. Finally, as the flood control measures are implemented, the plan calls for FEMA to make the necessary revisions to the FIS. Participation in the NFIP by the communities in Kenosha County is summarized in Table V-6.

¹⁷On April 24, 2015, a portion of the Town of Somers incorporated as the Village of Somers. The Village has initiated the process to participate in the NFIP.

FEMA has completed an update of the Kenosha County FIS as part of its Map Modernization program. The Map Modernization products include a countywide FIS and digital flood insurance rate maps (DFIRM). The DFIRM uses an aerial photo base, and incorporates updated floodplain boundaries delineated by SEWRPC and others. The updated Kenosha County FIS and DFIRM became effective on June 19, 2012. The Kenosha County Department of Planning and Development created a webpage on the County's website to inform County residents of the updated FIS and DFIRM.

FEMA has begun additional examination of floodplains in a portion of Kenosha County through its Risk Mapping, Assessment, and Planning (Risk MAP) Program. This program provides communities with more precise flood mapping products, risk assessment tools, and planning and outreach support in order to reduce risks due to flooding. On November 13, 2012, initial FEMA Risk MAP program discovery meetings were held for the upper Fox River Watershed. This watershed encompasses portions of Kenosha, Racine, Walworth, and Waukesha Counties. Following this meeting, FEMA issued an initial discovery report.¹⁸ Additional discovery meetings were held with communities in the watershed in February 2014. A final discovery report was issued to further reflect additional comments from the communities.¹⁹ As part of the Risk MAP project, detailed studies are proposed for the mainstem of the Fox River and New Munster Creek in Kenosha County. As of June 2016, FEMA funding for DFIRM production for the upper Fox River watershed has not been allocated.

Community Rating System

On May 1, 2013, Kenosha County began participating in NFIP's community rating system (CRS) program. To qualify for this program, FEMA verified that voluntary actions undertaken by the County have exceeded the minimum standards of the NFIP and meet the criteria for a CRS Class 5 rating. As a result of this rating, residents and business owners in the unincorporated areas of Kenosha County receive a 25 percent discount in the premium cost of flood insurance for NFIP policies issued or renewed in Special Flood Hazard Areas on or after May 1, 2013. It is recommended that incorporated municipalities in Kenosha County consider participating in this program.

It should be noted that as portions of unincorporated towns in Kenosha County incorporate as villages or cities, their residents will no longer be eligible for premium discounts through the County's participation in the CRS

¹⁸*Federal Emergency Management Agency, Discovery Report: Upper Fox River Watershed, HUC 07120006, March 26, 2013.*

¹⁹*Federal Emergency Management Agency, Discovery Report: Upper Fox River Watershed, HUC 07120006, November 5, 2014.*

program. In order to maintain these discounts, it is recommended that as new villages and cities incorporate in the County they enter into participation in the NFIP and CRS programs.

Lending Institution and Real-Estate-Agent Policies

This plan calls for lending institutions to continue their practice of determining the floodprone status of properties before mortgage transactions. To that end, these institutions should consult with the appropriate local zoning department to inquire about any additional flood hazard studies for areas not identified in the Federal FIS. The plan also calls for real-estate brokers and salespersons to continue to inform potential purchasers of property of any flood hazard that may exist at the site being traded in accord with rules of Wisconsin Department of **Safety and Professional Services**.

Stream Channel Maintenance

This plan calls for Kenosha County and local municipalities and drainage districts to work cooperatively to continue and expand programs for regular stream channel maintenance within their respective jurisdictions. These programs would include the periodic removal of sediment deposits, selected heavy vegetation, and debris from all watercourses in the County, including bridge openings and culverts, subject to obtaining any necessary local and State permits.

Stormwater Management Facilities Maintenance

The effectiveness of stormwater management conveyance and detention facilities and other management measures can be sustained only if proper operation, repair, and maintenance procedures are carefully followed. Important maintenance procedures include the periodic repair of storm sewers, clearing of sewer obstructions, maintenance of open channel vegetation linings, clearing debris and sediment from open channels, maintenance of the infiltration capacity of stormwater infiltration facilities, maintenance of detention facility inlets and outlets, maintenance of detention basin vegetative cover, and periodic removal of sediment accumulated in detention basins. The plan calls for these maintenance activities to be carried out on a continuing basis to maximize the effectiveness of the stormwater management facilities and measures and to protect the capital investment in the facilities.

Survey of Buildings in and near the **One-Percent-Annual-Probability** Floodplain

The extent of the one-percent-annual-probability floodplain has been delineated on the Kenosha County large-scale topographic maps, and much of that information **is** reflected on the FEMA DFIRMs that **have been** prepared. While those maps are adequate in detail to identify the extent of flooding for planning and zoning purposes, they can only be considered approximate in regards to establishing building grades. When future consideration is given to implementing flood mitigation measures for the identified buildings, this plan calls for Kenosha County or the appropriate municipality to survey the low-grade elevations adjacent to buildings and the

first-floor elevations of buildings that have been identified as remaining in or near **the one-percent-annual-probability** (100-year recurrence interval) floodplain after all other structural floodland management plan elements called for in this plan have been implemented. Such surveys will provide a more definitive identification of the flood hazard for those properties, and will assist property owners in deciding upon a course of action regarding floodproofing procedures.

A review of the Letter of Map Change (LOMC) information on the FEMA website reveals that **166** LOMC have been submitted for Kenosha County properties from **2012 to 2016**. LOMC include two categories: Letters of Map Amendment (LOMA) and Letters of Map Revision (LOMR). LOMA include those properties that have completed a topographic survey and under existing conditions are above the one-percent-annual-probability flood stage elevation. In Kenosha County, **159** properties have effective LOMA. Another **seven** properties have effective LOMR or Letters of Map Revision based on Fill (LOMR-F). LOMR most likely include an updated hydraulic study based on better topographic information or hydrology that indicates the subject properties are above the one-percent-annual-probability flood stage elevation. LOMR-F properties have been filled and it has been confirmed via survey that the structure has been raised above the one-percent-annual-probability flood stage elevation.

HAZARD MITIGATION PLAN COMPONENT FOR THUNDERSTORM, HIGH-WIND, HAIL, AND LIGHTNING HAZARDS

As described in Chapter III, thunderstorm, high winds, hail and lightning are natural hazard events of significant concern to be considered in the Kenosha County hazard mitigation plan. This section describes alternate and selected strategies to mitigate these types of hazards. As part of the updating process, these strategies were reviewed and reevaluated by the Kenosha County Hazard Mitigation Plan **Local Planning Team** in light of the updated hazard conditions and hazard mitigation goals documented in Chapters III and IV, respectively.

Identification of Alternative Mitigation Strategies

All thunderstorms and related hazard events are potentially dangerous and are the most common type of severe weather event compared to other natural hazards within Kenosha County as discussed in Chapter III. Kenosha County averages about 10 days per year in which thunderstorms inflict wind, hail, or lightning damage. Severe thunderstorm fronts can often be tracked, which generally provides ample warning for potentially affected areas to take preventative actions. In addition, when severe thunderstorms and related hazard events occur, they generally last for short periods of time. Severe wind downbursts can exceed hurricane force winds (greater than 74 mph) and can do more damage than an F1 tornado.

While it may not be possible to accurately identify specific areas where there is significant risk from thunderstorm and related hazard events, or the number or severity of the events, measures can be taken to reduce the potential damage caused by thunderstorm and related hazards wherever they may occur in the County. High-wind events associated with thunderstorms are very similar to tornadoes, except they are more common and usually less powerful than tornadoes. Hailstorms tend to occur in conjunction with severe thunderstorms. During a hail storm, personal safety is the first priority and persons should seek shelter and stop driving to avoid any accidents. Advance warning systems may allow for some actions to reduce hail damage to vehicles and some property, but little can be done to protect structures or crops in the field. Personal protection is paramount for lightning safety—many people incur injuries or are killed due to misinformation and inappropriate behavior during thunderstorms. A few simple precautions can reduce many of the dangers posed by lightning. The individual is ultimately responsible for his/her personal safety and has the right to take appropriate action when threatened by lightning. Through review by the Kenosha County Hazard Mitigation Plan Local Planning Team, the following measures to reduce vulnerability to thunderstorms, high winds, hail, and lightning have been identified as viable for the County hazard mitigation plan.

Nonstructural

- Review local building codes to determine if revisions are needed to improve the ability of structures to withstand greater wind velocities and impacts from hail;²⁰
- Encourage provision of safe rooms in residences, workplaces and other buildings, especially in structures that do not have a basement;
- Local fire suppression departments should obtain and maintain equipment to help detect or mitigate lightning-related fires, such as thermal imaging devices;
- Enforce existing local ordinances requiring adequate grounding of newly constructed buildings;
- Encourage local municipalities to become eligible for and join the National Weather Service's (NWS) StormReady program.²¹ Requirements for this program include:

²⁰The State Uniform Dwelling Code (UDC) is a statewide regulation that sets standards for fire safety, structural strength, energy conservation, erosion control, heating, plumbing and electrical systems, and general health and safety in dwellings constructed or altered after 1980. The UDC applies uniformly throughout the State, and local governments may not adopt a more or less stringent code. Consequently, should review of local ordinances reveal that a change in the building code would be a viable mitigation measure, the County and the municipalities within it would need to pursue a change in the UDC at the State level.

²¹More information on the NWS StormReady program can be found at <http://www.stormready.noaa.gov/>

- Establishing a 24-hour warning point and emergency operations center,
- Having multiple ways to receive severe weather warnings and forecasts and alert the public,
- Promoting the importance of public readiness through community seminars, and
- Developing a formal hazardous weather plan, which includes training severe weather spotters and holding emergency exercises;
- Provide annual access to weather spotter training; and
- Encourage agricultural producers to purchase crop insurance.

Structural

- Maintain, update, and upgrade public early warning systems and networks. Consider expanding such systems as necessary. Desirable characteristics of a robust early warning system include:
 - Employing multiple means of communication to alert people of the imminent threat of severe weather. Examples of such means of communication include providing warnings and/or information through outdoor warning systems, broadcast media, cable and satellite media, electronic mail, SMS messaging, social media, and reverse-911 telephony; and
 - Being capable of reaching vulnerable segments of the population;
- Trim and maintain the health of trees near vulnerable infrastructure, such as utility lines, essential facilities and roads, as well as near homes and businesses;
- Promote planting windbreaks for farm crops;
- Work with municipalities and businesses to explore installation of community safe rooms and hardening projects for community facilities, businesses, and manufacturers. Priority should be considered for those facilities that are located in slab-on-grade structures and for those projects that can be completed as part of a newly planned building or building expansion;
- Provide model mobile home park regulations to municipalities for their consideration which require that community safe rooms (storm shelters) be provided for residents of new and expanding mobile home parks. Based on community and landowner interest, pursue grant funding for installation of community safe rooms in existing mobile home parks;
- Bury and protect power and utility lines;

- Encourage the use of surge protectors on critical electronic equipment;
- Install lightning grade surge protection devices for critical electronic components used by government, public service, and public safety facilities, such as warning systems, control systems, communications, and computers; and
- Promote emergency back-up power at critical facilities.

Public Informational and Educational Programming

- Increase public education and awareness of the potential severity of thunderstorms and distribute emergency preparedness information related to thunderstorm hazards. Such educational efforts should include promoting public awareness of proven lightning safety guidelines to reduce the risk of lightning hazards and of the potential severity of hailstorms;
- Increase the coverage and use of National Oceanic and Atmospheric Administration (NOAA) All Hazard Weather Radios;
- Promote inclusion of safety strategies for severe weather events in driver education classes and materials;
- Encourage residents to develop a Family Emergency Preparedness Plan that would include the preparation of a Disaster Supply Kit (Appendix G); and
- Produce and distribute emergency preparedness information related to thunderstorm hazards.

Current Programs

Federal and State Programs

The National Weather Service issues severe thunderstorm warnings, watches, and advisories when there is a threat of severe weather conditions. Several categories of warnings, watches, and advisories apply to thunderstorms and associated hazards. The NWS Milwaukee/Sullivan office will issue a severe thunderstorm warning when either a spotter reports a thunderstorm producing winds that equal or exceed 58 miles per hour (mph), hail of one inch or larger in diameter, or a severe thunderstorm is detected by Doppler radar. The NWS Storm Prediction Center in Norman, Oklahoma will issue a severe thunderstorm watch when conditions are favorable for the development of severe thunderstorms in and close to the watch area. The NWS Milwaukee/Sullivan office will issue a high wind warning when sustained winds of 40 mph are expected to occur for an hour or more or wind gusts of 58 mph or more are expected to occur. The NWS Milwaukee/Sullivan office will issue a wind advisory when sustained winds of 30 mph are expected to occur for an hour or more or wind gusts of 45 mph to 57 mph or more are expected to occur. The office also issues a variety of wind-related marine warnings for events in Lake Michigan.

Federal and State programs include awareness and education efforts. The National Weather Service also has an extensive public information program to educate people about the dangers of thunderstorms and related hazards and assist in preventing related deaths and injuries. WEM, in conjunction with the National Weather Service and State and local government agencies, provides both preparedness information and severe weather information to the public. Preparedness information is provided during three severe weather awareness campaigns conducted during the year, each focusing on the prevalent weather hazard at that time. The Wisconsin Department of Health Services has developed a severe thunderstorm and tornado tool kit to provide information to local governments, health departments, and citizens in Wisconsin about preparing for and responding to severe thunderstorms and tornadoes.²² Similarly, WEM has produced several educational resources regarding thunderstorms and related hazards including prerecorded radio public service announcements, scripts for radio public service announcements, fliers, and educational materials for children.²³ In addition, numerous other organizations, including the American Red Cross, provide public safety information regarding lightning.

Local Programs

Programs within Kenosha County include those conducted by the Kenosha County Division of Emergency Management. The Kenosha County Division of Emergency Management has a number of brochures, booklets, and pamphlets available for the public on severe weather safety and other general emergency management-related topics. Kenosha County Emergency Management participates in all State sponsored severe weather awareness campaigns.

Kenosha County Emergency Management and County Dispatch rely on the following to notify others of severe weather hazards: NOAA All Hazard Weather Radio, Universal Weather Service, NAWAS, emergency e-mail network, and Doppler Radar. Kenosha County Emergency Management encourages all local citizens to have a NOAA All Hazard Weather Radio. In 2002, NOAA Weather Radio installed a new transmitter at CTH KR and Wood Road in Racine County. This transmitter serves both Kenosha and Racine Counties and is assigned a frequency of 162.450 megahertz. In addition, severe thunderstorm and related hazard warnings from NOAA Weather Radio are relayed to other media via the Federal Communication Commission's Emergency Alert System (EAS). The EAS allows officials to send emergency information targeted to specific geographical areas. The EAS sends alerts out to broadcast media, cable television providers, satellites, pagers, direct broadcast

²²Wisconsin Department of Health Services, Wisconsin Severe Thunderstorm and Tornadoes Toolkit, Publication P01037, June 2015.

²³These can be accessed at Wisconsin Emergency Management's ReadyWisconsin website located at: http://ready.wi.gov/Resources/Manager_Resources.asp.

satellites, high definition television, and video dial tone. This system uses the same digital protocols as NOAA Weather Radio. Nationally, the National Weather Service generates about 80 percent of EAS activations primarily for short-duration weather warnings and watches. Federal, State, and local emergency personnel can also access this system to disseminate nonweather emergency messages through the National Weather Service's HAZCollect system.

The Kenosha County Emergency Management Division provides a targeted emergency alert notification service to County residents. County residents can sign up with an alert provider to receive notification of emergency situations and severe weather alerts. Subscribers provide location information, which permits the service to target alerts to specific geographic areas. The service allows subscribers to specify their preferred contact method, including electronic mail, text messages through mobile phone or pages, and voice alerts through telephone. The service also allows subscribers to specify the severe weather situations for which they wish to receive alerts. Severe weather situations for which alerts can be received include high winds and severe thunderstorms. The Village of Pleasant Prairie provides a similar service to its residents.

Similarly, county emergency management representatives from southeastern Wisconsin have worked with computer science students from the University of Wisconsin-Parkside's "App Factory" to develop the *Ready Badger* app for wireless devices.²⁴ The app is designed to speed the process of sharing and gathering hazard-related information. This app allows emergency managers to send custom-made alerts for any type of emergency, including severe thunderstorm and high-wind related events. It also provides users with access to emergency preparedness information specific to their county. Users can also use the app to submit digital damage reports to County emergency managers, allowing them to assess damages and respond to disasters more quickly.

As described in Chapter II, Kenosha County has developed an emergency operations plan and hazard analysis, which sets forth an all-hazards action plan. In addition, many of the local units of government have developed emergency operations plans and/or programs that complement the County plan and that also set forth procedures and actions to deal with a range of situations and events, including thunderstorms, high-wind, and hail events.

Analysis of the vulnerability of humans, infrastructure, and economic production to thunderstorm and related hazard events demonstrates that the provision of advanced warning systems, as well as public informational and educational programming, are the most important mitigation actions to be considered. Kenosha County owns and operates a total of 35 outdoor warning and communication siren systems, with eight located within the City of Kenosha, nine within the Village of Pleasant Prairie, three within the Village of Somers, two within the Village of

²⁴The *Ready Badger* app can be downloaded for free in the Apple App Store and Android Google Play Store.

Twin Lakes, one within each of the Villages of Paddock Lake and Silver Lake, four within the Village of Bristol, three within of the Town of Salem, and one within each of the Towns of Brighton, Paris, Randall, and Wheatland. The County regularly tests and maintains these sirens. Recent maintenance includes providing an emergency backup generator for one siren located in the Village of Pleasant Prairie.

The County conducts one or more weather spotter training courses each spring.

Evaluation of Alternatives and Identification of Mitigation Actions

Based upon review of the above by the Kenosha County Hazard Mitigation Plan Local Planning Team as part of the updating process, refinement and expansion of current ongoing programs continues to represent a major component of the planned mitigation action with regard to early warning systems. The existing warning systems should continue to rely upon the use of multiple means of communication to alert people to the threat of severe weather. The highly developed urban areas located within the unincorporated areas, such as the major lake developments, should also be considered as areas needing outdoor warning systems. In addition, informing the public of the significance of thunderstorm watches and warnings so that they take thunderstorm warnings and related hazards seriously and know where to seek shelter in emergency situations, is an important, ongoing component for minimizing the risks associated with these natural hazards. Community- and school-based informational programs should also continue to be conducted by the County in partnership with Federal, State, and local authorities.

Promoting the provision of adequate safe places for people to seek shelter during severe storms constitutes an additional approach to mitigating some impacts of severe storms in Kenosha County. Residents of mobile home parks represent a segment of the County's population that lacks access to adequate shelters. Thus encouraging and promoting the construction of community safe rooms to provide shelter from severe storms to vulnerable populations such as mobile home parks constitutes an important addition to this hazard mitigation plan.

Similarly, severe storm events can cause economic losses especially to agricultural producers through damage to crops. Providing agricultural producers with information regarding Federal crop insurance programs and encouraging them to purchase crop insurance constitutes a means of providing them with some protection against such losses.

Finally, other feasible nonstructural and structural mitigation actions include provision of surge protection for sensitive electronic equipment; and other precautions that will limit possible future bodily injuries, deaths, or property damages due to severe weather events. The majority of these measures are currently in place, indicating an emphasis on informational programming and enforcement.

Multi-Jurisdictional Considerations

Thunderstorms and their related hazards can potentially impact all municipalities within the County. In addition, these severe weather events may cause multiple damages to a variety of infrastructure including transmission lines, communication lines, and transportation routes due to flooding from storms, as well as damage to buildings from flooding and/or high winds. Hence, Kenosha County, municipalities, and relevant businesses should coordinate hazard mitigation activities through a cooperative County and local government partnership in countywide disaster planning and response mechanisms. Such measures are already well underway through the coordinated emergency operations planning program involving the Kenosha County Division of Emergency Management and coordinated local community emergency operations programs and should be continued.

Priority Mitigation Measures

Based upon the foregoing evaluation, consideration of risk (see Appendix H), and review and action by the Kenosha County Hazard Mitigation Plan **Local Planning Team** as a part of the updating process (see Appendix A), the following mitigation activities related to thunderstorms, high-wind, hail, and lightning events are included as priority mitigation measures in the Kenosha County hazards mitigation plan:

- Maintain and potentially expand the early warning and communication systems including Emergency Alert System (EAS) capabilities and expanded use of emerging technologies, **such as the County's targeted emergency alert system**. In this regard, the expanded use of the NOAA All Hazard Weather Radio among residents is encouraged. This weather radio continuously broadcasts National Weather Service forecasts, warnings and crucial weather information. NOAA All Hazard Weather Radio also provides direct warning to the public for natural, man-made, and technological hazards, and is the primary trigger for activating the EAS on commercial radio, television, and cable systems;
- Promote educational and informational programming, especially related to the early warning network, NOAA All Hazard Weather Radio and EAS broadcasts, and to individual actions to protect citizens, property, and businesses. **Volunteer groups** may be able to provide assistance in these educational efforts;
- **Encourage the provision of safe rooms. Such encouragement should include:**
 - **Working with municipalities and businesses to explore installation of community safe rooms and hardening projects for community facilities, businesses, and manufacturers,**
 - **Consideration by municipalities of adopting mobile home park regulations which require that community safe rooms be provided for residents of new and expanding mobile home parks, and**

- Based on community and landowner interest, pursue grant funding for installation of community safe rooms in existing mobile home parks;²⁵
- Encourage agricultural producers to purchase crop insurance;
- Continue to conduct annual weather spotter training; and
- Continue coordination of emergency operations and response plans among governmental units and first responders.

The Local Planning Team decided to add the above listed components related to safe rooms and crop insurance to the hazard mitigation plan. Because the remaining measures are intended to be ongoing efforts, the Local Planning Team decided to retain them in the updated plan.

HAZARD MITIGATION PLAN COMPONENT FOR TORNADOES

As described in Chapter III, tornadoes are natural hazard events of moderate concern to be considered in this update of the Kenosha County hazard mitigation plan. This section describes alternate and selected strategies to mitigate these types of hazards. As part of the updating process, these strategies were reviewed and reevaluated by the Kenosha County Hazard Mitigation Local Planning Team in light of the updated hazard conditions and updated hazard mitigation goals documented in Chapters III and IV, respectively.

Identification of Alternative Mitigation Strategies

All tornadoes are potentially dangerous hazards within Kenosha County as discussed in Chapter III. However, tornadoes have been shown to impact Kenosha County about once every three to four years and these are most likely to be an EF1 magnitude or less. In addition, when tornadoes and related hazard events occur, they generally last for short periods of time and impact relatively small areas upon the landscape.

While it may not be possible to accurately identify specific areas where there is significant risk from tornado events, or the number or severity of the events, measures can be taken to reduce the potential damage caused by tornado and related hazards wherever they may occur in the County. Based upon review by the Kenosha County Hazard Mitigation Local Planning Team, the following measures to reduce vulnerability to tornadoes have been identified as viable for this update of the Kenosha County hazard mitigation plan.

²⁵A priority ranking of mobile home parks in the County for installation of safe rooms is given in Appendix L.

Nonstructural

- Review local building codes to determine if revisions are needed to improve the ability of structures to withstand greater wind velocities;²⁶
- Encourage provision of safe rooms, especially in structures that do not have a basement;
- Conduct of an inventory and inspection of facilities to ensure the quality, quantity, and accessibility of adequate tornado shelters;
- Encourage local municipalities to become eligible for and join the NWS StormReady program.²⁷ Requirements for the program include:
 - Establishing a 24-hour warning point and emergency operations center,
 - Having multiple ways to receive severe weather warnings and forecasts and alert the public,
 - Creating a system that monitors weather conditions locally,
 - Promoting the importance of public readiness through community seminars, and
 - Developing a formal hazardous weather plan, which includes training severe weather spotters and holding emergency exercises;
- Provide annual access to weather spotter training;
- Encourage the development a local tornado spotter network;
- Ensure that mobile and manufactured housing is securely anchored; and
- Establish safe and appropriate locations for temporary debris disposal sites.

²⁶The State Uniform Dwelling Code (UDC) is a statewide regulation that sets standards for fire safety, structural strength, energy conservation, erosion control, heating, plumbing and electrical systems, and general health and safety in dwellings constructed or altered after 1980. The UDC applies uniformly throughout the State, and local governments may not adopt a more or less stringent code. Consequently, should review of local ordinances reveal that a change in the building code would be a viable mitigation measure, the County and the municipalities within it would need to pursue a change in the UDC at the State level.

²⁷More information on the NWS StormReady program can be found at <http://www.stormready.noaa.gov/>.

Structural

- Maintain, update, and upgrade public early warning systems and networks. Consider expanding such networks as necessary. Desirable characteristics of a robust early warning system include:
 - Employing multiple means of communication to alert people of the imminent threat of severe weather. Examples of such means of communication include providing warnings and/or information through outdoor warning systems, broadcast media, cable and satellite media, electronic mail, SMS messaging, social media, and reverse-911 telephony; and
 - Being capable of reaching vulnerable segments of the population;
- Retrofit existing or install new structures to ensure adequate shelters from tornadoes for public buildings, major industrial sites, mobile home parks, and other large businesses or complexes such as shopping malls, fairgrounds, and other vulnerable public areas;
- Work with municipalities and businesses to explore installation of community safe rooms and hardening projects²⁸ for community facilities, businesses, and manufacturers. Priority should be considered for those facilities that are located in a slab-on-grade structure and for those projects that can be completed as part of a newly planned building or building expansion;
- Provide model mobile home park regulations to municipalities for their consideration which requires that community safe rooms (storm shelters) be provided for residents of new and expanding mobile home parks. Based on community and landowner interest, pursue grant funding for installation of community safe rooms in existing mobile home parks;
- Trim and maintain the health of trees near vulnerable infrastructure, such as utility lines, essential facilities and roads, as well as near homes and businesses; and
- Bury and protect power and utility lines.

Public Informational and Educational Programming

- Increase public education and awareness of the potential severity of tornadoes;

²⁸FEMA defines “hardening” as project-specific specialized design and construction methods which are applied to one or more rooms within a building and/or to an entire building envelope to allow portions of and/or entire structure to resist wind pressures and windborne debris impacts during an extreme wind event and are capable of providing life-safety protection to the occupants of the room or structure.

- Increase the coverage and use of NOAA All Hazard Weather Radios and Emergency Alert System broadcast awareness;
- Promote inclusion of safety strategies for severe weather events in driver education classes and materials;
- Encourage residents to develop a Family Emergency Preparedness Plan that would include the preparation of a Disaster Supply Kit (Appendix G); and
- Produce and distribute emergency preparedness information related to tornado hazards.

Current Programs

Federal and State Programs

The National Weather Service issues warnings, watches, and advisories when there is a threat of severe weather conditions. The National Weather Service issues tornado watches when conditions are favorable for the development of thunderstorms that have a strong capability of producing tornadoes and issues tornado warnings when a tornado has been spotted by a trained observer or Doppler radar has indicated a developing tornado.

Federal and State programs include awareness and educational activities regarding tornadoes. These include public information programs conducted by the National Weather Service, WEM, the Wisconsin Department of Health Services, and the American Red Cross. These programs were previously described in the section of this chapter on thunderstorms.

Local Programs

Programs within Kenosha County include those conducted by the Kenosha County Division of Emergency Management. The Kenosha County Division of Emergency Management has a number of brochures, booklets, and pamphlets available for the public on tornado safety and other general emergency management-related topics. Kenosha County Emergency Management participates in all State sponsored severe weather awareness campaigns.

A variety of methods are used to warn people in Kenosha County of severe weather events, including tornadoes. These were previously described in the section of this chapter on thunderstorms.

As described in Chapter II, Kenosha County has developed an emergency operations plan and hazard analysis, which sets forth an all-hazards action plan. In addition, many of the local units of government have developed emergency operations plans and/or programs that complement the County plan and that also set forth procedures and actions to deal with a range of situations and events, including tornado and related hazard events.

Analysis of the vulnerability of humans, infrastructure, and economic production to tornadoes and related hazard events demonstrates that the provision of advanced warning systems; availability of adequate shelters for public buildings, major industrial sites, and other large businesses or complexes such as shopping malls; as well as public informational and educational programming are the most important mitigation actions to be considered. Kenosha County owns and operates a total of 35 outdoor warning and communication siren systems, with eight located within the City of Kenosha, nine within the Village of Pleasant Prairie, **three within the Village of Somers,** two within the Village of Twin Lakes, one within each of the Villages of Paddock Lake and Silver Lake, **four within the Village of Bristol,** three within of the Town of Salem, and one within each of the Towns of Brighton, Paris, Randall, and Wheatland. **The County regularly tests and maintains these sirens. Recent maintenance includes providing an emergency backup generator for one siren located in the Village of Pleasant Prairie.**

The County conducts one or more weather spotter training course each spring.

Evaluation of Alternatives and Identification of Mitigation Actions

Based upon review of the above, refinement and expansion of the current ongoing programs represent a major component of the planned mitigation action with regard to early warning systems. **The existing warning systems should continue to rely upon the use of multiple means of communication to alert people to the threat of severe weather.** The highly developed urban areas located within the unincorporated areas, such as the major lake developments, should also be considered as needing early warning outdoor systems. The best shelters are specifically designed tornado shelters or safe rooms. Lacking such shelters, taking refuge in a basement near supporting walls or pillars, and away from windows, or, if there is no basement, taking shelter in smaller interior, windowless rooms, such as hallways or closets, can offer some protection and is the next best option. Cars, mobile homes, garages, and outbuildings are not safe shelters from tornadoes. **Thus, promoting the provision of adequate safe places for people to seek shelter during tornadoes constitutes an additional approach to mitigating some impacts of severe storms in Kenosha County. Residents of mobile home parks, in particular, represent a segment of the County's population that lacks access to adequate shelters. Thus encouraging and promoting the construction of community safe rooms to provide shelter from tornadoes to vulnerable populations such as mobile home parks constitutes an important addition to this hazard mitigation plan.**

In addition, informing the public of the significance of tornado watches and warnings so that they take tornado warnings seriously and know where to seek shelter in emergency situations, is an important, ongoing component for minimizing the risks associated with these natural hazards. Community- and school-based informational programs should also continue to be conducted by the County in partnership with Federal, State and local authorities.

Finally other feasible nonstructural and structural mitigation actions include incorporation of wind resistant construction methods for the protection of buildings and infrastructure; and other precautions that will limit possible future bodily injuries, deaths, or property damages due to tornado and related hazard events.

Multi-Jurisdictional Considerations

Tornadoes and their related hazards can potentially impact all municipalities within the County. In addition, these severe weather events can potentially cause multiple damages to a variety of infrastructure including transmission lines, communication lines, and transportation routes due to flooding, as well as destroyed buildings from high winds. Hence, Kenosha County, municipalities, and relevant businesses should coordinate hazard mitigation activities through a cooperative County and local government partnership in countywide disaster planning and response mechanisms. Such measures are already well underway through the coordinated emergency operations planning program involving the Kenosha County Division of Emergency Management and coordinated local community emergency operations programs.

Priority Mitigation Measures

Based upon the foregoing evaluation, consideration of risk (see Appendix H), and review and action by the Kenosha County Hazard Mitigation Plan Local Planning Team (see Appendix A), the following mitigation activities related to tornado hazard events are included as priority mitigation measures in the updated Kenosha County hazards mitigation plan:

- Further development of effective means of warning at-risk populations, including installation and maintenance of additional early warning systems to include EAS capabilities and expanded use of emergency technologies, such as the County's targeted alert system;
- Retrofitting of existing or install new structures to ensure there are adequate shelters from tornadoes for public buildings, major industrial sites, mobile home parks, and other large businesses or complexes, such as shopping malls, fairgrounds, and other vulnerable public areas. Encouragement of the installation of safe rooms should include:
 - Working with municipalities and businesses to explore installation of community safe rooms and hardening projects for community facilities, businesses, and manufacturers,
 - Consideration by municipalities of adopting model mobile home park regulations which require that community safe rooms be provided for residents of new and expanding mobile home parks, and

- Based on community and landowner interest, pursue grant funding for installation of community safe rooms in existing mobile home parks;²⁹
- Promotion of educational and informational programming, especially related to the early warning network, including NOAA All Hazard Weather Radio and EAS broadcasts, and to individual actions to protect citizens, property, and businesses. Volunteer groups may be able to provide assistance in these educational efforts;
- Continue to conduct annual weather spotter training;
- Enforcement of building code ordinance requirements; and
- Continued coordination of emergency response and operations plans among governmental units and first responders.

Because these measures are intended to be ongoing efforts, the Task Force decided to retain them in the updated plan.

HAZARD MITIGATION PLAN COMPONENT FOR EXTREME TEMPERATURE

As described in Chapter III, extreme temperatures are natural hazard events of significant concern to be considered in the Kenosha County hazard mitigation plan. This section describes alternate and selected strategies to mitigate these types of hazards. As part of the updating process, these strategies were reviewed and reevaluated by the Kenosha County Hazard Mitigation Local Planning Team in light of the updated hazard conditions and hazard mitigation goals documented in Chapters III and IV, respectively.

Identification of Alternative Mitigation Strategies

Extreme temperature events pose a serious threat to Kenosha County. Extreme heat and cold events combined are the most deadly natural hazards that Kenosha County must confront. Temperature extremes should be expected with each summer and winter season, making this a hazard for which plans can be easily prepared. Extreme heat and cold events do not typically occur suddenly and are generally connected to a weather system that can be forecast days in advance. When temperature extreme events do occur, they commonly last for extended periods of time (days or weeks) and impact entire areas larger than Kenosha County.

²⁹A priority ranking of mobile home parks in the County for installation of safe rooms is given in Appendix L.

While it may not be possible to accurately identify specific areas where there is significant risk from extreme temperature, extreme heat will have the greatest impact in the large urbanized areas of the County. Demographically, the elderly, poor, and debilitated are most vulnerable to excessive heat and cold. Fatalities are usually related to age because excessive heat is stressful and can overwhelm those who are weakened because of age or illness. Measures can be taken to reduce the potential injuries and fatalities caused by temperature extremes wherever they may occur in the County. Based upon review by the Kenosha County Hazard Mitigation **Local Planning Team**, the following measures to reduce vulnerability to extreme temperature events have been identified as viable for this update of the Kenosha County hazard mitigation plan.

Nonstructural

- Organize neighborhood outreach groups who look after vulnerable groups and individuals;
- Provide special arrangements for payment of heating bills;
- Designate sites to be used as public cooling/heating shelters during extreme temperature events. In addition:
 - Encourage these sites to extend their hours during extreme temperature events, and
- Encourage the arrangement of transportation for members of highly vulnerable populations to these sites during extreme temperature events;
- Increase coverage and use of NOAA All Hazard Weather Radio and EAS broadcasts; and
- Maintain, update, and upgrade public early warning systems and networks. Consider expanding such networks as necessary. Desirable characteristics of a robust early warning system include:
 - Employing multiple means of communication to alert people of the imminent threat of extreme temperatures. Examples of such means of communication include providing warnings and/or information through outdoor warning systems, broadcast media, cable and satellite media, electronic mail, SMS messaging, social media, and reverse-911 telephony; and
 - Being capable of reaching vulnerable segments of the population.

Structural

- Conduct an inventory and inspection of facilities to ensure the quality, quantity, and accessibility of adequate heating and/or cooling centers in the community.

Public Informational and Educational Programming

- Increase public education and awareness of the potential severity of temperature extreme events; and
- Produce and distribute emergency preparedness information related to temperature extremes.

Current Programs

Federal and State Programs

The NWS issues warnings, watches, and advisories when there is a threat of severe weather conditions. Several categories of warnings, watches, and advisories apply to extreme temperature conditions and associated hazards. The NWS Milwaukee/Sullivan office will issue an excessive heat warning when daytime high temperatures of 105°F or higher and night-time temperatures of 75°F or higher are expected to occur over a 48-hour period or when high temperatures of 100°F or more are expected over four or more consecutive days. The office will issue a heat advisory when daytime high temperatures of 100°F or higher are expected or when daytime high temperatures are expected to be between 95°F and 99°F for four or more consecutive days. The office will issue a wind chill warning when wind chills of 35 below zero or colder with winds of four or more mph are expected to occur for three or more hours. The office will issue a wind chill advisory when wind chills between 20 below zero and 34 below zero with winds of four or more mph are expected to occur for three or more hours.

Heat waves cannot be prevented, therefore, it is important to provide notice of adverse conditions so that the public can anticipate and avoid health-threatening situations. Excessive heat alert thresholds are being tailored at major metropolitan centers based on research results that link unusual amounts of heat-related deaths to city-specific meteorological conditions. The alert procedures are:

- Include Heat Index values in zone and city forecasts.
- Issue Special Weather Statements and/or Public Information Statements presenting a detailed discussion of 1) the extent of the hazard including Heat Index values, 2) who is most at risk, and 3) safety rules for reducing the risk.
- Assist State and local health officials in preparing civil emergency messages in severe heat waves. Meteorological information from Special Weather Statements will be included, as well as medical information, advice, and names and telephone numbers of health officials.
- Release to the media and over the NOAA All Hazard Weather Radio all of the above information.

State programs include awareness and education efforts. WEM, in conjunction with the National Weather Service and State and local government agencies, provides both preparedness information and severe weather information to the citizens of Wisconsin. Preparedness information is provided during three severe weather awareness

campaigns conducted during the year, each focusing on the prevalent weather hazard at that time. The Wisconsin Department of Health Services has developed an extreme heat tool kit to provide information to local governments, health departments, and citizens in Wisconsin about preparing for and responding to extreme heat events.³⁰ Similarly, the Department has developed a winter weather toolkit to provide information about winter weather, including extreme cold.³¹ Similarly, WEM has produced several educational resources regarding extreme heat and winter weather, such as extreme cold, including prerecorded radio public service announcements, scripts for radio public service announcements, fliers, and educational materials for children.³² In addition, numerous other organizations, such as the American Red Cross, provide public safety information.

Local Programs

Programs within Kenosha County include those conducted by the Kenosha County Division of Emergency Management. The Kenosha County Division of Emergency Management has information available for the public on extreme temperatures and other general emergency management-related topics. Kenosha County Emergency Management participates in all State sponsored severe weather awareness campaigns. The Kenosha County Division of Health Services has compiled and disseminates a list of cooling centers that provide air conditioned environments to prevent adverse effects from the heat. Kenosha County has also developed a severe heat and a severe cold plan so as to help protect and inform the public about these hazards.

As described in Chapter II, Kenosha County has developed an emergency operations plan and hazard analysis, which sets forth an all-hazards action plan. In addition, many of the local units of government have developed emergency operations plans and/or programs that complement the County plan and that also set forth procedures and actions to deal with a range of situations and events, including extreme temperatures.

Evaluation of Alternatives and Identification of Mitigation Actions

Based upon review of the above, the current ongoing informational and educational programs represent a major component of the planned mitigation action. Kenosha County should promote basic strategies to reduce injuries and fatalities, hazard awareness, and community involvement. Temperature hazards are faced by Kenosha County residents annually and the ability to make positive decisions concerning exposure limits will depend on safety awareness. Analysis of the vulnerability of humans, infrastructure, and economic production caused by extreme temperature events demonstrates that the provision of advanced weather forecasting systems; availability of

³⁰Wisconsin Department of Health Services, Wisconsin Extreme Heat Toolkit, Publication P00632, March 2014.

³¹Wisconsin Department of Health Services, Wisconsin Winter Weather Toolkit, Publication P00652, April 2014.

³²These can be accessed at Wisconsin Emergency Management's ReadyWisconsin website located at: http://ready.wi.gov/Resources/Manager_Resources.asp.

adequate shelter from the heat and cold in public buildings, major industrial sites, and other large businesses or complexes such as shopping malls; as well as public informational and educational programming are the most important mitigation actions to be considered. Public service announcements regarding avoiding heat stress help to minimize exposure. Kenosha County supports measures presently implemented by the National Weather Service; national, State, and local health organizations; and the media preceding and during excessively hot weather. It is also important to continue to encourage concern for, and awareness of, elderly neighbors. Community and school-based informational programs should continue to be conducted by the County in partnership with Federal, State, and local authorities.

Multi-Jurisdictional Considerations

Extreme temperature events are primarily a public health concern and ultimately prevention should fall to the neighborhood watch groups and local authorities. These events affect individuals, typically the elderly, sick, and invalid, who cannot access shelter with decent heat or air conditioning. A coordinated effort involving the Kenosha County Division of Emergency Management, Kenosha County Division of Health, and local community emergency operations programs will be needed to identify and protect individuals vulnerable to temperature related hazards.

Priority Mitigation Measures

Based upon the foregoing evaluation, consideration of risk (see Appendix H), and review and action by the Kenosha County Hazard Mitigation **Plan Local Planning Team** (see Appendix A), the following mitigation activities related to extreme temperature events are included as priority mitigation measures in the updated hazard mitigation plan for Kenosha County:

- Organize neighborhood outreach groups who look after vulnerable groups and individuals;
- Provide special arrangements for payment of heating bills;
- Identify and advertise a list of available heating and or cooling shelters in the immediate area;
- **Maintain, update, and upgrade public early warning systems and networks. As part of this,** increase coverage and use of NOAA All Hazard Weather Radio and EAS broadcasts; and
- Promote educational and informational programming. **Volunteer groups** may be able to provide assistance in these educational efforts.

Because these measures are intended to be ongoing efforts, the **Local Planning Team** decided to retain them in the updated plan.

HAZARD MITIGATION PLAN COMPONENT FOR LAKE MICHIGAN COASTAL HAZARDS

As described in Chapter III, Lake Michigan shoreline erosion, flooding, and damage to shoreline structures are natural hazard events of moderate concern to be considered in the Kenosha County hazard mitigation plan. This section describes alternate and selected strategies to mitigate these types of hazards. As part of the updating process, these strategies were reviewed and re-evaluated by the Kenosha County Hazard Mitigation **Local Planning Team** in light of the updated hazard mitigation goals and hazard conditions documented in Chapters IV and III, respectively.

Identification of Alternative Mitigation Strategies

As reported in Chapter III, a number of studies and planning programs have been carried out relating to Lake Michigan coastal erosion and related hazards. A review of those plans and materials developed under the State of Wisconsin Coastal Management Program indicates a range of alternative shoreline erosion control mitigation measures. In review by the Kenosha County Hazard Mitigation **Local Planning Team** as part of the updating process, the following measures to reduce the vulnerability to shoreline erosion and related hazards are considered as viable for incorporation into this update of the Kenosha County hazard mitigation plan.

- Acquisition and demolition of up to nine structures identified as potentially being located in the one-percent-annual-probability floodplain on the County large-scale topographic maps **along the Lake Michigan Coast. As of April 2015, eight of these structures were still present in the floodplain.** Field surveys should be made of those structures identified on the County large-scale topographic maps as being located within the one-percent-annual-probability floodplain in order to obtain a more definitive assessment of their flood hazard status. Furthermore, this plan element is presented as an option, subject to the preference of the individual property owner.
- Consider revising shoreland zoning ordinances to incorporate more-stringent bluff setback provisions for new development or redevelopment. (Guidance on setback provisions is available from the Wisconsin Coastal Management Program).
- **The WDNR may allow the placement of temporary emergency material in public waters if the landowner makes a request in writing to protect a structure or infrastructure from an eroding shoreline or bluff.³³ Such a request must include descriptions of the type and amount of material that**

³³*Requests for placing temporary emergency material should be directed to the Water Management Specialist for the landowner's area. Contact information for Water Management Specialists by county can be found at <http://dnr.wi.gov/topic/waterways/contacts.html#county>.*

will be used, where this material will be placed, and how the material will be put into place.³⁴ A letter authorizing the placement of temporary emergency structures may then be sent by the Department to the landowner. If such authorization is granted, the landowner may proceed with placing the temporary measures, subject to the condition that the landowner must actively work toward planning, designing, and implementing a permanent shoreline protection solution through the State permitting process set forth in Chapter 30, “Navigable Waters, Harbors, and Navigation,” of the *Wisconsin Statutes*.

- Construction and maintenance of permanent shoreline protection structures and bluff stabilization measures where urban development commitments have been made dictating the need for structures. Effective shore protection requires a combination of bluff stabilization, surface water and subsurface water control, and bluff toe protection. Structural shore protection measures should be provided if it can be shown that such measures will effectively reduce shoreline erosion and not adversely affect adjacent sections of the shoreline to impair public rights in navigable waters; that there will be no significant reduction in public access, use, and enjoyment of the shoreline environment; and that any adverse impacts on fish and wildlife resources caused by the structure will be compensated for by providing fish and wildlife preservation measures. Other considerations for designing and implementing structural shore protection projects include the following:
 - A geotechnical engineer or geologist trained in slope stabilization, an engineer trained in shore protection design, and a qualified marine contractor should be involved throughout any such project;³⁵ and
 - It can often be more economical and effective to plan and implement shoreline protection of bluff stability projects for a property in concert with design and implementation of such measures for neighboring properties.³⁶
- Relocate buildings within a high-risk area.
- Conduct an assessment of the condition and effectiveness of shoreline protection structures in the County.

³⁴*Wisconsin Department of Natural Resources, Factsheet for Landowners: Placing Temporary Emergency Erosion Control Structures, May 2016.*

³⁵*University of Wisconsin Sea Grant and U.S. Army Corps of Engineers, Living on the Coast—Protecting Investments in Shore Properties on the Great Lakes, 2003.*

³⁶*Ibid.*

- Continue ongoing programs to update and refine and map shoreline erosion risk data using geographic information system mapping. Such mapping would include shoreline erosion risk areas along with property and other cadastral features mapping.
- Develop public informational and educational programming covering:
 - Information on shoreland erosion and related hazards to serve as a “fair warning” guide for, and a valuable service to groups, such as realtor-brokers; shoreline property owners; developers; lending institutions; and prospective buyers.
 - Property owner guidance on proper shoreline and bluff management actions, such as vegetation and stormwater drainage practices.
 - Permitting and zoning: A number of educational materials have been developed through cooperative efforts with the State Coastal Management Program.

As shown in Table V-7, the estimated cost of implementing the Lake Michigan Coastal area floodplain management element would be \$1.22 million (2014 dollars).

Current Programs

Federal Programs

The Army Corps of Engineers exercises some control over lake levels through the use of water controls, such as locks and dams. However, these impacts are minimal compared to the impacts due to climatic influence.

FEMA has produced a Draft Great Lake Coastal Guidelines Update, dated March 2009, which includes new methodology to determine flood hazard zones within the FEMA Region V coastal zone. Final guidelines were issued in 2014.³⁷ Future steps include pilot studies to evaluate the new methodologies at specific Great Lakes locations followed by a prioritization of coastal mapping needs within the FEMA region for future analyses. The ultimate goal of these efforts will be a remapping of flood hazards along the Great Lakes coastal areas that would subsequently be reflected in revised Federal flood insurance studies.

The Great Lakes Coastal Flood Study (GLCFS) is a multi-year project led by FEMA to put a wide range of decision-making data in the hands of Great Lakes coastal communities, including more accurate and up-to-date Flood Insurance Rate Maps (FIRMs). These flood maps and related information will be tools that can help

³⁷Federal Emergency Management Agency, FEMA Great Lakes Coastal Guidelines, Appendix D.3 Update, January 2014

communities identify high-risk areas and guide land use planning and capital investments to mitigate future losses.

FEMA is conducting a coastal analysis and mapping study to produce updated DFIRMs of coastal counties around the Great Lakes. This study will update the coastal storm surge elevations for the shorelines. The resulting DFIRMs may have V zones in those shoreline areas that do not have bluffs. It is anticipated that draft maps will be submitted to FEMA in early June 2017 and that a State briefing with FEMA concerning the maps will be conducted about two weeks after the submission. It is also anticipated that a flood risk review meeting will be conducted during late July 2017 and that community comments will be accepted after this meeting.

State Programs

Wisconsin's Shoreland Management Program is a partnership between State and local government that requires the adoption of County shoreland zoning ordinances to regulate development near navigable lakes and streams, in compliance with statewide minimum standards. These minimum statewide standards are set forth in Chapter NR 115, *Wisconsin Administrative Code*.

The Wisconsin Coastal Management Program (WCMP), which is part of the Wisconsin Department of Administration, Division of Intergovernmental Relations, oversees management of the State's coastal resources and strives to maintain a balance between preservation and economic needs. Established in 1978 under the Federal Coastal Zone Management Act, the WCMP works to preserve, protect, and wisely use the resource of the Lake Michigan and Lake Superior coastline for this and future generations. The WCMP provides guidance and grants to encourage the management and protection of Wisconsin's coastal resources and to increase public access to the Great Lakes. The WCMP has constituted an interagency coastal hazards work group formed by staff from the WDNR, University of Wisconsin-Madison's Sea Grant Institute, State Cartographer's Office, and the Wisconsin Emergency Management Program as a forum to coordinate initiatives related to coastal management in the State.

The WCMP created a web-based tool that allows users to examine photos from the late 1970's and compare them to corresponding photos from 2007 and 2008 to assess changes to the shoreline. GIS layers for shore structures, beach protection, and bluff conditions for each time frame allow for more detailed analysis of shoreline and bluff changes.

The University of Wisconsin Sea Grant is a statewide program of basic and applied research, education, and outreach and technology transfer dedicated to the stewardship and sustainable use of the Great Lakes. The Sea Grant staff is able to provide support to Kenosha County in dealing with Lake Michigan shoreline management issues.

Local Programs

As reported in Chapter II, Kenosha County, the City of Kenosha, the Village of Pleasant Prairie, and the Village of Somers have adopted shoreland zoning ordinances that apply to the Lake Michigan shoreland area.³⁸ The Kenosha County ordinance applies to the shoreline in the Town of Somers, including nearly all of the potentially developable land and the highly erodible bluff area. The current County shoreland policy and regulation calls for shore protection where necessary and for Lake Michigan setbacks for development. The ordinance provides for the use of shoreline protection and bluff stabilization structural measures, as well as bluff setbacks for development in portions of the County where urban shoreline development exists or is envisioned, and provides for a larger setback for development in other parts of the County where structural protection is not envisioned to be used due to limited planned urban development. The County policies and regulations also provide for specific procedures for the design and review of shore protection measures.

A variety of methods are used to warn people in Kenosha County of severe weather events, including tornadoes. These were previously described in the section of this chapter on thunderstorms.

Evaluation of Alternatives and Identification of Mitigation Actions

A review of the alternative measures noted above and the status of ongoing programs indicates that all of the measures noted above are considered to be appropriate for inclusion in the Kenosha County hazard mitigation plan. The measures noted have been developed, evaluated, and recommended in other studies and programs.

Multi-Jurisdictional Considerations

The plan elements for Lake Michigan shoreline erosion and related problems correspond only to Kenosha County, the City of Kenosha, the Village of Pleasant Prairie, and the Village of Somers.

Priority Mitigation Measures

Based upon the foregoing evaluation, consideration of risk (see Appendix H), review and action by the Kenosha County Hazard Mitigation Local Planning Team (see Appendix A), the following mitigation activities related to

³⁸The 2015-2017 State Budget (Act 55) change State law relative to shoreland zoning. Under Act 55, a shoreland zoning ordinance may not regulate a matter more restrictively than it is regulated by a State shoreland-zoning standard unless the matter is not regulated by a standard under Chapter NR 115, "Wisconsin's Shoreland Protection Program," of the Wisconsin Administrative Code. Examples of unregulated matters may include wetland setbacks, bluff setbacks, development density, and stormwater standards. In addition, under Act 55 a local shoreland zoning ordinance may not required establishment or expansion of a vegetative buffer on already developed land and may not establish standards for impervious surfaces unless those standards consider a surface to be pervious if its runoff is treated or is discharged to an internally drained pervious area.

Lake Michigan coastal hazards are included as priority mitigation measures in the updated Kenosha County Hazard Mitigation Plan:

- Continue **to enforce** and review the County shoreland regulations and policies relating to setbacks for new development **or redevelopment** and structural shoreline erosion protection and bluff stabilization measures.
- Review of local Lake Michigan shoreline municipal shoreland ordinances to assess the need for updating to be consistent with the Wisconsin Coastal Management Program guidance for development setbacks and structural shoreline erosion protection and bluff stability measures.
- Develop a cooperative program involving Kenosha County, the Coastal Management Program, the WDNR, and the University of Wisconsin Sea Grant Institute to assess the effectiveness of Lake Michigan shoreline protection structures in the County.
- Continue construction and maintenance of shoreline protection structures to protect urban development in selected areas of the County and under the provisions provided for under the County Lake Michigan coastal erosion management plan.
- Continue ongoing programs to update and refine coastal hazard area data using geographic information system technology.
- Provide public informational and educational programming on shoreline erosion hazards and **allowable** property owner shoreline and bluff management actions.

HAZARD MITIGATION PLAN COMPONENT FOR WINTER STORMS

As described in Chapter III, winter storms are natural hazard events of moderate concern to be considered in the Kenosha County hazard mitigation plan. This section describes alternate and selected strategies to mitigate this type of hazard. As part of the updating process, these strategies were reviewed and reevaluated by the Kenosha County Hazard Mitigation **Local Planning Team** in light of the updated hazard conditions and hazard mitigation goals documented in Chapters III and IV, respectively.

Identification of Alternative Mitigation Strategies

As discussed in Chapter III, winter storm events can pose a serious threat to Kenosha County. Severe winter weather can include heavy snow, blizzards, freezing sleet, and dangerous combinations of temperatures and wind. Winter storms may last for days or weeks completely shutting down businesses and government, while isolating residents in their homes. Extreme cold temperatures often connected to winter storm events is the number two

leading natural hazard cause of deaths in the State. Additionally, fatalities associated with winter storms include heart attacks while shoveling snow and improper use of space heaters. Severe winter storm fronts can often be tracked, which generally provides ample warning for potentially affected areas to take preventative actions.

While it may not be possible to accurately predict the number or severity of winter storm events, measures can be taken to reduce the potential damage caused by winter storms and their related hazards whenever they may occur in the County. High-wind, freezing rain, sleet, ice, and snow may be associated with a winter storm. In review by the Kenosha County Hazard Mitigation Local Planning Team, the following measures to reduce vulnerability to these dangers have been identified as viable for this update of the Kenosha County hazard mitigation plan.

Nonstructural

- Review local building codes to determine if revisions are needed to improve the structures ability to withstand greater wind velocities and snow weight;³⁹ and
- Review the energy efficiency and winter readiness of critical facilities and housing in the community.

Structural

- Maintain, update, and upgrade public early warning systems and networks. Consider expanding such networks as necessary. Desirable characteristics of a robust early warning system include:
 - Employing multiple means of communication to alert people of the imminent threat of severe weather. Examples of such means of communication include providing warnings and/or information through outdoor warning systems, broadcast media, cable and satellite media, electronic mail, SMS messaging, social media, and reverse-911 telephony; and
 - Being capable of reaching vulnerable segments of the population;
- Work with utility companies to assess and improve, as needed, electric service systems reliability;
- Consider burying utilities at critical and vulnerable junctions to avoid power loss due to downed lines;
- Establish, update, and/or monitor public early warning systems and networks;

³⁹The State Uniform Dwelling Code (UDC) is a statewide regulation that sets standards for fire safety, structural strength, energy conservation, erosion control, heating, plumbing and electrical systems, and general health and safety in dwellings constructed or altered after 1980. The UDC applies uniformly throughout the State, and local governments may not adopt a more or less stringent code. Consequently, should review of local ordinances reveal that a change in the building code would be a viable mitigation measure, the County and the municipalities within it would need to pursue a change in the UDC at the State level.

- Trim and maintain the health of trees near vulnerable infrastructure, such as utility lines, essential facilities and roads, as well as near homes and businesses; and
- Promote planting windbreaks and installing snow fence to protect farm crops and highways.

Public Informational and Educational Programming

- Promote winter hazard awareness, including home and travel safety measures, such as avoiding travel during winter storms, and having a shovel, sand, warm clothing, food, and water, if travel cannot be avoided, and installing a back-up heating system in at least one room in the home;
- Increase the coverage and use of NOAA All Hazard Weather Radio and EAS broadcasts;
- Promote inclusion of safety strategies for severe weather events in driver education classes and materials;
- Promote low-income energy assistance programs;
- Encourage residents to develop a Family Emergency Preparedness Plan including the preparation of a Disaster Supply Kit (Appendix G);
- Produce and distribute emergency preparedness information related to winter storm hazards; and
- Maintain and update shelter sites that have back-up emergency power sources.

Current Programs

Federal and State Programs

The NWS issues warnings, watches, and advisories when there is a threat of severe weather conditions. Several categories of warnings, watches, and advisories apply to winter weather conditions and associated hazards. The NWS Milwaukee/Sullivan office will issue a winter storm warning when one or more of the following weather events are expected to occur over a period of 12 or fewer hours:

- Snowfall greater than six inches,
- Sleet accumulations of two or more inches,
- Intermittent blowing snow that reduces visibility below one-half mile with winds of 25 to 34 mph or closed roads, or
- Less than one-quarter inch of freezing rain accompanied by another winter event.

NWS forecasters also have discretion to issue winter storm warnings for events that may not officially reach the warning criteria, but are expected to have a significant impact on society. The office will issue a winter weather advisory if one or more of the following weather events are expected to occur over a period of 12 or fewer hours:

- Snowfall of three to six inches,
- Sleet accumulations of less than two inches,
- Intermittent blowing snow that reduces visibility below one-half mile with winds of less than 25 mph,
or
- Less than one-quarter inch of freezing rain accompanied by another winter event.

The NWS office will issue a blizzard warning under conditions of sustained winds or frequent gusts of 35 mph or more and falling or blowing snow which reduces visibility to one-quarter mile or less for three or more hours. The office will issue an ice storm warning when ice accumulations of one-quarter inch or more are expected over a period of 12 or fewer hours and an freezing rain advisory when ice accumulations of less than one-quarter inch are expected over a period of 12 or fewer hours.

NWS bulletins are disseminated over a number of telecommunication channels including: the NOAA All Hazard Weather Radio, the NOAA All Hazard Weather Wire, NAWAS, the State law enforcement TIME system, and through an emergency e-mailing network. In addition, these bulletins are relayed to other local media via the Federal Communication Commission's Emergency Alert System (EAS) which rebroadcast the weather bulletins over public and private television and radio stations.

Federal and State programs include awareness and education activities. WEM, in conjunction with the National Weather Service, other State agencies, and local emergency management organizations, provides awareness and preparedness information to the public. This information is provided in three severe weather awareness campaigns conducted annually, each focusing on the prevalent weather hazard at that time. In November each year, Winter Awareness Week focuses on informing and educating people concerning the hazards presented by severe winter weather and information on preparedness for extreme weather conditions during winter. The Wisconsin Department of Health Services has developed a weather tool kit to provide information to local governments, health departments, and citizens in Wisconsin about preparing for and responding to winter storm events.⁴⁰ Similarly, the Wisconsin Division of Emergency Management has produced several educational resources

⁴⁰Wisconsin Department of Health Services, Wisconsin Winter Weather Toolkit, op. cit.

regarding winter weather, including prerecorded radio public service announcements, scripts for radio public service announcements, fliers, and educational materials for children.⁴¹

The Wisconsin Building Code specifies design requirements to minimize vulnerability to winter storms by setting the load capacity of roofs by region based on likely maximum snowfall. The National Weather Service reports that 70 percent of winter storm fatalities occur in automobiles, therefore, listening to weather advisories and avoiding travel during winter storms would help prevent many fatalities.

Local Programs

Programs within Kenosha County include those conducted by the Kenosha County Division of Emergency Management, including a severe winter weather plan. Community strategies include plowing, salting and sanding roads, maintaining the health of urban trees to minimize damage from ice storms, and promoting sound levels of home insulation. Older homes can be vulnerable to heat loss and any home is vulnerable to power loss, therefore, possession of an alternative heat and power source is a consideration in protecting against winter storm hazards.

As described in Chapter II, Kenosha County has developed an emergency operations plan and hazard analysis, which sets forth an all-hazards action plan. In addition, many of the local units of government have developed emergency operations plans and/or programs that complement the County plan and that also set forth procedures and actions to deal with a range of situations and events, including winter storm events.

A variety of methods are used to warn people in Kenosha County of severe weather events, including tornadoes. These were previously described in the section of this chapter on thunderstorms.

Evaluation of Alternatives and Identification of Mitigation Actions

Analysis of the vulnerability of humans, infrastructure, and economic production to winter storms and related hazard events demonstrates that the provision of advanced weather forecasts and warning systems, as well as public informational and educational programming, are the most important mitigation actions to be considered. In addition, informing the public of the significance of winter storm watches and warnings so that they take these events seriously and know where to seek shelter in emergency situations, are important, ongoing components to minimizing the risks associated with these natural hazards. The formation of a neighborhood outreach program to locate isolated, vulnerable or special-needs populations likely to be affected by winter storms is an important element in ensuring that these vulnerable population groups are protected during these events. Community and

⁴¹These can be accessed at Wisconsin Emergency Management's ReadyWisconsin website located at: http://ready.wi.gov/Resources/Manager_Resources.asp.

school-based informational programs are currently being conducted by the County in partnership with Federal, State and local authorities.

Multi-Jurisdictional Considerations

Winter storms and their related hazards can potentially impact all municipalities within the County. In addition, these severe events can potentially cause multiple damages to a variety of infrastructure including transmission lines, communication lines, and transportation routes due to **reductions in visibility** and **accumulation of ice on surfaces**. Kenosha County, the local units of government, and relevant businesses need to coordinate hazard mitigation activities through local government participation in countywide disaster planning and response mechanisms. Such measures are already well underway through the coordinated emergency operations planning program involving the Kenosha County Division of Emergency Management and coordinated local community emergency operations programs.

Priority Mitigation Measures

Based upon the foregoing evaluation, consideration of risk (see Appendix H), and review and action by the Kenosha County Hazard Mitigation **Plan Local Planning Team** (see Appendix A), the following activities related to winter storm events are included as priority mitigation measures in the updated hazard mitigation plan for Kenosha County:

- Organize neighborhood outreach groups who look after vulnerable groups and individuals;
- Provide special arrangements for payment of heating bills;
- Identify and advertise a list of available heated shelters in the immediate area;
- **Maintain, update, and upgrade public early warning systems and networks. As part of this,** increase coverage and use of NOAA All Hazard Weather Radio and EAS broadcasts;
- Promote educational and informational programming. **Volunteer groups** may be able to provide assistance in these educational efforts;
- Ongoing enforcement of building code ordinance requirements;
- Work with agencies, such as the American Red Cross, to establish a system to provide for short-term shelters and shelter operations during severe winter storm event situations;
- Continue coordination of emergency response plans among governmental units and first responders;

- Continue and refine State, County, and local road maintenance programs; and
- Work with utilities to assess and improve, as needed, electrical service systems reliability.

Because these measures are intended to be ongoing efforts, the **Local Planning Team** decided to retain them in the updated plan.

HAZARD MITIGATION PLAN COMPONENT FOR DROUGHT

As described in Chapter III, droughts are natural hazard events of limited concern to be considered in the Kenosha County hazard mitigation plan. This section describes alternate and selected strategies to mitigate this type of hazard. As part of the updating process, these strategies were reviewed and reevaluated by the Kenosha County Hazard Mitigation **Local Planning Team** in light of the updated hazard conditions and hazard mitigation goals documented in Chapters III and IV, respectively.

Identification of Alternative Mitigation Strategies

As discussed in Chapter III, drought events pose a limited threat to Kenosha County. Stresses on the water resources of Kenosha County include: a growing population, increased competition for available water, and loss of groundwater recharge areas due to development. Severe droughts result from extended periods of limited or no rainfall, which generally provide ample warning for potentially affected areas to take preventative actions. When drought events do occur, they commonly last for extended periods of time **such as** weeks or months and impact a relatively large area.

While it may not be possible to accurately predict specific areas where there is significant risk from extreme drought, droughts have the greatest impact on agricultural areas. Kenosha County has **87,431** acres of agricultural land, and even droughts of limited duration can significantly reduce crop growth and yields, adversely affecting farm income. More substantial events can decimate croplands and result in total loss, and negatively impacting the individual producers and the local economy. Although nothing can prevent a drought, measures can be taken to reduce the potential loss caused by droughts wherever they may occur in the County. In review by the Kenosha County Hazard Mitigation **Local Planning Team** as part of the updating process, the following measures to reduce vulnerability to drought events have been identified as viable for this update of the Kenosha County hazard mitigation plan.

Nonstructural

- **Encourage the development and maintenance of drought emergency plans for local utilities and local communities. Such plans should include:**

- Development of criteria for triggering drought-related actions, and
- Specification of water use regulations to be initiated during drought conditions;
- Encourage the development of local water conservation programs. Such programs may include provisions such as:
 - Water supply system efficiency actions including water audits, meter testing, leak detection and repair, water main maintenance and replacement, water system audits, and water production system refinement,
 - Public information and education programming, including redesign of water bills, collation and distribution of educational materials, and presentations to schools and civic groups;
 - Outdoor watering reduction measures such as the use of rain barrels or imposition of lawn and landscape plant watering restrictions,
 - Development and use of water conservation rate structures, and/or
 - Fixture and plumbing system retrofits;
- Promote the use of agricultural methods that reduce evaporation and/or promote infiltration. Such methods may include planting windbreaks for farm crops, planting cover crops, use of no-till or reduced-till methods, and contour plowing;
- Allow and encourage the use of drought-resistant landscaping practices using native plantings;
- Support agricultural programs that promote soil health, preserve soil moisture, and help to minimize loss of crops and topsoil during drought conditions;
- Consider farm drought management strategies that include monitoring soil moisture levels and planting crops that will tolerate low moisture levels;
- Support ordinances that prioritize or control water use during drought conditions;
- Design and plan for water supply infrastructure systems that are not vulnerable to drought events; and
- Promote enrollment of agricultural producers into Federal crop insurance programs.

Structural

- Promote planting windbreaks for farm crops; and

- Encourage the WDNR, U.S. Geological Survey, National Weather Service, and U.S. Army Corps of Engineers to continue to operate and monitor stream gauging stations and groundwater monitoring wells.

Public Informational and Educational Programming

- Increase public education and awareness of the potential severity of drought events; and
- Produce and distribute emergency preparedness information related to droughts.

Current Programs

Federal and State Programs

The continuous monitoring of hydrologic conditions is important to identify and assess drought conditions. The U.S. Geological Survey operates a stream gauging program with local cooperators throughout the State. In Southeastern Wisconsin, this program is coordinated by the Wisconsin Department of Natural Resources and SEWRPC. The Wisconsin Geological and Natural History Survey also monitor a statewide network of groundwater elevation monitoring wells.

The National Drought Mitigation Center (NDMC), based at the University of Nebraska-Lincoln, provides assistance in the development and implementation of measures to reduce societal vulnerability to drought, stressing preparedness and risk management rather than crisis management.⁴² Most of the NDMC's services are directed to State, Federal, regional, and tribal governments that are involved in drought and water supply planning. The NDMC's activities include maintaining an information clearinghouse and drought portal; drought monitoring, including participation in the preparation of the U.S. Drought Monitor and maintenance of the web site; drought planning and mitigation; drought policy; advising policy makers; collaborative research; K-12 outreach; workshops for Federal, State, and foreign governments and international organizations; organizing and conducting seminars, workshops, and conferences; and providing data to and answering questions for the media and general public.

The U.S. Drought Monitor, a joint effort of the U.S. Department of Agriculture (USDA), the National Oceanic and Atmospheric Administration (NOAA), and the National Drought Mitigation Center, provides monitoring of drought conditions and forecasting of seasonal conditions throughout the United States.⁴³

⁴²*The National Drought Mitigation Center can be accessed at <http://drought.unl.edu/>.*

⁴³*The U.S. Drought Monitor can be accessed at <http://droughtmonitor.unl.edu/>.*

The USDA's Farm Service Agency (FSA) provides information about conservation, commodity programs, crop insurance, and farm loans, along with State and county contacts. It also administers several programs which can provide emergency assistance to agricultural producers in the event of natural disasters such as drought. These programs include the Emergency Conservation Program, the Emergency Forest Restoration Program, the Emergency Loan Program, the Livestock Forage Disaster Program, the Noninsured Crop Disaster Assistance Program, and the Tree Assistance Program. The FSA's electronic Hay and Grazing Net Ad Service (eHayNet) is an Internet-based service allowing farmers and ranchers to share "Need Hay" ads and "Have Hay" ads online.

Farmers in the County that irrigate can also use the Wisconsin Irrigation Scheduling Program (WISP). This research-based computer program provided by the University of Wisconsin-Extension can assist growers in determining the frequency and amounts of irrigation throughout the growing season. Irrigation scheduling provided by this program can be extremely helpful during a drought.⁴⁴

The Farmer to Farmer Hay, Forage and Corn List sponsored by the University of Wisconsin-Extension puts Wisconsin farmers in touch with one another for the purpose of buying and/or selling corn and forage. The farmer to farmer list is free of charge to both buyers and sellers.

Federal and State programs also include awareness and education activities. The Wisconsin Department of Health Services has developed a drought tool kit to provide information to local governments, health departments, and citizens in Wisconsin about preparing for and responding to drought events.⁴⁵

Chapter NR 852, "Water Conservation and Water Use Efficiency," of the *Wisconsin Administrative Code* establishes mandatory water conservation and efficiency measures for withdrawals in the Great Lakes Basin and water loss approvals throughout the State. The requirements set forth in this chapter apply to all persons within the Great Lakes Basin applying for a diversion or a new or increased withdrawal averaging 100,000 gallons per day (gpd) or more and all persons with the State applying for withdrawals that will result in a water loss averaging more than 2,000,000 gpd. The chapter establishes three tiers of requirements based upon the size of the withdrawal and the amount of water not returned to the basin from which it is withdrawn as a result of a diversion or consumptive use. The chapter requires that persons applying for a new or increased withdrawal, diversion, or water loss approval submit a water conservation plan meeting specified requirements with their application. In addition, written documentation must accompany the application showing that water conservation and efficiency

⁴⁴WISP can be accessed at <http://wisp.cals.wisc.edu/wisp/home>.

⁴⁵Wisconsin Department of Health Services, Wisconsin Drought Toolkit, Publication P00884, August 2014.

measures (CEM) that do not require retrofitting have been implemented or completed. The specific CEMs required vary according to the water use sector and tier to which the application is assigned.

Local Programs

Programs within Kenosha County include those conducted by the Kenosha County Division of Emergency Management. The Kenosha County Division of Emergency Management has a number of brochures, booklets, and pamphlets available for the public on droughts and other general emergency management-related topics.

As described in Chapter II, Kenosha County has developed an emergency operations plan and hazard analysis, which sets forth an all-hazards action plan. In addition, many of the local units of government have developed emergency operations plans and/or programs that complement the County plan and that also set forth procedures and actions to deal with a range of situations and events, including drought.

Evaluation of Alternatives and Identification of Mitigation Actions

Analysis of the vulnerability of humans, infrastructure, and economic production to drought hazard events demonstrates that the provision of hydrological and meteorological monitoring, water conservation programs, and drought emergency planning are the most important mitigation actions to be considered. The onset of a drought often occurs slowly and the effects of a drought linger beyond the return of rainfall. Because of this, the presence a drought may not be immediately obvious. Thus, mitigation of drought requires monitoring of hydrological and meteorological conditions, and that programs and response plans be in place prior to identification of drought conditions.

Multi-Jurisdictional Considerations

While, droughts and their related hazards can potentially impact all municipalities within the County, agricultural areas, municipalities served by public water supply systems that use groundwater as a source of supply and those communities that are served by large numbers of private wells are most vulnerable to the impacts of a severe drought. Kenosha County, the local units of government and relevant businesses need to coordinate hazard mitigation activities through the local government participation in countywide disaster planning and response mechanisms. Such measures are already well underway through the coordinated emergency operations planning program involving the Kenosha County Division of Emergency Management and coordinated local community emergency operations programs.

Priority Mitigation Measures

Based upon the foregoing evaluation, consideration of risk (see Appendix H), and review and action by the Kenosha County Hazard Mitigation Plan Local Planning Team (see Appendix A), the following mitigation

activities related to drought events are included as priority mitigation measures in the updated hazard mitigation plan for Kenosha County:

- Encourage the development and maintenance of drought emergency plans for local utilities and local communities;
- Encourage the development of local water conservation programs;
- Encourage multi-agency approaches to drought planning, water conservation, drought prediction, and stream and groundwater monitoring;
- Promote educational and informational programming relating to water conservation;
- Support agricultural programs that promote soil health, preserve soil moisture, and help to minimize loss of crops and topsoil in the event of a drought. Such programs should promote the use of agricultural methods that reduce evaporation and/or promote infiltration;
- Evaluate and design water supply systems that are not vulnerable to drought events; and
- Encourage farm operators to evaluate the economics of crop insurance programs.

Because these measures are intended to be ongoing efforts, the Local Planning Team decided to retain them in the updated plan.

HAZARD MITIGATION PLAN COMPONENT FOR FOG

As described in Chapter III, fog events are natural hazard events of moderate concern to be considered in the Kenosha County hazard mitigation plan. This section describes alternate and selected strategies to mitigate these types of hazards. As part of the updating process, these strategies were reviewed and reevaluated by the Kenosha County Hazard Mitigation Local Planning Team in light of the updated hazard conditions and hazard mitigation goals documented in Chapters III and IV, respectively.

Identification of Alternative Mitigation Strategies

As discussed in Chapter III, fog events pose a moderate threat to Kenosha County. The main impacts of fog events are upon transportation systems. Reduced visibility associated with fog events is a contributing factor in transportation-related accidents, especially during wet road conditions. In addition, dense fog results in travel problems and/or delays. In review by the Kenosha County Hazard Mitigation Local Planning Team as part of the updating process, the following measures to reduce vulnerability to fog events have been identified as viable for this update of the Kenosha County hazard mitigation plan.

Nonstructural

- Organize neighborhood outreach groups who look after vulnerable groups and individuals; and
- Increase coverage and use of NOAA All Hazard Weather Radio and EAS broadcasts.

Structural

- Maintain, update, and upgrade public early warning systems and networks. Consider expanding such networks as necessary. Desirable characteristics of a robust early warning system include:
 - Employing multiple means of communication to alert people of the imminent threat of severe weather. Examples of such means of communication include providing warnings and/or information through outdoor warning systems, broadcast media, cable and satellite media, electronic mail, SMS messaging, social media, and reverse-911 telephony; and
 - Being capable of reaching vulnerable segments of the population.

Public Informational and Educational Programming

- Increase public education and awareness of the potential severity of hazardous fog events; and
- Produce and distribute emergency preparedness information related to fog events.

Current Programs

Federal and State Programs

The National Weather Service issues advisory statements to media, emergency management, and public health officials when a hazardous weather event is occurring, imminent, or likely. Advisories are for less serious conditions than warnings that could lead to situations that may threaten life or property.

When dense fog covers a widespread area and reduces visibility to less than one-quarter mile for a period of three hours or more, the NWS will issue a Dense Fog Advisory. The NWS will issue a Freezing Fog Advisory when fog causes the formation of ice or rime on cold objects that impacts transportation. These advisories are broadcast through NOAA All Hazard Weather Radio and are relayed to other local media via the Federal Communication Commission's Emergency Alert System (EAS) The NWS recommends that drivers slow down and modify their speed, drive with low beam headlights in the day or night, and avoid turning on high beams on foggy nights as it reduces visibility. They also recommend tuning into NOAA All Hazard Weather Radio for the latest information.

The Wisconsin Department of Transportation (WisDOT) conducts several activities to inform motorists of hazards to highway safety, including fog, along the State's freeway system. WisDOT operates a network of

cameras that monitor road and traffic conditions on freeways through much of the State, including six cameras along IH 41/94 in Kenosha County. WisDOT makes information regarding road and weather conditions, travel times, road closures, and traffic incidents available to the public through the internet and a system of message signs located throughout the freeway system.⁴⁶

Local Programs

Programs within Kenosha County include those conducted by the Kenosha County Division of Emergency Management. The Kenosha County Division of Emergency Management has a number of brochures, booklets, and pamphlets available for the public on fog and other general emergency management-related topics.

A variety of methods are used to warn people in Kenosha County of severe weather events, including tornadoes. These were previously described in the section of this chapter on thunderstorms.

Evaluation of Alternatives and Identification of Mitigation Actions

The major vulnerabilities to fog result from its impacts upon the transportation system. Fog can create hazardous conditions for operating motor vehicles when it reduces visibility to one-quarter mile or less. Adjustment in motorist behavior in response to fog can substantially reduce the risks resulting from its presence. Thus, the impacts of this hazard can be mitigated largely through maintenance of warning systems to inform the public of the presence of potentially hazardous incidents of fog and public information and education programs which inform motorists of the attendant risks.

Multi-Jurisdictional Considerations

Fog and its related hazards can potentially impact all municipalities within the County. Kenosha County, the local units of government and relevant businesses need to coordinate hazard mitigation activities through the local government participation in countywide disaster planning and response mechanisms. Such measures are already well underway through the coordinated emergency operations planning program involving the Kenosha County Division of Emergency Management and coordinated local community emergency operations programs.

Priority Mitigation Measures

Based upon the foregoing evaluation, consideration of risk (see Appendix H), and action by the Kenosha County Hazard Mitigation **Local Planning Team** (see Appendix A), the following mitigation activities related to fog events are included as priority mitigation measures in the Kenosha County hazards mitigation plan:

⁴⁶This information is available through the internet at <http://www.511wi.gov/>

- Organize neighborhood outreach groups who look after vulnerable groups and individuals;
- **Maintain, update, and upgrade public early warning systems and networks. As part of this,** increase coverage and use of NOAA All Hazard Weather Radio and EAS broadcasts;
- Increase public education and awareness of the potential severity of hazardous fog events; and
- Produce and distribute emergency preparedness information related to fog events.

Because these measures are intended to be ongoing efforts, the **Local Planning Team** decided to retain them in the updated plan.

HAZARD MITIGATION PLAN COMPONENT FOR FIRES

As described in Chapter III, fires are natural hazard events of limited concern to be considered in the Kenosha County hazard mitigation plan. This section describes alternate and selected strategies to mitigate this type of hazard. As part of the updating process, these strategies were reviewed and reevaluated by the Kenosha County Hazard Mitigation **Local Planning Team** in light of the updated hazard conditions and hazard mitigation goals documented in Chapters III and IV, respectively.

Identification of Alternative Mitigation Strategies

Fires pose a limited threat to Kenosha County and as discussed in Chapter III the community impacts are considered not to be significant. Historically, fires are not a regularly occurring hazard in Kenosha County. From 1950-**2014** there have been no recorded wild or forest fires in the County. **While structure fires do occur, they are usually suppressed by the actions of local fire departments.**

Fires can occur at any time of day and during any month of the year, and they are capable of causing significant injury, death, and damage to property. In review by the Kenosha County Hazard Mitigation **Local Planning Team**, the following measures to reduce vulnerability to fire events have been identified as viable for this update of the Kenosha County hazard mitigation plan.

Nonstructural and Structural

- Bulldoze downed timber to prevent the spread of wildfire;
- **Conduct proper forest maintenance in forests and natural areas;**
- Clear debris around roads to allow the roads to work as a fire break;

- Promote emergency restrictions on the use of fireworks, grills, open burning pits, and campfires;
- Offer training and exercises for local and regional fire fighters;
- Map hazard areas and vulnerable structures;
- Acquire additional fire equipment, especially aircraft, hose trailers, and large bulldozers; and
- Offer early fire detection programs and promote an emergency communications system.

Public Informational and Educational Programming

- Support fire prevention, education, and enforcement programs; and
- Enhance fire hazard awareness for businesses, citizens, schools, and visitors.

Current Programs

Federal and State Programs

The Wisconsin Department of Natural Resources (WDNR) Bureau of Forestry is responsible for forest fire protection on approximately 18 million acres of forest and wild lands throughout the State. The Bureau maintains and conducts an active fire management program for the State. The Bureau works through six district offices to conduct local training, education classes, coordination, response actions, and assistance. The U.S. Forest Service maintains fire protection responsibility for designated national forests within the State.

Federal and State programs include outreach and education activities. The Wisconsin Department of Health Services has developed a wildfire tool kit to provide information to local governments, health departments, and citizens in Wisconsin about preparing for and responding to wildfire events.⁴⁷

Local Programs

Local fire departments carry out fire protection throughout the wildland and forested areas not covered by the WDNR. All of the local units of government in Kenosha County either own or contract for fire suppression services. In addition, all of the fire and rescue departments in Kenosha County participate in the Mutual Aid Box Alarm System (MABAS) agreement that enables departments to render assistance to each other in the County during the response to fire and rescue emergency incidents (see **Table II-11** in Chapter II). Other programs within Kenosha County include those conducted by the Kenosha County Division of Emergency Management. The

⁴⁷Wisconsin Department of Health Services, Wisconsin Wildfire Toolkit, Publication P00666, May 2014.

Kenosha County Division of Emergency Management has a number of brochures, booklets, and pamphlets available for the public on fire safety, as do each of the fire departments located within Kenosha County.

As described in Chapter II, Kenosha County has developed an emergency operations plan and hazard analysis, which sets forth an all-hazards action plan. In addition, many of the local units of government have developed emergency operations plans and/or programs that complement the County plan and that also set forth procedures and actions to deal with a range of situations and events, including fires.

A variety of methods are used to warn people in Kenosha County of severe weather events, including tornadoes. These were previously described in the section of this chapter on thunderstorms.

Based upon expert analysis, the independent Insurance Services Office, Inc. (ISO) assigns fire departments a Public Protection Classification rating. These ratings are based upon evaluation of the receiving and handling of fire alarms; fire department staffing, training, and equipment; and water supply. Since 2009, the ratings of the Pleasant Prairie Fire Department, the Town of Salem Fire/Rescue, and the Somers Fire and Rescue Department have improved.

Evaluation of Alternatives and Identification of Mitigation Actions

Based upon review of the above, the current ongoing programs represent a major component of the planned mitigation strategy for the continued prevention, control, and preparedness for major fire incidents.

Multi-Jurisdictional Considerations

Fires and their related hazards can potentially impact all municipalities within the County. Kenosha County, the local units of government and relevant businesses need to coordinate hazard mitigation activities through the local government participation in countywide disaster planning and response mechanisms. Such measures are already well underway through the coordinated emergency operations planning program involving the Kenosha County Division of Emergency Management and coordinated local community emergency operations programs.

Priority Mitigation Measures

Based upon the foregoing evaluation, consideration of risk (see Appendix H), and review and action by the Kenosha County Hazard Plan Local Planning Team (see Appendix A), the following mitigation activities related to fire events are included as priority mitigation measures in the updated Kenosha County hazards mitigation plan:

- Promote activities that physically stop the spread of fire, e.g., bulldoze downed timber and clear debris around roads;

- Promote emergency restrictions on fire causing activities;
- Offer training and exercises for local and regional fire fighters and acquire additional fire equipment;
- Map hazard areas and vulnerable structures; and
- Support fire prevention, education, and enforcement programs, and enhance fire hazard awareness for landowners and visitors.

Because these measures are intended to be ongoing efforts, the **Local Planning Team** decided to retain them in the updated plan.

HAZARD MITIGATION PLAN COMPONENT FOR TRANSPORTATION ACCIDENTS

As described in Chapter III, transportation accidents are human-induced hazard events of significant concern to be considered in the Kenosha County hazard mitigation plan. This section describes alternate and selected strategies to mitigate these types of hazards. As part of the updating process, these strategies were reviewed and reevaluated by the Kenosha County Hazard Mitigation **Local Planning Team** in light of the updated hazard conditions and hazard mitigation goals documented in Chapters III and IV, respectively.

Identification of Alternative Mitigation Strategies

As discussed in Chapter III, significant numbers of injuries, deaths, and property damages **are** associated with **crashes on the** roadway transportation system **in Kenosha County.** Motor vehicle-related accidents within the County are strongly influenced by factors **such** as road conditions, time of day, weather conditions, traffic conditions, **and drug** and alcohol **use.** **In addition, railway accidents occasionally occur in the County. These accidents can also result in injuries, loss of life, and damage to property.**

Roadways

Roadway intersections and highway segments at on- and off-ramp locations are areas that are significantly more dangerous than other areas among the automotive transportation system within Kenosha County. However, automotive-vehicle-related accidents have and will continue to occur in a variety of areas such as parking lots and local roadways, and cause injuries and death to motor vehicle passengers as well as pedestrians and bicycle riders throughout Kenosha County. In review by the Kenosha County Hazard Mitigation **Local Planning Team** as part of the updating process, the following measures to reduce vulnerability to motor vehicle accidents have been identified as viable for this update of the Kenosha County hazard mitigation plan

Nonstructural

- Continue to monitor and upgrade the transportation system, when necessary, to reduce accident exposure and provide for increased travel safety and personal security;⁴⁸
- Continue to promote enforcement of laws prohibiting mobile phone usage and texting while driving;
- Continue to promote enforcement of laws requiring use of safety restraints such as seat belts and infant car seats; and
- Continue to promote traffic-related law enforcement, including enforcement for traffic violations, weight and travel restrictions, and designated truck routes.

Structural

- Continue to improve the design, routing, and traffic control at problem roadway areas;
- Continue to evaluate the roadway system in the County for proper separation distances of ramps and frontage roads;
- Consider, as part of roadway reconstruction projects, the need for roadway shouldering in areas designated for bicycle or pedestrian trail systems; and
- Consider providing bicycle accommodation through bicycle lanes, paved shoulders, widened outside travel lanes, or enhanced bicycle facilities where feasible and where the existing surface arterial street system is resurfaced and reconstructed and as new surface arterial roads are constructed;
- Continue and expand the use of closed circuit television cameras (CCTV) on heavily traveled freeways, arterial streets, and highways;
- Continue and expand the use of advisory information measures including variable message signs (VMS) on the freeway system and appropriate arterial streets and highways.⁴⁹
- Expand the use of emergency vehicle preemption at traffic signals; and
- Consider and implement intersection improvements such as two- or four-way stop control, roundabouts, or signalization at arterial street and highway intersections.

⁴⁸SEWRPC Planning Report No. 55, VISION 2050: A Regional Land Use and Transportation System Plan for Southeastern Wisconsin, 2017

⁴⁹VMS are over-road devices that display dynamic messages providing real-time information to motorists.

Public Informational and Educational Programming

- Promote driver safety hazard awareness, especially to drivers within the 14 to 24 age group;
- Promote inclusion of safety strategies for severe weather events in driver education classes and materials;
- Promote the use of intelligent transportation systems (ITS) technology (see Federal and State Programs section below);
- Promote commercial operator training and skill enhancement programs;
- Promote training, planning, and preparedness for mass-casualty incidents involving public transportation;
- Develop trained, equipped, and prepared emergency first responders, as well as search and rescue teams;
- Continue public education regarding the dangers of distracted driving such as texting and using mobile phones while driving;
- Continue to provide public education on correct installation and use of child restraint devices;
- Promote the use of personal safety equipment such as helmets for operators and passengers of motorcycles and bicycles;
- Provide public education on recent innovations in road design and operation, such as signal preemption and driving roundabouts; and
- Promote awareness of the influence of drug and alcohol usage on driving safety.

Railways

As indicated in Table III-29 in Chapter III, more accidents occur at railway intersections than in other areas of the railway transportation system in Kenosha County. One reason for this is that trains cannot stop quickly. It can take a freight train moving at 55 miles per hour or an eight-car passenger train moving at 79 miles per hour as much as a mile or more to stop. Despite this, railroad-related accidents have and will continue to occur in a variety of areas and derailments can happen anywhere within the railroad system. In review by the Kenosha County Hazard Mitigation Local Planning Team as part of the updating process, the following measures to reduce vulnerability to railway related accidents have been identified as viable for this update of the Kenosha County hazard mitigation plan.

Nonstructural

- Promote railroad inspections and improved designs at problem railway/roadway intersections, particularly at grade crossings, and rural signs and/or signals for railroad crossings.

Structural

- Improve the design, routing, and traffic control at problem railway areas; and
- Consider adding railroad gate arms at grade crossings that do not currently have them installed.

Public Informational and Educational Programming

- Promote awareness and importance of all warning signs and signals;
- Promote awareness that some vehicles require special care at crossings, such as school buses, church vans, farm machinery, semi-trucks, and emergency response vehicles;
- Promote awareness of the hazards of trespassing on railroad tracks; and
- Continue emergency operation training, planning, and preparedness for mass-casualty incidents involving railroad transportation.

Current Programs

Federal and State Programs

WisDOT is currently involved in a variety of long-range transportation planning activities for airport, bicycle, highway, pedestrian, rail, and roadway systems.⁵⁰ Connections 2030, which was adopted in October 2009, is a strategic plan developed by WisDOT that provides a foundation for developing more detailed year 2030 plans. The plan establishes policies to help transportation decision-makers when evaluating programs and projects. The plan is published on the WisDOT website. In addition, planning guidance and tools are available on the WisDOT website to provide local communities with basic transportation planning-related information to help them develop the transportation element of the local community's comprehensive plan.⁵¹ WisDOT programs and services also include incorporation of a broad range of diverse technologies, known collectively as intelligent transportation

⁵⁰For more information about Wisconsin Department of Transportation Programs and Services, see <http://wisconsindot.gov/> and for specific information on the State Connections 2030 transportation plan see <http://wisconsindot.gov/Pages/projects/multimodal/conn2030.aspx>.

⁵¹For general local planning guidance and tools, see <http://wisconsindot.gov/Pages/projects/data-plan/plans/default.aspx>. For projects specific to the southeastern portion of the State of Wisconsin, including Kenosha County, see <http://wisconsindot.gov/Pages/projects/by-region/se/default.aspx>

systems (ITS) to assist in identifying and helping to resolve transportation-related problems. ITS is comprised of a number of information technologies, including information processing, communications, control, and electronic systems integrated together into the transportation systems in order to improve safety and reduce costs. The Wisconsin Department of Transportation, Department of Motor Vehicles also has an extensive public information program to educate people about driver safety and awareness of hazards to help prevent accidents and related deaths and injuries.

WisDOT's Bureau of Transportation Safety in partnership with the National Highway Traffic Safety Administration sponsors campaigns that mobilize hundreds of law enforcement agencies throughout the State to increase motorists' compliance with traffic safety laws. The high-visibility law enforcement efforts are combined with effective media campaigns to get more motorists to buckle up, slow down and drive sober. Examples of these campaigns include spring 2016 "Click It or Ticket" campaign to increase the use of safety belts and the summer 2016 "Drive Sober or Get Pulled Over" campaign which sought to discourage drunk driving.

WisDOT conducts several activities to inform motorists of hazards to highway safety along the State's freeway system. WisDOT operates a network of cameras that monitor road and traffic conditions on freeways through much of the State, including six cameras along IH 41/94 in Kenosha County. WisDOT makes information regarding road and weather conditions, travel times, road closures, and traffic incidents available to the public through the internet and a system of message signs located throughout the freeway system.⁵²

Local Programs

The Southeastern Wisconsin Regional Planning Commission (SEWRPC) is designated as the official metropolitan transportation planning organization for Southeastern Wisconsin under State and Federal laws and regulations. SEWRPC has the responsibility of developing and maintaining transportation plans for the Region under these designations. The 2050 regional land use and transportation plan⁵³ was adopted by the Regional Planning Commission in July 2016. VISION 2050 recommends a long-range vision for land use and transportation in the seven-county Southeastern Wisconsin Region. It makes recommendations to local and State governments to shape and guide land use development and transportation improvement including public transit, arterial streets and highways, and bicycle and pedestrian facilities, to the year 2050.

The Kenosha County Traffic Safety Commission works to enhance the level of safety on public roadways in Kenosha County. The Commission includes representatives from law enforcement, education, the legal

⁵²This information is available through the internet at <http://www.511wi.gov/>

⁵³SEWRPC Planning Report No. 55, op. cit.

professions, medicine, highway engineering, highway safety, and citizen groups. It meets quarterly to review crashes causing fatalities and injuries that occur in the County and traffic safety issues and to make recommendations to County and local governments regarding traffic safety problems.

Local agencies also conduct outreach related to transportation safety. For example, some local police and fire departments check bicycles for safety at special events such as safety fairs. Similarly, some fire departments and health departments check child car seats for proper installation, either at special events or on an ongoing basis. In addition, the Safe Kids Coalition of Kenosha and Racine Counties, led by Wheaton Franciscan Healthcare, focuses on ways to prevent injuries to children by educating the community on topics such as motor vehicle safety, pedestrian safety, proper use of bicycle helmets, and proper installation of child car seats.

As described in Chapter II, Kenosha County has developed an emergency operations plan and hazard analysis, which sets forth an all-hazards action plan including transportation accidents. In addition, many of the local units of government have developed emergency operations plans and/or programs that complement the County's plan and that also set forth procedures and actions to deal with a range of situations and events, including transportation accidents. As described in Chapter II, all of the fire and rescue departments in Kenosha County participate in the Mutual Aid Box Alarm System (MABAS) agreement.

Evaluation of Alternatives and Identification of Mitigation Actions

Based upon review of the above, the current ongoing programs represent the major component of the planned mitigation action with regard to transportation safety. Enforcement activities and public informational and educational programming should continue to constitute major components of the mitigation strategy for transportation accidents.

Multi-Jurisdictional Considerations

Transportation accidents can potentially impact all municipalities within the County. Kenosha County, the local units of government, and relevant businesses need to coordinate hazard mitigation activities through the local government participation in countywide disaster planning and response mechanisms. Such measures are already well underway through the coordinated emergency operations planning program involving the Kenosha County Division of Emergency Management, Kenosha County Sheriff's Department, local law enforcement agencies, and coordinated local community emergency operations programs.

Priority Mitigation Measures

Based upon the foregoing evaluation, consideration of risk (see Appendix H), and review and action by the Kenosha County Hazard Mitigation Local Planning Team (see Appendix A), the following mitigation activities

related to transportation accidents are included as priority mitigation measures in the updated Kenosha County hazards mitigation plan:

- Adopt and implement the recommendations of the VISION 2050 Regional land use and transportation system plan related to monitoring and improving the transportation system through design, routing, and traffic control at problem areas, including:
 - Expand the use of emergency vehicle preemption traffic signals;
 - Consider and implement intersection improvements such as two-or four-way stop control, roundabouts, or signalization at arterial street and highway intersections;
 - Continue and expand the use of closed circuit television cameras (CCTV) on heavily traveled freeways, highways, and arterial streets;
 - Continue and expand the use of advisory information measures including variable message signs (VMS) on the freeway system and at appropriate arterial street and highway locations;
 - Consider expanding the use of ramp closure devices to allow for rapid closure of freeway on-ramps during major traffic incidents, inclement weather, or special events;
 - Consider providing bicycle accommodations through bicycle lanes, paved shoulders, widened outside travel lanes, or enhanced bicycle facilities, where feasible when existing surface arterial streets are resurfaced and reconstructed and as new surface arterial roads are constructed;
 - Expand the use of freeway service patrols to include Kenosha County;
- Promote educational and informational programming, especially related to driver safety, and to individual actions to protect citizens, property, and businesses;
- Continue to monitor and improve the transportation system through design, routing, and traffic control at problem areas;
- Continue to promote traffic-related law enforcement, including enforcement for traffic violations, weight and travel restrictions, and designated truck routes. Enforcement should include efforts related to enforcement of laws regarding distracted driving and use of safety restraints;
- Continue to evaluate and refine safety components and consideration of railway facilities;

- Continue to support training, state-of-the-art equipment, planning, and preparedness of first responders as well as search and rescue teams;
- Continue to evaluate the roadway system in the County for proper separation distances of ramps and frontage roads;
- Consider, as part of roadway reconstruction projects, the need for roadway shouldering in areas designated for bicycle or pedestrian trail systems; and
- Continue the coordination of emergency response plans among governmental units and first responders.

Because these measures are intended to be ongoing efforts, the **Local Planning Team** decided to retain them in the updated plan.

HAZARD MITIGATION PLAN COMPONENT FOR CONTAMINATION AND LOSS OF WATER SUPPLY

As described in Chapter III, contamination and loss of water supply are natural hazard events of limited concern to be considered in the Kenosha County hazard mitigation plan. This section describes alternate and selected strategies to mitigate these types of hazards. As part of the updating process, these strategies were reviewed and reevaluated by the Kenosha County Hazard Mitigation Plan **Local Planning Team** in light of the updated hazard conditions and hazard mitigation goals documented in Chapters III and IV, respectively.

Identification of Alternative Mitigation Strategies

Kenosha County is richly endowed with surface and groundwater resources as discussed in Chapter II. However, these sources of freshwater are not unlimited and both surface and groundwater resources are subject to contamination, as well as over-use. Contamination and loss of water supply events generally provide no warning making it difficult for potentially affected areas to take preventative actions. In some cases, industries may be particularly vulnerable to loss of water supply, due to equipment and process needs. In addition, fire protection is an important related issue. When contamination and loss of water supply events do occur, they may last for extended periods of time, **such as weeks or months**, and likely would impact a specific water source, **such as an individual** well, **water intake**, reservoir, **or** utility. In review by the Kenosha County Hazard Mitigation **Local Planning Team** as part of the updating process, the following measures to reduce vulnerability to groundwater contamination events have been identified as viable for this update of the Kenosha County hazard mitigation plan.

Nonstructural

- Promote development of a thorough drinking water supply risk and threat assessment that identifies potential vulnerabilities and targets for sabotage and terrorism attack;
- Promote measures to protect groundwater recharge areas, including promotion of regional activities to protect groundwater recharge areas outside of the County boundaries;
- Develop wellhead protection plans and establish setbacks from wellhead locations;
- Identify failing onsite sewage disposal systems for maintenance and remediation;
- Reduce the potential for groundwater contamination from agricultural fertilizers and chemicals with emphasis on groundwater related water quality management areas;
- Manage livestock, manure, sewage sludge, and agricultural chemicals effectively in areas that are susceptible to groundwater contamination with emphasis on groundwater related water quality management areas;
- Utilize GIS technology to identify important groundwater management areas;
- Incorporate a groundwater protection element in future land use planning activities;
- Expand lead testing of out-of-tap drinking water supply in homes that are suspected to have lead water service lines or lead plumbing fixtures within the home;
- Encourage local municipalities and public water supply utilities to apply for potential funding opportunities to help offset the expense for homeowners to replace lead service lines and/or consider programs to offer homeowners low interest loan options or deferred payment through property taxes for such lead service line replacements; and
- Encourage local water utilities to develop emergency drinking water supply plans. Such plans may include provisions such as:
 - Establishing response partner contacts to discuss procedures,
 - Identifying priority water customers and developing plans for restoring their service first, and
 - Identifying potential distribution points for emergency water supply.

Structural

- Manage stormwater runoff more effectively;

- Locate and properly abandon old and improperly abandoned wells;
- Maintain and potentially upgrade water disinfection capabilities, including emergency disinfection equipment;
- Maintain municipal water and sewer infrastructure at acceptable operating standards;
- Develop a standard emergency operation plan for each public water supply system in order to plan procedures for mechanical failures, power outages, unsafe samples, and threats or acts of terrorism;
- Develop and implement wellhead protection plans to minimize the potential for contamination of groundwater supplies;
- Promote proper location, installation, cleaning, monitoring, and maintenance of septic systems;
- Develop and implement programs to the replace publicly owned water service mains, laterals, and other infrastructure that are known to contain lead;
- Promote the replacement of privately owned portions of lead water service lines and lead plumbing fixtures within the home; and
- Promote the use of water filtration devices on drinking water sources in homes where there are known lead service lines, lead plumbing, or fixtures and where replacement of the lead service line or plumbing fixture is not currently feasible;⁵⁴ and
- Evaluate condition of electrical equipment to accept generators. Repair or upgrade as necessary.

Public Informational and Educational Programming

- Encourage residents to develop a Family Emergency Preparedness Plan including the preparation of a Disaster Supply Kit (Appendix G);
- Continue and expand public education and outreach efforts regarding the effects of lead in drinking water and educate homeowners on steps to take to lessen their exposure to lead from the drinking water supply; and
- Train operators and plant personnel in security awareness and reporting protocols.

⁵⁴Water filters to remove lead from drinking water should be certified by the National Science Foundation (NSF) under Standard 53 for lead removal.

Current Programs

Federal and State Programs

There are various governmental and agency programs to help address and fund groundwater contamination-related issues. The U.S. Environmental Protection Agency administers the Superfund program. This program was designed to clean up the worst contamination sites from sources, such as warehouses and landfills. There are no Superfund sites located in Kenosha County.

In 1991, the USEPA published a regulation known as the Lead and Copper Rule mandating large water utilities to begin corrosion control treatment to reduce lead and copper concentrations in the water provided to consumers. The rule has undergone various revisions since its formation. Municipal water utilities are also required to regularly test their water supply for lead and copper under Section NR 809.54(3) of the *Wisconsin Administrative Code*. Under this code, the action level is exceeded if the concentration in more than ten percent of tap water samples collected during any monitoring period is greater than 15 $\mu\text{g/l}$ for lead and 1,300 $\mu\text{g/l}$ for copper. That is, if the 90th percentile lead concentration is greater than 15 $\mu\text{g/l}$, or the 90th percentile copper concentration is greater than 1,300 $\mu\text{g/l}$, the utility is out of compliance with the WDNR standards. If a utility fails to meet these standards, they are required to undertake additional action to control corrosion of pipes that are leading to the high lead or copper concentrations. The utility is also required to increase its monitoring program, and conduct public education and outreach regarding high lead or copper levels in the drinking water, and steps the consumer can take to protect their health.

The Wisconsin Department of Natural Resources oversees three programs relating to groundwater contamination issues:

- The first is overseen by the Department's Remediation and Redevelopment **Program** (RR). This bureau oversees response actions at spills, hazardous substance release sites, abandoned containers, drycleaners, brownfields (including the Site Assessment Grant Program), "high priority" leaking underground storage tanks, closed wastewater and solid waste facilities, hazardous waste corrective action and generator closures, and sediment cleanup actions. It has primary responsibility for implementing and aiding cleanups under the Spill Law, the Environmental Repair Law, Federal programs (Superfund, Hazardous Waste Corrective Action, Leaking Underground Storage Tanks (LUST), and Brownfields), the Land Recycling Law and State Brownfield Initiatives, the Drycleaner Environmental Response Fund, and at closed landfills. The RR program provides technical assistance, helps to clarify legal liability, provides financial assistance primarily to local governmental units, and provides technical project oversight of cleanup projects.
- The second is the Well Compensation Program, which provides financial assistance through grant monies to remediate or seal contaminated private wells.

- The third is the Source Water Assessment Program which was completed in May 2003, as required by the 1996 reauthorization of the Federal Safe Drinking Water Act (SDWA). The 1996 amendments to the SDWA require States to: 1) delineate assessment area boundaries from which public water systems receive supplies of drinking water, 2) inventory significant potential sources of contamination within those boundaries, 3) determine the susceptibility of the public water systems to those potential sources of contamination, and 4) provide the assessment results to the public. In addition, Chapter NR 811 of the *Wisconsin Administrative Code* requires that wellhead protection plans be developed and submitted to the WDNR for all municipal water supply wells constructed since May 1, 1992. In addition, the WDNR has delineated wellhead protection areas for all other municipal wells and is working with the communities to refine those delineations. The WDNR has also sent letters to all municipal water supply system operators recommending steps to be taken for system security purposes.

In 2016, the U.S. Environmental Protection Agency (USEPA) made \$14.5 million in funds available to the WDNR for dispersal to municipalities in the State to assist home owners with replacing lead service lines that bring drinking water into homes. Typically, municipalities are responsible for the portion of the water service lines from the water main to the curb stop while private property owners are responsible for the portion from the curb stop to the home.

Local Programs

As part of its water supply planning program, the Southeastern Wisconsin Regional Planning Commission has identified groundwater recharge areas with high and very high recharge potential and has made recommendations relative to groundwater recharge area protection.⁵⁵

Programs within Kenosha County include those conducted by the Kenosha County Division of Emergency Management. The Kenosha County Division of Emergency Management has a number of brochures, booklets, and pamphlets available for the public on contamination and loss of water supply and other general emergency management-related topics. Municipal water utilities also send out informational brochures and newsletters to their customers on water-related issues.

⁵⁵*SEWRPC Planning Report No. 52, A Regional Water Supply Plan for Southeastern Wisconsin, December 2010; SEWRPC Technical Report No. 47, Groundwater Recharge in Southeastern Wisconsin Estimated by a GIS-Based Water-Balance Model, July 2008.*

Evaluation of Alternatives and Identification of Mitigation Actions

Based upon review of the above, the current ongoing programs represent a major component of the planned mitigation action with regard to the continued provision of advanced protection and monitoring measures, as well as public informational and educational programming systems. In addition, feasible mitigation actions include development of a thorough water supply risk and threat assessment that identifies potential vulnerabilities, heightening security at water supply and treatment facilities, development of site emergency plans, including emergency water supply source alternative plans, which may be applicable at the town, city, or village municipality levels. Other potential mitigation actions include increased monitoring measures for pathogens and chemical toxins, as well as management measures to reduce the potential for groundwater contamination from chemicals, livestock, and sewage sources to limit possible future bodily injuries and deaths due to contamination or loss of water supply. **Aging water supply infrastructure can pose multiple risks including contamination and loss of delivery capacity. Maintenance and updating of water supply infrastructure should continue to be a major component of the planned mitigation measure.**

Multi-Jurisdictional Considerations

The contamination or loss of water supply can potentially impact all municipalities within the County. Those communities relying on individual private wells are susceptible to certain problems, such as shallow aquifer contamination or drawdown. Communities with public systems are more susceptible to security, **facility malfunction, main breaks, and aging infrastructure** related problems.

Priority Mitigation Measures

Based upon the foregoing evaluation, consideration of risk (see Appendix H), and review and action by the Kenosha County Hazard Mitigation **Plan Local Planning Team** (see Appendix A), the following mitigation activities related to contamination or loss of water supply are included as priority mitigation measures in the updated hazard mitigation plan for Kenosha County:

- Promote educational and informational programming related to water safety issues. **Volunteer groups** may be able to provide assistance in these educational efforts;
- Encourage multi-agency approaches to water conservation, loss and contamination prevention, and trend-monitoring;
- Prepare emergency operation **and emergency drinking water supply** plans for each public water supply system. The Wisconsin Department of Natural Resources correspondence on this element, including basic security measures to be considered is attached hereto as Appendix I;
- Continue coordination of emergency response plans among governmental units and first responders;

- Develop and implement plans to systematically replace publically owned water service lines and other public water supply infrastructure that are known to contain lead;
- Educate the public on, and promote the replacement of, privately owned portions of water service lines and other plumbing fixtures that contain lead. Pursue available funding opportunities to help offset the cost of these improvements to residents; and
- Promote the use of water filtration devices on drinking water sources in homes where there are known lead service lines, lead plumbing, or fixtures and where replacement of the lead service line or plumbing fixture is not currently feasible;⁵⁶and
- Prepare, update, and implement wellhead protection plans.

Because these measures are intended to be ongoing efforts, the Local Planning Team decided to retain the recommendations from the previous edition of the plan and include additional priority mitigation measures in this updated plan.

HAZARD MITIGATION PLAN COMPONENT FOR HAZARDOUS MATERIAL INCIDENTS

As described in Chapter III, hazardous material incidents are human-induced hazard events of significant concern to be considered in the Kenosha County hazard mitigation plan. This section describes alternate and selected strategies to mitigate these types of hazards. As part of the updating process, these strategies were reviewed and reevaluated by the Kenosha County Hazard Mitigation Plan Task Force in light of the updated hazard conditions and hazard mitigation goals documented in Chapters III and IV, respectively.

Identification of Alternative Mitigation Strategies

As described in Chapter II, Kenosha County contains a significant number of fixed facilities that store hazardous substances, as well as an extensive transportation system to move hazardous materials throughout the County. Nevertheless, there have only been a limited number of minor hazardous material incidents, all of which have been properly handled through local emergency response actions.

Hazardous materials are present in quantities of concern in business and industry, agriculture, universities, hospitals, utilities, and other facilities in Kenosha County. Despite extensive precautions taken to ensure careful handling during manufacture, transport, storage, use, and disposal, accidents and inadvertent releases are bound to

⁵⁶Water filters to remove lead from drinking water should be certified by the National Sanitation Foundation (NSF) under Standard 53 for lead removal.

occur. In review by the Kenosha County Hazard Mitigation Plan Task Force as part of the updating process, the following measures to reduce vulnerability to hazardous material incidents have been identified as viable for the updated Kenosha County hazard mitigation plan.

Nonstructural

- Continue participation in the Wisconsin Hazardous Materials Response System;
- Continue to document the flow of hazardous cargo along transportation routes in the County through recurring updates to the County's commodity flow study;
- Update the County's hazardous materials response plan as needed;
- Maintain communication and coordination between railroads operating trains containing large amounts of Bakken crude oil, Wisconsin Emergency Management, Racine County Office of Emergency Management, and local communities;⁵⁷
- Update the County's railroad emergency response plan as needed;
- Promote community and operator compliance with industry safety regulations and standards;
- Promote development of site emergency plans for schools, factories, office buildings, shopping malls, hospitals, and other appropriate sites that produce, store, or utilize hazardous materials and/or are near facilities/transportation routes where hazardous materials are used and/or transported;
- Inventory and evaluate stockpiles of materials used for responding to hazardous material incidents, such as firefighting foam; and
- Consider enacting zoning restrictions for areas adjacent to transportation routes carrying hazardous cargoes.

Structural

- Promote proper design, construction, maintenance, and inspections of hazardous material storage facilities, pipelines, and other related facilities;

⁵⁷U.S. Department of Transportation Emergency Order (Docket Number DOT-OST-2014-0067) requires that each railroad operating trains containing more than 1,000,000 gallons of crude oil, or approximately 35 tank cars, provide the State Emergency Response Commission notification regarding the expected movement of such trains through the counties in the State.

- Promote continued maintenance and upgrading of transportation infrastructure carrying shipments of hazardous cargo;
- Consider addition of safety gate systems at all at-grade railroad crossings along routes that transport crude oil cargo;
- Consider adding railroad gate arms at all at-grade crossings that do not currently have them installed;
- Promote control, enforcement, and cleanup of hazardous materials, including proper disposal of chemicals; and
- Continue and consider expansion of the current household hazardous waste management program.

Public Informational and Educational Programming

- Promote public awareness of hazardous material dangers and personal protection actions for these dangers;
- Educate businesses and those utilizing hazardous materials of their responsibilities;
- Encourage public awareness and widespread use of the “Diggers Hotline” utility damage prevention service;
- Conduct public outreach and education for those who live or work near facilities or transportation corridors where hazardous materials are produced, stored, used, or transported regarding actions to take if a hazardous materials incident occurs;
- Continue to promote training, planning, and preparedness for mass-casualty incidents involving fixed facilities and transportation systems; and
- Continue to develop trained, equipped, and prepared emergency first responders. Training should include refresher training and be recurring, as needed.

Current Programs

Federal and State Programs

In 2014, the U.S. Department of Transportation issued an Emergency Order requiring all railroads operating trains containing more than one million gallons of Bakken crude oil, or approximately 35 tank cars, in a particular state to provide the State Emergency Response Commission (SERC) notification regarding the expected transport of such cargo through the counties of that state. The notification must include estimated volumes of Bakken crude oil being transported, frequencies of anticipated train traffic, and the route that the crude oil will be transported.

The railroad operators must also provide contact information for a responsible party from the railroad and assist the SERC in sharing the information with the appropriate emergency responders in appropriate communities. In addition, the Pipeline and Hazardous Materials Safety Administration (PHMSA) and Federal Railroad Administration (FRA), in coordination with Canada, issued a rule in 2015 that mandates enhanced standards for new tank cars and a retrofitting schedule for older tank cars carrying crude oil and ethanol. The rule also requires a new braking standard for certain trains and designates new operational protocols for trains transporting large volumes of flammable liquids, including routing requirements, speed restrictions, and information for local government agencies regarding the cargo.

In accordance with the Emergency Planning and Community Right-to-Know Act (EPCRA) of 1986 and Chapter 59 of the *Wisconsin Statutes*, a Local Emergency Planning Committee (LEPC) has been established in Kenosha County and in other counties in Wisconsin. WEM has been charged with the duties of the State Emergency Response Commission and is the oversight organization for the EPCRA grant program, the emergency response system and establishing training standards for the State and the LEPCs. In Wisconsin, the Federally mandated local planning districts are counties and the LEPCs develop emergency response plans and prepare for hazardous material emergencies within their individual counties. Each LEPC is required to coordinate its planning activities with local response agencies and local industries that handle extremely hazardous substances above threshold planning quantities (TPQs), and to develop emergency response plans for the transportation of hazardous materials through their communities. Additionally, facilities are required to make emergency release notification to the National Response Center, the State EPCRA program, and the LEPC whenever there is a release of an “extremely hazardous substance” or other hazardous substances listed under the Comprehensive Environmental Resources and Conservation Liability Act (CERCLA).

To provide a high level of hazardous materials response capabilities to local communities, WEM contracts and manages 22 Regional Hazardous Materials Response Teams. The teams are divided into four Task Forces: Northeast Task Force, Northwest Task Force, Southeast Task Force, and the Southwest Task Force. These Task Forces are then divided into Type III, Type II, and Type I teams, all with complimentary capabilities and training requirements. In addition, there are county-based Type IV teams consisting of personnel drawn from local fire departments.

Type III teams are appropriately equipped and trained to handle all known industrial chemical hazards in liquid, aerosol, powder, and solid forms. They are not expected to be fully equipped to intervene and handle vapor or gas emergencies or incidents involving chemical, biological, radiological, nuclear, and explosive agents (CBRNE). Type II teams are equipped and trained to meet all Type III requirements and are appropriately equipped and trained to handle all unknown industrial chemical hazards in liquid, aerosol, powder, solids, and vapor or gas forms. They are generally not expected to be fully equipped to intervene and handle incidents involving CBRNE.

Type I teams meet all Type III and Type II requirements and are also appropriately equipped and trained to handle and can function in all categories for all known and unknown CBRNE agents.

Kenosha County is part of the Southeast Task Force. This task force includes Type III teams in Fond du Lac, Sheboygan, and Washington Counties, a Type II team in Racine County, and a Type I team in Milwaukee County. Kenosha County's Type IV hazardous materials response team has active members drawn from four fire departments in the County. All of the members of this team are trained to the Technician level. This team addresses about 90 percent of the hazardous material incidents that occur in the County.

The Wisconsin Hazardous Materials Response System may be activated for an incident involving a hazardous materials spill, leak, explosion, injury or the potential of immediate threat to life, the environment, or property. The Wisconsin Hazardous Materials Response system responds to the most serious spills and releases requiring the highest level of skin and respiratory protective gear. This includes all chemical, biological, or radiological emergencies.

Through public educational programs, Emergency Managers in Wisconsin counties are required to make the public aware of certain hazardous materials located at local facilities. Information about these facilities in Kenosha County is shared with the public through the Kenosha County LEPC. The LEPC consists of representatives from a cross-section of individuals from throughout Kenosha County, including, but not limited to, elected officials, members of emergency response agencies, media representatives, community groups, and facility representatives from the community. Types of material, quantities stored, and their inherent dangers are discussed during quarterly LEPC meetings. Facilities having these hazardous materials are required to give this information to Emergency Management and to prepare written plans to respond to possible spills.

Federal and State programs also include awareness and education activities. The Wisconsin Department of Health Services has developed a chemical release tool kit to provide information to local governments, health departments, and citizens in Wisconsin about preparing for and responding to hazardous material incidents.⁵⁸

Local Programs

The Kenosha County Division of Emergency Management and the LEPC have developed a countywide emergency response plan and continue to work on offsite facility plans, as needed, and updates them on a regular basis. The plan also contains information on protective actions such as how to reach the facility coordinator in an

⁵⁸Wisconsin Department of Health Services, Wisconsin Chemical Release Toolkit, Publication P00734, July 2014.

emergency, evacuation, and in-place sheltering. It also lists special facilities that may be located within the vulnerability zone. The Kenosha County Division of Emergency Management and the LEPC are also responsible for receiving and maintaining files. They also maintain a countywide emergency response plan and develop and update offsite emergency response plans and the County's hazard analysis for both fixed facilities and chemicals that are transported on highways and railways.

The Kenosha County Division of Emergency Management also has a number of brochures, booklets, and pamphlets available for the public on hazardous chemical safety and other general emergency management-related topics.

A variety of methods are used to warn people in Kenosha County of severe weather events, including tornadoes. These were previously described in the section of this chapter on thunderstorms.

As described in Chapter II, Kenosha County has developed an emergency operations plan and hazard analysis, which sets forth an all-hazards action plan. In addition, many of the local units of government have developed emergency operations plans and/or programs that complement the County's plan and that also set forth procedures and actions to deal with a range of situations and events, including hazardous materials incidents.

The Kenosha County Division of Emergency Management and the Kenosha County Local Emergency Planning Committee have conducted a hazardous material commodity flow and responder training assessment to identify hazardous materials risk exposures in both transportation and fixed facility settings and to determine whether first response personnel have maintained hazardous materials response training to proper levels.⁵⁹

Kenosha County has developed a county railway emergency response plan.⁶⁰ This plan was developed to serve as a resource for local emergency responders in the event of a rail emergency in the County. The plan addresses responding to a railway accident involving a hazardous material release. It includes response checklists and a guide to railroad car identification and to the railroad tank car marking system.

In the event of a hazardous materials incident, Kenosha County can utilize its county-wide hazardous materials response team or utilize the regional hazardous material response system. In 1995, the nearby City of Racine Fire

⁵⁹*Kenosha County Division of Emergency Management and Kenosha County Local Emergency Planning Committee, Hazardous Materials Commodity Flow and Responder Training Assessment for Kenosha County (WI), April 2016.*

⁶⁰*Kenosha County Division of Emergency Management, Kenosha County Railway Emergency Response Plan, May 2015.*

Department signed a contract with the State of Wisconsin to be the regional hazardous materials response agency for Southeastern Wisconsin. The City of Racine has a certified **Type II Hazardous Materials Response Team**, made up of firefighters who have been trained to respond to chemical-related emergencies throughout the region and has specialized equipment and a state-of-the-art hazardous materials response vehicle to assist in responding to regional hazardous materials incidents.

Evaluation of Alternatives and Identification of Mitigation Actions

Based upon review of the above, the current ongoing programs represent the major component of the planned mitigation action with regard to the continued compliance with safety regulation standards, **continued training of first responders**, enforcement **of existing laws and rules**, and public informational and educational programming systems. Other potential mitigation actions include expansion of the current household hazardous waste management program, **development of, and continued updates to, relevant hazardous materials related plans at the County and local municipality level; and maintenance and upgrading of transportation infrastructure.**

Multi-Jurisdictional Considerations

Hazardous material incidents could potentially impact all municipalities within the County. **Increased potential impacts for hazardous material incidents are apparent for those communities in the County that are traversed by IH 94 and freight railroad lines. It will be important for Kenosha County, the local units of government, and relevant businesses to coordinate hazard mitigation activities through the local government participation in countywide disaster planning and response mechanisms.**

Priority Mitigation Measures

Based upon the foregoing evaluation, consideration of risk (see Appendix H), and review and action by the Kenosha County **Local Planning Team** (see Appendix A), the following mitigation activities related to hazardous material incidents are included as priority mitigation measures in the updated Kenosha County hazards mitigation plan:

- **Continue participation in Wisconsin Hazardous Materials Response System;**
- Promote educational and informational programming related to hazardous material safety, and to individual actions to protect citizens, property, and businesses;
- **Promote development of site emergency plans for schools, factories, office buildings, shopping malls, hospitals, and other appropriate sites that produce, store, or utilize hazardous materials or that are near facilities or transportation routes where hazardous materials are produced, used, stored, or transported;**

- Promote community and operator compliance with industry safety regulations and standards;
- Promote ongoing enforcement of Federal, State, and County regulatory standards;
- Support existing and consider expansion of household waste management control programs;
- Promote continued maintenance and upgrading of transportation infrastructure carrying shipments of hazardous cargo;
- Educate businesses and those utilizing hazardous materials of their responsibilities;
- Continue support of training, equipment, planning, and preparedness of first responders for mass-casualty incidents involving hazardous materials at fixed facilities and transportation systems. Training should include refresher training; and
- Continue coordination of emergency response plans among governmental units, businesses and first responders.

Because these measures are intended to be ongoing efforts, the Local Planning Team decided to retain them in the updated plan.

HAZARD MITIGATION PLAN COMPONENT FOR TERRORISM INCIDENTS

As described in Chapter III, terrorism involving human-induced hazard events is of limited concern to be considered in the Kenosha County hazard mitigation plan. This section describes alternate and selected strategies to mitigate these types of hazards. As part of the updating process, these strategies were reviewed and reevaluated by the Kenosha County Hazard Mitigation Plan Local Planning Team in light of the updated hazard conditions and hazard mitigation goals documented in Chapters III and IV, respectively.

Identification of Alternative Mitigation Strategies

As described in Chapter III, a range of terrorism incidents from the individual level, through multi-casualty, to mass-casualty levels have the potential to occur throughout Kenosha County. The magnitude and scope of a terrorism incident is also dependent upon the technological means available to the terrorists, nature of the political issue motivating the act and points of weakness of the terrorism target. However, there is no real precedent for such events in Kenosha County. In review by the Kenosha County Hazard Mitigation Plan Task Force as part of the updating process, the following measures to reduce vulnerability to terrorism incidents and related hazards have been identified as viable for this update of the Kenosha County hazard mitigation plan.

Nonstructural

- Promote development of a thorough community risk and threat assessment that identifies potential vulnerabilities and targets for sabotage, terrorism, and/or weapons of mass destruction (WMD) attack;
- Promote and conduct preparedness activities including planning, training, and exercises for local law enforcement, fire and rescue, and other response personnel for a variety of terrorist, sabotage, and weapons of mass destruction attacks;
- Promote development of site emergency plans that address evacuation and in-place sheltering for schools; factories; office buildings; shopping malls; hospitals; critical governmental, utility, and infrastructure systems; and other appropriate sites;
- Promote alertness, awareness, and monitoring of organizations and activities that may threaten the community;
- Establish clear communication lines with the Wisconsin Department of Military Affairs, Division of Emergency Management, as the means to access assistance from the Wisconsin National Guard;
- Provide legitimate channels of political and public expression;
- Establish avenues of reporting (and potential rewards) for information preventing terrorist incidents and sabotage;
- Promote consistent use of computer data back-up systems and anti-virus software;
- Develop and promote workable population protection plans such as evacuation and in-place sheltering plans, as appropriate;
- Promote increased security measures at water supply facilities that could include increased security patrols, and/or increased monitoring for pathogens and chemical toxins;
- Continue and train Community Emergency Response Teams (CERT) coordinated with County and local emergency operations planning and programs; and
- Expand the use of Neighborhood Watch and **If You See Something, Say Something**.

Structural

- **Maintain, update, and upgrade public early warning systems and networks. Consider expanding such networks as necessary. Desirable characteristics of a robust early warning system include:**

- Employing multiple means of communications to alert people of the imminent threat of terrorism incident. Examples of such means include providing warnings and/or information through outdoor warning systems, broadcast media, cable and satellite media, electronic mail, SMS messaging, social media, and reverse-911 telephony, and
- Being capable of reaching vulnerable segments of the population;
- Heighten security at public gatherings, special events, and critical community facilities and industries.

Public Informational and Educational Programming

- Promote public awareness of terrorism-related dangers and personal protection actions for these dangers;
- Promote community awareness of designated shelters and accident warning systems;
- Promote greater awareness of, and provision for, mental health services in schools, workplaces, and institutional settings;
- Promote adequate training, equipment, planning, and preparedness for local law enforcement, fire and rescue departments, and other responders for a variety of terrorist/sabotage/WMD attacks; and
- Promote development and testing of internal emergency plans and procedures by businesses, government, and other organizations.

Current Programs

Federal and State Programs

At the Federal level, initiatives to combat terrorism are coordinated through the Department of Homeland Security (DHS). Since its establishment, DHS has been the lead Federal agency responsible for preparing for and responding to terrorist attacks, in addition to being the lead Federal agency for preparing for, responding to, and recovering from any accidental man-made or natural disasters. DHS also a variety of anti-terrorism resources available to local governments including information resources, training, funding.

The DHS has developed the Law Enforcement First Responder Training Program (LEFRTP). This classroom-based training program is designed to help State and local law enforcement officers build critical skills needed to effectively respond to mass consequence events, including criminal acts, terrorist attacks, and other large-scale emergencies. The program provides training, guidelines, and resources for first responders to use a system of command to achieve a coordinated and effective incident response.

In partnership with the FBI, the DHS has also developed a web portal known as Countering Violent Extremism and Active Shooter (CVE-AS) on the Homeland Security Information Network (HSIN). This web portal provides videos and training resources and a document library with information covering many violent extremism topics. The web portal also provides a forum for sworn law enforcement officers (Federal, State, or local) to exchange information and outreach initiatives on related topics.

Wisconsin anti-terrorism efforts are coordinated by WEM within the Department of Military Affairs in cooperation with the Wisconsin Office of Justice Assistance and various other Federal, State, and local agencies. A Wisconsin Interagency Working Group on Terrorism, which includes numerous State agencies and advisory members from Federal agencies, was initiated by the Governor in 1997. This group has been working with WEM on Weapons of Mass Destruction and other terrorism-related issues.

Another important State program is the availability of the Wisconsin National Guard civil support team, which can be accessed through the Wisconsin Department of Military Affairs, Division of Emergency Management.

Local Programs

As described in Chapter II, all 13 local units of government either own or contract with fire and rescue departments. There are three hospitals and about 20 major clinics located within Kenosha County (see Appendices C and D). Three of the 13 municipalities in Kenosha County provide for law enforcement through local police departments. In the remaining municipalities primary law enforcement is through the County Sheriff's Department. All of the fire and rescue departments within Kenosha County participate in the Mutual Aid Box Alarm System (MABAS) agreement. This agreement enables departments to render assistance to each other in the County during the response to emergency incidents and to bring in additional resources from other counties during these incidents.

Programs within Kenosha County include those conducted by the Kenosha County Division of Emergency Management. The Kenosha County Division of Emergency Management has a number of brochures, booklets, and pamphlets available for the public on terrorism incidents and other general emergency management-related topics.

A variety of methods are used to warn people in Kenosha County of severe weather events, including tornadoes. These were previously described in the section of this chapter on thunderstorms.

As described in Chapter II, Kenosha County has developed an emergency operations plan and hazard analysis, which sets forth an all-hazards action plan. In addition, many of the local units of government have developed

emergency operations plans and/or programs that complement the County's plan and that also set forth procedures and actions to deal with a range of situations and events, including a variety of terrorism incidents.

Evaluation of Alternatives and Identification of Mitigation Actions

Based upon review of the above, the current ongoing programs represent a major component of the planned mitigation action with regard to the continued prevention, control, and preparedness for terrorist incidents, and public informational and educational programming systems. Feasible, nonstructural and structural mitigation actions include development of a thorough community risk and threat assessment that identifies potential vulnerabilities, heightening security at special events and critical community facilities, development of site emergency plans, and development of emergency water supply source protection measures that may be applicable at the municipality level.

Multi-Jurisdictional Considerations

Terrorism incidents could potentially impact all municipalities within the County. These events can potentially cause multiple damages to a variety of infrastructure including, transmission lines, utilities, and transportation routes, as well as other critical community facilities in the vicinity of the incident. Hence, Kenosha County, municipalities, and relevant businesses will need to coordinate hazard mitigation activities through the local government participation in countywide disaster planning and response mechanisms. Such measures are already well underway through the coordinated emergency operations planning program involving the Kenosha County Division of Emergency Management, Kenosha County Sheriff's Department, local law enforcement agencies, and coordinated local community emergency operations programs.

Priority Mitigation Measures

Based upon the foregoing evaluation, consideration of risk (see Appendix H), and review and action by the Kenosha County Hazard Mitigation **Local Planning Team** (see Appendix A), the following mitigation activities related to terrorism incidents are included as priority mitigation measures in the updated Kenosha County hazards mitigation plan:

- **Maintain, update, and upgrade public early warning systems and networks. As part of this, increase coverage and use of NOAA All Hazard Weather Radio;**
- Continue and expand educational and informational programming related to public health and safety issues due to terrorist incidents;
- Consider the need to strengthen public health infrastructure to support surveillance, response, reporting and research, and to implement prevention and control programs from potential chemical and bio-terrorism attacks;

- Continue maintenance and potential enhanced security measures at water treatment facilities, including increased pathogen and chemical monitoring, and emergency drinking water supply source alternative planning;
- Continue support of training, equipment, planning, and preparedness for local law enforcement, fire and rescue departments, and other emergency management services;
- Continue coordination of emergency response plans among Federal, State, and local governmental units, businesses, and emergency management services;
- Continue and train Community Emergency Response Teams (CERT) coordinated with County and local emergency operations planning and programs; and
- Expand the use of Neighborhood Watch and **If You See Something, Say Something.**

Because these measures are intended to be ongoing efforts, the **Local Planning Team** decided to retain them in the updated plan.

HAZARD MITIGATION PLAN COMPONENTS FOR POWER OUTAGES

As described in Chapter II, power outages are hazard events of significant concern to be considered in the Kenosha County hazard mitigation plan. This section describes selected strategies to mitigate power outages. As part of the updating process, these strategies were reviewed and reevaluated by the Kenosha County Hazard Mitigation Plan **Local Planning Team** in light of the updated hazard conditions and hazard mitigation goals documented in Chapters III and IV, respectively.

Identification of Alternative Mitigation Strategies

As described in Chapter III, long-term power outages can occur throughout Kenosha County. The severity of such events may range from small, relatively localized incidents to major incidents impacting a substantial portion of the County. Some outages may result in serious social and economic disruptions. The following measures to reduce vulnerability to long-term power outages have been identified as viable for the Kenosha County Hazard Mitigation Plan.

Nonstructural

- Continue to review and implement programs to improve the reliability of the power supply facilities. Such measures may include implementation of maintenance and operational improvements, equipment upgrading, providing redundancy in the supply facilities where appropriate, and in some instances, burying power lines;

- Coordinate activities and communication between the power suppliers and the Kenosha County Emergency Management Office to keep County and, municipal officials informed of outage prevention practices and outage reaction activities during outages;
- Establish and maintain a database of critical facilities, such as shelters, long-term care facilities, and fueling sites, that have and don't have back up power generators;
- Encourage development of business resumption plans to be put into place following an outage; and
- Develop plans for evacuations and shelter operations in the case of a prolonged outage.

Structural

- Encourage the installation of backup power generators at critical facilities.

Public Informational and Educational Programming

- Conduct outreach to businesses and facilities to encourage them to develop plans for dealing with long-term power outages. Such outreach should also encourage them to be realistic about the amount and types of assistance that they can expect to receive from local government during an outage;
- Continue and refine public informational and educational programming to include information on safety during outages and preparation for outages. With regard to safety during outages, We Energies⁶¹ offers the following recommendations:
 - Stay at least 25 feet from downed power lines or flooded areas;
 - Use flashlights rather than candles;
 - Unplug or turn off appliances to avoid overloading when power is restored;
 - Do not use extension cords between homes or across yards or streets;
 - Do not use outdoor grills, kerosene heaters, or camping stoves or heaters indoors;
 - People whose homes are extremely hot or cold should go to a safe shelter;
 - Stay clear of electric company vehicles and equipment;
 - Have a supply of safe water;

⁶¹We Energies, "Power Outage Safety Tips," http://www.we-energies.com/outages_safety/reporting/outage-safety-tips.htm, accessed June 28, 2016.

- Keep refrigerated food safe or dispose of it;
- Leave a light on in your home. When crews do neighborhood spot checks, they'll know your power is back on if a light is on; and
- Create a family plan on procedures to be used if an outage occurs.

With regard to preparing for a power outage, We Energies recommends⁶² creating an emergency plan that includes backup provisions for special electrical medical equipment, sump pump backup systems, telephone provisions, assembly of an emergency kit, protection of electrical equipment, and installation or provision of power generators where appropriate.

Current Programs

Federal and State Programs

WEM has produced educational resources regarding power outages including prerecorded radio public service announcements and scripts for radio public service announcements.⁶³ Other informational and educational material related to power outages and mitigative measures are available from organizations such as the American Red Cross.⁶⁴

Local Programs

As previously noted, the causes of power outages are primarily weather related and, to a lesser extent, equipment failure and other factors. The electric power supply companies—in the case of Kenosha County, We Energies, Alliant Energy, and American Transmission Company have programs in place to improve the reliability of the electric power delivery system. Equipment and facilities where equipment failures have a history of occurrence are given priority.

These companies also have operational procedures for resolving outage problems once they occur. The power company procedures are prioritized to first deal with any life-threatening situations, then larger outages, and then smaller secondary lines and neighborhood equipment. In some cases homes, utilities, hospitals, and business owners have installed, or have available, backup power generating sources to be used during power outages that temporarily provide for partial or full power during an outage. We Energies and Alliant Energy have also

⁶²Ibid.

⁶³These can be accessed at Wisconsin Emergency Management's ReadyWisconsin website located at: http://ready.wi.gov/Resources/Manager_Resources.asp.

⁶⁴American Red Cross, "Be Red Cross Ready: Power Outage Checklist," 2009.

prepared informational and educational materials related to power outage **safety and mitigation** measures.⁶⁵ Similarly, the Wisconsin Division of Emergency Management has produced educational resources regarding power outages including prerecorded radio public service announcements and scripts for radio public service announcements.⁶⁶ Informational and educational material related to power outages and mitigative measures are also available from organizations such as the American Red Cross.⁶⁷

Multi-Jurisdictional Considerations

All municipalities within Kenosha County could potentially be impacted by long-term power outages.

Priority Mitigation Measures

The mitigative actions considered viable for power outage incidents are as follows:

- Continue to review and implement programs to improve the reliability of the power supply facilities. Such measures can include implementation of maintenance and operational improvements, equipment upgrading, providing redundancy in the supply facilities where appropriate, and, in some instances, burying power lines.
- Coordinate activities and communication between the power suppliers and the Kenosha County Division of Emergency Management to keep County and, municipal officials informed of outage prevention practices and outage reaction activities during outages.
- Encourage the installation of backup power generators at critical facilities.
- Continue and refine public informational and educational programming to include information on safety during outages and preparation for outages. With regard to safety during outages, **informational programming should include the previously discussed recommendations given by We Energies,**⁶⁸ and;
- **Conduct outreach to businesses and facilities to encourage them to develop plans for dealing with and resuming operations after long-term power outages. Such outreach should also encourage them to be**

⁶⁵*For example, Alliant Energy, "Weathering the Storm," February 2003.*

⁶⁶*These can be accessed at Wisconsin Emergency Management's ReadyWisconsin website located at: http://ready.wi.gov/Resources/Manager_Resources.asp.*

⁶⁷*American Red Cross 2009, op. cit.*

⁶⁸*We Energies, "Power Outage Safety Tips, op. cit.*

realistic about the amount and types of assistance that they can expect to receive from local government during an outage.

Because these measures are intended to be ongoing efforts, the Local Planning Team decided to retain them in the updated plan.

SUMMARY

Based upon the foregoing evaluation for each of the natural and other man-made hazards above, the priority mitigation measures identified to be included in the Kenosha County hazard mitigation plan are summarized in Table V-8. Table V-8 also includes a ranking evaluation of the mitigation measures identified in each hazard category based upon relative cost, direct benefits, likely indirect benefits, and a list of communities affected.

There are several potential issues inherent in the prioritization or ranking of the mitigation measures that were considered in development of the recommended ranking of priority mitigation measures. First, the Kenosha County hazard vulnerabilities as shown in Appendix H are different for loss of life and injury versus property damages, which may affect prioritization of costs to be incurred. For the purposes of this plan priority or emphasis was placed upon preventing loss of life and injury.

The costs of avoidance of a particular hazard may not be quantifiable, but the cost of occurrence of the hazard often is—for example, most hazards have been quantified by insurance underwriters in the issuance of property and life insurance policies. Conversely, the benefit of any particular mitigation measure may also not be quantifiable or realized. For example, continued coordination of emergency response and operation plans among governmental units and first responders will directly enhance preparedness and protection of the communities involved; however, this action may or may not ultimately result in reduced property damage, injuries or death if the hazard does not occur. Similarly in the case of flood mitigation upstream actions may result in downstream benefit even if the immediate benefits at the location where the mitigation measure was applied may be less than optimal—i.e. benefit-cost ratio less than one (see Estimated Cost section below).

Another potential issue is whether the hazard ranking reflects public health concerns for which mitigation is possible. For example, the vulnerability to hazards such as extreme heat and lightning are very much a matter of personal exposure. Mitigation in the traditional sense (strengthening a structure or moving a structure away from the hazard such as in flood mitigation) is of little use for these hazards. Neither extreme heat nor lightning are emergency management issues in terms of operations. Reducing the risk of mortality from lightning or temperature extremes requires public health information and hazard awareness so that individuals take precautions to limit their exposure to the hazard. While hazard awareness and public safety information are

important for any type of hazard, it is especially important for hazards such as temperature extremes, lightning, tornadoes, and severe thunderstorms.

Ranking of Priority Mitigation Measures

The mitigation measures identified in each hazard category were further evaluated based upon relative cost, direct benefits, and likely indirect benefits and ranked accordingly as shown in **Table V-8**. Consideration was given to the likelihood of occurrence of each type of hazard as set forth in the hazard prioritization analysis as shown in Appendix H. Greatest priority is recommended to be given to those mitigation measures that directly or indirectly resulted in minimized loss of life or injury.

Estimated Cost

Table V-8 includes a summary of the estimated capital cost and average annual operation and maintenance cost, where possible, for each mitigation measure. It is important to note that the annual benefits and cost used in the benefit-cost analysis include only the direct benefits derived from the abatement of monetary flood damages, and the direct costs attendant to implementation of the floodplain management measures. Hence, environmental, recreational or other intangible benefits and costs that cannot be readily quantified were not addressed or reflected in the **costs and benefits presented in Table V-8**.

In addition, there were many mitigation measures, especially for hazards other than flooding and related stormwater drainage problems, where a direct monetary cost analysis was not possible to calculate. Therefore, mitigation measures were further prioritized based upon comparison of the relative cost of implementation, direct benefits and indirect benefits (see Direct and Indirect Benefits section below).

Cost of Implementation

An estimated cost of implementation was developed in order to categorize the relative cost of each of the priority mitigation measures as shown in **Table V-8**. The cost of implementation is allocated among three categories of low (less than \$100,000 dollars), moderate (greater than \$100,000 and less than \$1.0 million), and high (greater than \$1.0 million) costs, which are generally defined as including:

Low

- Educational and informational programming.
- Ongoing enforcement of ordinances.
- Plan development.

Moderate

- Addition of new staff.
- Additional staff hours budgeted.
- Additional equipment.
- New ordinance development.
- New programs/task force.

High

- Major construction.
- Floodplain structures buyout programs.
- New buildings (infrastructure).
- Capital programs.

This cost categorization allows the mitigation measures to be prioritized with particular regard to cost effectiveness by comparing the estimated low, moderate, and high cost to the number of both direct and indirect benefits identified (see Direct and Indirect Benefits section below).

Direct and Indirect Benefits

The benefits from implementation of a mitigation measure can be classified as direct, or measurable, and as indirect, or intangible. Direct benefits were defined in terms of enhanced preparedness and protection of individuals or communities, reduced property damage, reduced injuries, and reduced mortalities. Although the exact numbers or amounts of such direct benefits are not known, these would be a direct result of implementing a particular mitigation measure. In contrast, indirect benefits represent a continuum of potential benefits that may occur as a result of the implementation of specific management actions. For example, implementation of informational programming, while not directly saving lives, may ultimately result in people having the knowledge necessary to save lives and protect property. These intangible benefits cannot be readily quantified and range from increased awareness to reduced loss of life and property, and have been assessed using the following relative cumulative scale:

1 = Increased awareness/preparedness.

2 = Enhanced quality of life/social benefits.

3 = Reduced property damage.

4 = Increased environmental and recreational benefits/ecosystems services.

5 = Reduced loss of life and injury with concomitant benefits for economic productivity.

As shown above and in **Table V-8**, the greatest indirect benefit was allocated to those mitigation measures that may ultimately result in minimized loss of life or injury.

Local Units of Government Affected

Table V-8 also provides a list of the local units of government affected for each hazard and corresponding priority mitigation measures.

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Chapter V

HAZARD MITIGATION STRATEGIES

TABLES

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Table V-1

**PRINCIPAL FEATURES AND COST OF THE RECOMMENDED FLOODPLAIN
MANAGEMENT PLAN ELEMENT FOR THE FOX RIVER WATERSHED**

Component Location	Capital Cost ^a		Annual Operation and Maintenance Cost ^a (thousands of dollars)	Implementation Status
	Description	Cost (thousands of dollars)		
1. Fox River Watershed – Kenosha County	Remove 203 structures ^b	\$31,010.2	--	Partially implemented and ongoing ^c
2. Elizabeth Lake	Spillway modifications	121.0	--	Implemented
3. Hoosier Creek and tributaries	Brush clearing	302.4	--	First assessment December 2009, ongoing
	Total	\$31,423.6	--	--

NOTE: The first feature identified is the recommended alternative from SEWRPC Planning Report No. 12, *A Comprehensive Plan for the Fox River Watershed*, Volume Two, February 1970.

^aAmounts shown are in 2014 dollars.

^bNumber of structures as of April 2015.

^cStructure removal to be carried out at discretion of property owners.

Source: SEWRPC.

Table V-2

**PRINCIPAL FEATURE AND COST OF THE RECOMMENDED FLOODPLAIN
MANAGEMENT PLAN ELEMENT FOR THE ROOT RIVER WATERSHED**

Component Location	Capital Cost ^a		Annual Operation and Maintenance Cost ^a (thousands of dollars)	Implementation Status
	Description	Cost (thousands of dollars)		
1. East Branch Root River Canal – Two miles	Channel clearing and maintenance	\$62.2	\$1.9	Partially implemented

NOTE: The principal feature identified is the recommended alternative from SEWRPC Planning Report No. 9, *A Comprehensive Plan for the Root River Watershed*, July 1966.

^aAmounts shown are in 2014 dollars.

Source: SEWRPC.

Table V-3

**PRINCIPAL FEATURES AND COSTS OF THE RECOMMENDED FLOODPLAIN
MANAGEMENT PLAN ELEMENT FOR THE PIKE RIVER WATERSHED**

Component Location	Capital Cost ^a		Annual Operation and Maintenance Cost ^a (thousands of dollars)	Implementation Status
	Description	Cost (thousands of dollars)		
1. Upper Pike River	Channel widening/deepening, CTH KR to river mile 10.80 ^b	\$ 163.6	\$ 0.7	Not implemented ^c
2. Upper Pike River	Bridge replacements, STH 31 and CTH KR	1,169.0	--	Not implemented
3. Upper Pike River	Aquatic habitat restoration, CTH KR to river mile 10.80 ^b	85.8	--	Not implemented
4. Pike River Watershed – Kenosha County	Remove eight structures ^d	1,222.1	--	Not implemented ^e
5. Pike Creek	Channel Improvements, floodwater detention storage, bridge replacements, and aquatic habitat restoration.	14,679.1	24.6	Not implemented
6. Airport Branch and Tributary to Airport Branch	Channel improvements, bridge replacement, aquatic habitat restoration	2,439.3	1.9	Not implemented
7. Somers Branch and tributary	Channel cleaning	20.6	--	Implemented
8. Pike River – Town of Somers	2005 and 2008 flood mitigation repair work	30.7	--	Implemented
	Total	\$19,810.2	\$27.2	--

NOTE: The principal features identified are the recommended alternatives from SEWRPC Planning Report No. 35, *A Comprehensive Plan for the Pike River Watershed*, June 1983; *SEWRPC Amendment to the Pike River Watershed Plan, City of Kenosha/Town of Somers*, June 1987; and *SEWRPC Amendment to the Pike River Watershed Plan, Kenosha and Racine Counties*, March 1996.

^aAmounts shown are in 2014 dollars.

^bRiver mile 10.80 is located about 1,850 feet downstream of CTH KR.

^cDesign dependent on channel restoration project currently being implemented by the Village of Mt. Pleasant for the Pike River in Racine County.

^dNumber of structures as of April 2015.

^eStructure removal to be carried out at discretion of property owners.

Source: SEWRPC.

Table V-4

**PRINCIPAL FEATURES AND COSTS OF THE RECOMMENDED FLOODPLAIN
MANAGEMENT PLAN ELEMENT FOR THE DES PLAINES RIVER WATERSHED**

Component Location	Capital Cost ^a		Annual Operation and Maintenance and Land Rental Costs ^a (thousands of dollars)	Implementation Status
	Description	Cost (thousands of dollars)		
Watershedwide				
a. Provide Onsite Detention Storage Facilities for Planned New Development	Detention facilities, including land cost	\$ 59,889.4 ^b	\$573.2	Ongoing
b. Restore Prairie Conditions on 6.0 Square Miles of Agricultural Land	Prairie Restoration ^c	23,685.7	30.5 to 2,151.5 ^d	Not implemented
c. Restore Wetland Conditions on 3.1 Square Miles of Agricultural Land in the 100-Year Floodplain	Wetland Restoration ^c	10,468.6	16.1 to 1,107.9	Not implemented
d. Land Rental Cost for Restored Wetlands and Prairies	--	--	1,027.6	Planning in progress
e. Floodproof 42 Residential, Commercial, and Agricultural Structures	Floodproofing	988.5		Not implemented
f. Elevate Three Residential Structures	Elevation	349.2		Not implemented
g. Acquire and demolish 13 Houses and Agricultural Structures ^e	--	2,186.5		Not implemented
h. Upper Des Plaines River Sediment Monitoring	Stream flow and water quality gage	23.6		Not implemented
	Stream channel cross-sections	64.2 ^f		Not implemented
	Subtotal	\$ 97,628.7	\$1,647.4 to \$4,860.2 ^d	--
Brighton Creek				
a. Replace the 18th Street Crossing	--	\$ 105.2		Implemented
Center Creek				
a. Riprap Work on 700 Feet of Channel	--	\$ 19.4		Implemented
Unnamed Tributary to Des Plaines River				
a. Chateau Eau Plaines Stormwater Pond	--	\$ 1,814.3		Village of Pleasant Prairie submitted CDBG in 2009, but funds were not received. Village is doing design for storm sewers to address the issue
Unnamed Tributary No. 6 to Brighton Creek				
a. Provide a Centralized Detention Storage Facility North of CTH K	--	\$ 953.7		Not implemented
b. Improve Storm Sewer	--	560.4		Not implemented
c. Acquire and Demolish Seven Houses	--	1,354.6		Not implemented
	Subtotal	\$ 2,868.7	\$9.7	--
Unnamed Tributary No. 1 to Center Creek				
a. Modification to FIRM to reflect stormwater basin in Strawberry Creek Subdivision	--	\$ 40.0		Not implemented
Unnamed Tributary No. 1 to Hooker Lake				
a. Replace Existing Culvert under 83rd Street	--	\$ 60.5	\$0.1	Implemented
	Total	\$102,536.8	\$1,657.2 to \$4,869.9 ^g	--

NOTE: The principal features identified are the recommendations from SEWRPC Planning Report No. 44, *A Comprehensive Plan for the Des Plaines River Watershed*, June 2003.

Footnotes to Table V-4

^aAmounts are shown in 2014 dollars.

^bCost to control runoff up to the 100-year event.

^cPrairie and wetland restoration to be carried out at discretion of property owners.

^dIncremental cost between control of the 50- and one-percent-annual- probability events.

^eNumber of structures as of April 2015.

^fCost of initial field survey, including establishment of horizontal and vertical control.

^gCost reflects range from minimal wetland and prairie operation and maintenance to active management.

Source: SEWRPC.

Table V-5

**PRINCIPAL FEATURES AND COST OF THE FLOODPLAIN MANAGEMENT
ELEMENT FOR THE LAKE MICHIGAN DIRECT DRAINAGE AREA**

Component Location	Capital Cost		Annual Operation and Maintenance Cost (thousands of dollars) ^a	Implementation Status
	Description	Cost (thousands of dollars) ^a		
1. Pike Creek–Town of Somers and City of Kenosha	Remove six structures ^b	\$ 916.6	--	Not implemented ^c
2. Chiwaukee Prairie-Carol Beach Open Space Area–Village of Pleasant Prairie	Acquire platted and unplatted lots in accordance with SEWRPC Community Assistance Planning Report No. 88	\$ 7,811.5	\$181.7	Complete
3. Tobin Creek	Study to review flows and slope stabilization needs	\$ 141.5	--	Not implemented
4. Stormwater Projects	Storm sewer study for Forest Park area	\$ 151.7	--	Completed 2014
	Shagbark Basin	518.0	--	Completed in 2009
	Spring Brook Innovation Center stormwater management project	879.9	--	Completed 2012
	Elevation of one residence in Village of Pleasant Prairie	83.5	--	Completed 2010
	Carol Beach Unit 1 sewer system improvements	955.5	--	Lift station rebuilt 2013
	Total	\$11,458.7	\$181.7	--

^aAmount shown is in 2014 dollars.

^bNumber of structures as of April 2015.

^cStructure removal to be carried out at discretion of property owners.

Source: SEWRPC.

Table V-6

PARTICIPATION IN THE NATIONAL FLOOD INSURANCE PROGRAM BY KENOSHA COUNTY JURISDICTIONS

Civil Division	Participating in Kenosha County Hazard Mitigation Plan	Participating in National Flood Insurance Program	Date Initial Flood Hazard Boundary Map Identified	Date Initial Flood Insurance Rate Map (FIRM)	Current Effective Map Date	Entry Date into National Flood Insurance Program
Cities Kenosha	Yes	Yes	12/28/1973	09/02/1982	06/19/2012	09/02/1982
Villages						
Bristol	Yes	Yes	--	06/19/2012	06/19/2012	03/08/2013
Paddock Lake	Yes	Yes	--	06/19/2012	06/19/2012	10/24/2012
Pleasant Prairie	Yes	Yes	--	12/05/1996	06/19/2012	04/03/1998
Silver Lake	Yes	Yes	12/28/1973	09/01/1978	06/19/2012	09/01/1978
Somers ^a	Yes	-- ^b	-- ^b	-- ^b	-- ^b	-- ^b
Twin Lakes	Yes	Yes	06/07/1974	06/01/1982	06/19/2012	06/01/1982
Towns						
Brighton	Yes	Yes	04/16/1976 ^c	02/17/1982 ^c	06/19/2012 ^c	02/17/1982 ^c
Paris	Yes	Yes	04/16/1976 ^c	02/17/1982 ^c	06/19/2012 ^c	02/17/1982 ^c
Randall	Yes	Yes	04/16/1976 ^c	02/17/1982 ^c	06/19/2012 ^c	02/17/1982 ^c
Salem	Yes	Yes	04/16/1976 ^c	02/17/1982 ^c	06/19/2012 ^c	02/17/1982 ^c
Somers	Yes	Yes	04/16/1976 ^c	02/17/1982 ^c	06/19/2012 ^c	02/17/1982 ^c
Wheatland	Yes	Yes	04/16/1976 ^c	02/17/1982 ^c	06/19/2012 ^c	02/17/1982 ^c
County Kenosha County.....	Yes	Yes	04/16/1976	02/17/1982	06/19/2012	02/17/1982

^aOn April 24, 2015, a portion of the Town of Somers incorporated as the Village of Somers.

^bThe Village has initiated the process to participate in the NFIP.

^cIn Wisconsin, towns are covered under county eligibility in the National Flood Insurance Program.

Source: Federal Emergency Management Agency.

Table V-7

**PRINCIPAL FEATURE AND COST OF THE RECOMMENDED
FLOODLAND ELEMENT FOR THE LAKE MICHIGAN COASTAL AREA**

Component Location	Capital Cost ^a		Annual Operation and Maintenance Cost ^a (thousands of dollars)	Implementation Status
	Description	Cost (thousands of dollars)		
1. Lake Michigan Coast	Remove eight structures ^b	\$1,222.1	--	Not implemented ^c

^aAmounts shown are in 2014 dollars.

^bNumber of structures as of April 2015.

^cStructure removal to be carried out at discretion of property owners.

Source: SEWRPC.

Table V-8

COST-BENEFIT ANALYSIS SUMMARY OF MEASURES INCLUDED IN THE KENOSHA COUNTY HAZARD MITIGATION PLAN

Hazard	Mitigation Measures	Estimated Cost ^a		Costs of Implementation ^b			Estimated Average Annual Benefits from Flood Damage Reduction (thousands of dollars) ^c	Direct Benefits				Indirect Benefits ^d	Community/Jurisdictions Affected	
		Capital (thousands of dollars)	Average Annual Operation and Maintenance (thousands of dollars)	Low	Moderate	High		Enhanced Preparedness/Protection	Reduced Property Damage	Reduced Injuries	Reduced Mortalities			
Flooding and Related Stormwater Drainage Problems ^e	Floodland and Environmentally Sensitive Land Preservation Element													
	• Floodplain and wetland zoning ^f	--g	--g	X	--	--	--	X	X	X	X	5	Kenosha County; City of Kenosha; Villages of Bristol, Paddock Lake, Pleasant Prairie, Silver Lake, Somers, and Twin Lakes; and Towns of Brighton, Paris, Randall, Salem, Somers, and Wheatland ^h	
	• Environmentally sensitive area and open space preservation actions ^f	20,940.2 ⁱ	--i	--	--	X	--	X	X	--	--	4	Kenosha County; City of Kenosha; Villages of Bristol, Paddock Lake, Pleasant Prairie, Silver Lake, Somers, and Twin Lakes; and Towns of Brighton, Paris, Randall, Salem, Somers, and Wheatland ^h	
	Floodland Management Plan Element													
	Fox River Watershed ^j													
	• Removal of 203 structures ^{f,k,l}	31,010.2	--	--	--	X	600.4	X	X	X	X	5	Kenosha County; Villages of Silver Lake and Twin Lakes; and Towns of Randall, Salem, and Wheatland ^h	
	• Elizabeth Lake spillway modifications	121.0	--	--	X	--	--	X	--	--	--	4	Village of Twin Lakes	
	• Hoosier Creek and tributaries brush clearing	302.4	--	--	X	--	--	X	X	--	--	3	Village of Brighton	
	Root River Watershed ^m													
	• Channel clearing along 2 miles of East Branch Root River Canal	62.2	1.9	X	--	--	--	X	X	--	--	3	Kenosha County and Town of Paris	
	Pike River Watershed ⁿ													
	• Upper Pike River—channel widening/deepening	163.6	0.7	--	X	--	--	X	X	--	--	3	Kenosha County, Village of Somers, and Town of Somers	
	• Upper Pike River—bridge replacements	1,169.0	--	--	--	X	--	X	X	--	--	3	Kenosha County, Village of Somers, and Town of Somers	
	• Upper Pike River—aquatic habitat restoration	85.8	--	X	--	--	--	--	X	--	--	3	Kenosha County, Village of Somers, and Town of Somers	
	Watershedwide—removal of eight structures ^{f,k,l}	1,222.1	--	--	--	X	38.4	X	X	X	X	5	Kenosha County, City of Kenosha, Village of Somers, and Town of Somers	

Hazard	Mitigation Measures	Estimated Cost ^a		Costs of Implementation ^b			Estimated Average Annual Benefits from Flood Damage Reduction (thousands of dollars) ^g	Direct Benefits				Indirect Benefits ^d	Community/Jurisdictions Affected	
		Capital (thousands of dollars)	Average Annual Operation and Maintenance (thousands of dollars)	Low	Moderate	High		Enhanced Preparedness/Protection	Reduced Property Damage	Reduced Injuries	Reduced Mortalities			
Flooding and Related Stormwater Drainage Problems ^e (continued)	Pike River Watershed ^f (continued)													
	• Pike Creek—channel improvements, floodwater detention storage, bridge replacements, and aquatic habitat restoration	14,679.1	24.6	--	--	X	--	X	X	--	--	3	Kenosha County, City of Kenosha, Village of Somers, and Town of Somers	
	• Airport Branch and Tributary to Airport Branch—channel improvements, bridge replacement, aquatic habitat restoration	2,439.3	1.9	--	--	X	--	X	X	--	--	3	Kenosha County, City of Kenosha, Village of Somers, and Town of Somers	
	• Somers Branch and tributary – channel cleaning	20.6	--	X	--	--	--	X	X	--	--	3	Kenosha County, Village of Somers, and Town of Somers	
	• Pike River flood mitigation repair work	30.7	--	X	--	--	--	X	X	--	--	5	Kenosha County, Village of Somers, and Town of Somers	
	Des Plaines River Watershed ^o													
	• Provision of onsite detention storage facilities for planned new development	59,889.4 ^p	573.2	--	--	X	--	X	X	--	--	3	Kenosha County, City of Kenosha; Villages of Bristol, Paddock Lake, and Pleasant Prairie, and Towns of Brighton, Paris, and Somers	
	• Restoration of prairie conditions ^{h,p}	23,685.7	30.5 to 2,151.5 ^r	--	--	X	--	--	X	--	--	4	Kenosha County, Village of Bristol and Towns of Paris and Somers	
	• Restoration of wetland conditions ^{h,q}	10,468.6	16.1 to 1,107.9 ^r	--	--	X	--	--	X	--	--	4	Kenosha County, Village of Bristol, and Towns of Brighton, Paris, Salem, and Somers	
	• Land rental cost for restored wetlands and prairies	--	1,027.6	--	--	X	--	--	X	--	--	4	Kenosha County, Village of Bristol, and Towns of Paris and Somers	
	• Floodproofing of 42 residential, commercial, and agricultural structures ^{r,k,l}	988.5	--	--	X	--	171.9	X	X	--	--	3	Kenosha County; Villages of Bristol, Paddock Lake and Pleasant Prairie; and Towns of Salem and Somers	
	• Elevation of three residential structures ^{r,k,l}	349.2	--	--	X	--	7.1	X	X	--	--	3	Kenosha County and Villages of Paddock Lake and Pleasant Prairie	
	• Removal of 13 residential and agricultural structures ^{r,k,l}	2,186.5	--	--	--	X	3.0	X	X	X	X	5	Kenosha County, Village of Pleasant Prairie, and Town of Somers.	
	• Upper Des Plaines River sediment monitoring	87.8	--	X	--	--	--	X	X	--	--	3	Kenosha County and Towns of Paris and Somers	
• Brighton Creek – replace the 18th Street crossing	105.2	--	--	X	--	--	X	X	--	--	3	Kenosha County and Town of Brighton		
• Center Creek riprap work	19.4	--	X	--	--	--	X	X	--	--	3	Kenosha County and Village of Bristol		
• UT to Des Plaines River – Chateau Eau Plaines stormwater pond	1,814.3	--	--	--	X	--	X	X	--	--	3	Village of Pleasant Prairie		

Hazard	Mitigation Measures	Estimated Cost ^a		Costs of Implementation ^b			Estimated Average Annual Benefits from Flood Damage Reduction (thousands of dollars) ^c	Direct Benefits				Indirect Benefits ^d	Community/Jurisdictions Affected
		Capital (thousands of dollars)	Average Annual Operation and Maintenance (thousands of dollars)	Low	Moderate	High		Enhanced Preparedness/Protection	Reduced Property Damage	Reduced Injuries	Reduced Mortalities		
Flooding and Related Stormwater Drainage Problems ^e (continued)	Des Plaines River Watershed ^o (continued)												
	• UT-6 to Brighton Creek – centralized detention storage facility north of CTH K	953.7	9.7	--	X	--	58.4 ^s	X	X	--	--	3	Kenosha County, Village of Paddock Lake, and Town of Salem
	• UT-6 to Brighton Creek - improve storm sewer	560.4	--	--	X	--	-- ^s	X	X	--	--	3	Kenosha County, Village of Paddock Lake, and Town of Salem
	• UT-6 to Brighton Creek - remove seven residential structures ^{h,k,l}	1,354.6	--	--	--	X	-- ^s	X	X	X	X	5	Kenosha County and Village of Paddock Lake
	• UT-1 to Center Creek – Modify FIRM to reflect stormwater basin in Strawberry Creek Subdivision	40.0	--	X	--	--	--	X	X	--	--	1	Kenosha County, WDNR
	• UT-1 to Hooker Lake – replace culvert under 83rd Street	60.5	0.1	X	--	--	--	X	X	--	--	3	Kenosha County and Village of Paddock Lake
	Lake Michigan Direct Drainage Watershed												
	• Removal of six structures ^{f,k,l}	\$ 916.6	--	--	--	X	37.0	X	X	X	X	5	Kenosha County, City of Kenosha, and Village of Somers
	• Continued implementation of land acquisition for the Chiwaukee Prairie-Carol Beach area ^{f,t}	7,811.5	181.7	--	--	X	--	X	X	--	--	4	Kenosha County and Village of Pleasant Prairie
	• Tobin Creek study	141.5	--	--	X	--	--	--	X	--	--	3	Kenosha County and Village of Pleasant Prairie
	• Forest Park storm sewer study	151.7	--	--	X	--	--	X	X	--	--	3	City of Kenosha
	• Shagbark Basin	518.0	--	--	X	--	--	X	X	--	--	3	City of Kenosha
	• Spring Brook Innovation Center stormwater management project	879.9	--	--	X	--	--	X	X	--	--	3	Village of Pleasant Prairie
	• Elevation of one residence ^f	83.5	--	X	--	--	--	--	X	X	--	5	Village of Pleasant Prairie
• Carol Beach Unit 1 sewer system improvements	955.5	--	--	X	--	--	X	X	--	--	3	Village of Pleasant Prairie	

Hazard	Mitigation Measures	Estimated Cost ^a		Costs of Implementation ^b			Estimated Average Annual Benefits from Flood Damage Reduction (thousands of dollars) ^g	Direct Benefits				Indirect Benefits ^d	Community/Jurisdictions Affected
		Capital (thousands of dollars)	Average Annual Operation and Maintenance (thousands of dollars)	Low	Moderate	High		Enhanced Preparedness/Protection	Reduced Property Damage	Reduced Injuries	Reduced Mortalities		
Flooding and Related Stormwater Drainage Problems ^e (continued)	Lake Michigan Direct Drainage Watershed (continued)												
	Lake Michigan Coast						--						
	• Removal of eight structures ^{f,k,l}	\$1,222.1	--	--	--	X	6.4	X	X	X	X	5	Kenosha County and Village of Pleasant Prairie
	<u>Stormwater Management Plan Element</u>												
	• Stormwater management plans ^l	-- ^u	-- ^u	X	--	--	--	X	X	--	--	3	Kenosha County; City of Kenosha; Villages of Bristol, Paddock Lake, Pleasant Prairie, Silver Lake, Somers, and Twin Lakes; and Towns of Brighton, Paris, Randall, Salem, Somers, and Wheatland ¹
	• Stormwater-related regulations ^l	-- ^v	-- ^v	--	--	--	--	X	X	--	--	3	Kenosha County; City of Kenosha; Villages of Bristol, Paddock Lake, Pleasant Prairie, Silver Lake, Somers, and Twin Lakes; and Towns of Brighton, Paris, Randall, Salem, Somers, and Wheatland ¹
	<u>Public Information and Education Element</u>												
	• Public education activities	-- ^w	-- ^w	X	--	--	--	X	--	--	--	4	Kenosha County; City of Kenosha; Villages of Bristol, Paddock Lake, Pleasant Prairie, Silver Lake, Somers, and Twin Lakes; and Towns of Brighton, Paris, Randall, Salem, Somers, and Wheatland ¹
	• Public participation activities and coordination with other agencies and units of government	-- ^w	-- ^w	X	--	--	--	X	--	--	--	4	Kenosha County; City of Kenosha; Villages of Bristol, Paddock Lake, Pleasant Prairie, Silver Lake, Somers, and Twin Lakes; and Towns of Brighton, Paris, Randall, Salem, Somers, and Wheatland ¹

Hazard	Mitigation Measures	Estimated Cost ^a		Costs of Implementation ^b			Estimated Average Annual Benefits from Flood Damage Reduction (thousands of dollars) ^c	Direct Benefits				Indirect Benefits ^d	Community/Jurisdictions Affected
		Capital (thousands of dollars)	Average Annual Operation and Maintenance (thousands of dollars)	Low	Moderate	High		Enhanced Preparedness/Protection	Reduced Property Damage	Reduced Injuries	Reduced Mortalities		
Flooding and Related Stormwater Drainage Problems ^e (continued)	Secondary Plan Element												
	• National Flood Insurance Program and map updating	--g	--g	X	--	--	--	X	X	--	--	3	Kenosha County; City of Kenosha; Villages of Bristol, Paddock Lake, Pleasant Prairie, Silver Lake, Somers, and Twin Lakes; and Towns of Brighton, Paris, Randall, Salem, Somers, and Wheatland ¹
	• Lending institution and real estate agent policies ^f	--g	--g	X	--	--	--	X	X	--	--	3	Kenosha County; City of Kenosha; Villages of Bristol, Paddock Lake, Pleasant Prairie, Silver Lake, Somers, and Twin Lakes; and Towns of Brighton, Paris, Randall, Salem, Somers, and Wheatland ¹
	• Channel maintenance	--g	--g	X	--	--	--	X	X	--	--	3	Kenosha County; City of Kenosha; Villages of Bristol, Paddock Lake, Pleasant Prairie, Silver Lake, Somers, and Twin Lakes; and Towns of Brighton, Paris, Randall, Salem, Somers, and Wheatland ¹
	• Stormwater management facilities maintenance	--g	--g	X	--	--	--	X	X	--	--	3	Kenosha County; City of Kenosha; Villages of Bristol, Paddock Lake, Pleasant Prairie, Silver Lake, Somers, and Twin Lakes; and Towns of Brighton, Paris, Randall, Salem, Somers, and Wheatland ¹
	• Survey of buildings near flood hazard areas ^g	434.2	--	--	X	--	--	X	X	--	--	3	Kenosha County; City of Kenosha; Villages of Bristol, Paddock Lake, Pleasant Prairie, Silver Lake, Somers, and Twin Lakes; and Towns of Brighton, Paris, Randall, Salem, Somers, and Wheatland ¹
Thunderstorm, High-Wind, Hail, and Lightning Hazards	Maintain and potentially expand the early warning and communication systems, with emphasis on NOAA All Hazard Weather Radio, EAS broadcasts, and expanded use of emergency technologies	--x	--x,y	--	X	--	--	X	--	--	--	5	Kenosha County and all local jurisdictions ²
	Promote educational and informational programming, especially related to the early warning network, and to individual actions to protect citizens, property, and businesses	--w	--w	X	--	--	--	X	--	--	--	5	Kenosha County and all local jurisdictions ²
	Encourage provision of safe rooms	--x	--x	X	--	--	--	X	--	X	X	5	Kenosha County and all local jurisdictions ²
	Work with municipalities and businesses to explore installation of community safe rooms and hardening projects for community facilities, businesses, and manufacturers	--aa	--aa	--	X	--	--	--	X	--	X	X	5

Hazard	Mitigation Measures	Estimated Cost ^a		Costs of Implementation ^b			Estimated Average Annual Benefits from Flood Damage Reduction (thousands of dollars) ^c	Direct Benefits				Indirect Benefits ^d	Community/Jurisdictions Affected
		Capital (thousands of dollars)	Average Annual Operation and Maintenance (thousands of dollars)	Low	Moderate	High		Enhanced Preparedness/Protection	Reduced Property Damage	Reduced Injuries	Reduced Mortalities		
Thunderstorm, High-Wind, Hail, and Lightning Hazards (continued)	Consideration by municipalities of adopting mobile home park regulations with the requirement that community safe rooms be provided for residents of new and expanding mobile home parks	--x	--x	x	--	--	--	x	--	x	x	5	Kenosha County and all local jurisdictions ²
	Based on community and landowner interest, pursue grant funding for installation of safe rooms in existing mobile home parks	--aa	--aa	--	--	x	--	x	--	x	x	5	Kenosha County, City of Kenosha; Villages of Bristol, Pleasant Prairie, Silver Lake, and Somers; Towns of Brighton, Salem, Somers, and Wheatland ¹
	Encourage agricultural producers to purchase crop insurance	--g	--g	x	--	--	--	x	x	x	x	1	Kenosha County
	Continue to conduct annual weather spotter training	--g	--g	x	--	--	--	x	--	--	--	5	Kenosha County
	Continue coordination of emergency operations and response plans among governmental units and first responders	--g	--g	x	--	--	--	x	--	--	--	5	Kenosha County and all local jurisdictions ²
Tornadoes	Maintain and potentially expand the early warning and communication systems, with emphasis on NOAA All Hazard Weather Radio, EAS broadcasts, and expanded use of emergency technologies	--x	--x,y	--	x	--	--	x	--	x	x	5	Kenosha County and all local jurisdictions ²
	Retrofit existing or install new structures to ensure adequate shelters from tornadoes for public buildings, major industrial sites, mobile home parks, and other large businesses or complexes such as shopping malls, fairgrounds, and other vulnerable public areas	--aa	--aa	--	x	--	--	x	x	x	x	5	Kenosha County and all local jurisdictions ²
	Work with municipalities and businesses to explore installation of community safe rooms and hardening projects for community facilities, businesses, and manufacturers	--aa	--aa	--	x	--	--	x	--	x	x	5	Kenosha County and all local jurisdictions ²
	Consideration by municipalities of adopting mobile home park regulations with the requirement that community safe rooms be provided for residents of new and expanding mobile home parks	--x	--x	x	--	--	--	x	--	x	x	5	Kenosha County and all local jurisdictions ²
	Based on community and landowner interest, pursue grant funding for installation of safe rooms in existing mobile home parks	--aa	--aa	--	--	x	--	x	--	x	x	5	Kenosha County, City of Kenosha; Villages of Bristol, Pleasant Prairie, Silver Lake, and Somers; Towns of Brighton, Salem, Somers, and Wheatland ¹

Hazard	Mitigation Measures	Estimated Cost ^a		Costs of Implementation ^b			Estimated Average Annual Benefits from Flood Damage Reduction (thousands of dollars) ^c	Direct Benefits				Indirect Benefits ^d	Community/Jurisdictions Affected
		Capital (thousands of dollars)	Average Annual Operation and Maintenance (thousands of dollars)	Low	Moderate	High		Enhanced Preparedness/Protection	Reduced Property Damage	Reduced Injuries	Reduced Mortalities		
Tornadoes (continued)	Promote educational and informational programming, especially related to the early warning network, and to individual actions to protect citizens, property, and businesses	-- ^w	-- ^w	X	--	--	--	X	--	--	--	5	Kenosha County and all local jurisdictions ²
	Continue to conduct annual weather spotter training	-.9	-.9	X	--	--	--	X	--	--	--	5	Kenosha County
	Enforce building code ordinance requirements	-.9	-.9	X	--	--	--	X	X	X	X	5	Kenosha County; the City of Kenosha; and Villages of Bristol, Paddock Lake, Pleasant Prairie, Silver Lake, Somers, and Twin Lakes ¹
	Continue coordination of emergency response and operations plans among governmental units and first responders	-.9	-.9	X	--	--	--	X	--	--	--	5	Kenosha County and all local jurisdictions ²
Extreme Temperature Events	Organize neighborhood outreach groups who look after vulnerable groups and individuals	-- ^x	-- ^x	X	--	--	--	X	--	--	--	5	Kenosha County and all local jurisdictions ²
	Provide special arrangements for payment of heating bills	-- ^x	-- ^x	X	--	--	--	X	--	--	--	5	Kenosha County and all local jurisdictions ²
	Identify and advertise a list of available heating and/or cooling shelters in the immediate area	-- ^w	-- ^w	X	--	--	--	X	--	--	--	5	Kenosha County and all local jurisdictions ²
	Maintain, update, and upgrade early warning systems and networks. As part of this increase coverage and use of NOAA All Hazard Weather Radio and EAS broadcasts	-- ^x	-- ^x	X	--	--	--	X	--	--	X	5	Kenosha County and all local jurisdictions ²
	Promote educational and informational programming	-- ^w	-- ^w	X	--	--	--	X	--	--	--	5	Kenosha County and all local jurisdictions ²
Lake Michigan Coastal Hazards	Continue enforcement of the County shoreland zoning ordinance	-.9	-.9	X	--	--	--	X	X	X	X	5	Kenosha County, City of Kenosha, Village of Pleasant Prairie, and Village of Somers
	Review of Lake Michigan shoreline municipal shoreland ordinances ³	-.9	-.9	X	--	--	--	X	X	X	X	5	Kenosha County, City of Kenosha, Village of Pleasant Prairie, and Village of Somers
	Develop a cooperative program to assess the effectiveness of Lake Michigan shoreline protection structures in the County	21.3	--	X	--	--	--	X	--	--	--	3	Kenosha County, City of Kenosha, Village of Pleasant Prairie, and Village of Somers
	Continue construction and maintenance of shoreline protection structures	-- ^{aa}	-- ^{aa}	--	X	--	--	X	X	--	--	3	Kenosha County, City of Kenosha, Village of Pleasant Prairie, and Village of Somers
	Continue ongoing programs to update and refine coastal hazard area data using geographic information system technology ^f	16.9	--	X	--	--	--	X	--	--	--	3	Kenosha County, City of Kenosha, Village of Pleasant Prairie, and Village of Somers

Hazard	Mitigation Measures	Estimated Cost ^a		Costs of Implementation ^b			Estimated Average Annual Benefits from Flood Damage Reduction (thousands of dollars) ^c	Direct Benefits				Indirect Benefits ^d	Community/Jurisdictions Affected
		Capital (thousands of dollars)	Average Annual Operation and Maintenance (thousands of dollars)	Low	Moderate	High		Enhanced Preparedness/Protection	Reduced Property Damage	Reduced Injuries	Reduced Mortalities		
Lake Michigan Coastal Hazards (continued)	Provide public informational and educational programming	-- ^w	-- ^w	X	--	--	--	X	--	--	--	5	Kenosha County, City of Kenosha, Village of Pleasant Prairie, and Village of Somers
Winter Storm Events	Organize neighborhood outreach groups who look after vulnerable groups and individuals	-- ^x	-- ^x	X	--	--	--	X	--	--	--	5	Kenosha County and all local jurisdictions ²
	Provide special arrangements for payment of heating bills	-- ^x	-- ^x	X	--	--	--	X	--	--	--	5	Kenosha County and all local jurisdictions ²
	Identify and advertise a list of available heated shelters in the immediate area	-- ^w	-- ^w	X	--	--	--	X	--	--	--	5	Kenosha County and all local jurisdictions ²
	Maintain, update, and upgrade public early warning systems and networks. As part of this, increase coverage and use of NOAA All Hazard Weather Radio and EAS broadcasts	-- ^x	-- ^{x,y}	--	X	--	--	--	X	--	X	5	Kenosha County and all local jurisdictions ²
	Promote educational and informational programming	-- ^w	-- ^w	X	--	--	--	X	--	--	--	5	Kenosha County and all local jurisdictions ²
	Ongoing enforcement of building code ordinance requirements	-- ^g	-- ^g	X	--	--	--	X	X	X	X	5	Kenosha County; City of Kenosha; and Villages of Bristol, Paddock Lake, Pleasant Prairie, Silver Lake, Somers, and Twin Lakes ¹
	Work with agencies to establish a system for short-term sheltering	-- ^x	-- ^x	X	--	--	--	X	--	--	--	5	Kenosha County and all local jurisdictions ²
	Continue coordination of emergency response plans among governmental units and first responders	-- ^g	-- ^g	X	--	--	--	X	--	--	--	5	Kenosha County and all local jurisdictions ²
	Continue and refine State, County, and local road maintenance programs	-- ^g	-- ^g	X	--	--	--	X	--	--	--	5	Kenosha County and all local jurisdictions ²
	Work with utilities to assess and improve electrical service reliability	-- ^g	-- ^g	X	--	--	--	X	--	--	--	5	Kenosha County and all local jurisdictions ²
Drought Events	Encourage the development and maintenance of drought emergency plans for local utilities and communities	-- ^x	-- ^x	X	--	--	--	X	--	--	--	2	Kenosha County and all local jurisdictions ²
	Encourage the development of local water conservation programs	-- ^c	66.9 ^{bb}	X	--	--	--	X	--	--	--	2	City of Kenosha, Villages of Bristol, Paddock Lake, Pleasant Prairie, and Somers
	Encourage multi-agency approaches to drought planning, water conservation, drought prediction, and stream and ground water monitoring	-- ^x	-- ^x	X	--	--	--	X	--	--	--	4	Kenosha County and all local jurisdictions ²
	Promote educational and informational programming	-- ^w	-- ^w	X	--	--	--	X	--	--	--	3	Kenosha County and all local jurisdictions ²

Hazard	Mitigation Measures	Estimated Cost ^a		Costs of Implementation ^b			Estimated Average Annual Benefits from Flood Damage Reduction (thousands of dollars) ^c	Direct Benefits				Indirect Benefits ^d	Community/Jurisdictions Affected
		Capital (thousands of dollars)	Average Annual Operation and Maintenance (thousands of dollars)	Low	Moderate	High		Enhanced Preparedness/Protection	Reduced Property Damage	Reduced Injuries	Reduced Mortalities		
Drought Events (continued)	Support agricultural programs that promote soil health, preserve soil moisture, and help to minimize loss of crops and topsoil in the event of a drought	--g	--g	X	--	--	--	X	--	--	--	3	Kenosha County and all local jurisdictions ^z
	Evaluate and design water supply systems that are not vulnerable to drought	--aa	--aa	X	--	--	--	X	--	--	--	3	Kenosha County and all local jurisdictions ^z
	Encourage farm operators to evaluate the economics of crop insurance programs	--aa	--aa	X	--	--	--	X	--	--	--	3	Kenosha County and all local jurisdictions ^z
Fog	Organize neighborhood outreach groups who look after vulnerable groups and individuals	--x	--x	X	--	--	--	X	--	--	--	5	Kenosha County and all local jurisdictions ^z
	Maintain, update, and upgrade public early warning systems and networks. As part of this, increase coverage and use of NOAA All Hazard Weather Radio and EAS broadcasts	--x	--xy	--	X	--	--	X	--	X	X	5	Kenosha County and all local jurisdictions ^z
	Increase public education and awareness of the potential severity of hazardous fog events	--w	--w	X	--	--	--	X	--	--	--	5	Kenosha County and all local jurisdictions ^z
	Produce and distribute emergency preparedness information related to fog events	--w	--w	X	--	--	--	X	--	--	--	5	Kenosha County and all local jurisdictions ^z
Fire	Promote activities that physically stop the spread of fire	--x	--x	X	--	--	--	X	X	X	X	5	Kenosha County and all local jurisdictions ^z
	Promote emergency restrictions on fire causing activities	--x	--x	X	--	--	--	X	X	X	X	5	Kenosha County and all local jurisdictions ^z
	Offer training and exercises for local and regional fire fighters and acquire additional fire equipment	--x	--x	X	--	--	--	X	X	X	X	5	Kenosha County; City of Kenosha; Villages of Bristol, Paddock Lake, Pleasant Prairie, Silver Lake, and Twin Lakes; and Towns of Brighton, Bristol, Paris, Randall, Salem, Somers, and Wheatland ^h
	Map hazard areas and vulnerable structures	--x	--x	--	X	--	--	X	X	X	X	5	Kenosha County; City of Kenosha; Villages of Bristol, Paddock Lake, Pleasant Prairie, Silver Lake, Somers, and Twin Lakes; and Towns of Brighton, Paris, Randall, Salem, Somers, and Wheatland ^h
	Support fire prevention, education, and enforcement programs, and enhance fire hazard awareness for landowners and visitors	--w	--w	X	--	--	--	X	--	--	--	5	Kenosha County and all local jurisdictions ^x

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Transportation Accident-Related Events	Adopt and implement the recommendations made in the VISION 2050 Regional land use and transportation system plan related to monitoring and improving the transportation system through design, routing, and traffic control problem areas including:						--						
	Expand the use of emergency vehicle preemption traffic signals	--cc	--	--	X	--	--	X	--	--	--	3, 5	Kenosha County and all local jurisdictions ²
	Consider and implement intersection improvements such as two-or four-way stop control, roundabouts, or signalization at arterial street and highway intersections	--x	--	--	X	--	--	X	--	--	--	3, 5	Kenosha County and all local jurisdictions ²
	Continue and expand the use of closed circuit television cameras (CCTV) on heavily traveled freeways, highways, and arterial streets	--dd	--dd	--	X	--	--	X	--	--	--	3, 5	Kenosha County and all local jurisdictions ²
	Continue and expand the use of advisory information measures including variable message signs (VMS) on the freeway system and at appropriate arterial street and highway locations	--ee	--ee	--	X	--	--	X	--	--	--	3, 5	Kenosha County and all local jurisdictions ²
	Consider expanding the use of ramp closure gates to allow for rapid closure of freeway on-ramps during major traffic incidents, inclement weather, or special events	--ff	--ff	--	X	--	--	X	--	--	--	3, 5	Kenosha County; City of Kenosha; Villages of Bristol and Pleasant Prairie; and Towns of Paris and Somers
	Consider providing bicycle accommodations through bicycle lanes, paved shoulders, widened outside travel lanes, or enhanced bicycle facilities, where feasible when existing surface arterial street system is resurfaced and reconstructed and as new surface arterial roads are constructed	--aa	--	--	X	--	--	--	--	X	X	3	Kenosha County and all local jurisdictions ²
	Expand the use of freeway service patrols to include Kenosha County	--aa	--	--	X	--	--	X	--	--	--	3, 5	Kenosha County; City of Kenosha; Villages of Bristol and Pleasant Prairie; and Towns of Paris and Somers
	Promote educational and informational programming, especially related to driver safety, and to individual actions to protect citizens, property, and businesses	--g	--g	X	--	--	--	X	--	--	--	5	Kenosha County and all local jurisdictions ²

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Transportation Accident-Related Events (continued)	Continue to monitor and improve the transportation system through design, routing, and traffic control at problem areas	--.9	--.9	X	--	--	--	X	X	X	X	5	Kenosha County and all local jurisdictions ²
	Expand the use of emergency vehicle preemption at traffic signals	--.00	--	--	X	--	--	X	X	X	X	5	Kenosha County and all local jurisdictions ²
	Continue to promote traffic-related law enforcement including enforcement for traffic violations, weight and travel restrictions, designated truck routes, distracted driving, and use of safety restraints	--.9	--.9	X	--	--	--	X	X	X	X	5	Kenosha County and all local jurisdictions ²
	Continue to evaluate and refine safety components of railway facilities	--.9	--.9	X	--	--	--	X	X	X	X	5	Kenosha County; City of Kenosha; Villages of Pleasant Prairie, Silver Lake, and Somers, and Towns of Salem, Somers, and Wheatland
	Continue to evaluate and refine safety components of airport facilities	--.9	--.9	X	--	--	--	X	X	X	X	5	Kenosha County, City of Kenosha, and Towns of Salem and Randall
	Continue to support training, state-of-the-art equipment, planning, and preparedness of first responders, as well as search and rescue teams	--.9	--.9	X	--	--	--	X	--	--	--	5	Kenosha County and all local jurisdictions ²
	Continue to coordinate emergency response plans among governmental units and first responders	--.9	--.9	X	--	--	--	X	--	--	--	5	Kenosha County and all local jurisdictions ²
Contamination or Loss of Water Supply	Promote educational and informational programming related to water safety issues	--.U	--.U	X	--	--	--	X	--	--	--	5	Kenosha County and all local jurisdictions ²
	Encourage multi-agency approaches to water conservation, loss and contamination prevention and trend-monitoring	--.X	--.X	X	--	--	--	X	--	--	--	4	Kenosha County and all local jurisdictions ²
	Prepare emergency operation and emergency drinking water supply plans for each public water supply system	--.X	--.X	--	X	--	--	X	--	--	--	5	Kenosha County, City of Kenosha, and Villages of Bristol, Paddock Lake, Pleasant Prairie, and Somers
	Continue coordination of emergency response plans among governmental units and first responders	--.9	--.9	X	--	--	--	X	--	--	--	5	Kenosha County and all local jurisdictions ²
	Develop and implement plans to systematically replace publically owned water service lines and other public water supply infrastructure that are known to contain lead	--.X,99	--.X,99	--	--	X	--	X	--	X	--	2, 5	Kenosha County, City of Kenosha, and Villages of Bristol, Paddock Lake, Pleasant Prairie, and Somers

Hazard	Mitigation Measures	Estimated Cost ^a		Costs of Implementation ^b			Estimated Average Annual Benefits from Flood Damage Reduction (thousands of dollars) ^c	Direct Benefits				Indirect Benefits ^d	Community/Jurisdictions Affected
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Contamination or Loss of Water Supply (continued)	Educate the public on, and promote the replacement of, privately owned portions of water service lines and other plumbing fixtures that contain lead. Pursue available funding opportunities to help offset the cost of these improvements to residents	--x,hh,ii	--x,hh,ii	--	X	--	--	X	--	X	--	2, 5	Kenosha County and all local jurisdictions ²
	Promote the use of water filtration devices on drinking water sources in homes where there are known lead service lines, lead plumbing, or lead fixtures and where replacement of the lead service line or plumbing fixture is not currently feasible	--x,hh,jj,kk	--x,hh,jj,kk	X	--	--	--	X	--	X	--	2, 5	Kenosha County and all local jurisdictions ²
	Prepare, update, and implement wellhead protection plans	--x	--x	X	--	--	--	X	--	--	--	5	Kenosha County, Villages of Bristol and Paddock Lake
Hazardous Material Events	Continue participation in the Wisconsin Hazardous Materials Response System	--g	--g	X	--	--	--	X	--	--	--	5	Kenosha County and all local jurisdictions ²
	Promote educational and informational programming related to hazardous material safety, and to individual actions to protect citizens, property, and businesses	--w	--w	X	--	--	--	X	--	--	--	5	Kenosha County and all local jurisdictions ²
	Promote development of site emergency plans for schools, factories, office buildings, shopping malls, hospitals, and other appropriate sites that produce, store, or utilize hazardous materials or that are near fixed facilities or transportation routes where hazardous materials are produced, used, stored, or transported	--w	--w	X	--	--	--	X	--	--	--	3, 5	Kenosha County and all local jurisdictions ²
	Promote community and operator compliance with industry safety regulations and standards	--g	--g	X	--	--	--	X	X	X	X	5	Kenosha County and all local jurisdictions ²
	Promote ongoing enforcement of Federal, State, and County regulatory standards	--w	--w	X	--	--	--	X	X	X	X	5	Kenosha County and all local jurisdictions ²
	Support existing or consider expansion of household waste management control programs, which should include hazardous material disposal sites for public citizens	--x	--x	X	--	--	--	X	--	--	--	5	Kenosha County and all local jurisdictions ²

Hazard	Mitigation Measures	Estimated Cost ^a		Costs of Implementation ^b			Estimated Average Annual Benefits from Flood Damage Reduction (thousands of dollars) ^c	Direct Benefits				Indirect Benefits ^d	Community/Jurisdictions Affected
		Capital (thousands of dollars)	Average Annual Operation and Maintenance (thousands of dollars)	Low	Moderate	High		Enhanced Preparedness/Protection	Reduced Property Damage	Reduced Injuries	Reduced Mortalities		
Hazardous Material Events (continued)	Promote continued maintenance and upgrading of transportation infrastructure carrying shipments of hazardous cargo	--X	--X	X	--	--	--	X	--	--	--	3, 5	Kenosha County and all local jurisdictions ²
	Educate businesses and those utilizing hazardous materials of their responsibilities	--X	--X	X	--	--	--	X	--	--	--	3, 5	Kenosha County and all local jurisdictions ²
	Continue support of training, equipment, planning, and preparedness of first responders for mass casualty incidents involving hazardous materials at fixed facilities and transportation systems. Training should include refresher training.	--X	--X	X	--	--	--	X	--	--	--	5	Kenosha County and all local jurisdictions ²
	Continue coordination of emergency response plans among governmental units, businesses, and first responders	--X	--X	X	--	--	--	X	--	--	--	5	Kenosha County and all local jurisdictions ²
Terrorism Incidents	Maintain, update, and upgrade public early warning systems and networks. As part of this, increase coverage and use of NOAA All Hazard Weather Radio and EAS broadcasts	--X	--X ^y	--	X	--	--	X	--	X	X	5	Kenosha County and all local jurisdictions ²
	Continue and expand educational and informational programming related to public health and safety issues due to terrorist incidents	--W	--W	X	--	--	--	X	--	--	--	5	Kenosha County and all local jurisdictions ²
	Consider the need to strengthen public health infrastructure to support surveillance, response, reporting, and research, and to implement prevention and control programs from potential chemical and bio-terrorism attacks	--X	--X	--	X	--	--	X	--	--	--	5	Kenosha County and all local jurisdictions ²
	Continue maintenance and potentially enhance security measures at water treatment facilities, including increased pathogen and chemical monitoring and emergency drinking water supply source alternative planning	--X	--X	--	X	--	--	X	--	X	X	5	Kenosha County and all local jurisdictions ²
	Continue support of training, equipment, planning, and preparedness for local law enforcement, fire and rescue departments, and other emergency management services	--X	--X	--	X	--	--	X	--	--	--	5	Kenosha County and all local jurisdictions ²

Hazard	Mitigation Measures	Estimated Cost ^a		Costs of Implementation ^b			Estimated Average Annual Benefits from Flood Damage Reduction (thousands of dollars) ^c	Direct Benefits				Indirect Benefits ^d	Community/Jurisdictions Affected
		Capital (thousands of dollars)	Average Annual Operation and Maintenance (thousands of dollars)	Low	Moderate	High		Enhanced Preparedness/Protection	Reduced Property Damage	Reduced Injuries	Reduced Mortalities		
Terrorism Incidents (continued)	Continue coordination of emergency response plans among Federal, State, and local governmental units, businesses, and emergency management services	--X	--X	X	--	--	--	X	--	--	--	5	Kenosha County and all local jurisdictions ^z
	Establish and train community emergency response team	--II	--II	--	X	--	--	X	--	--	--	5	Kenosha County and all local jurisdictions ^z
	Expand neighborhood watch program	--X	--X	X	--	--	--	X	--	--	--	5	Kenosha County and all local jurisdictions ^z
Power Outages	Continue to review and implement programs to improve reliability of power supply facilities	--g	--g	X	--	--	--	X	--	--	--	3	Kenosha County and all local jurisdictions ^x
	Coordinate activities and communication regarding prevention and response to power outages	--g	--g	X	--	--	--	X	--	--	--	5	Kenosha County and all local jurisdictions ^z
	Encourage backup power generation facilities	--g	--g	X	--	--	--	X	--	--	--	5	Kenosha County and all local jurisdictions ^z
	Continue and refine public informational and educational programming	--w	--w	X	--	--	--	X	--	--	--	3	Kenosha County and all local jurisdictions ^z
	Conduct outreach to businesses and facilities to encourage them to develop plans for dealing with and resuming operations after long-term power outages.	--g	--g	X	--	--	--	X	--	--	--	1	Kenosha County and all local jurisdictions ^z

^aAll costs expressed in 2014 dollars.

^bCost of implementation is allocated among three categories of low (less than \$100,000), moderate (greater than \$100,000 and less than \$1.0 million), and high (greater than \$1.0 million) costs that are generally defined as:

- Low: Educational and informational programming, ongoing enforcement of ordinances, plan development, and continued coordination/mutual aid/interagency agreements.
- Moderate: Addition of new staff, additional staff hours budgeted, additional equipment, new ordinance development, and new programs/task force.
- High: Major construction, new buildings (infrastructure), and capital programs.

^cThe estimated benefits are based upon the reduction average annual flood damages. The damage estimates were developed by the Commission staff based upon structure values, flood stage, and depth of flooding as described in Chapter III.

^dIndirect benefits represent a continuum of potential benefits that may occur as a result of the implementation of specific management actions. For example, implementation of informational programming, while not directly saving lives, may ultimately result in people having the knowledge necessary to save lives and protect property. These intangible benefits cannot be readily quantified and range from increased awareness to reduced loss of life and property, and have been assessed using the following relative cumulative scale:

- 1 = Increased awareness/preparedness
- 2 = Enhanced quality of life/social benefits
- 3 = Reduced property damage
- 4 = Increased environmental and recreational benefits/ecosystems services
- 5 = Reduced loss of life and injury with concomitant benefits for economic productivity

^eFor further details on the benefit-cost analysis of floodland mitigation refer to Tables IV-1 through IV-7.

^fThis mitigation measure is related but not essential to continued compliance with the requirements of the National Flood Insurance Program.

^gCosts covered under ongoing activity.

^hOn November 21, 2016 the Wisconsin Department of Administration approved a cooperative plan submitted by the Village of Silver Lake and the Town of Salem. Effective February 14, 2017 the two municipalities merged to become the Village of Salem Lakes.

ⁱCosts are included under Kenosha County Park and Open Space Plan Implementation. The costs are based on purchasing all recommended land for parks and open spaces. It should be noted that the protection of these areas could also be accomplished through conservation easements, conservation subdivisions, donations, and purchase or transfer of development rights. The costs to the County and local governments could be significantly reduced through the use of alternative methods of land acquisition, and through the use of available State and Federal funds for acquisition.

^jThis mitigation measure is the recommended alternative from SEWRPC Planning Report No. 12, A Comprehensive Plan for the Fox River Watershed, Volume Two, February 1970.

^kStructure floodproofing, elevation, or removal to be evaluated on a site-by-site basis and to be carried out at the discretion of property owners.

^lNumber of structures as of April 2015.

^mThis mitigation measure is the recommended alternative from SEWRPC Planning Report No. 9, A Comprehensive Plan for the Root River Watershed, July 1966.

ⁿThese mitigation measures are the recommended alternatives from SEWRPC Planning Report No. 35, A Comprehensive Plan for the Pike River Watershed, June 1983; SEWRPC Amendment to the Pike River Watershed Plan, City of Kenosha/Town of Somers, June 1987; and SEWRPC Amendment to the Pike River Watershed Plan, Kenosha and Racine Counties, March 1996.

^oThese mitigation measures are the recommended alternatives from SEWRPC Planning Report No. 44, A Comprehensive Plan for the Des Plaines River Watershed, June 2003.

^pCost to control runoff up to the 100-year event.

^qPrairie and wetland restoration to be carried out at discretion of property owners.

^rIncremental cost between control of two-year and 100-year events.

^sThe estimated benefit shown is the combined estimated benefit that would result from implementation of the recommended detention basin, sewer improvements, and structure removals.

^tAmount shown is the estimated amount prior to implementation in 2015 dollars.

^uCosts to be determined by each community based upon logical subwatershed area. Estimated cost is from \$1.2 to \$1.5 million countywide.

^vCost of ordinance development is covered under ongoing programs. Cost of implementation is not determined.

^wPortion of costs included in ongoing programs and construction project implementation. Additional cost of the hazard mitigation and public informational and educational programs is estimated to be \$24,200 per year.

^xCosts to be determined. Partially covered under ongoing programs.

^yCosts include annual subscription fee of \$11,000 for targeted alert notification service.

^zJurisdictions include general purpose units of government—Cities, Towns, and Villages—and special purpose units of government such as School Districts, Sanitary and Utility Districts, Public Inland Lake Protection and Rehabilitation Districts, and Agricultural Drainage Districts.

^{aa}Costs are site-specific and survey is needed for countywide estimate.

^{bb}Costs shown are the estimated annual costs of water supply programs for existing water utilities in the County given in SEWRPC PR No. 52, A Regional Water Supply Plan for Southeastern Wisconsin, December 2010.

^{cc}Estimated cost for emergency vehicle preemption at one four-way intersection is about \$8,200.

^{dd}Estimated equipment and installation cost for one closed circuit television system ranges from \$50,000 to \$65,000. Average annual operation and maintenance cost for a single unit is approximately \$1,500.

^{ee}Estimated equipment and installation cost for one variable message sign (VMS) ranges from \$35,000 to \$75,000 at an arterial highway location, from \$80,000 to \$90,000 for a ground-mount system at a freeway location, and from \$180,000 to \$200,000 for an overhead system at a freeway location. Average annual operation and maintenance costs for a single VMS unit are about \$2,200.

^{ff}Estimated equipment and installation cost for one ramp closure gate ranges from \$10,000 to \$15,000. Note that this is the cost of one gate and that one or two gates are typically installed at one freeway entrance ramp. Average annual operations and maintenance for a single ramp closure gate is estimated to be \$400.

^{gg}Estimated cost for replacement of a utility-owned portion of a water service line is about \$6,000. The cost is dependent upon the length of the pipe and other factors.

^{hh}Homes constructed prior to 1951 are more likely to have lead water supply service lines.

ⁱⁱEstimated cost for replacement of a typical privately-owned portion of a water service line is between \$3,500 and \$7,000. The cost is dependent upon the length of the pipe and other factors.

^{jj}Private property costs to be expended as needs arise.

^{kk}Costs of an NSF-certified lead removal filter can vary greatly. Typical costs range between about \$20 and \$130 for a pour-through pitcher-style filter, about \$20 and \$200 for faucet-mounted systems, and about \$80 and \$500 for counter-top systems. The recommended filter change cycle varies from one product to another.

^{ll}Costs to be determined.

Source: SEWRPC.

Chapter V

HAZARD MITIGATION STRATEGIES

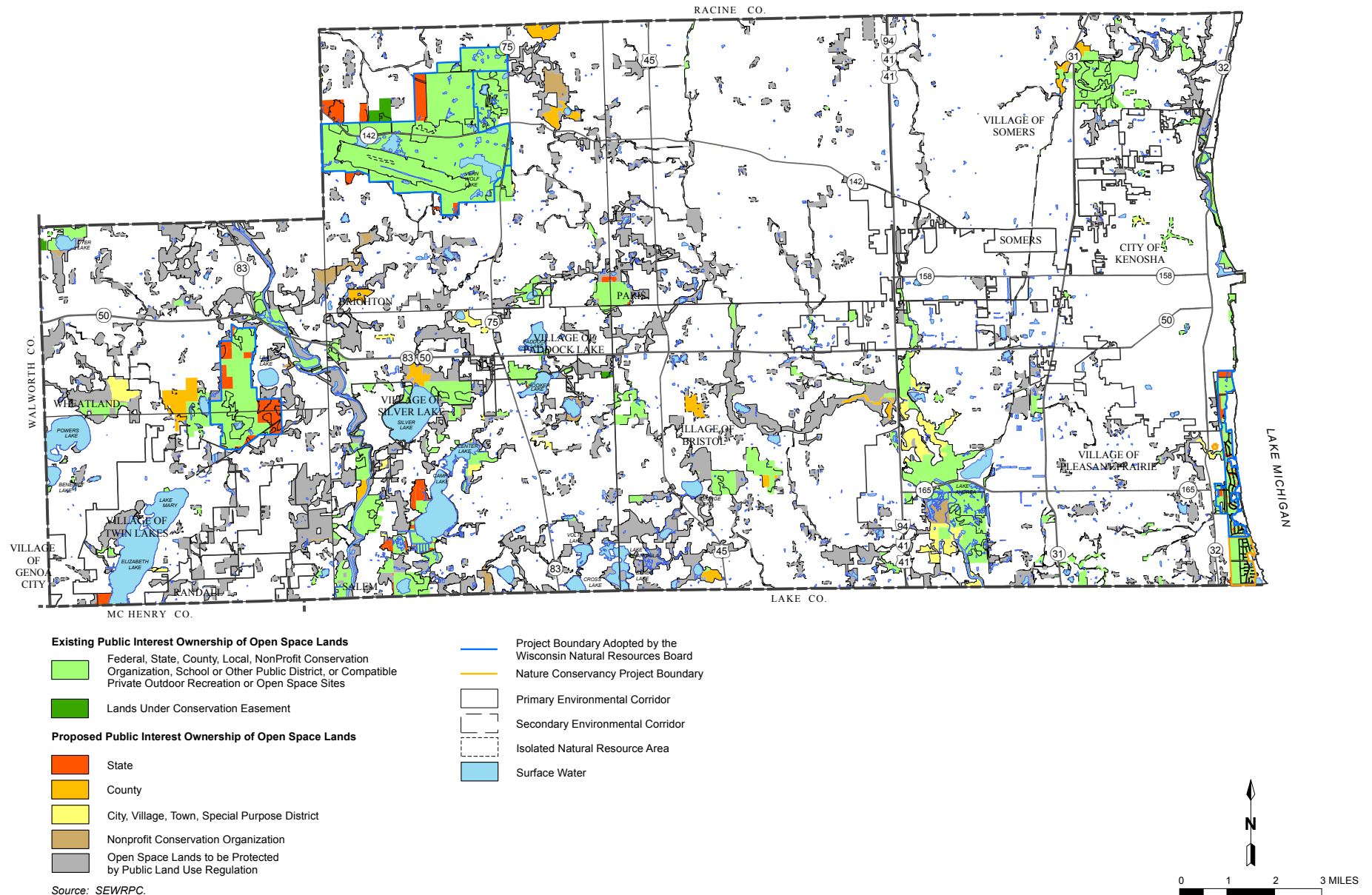
MAPS

KENOSHA CO CH-3 TABLES DRAFT (00224156).DOC
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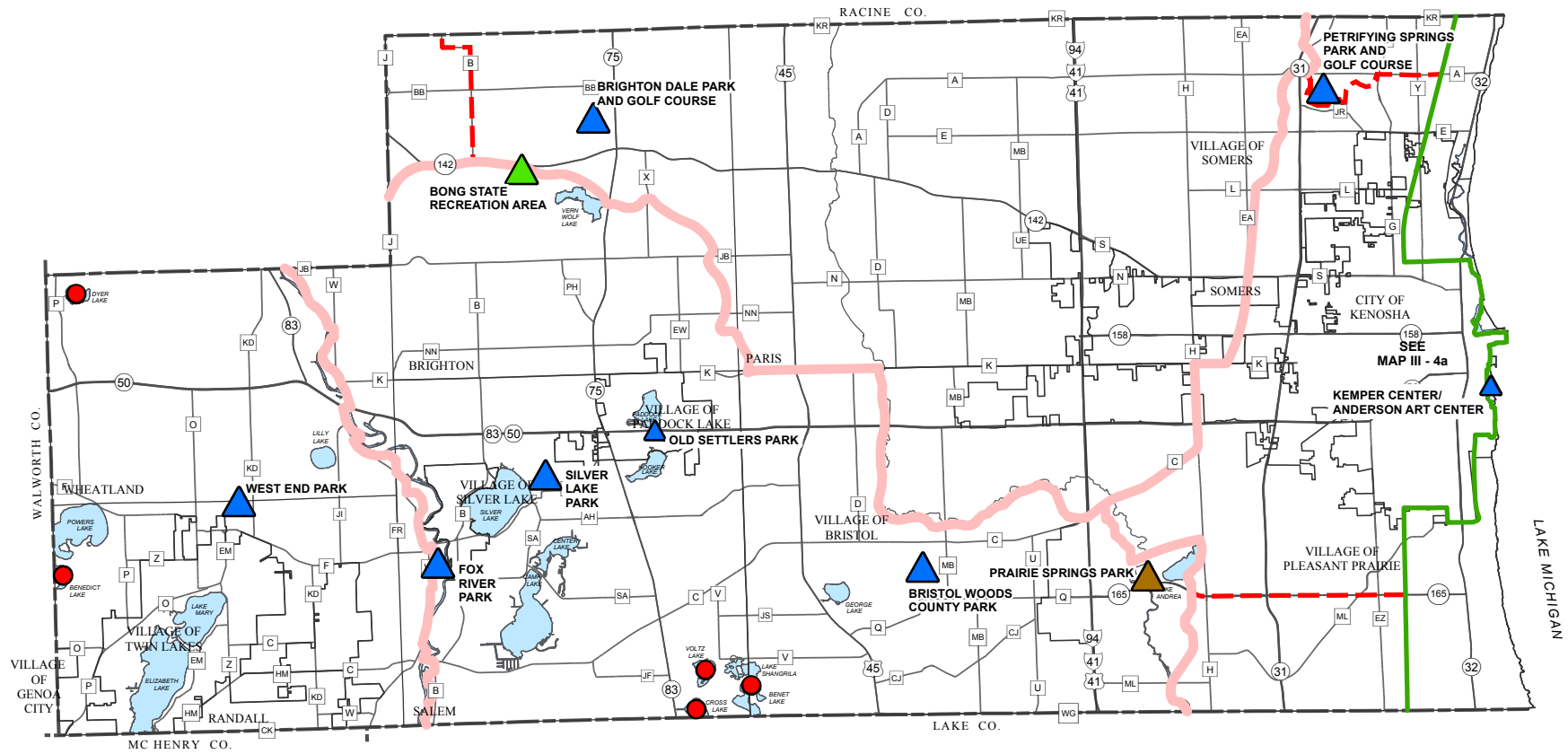
Map V - 1

OPEN SPACE PRESERVATION ELEMENT OF THE KENOSHA COUNTY PARK AND OPEN SPACE PLAN: 2035

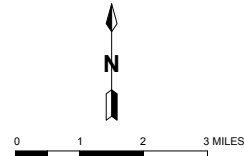


Map V - 2

OUTDOOR RECREATION ELEMENT OF THE KENOSHA COUNTY PARK AND OPEN SPACE PLAN: 2035



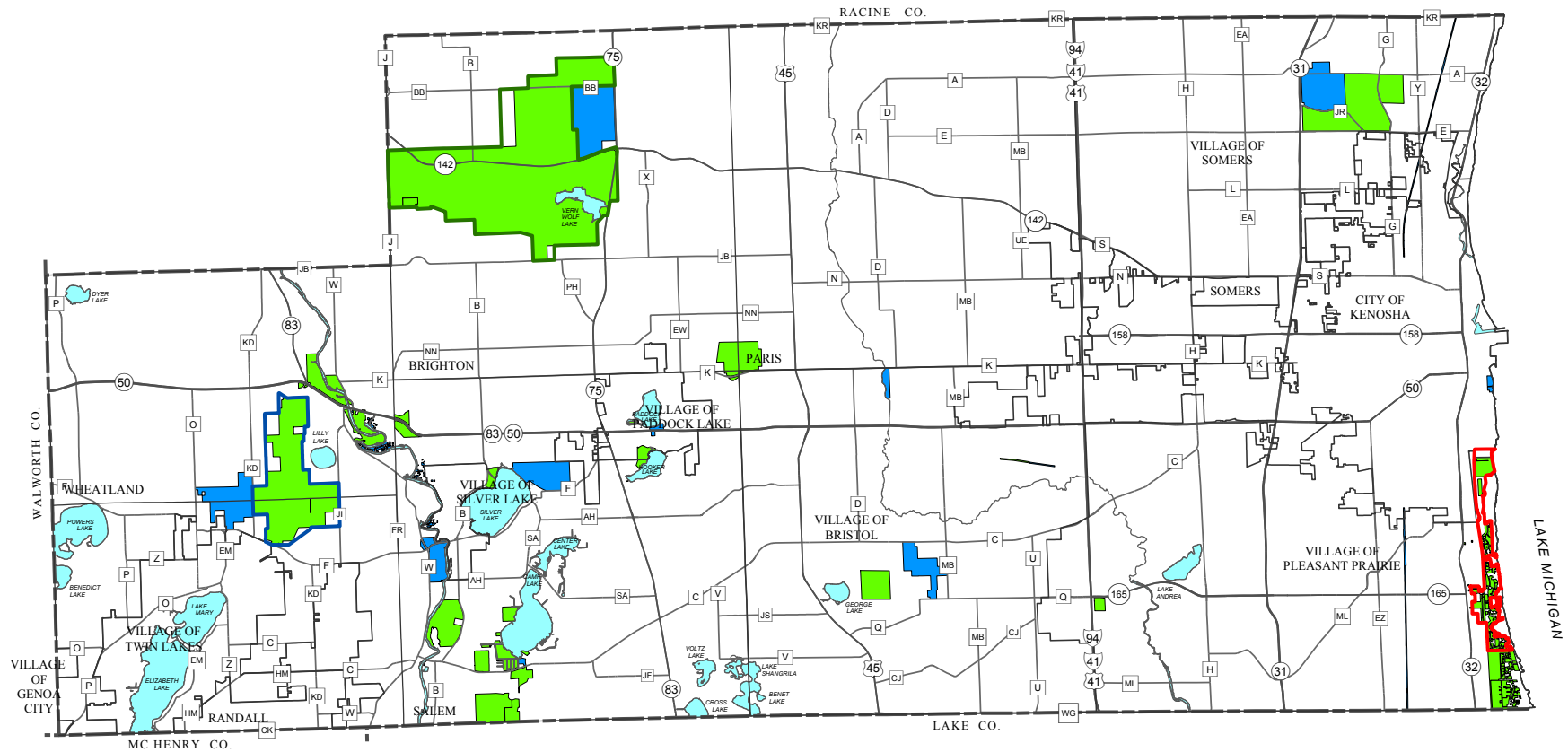
- | | | |
|--------------------|--------------------|--|
| MAJOR PARKS | OTHER PARKS | RECREATION CORRIDORS |
| COUNTY | COUNTY | EXISTING RECREATION TRAIL |
| STATE | | PROPOSED RECREATION TRAIL (GENERAL LOCATION) |
| LOCAL | | PROPOSED CONNECTION TRAIL (GENERAL LOCATION) |
| | | BOAT ACCESS FACILITIES |
| | | LAKE NEEDING NEW OR EXPANDED FACILITY |



Source: SEWRPC.

Map V - 3

KENOSHA COUNTY AND STATE OF WISCONSIN PARK AND OPEN SPACE SITES: 2016

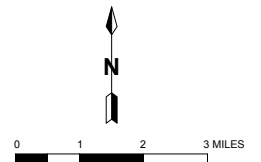


- STATE OWNED SITES
- COUNTY OWNED SITES

**WISCONSIN DEPARTMENT OF NATURAL RESOURCES
PROJECT BOUNDARIES**

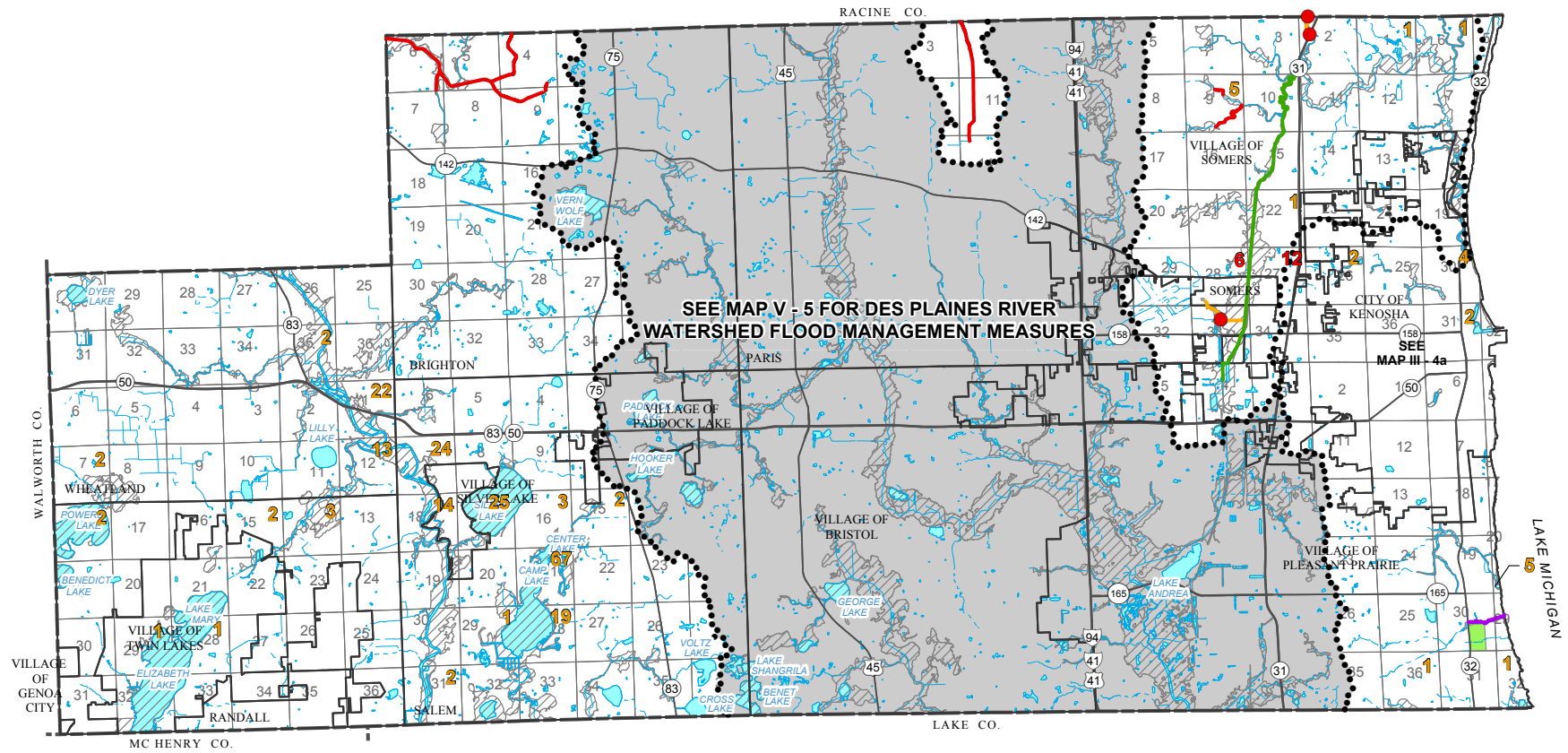
- BONG STATE RECREATION AREA
- CHIWAUKEE PRAIRIE - CAROL BEACH PRAIRIE
- NEW MUNSTER WILDLIFE AREA














Source: Wisconsin Department of Natural Resources, Kenosha County, and SEWRPC.



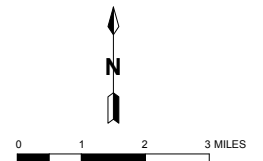
Map V - 4

RECOMMENDED FLOODPLAIN MANAGEMENT MEASURES FOR THE KENOSHA COUNTY HAZARD MITIGATION PLAN: 2017

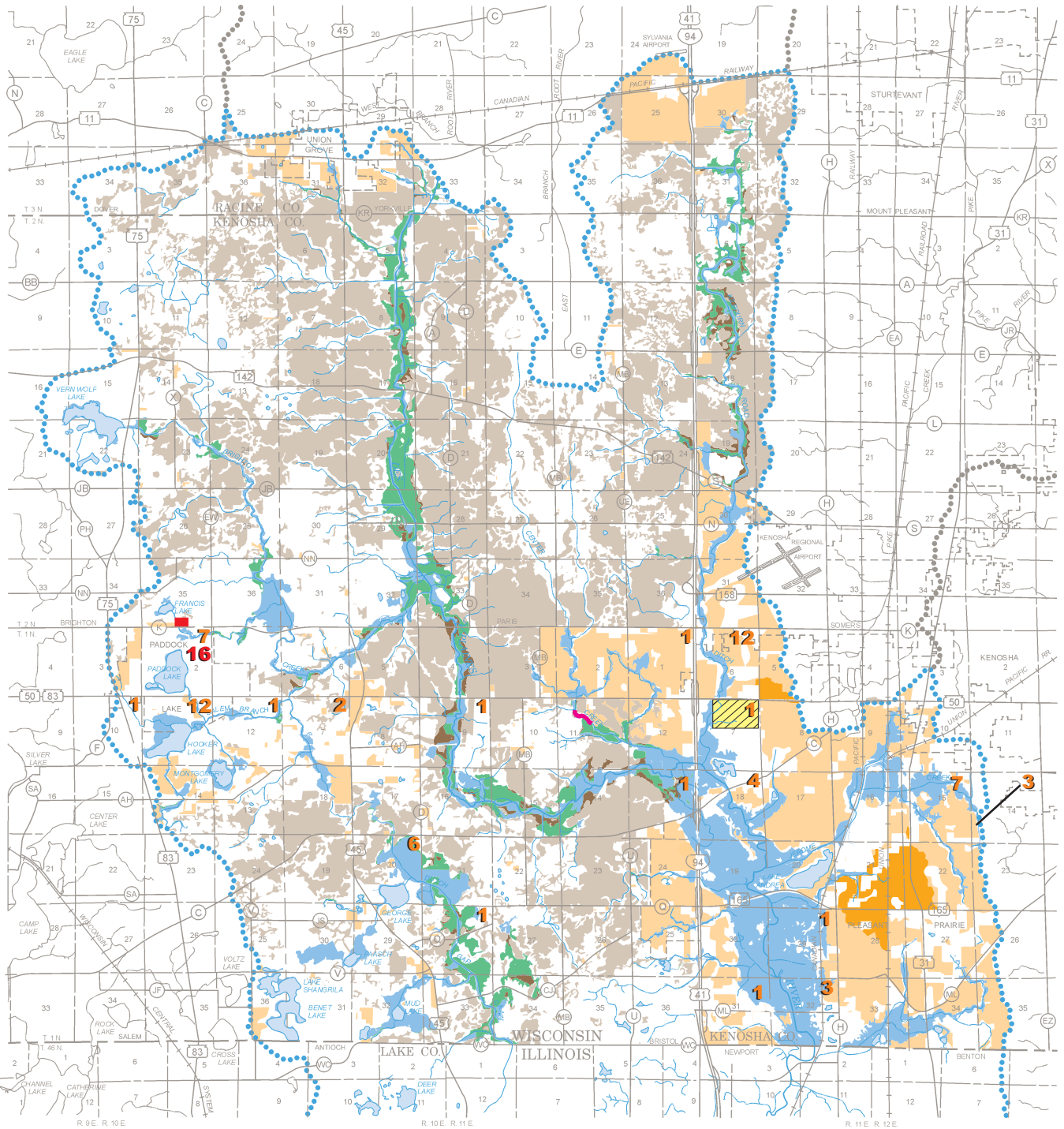


- | | | | |
|---|--|---|--|
|  | CHANNEL CLEARING AND MAINTENANCE |  | CAROL BEACH UNIT 1 SEWER IMPROVEMENTS |
|  | CHANNEL WIDENING, DEEPENING, AND AQUATIC HABITAT RESTORATION |  | ONE-PERCENT-ANNUAL-PROBABILITY (100-YEAR RECURRENCE INTERVAL) FLOODPLAINS (2012) |
|  | PIKE CREEK CHANNEL IMPROVEMENTS, FLOOD STORAGE, AND AQUATIC HABITAT RESTORATION. THERE ARE ALSO NINE PROPOSED BRIDGE OR CULVERT MODIFICATIONS OR REPLACEMENTS AS PART OF THIS PROJECT. |  | SURFACE WATER |
|  | TOBIN CREEK STUDY |  | PERENNIAL STREAM |
|  | BRIDGE REPLACEMENT |  | INTERMITTENT STREAM |
|  | STRUCTURE FLOODPROOFING OR ACQUISITION AND DEMOLITION (NUMBER OF STRUCTURES IN U.S. PUBLIC LAND SURVEY SECTION) |  | MAJOR WATERSHED BOUNDARY |
|  | STRUCTURE NO LONGER IN 100-YEAR RECURRENCE INTERVAL FLOODPLAIN WITH RECOMMENDED MEASURES | | |

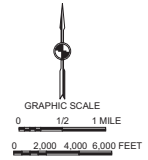
Source: SEWRPC.



RECOMMENDED FLOODPLAIN AND STORMWATER MANAGEMENT MEASURES AND RECENTLY-COMPLETED PROJECTS FOR THE DES PLAINES RIVER WATERSHED



- ONE-PERCENT-ANNUAL-PROBABILITY (100-YEAR RECURRENCE INTERVAL) FLOODPLAIN—PLANNED LAND USE AND EXISTING CHANNEL CONDITIONS
- POTENTIAL WETLAND RESTORATION AREAS LOCATED WITHIN THE ONE-PERCENT-ANNUAL-PROBABILITY (100-YEAR RECURRENCE INTERVAL) FLOODPLAIN
- POTENTIAL PRAIRIE RESTORATION AREAS LOCATED OUTSIDE THE ONE-PERCENT-ANNUAL-PROBABILITY (100-YEAR RECURRENCE INTERVAL) FLOODPLAIN
- POTENTIAL PRAIRIE RESTORATION AREAS LOCATED WITHIN THE ONE-PERCENT-ANNUAL-PROBABILITY (100-YEAR RECURRENCE INTERVAL) FLOODPLAIN
- AREAS OF PLANNED URBAN DEVELOPMENT WHERE DETENTION STORAGE WOULD BE PROVIDED
- MAJOR AREAS OF DEVELOPMENT SINCE 1990 THAT INCLUDE DETENTION STORAGE FACILITIES
- CHATEAU EAU PLAINES SOUTHWEST POND STUDY AREA
- CHANNEL RIPRAP
- DETENTION FACILITY
- 2 STRUCTURE FLOODPROOFING OR ACQUISITION AND DEMOLITION (NUMBER OF STRUCTURES IN U.S. PUBLIC LAND SURVEY SECTION)
- 2 STRUCTURE NO LONGER IN 100-YEAR RECURRENCE INTERVAL FLOODPLAIN WITH RECOMMENDED MEASURES



The recommended floodplain and stormwater management plan element calls for structure floodproofing, elevation, and removal; detention storage to control runoff from new development (100-year storm release rate=0.3 cfs/acre, two-year storm release rate=0.04 cfs/acre); prairie restoration on six square miles of agricultural land (20 percent of the potential restoration area); wetland restoration within floodlands (3.1 square miles); specific measures along Unnamed Tributary No. 6 to Brighton Creek and Unnamed Tributary No. 1 to Hooker Lake; and initiation of a monitoring program to assess sediment conditions along the Upper Des Plaines River.

Source: SEWRPC.

Chapter VI

PLAN ADOPTION, IMPLEMENTATION, MAINTENANCE, AND REVISION

The updated hazard mitigation plan described in this report is designed to attain, to the maximum extent practicable, the goals and objectives set forth in Chapter IV of this report. In a practical sense, however, the plan is not complete until the steps to convert the plan into action policies and programs have been specified. This chapter presents the plan implementation strategies envisioned and includes provisions and information on plan adoption, maintenance, and revision.

PLAN REFINEMENT, REVIEW, AND ADOPTION

As described in Chapter I, the all-hazard mitigation planning program was initiated by Kenosha County in 2003. The plan update set forth in this report was begun in 2015 and conducted pursuant to the mitigation planning requirements of 44 *Code of Federal Regulations*, Section 201.6(d) (44 CFR 201.6(d)) which call for local hazard mitigation plans to be reviewed; updated to reflect changes in development, progress in local mitigation efforts, and changes in priorities; and reapproved every five years for local jurisdictions to be able to receive hazard mitigation funding. During 2002, the Federal Emergency Management Agency (FEMA) published rules for hazard mitigation planning in response to the Disaster Mitigation Act of 2000. These rules address State and local mitigation planning and are important for the Kenosha County hazard mitigation program in the following manner:

- The Wisconsin Department of Military Affairs, Division of Emergency Management (WEM), is directly involved in a partnership role for all-hazard mitigation planning. That agency is responsible for preparing and periodically updating a State all-hazard mitigation plan, provides technical assistance and guidance for local all-hazards planning, and administers planning grant programs for FEMA.

- The rules outline State and local mitigation planning guidelines for accessing hazard mitigation grant funds. For disasters declared after November 1, 2004, local units of government must have a FEMA-approved mitigation plan in order to receive project grants from the Hazard Mitigation Grant Program (HMGP) and the Pre-Disaster Mitigation (PDM) program. Until that deadline, local governments **were** able to receive a grant concurrent with all-hazards planning. This element is important because it requires local adoption of an all-hazards mitigation plan to remain eligible to receive grants from specific mitigation funds. Communities can formally adopt the County plan, or, alternatively, create and adopt their own plan.
- The rules and related guidance provide more specificity and detail on the hazard mitigation plan content than did the previous rules.

The Kenosha County hazard mitigation plan and this plan update have been structured to meet the 2002 guidance.

The Kenosha County hazard mitigation plan was prepared under the guidance of the Kenosha County All Hazards Mitigation Plan Task Force comprised of representatives of all of the communities within the County, as well as County businesses and agency representatives. That task force met four times during the plan preparation period for the original plan to provide input on the types of hazards to be considered, the appropriate mitigation strategies, and to review the draft report chapters with the report chapters then being refined to reflect the comments and recommendations of the Task Force. The Task Force was reconvened for **the first** updating effort and met three times during the plan preparation period to provide input on the types of hazards to be considered, the appropriate mitigation strategies, and to review the draft report chapters with the report chapters then being refined to reflect the comments and recommendations of the Task Force. **For the second updating effort, the Task Force was renamed as the Kenosha County Hazard Mitigation Plan Local Planning Team. During this effort, the Local Planning Team met four times during the plan preparation period to provide input on the types of hazards to be considered, the appropriate mitigation strategies, and to review the draft report chapters, with the report chapters then being refined to reflect the comments and recommendations of the Local Planning Team (see Appendix A).**

During the drafting of the initial plan, public informational meetings were held to review the plan with local officials, businesses and industry, and citizens, following completion of the first two chapters and after completion of the plan in draft form. Following plan finalization, the plan was presented for consideration and adoption to the Kenosha County Board of Supervisors on April 19, 2005. A copy of the signed plan adoption resolution is included in Appendix M. Copies of the plan were also sent to each of the local units of government in the County advising them of the need for adoption by the local government in order to retain future eligibility for mitigation funding for the FEMA Hazard Mitigation Grant and the Pre-Disaster Mitigation Programs

administered by WEM. Copies of the adopted resolutions approving the plan at the local units of government are included in Appendix M. In addition, County and SEWRPC staff have been made available to meet with communities on an individual basis to review the plan and consider adoption and implementation steps. A status report on plan adoption by the County and local units of government is maintained by the Kenosha County Division of Emergency Management.

With some additions, similar local adoption procedures were followed for the **first update of this** plan. As draft chapters of the updated plan were completed, copies were placed in downloadable form on the website of the Southeastern Wisconsin Regional Planning Commission (SEWRPC) and a webpage was available on the SEWRPC website on which members of the public could ask questions and submit comments upon the draft plan update. When the plan was completed in draft form, a public informational meeting was held to review the plan with local officials, business and industry, and citizens. Following finalization of the updated plan, the plan update was presented for consideration and adoption to the County Board. This included presentation to the County Board Judiciary and Law Enforcement Committee and to the full County Board. Copies of the report were also sent to each of the local units of government requesting adoption of the updated plan and advising them of the need for such action in order to retain future eligibility for mitigation funding for the FEMA Hazard Mitigation Grant Program and the Pre-Disaster Mitigation Program administered by the Wisconsin Department of Military Affairs, Division of Emergency Management (WEM).

The local adoption procedures for this updated plan were similar to those followed for the first update. The main difference was that two public informational meetings were held during the updating period to review the plan with local officials, business and industry, and citizens. One of these was held following completion of the risk analysis and covered the material documented in Chapter I through IV. The second was held after completion of the plan in draft form and covered the entire plan. As with the first update, copies of draft chapters were placed in downloadable form on the website of the Southeastern Wisconsin Regional Planning Commission (SEWRPC) and a webpage was available on the SEWRPC website on which members of the public could ask questions and submit comments upon the draft plan update. No comments were received on through the website. As part of consideration and adoption of the plan by the County Board, the plan was presented to the County Board Judiciary and Law Enforcement Committee on [REDACTED], [REDACTED] and to the full County Board on [REDACTED], [REDACTED].

To support adoption of the plan by participating municipalities, County and SEWRPC staff have been made available to meet with communities on an individual basis to review the plan and consider adoption and implementation steps. A status report on plan adoption by the County and local units of government is maintained by the Kenosha County Division of Emergency Management.

PLAN IMPLEMENTATION STRATEGIES

An important first step in the implementation of the updated hazard mitigation plan for Kenosha County is its formal adoption by Kenosha County; the City of Kenosha; the Villages of Bristol, Paddock Lake, Pleasant Prairie, Salem Lakes,¹ Somers, and Twin Lakes; and the Towns of Brighton, Paris, Randall, Somers, and Wheatland. Upon formal adoption, the plan becomes an important guide to the making of hazard mitigation and related management decisions for the County and participating local units of government. Such adoption serves to signify agreement with and official support of the plan recommendations and enables government officials and staff to begin integrating the plan recommendations into the other ongoing County and municipal programs, such as land use control, and public works development planning and programming.

Realization of the plan will require a long-term commitment to the objectives of the plan and a high degree of coordination and cooperation among County officials and staff and various County and community departments and other bodies, including the Hazard Mitigation Plan Local Planning Team; intergovernmental task forces or other committees that may be created in the future to help address common hazard mitigation issues; other concerned units and agencies of government and their respective officials and staffs; area developers and lending institutions; businesses, industry, and institutions; and concerned private citizens in undertaking the substantial investments and series of actions needed to implement the plan. Close cooperation with WEM and FEMA is also essential.

A summary of the plan elements and selected implementation strategy information, including costs, designated management agencies, and schedules are included in Tables VI-1 and VI-2. In addition, corresponding mitigation measures are summarized on Maps V-4 and V-5 in Chapter V of this report.

It is recommended that the County and local units of government incorporate the analyses performed and mitigation strategies recommended into other local planning efforts, such as those related to stormwater management, stream and river protection, land and water conservation, and comprehensive planning, where appropriate. As an example of this, the analyses and recommendations of the initial Kenosha County hazard mitigation plan were reviewed and considered as part of the development of the comprehensive plan for Kenosha County.²

¹On November 21, 2016 the Wisconsin Department of Administration approved a cooperative plan submitted by the Village of Silver Lake and the Town of Salem. Effective February 14, 2017 the two municipalities merged to become the Village of Salem Lakes. As of February 14, 2017, the plan implementation responsibilities for the Village of Silver Lake and the Town of Salem are assigned to the Village of Salem Lakes.

²SEWRPC Community Assistance Planning Report No. 299, A Multi-Jurisdictional Comprehensive Plan for Kenosha County: 2035, April 2010.

HAZARD MITIGATION FUNDING SOURCES

Financing of the construction, operation, and maintenance of hazard mitigation measures may be accomplished through a number of means, including: the establishment of a stormwater utility; tax incremental financing (TIF) districts; local property taxes; reserve funds; general obligation bonds; private-developer contributions, including fees applied to construction of regional stormwater management facilities in lieu of providing onsite facilities; State grants or loans; and certain Federal and State programs.

The identification of potential funding sources, including sources other than solely local-level sources, is an integral part of the implementation of a successful mitigation plan. The following description of funding sources includes those that appear to be applicable for the County and local units of government as of 2016. However, because funding programs and opportunities are constantly changing, the involved staff of County and local units of government will need to monitor the potential funding sources and programs. Some of the programs described in this chapter may not be available under all envisioned conditions in the County or to its residents and/or property owners for a variety of reasons, including, for example, eligibility requirements or lack of funds at a given time in Federal and/or State budgets. Nonetheless, the list of sources and programs set forth in this chapter should provide a starting point for identifying possible funding for implementing the hazard mitigation plan recommended in this report (see also Appendices J and K).

Federal Emergency Management Agency Programs

The Federal Emergency Management Agency (FEMA) funds several programs that in the State of Wisconsin are administered through the Wisconsin Department of Military Affairs, Division of Emergency Management. These programs include the Hazard Mitigation Grant Program, the Flood Mitigation Assistance Program, the Pre-Disaster Mitigation Program, and the Public Assistance Program. These programs are described below.³ Examples of types of projects that can be eligible for funding under the Hazard Mitigation Grant Program, the Flood Mitigation Assistance Program, and the Pre-Disaster Mitigation Program are given in Table VI-3.

Hazard Mitigation Grant Program

The Hazard Mitigation Grant Program (HMGP) can provide up to 75 percent of the costs attendant to certain natural hazard mitigation programs. In the case of flood mitigation, projects can include the floodproofing or

³Additional information on eligibility requirements and eligible projects under the Hazard Mitigation Grant Program, the Flood Mitigation Assistance Program, and the Pre-Disaster Mitigation Program can be found in Federal Emergency Management Agency, Hazard Mitigation Assistance Guidance: Hazard Mitigation Grant Program, Pre-Disaster Mitigation Program, and Flood Mitigation Assistance Program, February 27, 2015.

acquisition and relocation of floodprone properties, the elevation of structures in compliance with National Flood Insurance Program (NFIP) standards, and other flood control measures, including structural projects, where identified as cost-effective. To be eligible for mitigation activities with FEMA funding, structures must be insured under the NFIP. Under the HMGP, the balance of the costs is shared by the State of Wisconsin (12.5 percent) and the grantee (12.5 percent). Communities in Wisconsin can apply through the State for HMGP funds only after a Presidential disaster declaration is issued. HMGP funds must be applied for within 60 days of the declaration. The State, as HMGP grantee, is responsible for identifying and prioritizing projects. Eligible projects must be included as part of the grantee's all-hazard mitigation plan and must meet cost-benefit criteria established by FEMA. Although State and local units of government are eligible applicants, HMGP funds can be used on private property for eligible projects. The HMGP gives priority to properties identified by FEMA as repetitive-loss properties.

Flood Mitigation Assistance Program

The Flood Mitigation Assistance (FMA) program can provide up to 75 percent of the costs attendant to the acquisition, relocation, elevation, and floodproofing of structures in compliance with NFIP standards. **Properties included in a project subapplication for FMA funding must be NFIP-insured at the time of the application submittal and prior to the period of availability or application start date. Flood insurance must be maintained through completion of the mitigation activity and for the life of the structure.** In addition to participating in the NFIP, eligible program applicants must meet cost-benefit criteria established by FEMA. Mitigation of repetitive-loss properties is given a high priority under this program. Increased cost of compliance (ICC) coverage under the NFIP may provide a funding source for bringing noncompliant structures into compliance after a flood loss.

Pre-Disaster Mitigation Program

FEMA's Pre-Disaster Mitigation Program (PDM) can potentially provide up to 75 percent of the costs attendant to pre-disaster mitigation planning and the implementation of cost-effective mitigation projects prior to a disaster event. Funding these plans and projects reduces overall risks to the population and structures, while also reducing reliance on funding from actual disaster declarations. Examples of eligible projects include property acquisition, structure acquisition and demolition or relocation, structure elevation, safe room construction, dry floodproofing of nonresidential structures and historic residential structures, and minor localized flood reduction projects.

Public Assistance Program

FEMA's Public Assistance Program **(PA)** can provide some limited assistance with respect to structure elevation and relocation. For example, if entire portions of a community were to be relocated outside of a floodplain, this program can assist in rebuilding the necessary infrastructure in the new location. Funding under this program is provided for repair of infrastructure damaged during a flood that results in a Presidential disaster declaration. In making repairs to the infrastructure, cost-effective mitigation activities may be included. If a community

determines that a badly damaged facility is not to be repaired, the estimated damage amount may be used to fund an alternate project. Funding provided under the PA may pay for cost-effective hazard mitigation measures for facilities damaged by the incident. In addition, funding from the PA may be combined with funding from the HMGP, FMA, and/or PDM programs to implement mitigation measures on the same facility; however, they cannot be combined to pay for the same work.

U.S. Department of Housing and Urban Development Community Development Block Grant Program

Community Development Block Grant (CDBG) programs, funded by the U.S. Department of Housing and Urban Development, are administered by the Wisconsin Department of Administration.

The Community Development Block Grant Emergency Assistance Program is a special program that the Wisconsin Department of Administration, Division of Energy, Housing and Community Resources activates to assist local units of government that have recently experienced a natural or man-made disaster. The program provides funds to address housing needs that occur as a direct result of natural or man-made disasters, with preference given to those households with incomes at or below 80 percent of the county median household income. A local unit of government that has recently experienced a natural or man-made disaster may apply for assistance in addressing the housing problems caused by the disaster. Generally, cities, towns, counties, and villages with populations less than 50,000 and all counties, except Milwaukee, Waukesha, and Dane, are eligible to apply. The program also makes funds available for the repair of public infrastructure affected by natural disaster. Eligible activities dependent upon the nature of the disaster may include: repair of damage to the dwelling unit; acquisition and demolition of dwellings unable to be repaired; costs for new housing units to replace those lost in the disaster; and repairs to publically owned utility systems, streets, and sidewalks.

The Community Development Block Grant for Public Facilities Program is a versatile financing tool for general-purpose local units of government in need of funds to undertake needed infrastructure and public building projects. This program is designed to enhance the vitality of a community by undertaking public investment that contributes to its overall community and economic development. Eligible applicants are local units of government that are not HUD entitlement communities.⁴ Projects must meet one of three national objectives for the program. These are: 1) the project principally benefits low and moderate income persons; 2) the project eliminates slum and blight; and 3) the proposed activity meets an urgent local need, typically a catastrophic event. Eligible activities include utilities and streets, fire stations and emergency vehicles, community/senior centers and shelters, and

⁴HUD entitlement communities include principal cities of Metropolitan Statistical Areas, other metropolitan cities with populations of at least 50,000, and urban counties with populations of at least 200,000 (excluding the population of entitlement cities). The City of Kenosha is the only entitlement community in Kenosha County.

municipal telecommunications. Grant funds are available on a continual basis. The maximum grant for any single applicant is \$500,000, and applicants can receive only one grant per 12-month period.

U.S. Small Business Administration Programs

The U.S. Small Business Administration (SBA) provides disaster loans to homeowners and businesses to repair or replace property damaged in a declared disaster. SBA loans are granted only for uninsured losses. Loans may be used to meet required building codes, such as the NFIP requirements. SBA may also provide loans for relocation out of special flood hazard areas when such locations are required by local officials. While SBA's enabling legislation generally prohibits the agency from making disaster loans for voluntary relocations, there are exceptions that can be made, including relocations of homeowners, renters, and business owners out of special flood hazard areas when the community is participating in a buyout program. These loans would be limited to the amount necessary to repair or replace the damage at the disaster site. SBA loans may also be used to refinance existing mortgages. Up to 20 percent of the disaster loan can be used for mitigation measures.

U.S. Army Corps of Engineers

The Army Corps of Engineers programs are potential sources of funding for implementing the floodland management recommendations of this plan. In order to be eligible for funding, the plan components must meet specific Corps economic feasibility and other criteria. The programs that may be applicable include the following:

- Section 22—Water resources planning assistance (50 percent Federal, 50 percent local cost share).
- Section 103—Hurricane and Storm Damage Reduction Program. Maximum \$5.0 million per project (65 percent Federal, 35 percent local cost share).
- Section 205—Flood damage reduction projects. Maximum Federal cost for planning, design, and construction is \$10.0 million per project (65 percent Federal, 35 percent local cost share).
- Section 208—Clearing debris and sediment from channels for flood prevention. Maximum \$500,000 per project (65 percent Federal, 35 percent local cost share).
- Section 14—Emergency streambank and shoreline protection. Maximum \$1.5 million per project (65 percent Federal, 35 percent local cost share).

Wisconsin Department of Natural Resources

The Wisconsin Department of Natural Resources (WDNR) operates programs that may serve as potential funding sources for flood mitigation efforts by the County and local communities (see also Appendices J and K). These programs are described below.

Municipal Flood Control Grants

Under Chapter NR 199, “Municipal Flood Control Grants” of the *Wisconsin Administrative Code* municipalities including cities, towns, and villages, as well as metropolitan sewerage districts, are eligible for cost-sharing grants from the State for projects such as acquisition and removal of structures; floodproofing and elevation of structures; riparian restoration projects; acquisition of vacant land or purchase of easements to provide additional flood storage or to facilitate natural or more efficient flood flows; construction of facilities for the collection, detention, retention, storage, and transmission of stormwater and groundwater for flood control and riparian restoration projects; and preparation of flood mapping projects. Municipalities and metropolitan sewerage districts are eligible for up to 70 percent State cost-share funding for eligible projects, and would have to provide at least a 30 percent local match. Applications are due on **March 15 of even-numbered years**.

Knowles-Nelson Stewardship Local Grant Assistance Programs

Local units of government are eligible to apply for funding through four stewardship grant programs and two related federal programs administered by the WDNR. The WDNR programs include the Aids for the Acquisition and Development of Local Parks, the Urban Green Space, the Urban Rivers, and the Acquisition of Development Rights programs. The WDNR also administers the Federal Land and Water Conservation Fund and Recreational Trails Act programs. These programs provide 50 percent matching grants to cities, villages, towns, counties, public inland lake protection and rehabilitation districts, and qualified nonprofit conservation organizations. Eligible activities include acquisition of land; development and renovation projects for nature-based outdoor recreation; development, maintenance, and restoration of trails; river habitat restoration projects that serve public recreation or resource conservation purposes; and purchase of land for noncommercial gardening in urban areas. The annual application deadline is May 1.

Stormwater Management Program

The WDNR administers a Targeted Runoff Management (TRM) grant program provided for under Section 281.65(4c) of the *Wisconsin Statutes*. Local governmental units may be reimbursed up to 70 percent of eligible costs associated with installing Best Management Practices (BMPs) to limit or end nonpoint water pollution. Grant awards **for small-scale agricultural and urban projects** cannot exceed \$150,000. Grants provided under this program may be used for projects to control nonpoint source pollution and may be available to partially support dual-purpose (quality and quantity) detention ponds, streambank protection projects, or other stormwater management facilities.

The WDNR also administers an Urban Nonpoint Source and Stormwater Grant Program provided for under Section 281.66 of the *Wisconsin Statutes*. Cities, towns, villages, and counties are eligible for grants under this program to improve urban water quality by limiting or ending sources of urban nonpoint source pollution. Funded

projects are site-specific and targeted to address high priority problems in urban project areas. Two types of grants are available under this program: planning grants and construction grants. Construction grants are made for construction projects designed to control stormwater runoff rates, volumes, and discharge quality from nonpoint sources within existing urban development. Eligible project sponsors can be reimbursed up to 50 percent to construct BMPs. A project must be located in an urban area to be eligible for BMP cost sharing. Eligible activities include construction of structural urban BMPs such as detention basins, wet basins, infiltration trenches, infiltration basins, or wetland basins; engineering design and construction services for BMP installation; land acquisition and easement purchase; storm sewers; and streambank and shoreland stabilization projects. Projects are selected for funding based on a competitive process.

Wisconsin Coastal Management Program

The Wisconsin Coastal Management Program administers an annual competitive grants program available for the 15 Wisconsin coastal counties. Under the category Coastal Resource and Community Planning, funds are available for projects that support natural hazard planning and development of ordinances.

Other Potential Funding Sources

A variety of other potential funding sources exist which may provide funds for implementation of elements of the recommended hazard mitigation plan. These are listed in Appendices J and K.

PLAN MONITORING AND REEVALUATION STRATEGIES

For a hazard mitigation plan to be successful it must not only be implemented; it must be monitored. Plan monitoring is best accomplished through a formal, periodic process designed to measure and assess progress in implementation, changes in outside circumstances that may affect the plan and efforts to implement it, and changes to the plan or the implementation process. The plan should also be reviewed following each hazard event to assess its continued viability and the need for revisions.

Plan Monitoring

Annual Review

Toward ensuring successful monitoring of the hazard mitigation plan, the County intends that the Kenosha County Hazards Mitigation Plan **Local Planning Team** meet at least annually to review the plan and the status of its implementation with a view toward enhancing and improving response to natural and other hazard events. These meetings will provide the opportunity to develop and recommend any necessary revisions **and updates** of the plan to the Kenosha County Board of Supervisors, as well as to the local units of government involved. The revisions would be proposed, considered, and adopted **as** formal amendments to the hazard mitigation plan. This review process will be coordinated and conducted by the County Division of Emergency Management, with input

from, coordination with, and participation by all concerned County officials and staff, all units and agencies of government involved in plan implementation, and concerned private parties.

The **Local Planning Team**, in its review process, will periodically examine **and evaluate** the plan and the efforts to implement it with respect to: 1) whether any hazards affecting the County and local units of government have changed, and, if so, how they have changed; 2) whether any hazard mitigation goals and objectives have changed, or need to be changed; 3) the degree and extent of progress made in implementing previously identified hazard mitigation actions; 4) whether the plan elements and their priorities should remain unchanged or need modification; 5) whether any new plan elements are needed; and 6) whether applicable funding programs and levels have changed. As an integral part of its review process, County Emergency Management, with review and guidance of the **Local Planning Team**, will submit an annual written report to the Local Emergency Planning Committee and the County Board that sets forth the status of plan implementation efforts, details plan implementation actions taken over the past year, prioritizes mitigation goals and activities for the next year, and sets forth any recommended revisions to the plan. It is also recommended that County Emergency Management oversee the development and maintenance of a tracking and archiving system for all future detailed hazard mitigation studies undertaken by or for the County or the local units of government concerned. Such studies should be evaluated using policies established either by the **Local Planning Team** or the County Board.

The meetings of the **Local Planning Team** will continue to be publicly noticed and salient decisions recorded in County Emergency Management files and, where appropriate, on the County website and in press releases among others. Meetings of the **Local Planning Team** are considered public meetings under Wisconsin Law and are open to all interested parties.

As noted in Chapter I of this report, the Local Planning Team held annual meetings in 2012, 2013, and 2014. These meetings are documented in a series of SEWRPC Staff Memoranda. Copies of these Memoranda are included Appendix A.

County Emergency Management staff will also continue to organize community level events to increase public awareness, participation, and preparedness. The staff will ensure that appropriate notices, agendas, and other documentation are provided to interested persons and **Local Planning Team** members in a timely manner. The venue and timing of these events shall be varied to ensure the widest possible participation and geographic spread across the County. Through these community level events, staff will gain an understanding of issues of concern, encourage public involvement, and maintain hazard awareness and preparedness at a high level.

County Emergency Management will be responsible on a day-to-day basis for creating and implementing a common monitoring system. This will require close cooperation and coordination with other units of government

and agencies involved. This review will form part of the agenda for the aforereferenced annual meeting of the **Local Planning Team**.

Post-Disaster Review

The plan monitoring and refinement strategy will include a post-disaster component whereby the plan is reviewed and evaluated after any future major hazard event. Based upon this review, the hazard mitigation plan will be updated or revised as needed based upon the flood event experiences, circumstances, and consequences. In this regard, the post-disaster review effort will be coordinated with the emergency operations program administered by County Emergency Management in partnership with the local units of government. The experiences of the emergency operations may indicate a need for refined mitigation actions that would then be incorporated into the plan. Any plan updating found to be needed will be incorporated into the annual plan update noted above.

Reevaluation Strategy

The components of the hazard mitigation plan developed under County- and local-level planning efforts will be reevaluated **and updated** at a minimum of five-year intervals. **Reevaluation, updating, and revision of this plan should be initiated approximately 24 months prior to expiration of this updated plan. The Director of the Kenosha County Division of Emergency Management will be responsible for the five-year update of the plan.** The Director of the Kenosha County Division of Emergency Management will be responsible for scheduling the meetings of the **Local Planning Team** and the County Board to reevaluate and update the plan. The meetings will be open to the public and **include a component** to solicit public input. **The Local Planning Team** will review the goals and mitigation strategies of the plan to determine their relevance to changing situations in the County, as well as to review changes in State and Federal policy, to ensure they are addressing current and expected conditions. **Reevaluation of the plan will include a** review the vulnerability assessment portions of the plan to determine if this information should be updated or modified. **This review should include of updating** the list of critical facilities. The Director of the Kenosha County Division of Emergency Management will give a status report detailing the success of various mitigation projects, difficulties encountered, and the success of the coordination efforts identified in the plan. The Director will also identify those mitigation strategies that should be revised.

When an updated draft of the plan is completed, it will be submitted to the State Hazard Mitigation Officer at the Wisconsin Division of Emergency Management for review. Following any revisions suggested by the State Hazard Mitigation Officer, the draft updated plan will be submitted to FEMA for approval. Once FEMA has found that the updated plan is approvable upon adoption, the Director of the Kenosha County Division of Emergency Management will submit it to the Kenosha County Board for adoption. Following adoption of the

updated plan by the County Board, the Director of the Kenosha County Division of Emergency Management will request that the governing bodies of the incorporated municipalities within the County adopt the updated plan.⁵

Incorporating Existing Planning Mechanisms

The Hazard Mitigation Plan **Local Planning Team** will meet on an annual basis to provide a mechanism for ensuring that the actions identified in the Plan are incorporated into ongoing County planning activities.

Kenosha County currently utilizes comprehensive land use planning, land use regulations, neighborhood planning, and building codes to guide and control development in the County. These existing mechanisms will have hazard mitigation strategies integrated into them where applicable.

In addition, the County will require that participating local municipalities address hazards in their comprehensive plans and land use regulations. Specifically, one of the goals in the Plan promotes the spatial distribution of land uses to minimize hazards and dangers to the health, welfare, and safety of County residents from natural and manmade hazards. The County Planning Department will conduct periodic reviews of the County's comprehensive plans and land use policies, analyze any plan amendments, and provide technical assistance to other local municipalities in implementing these requirements.

The local towns are responsible for administering the building codes in unincorporated municipalities. Participating towns will work with the State of Wisconsin to ensure that their jurisdiction adopts and enforces the minimum standards established in the new State Building Code. This is to ensure that life and safety criteria are met for new construction.

Within one year of the formal adoption of the Mitigation Plan, the policies listed above will be incorporated into the process of existing planning mechanisms for all participating local units of government.

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⁵The review, approval, adoption process described in this paragraph follows the practices currently used by the Wisconsin Division of Emergency Management and FEMA. Should such practices change, it is recommended that the County follow the process recommended by the Wisconsin Division of Emergency Management.

Chapter VI

**PLAN ADOPTION, IMPLEMENTATION,
MAINTENANCE, AND REVISION**

TABLES

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Table VI-1

KENOSHA COUNTY HAZARD MITIGATION PLAN SUMMARY AND IMPLEMENTATION STRATEGIES

Hazard	Mitigation Measures	Estimated Cost: 20-Year ^a		Plan Implementation Schedule	Potential Funding Programs (see Appendix J)
		Capital (thousands of dollars)	Average Annual Operation and Maintenance (thousands of dollars)		
Flooding and Related Stormwater Drainage Problems	<u>Floodland and Environmentally Sensitive Land Preservation Element</u>				
	<ul style="list-style-type: none"> Floodplain and wetland zoning 	-- ^b	-- ^b	Plan implementation is in place; some review and refinement needed in local community ordinances	1,2,5,11,16,18,36,37,39,40,44,46,47,49
	<ul style="list-style-type: none"> Environmentally sensitive area and open space preservation actions 	\$20,940.2 ^c	-- ^c	Plan implementation is in place or ongoing; additional actions needed in some areas	1,2,5,6,7,9,10,12,13,15,17,18,19,24,33,35,36,37,38,39,42,45,46,47,50,55,59,62
	<u>Floodland Management Plan Element</u>				
	Fox River Watershed ^d				
	<ul style="list-style-type: none"> Removal of 203 structures^e 	\$31,010.2	--	Ongoing in the Village of Silver Lake and the Towns of Salem and Wheatland ^f	1,2,5,6,7,9,10,12,17,19,23,24,35,36,37,38,47,59
	<ul style="list-style-type: none"> Elizabeth Lake spillway modifications 	121.0	--	Implemented	
	<ul style="list-style-type: none"> Hoosier Creek and tributaries brush clearing 	302.4	--	First assessment December 2009	
	Root River Watershed ^g				
	<ul style="list-style-type: none"> Channel clearing along two miles of the East Branch Root River Canal 	\$62.2	\$1.9	To be determined	1,2,5,6,7,8,9,10,12,13,17,18,19,36,37,38,50
Pike River Watershed ^h					
<ul style="list-style-type: none"> Upper Pike River: channel widening/deepening 	\$163.6	\$0.7	To be determined	1,2,5,6,7,9,10,12,17,19,23,33,34,36,37,38,51,62,63,64	
<ul style="list-style-type: none"> Upper Pike River: bridge replacements 	1,169.0	--	To be determined		
<ul style="list-style-type: none"> Upper Pike River: aquatic habitat restoration 	85.8	--	To be determined		
<ul style="list-style-type: none"> Watershedwide: removal of eight structures^e 	1,222.1	--	To be determined		
<ul style="list-style-type: none"> Pike Creek: channel improvements, floodwater detention storage, bridge replacements, and aquatic habitat restoration 	14,679.1	24.6	To be determined		
<ul style="list-style-type: none"> Airport Branch and Tributary to Airport Branch: channel improvements, bridge replacement, and aquatic habitat restoration 	2,439.3	1.9	To be determined		
<ul style="list-style-type: none"> Somers Branch and tributary: channel cleaning 	20.6	--	Implemented		
<ul style="list-style-type: none"> Pike River Town of Somers flood mitigation repair work 	30.7	--	Implemented		
Des Plaines River Watershed ⁱ					
<ul style="list-style-type: none"> Provision of onsite detention storage facilities for planned new development 	\$59,889.4 ^j	\$573.2	Ongoing	1,2,5,6,12,15,16,23,33,34,36,37,38,39,42,45,50,51,59,62,63	
<ul style="list-style-type: none"> Restoration of prairie conditions^k 	23,685.7	30.5 to 2,151.5 ^l	To be determined		
<ul style="list-style-type: none"> Restoration of wetland conditions^k 	10,468.6	16.1 to 1,107.9 ^l	To be determined		
<ul style="list-style-type: none"> Land rental cost for restored wetlands and prairies 	--	1,027.6	2nd level planning in progress		
<ul style="list-style-type: none"> Floodproofing of 42 residential, commercial, and agricultural structures^e 	988.5	--	To be determined		

Hazard	Mitigation Measures	Estimated Cost: 20-Year ^a		Plan Implementation Schedule	Potential Funding Programs (see Appendix J)
		Capital (thousands of dollars)	Average Annual Operation and Maintenance (thousands of dollars)		
Flooding and Related Stormwater Drainage Problems (continued)	Des Plaines River Watershed ^d (continued)				
	• Elevation of three residential structures ^e	349.2	--	To be determined	1,2,5,6,12,16,23,33,34,35,36,37,39,42,50,51,59,63
	• Removal of 13 residential and agricultural structures ^e	2,186.5	--	To be determined	
	• Upper Des Plaines River sediment monitoring	87.8	--	To be determined	
	• Brighton Creek – replace the 18th Street crossing	105.2	--	Implemented	
	• Center Creek riprap work	19.4	--	Implemented	
	• Chateau Eau Plaines stormwater pond	1,814.3	--	To be determined	
	• UT-6 to Brighton Creek – centralized detention facility	953.7	9.7	To be determined	
	• UT-6 to Brighton Creek – improve storm sewer	560.4	--	To be determined	
	• UT-6 to Brighton Creek – remove seven residential structures ^e	1,354.6	--	Federal grants applied for 2009	
	• UT-1 to Hooker Lake – replace culvert under 83rd Street	60.5	0.1	Implemented	
	Lake Michigan Direct Drainage Watershed				1,2,5,6,7,9,10,12,17,19,23,24,33,34,35,36,37,38,42,47,54,59,62,63,64,68
	• Removal of six structures ^e	\$916.6	--	To be determined	
	• Continued implementation of land acquisition for the Chiwaukee Prairie-Carol Beach area ^e	7,811.5	181.7	Essentially complete 2009	
	• Tobin Creek study	141.5	--	To be determined. Unsuccessful GLRI proposal submitted 2009	
• Forest Park storm sewer study	151.7	--	Study completed 2014		
• Shagbark basin	518.0	--	Completed in 2009		
• Spring Brook Innovation Center stormwater management project	879.9	--	Implemented 2012		
• Elevation of one residence	83.5	--	Implemented 2010		
• Carol Beach Unit 1 sewer system improvements	955.5	--	Lift station rebuilt 2013		
Lake Michigan Coast				--	
• Removal of eight structures ^e	\$1,222.1	--	To be determined		
<u>Stormwater Management Plan Element</u>				5,9,10,13,27,36,37,50	
• Stormwater management plans	--m	--m	Ongoing		
• Stormwater-related regulations	--n	--n	Ongoing		
<u>Public Information and Education Element</u>				5,26,27,36,38,44,50,53	
• Public education activities	--o	--o	Ongoing		
• Public participation activities and coordination with other agencies and units of government	--o	--o	Ongoing		

Hazard	Mitigation Measures	Estimated Cost: 20-Year ^a		Plan Implementation Schedule	Potential Funding Programs (see Appendix J)
		Capital (thousands of dollars)	Average Annual Operation and Maintenance (thousands of dollars)		
Flooding and Related Stormwater Drainage Problems (continued)	<u>Secondary Plan Element</u>				
	• National Flood Insurance Program and map updating	--b	--b	Ongoing	8,9,11,12,17,36,37,50
	• Lending institution and real estate agent policies	--b	--b	Ongoing	
	• Channel maintenance	--b	--b	Ongoing	
	• Stormwater management facilities maintenance	--b	--b	Ongoing	
• Survey of buildings near flood hazard areas	\$434.2	--	To be determined		
Thunderstorm, High-Wind, Hail, and Lightning Hazards	Maintain and potentially expand the early warning and communication systems, with emphasis on NOAA All Hazard Weather Radio, EAS broadcasts, and expanded use of emergency technologies	--p,q	--p	Ongoing	1,5,24,26,35,36,53,56
	Promote educational and informational programming, especially related to the early warning network, and to individual actions to protect citizens, property, and businesses	--o	--o	Ongoing	
	Encourage provision of safe rooms	--p	--p	Ongoing	
	Work with municipalities and businesses to explore installation of community safe rooms and hardening projects for community facilities, businesses, and manufacturers	--f	--f	Ongoing	
	Consideration by municipalities of adopting mobile home park regulations that require that community safe rooms be provided for residents of new and expanding mobile home parks	--p	--p	Ongoing	
	Based on community and landowner interest, pursue grant funding for installation of safe rooms in existing mobile home parks	--f	--f	To be determined	
	Encourage agricultural producers to purchase crop insurance	--b	--b	Ongoing	
	Continue to conduct annual weather spotter training	--b	--b	Ongoing	
	Continue coordination of emergency operations and response plans among governmental units and first responders	--b	--b	Ongoing	
	Tornadoes	Maintain and potentially expand the early warning and communication systems, with emphasis on NOAA All Hazard Weather Radio, EAS broadcasts, and expanded use of emergency technologies	--p,q	--p	
Retrofit existing or install new structures to ensure adequate shelters from tornadoes for public buildings, major industrial sites, mobile home parks, and other large businesses or complexes such as shopping malls, fairgrounds, and other vulnerable public areas		--f	--f	To be determined	
Work with municipalities and businesses to explore installation of community safe rooms and hardening projects for community facilities, businesses, and manufacturers		--f	--f	Ongoing	
Consideration by municipalities of adopting mobile home park regulations that require that community safe rooms be provided for residents of new and expanding mobile home parks		--p	--p	Ongoing	
Based on community and landowner interest, pursue grant funding for installation of safe rooms in existing mobile home parks		--f	--f	To be determined	

Hazard	Mitigation Measures	Estimated Cost: 20-Year ^a		Plan Implementation Schedule	Potential Funding Programs (see Appendix J)
		Capital (thousands of dollars)	Average Annual Operation and Maintenance (thousands of dollars)		
Tornadoes (continued)	Promote educational and informational programming, especially related to the early warning network, and to individual actions to protect citizens, property, and businesses	-- ^o	-- ^o	Ongoing	See previous page
	Enforce building code ordinance requirements	.. ^b	.. ^b	Ongoing	
	Continue to conduct annual weather spotter training	.. ^b	.. ^b	Ongoing	
Extreme Temperature Events	Continue coordination of emergency response and operations plans among governmental units and first responders	.. ^b	.. ^b	Ongoing	23,26,35,36,53
	Organize neighborhood outreach groups who look after vulnerable groups and individuals	.. ^p	.. ^p	Ongoing	
	Provide special arrangements for payment of heating bills	.. ^p	.. ^p	Ongoing	
	Identify and advertise a list of available heating and or cooling shelters in the immediate area	.. ^p	.. ^p	Ongoing	
	Maintain, update, and upgrade early warning systems and networks. As part of this increase coverage and use of NOAA All Hazard Weather Radio and EAS broadcasts	.. ^{p,q}	.. ^p	Ongoing	
Promote educational and informational programming	.. ^p	.. ^p	Ongoing		
Lake Michigan Coastal Hazards	Continue enforcement of the County shoreland zoning ordinance	.. ^b	.. ^b	Ongoing	11,38,49,54,55,57,61
	Review Lake Michigan shoreline municipal shoreland ordinances	.. ^b	.. ^b	To be determined	
	Develop a cooperative program to assess the effectiveness of Lake Michigan shoreline protection structures in the County	21.3	--	To be determined	
	Continue construction and maintenance of shoreline protection structures	.. ^r	.. ^r	Ongoing	
	Continue ongoing programs to update and refine coastal hazard area data using geographic information system technology	16.9	--	To be determined	
	Review water and wastewater treatment plant capacity and level of protection under range of Lake Michigan water levels	.. ^s	.. ^s	To be determined	
	Provide public informational and educational programming	.. ^o	.. ^o	Ongoing	
Winter Storm Events	Continue coordination of emergency response and operations plans among governmental units and first responders	.. ^b	.. ^b	Ongoing	24,26,36,53
	Organize neighborhood outreach groups who look after vulnerable groups and individuals	.. ^p	.. ^p	Ongoing	
	Provide special arrangements for payment of heating bills	.. ^p	.. ^p	Ongoing	
	Identify and advertise a list of available heated shelters in the immediate area	.. ^o	.. ^o	Ongoing	
	Maintain, update, and upgrade public early warning systems and networks. As part of this, increase coverage and use of NOAA All Hazard Weather Radio and EAS broadcasts	.. ^p	.. ^p	Ongoing	
	Promote educational and informational programming	.. ^o	.. ^o	Ongoing	
	Enforcement of building code ordinance requirements	.. ^b	.. ^b	Ongoing	
	Work with agencies to establish a system for short-term sheltering	.. ^p	.. ^p	Ongoing	
	Continue coordination of emergency response plans among governmental units and first responders	.. ^b	.. ^b	Ongoing	
Continue and refine State, County, and local road maintenance programs	.. ^b	.. ^b	Ongoing		

Hazard	Mitigation Measures	Estimated Cost: 20-Year ^a		Plan Implementation Schedule	Potential Funding Programs (see Appendix J)
		Capital (thousands of dollars)	Average Annual Operation and Maintenance (thousands of dollars)		
Winter Storm Events (continued)	Work with utilities to assess and improve electrical service reliability	--b	--b	Ongoing	See previous page
Drought Events	Encourage the development and maintenance of drought emergency plans for local utilities and communities	--p	--p	Ongoing	26,36,53
	Encourage the development of local water conservation programs	--p	66.9 [†]	Ongoing	
	Encourage multi-agency approaches to drought planning, water conservation, drought prediction, and stream and ground water monitoring	--p	--p	Ongoing	
	Promote educational and informational programming	--o	--o	Ongoing	
	Support agricultural programs that promote soil health, preserve soil moisture, and help to minimize loss of crops and topsoil in the event of a drought	--b	--b	Ongoing	
	Evaluate and design water supply systems that are not vulnerable to drought	--r	--r	Ongoing	
Encourage farm operators to evaluate the economics of crop insurance programs	--u	--u	Ongoing		
Fog	Organize neighborhood outreach groups who look after vulnerable groups and individuals	--p	--p	Ongoing	24,35,36,53
	Maintain, update, and upgrade public early warning systems and networks. As part of this, increase coverage and use of NOAA All Hazard Weather Radio and EAS broadcasts	--p	--p,q	Ongoing	
	Increase public education and awareness of the potential severity of hazardous fog events	--o	--o	Ongoing	
	Produce and distribute emergency preparedness information related to fog events	--o	--o	Ongoing	
Fire	Promote activities that physically stop the spread of fire	--p	--p	Ongoing	3,4,24,28,29,30,31,32,35,36,41,53,69
	Promote emergency restrictions on fire causing activities	--p	--p	Ongoing	
	Offer training and exercises for local and regional fire fighters and acquire additional fire equipment	--p	--p	Ongoing	
	Map hazard areas and vulnerable structures	--p	--p	Ongoing	
	Support fire prevention, education, and enforcement programs, and enhance fire hazard awareness for landowners and visitors	--o	--o	Ongoing	
Transportation Accident-Related Events	Adopt and implement the recommendations made in the VISION 2050 Regional land use and transportation system plan related to monitoring and improving the transportation system through design, routing, and traffic control problem areas including:				4,23,28,31,32,41,53,65,66,67,69,37,44,45,55,57
	Expand the use of emergency vehicle preemption traffic signals	--v	--	As needed	
	Consider and implement intersection improvements such as two-or four-way stop control, roundabouts, or signalization at arterial street and highway intersections	--p	--p	As needed	
	Continue and expand the use of closed circuit television cameras (CCTV) on heavily traveled freeways, highways, and arterial streets	--w	--w	As needed	
	Continue and expand the use of advisory information measures including variable message signs (VMS) on the freeway system and at appropriate arterial street and highway locations	--x	--x	As needed	

Hazard	Mitigation Measures	Estimated Cost: 20-Year ^a		Plan Implementation Schedule	Potential Funding Programs (see Appendix J)
		Capital (thousands of dollars)	Average Annual Operation and Maintenance (thousands of dollars)		
Transportation Accident-Related Events (continued)	Consider expanding the use of ramp closure gates to allow for rapid closure of freeway on-ramps during major traffic incidents, inclement weather, or special events	--y	--y	As needed	See previous page
	Consider providing bicycle accommodations through bicycle lanes, paved shoulders, widened outside travel lanes, or enhanced bicycle facilities, where feasible when existing surface arterial street system is resurfaced and reconstructed and as new surface arterial roads are constructed	--f	--f	As surface arterial roads are constructed and as existing surface arterials are resurfaced and reconstructed	
	Expand the use of freeway service patrols to include Kenosha County	--f	--f	As needed	
	Promote educational and informational programming, especially related to driver safety, and to individual actions to protect citizens, property, and businesses	--b	--b	Ongoing	
	Continue to monitor and improve the transportation system through design, routing, and traffic control at problem areas	--b	--b	Ongoing	
	Continue to promote traffic-related law enforcement including enforcement for traffic violations, weight and travel restrictions, designated truck routes, distracted driving, and use of safety restraints	--b	--b	Ongoing	
	Continue to evaluate and refine safety components of railway facilities	--b	--b	Ongoing	
	Continue to evaluate and refine safety components of airport facilities	--b	--b	Ongoing	
	Continue to support training, state-of-the-art equipment, planning, and preparedness of first responders, as well as search and rescue teams	--b	--b	Ongoing	
Continue to coordinate emergency response plans among governmental units and first responders	--b	--b	Ongoing		
Contamination or Loss of Water Supply	Promote educational and informational programming related to water safety issues	--o	--o	Ongoing	14,26,27,36,48,52,53,55,56
	Encourage multi-agency approaches to water conservation, loss and contamination prevention and trend-monitoring	--p	--p	Ongoing	
	Prepare emergency operation and emergency drinking water supply plans for each public water supply system	--p	--p	To be determined	
	Continue coordination of emergency response plans among governmental units and first responders	--b	--b	Ongoing	
	Develop and implement plans to systematically replace publically owned water service lines and other public water supply infrastructure that are known to contain lead	--z	--z	Develop plans by 2022	
	Educate the public on, and promote the replacement of, privately owned portions of water service lines and other plumbing fixtures that contain lead. Pursue available funding opportunities to help offset the cost of these improvements to residents	--aa	--aa	Ongoing	
	Promote the use of water filtration devices on drinking water sources in homes where there are known lead service lines, lead plumbing, or lead fixtures and where replacement of the lead service line or plumbing fixture is not currently feasible	--bb	--bb	Ongoing	
	Prepare, update, and implement wellhead protection plans	--p	--p	To be determined	
Hazardous Material Events	Continue participation in the Wisconsin Hazardous Materials Response System	--b	--b	Ongoing	3,4,20,21,25,29,30,31,32,36,43,53,56
	Promote educational and informational programming related to hazardous material safety, and to individual actions to protect citizens, property, and businesses	--o	--o	Ongoing	

Hazard	Mitigation Measures	Estimated Cost: 20-Year ^a		Plan Implementation Schedule	Potential Funding Programs (see Appendix J)
		Capital (thousands of dollars)	Average Annual Operation and Maintenance (thousands of dollars)		
Hazardous Material Events (continued)	Promote development of site emergency plans for schools, factories, office buildings, shopping malls, hospitals, and other appropriate sites that produce, store, or utilize hazardous materials or that are near fixed facilities or transportation routes where hazardous materials are produced, used, stored, or transported	-- ^o	-- ^o	Ongoing	
	Promote community and operator compliance with industry safety regulations and standards	-- ^b	-- ^b	Ongoing	
	Promote ongoing enforcement of Federal, State, and County regulatory standards	-- ^o	-- ^o	Ongoing	
	Support existing or consider expansion of household waste management control programs, which should include hazardous material disposal sites for public citizens	-- ^p	-- ^p	Ongoing	
	Promote continued maintenance and upgrading of transportation infrastructure carrying shipments of hazardous cargo	-- ^p	-- ^p	Ongoing	
	Educate businesses and those utilizing hazardous materials of their responsibilities	-- ^p	-- ^p	Ongoing	
	Continue support of training, equipment, planning, and preparedness of first responders, for mass casualty incidents involving hazardous materials at fixed facilities and transportation systems. Training should include refresher training	-- ^p	-- ^p	Ongoing	
	Continue coordination of emergency response plans among governmental units, businesses, and first responders	-- ^p	-- ^p	Ongoing	
Terrorism Incidents	Maintain, update, and upgrade public early warning systems and networks. As part of this, increase coverage and use of NOAA All Hazard Weather Radio and EAS broadcasts	-- ^p	-- ^{p,q}	Ongoing	3,4,22,23,28,29,30,31,32,36,41,53,56
	Continue and expand educational and informational programming related to public health and safety issues due to terrorist incidents	-- ^o	-- ^o	Ongoing	
	Consider the need to strengthen public health infrastructure to support surveillance, response, reporting, and research, and to implement prevention and control programs from potential chemical and bio-terrorism attacks	-- ^p	-- ^p	Ongoing	
	Continue maintenance and potentially enhance security measures at water treatment facilities, including increased pathogen and chemical monitoring and emergency drinking water supply source alternative planning	-- ^p	-- ^p	Ongoing	
	Continue support of training, equipment, planning, and preparedness for local law enforcement, fire and rescue departments, and other emergency management services	-- ^p	-- ^p	Ongoing	
	Continue coordination of emergency response plans among Federal, State, and local governmental units, businesses, and emergency management services	-- ^p	-- ^p	Ongoing	
	Establish and train community emergency response team	-- ^{cc}	-- ^{cc}	Ongoing	
	Expand neighborhood watch program	-- ^p	-- ^p	Ongoing	
Power Outages	Continue to review and implement programs to improve reliability of power supply facilities	-- ^b	-- ^b	Ongoing	36,53
	Coordinate activities and communication regarding prevention and response to power outages	-- ^b	-- ^b	Ongoing	
	Encourage backup power generation facilities	-- ^b	-- ^b	Ongoing	
	Continue and refine public informational and educational programming	-- ^o	-- ^o	Ongoing	

Hazard	Mitigation Measures	Estimated Cost: 20-Year ^a		Plan Implementation Schedule	Potential Funding Programs (see Appendix J)
		Capital (thousands of dollars)	Average Annual Operation and Maintenance (thousands of dollars)		
Power Outages (continued)	Conduct outreach to businesses and facilities to encourage them to develop plans for dealing with and resuming operations after long-term power outages.	-- ^b	-- ^b	Ongoing	See previous page

^aAll cost expressed in 2014 dollars.

^bCosts covered under ongoing activity.

^cCosts are included under Kenosha County Park and Open Space Plan Implementation. The costs are based on purchasing all recommended land for parks and open spaces. It should be noted that the protection of these areas could also be accomplished through conservation easements, conservation subdivisions, donations, and purchase or transfer of development rights. To the extent that the costs are reduced through the use of alternative methods of land acquisition, and through the use of available State and Federal funds for acquisition, the costs to the County and local governments could be significantly reduced.

^dThis mitigation measure is the recommended alternative from SEWRPC Planning Report No. 12, A Comprehensive Plan for the Fox River Watershed, Volume Two, February 1970.

^eStructure floodproofing, elevation, or removal to be evaluated on a site-by-site basis and to be carried out at the discretion of property owners.

^fOn November 21, 2016 the Wisconsin Department of Administration approved a cooperative plan submitted by the Village of Silver Lake and the Town of Salem. Effective February 14, 2017 the two municipalities merged to become the Village of Salem Lakes.

^gThis mitigation measure is the recommended alternative from SEWRPC Planning Report No. 9, A Comprehensive Plan for the Root River Watershed, July 1966.

^hThese mitigation measures are the recommended alternatives from SEWRPC Planning Report No. 35, A Comprehensive Plan for the Pike River Watershed, June 1983; SEWRPC Amendment to the Pike River Watershed Plan, City of Kenosha/Town of Somers, June 1987; and SEWRPC Amendment to the Pike River Watershed Plan, Kenosha and Racine Counties, March 1996.

ⁱThese mitigation measures are the recommended alternatives from SEWRPC Planning Report No. 44, A Comprehensive Plan for the Des Plaines River Watershed, June 2003.

^jCost to control runoff up to the one-percent-annual-probability (100-year recurrence interval) event.

^kPrairie and wetland restoration to be carried out at discretion of property owners.

^lIncremental cost between control of the 50-percent-annual-probability and one-percent-probability events.

^mCosts to be determined by each community based upon logical subwatershed area. Estimated cost is from \$1.2 to \$1.5 million countywide.

ⁿCost of ordinance development is covered under ongoing programs. Cost of implementation is not determined.

^oPortion of costs included in ongoing program and construction project implementation programs. Additional cost of all of the hazard mitigation and public informational and educational programs is estimated to be \$20,000 per year.

^pCosts to be determined. Partially covered under ongoing programs.

^qCosts include annual subscription fee of \$11,000 for targeted alert notification service.

^rCosts are site-specific and survey is needed for countywide estimate.

^sTo be conducted as part of next needed facility planning program.

^tCosts shown are the estimated annual costs of water supply programs for existing water utilities in the County given in SEWRPC PR No. 52, A Regional Water Supply Plan for Southeastern Wisconsin, December 2010.

^uPrivate property costs to be expended as needs arise.

^vEstimated cost for installation of emergency vehicle preemption at a four-way intersection is about \$8,200.

^wEstimated equipment and installation cost for one closed circuit television system ranges from \$50,000 to \$65,000. Average annual operations and maintenance cost for a single unit is approximately \$1,500.

^xEstimated equipment and installation cost for one variable message sign (VMS) ranges from 35,000 to \$75,000 at an arterial highway location, from \$80,000 to \$90,000 for a ground-mount system at a freeway location, and from \$180,000 to \$200,000 for an overhead system at a freeway location. Average annual operation and maintenance costs for a single VMS unit are about \$2,200.

^yEstimated equipment and installation cost for one ramp closure gate ranges from \$10,000 to \$15,000. Note that this is the cost of one gate and that one or two gates are typically installed at one freeway entrance ramp. Average annual operations and maintenance for a single ramp closure gate is estimated to be \$400.

^zCosts to be determined. Partially covered under ongoing programs. Estimated cost for replacement of a utility-owned portion of a water service line is about \$6,000. The cost is dependent upon the length of the pipe and other factors.

^{aa}Costs to be determined. Partially covered under ongoing programs. Homes constructed prior to 1951 are more likely to have lead water supply service lines. Estimated cost for replacement of a typical privately-owned portion of a water service line is between \$3,500 and \$7,000. The cost is dependent upon the length of the pipe and other factors.

^{bb}Costs to be determined. Partially covered under ongoing programs. Private property costs to be expended as needs arise. Homes constructed prior to 1951 are more likely to have lead water supply service lines. Costs of an NSF-certified lead removal filter can vary greatly. Typical costs range between about \$20 and \$130 for a pour-through pitcher-style filter, about \$20 and \$200 for faucet-mounted systems, and about \$80 and \$500 for counter-top systems. The recommended filter change cycle varies from one product to another.

^{cc}Costs to be determined.

Source: SEWRPC.

Table VI-2

**SUMMARY OF KENOSHA COUNTY HAZARD MITIGATION MEASURES
AND PRIMARY IMPLEMENTING GOVERNMENTAL UNITS AND AGENCIES**

Mitigation Measures	Kenosha County	City of Kenosha	Village of Bristol	Village of Paddock Lake	Village of Pleasant Prairie	Village of Silver Lake ^a	Village of Somers	Village of Twin Lakes	Town of Brighton	Town of Paris	Town of Randall	Town of Salem ^a	Town of Somers	Town of Wheatland
<u>Floodland and Environmentally Sensitive Land Preservation Element</u>														
• Floodplain and wetland zoning	KCPD, KCB	CKDCD, CKCC	VBPC, BVV	PLPC, PLVB	PPPC, PPVB	SLPC, SLVB	VSPC, SVB	TLPC, TLVB	KCPD, KCB	KCPD, KCB	KCPD, KCB	KCPD, KCB	KCPD, KCB	KCPD, KCB
• Environmentally sensitive area and open space preservation actions	KCPW	CKDCD, CKPK	VBPC, VBPK	PLPC, PLPK	PPPC, PPPAC	SLPC, SLPW	VSPC, VSPK	TLPC, TLPK	TBPC	TPPC	RPB, RPK	TSPLU, TSPK	SOPC, SOPK	WPLZ
<u>Floodland Management Plan Element</u> <u>Fox River Watershed^b</u>														
• Removal of 203 structures	KCHA	--	--	--	--	--	--	--	--	--	--	--	--	--
• Elizabeth Lake spillway modifications	--	--	--	--	--	--	--	TLPRD	--	--	--	--	--	--
• Hoosier Creek and tributaries brush clearing	--	--	--	--	--	--	--	--	RCBDC	--	--	--	--	--
<u>Root River Watershed^c</u>														
• Channel clearing along the East Branch Root River Canal	RCBDC	--	--	--	--	--	--	--	--	--	--	--	--	--

NOTE: Agency abbreviations in the table are as follows:

BVB	Bristol Village Board	PLPK	Village of Paddock Lake Parks Department	RPK	Town of Randall Park Board	TBPC	Town of Brighton Planning Commission	TSPLU	Town of Salem Planning and Land Use
CKCC	City of Kenosha Common Council	PLVB	Paddock Lake Village Board	SLPC	Village of Silver Lake Planning Commission	TLPC	Village of Twin Lakes Planning Commission	VBPC	Village of Bristol Planning Commission
CKDCD	City of Kenosha Department of City Development	PPPAC	Village of Pleasant Prairie Parks Commission	SLPW	Village of Silver Lake Sanitary Sewer and Public Works Department	TLPK	Village of Twin Lakes Board of Park Commissioners	VBPK	Village of Bristol Parks Department
KCB	Kenosha County Board	PPPC	Village of Pleasant Prairie Planning Commission	SLVB	Silver Lake Village Board	TLPRD	Twin Lakes Lake Protection and Rehabilitation District	VSPC	Village of Somers Park Committee
KCHA	Kenosha County Housing Authority	PPVB	Pleasant Prairie Village Board	SOPC	Town of Somers Planning Commission	TLVB	Twin Lakes Village Board	VSPK	Village of Somers Planning Commission
KCPD	Kenosha County Department of Planning and Development	RCBDC	Racine County Board of Drain Commissioners	SOPK	Town of Somers Parks Commission	TPPC	Town of Paris Planning Commission	WPLZ	Town of Wheatland Planning and Zoning Commission
PLPC	Village of Paddock Lake Planning Commission	RPB	Town of Randall Planning Board	SVB	Somers Village Board	TSPK	Town of Salem Parks Commission		

Mitigation Measures	Kenosha County	City of Kenosha	Village of Bristol	Village of Paddock Lake	Village of Pleasant Prairie	Village of Silver Lake ^a	Village of Somers	Village of Twin Lakes	Town of Brighton	Town of Paris	Town of Randall	Town of Salem ^a	Town of Somers	Town of Wheatland
<u>Pike River Watershed^d</u>														
• Upper Pike River—channel widening/deepening	KCPD, MPSU	--	--	--	--	--	--	--	--	--	--	--	--	--
• Upper Pike River—bridge replacements	KCPW, MPSU	--	--	--	--	--	--	--	--	--	--	--	--	--
• Upper Pike River—aquatic habitat restoration	KCPD, MPSU	--	--	--	--	--	--	--	--	--	--	--	--	--
• Watershedwide—removal of eight structures	KCHA	CKDCD	--	--	--	--	--	--	--	--	--	--	--	--
• Pike Creek—channel improvements, floodwater detention storage, bridge replacements, and aquatic habitat restoration	KCPD	CKPW	--	--	--	--	--	--	--	--	--	--	--	--
• Airport Branch and Tributary to Airport Branch—channel improvements, bridge replacement, and aquatic habitat restoration	KCPD	CKPW	--	--	--	--	--	--	--	--	--	--	--	--
• Somers Branch and tributary channel cleaning	KCPD	--	--	--	--	--	--	--	--	--	--	--	--	--
• Pike River flood mitigation repair work	KCPD	--	--	--	--	--	--	--	--	--	--	--	--	--

NOTE: Agency abbreviations in the table are as follows:

- CKDCD City of Kenosha Department of City Development
- CKPW City of Kenosha Public Works Department
- KCHA Kenosha County Housing Authority
- KCPD Kenosha County Department of Planning and Development
- KCPW Kenosha County Department of Public Works
- MPSU Village of Mount Pleasant Stormwater Utility

Mitigation Measures	Kenosha County	City of Kenosha	Village of Bristol	Village of Paddock Lake	Village of Pleasant Prairie	Village of Silver Lake ^a	Village of Somers	Village of Twin Lakes	Town of Brighton	Town of Paris	Town of Randall	Town of Salem ^a	Town of Somers	Town of Wheatland
<u>Des Plaines River Watershed^e</u>														
• Provision of onsite detention storage facilities for planned new development	KCPD	CKSWU	VBPC	PLPW	PPPC	--	--	--	--	TPPC	--	--	--	--
• Restoration of prairie conditions ^e	KCPD, WDNR	--	--	--	--	--	--	--	--	--	--	--	--	--
• Restoration of wetland conditions ^e	KCPD, WDNR	--	--	--	--	--	--	--	--	--	--	--	--	--
• Floodproofing of 42 residential, commercial, and agricultural structures	KCHA	--	BVB	PLPB	PPCD	--	--	--	--	--	--	TSPLU	SOPC	--
• Elevation of three residential structures	KCHA	--	BVB	--	PPCD	--	--	--	--	--	--	--	--	--
• Removal of 13 residential and agricultural structures	KCHA	--	BVB	--	PPCD	--	--	--	--	--	--	--	SOPC	--
• Upper Des Plaines River sediment monitoring	WDNR	--	--	--	--	--	--	--	--	--	--	--	--	--
• Brighton Creek replacement of 18th Street crossing	KCPW	--	--	--	--	--	--	--	--	--	--	--	--	--
• Center Creek riprap work	KCPD	--	VBPC	--	--	--	--	--	--	--	--	--	--	--
• Chateau Eau Plaines stormwater pond	KCPD	--	--	--	PPPC	--	--	--	--	--	--	--	--	--
• UT-6 to Brighton Creek centralized detention storage	KCPD	--	--	PLPW	--	--	--	--	--	--	--	TSSU	--	--
• UT-6 to Brighton Creek storm sewer improvements	KCPD	--	--	PLPW	--	--	--	--	--	--	--	TSSU	--	--
• UT-6 to Brighton Creek remove seven residential structures	KCHA	--	--	PLPB	--	--	--	--	--	--	--	--	--	--
• UT-1 to Hooker Lake culvert replacement under 83rd Street	KCPW	--	--	PLPW	--	--	--	--	--	--	--	--	--	--

NOTE: Agency abbreviations in the table are as follows:

BVB	Bristol Village Board	PLPB	Village of Paddock Lake Planning and Building	TPPC	Town of Paris Planning Commission
CKSWU	City of Kenosha Stormwater Utility	PLPW	Village of Paddock Lake Public Works Department	TSPLU	Town of Salem Planning and Land Use
KCHA	Kenosha County Housing Authority	PPCD	Village of Pleasant Prairie Department of Community Development	TSSU	Town of Salem Stormwater Utility
KCPD	Kenosha County Department of Planning and Development	PPPC	Village of Pleasant Prairie Planning Commission	VBPC	Village of Bristol Planning Commission
KCPW	Kenosha County Department of Public Works	SOPC	Town of Somers Planning Commission	WDNR	Wisconsin Department of Natural Resources

Mitigation Measures	Kenosha County	City of Kenosha	Village of Bristol	Village of Paddock Lake	Village of Pleasant Prairie	Village of Silver Lake ^a	Village of Somers	Village of Twin Lakes	Town of Brighton	Town of Paris	Town of Randall	Town of Salem ^a	Town of Somers	Town of Wheatland
<u>Lake Michigan Direct Drainage Watershed</u>														
• Removal of six structures	KCHA	CKDCD	--	--	--	--	VSPC	--	--	--	--	--	--	--
• Continued implementation of land acquisition for the Chiwaukee Prairie-Carol Beach area	KCPW	--	--	--	PPPAC	--		--	--	--	--	--	--	--
• Tobin Creek study	--	--	--	--	PPPC	--		--	--	--	--	--	--	--
• Forest Park storm sewer study	--	CKSWU	--	--	--	--		--	--	--	--	--	--	--
• Shagbark Basin	--	CKSWU	--	--	--	--		--	--	--	--	--	--	--
• Spring Brook Innovation Center stormwater management project	--	--	--	--	PPPC	--		--	--	--	--	--	--	--
• Elevation of one residence	--	--	--	--	PPPC	--		--	--	--	--	--	--	--
• Carol Beach Unit 1 sewer system improvements	--	--	--	--	PPPC	--		--	--	--	--	--	--	--
<u>Lake Michigan Coast</u>														
• Removal of eight structures	KCHA	--	--	--	--	--		--	--	--	--	--	--	--
<u>Stormwater Management Plan Element</u>														
• Stormwater management plans	KCPD	CKSWU	VBPC	PLPB	PPPC	SLZA	VSPC	TLPRD	--	--	--	TSSU	--	--
• Stormwater-related regulations	KCPD	CKSWU	VBPC	PLPB	PPPC	SLZA	VSPC	TLPRD	--	--	--	TSSU	--	--
<u>Public Information and Education Element</u>														
• Public education activities	RPWIN	RPWIN	RPWIN	PLPW	RPWIN	RPWIN	RPWIN	TLPW	--	--	--	RPWIN	RPWIN	--
• Public participation activities and coordination with other agencies and units of government	KCPD	CKDCD, CKSWU	VBPC	PLPB	PPCD	SLPC	VSPC	TLPC, TLPRD	--	--	--	TSSU	SOPC	--

NOTE: Agency abbreviations in the table are as follows:

CKDCD	City of Kenosha Department of City Development	KCPW	Kenosha County Department of Public Works	PPPAC	Village of Pleasant Prairie Parks Commission	SLZA	Village of Silver Lake Zoning Administrator	TSSU	Town of Salem Stormwater Utility
CKSWU	City of Kenosha Stormwater Utility	PLPB	Village of Paddock Lake Planning and Building	PPPC	Village of Pleasant Prairie Planning Commission	TLPC	Village of Twin Lakes Planning Commission	VBPC	Village of Bristol Planning Commission
KCHA	Kenosha County Housing Authority	PLPW	Village of Paddock Lake Public Works Department	RPWIN	Root-Pike Watershed Initiative Network	TLPRD	Twin Lakes Lake Protection and Rehabilitation District	VSPC	Village of Somers Planning Commission
KCPD	Kenosha County Department of Planning and Development	PPCD	Village of Pleasant Prairie Department of Community Development	SLPC	Village of Silver Lake Planning Commission	TLPW	Village of Twin Lakes Public Works Department		

Mitigation Measures	Kenosha County	City of Kenosha	Village of Bristol	Village of Paddock Lake	Village of Pleasant Prairie	Village of Silver Lake ^a	Village of Somers	Village of Twin Lakes	Town of Brighton	Town of Paris	Town of Randall	Town of Salem ^a	Town of Somers	Town of Wheatland
Secondary Plan Element														
• National Flood Insurance Program and map updating	FEMA	FEMA	FEMA	FEMA	FEMA	FEMA	FEMA	FEMA	--	--	--	--	--	--
• Lending institution and real estate agent policies	LI, RB	LI, RB	LI, RB	LI, RB	LI, RB	LI, RB	LI, RB	LI, RB	LI, RB	LI, RB	LI, RB	LI, RB	LI, RB	LI, RB
• Channel maintenance	KCPW	CKPW, CKSWU	VBPW	PLPW	PPPW	SLPW	VSPW	TLPW, TLPWD	BFDD	--	--	TSHD, TSSU	--	--
• Stormwater management facilities maintenance	KCPW	CKSWU, CKPW	VBPW	PLPW	PPPW	SLPW	VSPW	TLPW	--	--	--	TSSU, TSHD	--	--
• Survey of buildings near flood hazard areas	KCPW	CKPW	VBPW	PLPW	PPPW	SLPW	VSPW	TLPW	--	--	--	--	--	--
Thunderstorm, High-Wind, Hail, and Lightning Hazards														
Maintain and potentially expand the early warning and communication systems, with emphasis on NOAA All Hazard Weather Radio, EAS broadcasts, and expanded use of emergency technologies	KCEM, UWP	--	--	--	PPVB	--	--	--	--	--	--	--	--	--
Promote educational and informational programming, especially related to the early warning network, and to individual actions to protect citizens, property, and businesses	KCEM	--	--	--	--	--	--	--	--	--	--	--	--	--
Encourage provision of safe rooms	KCEM	--	--	--	--	--	--	--	--	--	--	--	--	--
Work with municipalities and businesses to explore installation of community safe rooms and hardening projects for community facilities, businesses, and manufacturers	KCEM	--	--	--	--	--	--	--	--	--	--	--	--	--

NOTE: Agency abbreviations in the table are as follows:

BFDD	Bristol Farm Drainage District	KCEM	Kenosha County Emergency Management	PPPW	Village of Pleasant Prairie Public Works	TLPW	Village of Twin Lakes Public Works Department	UWP	University of Wisconsin-Parkside
CKPW	City of Kenosha Public Works Department	KCPW	Kenosha County Department of Public Works	RB	Real Estate Brokers	TSHD	Town of Salem Highway Department	VBPW	Village of Bristol Public Works Department
CKSWU	City of Kenosha Stormwater Utility	LI	Lending Institutions	SLPW	Village of Silver Lake Sanitary Sewer and Public Works Department	TSSU	Town of Salem Stormwater Utility	VSPW	Village of Somers Public Works Department
FEMA	Federal Emergency Management Agency	PLPW	Village of Paddock Lake Public Works Department	TLPRD	Twin Lakes Lake Protection and Rehabilitation District				

Mitigation Measures	Kenosha County	City of Kenosha	Village of Bristol	Village of Paddock Lake	Village of Pleasant Prairie	Village of Silver Lake ^a	Village of Somers	Village of Twin Lakes	Town of Brighton	Town of Paris	Town of Randall	Town of Salem ^a	Town of Somers	Town of Wheatland
Thunderstorm, High-Wind, Hail, and Lightning Hazards (continued) Consideration by municipalities of adopting mobile home park regulations that require that community safe rooms be provided for residents of new and expanding mobile home parks	KCPD	CKCC	BVB	PLVB	PPVB	SLVB	SVB	TLVB	--	--	--	--	--	--
Based on community and landowner interest, pursue grant funding for installation of safe rooms in existing mobile home parks	KCEM	--	--	--	--	--	--	--	--	--	--	--	--	--
Encourage agricultural producers to purchase crop insurance	KCPD, FSA	--	--	--	--	--	--	--	--	--	--	--	--	--
Continue to conduct annual weather spotter training	KCEM	--	--	--	--	--	--	--	--	--	--	--	--	--
Continue coordination of emergency operations and response plans among governmental units and first responders	KCEM, KCSD	CKPD, CKFD	VBFD	TSFR	PPPD, PPFD	SLPD, SLRS, TSFR	SOFR	TLFD, TLPD	TSFR, KVR, SLRS	PFR	RFD, TLFD	TSFR	SOFR	WFD, TLFD
Tornadoes Maintain and potentially expand the early warning and communication systems, with emphasis on NOAA All Hazard Weather Radio, EAS broadcasts, and expanded use of emergency technologies	KCEM	--	--	--	--	--	--	--	--	--	--	--	--	--
Retrofit existing or install new structures to ensure adequate shelters from tornadoes for public buildings, major industrial sites, mobile home parks, and other large businesses or complexes such as shopping malls, fairgrounds, and other vulnerable public areas	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO	PO

NOTE: Agency abbreviations in the table are as follows:

BVB	Bristol Village Board	KCEM	Kenosha County Emergency Management	PLVB	Paddock Lake Village Board	SLRS	Silver Lake Rescue Squad	TLVB	Twin Lakes Village Board
CKCC	City of Kenosha Common Council	KCSD	Kenosha County Sheriff's Department	PPFD	Village of Pleasant Prairie Fire Department	SLPD	Village of Silver Lake Police Department	TSFR	Town of Salem Fire and Rescue
CKFD	City of Kenosha Fire Department	KVR	Kansasville Volunteer Fire and Rescue	PPPD	Village of Pleasant Prairie Police Department	SLVB	Silver Lake Village Board	VBFD	Village of Bristol Fire Department
CKPD	City of Kenosha Police Department	PFR	Town of Paris Fire and Rescue	PPVB	Pleasant Prairie Village Board	SOFR	Somers Fire and Rescue Department	WFD	Wheatland Fire Department
FSA	USDA Farm Services Agency	PO	Property Owners	SLFD	Silver Lake Fire Department	SVB	Somers Village Board		

Mitigation Measures	Kenosha County	City of Kenosha	Village of Bristol	Village of Paddock Lake	Village of Pleasant Prairie	Village of Silver Lake ^a	Village of Somers	Village of Twin Lakes	Town of Brighton	Town of Paris	Town of Randall	Town of Salem ^a	Town of Somers	Town of Wheatland
Tornadoes (continued) Work with municipalities and businesses to explore installation of community safe rooms and hardening projects for community facilities, businesses, and manufacturers	KCEM	--	--	--	--	--	--	--	--	--	--	--	--	--
Consideration by municipalities of adopting mobile home park regulations that require that community safe rooms be provided for residents of new and expanding mobile home parks	KCPD	CKCC	BVB	PLVB	PPVB	SLVB	SVB	TLVB	--	--	--	--	--	--
Based on community and landowner interest, pursue grant funding for installation of safe rooms in existing mobile home parks	KCEM	--	--	--	--	--	--	--	--	--	--	--	--	--
Promote educational and informational programming, especially related to the early warning network, and to individual actions to protect citizens, property, and businesses	KCEM	--	--	--	--	--	--	--	--	--	--	--	--	--
Enforce building code ordinance requirements	KCPD	CKDCD	VBBI, VBPC,	PLPB, PLPC	PPBI, PPPC	SLPC, SLVB	VSBI, VSPC	TLBZ, TLPC	TBBI	TPBI	RBI	TSBD	SOBI	WBI
Continue to conduct annual weather spotter training	KCEM	--	--	--	--	--	--	--	--	--	--	--	--	--

NOTE: Agency abbreviations in the table are as follows:

BVB	Bristol Village Board	PLVB	Paddock Lake Village Board	SOBI	Town of Somers Building Inspector	TSBD	Town of Salem Building Department
CKCC	City of Kenosha Common Council	PPBI	Village of Pleasant Prairie Building Inspector	SVB	Somers Village Board	VBBI	Village of Bristol Building Inspector
CKDCD	City of Kenosha Department of City Development	PPPC	Village of Pleasant Prairie Planning Commission	TBBI	Town of Brighton Building Inspector	VBPC	Village of Bristol Planning Commission
KCEM	Kenosha County Emergency Management	PPVB	Pleasant Prairie Village Board	TLBZ	Village of Twin Lakes Building and Zoning Department	VSBI	Village of Somers Building Inspector
KCPD	Kenosha County Department of Planning and Development	RBI	Town of Randall Building Inspector	TLPC	Village of Twin Lakes Planning Commission	VSPC	Village of Somers Planning Commission
PLPB	Village of Paddock Lake Planning and Building	SLPC	Village of Silver Lake Planning Commission	TLVB	Twin Lakes Village Board	WBI	Town of Wheatland Building Inspector
PLPC	Village of Paddock Lake Planning Commission	SLVB	Silver Lake Village Board	TPBI	Town of Paris Building Inspector		

Mitigation Measures	Kenosha County	City of Kenosha	Village of Bristol	Village of Paddock Lake	Village of Pleasant Prairie	Village of Silver Lake ^a	Village of Somers	Village of Twin Lakes	Town of Brighton	Town of Paris	Town of Randall	Town of Salem ^a	Town of Somers	Town of Wheatland
Tornadoes (continued) Continue coordination of emergency response and operations plans among governmental units and first responders	KCEM, KCSD	CKPD, CKFD	VBFD	TSFR	PPPD, PPF	SLPD, SLRS, TSFR	SOFR	TLFD, TLPD	TSFR, KVR, SLRS	PFR	RFD, TLFD	TSFR	SOFR	WFD, TLFD
<u>Extreme Temperature Events</u> Organize neighborhood outreach groups who look after vulnerable groups and individuals	KCEM	--	--	--	--	--	--	--	--	--	--	--	--	--
Provide special arrangements for payment of heating bills	KCWD	--	--	--	--	--	--	--	--	--	--	--	--	--
Identify and advertise a list of available heating and/or cooling shelters in the immediate area	KCEM, KCHS	--	--	--	--	--	--	--	--	--	--	--	--	--
<u>Maintain, update, and upgrade early warning systems and networks. As part of this increase coverage and use of NOAA All Hazard Weather Radio and EAS broadcasts</u>	KCEM	--	--	--	PPVB	--	--	--	--	--	--	--	--	--
Promote educational and informational programming	KCEM	--	--	--	--	--	--	--	--	--	--	--	--	--
<u>Lake Michigan Coastal Hazards</u> Continue enforcement of the County shoreland zoning ordinance	KCPD	--	--	--	--	--	--	--	--	--	--	--	--	--
Review of Lake Michigan shoreline municipal shoreland ordinances	KCPD	CKDCD	--	--	PPPC	--	VSPC	--	--	--	--	--	--	--
Develop a cooperative program to assess the effectiveness of Lake Michigan shoreline protection structures in the County	KCPD	CKDCD	--	--	PPPC	--	VSPC	--	--	--	--	--	--	--

NOTE: Agency abbreviations in the table are as follows:

CKDCD	City of Kenosha Department of City Development	KVR	Kansasville Volunteer Fire and Rescue	SLRS	Silver Lake Rescue Squad
CKFD	City of Kenosha Fire Department	PFR	Town of Paris Fire and Rescue	SOFR	Somers Fire and Rescue
CKPD	City of Kenosha Police Department	PPFD	Village of Pleasant Prairie Fire Department	TLFD	Twin Lakes Fire Department
KCEM	Kenosha County Emergency Management	PPPC	Village of Pleasant Prairie Planning Commission	TLPD	Twin Lakes Police Department
KCHS	Kenosha County Division of Health Services	PPPD	Village of Pleasant Prairie Police Department	TSFR	Town of Salem Fire and Rescue
KCPD	Kenosha County Department of Planning and Development	PPVB	Pleasant Prairie Village Board	VBFD	Village of Bristol Fire Department
KCSD	Kenosha County Sheriff's Department	RFD	Town of Randall Fire Department	VSPC	Village of Somers Planning Commission
KCWD	Kenosha County Department of Workforce Development	SLPD	Silver Lake Police Department	WFD	Town of Wheatland Fire Department

Mitigation Measures	Kenosha County	City of Kenosha	Village of Bristol	Village of Paddock Lake	Village of Pleasant Prairie	Village of Silver Lake ^a	Village of Somers	Village of Twin Lakes	Town of Brighton	Town of Paris	Town of Randall	Town of Salem ^a	Town of Somers	Town of Wheatland
<u>Lake Michigan Coastal Hazards (continued)</u>														
Continue construction and maintenance of shoreline protection structures	KCPW	CKPW	--	--	PPPW	--	VSPW	--	--	--	--	--	--	--
Continue ongoing programs to update and refine coastal hazard area data using geographic information system technology	KCPD	--	--	--	--	--	--	--	--	--	--	--	--	--
Review water and wastewater treatment plant capacity and level of protection under range of Lake Michigan water levels	--	KWU, CKPW	--	--	--	--	--	--	--	--	--	--	--	--
Provide public informational and educational programming	KCEM	--	--	--	--	--	--	--	--	--	--	--	--	--
<u>Winter Storm Events</u>														
Organize neighborhood outreach groups who look after vulnerable groups and individuals	KCEM	--	--	--	--	--	--	--	--	--	--	--	--	--
Provide special arrangements for payment of heating bills	KCWD	--	--	--	--	--	--	--	--	--	--	--	--	--
Identify and advertise a list of available heated shelters in the immediate area	KCEM, KCHS	--	--	--	--	--	--	--	--	--	--	--	--	--
Maintain, update, and upgrade public early warning systems and networks. As part of this, increase coverage and use of NOAA All Hazard Weather Radio and EAS broadcasts	KCEM	--	--	--	PPVB	--	--	--	--	--	--	--	--	--
Promote educational and informational programming	KCEM	--	--	--	--	--	--	--	--	--	--	--	--	--

NOTE: Agency abbreviations in the table are as follows:

CKPW	City of Kenosha Public Works Department	KCPW	Kenosha County Department of Public Works	KCPD	Kenosha County Department of Planning and Development	PPVB	Pleasant Prairie Village Board	VSPW	Village of Somers Public Works Department
KCEM	Kenosha County Emergency Management	KCHS	Kenosha County Division of Health Services	PLPW	Village of Paddock Lake Public Works Department				

Mitigation Measures	Kenosha County	City of Kenosha	Village of Bristol	Village of Paddock Lake	Village of Pleasant Prairie	Village of Silver Lake ^a	Village of Somers	Village of Twin Lakes	Town of Brighton	Town of Paris	Town of Randall	Town of Salem ^a	Town of Somers	Town of Wheatland
<u>Winter Storm Events (continued)</u> Ongoing enforcement of building code ordinance requirements	KCPD	CKDCD	VBBI	PLPI	PPBI	SLBI	VSBI	TLBZ	--	--	--	--	--	--
Work with agencies to establish a system for short-term sheltering	KCEM, KCHS	--	--	--	--	--		--	--	--	--	--	--	--
Continue coordination of emergency response plans among governmental units and first responders	KCEM, KCSD	CKPD, CKFD	VBFD	TSFR	PPPD, PPF	SLPD, SLRS, TSFR	SOFR	TLFD, TLPD	TSFR, KVR, SLRS	PFR	RFD, TLFD	TSFR	SOFR	WFD, TLFD
Continue and refine State, County, and local road maintenance programs	KCPW	CKPW	VBPW	PLPW	PPPW	SLPW	VSPW	TLPW	--	--	--	TSHD	SOPW	--
Work with utilities to assess and improve electrical service reliability	KCEM, WE	--	--	--	--	--	--	--	--	--	--	--	--	--
<u>Drought Events</u> Encourage multi-agency approaches to drought planning, water conservation, drought prediction, and stream and ground water monitoring	FSA, WDNR, USGS	--	--	--	--	--	--	--	--	--	--	--	--	--
Promote educational and informational programming	KCEM	--	--	--	--	--	--	--	--	--	--	--	--	--

NOTE: Agency abbreviations in the table are as follows:

CKDCD	City of Kenosha Department of City Development	KVR	Kansasville Volunteer Fire and Rescue	SLRS	Silver Lake Rescue Squad	USGS	U.S. Geological Survey
CKFD	City of Kenosha Fire Department	PLPI	Village of Paddock Lake Building Inspector	SOFR	Somers Fire and Rescue	VBBI	Village of Bristol Building Inspector
CKPD	City of Kenosha Police Department	PLPW	Village of Paddock Lake Public Works Department	SOPW	Town of Somers Public Works Department	VBFD	Village of Bristol Fire Department
CKPW	City of Kenosha Department of Public Works	PPBI	Village of Pleasant Prairie Building Inspector	PFR	Town of Paris Fire and Rescue	VBPW	Village of Bristol Public Works Department
FSA	U.S. Department of Agriculture Farm Services Agency	PPFD	Village of Pleasant Prairie Fire Department	RFD	Town of Randall Fire Department	VSBI	Village of Somers Building Inspector
KCEM	Kenosha County Emergency Management	PPPD	Village of Pleasant Prairie Police Department	TLFD	Village of Twin Lakes Fire and Rescue Department	VSPW	Village of Somers Public Works Department
KCHS	Kenosha County Division of Health Services	PPPW	Village of Pleasant Prairie Public Works Department	TLPD	Village of Twin Lakes Police Department	WFD	Town of Wheatland Fire Department
KCPD	Kenosha County Department of Planning and Development	SLBI	Village of Silver Lake Building Inspector	TSFR	Town of Salem Fire and Rescue	WDNR	Wisconsin Department of Natural Resources
KCPW	Kenosha County Department of Public Works	SLPD	Village of Silver Lake Police Department	TLBZ	Village of Twin Lakes Building and Zoning Department	WE	We Energies
KCSD	Kenosha County Sheriff's Department	SLPW	Village of Silver Lake Public Works Department	TSHD	Town of Salem Highway Department		

Mitigation Measures	Kenosha County	City of Kenosha	Village of Bristol	Village of Paddock Lake	Village of Pleasant Prairie	Village of Silver Lake ^a	Village of Somers	Village of Twin Lakes	Town of Brighton	Town of Paris	Town of Randall	Town of Salem ^a	Town of Somers	Town of Wheatland
Drought Events (continued)														
Support agricultural programs that promote soil health, preserve soil moisture, and help to minimize loss of crops and topsoil in the event of a drought	KCPD, NRCS, FSA	--	--	--	--	--	--	--	--	--	--	--	--	--
Evaluate and design water supply systems that are not vulnerable to drought	KCPD	KWU	BUD1, BUD3	PLWU	PPWU	--	SOWU	--	--	--	--	--	SOWU	--
Encourage farm operators to evaluate the economics of crop insurance programs	FSA, KCPD	--	--	--	--	--	--	--	--	--	--	--	--	--
Fog														
Organize neighborhood outreach groups who look after vulnerable groups and individuals	KCEM	--	--	--	--	--	--	--	--	--	--	--	--	--
Maintain, update, and upgrade public early warning systems and networks. As part of this, increase coverage and use of NOAA All Hazard Weather Radio and EAS broadcasts	KCEM	--	--	--	PPVB	--	--	--	--	--	--	--	--	--
Increase public education and awareness of the potential severity of hazardous fog events	KCEM	--	--	--	--	--	--	--	--	--	--	--	--	--
Produce and distribute emergency preparedness information related to fog events	KCEM	--	--	--	--	--	--	--	--	--	--	--	--	--
Fire														
Promote activities that physically stop the spread of fire	--	CKFD	VBFD	TSFR	PPFD	SLRS, TSFR	SOFR	TLFD	TSFR, KVR	PFR	RFD	TSFR	SOFR	WFD
Promote emergency restrictions on fire causing activities	--	CKFD	VBFD	TSFR	PPFD	SLRS, TSFR	SOFR	TLFD	TSFR, KVR	PFR	RFD	TSFR	SOFR	WFD

BUD1	Bristol Utility District No. 1	KWU	Kenosha Water Utility	SLRS	Silver Lake Rescue Service
BUD3	Bristol Utility District No. 3	NRCS	Natural Resources Conservation Service	SOFR	Somers Fire and Rescue Department
CKFD	City of Kenosha Fire Department	PFR	Town of Paris Fire and Rescue	SOWU	Somers Water Utility
FSA	U.S. Department of Agriculture Farm Services Agency	PPFD	Village of Pleasant Prairie Fire Department	TLFD	Village of Twin Lakes Fire and Rescue Department
KCEM	Kenosha County Emergency Management	PLWU	Village of Paddock Lake Water Utility	TSFR	Town of Salem Fire and Rescue
KCPD	Kenosha County Department of Planning and Development	PPWU	Village of Pleasant Prairie Water Utility	VBFD	Village of Bristol Fire Department
KVR	Kansasville Volunteer Fire and Rescue	RFD	Town of Randall Fire Department	WFD	Wheatland Fire Department

Mitigation Measures	Kenosha County	City of Kenosha	Village of Bristol	Village of Paddock Lake	Village of Pleasant Prairie	Village of Silver Lake ^a	Village of Somers	Village of Twin Lakes	Town of Brighton	Town of Paris	Town of Randall	Town of Salem ^a	Town of Somers	Town of Wheatland
<u>Fire (continued)</u> Offer training and exercises for local and regional fire fighters and acquire additional fire equipment	KCEM	CKFD	VBFD	TSFR	PPFD	SLRS, TSFR	SOFR	TLFD	TSFR, KVR	PFR	RFD	TSFR	SOFR	WFD
Map hazard areas and vulnerable structures		CKFD	VBFD	TSFR	PPFD	SLRS, TSFR	SOFR	TLFD	TSFR, KVR	PFR	RFD	TSFR	SOFR	WFD
Support fire prevention, education, and enforcement programs, and enhance fire hazard awareness for landowners and visitors	KCEM	CKFD	VBFD	TSFR	PPFD	SLRS, TSFR	SOFR	TLFD	TSFR, KVR	PFR	RFD	TSFR	SOFR	WFD
<u>Transportation Accident-Related Events</u> Adopt and implement the recommendations made in the VISION 2050 Regional land use and transportation system plan related to monitoring and improving the transportation system through design, routing, and traffic control problem areas including:														
Expand the use of emergency vehicle preemption traffic signals	KCPW, KCTSC	CKPW	VBPW	PLPW	PPPW	SLPW	SOPW	TLPW	BTB	PTB	RTB	TSHD	SOPW	WTB
Consider and implement intersection improvements such as two-or four-way stop control, roundabouts, or signalization at arterial street and highway intersections	WDOT, KCPW, KCTSC	CKPW	VBPW	PLPW	PPPW	SLPW	SOPW	TLPW	BTB	PTB	RTB	TSHD	SOPW	WTB

NOTE: Agency abbreviations in the table are as follows:

BTB	Brighton Town Board	PPPW	Village of Pleasant Prairie Public Works Department	TLPW	Village of Twin Lakes Public Works Department
CKFD	City of Kenosha Fire Department	PTB	Paris Town Board	TSFR	Town of Salem Fire and Rescue
CKPW	City of Kenosha Public Works Department	RFD	Town of Randall Fire Department	TSHD	Town of Salem Highway Department
KCEM	Kenosha County Emergency Management	RTB	Randall Town Board	VBFD	Village of Bristol Fire Department
KCPW	Kenosha County Department of Public Works	SLRS	Silver Lake Rescue Squad	VBPW	Village of Bristol Public Works Department
KCTSC	Kenosha County Traffic Safety Commission	SLPW	Village of Silver Lake Public Works Department	VSPW	Village of Somers Public Works Department
KVR	Kansasville Volunteer Fire and Rescue	SOFR	Somers Fire and Rescue Department	WDOT	Wisconsin Department of Transportation
PFR	Town of Paris Fire and Rescue	SOPW	Town of Somers Public Works Department	WFD	Wheatland Fire Department
PLPW	Village of Paddock Lake Public Works Department	TLFD	Village of Twin Lakes Fire and Rescue Department	WTB	Wheatland Town Board
PPFD	Village of Pleasant Prairie Fire Department				

Mitigation Measures	Kenosha County	City of Kenosha	Village of Bristol	Village of Paddock Lake	Village of Pleasant Prairie	Village of Silver Lake ^a	Village of Somers	Village of Twin Lakes	Town of Brighton	Town of Paris	Town of Randall	Town of Salem ^a	Town of Somers	Town of Wheatland
<u>Transportation Accident-Related Events (continued)</u>														
Continue and expand the use of closed circuit television cameras (CCTV) on heavily traveled freeways, highways, and arterial streets	WDOT	--	--	--	--	--	--	--	--	--	--	--	--	--
Continue and expand the use of advisory information measures including variable message signs (VMS) on the freeway system and at appropriate arterial street and highway locations	WDOT	--	--	--	--	--	--	--	--	--	--	--	--	--
Consider expanding the use of ramp closure gates to allow for rapid closure of freeway on-ramps during major traffic incidents, inclement weather, or special events	WDOT	--	--	--	--	--	--	--	--	--	--	--	--	--
Consider providing bicycle accommodations through bicycle lanes, paved shoulders, widened outside travel lanes, or enhanced bicycle facilities, where feasible when existing surface arterial street system is resurfaced and reconstructed and as new surface arterial roads are constructed	KCPW	CKPW	VBPW	PLPW	PPPW	SLPW	SOPW	TLPW	BTB	PTB	RTB	TSHD	SOPW	WTB
Expand the use of freeway service patrols to include Kenosha County	KCSD, WSP	--	--	--	--	--	--	--	--	--	--	--	--	--
Promote educational and informational programming, especially related to driver safety, and to individual actions to protect citizens, property, and businesses	KCEM	--	--	--	--	--	--	--	--	--	--	--	--	--

NOTE: Agency abbreviations in the table are as follows:

BTB	Brighton Town Board	PLPW	Village of Paddock Lake Public Works Department	SLPW	Village of Silver Lake Public Works Department	VBFD	Village of Bristol Public Works Department
CKPD	City of Kenosha Public Works Department	PPPW	Village of Pleasant Prairie Public Works Department	SOPW	Town of Somers Public Works Department	WDOT	Wisconsin Department of Transportation
KCEM	Kenosha County Department of Public Works	PTB	Paris Town Board	TLPW	Village of Twin Lakes Public Works Department	WSP	Wisconsin State Patrol
KCSD	Kenosha County Sheriff's Department	RTB	Randall Town Board	TSHD	Town of Salem Highway Department	WTB	Wheatland Town Board

Mitigation Measures	Kenosha County	City of Kenosha	Village of Bristol	Village of Paddock Lake	Village of Pleasant Prairie	Village of Silver Lake ^a	Village of Somers	Village of Twin Lakes	Town of Brighton	Town of Paris	Town of Randall	Town of Salem ^a	Town of Somers	Town of Wheatland
<u>Transportation Accident-Related Events (continued)</u>														
Continue to monitor and improve the transportation system through design, routing, and traffic control at problem areas	KCPW, KCTSC	CKPW	VBPW	PLPW	PPPW	SLPW	VSPW	TLPW	BTB	PTB	RTB	TSHD	SOPW	WTB
Expand the use of emergency vehicle preemption at traffic signals	KCPW	CKPW	VBPW	PLPW	PPPW	SLPW	VSPW	TLPW	KCPW	KCPW	KCPW	TSHD, KCPW	SOPW, KCPW	KCPW
Continue to promote traffic-related law enforcement including enforcement for traffic violations, weight and travel restrictions, designated truck routes, distracted driving, and use of safety restraints	KCSD, WSP	CKPD	KCSD	KCSD	PPPD	SLPD	KCSD	TLPD	KCSD	KCSD	KCSD	KCSD	KCSD	KCSD
Continue to evaluate and refine safety components of railway facilities	FRA, NTSB	--	--	--	--	--	--	--	--	--	--	--	--	--
Continue to evaluate and refine safety components of airport facilities	FAA, NTSB	--	--	--	--	--	--	--	--	--	--	--	--	--
Continue to support training, state-of-the-art equipment, planning, and preparedness of first responders, as well as search and rescue teams	KCEM, KCSD	CKPD, CKFD	VBFD	TSFR	PPPD, PPFD	SLPD, SLRS, TSFR	SOFR	TLPD, TLPD	TSFR, KVR	PFR	RFD	TSFR	SOFR	WFD

NOTE: Agency abbreviations in the table are as follows:

BTB	Brighton Town Board	KCTSC	Kenosha County Traffic Safety Commission	RTB	Randall Town Board	TSFR	Town of Salem Fire and Rescue
CKFD	City of Kenosha Fire Department	KVR	Kansasville Volunteer Fire and Rescue	SLPD	Village of Silver Lake Police Department	TSHD	Town of Salem Highway Department
CKPD	City of Kenosha Police Department	NSTB	National Traffic Safety Board	SLPW	Village of Silver Lake Public Works Department	VBFD	Village of Bristol Fire Department
CKPW	City of Kenosha Public Works Department	PLPW	Village of Paddock Lake Public Works Department	SLRS	Silver Lake Rescue Squad	VBPW	Village of Bristol Public Works Department
FAA	Federal Aviation Administration	PPFD	Village of Pleasant Prairie Fire Department	SOFR	Somers Fire and Rescue Department	VSPW	Village of Somers Public Works Department
FRA	Federal Railroad Administration	PPPD	Village of Pleasant Prairie Police Department	SOPW	Town of Somers Public Works Department	WFD	Wheatland Fire Department
KCEM	Kenosha County Emergency Management	PPPW	Village of Pleasant Prairie Public Works Department	TLPD	Village of Twin Lakes Fire and Rescue Department	WSP	Wisconsin State Patrol
KCSD	Kenosha County Sheriff's Department	PTB	Paris Town Board	TLPD	Village of Twin Lakes Police Department	WTB	Wheatland Town Board
KCPW	Kenosha County Public Works Department	RFD	Town of Randall Fire Department	TPPW	Village of Twin Lake Public Works Department		

Mitigation Measures	Kenosha County	City of Kenosha	Village of Bristol	Village of Paddock Lake	Village of Pleasant Prairie	Village of Silver Lake ^a	Village of Somers	Village of Twin Lakes	Town of Brighton	Town of Paris	Town of Randall	Town of Salem ^a	Town of Somers	Town of Wheatland
<u>Contamination or Loss of Water Supply</u> Promote educational and informational programming related to water safety issues	KCEM	KWU	BUD1, BUD3	PLWU	PPWU	--	SOWU	--	--	--	--	--	SOWU	--
Encourage multi-agency approaches to water conservation, loss and contamination prevention and trend-monitoring	--	KWU	BUD1, BUD3	PLWU	PPWU	--	SOWU	--	--	--	--	--	SOWU	--
Prepare emergency operation and emergency drinking water supply plans for each public water supply system	--	KWU	BUD1, BUD3	PLWU	PPWU	--		--	--	--	--	--	SOWU	--
Continue to coordinate emergency response plans among governmental units and first responders	KCEM, KCSD	CKPD, CKFD	VBFD	TSFR	PPPD, PPFD	SLPD, SLRS, TSFR	SOFR	TLFD, TLPD	TSFR, KVR, SLRS	PFR	RFD, TLFD	TSFR	SOFR, SOWU	WFD, TLFD
Develop and implement plans to systematically replace publically owned water service lines and other public water supply infrastructure that are known to contain lead	--	KWU	BUD1, BUD3	PLWU	PPWU	--	SOWU	--	--	--	--	--	SOWU	--
Educate the public on, and promote the replacement of, privately owned portions of water service lines and other plumbing fixtures that contain lead. Pursue available funding opportunities to help offset the cost of these improvements to residents	--	KWU	BUD1, BUD3	PLWU	PPWU	--	SOWU	--	--	--	--	--	SOWU	--
Promote the use of water filtration devices on drinking water sources in homes where there are known lead service lines, lead plumbing, or lead fixtures and where replacement of the lead service line or plumbing fixture is not currently feasible	KCEM, KCHD	KWU	BUD1, BUD3	PLWU	PPWU	--	SOWU	--	--	--	--	--	SOWU	--

BUD1	Bristol Utility District No. 1	KVR	Kansasville Volunteer Fire and Rescue	PPWU	Village of Pleasant Prairie Water Utility	TLFD	Village of Twin Lakes Fire and Rescue Department
BUD3	Bristol Utility District No. 3	KWU	Kenosha Water Utility	RFD	Town of Randall Fire Department	TLPD	Village of Twin Lakes Police Department
CKFD	City of Kenosha Fire Department	PFR	Town of Paris Fire and Rescue	SLPD	Village of Silver Lake Police Department	TSFR	Town of Salem Fire and Rescue
CKPD	City of Kenosha Police Department	PLWU	Paddock Lake Water Utility	SLRS	Silver Lake Rescue Squad	VBFD	Village of Bristol Fire Department
KCEM	Kenosha County Emergency Management	PPFD	Village of Pleasant Prairie Fire Department	SOFR	Somers Fire and Rescue Department	WFD	Wheatland Fire Department
KCSD	Kenosha County Sheriff's Department	PPPD	Village of Pleasant Prairie Police Department	SOWU	Town of Somers Water Utility		

Mitigation Measures	Kenosha County	City of Kenosha	Village of Bristol	Village of Paddock Lake	Village of Pleasant Prairie	Village of Silver Lake ^a	Village of Somers	Village of Twin Lakes	Town of Brighton	Town of Paris	Town of Randall	Town of Salem ^a	Town of Somers	Town of Wheatland
<u>Contamination or Loss of Water Supply (continued)</u>														
Prepare, update, and implement wellhead protection plans	--	--	BUD1, BUD3	PLWU	--	--	SOWU	--	--	--	--	--	--	--
<u>Hazardous Material Events</u>														
Continue participation in the Wisconsin Hazardous Materials Response System	KCEM	--	--	--	--	--	--	--	--	--	--	--	--	--
Promote educational and informational programming related to hazardous material safety, and to individual actions to protect citizens, property, and businesses	KCEM	--	--	--	--	--	--	--	--	--	--	--	--	--
Promote development of site emergency plans for schools, factories, office buildings, shopping malls, hospitals, and other appropriate sites that produce, store, or utilize hazardous materials or that are near fixed facilities or transportation routes where hazardous materials are produced, used, stored, or transported	KCEM	--	--	--	--	--	--	--	--	--	--	--	--	--
Promote community and operator compliance with industry safety regulations and standards	KCLEPC	--	--	--	--	--	--	--	--	--	--	--	--	--
Promote ongoing enforcement of Federal, State, and County regulatory standards	KCLEPC	--	--	--	--	--	--	--	--	--	--	--	--	--

NOTE: Agency abbreviations in the table are as follows:

BUD1 Bristol Utility District No. 1 KCEM Kenosha County Emergency Management PLWU Paddock Lake Water Utility SOWU Town of Somers Water Utility
BUD3 Bristol Utility District No. 3 KCLEPC Kenosha County Local Emergency Planning Committee

Mitigation Measures	Kenosha County	City of Kenosha	Village of Bristol	Village of Paddock Lake	Village of Pleasant Prairie	Village of Silver Lake ^a	Village of Somers	Village of Twin Lakes	Town of Brighton	Town of Paris	Town of Randall	Town of Salem ^a	Town of Somers	Town of Wheatland
<u>Hazardous Material Events (continued)</u> Support existing or consider expansion of household waste management control programs, which should include hazardous material disposal sites for public citizens	KCHS KCEM, KCB	CKCC	BVB	PLVB	PPVB	SLVB	SVB	TLVB	BTB	PTB	RTB	SATB	SOTB	WTB
Promote continued maintenance and upgrading of transportation infrastructure carrying shipments of hazardous cargo	WDOT, KCPW, KCTSC	CKPW	VBPW	PLPW	PPPW	SLPW	SOPW	TLPW	BTB	PTB	RTB	TSHD	SOPW	WTB
Educate businesses and those utilizing hazardous materials of their responsibilities	KCEM													
Continue support of training, equipment, planning, and preparedness of first responders, for mass casualty incidents involving hazardous materials at fixed facilities and transportation systems. Training should include refresher training.	KCEM, KCSD	CKPD, CKFD	VBFD	TSFR	PPPD, PPFD	SLPD, TSFR, SLRS	SOFR	TLPD, TLFD	TSFR, KVR	PFR	RFD	TSFR	SOFR	WFD

NOTE: Agency abbreviations in the table are as follows:

BTB	Brighton Town Board	KCSD	Kenosha County Sheriff's Department	RTB	Randall Town Board	TLPW	Village of Twin Lakes Public Works Department
BVB	Bristol Village Board	KVR	Kansasville Volunteer Fire and Rescue	SATB	Salem Town Board	TLVB	Twin Lakes Village Board
CKCC	City of Kenosha Common Council	PFR	Town of Paris Fire and Rescue	SLPD	Village of Silver Lake Police Department	TSFR	Town of Salem Fire and Rescue
CKFD	City of Kenosha Fire Department	PLPW	Village of Paddock Lake Public Works Department	SLPW	Village of Silver Lake Public Works Department	TSHD	Town of Salem Highway Department
CKPD	City of Kenosha Police Department	PLVB	Paddock Lake Village Board	SLVB	Silver Lake Village Board	VBFD	Village of Bristol Fire Department
CKPW	City of Kenosha Public Works Department	PPFD	Village of Pleasant Prairie Fire Department	SLRS	Silver Lake Rescue Squad	VBPW	Village of Bristol Public Works Department
KCB	Kenosha County Board	PPPD	Village of Pleasant Prairie Police Department	SOFR	Somers Fire and Rescue Department	WFD	Wheatland Fire Department
KCEM	Kenosha County Emergency Management	PPPW	Village of Pleasant Prairie Public Works Department	SOPW	Town of Somers Public Works Department	WDOT	Wisconsin Department of Transportation
KCHS	Kenosha County Division of Health Services	PPVB	Pleasant Prairie Village Board	SVB	Somers Village Board	WTB	Wheatland Town Board
KCLEPC	Kenosha County Local Emergency Planning Committee	PTB	Paris Town Board	TLFD	Village of Twin Lakes Fire and Rescue Department	WDOT	Wisconsin Department of Transportation
KCPW	Kenosha County Department of Public Works	RFD	Town of Randall Fire Department	TLPD	Village of Twin Lakes Police Department	WTB	Wheatland Town Board
KCTSC	Kenosha County Traffic Safety Commission						

Mitigation Measures	Kenosha County	City of Kenosha	Village of Bristol	Village of Paddock Lake	Village of Pleasant Prairie	Village of Silver Lake ^a	Village of Somers	Village of Twin Lakes	Town of Brighton	Town of Paris	Town of Randall	Town of Salem ^a	Town of Somers	Town of Wheatland
<u>Hazardous Material Events (continued)</u>														
Continue coordination of emergency response plans among governmental units, businesses, and first responders	KCEM, KCSD	CKPD, CKFD	VBFD	TSFR	PPPD, PPFD	SLPD, TSFR, SLRS	SOFR	TLPD, TLFD	TSFR, KVR	PFR	RFD	TSFR	SOFR	WFD
<u>Terrorism Incidents</u>														
Maintain, update, and upgrade public early warning systems and networks. As part of this, increase coverage and use of NOAA All Hazard Weather Radio and EAS broadcasts	KCEM	--	--	--	PPVB	--	--	--	--	--	--	--	--	--
Continue and expand educational and informational programming related to public health and safety issues due to terrorist incidents	KCEM, KCHS	--	--	--	--	--	--	--	--	--	--	--	--	--
Consider the need to strengthen public health infrastructure to support surveillance, response, reporting, and research, and to implement prevention and control programs from potential chemical and bio-terrorism attacks	KCHS	--	--	--	--	--	--	--	--	--	--	--	--	--
Continue maintenance and potentially enhance security measures at water treatment facilities, including increased pathogen and chemical monitoring and emergency drinking water supply source alternative planning	--	KWU	BUD1, BUD3	PLWU	PPWU	--	SOWU	--	--	--	--	--	SOWU	--

NOTE: Agency abbreviations in the table are as follows:

BUD1	Bristol Utility District No. 1	KVR	Kansasville Volunteer Fire and Rescue	PPVB	Pleasant Prairie Village Board	SOWU	Town of Somers Water Utility
BUD3	Bristol Utility District No. 3	KWU	Kenosha Water Utility	PPWU	Village of Pleasant Prairie Water Utility	TLFD	Village of Twin Lakes Fire and Rescue Department
CKFD	City of Kenosha Fire Department	PFR	Town of Paris Fire and Rescue	RFD	Town of Randall Fire Department	TLPD	Village of Twin Lakes Police Department
CKPD	City of Kenosha Police Department	PLWU	Village of Paddock Lake Water Utility	SLPD	Village of Silver Lake Police Department	TSFR	Town of Salem Fire and Rescue
KCEM	Kenosha County Emergency Management	PPFD	Village of Pleasant Prairie Fire Department	SLRS	Silver Lake Rescue Squad	VBFD	Village of Bristol Fire Department
KCHS	Kenosha County Department of Health Services	PPPD	Village of Pleasant Prairie Police Department	SOFR	Somers Fire and Rescue Department	WFD	Wheatland Fire Department
KCSD	Kenosha County Sheriff's Department						

Mitigation Measures	Kenosha County	City of Kenosha	Village of Bristol	Village of Paddock Lake	Village of Pleasant Prairie	Village of Silver Lake ^a	Village of Somers	Village of Twin Lakes	Town of Brighton	Town of Paris	Town of Randall	Town of Salem ^a	Town of Somers	Town of Wheatland
Terrorism Incidents (continued)														
Continue support of training, equipment, planning, and preparedness for local law enforcement, fire and rescue departments, and other emergency management services	KCEM, KCSD	CKPD, CKFD	VBFD	TSFR	PPPD, PPF	SLPD, SLRS, TSFR	SOFR	TLPD, TLF	TSFR, KVR	PFR	RFD	TSFR	SOFR	WFD
Continue coordination of emergency response plans among Federal, State, and local governmental units, businesses, and emergency management services	KCEM, KCSD	CKPD, CKFD	VBFD	TSFR	PPPD, PPF	SLPD, SLRS, TSFR	SOFR	TLPD, TLF	TSFR, KVR	PFR	RFD	TSFR	SOFR	WFD
Establish and train community emergency response team	KCSD	CKFD	VBFD	TSFR	PPFD	TSFR	SOFR	TLFD	TSFR, KVR	PFR	RFD	TSFR	SOFR	WFD
Expand neighborhood watch program	KCSD	CKPD	KCSD	KCSD	PPPD	SLPD	KCSD	TLPD	KCSD	KCSD	KCSD	KCSD	KCSD	KCSD
Power Outages														
Continue to review and implement programs to improve reliability of power supply facilities	WE	--	--	--	--	--	--	--	--	--	--	--	--	--
Coordinate activities and communication regarding prevention and response to power outages	KCEM	--	--	--	--	--	--	--	--	--	--	--	--	--
Encourage backup power generation facilities	KCEM	--	--	--	--	--	--	--	--	--	--	--	--	--
Continue and refine public informational and educational programming	KCEM	--	--	--	--	--	--	--	--	--	--	--	--	--
Conduct outreach to businesses and facilities to encourage them to develop plans for dealing with and resuming operations after long-term power outages.	KCEM	--	--	--	--	--	--	--	--	--	--	--	--	--

NOTE: Agency abbreviations in the table are as follows:

CKFD	City of Kenosha Fire Department	PFR	Town of Paris Fire and Rescue	SLRS	Silver Lake Rescue Squad	TSFR	Town of Salem Fire and Rescue
CKPD	City of Kenosha Police Department	PPFD	Village of Pleasant Prairie Fire Department	SOFR	Somers Fire and Rescue Department	VBFD	Village of Bristol Fire Department
KCEM	Kenosha County Emergency Management	PPPD	Village of Pleasant Prairie Police Department	TLFD	Village of Twin Lakes Fire and Rescue Department	WE	We Energies
KCSD	Kenosha County Sheriff's Department	SLPD	Village of Silver Lake Police Department	TLPD	Village of Twin Lakes Police Department	WFD	Wheatland Fire Department
KVR	Kansasville Volunteer Fire and Rescue						

^aOn November 21, 2016 the Wisconsin Department of Administration approved a cooperative plan submitted by the Village of Silver Lake and the Town of Salem. Effective February 14, 2017 the two municipalities merged to become the Village of Salem Lakes. As of February 14, 2017, the plan implementation responsibilities for the Village of Silver Lake and the Town of Salem are assigned to the Village of Salem Lakes.

^bThis mitigation measure is the recommended alternative from SEWRPC Planning Report No. 12, A Comprehensive Plan for the Fox River Watershed, Volume Two, February 1970.

^c*This mitigation measure is the recommended alternative from SEWRPC Planning Report No. 9, A Comprehensive Plan for the Root River Watershed, July 1966.*

^d*These mitigation measures are the recommended alternatives from SEWRPC Planning Report No. 35, A Comprehensive Plan for the Pike River Watershed, June 1983; SEWRPC Amendment to the Pike River Watershed Plan, City of Kenosha/Town of Somers, June 1987; and SEWRPC Amendment to the Pike River Watershed Plan, Kenosha and Racine Counties, March 1996.*

^e*These mitigation measures are the recommended alternatives from SEWRPC Planning Report No. 44, A Comprehensive Plan for the Des Plaines River Watershed, June 2003.*

^f*Prairie and wetland restoration to be carried out at discretion of property owners.*

Source: SEWRPC.

Table VI-3

ELIGIBLE ACTIVITIES UNDER FEDERAL HAZARD MITIGATION GRANT PROGRAMS

Eligible Activity	Hazard Mitigation Grant Program	Flood Mitigation Assistance Program	Pre-Disaster Mitigation Program
Mitigation Projects	Y	Y	Y
Property Acquisition and Structure Demolition	Y	Y	Y
Property Acquisition and Structure Relocation	Y	Y	Y
Structure Elevation	Y	Y	Y
Mitigation Reconstruction	Y	Y	Y
Dry Floodproofing of Historic Residential Structures	Y	Y	Y
Dry Floodproofing of Non-residential Structures	Y	Y	Y
Generators	Y	--	Y
Localized Flood Risk Reduction Projects	Y	Y	Y
Non-localized Flood Risk Reduction Projects	Y	--	Y
Structural Retrofitting of Existing Buildings and Facilities	Y	Y	Y
Non-structural Retrofitting of Existing Buildings and Facilities	Y	Y	Y
Safe Room Construction	Y	--	Y
Wind Retrofit for One- and Two Family Residences	Y	--	Y
Infrastructure Retrofit	Y	Y	Y
Soil Stabilization	Y	Y	Y
Wildfire Mitigation	Y	--	Y
Post-Disaster Code Enforcement	Y	--	--
Advance Assistance	Y	--	--
5 Percent Initiative Projects	Y	--	--
Miscellaneous/Other ^a	Y	Y	Y
Hazard Mitigation Planning	Y	Y	Y
Planning Related Activities	Y	--	--
Technical Assistance	--	Y	--
Management Cost	Y	Y	Y

^aMiscellaneous/Other indicates that any proposed action will be evaluated on its own merit against program requirements. Eligible projects may be approved provided funding is available.

Source: Federal Emergency Management Agency.

Appendix A

**KENOSHA COUNTY HAZARD MITIGATION LOCAL
PLANNING TEAM AGENDAS AND MEETING SUMMARY
NOTES, INFORMATION ON PUBLIC MEETING, AND
PERTINENT COMMITTEE MEMBERSHIP LISTS**

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Figure A-1

**MEMBERS OF THE KENOSHA COUNTY
HAZARD MITIGATION LOCAL PLANNING TEAM**

Lt. Gil S. Benn, Chair	Director (retired), Kenosha County Division of Emergency Management
Lt. Horace J. Staples, Chair	Director, Kenosha County Division of Emergency Management
Joseph E. Boxhorn, Secretary	Senior Planner, Southeastern Wisconsin Regional Planning Commission
Ray Arbet	Director, Kenosha County Department of Public Works
Megan Beauchaine	Research Analyst, Southeastern Wisconsin Regional Planning Commission
Bill Beth	Deputy Director, Kenosha County Division of Emergency Management
Michael Blodgett	Assistant Communications Manager, Kenosha Joint Services
Andy M. Buehler	Director, Kenosha County Department of Planning and Development
Jeffrey Cross	Planner, Southeastern Wisconsin Regional Planning Commission
Roger Field	Director of Production, Kenosha Water Utility
Matt Fineour	Village Engineer, Village of Pleasant Prairie
Capt. Christine Flahive	City of Kenosha Fire Department
William Glembocki	Chairman, Town of Wheatland
Robert Grieshaber	Safety-Risk Manager, University of Wisconsin-Parkside
Matthew N. Haerter	Battalion Chief, City of Kenosha Fire Department
Benjamin Harbach	Chairman, Town of Somers
Jerry Helment	Planning Commissioner, Town of Brighton
Laura K. Herrick	Chief Environmental Engineer, Southeastern Wisconsin Regional Planning Commission
William Hoare	Associate Vice President, Carthage College
Lt. Peter Jung	Village of Pleasant Prairie Police Department
Randall Kerkman	Administrator, Village of Bristol
John Klabecek	Director of Security, Carthage College
David Lewis	Assistant General Manager, Kenosha Water Utility
Dennis Linn	Captain, Village of Twin Lakes Police Department
Doug McElmury	Fire Chief, Village of Pleasant Prairie
John Meland	Principal Specialist, Southeastern WI Regional Planning Commission
Mark Melotik	Director of Environmental Health, Kenosha County Health Department
Darron Newton	Detentions Supervisor, Kenosha County Sheriff's Department
Aaron Owens	Planner, Southeastern Wisconsin Regional Planning Commission
Chris Parisey	Director Kenosha County Housing Authority/Planner SEWRPC
Peter Parker	Fire Chief, Village of Bristol Fire Department
Nakeisha N. Payne	Public Involvement and Outreach Specialist, SEWRPC
Tim Popanda	Administrator, Village of Paddock Lake
Leigh Presley	Agriculture Educator for Kenosha and Racine Counties, University of Wisconsin-Extension
Kyle Roeder	Disaster Program Manager, American Red Cross
Mike Schrandt	Facilities Manager, Kenosha County Division of Facilities
Ken Schroeder	Battalion Chief, City of Kenosha Fire Department
Tom Shircel	Assistant Village Administrator, Village of Pleasant Prairie
Mike Slover	Chief, Salem Fire and Rescue
David Smetana	Chief of Police, Village of Pleasant Prairie
Dan Treloar	County Conservationist Kenosha County Department of Planning and Development
Capt. Ken Weyker	Commander of Field Operations, Kenosha County Sheriff's Department
Tedi Winnett	Director, Kenosha County University of Wisconsin-Extension
Steve Wlahovich	Erosion Inspector, Village of Pleasant Prairie

Figure A-2

**ACTIVITIES OF THE KENOSHA COUNTY
HAZARD MITIGATION LOCAL PLANNING TEAM**

Notice of Meeting and Agenda

**KENOSHA COUNTY HAZARD MITIGATION TASK FORCE
ANNUAL REVIEW OF THE KENOSHA COUNTY HAZARD MITIGATION PLAN UPDATE**

DATE: September 5, 2012

TIME: 1:30 to 3:30 p.m.

PLACE: Kenosha County Center
Public Hearing Room
19600 - 75th Street
Bristol, Wisconsin

AGENDA:

1. Introductions
2. Review of the plan (SEWRPC Community Assistance Planning Report No. 278 (CAPR No. 278), 2nd Edition, *Kenosha County Hazard Mitigation Plan Update: 2011-2015*)
http://www.sewrpc.org/SEWRPCFiles/Publications/CAPR/capr-278_2nded_kenoshacountyhazardmitigationplan.pdf, addressing the following questions (see pages 259 and 260 of CAPR No. 278, 2nd Edition):
 - a. Have any hazards changed in the past year? (See CAPR No. 278, 2nd Edition, Table 24 on page 69)
 - b. Have the hazard mitigation goals and objectives changed in the past year? (See CAPR No. 278, 2nd Edition, pages 152-154)
 - c. What progress has been made in implementing previously identified hazard mitigation actions? (See CAPR No. 278, 2nd Edition, Tables 60 and 61 on pages 234-255)
 - d. Do any plan elements and their priorities need modification? (See CAPR No. 278, 2nd Edition, Tables 60 and 61 on pages 234-255)
 - e. Are any new plan elements needed? (See CAPR No. 278, 2nd Edition, Tables 60 and 61 on pages 234-255)
 - f. Have applicable funding programs and levels of funding changed? (See CAPR No. 278, 2nd Edition, pages 233 and 256-259 and Appendices J and K)
3. Review of the February 2, 2011, blizzard and the June 30, 2011, wind storm
4. Procedure for documentation of the meeting
5. Adjourn

Michael G. Hahn
Secretary

Enclosures

CAPR-278 2ND ED 1ST ANNUAL REVIEW MEETING NOTICE SEPT 2012 (00206445).DOC
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SEWRPC Staff Memorandum

SUMMARY OF THE KENOSHA COUNTY HAZARD MITIGATION TASK FORCE FIRST ANNUAL MEETING TO REVIEW THE KENOSHA COUNTY HAZARD MITIGATION PLAN UPDATE

October 10, 2012

INTRODUCTION

The Kenosha County Hazard Mitigation Task Force's first annual meeting to review the June 2011 Kenosha County Hazard Mitigation Plan Update was held at the Kenosha County Center on September 5, 2012. The meeting agenda is attached as Exhibit A and the list of Task Force members in attendance is attached as Exhibit B.

The plan is documented in SEWRPC Community Assistance Planning Report No. 278 (CAPR No. 278), 2nd Edition, *Kenosha County Hazard Mitigation Plan Update: 2011-2015*, June 2011. On page 259 of that report it is recommended that the Task Force meet at least annually to review the plan and the status of implementation with a view toward enhancing and improving response to natural and other hazard events. Consistent with the recommendations of CAPR No. 278, 2nd Edition, the review addressed the following questions:

1. Have any hazards changed in the past year?
2. Have the hazard mitigation goals and objectives changed in the past year?
3. What progress has been made in implementing previously identified hazard mitigation actions?
4. Do any plan elements and their priorities need modification?
5. Are any new plan elements needed?
6. Have applicable funding programs and levels of funding changed?

The decisions made regarding each of these questions, along with the review of the February 1 through 3, 2011, blizzard and the June 30, 2011, straight-line wind storm are documented below.

ISSUES REVIEWED

Have any Hazards Changed in the Past Year?

The Task Force reviewed the hazards set forth in Table 24 on page 69 of SEWRPC CAPR No. 278, 2nd Edition. Lieutenant Edward M. VanTine said that he had been asked whether earthquakes should be included. The SEWRPC staff responded that the hazards from earthquakes were considered by the Task Force in developing the plan, and it was decided earthquakes would not be included in the plan because the risks are small.

Prior to the meeting, the SEWRPC staff reviewed wind, thunderstorm, hail, and tornado data collected by the National Climatic Data Center since the plan update was issued. The SEWRPC staff reported that 15 damaging thunderstorms (averaging about \$27,000 in damages per storm), one damaging lightning strike, and one damaging hail storm occurred since the plan update was issued. Also, an Enhanced Fujita (EF) 0 tornado occurred in the Town of Brighton on November 11, 2010, causing \$2,000 in damages, and an EF 1 tornado occurred in the Town of Somers on October 26, 2010, causing a total of \$100,000 in damages. It was concluded that review of the climate records did not indicate a significant change in climate-related hazards.

The SEWRPC staff also reported that Wisconsin Department of Transportation data on traffic accidents indicates that accidents and fatalities decreased in 2009 and 2010 relative to the period 2007 through 2008. It was concluded that review of the traffic accident records did not indicate a significant change in traffic-related hazards.

Have the Hazard Mitigation Goals and Objectives Changed in the Past Year?

The Task Force reviewed the hazards set forth on pages 152 through 154 of CAPR No. 278, 2nd Edition, and concluded that no changes in hazard mitigation goals and objectives are warranted.

What Progress Has Been Made in Implementing Previously Identified Hazard Mitigation Actions?

The Task Force reviewed the hazards set forth in Tables 60 and 61 on pages 234 through 255 of CAPR No. 278, 2nd Edition.

John Meland of the Kenosha County Housing Authority and the SEWRPC staff reported on the County program to purchase, demolish, and remove flood-prone houses along the Fox River in the Village of Silver Lake and the Town of Wheatland. That program is coordinated with the State of Wisconsin Division of Emergency Management, using Federal Emergency Management Agency (FEMA) hazard mitigation grant funds.

As of 2009, 86 structures had been purchased and removed from the floodplain. Since the hazard mitigation plan update was issued, 14 additional properties were purchased, with thirteen of those removed to date and the other

one scheduled to be demolished by the end of September 2012. A total of \$11.5 million has been spent on purchasing 100 structures, and 79 structures/properties in the project area have yet to be purchased.

The Task Force discussed a project to purchase, demolish, and remove seven flood-prone houses in the Village of Paddock Lake that were mentioned in the hazard mitigation plan update. A FEMA grant was received by the Village, but the houses were not purchased and the funds were returned.

Do Any Plan Elements and Their Priorities Need Modification?

In considering this question, the Task Force once again reviewed the hazards set forth in Tables 60 and 61 on pages 234 through 255 of CAPR No. 278, 2nd Edition.

There was some discussion of the current setback requirements for development along the Lake Michigan coast. When the plan is updated, consideration should be given to revising existing zoning ordinances to require more stringent development setbacks.

It was noted that replacement of a culvert under 84th Street along Unnamed Tributary No. 1 to Hooker Lake in the Town of Salem in the Des Plaines River watershed was incorrectly listed as having been implemented in Table 60 on page 235. Also, the culvert replacement cost was incorrectly reported in the table. (The estimated cost is \$180,000 in 2010 dollars.) Unless that culvert replacement is accomplished prior to the next full plan update, those corrections will be made at the time of the next full update.

Are Any New Plan Elements Needed?

In considering this question, the Task Force once again reviewed the hazards set forth in Tables 60 and 61 on pages 234 through 255 of CAPR No. 278, 2nd Edition. The SEWRPC staff noted that the plan update references to review of building codes could be omitted in the next update because the uniform State building code is now in effect throughout the County.

Have Applicable Funding Programs and Levels of Funding Changed?

In considering this question, the Task Force once again reviewed pages 233, pages 256 through 259, and Appendices J and K in CAPR No. 278, 2nd Edition. Mr. Meland noted that the Wisconsin Department of Natural Resources Municipal Flood Control Grants Program (reference number 18 in Appendix J) is a biannual program. That will be noted in the next plan update. Dan Treloar of the Kenosha County Department of Planning and Development suggested that the descriptions of the Wisconsin Coastal Management Program (WCMP) grants program on page 259 and on page 411 in Appendix J of CAPR No. 278 be revised to mention the great Lakes Fund program that is available through the WCMP.

February 1 through 3, 2011 Blizzard

The March 1, 2011, “2011 Kenosha County Blizzard – February 1-3, 2011 - After Action Report/Improvement Plan” provides critical analyses and recommendations related to:

- Emergency Management
- Joint Public Safety Services (City/County)
- Public Safety/Law Enforcement (Sheriff’s Department)
- Highway Services (Division of Highways)
- Facilities Services (Division of Facilities)
- Nursing Home Resident Care (Brookside Care Center)
- Finance and Purchasing Services/Technology Support (Division of Finance /Purchasing/Information Technology)
- Personnel Services/Risk Management (Division of Personnel Services)
- Court Services (Clerk of Courts Office)
- Human Services (Department of Human Services)
- Health Services (Division of Health)
- Planning and Development Services (Department of Planning and Development)

Lieutenant VanTine summarized portions of the report. He noted that there was no loss of life resulting from the blizzard and that the appropriate agencies worked together to provide documentation which led to a Presidential disaster declaration being issued. The After Action Report/Improvement Plan (AAR/IP) is classified as being “For Official Use Only,” and the report states that information in the AAR/IP “should be handled as sensitive information not to be disclosed.” Therefore, the AAR/IP is not attached to this memorandum.

June 30, 2011 Straight-Line Wind Storm

Lieutenant VanTine described this as a straight-line easterly wind storm off Lake Michigan with peak wind speeds of about 70 miles per hour. He said that the effects of the storm were significant and they extended about one mile inland from the Lake shore. The Emergency Operations Center was opened and the emergency response was satisfactory.

Letters from the State of Wisconsin Division of Emergency Management transmitting Wisconsin Disaster Fund checks to the City of Kenosha and the Village of Pleasant Prairie are attached as Exhibit C.

* * *

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Exhibit A

Kenosha County Division of Emergency Management
Southeastern Wisconsin Regional Planning Commission

Notice of Meeting and Agenda

KENOSHA COUNTY HAZARD MITIGATION TASK FORCE ANNUAL REVIEW OF THE KENOSHA COUNTY HAZARD MITIGATION PLAN UPDATE

DATE: September 5, 2012
TIME: 1:30 to 3:30 p.m.
PLACE: Kenosha County Center
Public Hearing Room
19600 - 75th Street
Bristol, Wisconsin

AGENDA:

1. Introductions
2. Review of the plan (SEWRPC Community Assistance Planning Report No. 278 (CAPR No. 278), 2nd Edition, *Kenosha County Hazard Mitigation Plan Update: 2011-2015*)
http://www.sewrpc.org/SEWRPCFiles/Publications/CAPR/capr-278_2nded_kenoshacountyhazardmitigationplan.pdf, addressing the following questions (see pages 259 and 260 of CAPR No. 278, 2nd Edition):
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 - e. Are any new plan elements needed? (See CAPR No. 278, 2nd Edition, Tables 60 and 61 on pages 234-255)
 - f. Have applicable funding programs and levels of funding changed? (See CAPR No. 278, 2nd Edition, pages 233 and 256-259 and Appendices J and K)
3. Review of the February 2, 2011, blizzard and the June 30, 2011, wind storm
4. Procedure for documentation of the meeting
5. Adjourn

Michael G. Hahn
Secretary

Enclosures

KEN CTY HMPU 2012 ANNUAL REVIEW MTG (00207076).DOC
KRY/MGH/pk
08/15/12

Exhibit B

KENOSHA COUNTY HAZARD MITIGATION TASK FORCE FIRST ANNUAL MEETING TO REVIEW THE KENOSHA COUNTY HAZARD MITIGATION PLAN UPDATE September 5, 2012

In attendance at the meeting were the following individuals:

Joseph E. Boxhorn	Southeastern Wisconsin Regional Planning Commission
Patrick Finnemore	Kenosha Unified
William M. Glembocki	Town of Wheatland
Michael G. Hahn	Southeastern Wisconsin Regional Planning Commission
Robert Hallisy	Kenosha County Emergency Management
John Jansen	Kenosha County Department of Human Services
Nina Jones	Kenosha County Department of Human Services
Cheryl McCrary	Kenosha County Emergency Management
Doug McElmury	Village of Pleasant Prairie Fire & Rescue Department
John Meland	Kenosha County Housing Authority
David Mogensen	Village of Pleasant Prairie Police Department
Aaron W. Owens	Southeastern Wisconsin Regional Planning Commission
Peter Parker	Village of Bristol Fire Department
Daniel R. Treloar	Kenosha County Planning and Development
Edward VanTine	Kenosha County Emergency Management
Kurt Worden	American Red Cross

#207076
330-3022
MGH/pk
09/18/12

Exhibit C



STATE OF WISCONSIN
DEPARTMENT OF MILITARY AFFAIRS
DIVISION OF EMERGENCY MANAGEMENT

Brian M. Satula
Administrator

Scott Walker
Governor

May 2, 2012

Ms. Carol Stancato, Director of Finance
City of Kenosha
625 52nd Street
Kenosha, WI 53140

Dear Ms. Stancato:

Enclosed is a check (A8455263) for the City of Kenosha in the amount of \$554,785.92 from the Wisconsin Disaster Fund. The Wisconsin Disaster Fund was created by order of 2005 Wisconsin Act 269 enacted April 5, 2006 to provide state disaster assistance to local government units. This assistance is in the form of payments for damages and costs incurred as a result of a major catastrophe when federal assistance is not available.

The City of Kenosha incurred and documented damages in the amount of \$792,551.32 for Disaster 901E (Wind Storm on 6/30/2011). The Wisconsin Disaster Fund will reimburse local units of government 70% of eligible and documented costs if funds are available.

If you have any questions about this award, please call Wisconsin Emergency Management at (608) 242-3259 or email us at WIDisasterFund@wisconsin.gov.

Sincerely,

Caryn Stone
Wisconsin Disaster Fund Manager
Wisconsin Emergency Management



STATE OF WISCONSIN
DEPARTMENT OF MILITARY AFFAIRS
DIVISION OF EMERGENCY MANAGEMENT

Brian M. Satula
Administrator

Scott Walker
Governor

July 10, 2012

Mr. Doug McElmury, Assistant Fire Chief
Village of Pleasant Prairie
9915-39th Avenue
Pleasant Prairie, WI 53158

Dear Mr. McElmury:

Enclosed is a check (A8597956) for the Village of Pleasant Prairie in the amount of \$70,607.68 from the Wisconsin Disaster Fund. The Wisconsin Disaster Fund was created by order of 2005 Wisconsin Act 269 enacted April 5, 2006 to provide state disaster assistance to local government units. This assistance is in the form of payments for damages and costs incurred as a result of a major catastrophe when federal assistance is not available.

The Village of Pleasant Prairie incurred and documented damages in the amount of \$100,868.11 for Disaster 901E (Wind Storm on 6/30/2011). The Wisconsin Disaster Fund will reimburse local units of government 70% of eligible and documented costs if funds are available.

If you have any questions about this award, please call Wisconsin Emergency Management at (608) 242-3259 or email us at WIDisasterFund@wisconsin.gov.

Sincerely,

Caryn Stone
Wisconsin Disaster Fund Manager
Wisconsin Emergency Management

Notice of Meeting and Agenda

**KENOSHA COUNTY HAZARD MITIGATION TASK FORCE
ANNUAL REVIEW OF THE KENOSHA COUNTY HAZARD MITIGATION PLAN UPDATE**

DATE: September 18, 2013
TIME: 1:30 to 3:30 p.m.
PLACE: Kenosha County Center
Public Hearing Room
19600 - 75th Street
Bristol, Wisconsin

AGENDA:

1. Introductions
2. Review of summary notes from September 20, 2012, meeting of the Kenosha County Hazard Mitigation Task Force
3. Review of the plan (SEWRPC Community Assistance Planning Report No. 278 (CAPR No. 278), 2nd Edition, *Kenosha County Hazard Mitigation Plan Update: 2011-2015*)
http://www.sewrpc.org/SEWRPCFiles/Publications/CAPR/capr-278_2nded_kenoshacountyhazardmitigationplan.pdf, addressing the following questions (see pages 259 and 260 of CAPR No. 278, 2nd Edition):
 - a. Have any hazards changed in the past year? (See CAPR No. 278, 2nd Edition, Table 24 on page 69)
 - b. Have the hazard mitigation goals and objectives changed in the past year? (See CAPR No. 278, 2nd Edition, pages 152-154)
 - c. What progress has been made in implementing previously identified hazard mitigation actions? (See CAPR No. 278, 2nd Edition, Tables 60 and 61 on pages 234-255)
 - d. Do any plan elements and their priorities need modification? (See CAPR No. 278, 2nd Edition, Tables 60 and 61 on pages 234-255)
 - e. Are any new plan elements needed? (See CAPR No. 278, 2nd Edition, Tables 60 and 61 on pages 234-255)
 - f. Have applicable funding programs and levels of funding changed? (See CAPR No. 278, 2nd Edition, pages 233 and 256-259 and Appendices J and K)

[NOTE: The intent of this agenda item is to receive input from the Task Force members in attendance.]

4. Review of the Kenosha County Fox River Flood Warning Tool
5. Status of Revisions to the Strawberry Creek Floodplain
6. Procedure for documentation of the meeting
7. Adjourn

Michael G. Hahn
Secretary

SEWRPC Staff Memorandum

SUMMARY OF THE KENOSHA COUNTY HAZARD MITIGATION TASK FORCE SECOND ANNUAL MEETING TO REVIEW THE KENOSHA COUNTY HAZARD MITIGATION PLAN UPDATE

October 14, 2013

INTRODUCTION

The Kenosha County Hazard Mitigation Task Force's second annual meeting to review the June 2011 Kenosha County Hazard Mitigation Plan Update was held at the Kenosha County Center on September 18, 2013. The meeting agenda is attached as Exhibit A and the list of Task Force members in attendance is attached as Exhibit B.

The plan is documented in SEWRPC Community Assistance Planning Report No. 278 (CAPR No. 278), 2nd Edition, *Kenosha County Hazard Mitigation Plan Update: 2011-2015*, June 2011. On page 259 of that report it is recommended that the Task Force meet at least annually to review the plan and the status of implementation with a view toward enhancing and improving response to natural and other hazard events. Consistent with the recommendations of CAPR No. 278, 2nd Edition, the review addressed the following questions:

1. Have any hazards changed in the past year?
2. Have the hazard mitigation goals and objectives changed in the past year?
3. What progress has been made in implementing previously identified hazard mitigation actions?
4. Do any plan elements and their priorities need modification?
5. Are any new plan elements needed?
6. Have applicable funding programs and levels of funding changed?

The decisions made regarding each of these questions, along with the review of the Kenosha County Fox River Flood Warning Tool and the status of the Center Creek floodplain relative to the Strawberry Creek development are documented below.

ISSUES REVIEWED

Summary Notes of the September 5, 2012, Kenosha County Hazard Mitigation Task Force First Annual Meeting to Review the Kenosha County Hazard Mitigation Plan Update

Lieutenant Edward VanTine said that 1) next year the County would seek grant funds for preparation of the next five-year plan update, 2) he will be retiring at the end of September 2013, and 3) that Lieutenant Gil Benn will be taking over as County Emergency Management Director.

Michael Hahn of the SEWRPC staff briefly reviewed the SEWRPC Staff Memorandum, "Summary of the Kenosha County Hazard Mitigation Task Force First Annual Meeting to Review the Kenosha County Hazard Mitigation Plan Update," October 10, 2012. He noted that the County will submit the summary notes from today's meeting in partial fulfillment of the requirements for the Federal Emergency Management Agency Community Rating System. In addition, he said that any corrections or comments on the summary notes from the September 5, 2012, meeting could be submitted to him.

Have any Hazards Changed in the Past Year?

The Task Force reviewed the hazards set forth in Table 24 on page 69 of SEWRPC CAPR No. 278, 2nd Edition. Lieutenant VanTine said that the County opened its Emergency Operations Center in October 2012 during Hurricane Sandy because of the threat posed to coastal areas in the County from high waves generated on Lake Michigan. He added that because of the wind direction, the hurricane did not produce these waves.

Andy Buehler of the Kenosha County Department of Planning and Development reported that the records from the U.S. Geological Survey (USGS) streamflow gage at New Munster show that the April 2013 floods on the Fox River in the County had the third highest stage in the record of the gage. He and Daniel Treloar, also of the Kenosha County Department of Planning and Development, indicated that this flood impacted relatively few houses, with about five house experiencing inundation of the first floor.

Prior to the meeting, the SEWRPC staff reviewed meteorological hazard data collected by the National Climatic Data Center since the plan update was issued. A summary table of the results of this review is attached as Exhibit C. The SEWRPC staff reported that the data that have become available since the last annual review indicates that two damaging thunderstorms and six damaging wind storms occurred during the period May 2012 through April 2013. A total of \$52,000 in property damages were reported as occurring as a result of these storms. Also, two flooding incidents occurred, causing \$10,000 in property damages and \$2,000 in crop damages. During the same period five extreme temperature incidents, seven winter storms, one drought, and eight dense fog incidents also occurred. No property damages or crop damages were reported as a result of these hazard occurrences.

Cindy Johnson of the Kenosha County Health Department asked which category of hazard includes the 2011 wind storm. Joseph Boxhorn of the SEWRPC staff replied that it would be classified under thunderstorm/high wind, high wind, or strong wind. Ms. Johnson suggested that the data listed may under-report the damages resulting from this storm. Mr. Boxhorn replied that the damages listed almost certainly represent an underestimate, explaining that the National Climatic Data Center Storm Events Database contains only records of damages that are reported to the National Weather Service (NWS). He added that many damages from storms are probably not reported to the NWS. Ms. Johnson asked whether a better estimate could be generated. Mr. Hahn indicated that any information that Task Force members have on damages resulting from particular events can be incorporated into the inventories during the next update of the plan. Lieutenant Van Tine said that he would be able to provide damage amounts from the 2011 wind storm for the City of Kenosha and the Village of Pleasant Prairie.

It was concluded that review of the climate records did not indicate a significant change in climate-related hazards.

The SEWRPC staff also reviewed Wisconsin Department of Transportation data on traffic accidents in Kenosha County. A summary table of the results of this review is attached as Exhibit D. The data indicates that total numbers of accidents, accidents resulting in injuries, and injuries have decreased since 2008. Ms. Johnson asked whether there were more detail available on causes of traffic accidents. Mr. Boxhorn replied that much of the data in the Wisconsin Department of Transportation report that is the source of the data is aggregated at the State level rather than at the County level. He noted that the plan report provides more detail on traffic accidents where it is available. During the review of hazard mitigation goals and objectives, there was a discussion of the efficacy of roundabouts, cameras at lighted intersections, and visible repetitive enforcement in reducing the numbers of traffic accidents and accident-related injuries. There was a consensus among the task force members who represent law enforcement and fire departments that the installation of roundabouts had reduced accidents at several intersections in the County. Law enforcement personnel expressed some concerns regarding cameras at lighted intersections, especially with respect to being unable to issue citations based upon photographs from these cameras.

The Task Force concluded that review of the traffic accident records did not indicate a significant change in traffic-related hazards.

Have the Hazard Mitigation Goals and Objectives Changed in the Past Year?

The Task Force reviewed the hazard mitigation goals and objectives set forth on pages 152 through 154 of CAPR No. 278, 2nd Edition. Ms. Johnson asked the members of the task force who represent law enforcement agencies whether any additional goals should be considered in relation to influx of tourists into the County. Lt. VanTine replied that there is nothing needed over and above the highway work that the Wisconsin Department of Transportation is currently doing. He added that the National Transportation Safety Board recently developed an evacuation plan for the County. He noted that this plan may be incorporated into a future exercise. Doug McElmury of the Pleasant Prairie Fire and Rescue Department indicated that the County has completed the third update of its multiple patient plan, which is intended to enable fire and rescue agencies and hospitals to respond effectively to multiple patient incidents. He added that this plan has been tested. The Task Force concluded that no changes in hazard mitigation goals and objectives are warranted.

What Progress Has Been Made in Implementing Previously Identified Hazard Mitigation Actions?

The Task Force reviewed the hazards set forth in Tables 60 and 61 on pages 234 through 255 of CAPR No. 278, 2nd Edition.

Mr. Hahn noted that the U.S. Army Corps of Engineers (USCOE) has released a draft phase II feasibility study report on the Upper Des Plaines River and tributaries. The report outlines a variety of potential flood risk management and environmental restoration projects that could be implemented in the Upper Des Plaines River watershed. He noted that there will be a public meeting regarding the draft report on September 25, 2013, at the Kenosha County Center in Bristol. Mr. Treloar noted that the Federal Emergency Management Agency (FEMA) is beginning the discovery process to collect information related to flood hazards in the Des Plaines River watershed to potentially be used under the FEMA Risk Mapping, Analysis, and Planning Program (Risk MAP). He added that the Risk MAP process is also in progress in the Fox River watershed, which is the watershed in the County with the oldest comprehensive watershed study. Mr. Treloar also mentioned that FEMA was conducting the Great Lakes Coastal Flooding Study.

On behalf of John Meland of the Kenosha County Housing Authority and the SEWRPC staff, who was unable to attend the Task Force meeting, Mr. Boxhorn reported on the County program to purchase, demolish, and remove flood-prone houses along the Fox River in the Village of Silver Lake and the Town of Wheatland. That program is coordinated with the State of Wisconsin Division of Emergency Management, using FEMA hazard mitigation grant funds. Over the last year the program has been wrapping up activities related to two grants received in 2008. Projects funded by these grants have to be completed in August 2014. One acquisition is currently in progress and should be completed in late September 2013. It is anticipated that five other properties will be acquired over the next 11 months. Acquisition of these properties was approved in 2008; however, at the time these properties were assigned lower priority for acquisition. Finally, Wisconsin Emergency Management has money available under a currently active disaster declaration. The County is trying to secure funding under the Flood Mitigation Assistance Program or the Hazard Mitigation Grant Program for additional buyouts and acquisitions of vacant properties.

Mr. Treloar reported that the County is close to securing funding to purchase a flood-prone property along Center Lake. Mr. Buehler reported that County is working on a County Board resolution to set aside \$50,000 for purchasing remaining properties recommended for acquisition under the Fox River buyout program that may not meet FEMA's cost-benefit criteria. He noted that the hope is that this funding would also be provided in future years. He added that will also allow the County to purchase foreclosure properties in the project area. Mr. Treloar added that the County will also be sending letters to owners of unbuildable properties in the project area asking them to consider donating the properties to the County.

Mr. Treloar reported that FEMA's cost-benefit criteria for projects will be changing. Under the new criteria, FEMA plans to give all properties with a value of \$276,000 or less the same rank. Substantial damage and repetitive damage may also be considered. He noted that all of the properties recommended for acquisition in the Fox River project area have values of less than \$265,000.

During the discussion of whether any plan elements and their priorities need modification, it was noted that the Village of Pleasant Prairie has implemented a monthly household hazardous waste collection program and that the County will hold its second annual electronic waste recycling event on November 2, 2013.

Do Any Plan Elements and Their Priorities Need Modification?

In considering this question, the Task Force once again reviewed the hazards set forth in Tables 60 and 61 on pages 234 through 255 of CAPR No. 278, 2nd Edition.

Lt. VanTine noted that flooding of Kilbourn Road Ditch during spring 2013 affected the mobile home park located just south of CTH K. Mr. Hahn noted that acquisition and removal of the structures in this mobile home park is recommended in the Des Plaines watershed plan and the hazard mitigation plan. He added that the USCOE is examining other options in this location.

There was some discussion of the failure of the dam impounding Vern Wolf Lake in Bong State Recreation Area. This low hazard earthen dam failed in April 2013 after being overtopped by water from heavy rains. Following the dam failure the Wisconsin Department of Natural Resources (WDNR) opened the dam's low level outlet, draining the Lake. The WDNR's long-range plan is to replace the dam, refill the lake, and possibly dredge the impoundment; however, money is not currently available to fund reconstruction. The main immediate hazard posed by failure of this dam is damage to STH 75.

Mr. Treloar reported that the County has completed an emergency action plan (EAP) for the high hazard KD Park dam. The new dam is an earthen embankment with a concrete spillway. The previous unengineered earthen embankment failed in 2002 and washed out CTH KD. The EAP will be submitted to the WDNR by October 1, 2013.

Are Any New Plan Elements Needed?

In considering this question, the Task Force once again reviewed the hazards set forth in Tables 60 and 61 on pages 234 through 255 of CAPR No. 278, 2nd Edition.

Ms. Johnson noted that the current plan elements do not address cyber-attack.

Lt. VanTine indicated that the National Weather Service (NWS) has asked to raise the reporting levels for the USGS stream gage at New Munster. Under the NWS request, the action level would be raised from a stage of nine feet to one of 10 feet and the flood stage would be raised from a stage of 10 feet to one of 11 feet. The County Executive and the Chair of the Town of Wheatland have indicated that they would probably agree to the requested change. Mr. Treloar noted that there are two houses in the Village of Silver Lake that flood when the River is at the 10-foot stage at the gage.

Mr. Hahn indicated that the next update of the plan will include examination of dams and cyber-attack.

Have Applicable Funding Programs and Levels of Funding Changed?

In considering this question, the Task Force once again reviewed pages 233, pages 256 through 259, and Appendices J and K in CAPR No. 278, 2nd Edition. Mr. Treloar suggested it may be possible to obtain funding for some projects through the Federal Great Lakes Restoration Initiative.

Kenosha County Fox River Flood Warning Tool

Scott Schutze of the Kenosha County Land Information Office demonstrated the Kenosha County Fox River Flood Warning Tool. This tool is a predictive model showing the estimated geographical extent of flooding that can be expected for different stages of the Fox River at the USGS gage at New Munster. It is based upon a tool developed for the Fox River in Lake County, Illinois. The tool focuses on the reach of the Fox River in Kenosha County that experiences the greatest flood hazard. The model was developed using detailed land surface elevation data that was acquired in 2010 and was validated using June 15, 2008 river level data collected by staff from the Kenosha County Planning and Development Department using geographical positioning system (GPS) technology. The tool gives flood level estimates for river stages at 0.5-foot intervals. The NWS web page for the

New Munster gaging station is linked to the tool. Mr. Schutze emphasized that this tool is not a substitute for detailed engineering studies. He anticipated that future enhancements of the tool will include showing building outlines and the addition of a vector line showing the boundary of the land flooded when the record River crest level was recorded. Mr. Schutze indicated that when the tool is completed, it will be made available to County and municipal staff. It has not been decided whether the tool will be for internal use or made available to the public. A copy of Mr. Schutze's presentation is attached as Exhibit E.

There was some discussion by the Task Force of Mr. Schutze's presentation. Points made in this discussion include:

- Lieutenant Benn said that the tool would be useful for targeting "reverse 911" warnings when flooding is anticipated to occur.
- Hard copy maps produced using the tool could be given to school bus companies, emergency responders, and other in order to determine which roads are likely to close during flooding events.
- The base data for developing this type of tool are available for the entire County. Developing tools for other areas would require obtaining stream water level elevations in the project area during a flood.
- The tool requires the presence of a gage on the stream being modeled. If a municipality is interested in developing this type of model for an ungaged stream, they could cooperate with the USGS on funding a gage under a program which SEWRPC coordinates. The cost of this to the municipality would be approximately \$6,000 per year. USGS also contributes funds.

Status of Revision to the Strawberry Creek Floodplain

Mr. Hahn reported that FEMA requested all new modeling for the Center Creek floodplain within the Strawberry Creek development in the City of Kenosha. This was necessary to correct incorrect data used when the floodplains were last updated by FEMA. The City's consultant, Manhard Engineering, submitted a new model to the WDNR for review. The WDNR has reviewed this and the consultant will make revisions requested by the Department. Following this, the City will submit an application to FEMA for a Letter of Map Revision.

* * *

KEN CTY HMPU 2013 ANNUAL REVIEW MTG (00213609).DOC
330-3022
MGH/JEB/pk
09/24/13, 10/14/13

Exhibit A

Kenosha County Division of Emergency Management
Southeastern Wisconsin Regional Planning Commission

Notice of Meeting and Agenda

KENOSHA COUNTY HAZARD MITIGATION TASK FORCE ANNUAL REVIEW OF THE KENOSHA COUNTY HAZARD MITIGATION PLAN UPDATE

DATE: September 18, 2013
TIME: 1:30 to 3:30 p.m.
PLACE: Kenosha County Center
Public Hearing Room
19600 - 75th Street
Bristol, Wisconsin

AGENDA:

1. Introductions
2. Review of summary notes from September 20, 2012, meeting of the Kenosha County Hazard Mitigation Task Force
3. Review of the plan (SEWRPC Community Assistance Planning Report No. 278 (CAPR No. 278), 2nd Edition, *Kenosha County Hazard Mitigation Plan Update: 2011-2015*)
http://www.sewrpc.org/SEWRPCFiles/Publications/CAPR/capr-278_2nded_kenoshacountyhazardmitigationplan.pdf, addressing the following questions (see pages 259 and 260 of CAPR No. 278, 2nd Edition):
 - a. Have any hazards changed in the past year? (See CAPR No. 278, 2nd Edition, Table 24 on page 69)
 - b. Have the hazard mitigation goals and objectives changed in the past year? (See CAPR No. 278, 2nd Edition, pages 152-154)
 - c. What progress has been made in implementing previously identified hazard mitigation actions? (See CAPR No. 278, 2nd Edition, Tables 60 and 61 on pages 234-255)
 - d. Do any plan elements and their priorities need modification? (See CAPR No. 278, 2nd Edition, Tables 60 and 61 on pages 234-255)
 - e. Are any new plan elements needed? (See CAPR No. 278, 2nd Edition, Tables 60 and 61 on pages 234-255)
 - f. Have applicable funding programs and levels of funding changed? (See CAPR No. 278, 2nd Edition, pages 233 and 256-259 and Appendices J and K)

[NOTE: The intent of this agenda item is to receive input from the Task Force members in attendance.]
4. Review of the Kenosha County Fox River Flood Warning Tool
5. Status of Revisions to the Strawberry Creek Floodplain
6. Procedure for documentation of the meeting
7. Adjourn

Michael G. Hahn
Secretary

KEN CTY HMPU 2013 ANNUAL REVIEW MTG (00213609).DOC
MGH/JEB/pk
08/22/13

Exhibit B

KENOSHA COUNTY HAZARD MITIGATION TASK FORCE FIRST ANNUAL MEETING TO REVIEW THE KENOSHA COUNTY HAZARD MITIGATION PLAN UPDATE September 18, 2013

In attendance at the meeting were the following individuals:

Gil Benn	Kenosha County Sheriff's Department
Joseph E. Boxhorn	Southeastern Wisconsin Regional Planning Commission
Andy M. Buehler	Kenosha County Planning and Development
Patrick Finnemore	Kenosha Unified
Michael G. Hahn	Southeastern Wisconsin Regional Planning Commission
John Jansen	Kenosha County Department of Human Services
Cindy Johnson	Kenosha County Health Department
Nina Jones	Kenosha County Department of Human Services
John Klabecek	Carthage College
Doug McElmury	Village of Pleasant Prairie Fire & Rescue Department
Mark Melotik	Kenosha County Health Department
Peter Parker	Village of Bristol Fire Department
Scott Schutze	Kenosha County Land Information Division
Mike Slover	Town of Salem Fire/Rescue
David Smetana	Village of Pleasant Prairie Police Department
Michael Spence	Village of Pleasant Prairie
Daniel R. Treloar	Kenosha County Planning and Development
Edward VanTine	Kenosha County Emergency Management
Tedi Winnett	University of Wisconsin-Extension

Exhibit C

Table 1

OCCURRENCES OF METEOROLOGICAL HAZARDS SINCE COMPLETION OF THE INVENTORIES FOR THE KENOSHA COUNTY HAZARD MITIGATION PLAN UPDATE

Hazard	May 2012-April 2013 ^a					May 2009-April 2013				
	Incidents	Deaths	Injuries	Property Damage	Crop Damage	Incidents	Deaths	Injuries	Property Damage	Crop Damage
Flood	2	0	0	\$10,000	\$2,000	3	0	0	\$ 10,000	\$2,000
Thunderstorms, High Wind, Hail, and Lightning										
Thunderstorm/High Wind	2	0	0	\$10,000	0	21	1	1	\$ 405,000	0
High Wind	1	0	0	15,000	0	4	0	0	65,000	0
Strong Wind	5	0	0	27,000	0	23	0	0	79,000	0
Hail	0	0	0	0	0	3	0	0	0	0
Lightning	0	0	0	0	0	1	0	0	15,000	0
Subtotal	8	0	0	\$52,000	0	52	1	1	\$ 564,000	0
Tornado										
Tornado	0	0	0	0	0	3	0	0	\$ 102,000	0
Funnel Cloud	0	0	0	0	0	1	0	0	0	0
Subtotal	0	0	0	0	0	4	0	0	\$ 102,000	0
Extreme Temperatures										
Extreme Cold/Wind Chill	1	0	0	0	0	2	0	0	0	0
Excessive Heat	1	0	0	0	0	1	0	0	0	0
Heat	3	0	0	0	0	6	0	0	0	0
Subtotal	5	0	0	0	0	9	0	0	0	0
Winter Storms										
Blizzard	0	0	0	0	0	1	0	0	\$ 20,000	0
Lake Effect Snow	0	0	0	0	0	1	0	0	0	0
Winter Storm	3	0	0	0	0	7	0	0	0	0
Winter Weather	4	0	0	0	0	19	0	0	20,000	0
Subtotal	7	0	0	0	0	28	0	0	\$ 40,000	0
Drought	1	0	0	0	0	1	0	0	0	0
Dense Fog	8	0	0	0	0	18	0	0	0	0
Total	31	0	0	\$62,000	\$2,000	115	1	1	\$1,116,000	\$2,000

^aBased upon data that have become available since the September 5, 2012 meeting of the Kenosha County Hazard Mitigation Task Force.

Source: National Oceanic and Atmospheric Administration National Climatic Data Center and SEWRPC.

Exhibit D

Table 2

TRAFFIC FATALITIES, INJURIES, AND ACCIDENTS IN KENOSHA COUNTY: 2002-2011

Year	Fatalities	Injuries	Fatality Crashes	Injury Crashes	Property Damage Crashes	Total Crashes
2002	20	2,170	20	1,456	2,123	3,599
2003	24	2,171	21	1,421	2,191	3,633
2004	26	2,199	25	1,498	2,276	3,797
2005	25	2,286	24	1,518	2,250	3,792
2006	25	2,044	24	1,368	2,113	3,505
2007	20	2,083	18	1,425	2,422	3,865
2008	28	1,904	26	1,318	2,640	3,984
2009	16	1,744	14	1,205	2,348	3,567
2010	12	1,579	12	1,094	2,108	3,214
2011 ^a	19	1,561	18	1,050	2,097	3,165

^aData that have become available since the September 5, 2012, meeting of the Kenosha County Hazard Mitigation Task Force.

Source: Wisconsin Department of Transportation.

KENOSHA COUNTY
**PREDICTIVE FLOOD
MODELING TOOL**

Predictive Flood Modeling Tool

- predictive model only
- based on similar application developed in Lake County, Illinois (Fox River) and in North Dakota (Red River)
- requires use of very detailed elevation data acquired in 2010

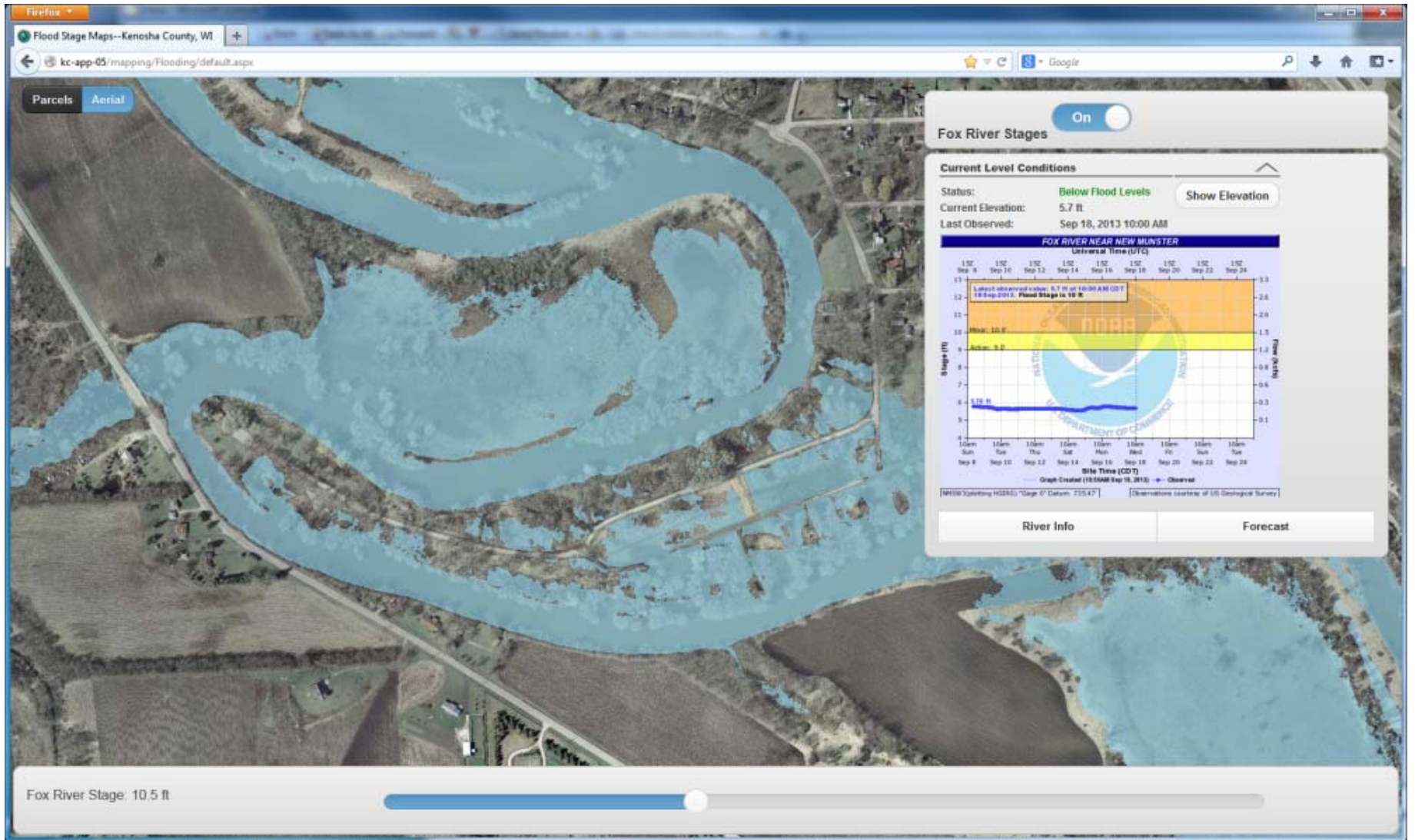
June 2008 Flooding Event

- Kenosha County experienced worst flooding ever along Fox River
- Due to flooding, the State issued CDBG-EAP grants specifically for the collection of highly detailed elevation data
- Kenosha County awarded \$175,000

LIDAR Data Collection 2010

- **L**ight **D**etecting **A**nd **R**anging (LIDAR)
- plane mounted sensor
- laser pulses shot at earth's surface and time it takes to bounce back to the sensor is measured providing an elevation
- thousands of laser pulses emitted each second
- points create a detailed picture of the earth's surface

Application Demonstration



Notice of Meeting and Agenda

**KENOSHA COUNTY HAZARD MITIGATION TASK FORCE
ANNUAL REVIEW OF THE KENOSHA COUNTY HAZARD MITIGATION PLAN UPDATE**

DATE: September 23, 2014
TIME: 10:00 a.m. to 12:00 p.m.
PLACE: Kenosha County Center
Public Hearing Room
19600 - 75th Street
Bristol, Wisconsin

AGENDA:

1. Introductions
 2. Review of summary notes from September 18, 2013, meeting of the Kenosha County Hazard Mitigation Task Force
 3. Review of the plan (SEWRPC Community Assistance Planning Report No. 278 (CAPR No. 278), 2nd Edition, *Kenosha County Hazard Mitigation Plan Update: 2011-2015*)
http://www.sewrpc.org/SEWRPCFiles/Publications/CAPR/capr-278_2nded_kenoshacountyhazardmitigationplan.pdf, addressing the following questions (see pages 259 and 260 of CAPR No. 278, 2nd Edition):
 - a. Have any hazards changed in the past year? (See CAPR No. 278, 2nd Edition, Table 24 on page 69)
 - b. Have the hazard mitigation goals and objectives changed in the past year? (See CAPR No. 278, 2nd Edition, pages 152-154)
 - c. What progress has been made in implementing previously identified hazard mitigation actions? (See CAPR No. 278, 2nd Edition, Tables 60 and 61 on pages 234-255)
 - d. Do any plan elements and their priorities need modification? (See CAPR No. 278, 2nd Edition, Tables 60 and 61 on pages 234-255)
 - e. Are any new plan elements needed? (See CAPR No. 278, 2nd Edition, Tables 60 and 61 on pages 234-255)
 - f. Have applicable funding programs and levels of funding changed? (See CAPR No. 278, 2nd Edition, pages 233 and 256-259 and Appendices J and K)
- [NOTE: The intent of this agenda item is to receive input from the Task Force members in attendance.]**
4. Discussion of possible change to the flood action stage for the Fox River.
 5. Status of application for Pre-Disaster Mitigation Grant funds for updating the Kenosha County Hazard Mitigation Plan.
 6. Procedure for documentation of the meeting
 7. Adjourn

Joseph E. Boxhorn
Secretary

SEWRPC Staff Memorandum

SUMMARY OF THE KENOSHA COUNTY HAZARD MITIGATION TASK FORCE THIRD ANNUAL MEETING TO REVIEW THE KENOSHA COUNTY HAZARD MITIGATION PLAN UPDATE

September 24, 2014

INTRODUCTION

The Kenosha County Hazard Mitigation Task Force's third annual meeting to review the June 2011 Kenosha County Hazard Mitigation Plan Update was held at the Kenosha County Center on September 23, 2014. The meeting agenda is attached as Exhibit A and the list of Task Force members in attendance is attached as Exhibit B.

The plan is documented in SEWRPC Community Assistance Planning Report No. 278 (CAPR No. 278), 2nd Edition, *Kenosha County Hazard Mitigation Plan Update: 2011-2015*, June 2011. On page 259 of that report it is recommended that the Task Force meet at least annually to review the plan and the status of implementation with a view toward enhancing and improving response to natural and other hazard events. Consistent with the recommendations of CAPR No. 278, 2nd Edition, the review addressed the following questions:

1. Have any hazards changed in the past year?
2. Have the hazard mitigation goals and objectives changed in the past year?
3. What progress has been made in implementing previously identified hazard mitigation actions?
4. Do any plan elements and their priorities need modification?
5. Are any new plan elements needed?
6. Have applicable funding programs and levels of funding changed?

The decisions made regarding each of these questions, along with the response to the request from the National Weather Service to change the flood action level for the stream gage on the Fox River at New Munster are documented below.

ISSUES REVIEWED

Discussion of Possible Change to the Flood Action Stage for the Fox River

At the request of Brian Hahn of the National Weather Service (NWS), discussion of the requested change to the action and flood stages for the Fox River at the gage at New Munster was moved to the beginning of the agenda. Mr. Hahn stated that the NWS is asking to change the action and flood stages for the Fox River at the stream gage at New Munster. Under this proposal, he continued, the action stage would be changed from nine feet to 10 feet and the flood (minor) stage would be changed from 10 feet to 11 feet. He added that the moderate and major flood stages would remain at 13 and 14 feet, respectively. He explained that surveys of recent floods indicate that the flood stage for this gage is currently set too low. He noted that the current stages were set in the 1990s with the understanding that they might change. He added that while four flood warnings have recently been issued for the gage at New Munster, none have been issued for the upstream gage at Burlington.

Mr. Treloar commented that the only problem he could see with the proposal is that people would not be warned of a flood using the proposed action stages as early as they are under the current action stages. He noted that there are imminent structure impacts at a stage of 11 feet.

Mr. McElmury asked whether this change would have any impact on eligibility for funding from the Federal Emergency Management Agency (FEMA). Mr. Meland replied that it would not, noting that this eligibility is tied to Presidential disaster declarations. He added that at this gage floods that would result in a disaster declaration usually occur at stages of 13 or 14 feet.

Mr. Buehler stated that many of the structures in the floodplain along the Fox River that would have been impacted by flooding have been removed. He noted that the last flood in this area had a peak stage of 13 feet and only five houses were impacted. He indicated that this change was acceptable.

The consensus of the Task Force was to approve the proposed change.

Mr. Hahn indicated that the proposal will go to the NWS North Central River Forecast Center in Minneapolis. They will issue public notice of the change.

Summary Notes of the September 20, 2013, Kenosha County Hazard Mitigation Task Force Second Annual Meeting to Review the Kenosha County Hazard Mitigation Plan Update

Joseph Boxhorn of the SEWRPC staff briefly reviewed the SEWRPC Staff Memorandum, "Summary of the Kenosha County Hazard Mitigation Task Force Second Annual Meeting to Review the Kenosha County Hazard Mitigation Plan Update," September 20, 2013. There were no questions or comments on the summary notes.

Mr. Treloar noted that the County will submit the summary notes from today's meeting in partial fulfillment of the requirements for the FEMA Community Rating System.

Have any Hazards Changed in the Past Year?

Prior to the meeting, the SEWRPC staff reviewed meteorological hazard data collected by the National Climatic Data Center since the plan update was issued. A summary table of the results of this review is attached as Exhibit C. Mr. Boxhorn reported that the data that have become available since the last annual review indicates that three damaging thunderstorms occurred during the period May 2013 through May 2014. A total of \$32,000 in property damages were reported as occurring as a result of these storms. During the same period four extreme temperature incidents, 15 winter storms, one dense fog incident, two wind storms, and two hail storms also occurred. No property damages or crop damages were reported as a result of these hazard occurrences.

The SEWRPC staff also reviewed Wisconsin Department of Transportation data on traffic accidents in Kenosha County. A summary table of the results of this review is attached as Exhibit D. The data indicates that annual total numbers of accidents, accidents resulting in injuries, and injuries have decreased since 2008.

Lieutenant Benn stated that extreme cold last winter caused water main breaks for several public water utilities in the County. He indicated that the affected communities include the City of Kenosha, the Villages of Bristol and Paddock Lake, and the Town of Salem. He noted that the damages to the utilities' water distribution systems were estimated at \$1.4 million. He stated that a request to FEMA was made that a disaster declaration be issued for this event. He noted that the request was denied. Mr. Treloar asked whether the City of Kenosha's water intake was compromised by freezing. Lieutenant Benn replied that it was not.

Mr. Smetana asked whether Kenosha County experienced any shortages of propane last winter. Lieutenant Benn replied that the County was not greatly affected by the shortages.

Mr. Treloar said that the severity of the 2013-2014 winter resulted in communities having high expenses related to road maintenance. He explained that high costs were incurred for snow plowing, deicing, and repairing damage caused by equipment and multiple heaving cycles.

Lieutenant Benn noted that the County experienced several relatively minor straight-line wind events. He described a summer 2014 event which affected a 15-block area in the City of Kenosha between STH 31 and 22nd Avenue which damaged fences and trees.

Mr. Treloar commented that, relative to hazards, the past year was calm. He noted that there was no flooding and that the crops are doing well.

Based on the review and discussion of hazards experienced over the past year, the Task Force concluded that there has not been a significant change in the hazards affecting Kenosha County.

Have the Hazard Mitigation Goals and Objectives Changed in the Past Year?

The Task Force reviewed the hazard mitigation goals and objectives set forth on pages 152 through 154 of CAPR No. 278, 2nd Edition.

Relative to Goal No. 8 which promotes communication interoperability among emergency response personnel, Mr. McElmury stated that one way that this has been achieved is through the installation of emergency vehicle preemption equipment (EVP) at some major intersections in the County. He commented that installation of these devices provides additional safety for first responders, especially with traffic volumes increasing throughout the County. He noted that this equipment can be expensive for local communities and asked whether grants are available to help local communities purchase and install these devices. Mr. Treloar suggested that a recommendation for the installation of these devices could be incorporated into the next revision of the hazard mitigation plan.

Relative to Goal No. 6 which promotes the identification of high erosion risk Lake Michigan shoreline areas and the development of a coastal erosion control program that reduces the exposure of people and property to shoreline erosion and bluff recession, Mr. Buehler stated that FEMA should be providing new base flood elevations for Lake Michigan in 2015. He noted that these are from a wave runup study that FEMA has conducted. Ms. Kletti indicated that the draft maps are currently available for review by communities. Mr. Treloar noted that the communities will need to adopt the new maps when they are finalized.

Based on the review and discussion of the hazard mitigation goals and objectives, the Task Force concluded that there has not been a significant change in the hazard mitigation goals and objectives for Kenosha County.

What Progress Has Been Made in Implementing Previously Identified Hazard Mitigation Actions?

The Task Force reviewed the hazards set forth in Tables 60 and 61 on pages 234 through 255 of CAPR No. 278, 2nd Edition.

Mr. Boxhorn asked John Meland of the Kenosha County Housing Authority and the SEWRPC staffs to describe the recent activities of the County program to purchase, demolish, and remove flood-prone houses along the Fox River in the Village of Silver Lake and the Towns of Salem and Wheatland. Mr. Meland stated that since the program began in 1995, 103 properties have been purchased, including 14 properties in the Village of Silver Lake, 23 properties in the Town of Salem, and 66 properties in the Town of Wheatland. He noted that about \$10.8 million has been spent on this program to date, with funding coming from FEMA, the Federal Department of Housing and Urban Development (HUD), and the County. He added that these properties represented 166 tax parcels and that some of these parcels have been consolidated. He indicated that four properties were acquired in the last year, two in the Town of Salem and two in the Town of Wheatland. Mr. Meland added that the County is also in the process of acquiring a flood prone property in the Camp Lake area.

Mr. Meland stated that money that can fund the buyout program becomes available when there is a Presidential disaster declaration. He stated that this usually occurs at a flood stage of 13 feet. He added that the last two declarations occurred in 2007 and 2008. Mr. Buehler asked whether the disaster declaration needs to be specific to the project area or whether it can be for anywhere in the State for the County to be eligible for funds for this program. Mr. Meland replied that this depends on how FEMA writes the particular disaster declaration.

Mr. Meland reported that FEMA has changed the criteria by which properties become eligible for buyouts. He explained that in the past, properties qualified through a favorable benefit-cost analysis. He added that this is no longer required, and any property with a value of \$276,000 or less that is at risk by being in the one-percent annual probability floodplain qualifies for mitigation. He noted that as a result of this change, about 71 more residences in the Fox River project area could be qualify for funding when it becomes available, including some that would not have qualified under the benefit-cost criteria.

Mr. Treloar reported that the County funded the purchase of one property in the project area. He noted that there are several vacant properties in the project area on which structures cannot be built due to their locations. He indicated that the County has contacted the owners of several of these properties and asked whether they would be interested in donating them to the County, in some instances in exchange for forgiveness for delinquent property taxes. He noted that the County has gotten responses from some of the owners.

Mr. Meland stated that FEMA has consolidated its mitigation programs, reducing the number of programs from five to three. He explained that the Repetitive Loss Program and the Severe Repetitive Loss Program have been folded into the Hazard Mitigation Grant Program. Mr. Treloar noted that there are 17 repetitive loss properties remaining in the County.

Mr. Treloar stated that FEMA is conducting flood modeling studies along the Fox River through its Risk MAP program. He noted that these studies will incorporate the most recent precipitation and LIDAR elevation data. He expects that the studies will be completed in about two years. He added that FEMA is also conducting flood studies at Powers Lake.

Mr. Beth asked whether the mobile home park along CTH K is in the floodplain. Mr. Treloar replied that it is located in the floodplain. Mr. Buehler stated that as part of the Phase 2 Des Plaines River project, he tried to get the U.S. Army Corps of Engineers interested in addressing this site. He added that he was unable to get the mobile home park added to the Corps effort. Mr. McElmury noted that his department has conducted multiple rescues from this mobile home park.

Mr. Treloar reported that Kenosha County has adopted the 2013 Pike River Watershed Restoration Plan.

Do Any Plan Elements and Their Priorities Need Modification?

In considering this question, the Task Force once again reviewed the hazards set forth in Tables 60 and 61 on pages 234 through 255 of CAPR No. 278, 2nd Edition.

Lieutenant Benn reported that the Sheriff's Department has upgraded its mobile command post. He noted that this post is available by request to all fire departments in the County for incident command.

Based on the review and discussion of the plan elements, the Task Force concluded that no plan elements currently require modification.

Are Any New Plan Elements Needed?

In considering this question, the Task Force once again reviewed the hazards set forth in Tables 60 and 61 on pages 234 through 255 of CAPR No. 278, 2nd Edition.

Lieutenant Benn expressed concerns regarding shipments of crude oil from the Bakken formation in North Dakota to refineries in Chicago over rail lines that pass through the County. He explained that local fire departments receive only a general notification that such shipments will pass through their jurisdiction over the next 24 to 48 hours. He noted that this crude oil is more volatile than other crude oil and presents a potential major hazard should one of these trains derail. Mr. McElmury concurred with Lieutenant Benn's concerns. He stated that this crude is highly toxic. He noted that the railroads are required to notify local communities that a shipment is passing through their jurisdictions when the volume of the shipment equals or exceeds 1,000,000 gallons. Mr. Boxhorn replied that as part of the update of the hazard mitigation plan, this could be examined under the either the existing transportation accident element or the existing hazardous material incident element.

Have Applicable Funding Programs and Levels of Funding Changed?

In considering this question, the Task Force once again reviewed pages 233, pages 256 through 259, and Appendices J and K in CAPR No. 278, 2nd Edition.

Mr. Treloar reported that the County is in the early stages of developing a small fund for the purchase of floodplain properties. He noted that nothing is final yet. He indicated that the hope is to have this as a permanent line item in the County’s budget. Mr. Buehler added that a decision should be made regarding this in 2015.

Mr. Melotik reported that the County Health Department in partnership with Racine County has applied for a grant for lead abatement. He indicated that his department has also applied for grants related to asthma and healthy homes.

Status of Application for Pre-Disaster Mitigation Grant for Updating the Kenosha County Hazard Mitigation Plan

Mr. Boxhorn reported that the County has applied to FEMA for a Pre-Disaster Mitigation Grant to fund updating and revising the County’s hazard mitigation plan. He indicated that the County’s application has been accepted for further review by FEMA. He added that based upon discussions with staff from the Wisconsin Division of Emergency Management, he expects to know whether the grant is funded by the end of this year.

Procedure for Documentation of This Meeting

Mr. Boxhorn stated that he would document this meeting as a SEWRPC staff memorandum. He indicated that he would provide a draft of the memorandum to Mr. Benn to distribute to the Task Force. He asked that any additions or corrections be directed to him by October 15, 2014. He indicated that he would also provide a draft of the memorandum to Mr. Treloar for submission to FEMA as part of the requirements of the Community Rating System.

Adjournment

The September 23, 2014 meeting of the Kenosha County Hazard Mitigation Task Force was adjourned by unanimous consent at 11:30 a.m.

* * *

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Exhibit A

Kenosha County Division of Emergency Management
Southeastern Wisconsin Regional Planning Commission

Notice of Meeting and Agenda

KENOSHA COUNTY HAZARD MITIGATION TASK FORCE ANNUAL REVIEW OF THE KENOSHA COUNTY HAZARD MITIGATION PLAN UPDATE

DATE: September 23, 2014
TIME: 10:00 a.m. to 12:00 p.m.
PLACE: Kenosha County Center
Public Hearing Room
19600 - 75th Street
Bristol, Wisconsin

AGENDA:

1. Introductions
2. Review of summary notes from September 18, 2013, meeting of the Kenosha County Hazard Mitigation Task Force
3. Review of the plan (SEWRPC Community Assistance Planning Report No. 278 (CAPR No. 278), 2nd Edition, *Kenosha County Hazard Mitigation Plan Update: 2011-2015*)
http://www.sewrpc.org/SEWRPCFiles/Publications/CAPR/capr-278_2nded_kenoshacountyhazardmitigationplan.pdf, addressing the following questions (see pages 259 and 260 of CAPR No. 278, 2nd Edition):
 - a. Have any hazards changed in the past year? (See CAPR No. 278, 2nd Edition, Table 24 on page 69)
 - b. Have the hazard mitigation goals and objectives changed in the past year? (See CAPR No. 278, 2nd Edition, pages 152-154)
 - c. What progress has been made in implementing previously identified hazard mitigation actions? (See CAPR No. 278, 2nd Edition, Tables 60 and 61 on pages 234-255)
 - d. Do any plan elements and their priorities need modification? (See CAPR No. 278, 2nd Edition, Tables 60 and 61 on pages 234-255)
 - e. Are any new plan elements needed? (See CAPR No. 278, 2nd Edition, Tables 60 and 61 on pages 234-255)
 - f. Have applicable funding programs and levels of funding changed? (See CAPR No. 278, 2nd Edition, pages 233 and 256-259 and Appendices J and K)

[NOTE: The intent of this agenda item is to receive input from the Task Force members in attendance.]
4. Discussion of possible change to the flood action stage for the Fox River.
5. Status of application for Pre-Disaster Mitigation Grant funds for updating the Kenosha County Hazard Mitigation Plan.
6. Procedure for documentation of the meeting
7. Adjourn

Joseph E. Boxhorn
Secretary

Exhibit B

**KENOSHA COUNTY HAZARD MITIGATION TASK FORCE
THIRD ANNUAL MEETING TO REVIEW THE
KENOSHA COUNTY HAZARD MITIGATION PLAN UPDATE
September 23, 2014**

In attendance at the meeting were the following individuals:

Gil Benn	Kenosha County Sheriff's Department
Bill Beth	Kenosha County Emergency Management
Joseph E. Boxhorn	Southeastern Wisconsin Regional Planning Commission
Andy M. Buehler	Kenosha County Planning and Development
William M. Glebacki	Town of Wheatland
Brian Hahn	National Weather Service
John Klabecek	Carthage College
Laura L. Kletti	Southeastern Wisconsin Regional Planning Commission
Doug McElmury	Village of Pleasant Prairie Fire & Rescue Department
John Meland	Kenosha County Housing Authority/Southeastern Wisconsin Regional Planning Commission
Mark Melotik	Kenosha County Health Department
Aaron W. Owens	Southeastern Wisconsin Regional Planning Commission
Peter Parker	Village of Bristol Fire Department
Nakeisha N. Payne	Southeastern Wisconsin Regional Planning Commission
Rudy Schaar	National Weather Service
David Smetana	Village of Pleasant Prairie Police Department
Tom Smith	Town of Somers Fire and Rescue
Daniel R. Treloar	Kenosha County Planning and Development
Kurt Worden	American Red Cross

Exhibit C

Table 1

OCCURRENCES OF METEOROLOGICAL HAZARDS SINCE COMPLETION OF THE INVENTORIES FOR THE KENOSHA COUNTY HAZARD MITIGATION PLAN UPDATE

8

Hazard	May 2013-May 2014 ^a					May 2009-May 2014				
	Incidents	Deaths	Injuries	Property Damage	Crop Damage	Incidents	Deaths	Injuries	Property Damage	Crop Damage
Flood	0	0	0	\$ 0	\$ 0	9	0	0	\$12,307,000	\$205,000
Thunderstorms, High Wind, Hail, and Lightning										
Thunderstorm/High Wind	3	0	0	32,000	0	24	1	1	437,000	0
High Wind	1	0	0	0	0	4	0	0	65,000	0
Strong Wind	1	0	0	0	0	24	0	0	79,000	0
Hail	2	0	0	0	0	6	0	0	0	0
Lightning	0	0	0	0	0	3	0	0	15,000	0
Subtotal	7	0	0	32,000	0	61	1	1	596,000	0
Tornado										
Tornado	0	0	0	0	0	3	0	0	102,000	0
Funnel Cloud	0	0	0	0	0	1	0	0	0	0
Subtotal	0	0	0	0	0	4	0	0	102,000	0
Extreme Temperatures										
Cold/Wind Chill	1	0	0	0	0	3	0	0	0	0
Extreme Cold/Wind Chill	1	0	0	0	0	1	0	0	0	0
Excessive Heat	1	0	0	0	0	2	0	0	0	0
Heat	1	0	0	0	0	8	0	0	0	0
Subtotal	4	0	0	0	0	14	0	0	0	0
Winter Storms										
Blizzard	0	0	0	0	0	1	0	0	20,000	0
Lake Effect Snow	0	0	0	0	0	1	0	0	0	0
Winter Storm	2	0	0	0	0	9	0	0	0	0
Winter Weather	13	0	0	0	0	32	0	0	20,000	0
Subtotal	15	0	0	0	0	43	0	0	40,000	0
Drought	0	0	0	0	0	6	0	0	0	0
Dense Fog	1	0	0	0	0	19	0	0	0	0
Total	27	0	0	\$32,000	\$ 0	156	1	1	\$13,045,000	\$205,000

^aBased upon data that have become available since the September 18, 2013 meeting of the Kenosha County Hazard Mitigation Task Force.

Source: National Oceanic and Atmospheric Administration National Climatic Data Center and SEWRPC.

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Exhibit D

Table 2

TRAFFIC FATALITIES, INJURIES, AND ACCIDENTS IN KENOSHA COUNTY: 2002-2012

Year	Fatalities	Injuries	Fatality Crashes	Injury Crashes	Property Damage Crashes	Total Crashes
2002	20	2,170	20	1,456	2,123	3,599
2003	24	2,171	21	1,421	2,191	3,633
2004	26	2,199	25	1,498	2,276	3,797
2005	25	2,286	24	1,518	2,250	3,792
2006	25	2,044	24	1,368	2,113	3,505
2007	20	2,083	18	1,425	2,422	3,865
2008	28	1,904	26	1,318	2,640	3,984
2009	16	1,744	14	1,205	2,348	3,567
2010	12	1,579	12	1,094	2,108	3,214
2011	19	1,561	18	1,050	2,097	3,165
2012 ^a	17	1,518	17	1,065	2,092	3,174

^aData that have become available since the September 18, 2013 meeting of the Kenosha County Hazard Mitigation Task Force.

Source: Wisconsin Department of Transportation.

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Kenosha County Division of Emergency Management
Southeastern Wisconsin Regional Planning Commission

Notice of Meeting and Agenda

KENOSHA COUNTY HAZARD MITIGATION PLAN LOCAL PLANNING TEAM

DATE: April 22, 2015
TIME: 9:00 to 11:30 a.m.
PLACE: Kenosha County Center
Public Hearing Room
19600 - 75th Street
Bristol, Wisconsin

AGENDA:

1. Welcome
2. Introductions
3. Overview of hazard mitigation plan updating process: Joseph E. Boxhorn, SEWRPC Senior Planner
4. Overview of ongoing buyouts of floodprone buildings along the Fox River in Kenosha County: John Meland, SEWRPC Principal Specialist
5. Background on the second update to the Kenosha County Hazard Mitigation Plan: Joe Boxhorn
 - a. Initial 2004/2005 plan
 - b. 2009/2010 updated plan
 - c. Main components to be reviewed and revised
 - d. Schedule for the plan update (Attachment 1)
 - e. Local Planning Team role
6. Review hazard mitigation goals as revised by the first plan update (Attachment 2): Joe Boxhorn
7. Hazard and vulnerability assessment exercise (Attachment 3): Joe Boxhorn
8. Adjourn

Joseph E. Boxhorn
Secretary

Enclosures

CAPR-278 3RD ED MEETING NOTICE APR 2015 (00224794).DOC
500-1112
JEB/pk
04/07/15

Attachment 1

**PROPOSED WORK SCHEDULE FOR UPDATING THE
KENOSHA COUNTY HAZARD MITIGATION PLAN**

Task	Estimated Completion Date
Update Planning Team Membership	April 1, 2015
Survey Designated Management Agencies Regarding Status of Implementation of Original Plan	June 30, 2015
Kickoff Planning Team Meeting	Late April 2015
Public Participation	January 2015 through July 2016
Develop Updated Community Profiles	June 15, 2015
Planning Team Meeting (Review Chapters 1 and 2)	Early August 2015
Identify and Describe Hazards	August 31, 2015
Review of Established Goals and Objectives	September 30, 2015
Update Risk and Vulnerability Assessments	October 30, 2015
Planning Team Meeting (Review Chapters 3 and 4)	Late January 2016
First Public Meeting	Mid February 2016
Development of Updated Mitigation Actions	April 30, 2016
Development of Updated Plan Maintenance Process	May 31, 2016
Apply to Wisconsin Emergency Management for Extension of Grant Deadline (Original Period of Performance Deadline is September 1, 2016)	June 15, 2016
Planning Team Meeting (Review Chapters 5 and 6)	Early June 2016
Second Public Meeting	Mid July 2016
Submit Draft Plan Update to Wisconsin Division of Emergency Management for Review	August 31, 2016
Revise Plan Based on State Review	October 31, 2016
Submit Final Plan Update to the Federal Emergency Management Agency for Approval Pending Adoption	November 15, 2016
Formal Adoption	February 15, 2017
Anticipated Period of Performance Deadline	March 1, 2017

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04/07/15

Attachment 2

HAZARD MITIGATION GOALS AND OBJECTIVES FOR KENOSHA COUNTY HAZARD MITIGATION PLAN

The following goals were established for the initial Kenosha County hazard mitigation planning program,¹ based, in part, upon goals previously established in watershed, park and open space, and land use planning programs.

1. **Land Use:** A spatial distribution of the various land uses that minimizes hazards and dangers to health, welfare, and safety, as well as further enhancing the economic base of the County, and will result in a compatible arrangement of land uses properly related to the existing and proposed supporting transportation, utility, public safety systems, and public facility systems.
2. **Natural Resources:** A spatial distribution of the various land uses which maintains biodiversity and will result in the protection and wise use of the natural resources of the County, including its soils, inland lakes and streams, groundwater, wetlands, woodlands, wildlife, and natural areas and critical species habitats.
3. **Transportation:** An integrated transportation system that, through its location, capacity, and design, will safely, economically, and effectively serve the existing and proposed land use pattern and promote the implementation of the land use plan, meeting the current and anticipated travel demand and minimizing the potential for accidents and the associated toll on life and property damage.
4. **Fire, Police, and Emergency Medical Services:** The provision of facilities necessary to maintain a high quality of fire and police protection and emergency medical services throughout the County.
5. **Stormwater and Floodland Management:** The development of a stormwater and floodland management system that reduces the exposure of people to drainage- and flooding-related inconvenience and to health and safety hazards and that reduces the exposure of real and personal property to damage through inundation resulting from flooding and inadequate stormwater drainage.
6. **Lake Michigan Coastal Erosion:** The identification of high erosion risk Lake Michigan shoreline areas and the development of a coastal erosion control program that reduces the exposure of people and real and personal property to shoreline erosion and bluff recession.
7. **Unpredictable Hazards:** The identification and development of programs that complement County and local emergency operations plans to mitigate the potential exposure to health and safety and the exposure of real and personal property resulting from a broad range of hazards which are unpredictable and not geographically specific in nature.
8. **Communications:** Communications interoperability throughout the County amongst all First Responders, so as to be able to quickly and effectively respond to any incident to prevent the loss of life and to save property.

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04/07/15

¹SEWRPC Community Assistance Planning Report No. 278, Kenosha County Hazard Mitigation Plan Update: 2011-2015 (2nd Edition), June 2010.

Attachment 3

HAZARD AND VULNERABILITY ASSESSMENT TOOL
KENOSHA COUNTY HAZARD MITIGATION PLAN UPDATE

EVENT	PROBABILITY	SEVERITY = (MAGNITUDE - MITIGATION)				RISK	
		HUMAN IMPACT	PROPERTY IMPACT	BUSINESS AND AGENCY IMPACT	PREPAREDNESS		
		<i>Likelihood This Will Occur</i>	<i>Possibility of Death or Injury</i>	<i>Physical Losses and Damages</i>	<i>Interruption of Services</i>		<i>Preplanning</i>
SCORE	0 = N/A 1 = Low 2 = Moderate 3 = High	0 = N/A 1 = Low 2 = Moderate 3 = High	0 = N/A 1 = Low 2 = Moderate 3 = High	0 = N/A 1 = Low 2 = Moderate 3 = High	0 = N/A 1 = Low 2 = Moderate 3 = High	0 = N/A 1 = High 2 = Moderate 3 = Low or none	0 - 100%
A1. Riverine flooding						0%	
A2. Stormwater flooding						0%	
A3. Lake flooding						0%	
A4. Tornado						0%	
A5. Earthquake						0%	
A6. Thunderstorm						0%	
A7. High straight-line wind						0%	
A8. Lightning						0%	
A9. Hail						0%	
A10. Heavy snow storm						0%	
A11. Blizzard						0%	
A12. Ice storm						0%	
A13. Extreme cold						0%	
A14. Extreme heat						0%	
A15. Drought						0%	
A16. Fog						0%	
A17. Dust storm						0%	
A18. Lake Michigan Erosion							
B1. Contamination or loss of water supply system						0%	
B2. Loss of sewerage system						0%	
B3. Loss of telecommunication						0%	
B4. Electrical system outage						0%	
B5. Computer system incident/cyber attack						0%	
C1. Hazardous materials railroad incidents						0%	
C2. Hazardous materials roadway incidents						0%	
C3. Hazardous materials pipeline incidents						0%	
C4. Hazardous materials fixed facility incidents (industries, bulk fuel storage sites, grain elevators, agricultural chemical storage, and explosives, including fireworks storage)						0%	
D1. Railroad transportation accidents						0%	
D2. Roadway transportation accidents						0%	
D3. Aviation accidents						0%	
E1. Correctional center incidents						0%	
E2. Civil unrest						0%	
E3. Terrorism incidents (bomb threats, hostage situations, biological incidents)						0%	
E4. Workplace violence						0%	
E5. School violence						0%	
F1. Communicable disease outbreak or epidemic						0%	
F2. Large-scale food contamination						0%	
G1. Wildfire						0%	
G2. Large structure fires						0%	
G3. Explosions						0%	
G4. Mass casualty incidents						0%	
G5. Building collapse or cave-in						0%	
H1. Dam failure						0%	
H2. Landslide						0%	
H3. Land subsidence						0%	
AVERAGE SCORE	0.00	0.00	0.00	0.00	0.00	0%	

*Threat increases with percentage.

Source: Kaiser Permanente and SEWRPC.

RISK = PROBABILITY * SEVERITY		
0.00	0.00	0.00

Shaded hazards are profiled in the current Kenosha County hazard mitigation plan.

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SUMMARY NOTES OF THE APRIL 22, 2015 MEETING OF THE KENOSHA COUNTY HAZARD MITIGATION PLAN LOCAL PLANNING TEAM

INTRODUCTION

The April 22, 2015 meeting of the Kenosha County Hazard Mitigation Plan Local Planning Team was convened at the Kenosha County Center at 9:07 a.m. The meeting was called to order by Lieutenant Gil Benn, Director of the Kenosha County Division of Emergency Management. Attendance was taken by circulating a sign-in sheet.

In attendance at the meeting were the following individuals:

Local Planning Team Members

Lt. Gil S. Benn, Chair	Director, Kenosha County Division of Emergency Management
Joseph E. Boxhorn, Secretary	Senior Planner, Southeastern Wisconsin Regional Planning Commission
Ray Arbet	Director, Kenosha County Department of Public Works
Megan Beauchaine	Research Analyst, Southeastern Wisconsin Regional Planning Commission
Bill Beth	Deputy Director, Kenosha County Division of Emergency Management,
Michael Blodgett	Assistant Communications Manager, Kenosha Joint Services
Andy M. Buehler	Director, Kenosha County Department of Planning and Development
Matt Fineour	Village Engineer, Village of Pleasant Prairie
William Glembocki	Chair, Town of Wheatland
Robert Grieshaber	Safety- Risk Manager, University of Wisconsin-Parkside
Benjamin Harbach	Chairman, Town of Somers
Jerry Helment	Planning Commissioner, Town of Brighton
William Hoare	Associate Vice President, Carthage College
Laura Kletti	Chief Environmental Engineer, Southeastern Wisconsin Regional Planning Commission
Dennis Linn	Captain, Twin Lakes Police Department
Doug McElmury	Fire Chief, Village of Pleasant Prairie
John Meland	Principal Specialist, Southeastern Wisconsin Regional Planning Commission
Mark Melotik	Director of Environmental Health, Kenosha County Department of Health
Darron Newton	Detentions Supervisor, Kenosha County Sheriff's Department
Aaron Owens	Planner, Southeastern Wisconsin Regional Planning Commission
Tim Popanda	Administrator, Village of Paddock Lake
Peter Parker	Fire Chief, Village of Bristol
Kyle Roeder	Disaster Program Manager, American Red Cross
Mike Schrandt	Facilities Manager, Kenosha County Division of Facilities
Ken Schroeder	Battalion Chief, City of Kenosha Fire Department
Tom Shircel	Assistant Village Administrator, Village of Pleasant Prairie
Dan Treloar	Conservationist, Kenosha County Department of Planning and Development
Capt. Ken Weyker	Commander of Field Operations, Kenosha County Sheriff's Department
Tedi Winnett	Director, University of Wisconsin-Extension, Kenosha County

Lt. Benn welcomed all attendees to the meeting. He noted that the Kenosha County hazard mitigation plan is required to be updated every five years, and that this would be the second update to the original plan. Lt. Benn explained that the County applied for grant funding in 2014 to begin the updating process. He informed the

planning team that he anticipates that there will be four meetings of the team throughout the Plan updating process. At the request of Lt. Benn, the team members introduced themselves.

OVERVIEW OF HAZARD MITIGATION AND HAZARD MITIGATION PLAN UPDATING PROCESS

Lt. Benn introduced Joseph Boxhorn, Senior Planner, Southeastern Wisconsin Regional Planning Commission (SEWRPC). Mr. Boxhorn presented an overview of hazard mitigation and the hazard mitigation plan updating process.

[Secretary's Note: A copy of Mr. Boxhorn's presentation is attached herein as Exhibit A.]

OVERVIEW OF THE ONGOING BUYOUTS OF FLOODPRONE BUILDINGS ALONG THE FOX RIVER IN KENOSHA COUNTY

Mr. Boxhorn introduced John Meland, SEWRPC Principal Specialist. At Mr. Boxhorn's request, Mr. Meland presented an overview of Kenosha County's ongoing Fox River buyout program for flood prone buildings. Mr. Meland stated that when the program began in 1995, there were 175 flood prone structures located in the floodplain along the Fox River between Wheatland and Silver Lake. He added that the buyout program has received 11 million dollars in grant funds and that 103 residential properties representing 160 tax parcels have been voluntarily sold to the County and demolished. Mr. Meland explained that funds are currently exhausted and no more funds will be available for buyouts unless there is a federally declared disaster in the County. He noted that 72 flood prone residential properties currently remain in the project area. He indicated that one repetitive loss property was also purchased on Camp Lake in January 2015 with funding from the FEMA Flood Mitigation Assistance Program.

Mr. Popanda asked who retains ownership of the properties after the buildings had been removed. Mr. Meland replied that Kenosha County now owns the parcels. Lt. Benn indicated that there are privately-owned parcels located in the project area that have no structures on them. He noted that despite the fact that these parcels are unbuildable the owners are unwilling to sell them. Lt. Benn suggested these parcels could become parkland. Mr. Meland replied that FEMA will not pay for the acquisition of vacant land and noted that the only way for the County to acquire those parcels is through donation to the County by the owners. Mr. Meland added that FEMA requires that parcels acquired using funding from FEMA grant programs remain in open space land uses. Mr. Treloar responded that his office has sent letters to the owners of all the vacant parcels in the project area explaining that they have the option to donate these properties to the County. Mr. Treloar added that the letters also explain that such a donation would free the owners of the property tax obligations associated with the properties. He noted that four property owners have expressed interest.

BACKGROUND ON THE SECOND UPDATE OF THE KENOSHA COUNTY HAZARD MITIGATION PLAN

Mr. Boxhorn presented background information on the initial hazard mitigation plan and the first update to the plan. He noted that the initial plan was completed in 2005 and the first plan update was completed in 2010. Mr. Boxhorn also outlined the main plan components to be reviewed and revised, presented a work schedule for the plan update, and explained the role of the Local Planning Team in the plan development process. He stated that a project webpage has been created on the SEWRPC website. He indicated that draft chapters of the plan report, meeting materials, and summary notes from planning team meetings will be available on this page. He added that a comment screen is also available on this webpage through which planning team members and members of the public may submit questions or comments on the draft plan.

Lt. Benn asked whether data can be uploaded onto the website. Mr. Boxhorn explained that the website comment screen was mainly for questions and comments and suggested that it would be best to email him any data pertaining to the plan.

[Secretary's Note: As previously noted, Mr. Boxhorn's presentation is attached herein as Exhibit A. A copy of the proposed work schedule for the plan update is attached herein as Exhibit B.]

REVIEW OF HAZARD MITIGATION GOALS FROM FIRST PLAN UPDATE

Mr. Boxhorn presented an overview of the goals that were established for the initial Kenosha County hazard mitigation planning program and revised during the first update of the plan. He asked the Team to review the goals and to begin to think about any changes and/or additions that may be necessary.

[Secretary's Note: A copy of the hazard mitigation goals is attached herein as Exhibit C.]

HAZARD AND VULNERABILITY ASSESSMENT EXERCISE

Mr. Boxhorn stated that as part of the hazard and vulnerability analysis for the plan, it will be necessary to decide which hazards will be addressed by the plan. He indicated that a hazard and vulnerability assessment tool and instructions for completing the tool were included with the agenda for this meeting. He explained that the tool is a modified version of a tool developed by Kaiser Permanente for assessing the risks faced by healthcare facilities.

[Secretary's Note: A copy of the hazard and vulnerability assessment tool and the instructions for completing the tool are attached herein as Exhibit D.]

Mr. Boxhorn asked the members of the Local Planning Team to complete the hazard and vulnerability assessment tool. He explained that the results of this exercise would be used to help determine which hazards are addressed by the hazard mitigation plan update.

Mr. Arbet asked whether the assessment tool should be completed utilizing their experience in their own communities or through their perception of the entire County. Mr. Boxhorn replied that their assessment should be applicable to the entire County. Mr. Popanda, suggested that each team member should complete the assessment based upon the areas that they know and represent, noting that to do otherwise could cause the results to be skewed. Mr. Boxhorn noted that the assessment results will not be the only information used to identify the hazards faced by the County. Lt. Benn suggested that people fill out the survey based on the community they represent and record the name of the community on the worksheet. Mr. Boxhorn agreed.

ADJOURNMENT

There being no further business, the meeting was adjourned by unanimous consent at 10:20 a.m.

CAPR-278-3 SUMMARY NOTES KENOSHA CTY HMP LPT MTG APRIL 22 2015 (00225232-2).DOC
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Exhibit A

HAZARD MITIGATION PLANNING
April 22, 2015

Joseph Boxhorn, Ph.D., Senior Planner
Southeastern Wisconsin Regional Planning Commission

Katie Sommers, CFM, State Hazard Mitigation Officer
Wisconsin Division of Emergency Management

Roxanne Gray, Mitigation Section Supervisor
Wisconsin Division of Emergency Management

SEWRPC
Southeastern Wisconsin Regional Planning Commission
One Wisconsin Way, Suite 1000
Madison, WI 53703

WISCONSIN DIVISION OF EMERGENCY MANAGEMENT

DOCS #225154

What is Mitigation?

- “Mitigation is any sustained action taken to eliminate or reduce the long-term risk to human life and property from natural and technological hazards” – FEMA definition
- Constructive actions to reduce damages prior to the next disaster



What is Mitigation?

- Mitigation is not
 - Emergency response
 - Crisis management
 - Disaster preparation and recovery
- Mitigation focuses on reducing the impacts of disasters when they occur



Mitigation Breaks the Disaster Cycle



Why Do We Mitigate?



- Disasters cost society too much
- State and federal aid insufficient
- Can prevent future damages
- Less impact and speed response and recovery process
- Mitigation happens at the local level

Why Do We Mitigate?

Nationwide Trends

- \$80 Billion 2004-2011 (GAO) responding to disasters
- \$6 Billion per year in flood damages
- Costs continue to rise
- People continue to build and live in high-risk areas



Why Do We Mitigate?



In Wisconsin

- \$3 billion in disaster-related damages last 3 decades
- 12 Federal Disaster Declarations in the 90's compared to 6 in the 80's
- 2000, 2001, two in 2002, 2004, 2007, 2008, two in 2010, 2011, 2012, 2013
- 2 snow emergencies (2000 and 2008)

Value of Mitigation



In 2005, the National Institute of Building Sciences found that for every \$1 spent on mitigation, \$4 are saved in avoided future damages

Examples of Mitigation Measures (mostly related to flooding)



Acquisition/Demolition



Communities acquire land, demolish structures, and keep the land in open space.

Images from Darlington, WI

Elevation



Elevation raises a structure out of the floodplain. Wisconsin has specific regulations to follow with elevation projects. See DNR for more information.

Images from Soldiers Grove, WI

Floodwall



Floodwalls can prevent water from inundating structures that cannot be elevated, relocated, or demolished.

Image from Darlington, WI

Community Safe Room



Community safe rooms built to FEMA-361 standards can withstand winds up to 250 MPH.

Image from Town of Dunn, WI

Stormwater Detention



Detention ponds can store stormwater runoff, decreasing flash flooding in urban areas.

Image from MMSD Stormwater Detention Project (Wauwatosa, WI)

Stormwater Management



Stream restoration allows watersheds to better manage flooding.

Image from Thiensville, WI

River Warning Systems



River warning systems installed on conservation dams to warn county officials about expected dam breaching.

Images from Vernon County

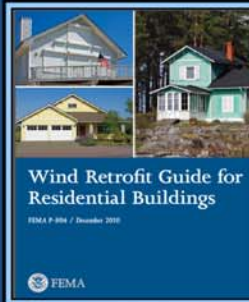
Other Projects



NOAA Weather Radios



Mobile Home Tie-Downs



Wind Retrofit Guide for Residential Buildings

FEMA P-304 / December 2010



Proper Landscaping

- Raise appliances and utilities
- Install back-flow valves
- Retrofit for wind resistance
- Education and public awareness
- Insurance (flood and sewer backup)
- Land use planning

Benefits of Mitigation

- Enhance recreation and tourism
 - Parks
 - Trails
- Increase community pride and quality of live
- Save tax dollars



Darlington, WI



Chaseburg, WI

Hazard Mitigation Planning



Disaster Mitigation Act of 2000

- Established a national disaster mitigation program
- Communities must have an approved hazard mitigation plan to be eligible to receive Federal funds through:
 - Hazard Mitigation Grant Program (HMGP)
 - Pre-disaster Mitigation Program (PDM)
 - Flood Mitigation Assistance Program (FMA)
- Plans must be reviewed and updated every five years

Disaster Mitigation Act of 2000

Vision of the Disaster Mitigation Act of 2000

- Communities will have all hazards mitigation plans that identify and prioritize cost-effective mitigation measures that can be implemented prior to a disaster or quickly after a disaster
- Having a plan would speed up the recovery process

Plan Components

1. Documentation of the planning process
2. Description of study area
3. Analysis of hazard conditions
4. Hazard mitigation goals and objectives
5. Hazard mitigation strategies
6. Plan adoption, implementation, and maintenance

Plan Components

1. Documentation of the Planning Process

- Chapter 1 and Appendix A
- Incorporated municipalities must participate in plan development and adopt the plan in order to be covered
 - County adoption covers the towns
- Public and adjacent communities must be given an opportunity to comment during the drafting stage

Plan Components

2. Description of Study Area – Chapter 2

- Demographic
- Surface waters
- Transportation
- Public facilities
 - Police facilities
 - Fire facilities
 - EMS facilities
- Related regulations and programs
- Land use
- Flood hazard areas
- Utility systems
- Critical community facilities
- Hazardous material use and storage
- Emergency operation planning

Plan Components

3. Analysis of Hazard Conditions-Chapter 3

- Vulnerability and risk analysis for each covered hazard
 - Historical and recent incidents
 - Vulnerabilities and community impacts
 - Human lives, property damages, crop damages
 - Potential for future changes in hazard conditions
 - Multijurisdictional aspects

Plan Components

4. Hazard Mitigation Goals-Chapter 4

- Express what the plan is trying to achieve
- Ties the plan to other active plans
 - *e.g.* The County comprehensive plan
- Fairly general

Plan Components

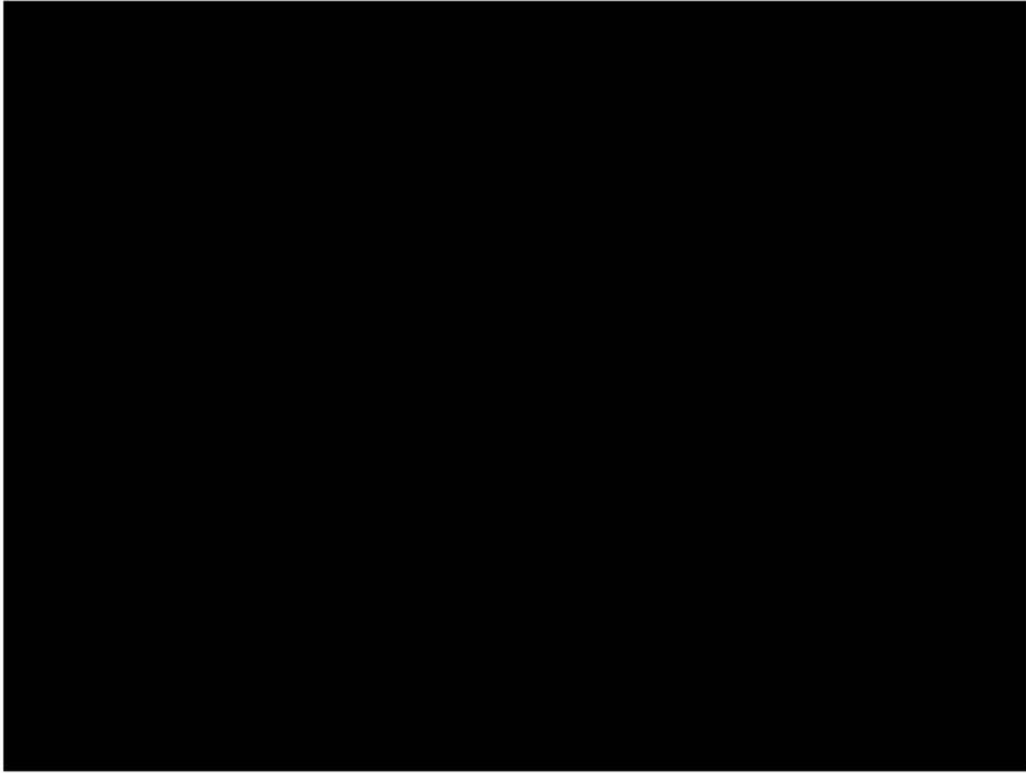
5. Hazard Mitigation Strategies-Chapter 5

- Develop a range of actions and projects to reduce the impacts of each hazard
 - Structural, nonstructural, educational
- Prioritize actions for implementation
- Identify responsible parties
- Examine costs and benefits
- Consider multi-jurisdictional aspects

Plan Components

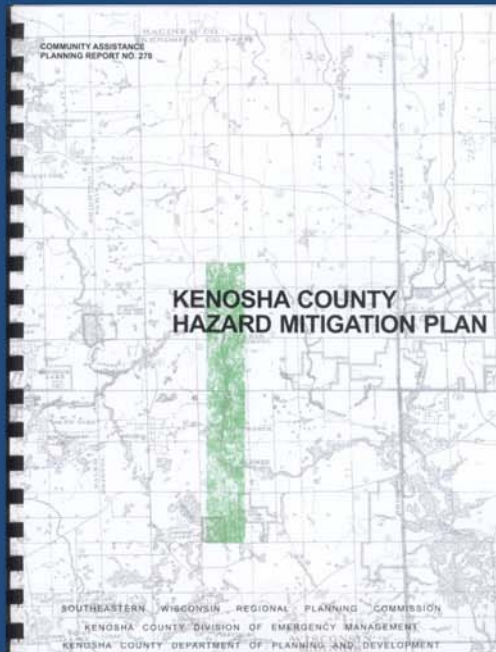
6. Plan Adoption, Implementation, and Maintenance-Chapter 6

- County and incorporated municipalities must formally adopt the plan
 - Towns are covered by County adoption
- Detail available funding and technical assistance
- Monitoring of plan implementation
- Incorporation of the plan into existing planning mechanisms



Initial Kenosha County HMP

- Study conducted 2004-2005
- Report published 2005



Initial Kenosha County HMP

Local government partners:

- City of Kenosha
- Village of Genoa City
- Village of Paddock Lake
- Village of Pleasant Prairie
- Village of Silver Lake
- Village of Twin Lakes
- Town of Brighton
- Town of Bristol
- Town of Paris
- Town of Randall
- Town of Salem
- Town of Somers
- Town of Wheatland

Initial Kenosha County HMP

Additional Partners

- Kenosha County Executive's Office
- Kenosha County Board
- Kenosha County Departments
- State Representative Kerkman, 66th District
- Sherriff's, Police, and Fire Departments
- Public Works Departments
- UW-Parkside, Carthage College, and UW-Extension
- Kenosha Area Business Alliance
- Kenosha Area Chamber of Commerce
- Wisconsin Division of Emergency Management
- American Red Cross
- We Energies
- ChemReport, Inc.

First Plan Update

- Study conducted 2009/2010
- Coordinated with development of the County comprehensive plan
- Reviewed and revised
 - Goals
 - Vulnerability and risk analysis
 - Mitigation strategies
- Report published 2010

First Update: Participating Jurisdictions

- Kenosha County
- City of Kenosha
- Village of Bristol
- Village of Paddock Lake
- Village of Pleasant Prairie
- Village of Silver Lake
- Village of Twin Lakes
- Town of Brighton
- Town of Paris
- Town of Randall
- Town of Salem
- Town of Somers
- Town of Wheatland

First Plan Update

Additional Partners

- Kenosha County Board
- Kenosha County Departments
- Sherriff's, Police, and Fire Departments
- Public Works Departments
- UW-Parkside, Carthage College, and UW-Extension
- Kenosha Unified School District
- Wisconsin Division of Emergency Management
- American Red Cross
- We Energies
- ChemReport, Inc.

Plan Components to Review and Revise

- Review implementation activities
- Update inventories of natural and built features
- Review and reevaluate identification of hazards
- Update and reevaluate risk analysis
- Review and revise mitigation goals
- Review and revise mitigation strategies
- Update plan implementation and maintenance
 - Update potential funding sources

Tentative Schedule

Task	Estimated Completion Date
Update Planning Team Membership	April 1, 2015
Survey Designated Management Agencies Regarding Status of Implementation of Original Plan	June 30, 2015
Kickoff Planning Team Meeting	Late April 2015
Public Participation	January 2015 through July 2016
Develop Updated Community Profiles	June 15, 2015
Planning Team Meeting (Review Chapters 1 and 2)	Early August 2015
Identify and Describe Hazards	August 31, 2015
Review of Established Goals and Objectives	September 30, 2015
Update Risk and Vulnerability Assessments	October 30, 2015
Planning Team Meeting (Review Chapters 3 and 4)	Late January 2016
First Public Meeting	Mid February 2016
Development of Updated Mitigation Actions	April 30, 2016
Development of Updated Plan Maintenance Process	May 31, 2016
Apply to Wisconsin Emergency Management for Extension of Grant Deadline (Original Period of Performance Deadline is September 1, 2016)	June 15, 2016
Planning Team Meeting (Review Chapters 5 and 6)	Early June 2016
Second Public Meeting	Mid July 2016
Submit Draft Plan Update to Wisconsin Division of Emergency Management for Review	August 31, 2016
Revise Plan Based on State Review	October 31, 2016
Submit Final Plan Update to the Federal Emergency Management Agency for Approval Pending Adoption	November 15, 2016
Formal Adoption	February 15, 2017

Key Dates (*all tentative*)

- Local Planning Team Meetings
 - August 2015, January 2016, June 2016
- Public Meetings
 - February 2016, July 2016
- Submit for Review
 - August 2016
- County Adoption
 - February 2017

Local Planning Team Role

- Weigh in on hazard identification
- Review the plan chapters
- Help us get needed information
 - Recent and historical problems with hazards → Location, occurrence, damages
 - Recent projects, planned and contemplated projects, recent hazard-related outreach
 - Inventory data

Project Web Site

<http://www.sewrpc.org/SEWRPC/communityassistance/Hazard-Mitigation-Planning.htm>

- Copy of the 2010 plan update
- Agendas and other meeting materials
- Summary notes from meetings
- Presentations
- Draft chapters as they are completed
- Comment screen
- Other ways to send a comment



Hazard Mitigation Goals

1. A spatial distribution of the various land uses that minimizes hazards and dangers to health, welfare, and safety as well as further enhancing the economic base of the County, and will result in a compatible arrangement of land uses properly related to the existing and proposed supporting transportation, utility, public safety systems, and public facility systems.
2. A spatial distribution of the various land uses that maintains biodiversity and which will result in the protection and wise use of the natural resources of the County, including its soils, inland lakes and streams, groundwater, wetlands, woodlands, wildlife, and natural areas and critical species habitats.

Hazard Mitigation Goals

3. An integrated transportation system that, through its location, capacity, and design, will safely, economically, and effectively serve the existing and proposed land use pattern and promote the implementation of the land use plan, meeting the current and anticipated travel demand and minimizing the potential for accidents and the associated toll on life and property damage.
4. The provision of facilities necessary to maintain a high quality of fire and police protection and emergency medical services throughout the County.

Hazard Mitigation Goals

5. The development of a stormwater and floodland management system which reduces the exposure of people to drainage- and flooding-related inconvenience and to health and safety hazards and which reduces the exposure of real and personal property to damage through inundation resulting from flooding and inadequate stormwater drainage.
6. The identification of high erosion risk Lake Michigan shoreline areas and the development of a coastal erosion management program that reduces the exposure of people and real and personal property to shoreline erosion and bluff recession.

Hazard Mitigation Goals

7. The identification and development of programs that complement County and local emergency operations plans to mitigate the potential exposure to health and safety and the exposure of real and personal property resulting from a broad range of hazards that are unpredictable and not geographically specific in nature.
8. Communications interoperability throughout the County amongst all First Responders, so as to be able to quickly and effectively respond to any incident to prevent the loss of life and to save property.

Exhibit B

Attachment 1

PROPOSED WORK SCHEDULE FOR UPDATING THE KENOSHA COUNTY HAZARD MITIGATION PLAN

Task	Estimated Completion Date
Update Planning Team Membership	April 1, 2015
Survey Designated Management Agencies Regarding Status of Implementation of Original Plan	June 30, 2015
Kickoff Planning Team Meeting	Late April 2015
Public Participation	January 2015 through July 2016
Develop Updated Community Profiles	June 15, 2015
Planning Team Meeting (Review Chapters 1 and 2)	Early August 2015
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Second Public Meeting	Mid July 2016
Submit Draft Plan Update to Wisconsin Division of Emergency Management for Review	August 31, 2016
Revise Plan Based on State Review	October 31, 2016
Submit Final Plan Update to the Federal Emergency Management Agency for Approval Pending Adoption	November 15, 2016
Formal Adoption	February 15, 2017
Anticipated Period of Performance Deadline	March 1, 2017

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03/11/15

Exhibit C

Attachment 2

HAZARD MITIGATION GOALS AND OBJECTIVES FOR KENOSHA COUNTY HAZARD MITIGATION PLAN

The following goals were established for the initial Kenosha County hazard mitigation planning program,¹ based, in part, upon goals previously established in watershed, park and open space, and land use planning programs.

1. **Land Use:** A spatial distribution of the various land uses that minimizes hazards and dangers to health, welfare, and safety, as well as further enhancing the economic base of the County, and will result in a compatible arrangement of land uses properly related to the existing and proposed supporting transportation, utility, public safety systems, and public facility systems.
2. **Natural Resources:** A spatial distribution of the various land uses which maintains biodiversity and will result in the protection and wise use of the natural resources of the County, including its soils, inland lakes and streams, groundwater, wetlands, woodlands, wildlife, and natural areas and critical species habitats.
3. **Transportation:** An integrated transportation system that, through its location, capacity, and design, will safely, economically, and effectively serve the existing and proposed land use pattern and promote the implementation of the land use plan, meeting the current and anticipated travel demand and minimizing the potential for accidents and the associated toll on life and property damage.
4. **Fire, Police, and Emergency Medical Services:** The provision of facilities necessary to maintain a high quality of fire and police protection and emergency medical services throughout the County.
5. **Stormwater and Floodland Management:** The development of a stormwater and floodland management system that reduces the exposure of people to drainage- and flooding-related inconvenience and to health and safety hazards and that reduces the exposure of real and personal property to damage through inundation resulting from flooding and inadequate stormwater drainage.
6. **Lake Michigan Coastal Erosion:** The identification of high erosion risk Lake Michigan shoreline areas and the development of a coastal erosion control program that reduces the exposure of people and real and personal property to shoreline erosion and bluff recession.
7. **Unpredictable Hazards:** The identification and development of programs that complement County and local emergency operations plans to mitigate the potential exposure to health and safety and the exposure of real and personal property resulting from a broad range of hazards which are unpredictable and not geographically specific in nature.
8. **Communications:** Communications interoperability throughout the County amongst all First Responders, so as to be able to quickly and effectively respond to any incident to prevent the loss of life and to save property.

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03/31/15

¹SEWRPC Community Assistance Planning Report No. 278, Kenosha County Hazard Mitigation Plan Update: 2011-2015 (2nd Edition), June 2010.

Exhibit D

INSTRUCTIONS FOR COMPLETING HAZARD VULNERABILITY AND ASSESSMENT TOOL

The purpose of this Hazard Vulnerability and Assessment Tool is to evaluate the potential that specific hazards may occur, the likely severity of impacts resulting from these hazards, and the extent to which these impacts may be mitigated by current levels of preparedness. The tool uses estimates of probability of occurrence, likely severity of impacts, and level of preparedness to estimate the risk posed by each hazard.

Please address all of the potential threats that are listed. Instructions for completing entries in each column are given below.

Probability

For each of the listed hazards, please indicate the likelihood that it will occur, with 1 indicating a low probability of occurrence, 2 indicating a moderate probability of occurrence, and 3 indicating a high probability of occurrence. Issues to consider for probability include, but are not limited to:

- Known risk,
- Historical data and experience, and
- Local government or agency experience.

Human Impacts

For each of the listed hazards, please indicate what you consider to be the likely level of impacts to human life if the hazard occurs, with 1 indicating a low level of impacts, 2 indicating a moderate level of impacts, and 3 indicating a high level of impacts. Issues to consider for human impacts include, but are not limited to:

- Potential of the hazard to cause death, and
- Potential of the hazard to cause injury requiring medical treatment.

Property Impacts

For each of the listed hazards, please indicate the likely level of physical losses and damages to property if the hazard occurs, with 1 indicating a low level of losses and damages, 2 indicating a moderate level of losses and damages, and 3 indicating a high level of losses and damages. Issues to consider for property impacts include, but are not limited to:

- The potential of the hazard to cause damage to property or crops,
- The cost to replace damaged property,
- The cost to set up a temporary replacement for damaged property,
- The cost to repair damaged property, and
- The time to recover from the property damage.

Business and Government Agency Impacts

For each of the listed hazards, please indicate what the likely level of impacts to the operations of businesses and government agencies is if the hazard occurs, with 1 indicating a low level of impacts, 2 indicating a moderate level of impacts, and 3 indicating a high level of impacts. Issues to consider for business impacts include, but are not limited to:

- Business or agency interruption,
- Employees unable to report to work,
- Customers or clients unable to reach facility,
- Company or agency in violation of contractual agreements,
- Imposition of fines and penalties or legal costs,
- Interruption of access to critical supplies,

- Interruption of product or service distribution,
- Financial impact or burden, and
- Interruption of critical care and emergency services.

Preparedness

For each of the listed hazards, please indicate the current level of preparedness for dealing with the hazard and its impacts, with 1 indicating a high level of preparedness, 2 indicating a moderate level of preparedness, and three indicating a low level of preparedness or no preparedness. Issues to consider for preparedness include, but are not limited to:

- The status of current plans that address the hazard,
- The frequency of drills that address the hazard,
- The status of training related to the hazard and its impacts,
- Insurance,
- The availability of back-up systems, and
- The availability of community resources.

This survey will be compiled and the results will be reported during the hazard identification phase of developing or updating the hazard mitigation plan.

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JEB
03/30/15

Exhibit D (continued)

Attachment 3

**HAZARD AND VULNERABILITY ASSESSMENT TOOL
KENOSHA COUNTY HAZARD MITIGATION PLAN UPDATE**

EVENT	SEVERITY = (MAGNITUDE - MITIGATION)					RISK
	PROBABILITY	HUMAN IMPACT	PROPERTY IMPACT	BUSINESS AND AGENCY IMPACT	PREPAREDNESS	
	<i>Likelihood This Will Occur</i>	<i>Possibility of Death or Injury</i>	<i>Physical Losses and Damages</i>	<i>Interruption of Services</i>	<i>Preplanning</i>	
SCORE	0 = N/A 1 = Low 2 = Moderate 3 = High	0 = N/A 1 = Low 2 = Moderate 3 = High	0 = N/A 1 = Low 2 = Moderate 3 = High	0 = N/A 1 = Low 2 = Moderate 3 = High	0 = N/A 1 = High 2 = Moderate 3 = Low or none	0 - 100%
A1. Riverine flooding						0%
A2. Stormwater flooding						0%
A3. Lake flooding						0%
A4. Tornado						0%
A5. Earthquake						0%
A6. Thunderstorm						0%
A7. High straight-line wind						0%
A8. Lightning						0%
A9. Hail						0%
A10. Heavy snow storm						0%
A11. Blizzard						0%
A12. Ice storm						0%
A13. Extreme cold						0%
A14. Extreme heat						0%
A15. Drought						0%
A16. Fog						0%
A17. Dust storm						0%
A18. Lake Michigan Erosion						0%
B1. Contamination or loss of water supply system						0%
B2. Loss of sewerage system						0%
B3. Loss of telecommunication						0%
B4. Electrical system outage						0%
B5. Computer system incident/cyber attack						0%
C1. Hazardous materials railroad incidents						0%
C2. Hazardous materials roadway incidents						0%
C3. Hazardous materials pipeline incidents						0%
C4. Hazardous materials fixed facility incidents (industries, bulk fuel storage sites, grain elevators, agricultural chemical storage, and explosives, including fireworks storage)						0%
D1. Railroad transportation accidents						0%
D2. Roadway transportation accidents						0%
D3. Aviation accidents						0%
E1. Correctional center incidents						0%
E2. Civil unrest						0%
E3. Terrorism incidents (bomb threats, hostage situations, biological incidents)						0%
E4. Workplace violence						0%
E5. School violence						0%
F1. Communicable disease outbreak or epidemic						0%
F2. Large-scale food contamination						0%
G1. Wildfire						0%
G2. Large structure fires						0%
G3. Explosions						0%
G4. Mass casualty incidents						0%
G5. Building collapse or cave-in						0%
H1. Dam failure						0%
H2. Landslide						0%
H3. Land subsidence						0%
AVERAGE SCORE	0.00	0.00	0.00	0.00	0.00	0%

*Threat increases with percentage.

Source: Kaiser Permanente and SEWRPC.

RISK = PROBABILITY * SEVERITY		
0.00	0.00	0.00

Shaded hazards are profiled in the current Kenosha County hazard mitigation plan.

#224927
500-1112
JEB/pk
04/07/15

Kenosha County Division of Emergency Management
Southeastern Wisconsin Regional Planning Commission

Notice of Meeting and Agenda

KENOSHA COUNTY HAZARD MITIGATION PLAN LOCAL PLANNING TEAM

DATE: October 23, 2015
TIME: 9:00 to 12:00 noon
PLACE: Kenosha County Center
Public Hearing Room
19600 - 75th Street
Bristol, Wisconsin

AGENDA:

1. Welcome
2. Introductions
3. Consideration of Summary Notes of April 22, 2015, Local Planning Team Meeting (a copy of the draft summary notes is available for download from the SEWRPC website at: <http://www.sewrpc.org/SEWRPC/communityassistance/Hazard-Mitigation-Planning.htm>)
4. Consideration of Chapter I, "Introduction and Background," of SEWRPC Community Assistance Planning Report No. 278 (3rd edition), *Kenosha County Hazard Mitigation Plan Update: 2016-2020* (a copy of the draft chapter is available for download from the SEWRPC website at: <http://www.sewrpc.org/SEWRPC/communityassistance/Hazard-Mitigation-Planning.htm>)
5. Consideration of Chapter II, "Basic Study Area Inventory and Analysis," of SEWRPC Community Assistance Planning Report No. 278 (3rd edition), *Kenosha County Hazard Mitigation Plan Update: 2016-2020* (a copy of the draft chapter is available for download from the SEWRPC website at: <http://www.sewrpc.org/SEWRPC/communityassistance/Hazard-Mitigation-Planning.htm>)
6. Review of results from hazard and vulnerability assessment exercise (Attachment 1)
7. Discussion of hazards to be addressed by the Kenosha County Hazard Mitigation Plan Update
8. Adjourn

Joseph E. Boxhorn
Secretary

Enclosures

#227960 – CAPR-278 3RD ED MEETING NOTICE OCT 23 2015
500-1112
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09/21/15

SUMMARY NOTES OF THE OCTOBER 23, 2015 MEETING OF THE KENOSHA COUNTY HAZARD MITIGATION PLAN LOCAL PLANNING TEAM

INTRODUCTION

The October 23, 2015, meeting of the Kenosha County Hazard Mitigation Plan Local Planning Team was convened at the Kenosha County Center at 9:02 a.m. The meeting was called to order by Lieutenant Gil Benn, Director of the Kenosha County Division of Emergency Management. Attendance was taken by circulating a sign-in sheet.

In attendance at the meeting were the following individuals:

Local Planning Team Members

Lt. Gil S. Benn, Chair	Director, Kenosha County Division of Emergency Management
Joseph E. Boxhorn, Secretary	Senior Planner, Southeastern Wisconsin Regional Planning Commission
Ray Arbet	Director, Kenosha County Department of Public Works
Michael Blodgett	Assistant Communications Manager, Kenosha Joint Services
Robert Grieshaber	Safety-Risk Manager, University of Wisconsin-Parkside
Matthew N. Haerter	Battalion Chief, City of Kenosha Fire Department
William Hoare	Associate Vice President, Carthage College
Laura Kletti	Chief Environmental Engineer, Southeastern Wisconsin Regional Planning Commission
Dave Lewis	Assistant General Manager, Kenosha Water Utility
Dennis Linn	Captain, Twin Lakes Police Department
John Meland	Principal Specialist, Southeastern Wisconsin Regional Planning Commission
Mark Melotik	Director of Environmental Health, Kenosha County Department of Health
Aaron Owens	Planner, Southeastern Wisconsin Regional Planning Commission
Tim Popanda	Administrator, Village of Paddock Lake
Peter Parker	Fire Chief, Village of Bristol
Nakeisha N. Payne	Public Involvement and Outreach Specialist, Southeastern Wisconsin Regional Planning Commission
Leigh Presley	Agriculture Educator for Kenosha and Racine Counties, University of Wisconsin-Extension
Tom Shircel	Assistant Village Administrator, Village of Pleasant Prairie
Mike Slover	Chief, Salem Fire and Rescue
David Smetana	Chief of Police, Village of Pleasant Prairie
Dan Treloar	Conservationist, Kenosha County Department of Planning and Development
Capt. Ken Weyker	Commander of Field Operations, Kenosha County Sheriff's Department

Lt. Benn welcomed all attendees to the meeting. He noted that the Kenosha County hazard mitigation plan is required to be updated every five years, and that this would be the second update to the original plan. At the request of Lt. Benn, the team members introduced themselves.

Lt. Benn introduced Nakeisha Payne, Public Involvement and Outreach Specialist, Southeastern Wisconsin Regional Planning Commission (SEWRPC). Ms. Payne announced that the fourth round of public workshops for VISION 2050, the updating for the regional land use and transportation plans, will be held in November 2015. She indicated that these workshops will present the alternative plans that have been developed. She added that one

of the workshops will be held at 5:00 pm on November 12, 2015, in the Madrigano Auditorum at Gateway Technical College in Kenosha.

[Secretary's Note: Additional information on the VISION 2050 planning effort can be found on its website at: <http://vision2050sewis.org/Vision2050>]

CONSIDERATION OF THE SUMMARY NOTES OF THE APRIL 22, 2015, LOCAL PLANNING TEAM MEETING

Lt. Benn introduced Joseph Boxhorn, Senior Planner, Southeastern Wisconsin Regional Planning Commission (SEWRPC). At Lt. Benn's request, Mr. Boxhorn reviewed the summary notes from the April 22, 2015, meeting of the Local Planning Team. No questions or comments were offered on the summary notes. Mr. Boxhorn indicated that the Local Planning team members could send him any comments or corrections to the summary notes by electronic mail or through the comments screen on the project webpage. He stated that if he receives no comments within a week, he will consider the summary notes to present an accurate reflection of what transpired at the April 22, 2015, meeting.

CONSIDERATION OF CHAPTER I, "INTRODUCTION AND BACKGROUND," OF SEWRPC COMMUNITY ASSISTANCE PLANNING REPORT NO. 278 (3RD EDITION), *KENOSHA COUNTY HAZARD MITIGATION PLAN UPDATE: 2016-2020*

At Lt. Benn's request, Mr. Boxhorn reviewed the preliminary draft of Chapter I of the plan report. Mr. Boxhorn indicated that he would display copies of the maps from Chapters I and II on the projection screen in the meeting room during discussion of these chapters.

[Secretary's Note: Mr. Boxhorn's presentation is attached herein as Exhibit A.]

Lt. Benn noted that a portion of the Town of Somers has recently incorporated as a village. He asked whether the remnant portion of the Town will be covered under the plan. Mr. Boxhorn answered that the Towns are covered under the plan once it is adopted by the County.

In reference to recent plan maintenance and implementation activities, Lt. Benn noted that the Kenosha County Land Information Office created a flood inundation tool for a section of the Fox River. He asked whether this tool is discussed in Chapter I. Mr. Boxhorn replied that his understanding is that the tool is available to County departments. He indicated that it is discussed in the subsection on implementation activities in Chapter I.

Mr. Meland asked that Kenosha County be added to the funding agencies listed in the description of the Kenosha County Fox River Flood Mitigation Program. Mr. Treloar added that the County budget dedicates \$75,000 for purchasing property in the project area, should it become available. Mr. Arbet noted that these funds are not restricted to the purchase of properties with flood prone structures.

[Secretary's Note: The sixth and seventh sentences in the second paragraph on page 9 of the draft chapter were revised to read as follows (text in bold is included here, and in similar subsequent Secretary's Notes, to indicate language changed or added onto the text. Text will not be bold in the report):

"Funding for this program has been obtained from several sources, including **Kenosha County**, FEMA, the Wisconsin Division of Emergency Management, the Wisconsin Department of Natural Resources, and Federal Community Development Block Grants. **In addition, Kenosha County has dedicated funding to this program through its budget.** The program is administered by the Kenosha County Housing Authority, with staff support provided by SEWRPC."]

Mr. Boxhorn asked whether there were any additional corrections or comments to Chapter I. None were offered. He indicated that members of the Local Planning Team could submit additional comments to him via the project website or electronic mail.

CONSIDERATION OF CHAPTER II, “BASIC STUDY AREA INVENTORY AND ANALYSIS,” OF SEWRPC COMMUNITY ASSISTANCE PLANNING REPORT NO. 278 (3RD EDITION), *KENOSHA COUNTY HAZARD MITIGATION PLAN UPDATE: 2016-2020*

At Lt. Benn’s request, Mr. Boxhorn reviewed the preliminary draft of Chapter II of the plan report.

In reference to the dams shown on Map II-6, Mr. Popanda asked where dam number 25 is located. Mr. Arbet replied that this dam is located in a park. Lt. Benn asked whether some of the dams shown on Map II-6 are privately owned. Mr. Boxhorn replied that some of them are privately owned. Mr. Arbet asked whether dam number 26 on Map II-6 is the dam located along the Pike River, noting that such a dam near the location shown was recently removed. Mr. Boxhorn replied that this is not the same dam and that the dam removal Mr. Arbet referred to is discussed in the text.

[Secretary’s Note: Dam number 26 on Map II-6 is Marescalo Dam, which is located on an unnamed tributary to the Pike River. The removal of the dam along the Pike River at Petrifying Springs Park is discussed on page 10 of preliminary draft Chapter I of the plan report.]

Mr. Treloar asked whether the dam on Lake Shangri-La is rated as having a high hazard potential. Ms. Kletti replied that Table II-8A indicates that it is so rated.

In reference to Lake Michigan shoreline erosion hazard areas, Mr. Hoare stated that Carthage College has completed a bluff study for its shoreline. He offered to provide the data from the study.

[Secretary’s Note: no data had been provided.]

Mr. Treloar commented that the Lake Michigan shoreline erosion study should be updated. Lt. Benn noted that some land was lost to erosion in the City of Kenosha as a result of wave run-up. Mr. Haerter added that the City has performed some repair work and indicated that he would forward contact information for the appropriate City department to SEWRPC staff. Mr. Lewis noted that the parks department may have information on this.

[Secretary’s Note: Subsequent to the meeting of the Local Planning Team, Mr. Haerter provided SEWRPC staff with contact information for the City of Kenosha Department of Public Works via electronic mail. SEWRPC staff contacted the Department and as of the date of distribution of these summary notes, no data had been provided.]

In reference to Map II-10. Mr. Owens noted that Batten International Airport in Racine is privately owned.

[Secretary’s Note: Map II-10 was revised to indicate that Batten Airport is privately owned.]

In reference to utilities, Mr. Arbet noted that some private data storage facilities are located in Kenosha and asked whether they should be inventoried. Mr. Boxhorn asked if it was the role of local government to try to mitigate threats to private data. Mr. Arbet replied that if these archives do not contain public data, then this probably is not something for local government to address. He added that loss of the data at these facilities could cause major economic problems and that it is important that someone address this issue.

Lt. Benn commented that trains carrying oil from the Bakken Fields pass through the County on the Canadian Pacific tracks. He expressed concerns about the alerts and notifications that are sent over the State’s E-Sponder system prior to a train carrying oil passing through the County. He noted that while a general alert is sent, it does not include the scheduled date and time that the train is anticipated to pass through the County nor does it give

any details regarding the train's cargo. Mr. Boxhorn responded that we may be able to document this in the discussion on hazardous materials.

Mr. Treloar commented that the locations of cellular communication towers should be documented on Map II-14. He indicated that the County has geographic information system shapefiles that indicate these locations. Mr. Boxhorn replied that these locations could be added if the County were to provide the data, noting that the data SEWRPC has is about 10 years out of date. Mr. Blodgett stated that if the data were provided by the companies for the 911 dispatch center, it may be subject to nondisclosure agreements that would preclude publishing it in a public document.

[Secretary's Note: Mr. Treloar provided these shape files. According to the County staff, the data were provided in support of the communication companies cell tower permits, and not subject to nondisclosure agreements.]

In reference to the section on law enforcement, Mr. Smetana indicated that there is only one special weapons and tactics team in the County, noting that it is a joint team between the Sheriff's Department and the City of Kenosha Police Department. He stated that the Village of Pleasant Prairie also has a canine unit. Lt. Benn indicated that the Sheriff's Department also has a snowmobile unit.

[Secretary's Note: The last three sentences in the first paragraph on page 15 of the draft chapter were revised to read as follows:

“The Sheriff's Department also has canine, all-terrain vehicle, **snowmobile**, and marine units. The City of Kenosha Police Department's special teams include a bike patrol and a canine unit. **The Village of Pleasant Prairie also has a canine unit.** There **is one** special weapons and tactics (SWAT)-type **team** within the County **which is jointly operated by** the Sheriff's Department and **the** City of Kenosha Police Department.”]

Mr. Smetana noted that the Village of Pleasant Prairie on the insets to several maps is mislabeled as the Village of Mt. Pleasant.

[Secretary's Note: The label for the Village of Pleasant Prairie was corrected on Maps II-19a, II-20a, II-22a, II-23a, and II-24a.]

Mr. Blodgett said that the locations shown for several fire stations on Map II-16 are incorrect. He noted that several fire and EMS service areas have recently changed or will change effective January 1, 2016. He indicated that he would provide updated information.

[Secretary's Note: At Mr. Blodgett's request, the Kenosha County Division of Land Information provided updated shapefiles showing service area boundaries for police, fire, and EMS services in the County. These were used to revise Maps II-16, II-17, and II-18.]

Mr. Boxhorn asked whether there were any additional corrections or comments to Chapter II. None were offered. He reminded the Local Planning Team that they could submit additional comments to him via the project website or electronic mail.

REVIEW OF RESULTS FROM HAZARD AND VULNERABILITY EXERCISE

Mr. Boxhorn reviewed the results of the hazard and vulnerability assessment tool (HVA) which the Local Planning Team completed at its April 22, 2015, meeting. He briefly explained how the data were analyzed. He noted that the 10 highest-ranked hazards identified by the tool were all related to severe storms or winter weather. He added that other notable hazards identified by the tool were related to automobile accidents and hazardous

material incidents. He noted that a table and text were attached to the agenda for this meeting that summarized the results of the HVA. He indicated that this table and text will be included in Chapter III of the plan report.

DISCUSSION OF HAZARDS TO BE ADDRESSED BY THE KENOSHA COUNTY HAZARD MITIGATION PLAN UPDATE

Mr. Boxhorn stated that as part of the updating process for the hazard mitigation plan, it is important to review the set of hazards that the plan addresses. He explained that this review should make two determinations: 1) whether there are additional hazards that the plan should address and 2) whether current circumstances are such that there is no longer a need for the plan to profile some currently addressed hazards. He noted that factors to consider in making these determinations are the results from the HVA tool and the County's historical experience with hazards. Mr. Boxhorn distributed a handout to the Local Planning Team that contains tables with preliminary data related to the Kenosha County's historical experience with several hazards. He added that these data will be refined as the risk analysis is revised.

[Secretary's Note: A copy of the handout distributed by Mr. Boxhorn is attached hereto as Exhibit B.]

Mr. Boxhorn reviewed the preliminary damage estimates on the handout. He stated that on an average annual basis automobile accidents are responsible for the highest amount of damages to property and crops and account for at least \$60 million of damages per year in Kenosha County. He noted that flooding is responsible for at least \$1.2 million of damages per year and several types of severe storm events, drought, and railway accidents each account for over \$100 thousand of damages per year. Mr. Boxhorn stated that on an average annual basis automobile accidents have the highest impact on human life and account for over 1,950 fatalities and injuries per year in Kenosha County. He noted that there are several hundred cases of sexually transmitted diseases and communicable diseases in the County each year. He added that railway accidents cause about 1.6 deaths and injuries each year and that all other hazards for which he could find data cause less than one death or injury per year. Mr. Boxhorn noted that there were a few hazards for which he could find confirmed incidences but no data on damages and several others for which he could find no data on incidences or damages.

Mr. Boxhorn proposed that this plan update address the set of hazards that were addressed in the previous plan update. Lt. Benn indicated that he feels that the current plan addresses an appropriate set of hazards. Lt. Benn added that the plan should focus on larger hazards.

Mr. Meland asked whether dam failure should be added to the hazards that the plan addresses. Mr. Boxhorn noted that the dam on Vern Wolf Lake failed recently and was rebuilt. Lt. Benn added that this dam had also failed once before. Mr. Arbet commented that the risk of damages in the County from dam failure is not as severe as with some other hazards. Mr. Boxhorn noted that the main impact from dam failure is likely to be flooding downstream of the dam. He suggested that this issue could be addressed in the flooding section of the plan.

Mr. Haerter commented that loss of water supply has been an ongoing issue for the City of Kenosha. He explained that water main breaks during periods of intense cold last winter led to loss of service, noting that at one point about 100,000 people were without water. Lt. Benn noted that the cost of repairing these mains was over \$1 million. He added that the City applied to the Federal Emergency Management Agency for funding to address this, but the application was denied. Mr. Haerter added that the City also experienced problems due to water intakes freezing. Mr. Lewis stated that the Kenosha Water Utility has two large water intakes in Lake Michigan and a third intake in the harbor. He noted that the third intake is used during winter to supplement the supply from the other intakes. Mr. Boxhorn indicated that the section of the plan addressing contamination and loss of water supply could be expanded to discuss these cold-weather issues.

Mr. Arbet noted that blooms of toxic algae have been a problem for the City of Toledo which draws its water from Lake Erie. He asked whether this is an issue for the Kenosha Water Utility. Mr. Lewis replied that Kenosha's situation is different, noting that these sorts of algal blooms are not seen in Lake Michigan. He added that discharge limits for phosphorus should reduce phosphorus levels in the Lake, making blooms even less likely.

Mr. Boxhorn asked whether there were other hazards that the Local Planning Team would like to consider either adding to the plan or removing from the plan. None were offered. The consensus of the Team was to address the impact of dam failure in the flooding section of the plan and to expand the section of the plan that addresses contamination and loss of water supply with respect to the impacts of cold weather on water utilities.

OTHER BUSINESS

Lt. Benn noted that there are still homes at risk from flooding along the Fox River, especially near Silver Lake. He asked what progress has been made, especially in the southern part of the project area. Mr. Meland replied that there are still 72 homes left in the corridor. He noted that these are scattered throughout the project area and explained that this is a voluntary buyout program. Mr. Meland indicated that currently no funding is available for acquiring parcels and that funding probably would not become available until there is another disaster.

NEXT MEETING OF THE LOCAL PLANNING TEAM

Mr. Boxhorn reminded the Team that they can submit any additional questions or comments that they may have regarding Chapters I and II to him either through the website or electronic mail. He indicated that at the Team's next meeting, they will review the risk assessment and goal chapters. He stated that this meeting will be scheduled once he finishes updating these chapters. Mr. Boxhorn noted that following that meeting of the Team, a meeting will be scheduled to present the first four chapters to the public and get public input.

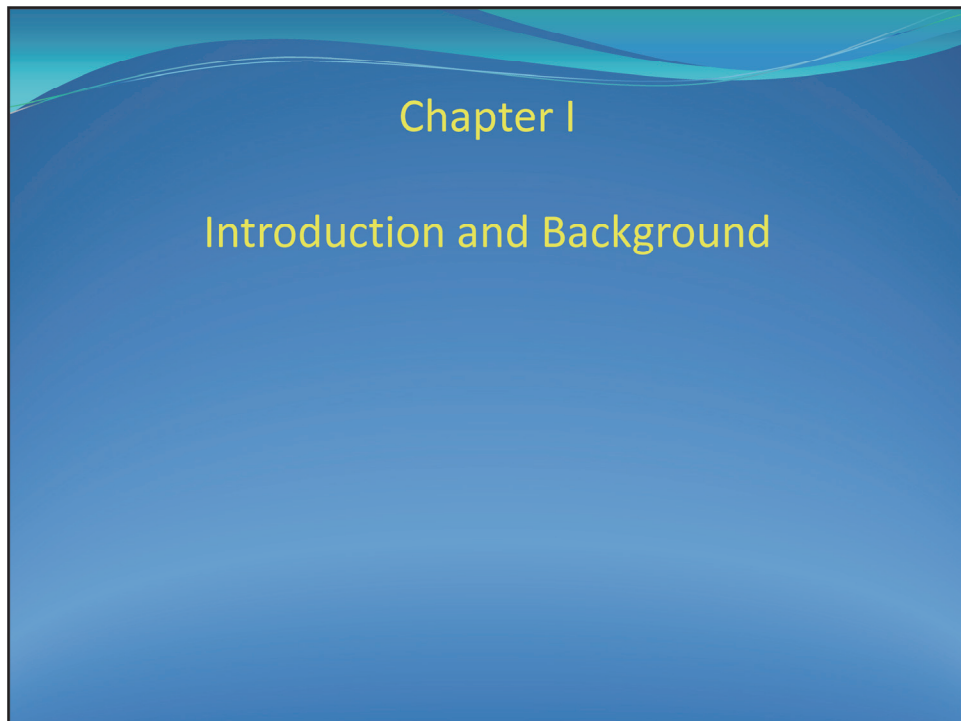
ADJOURNMENT

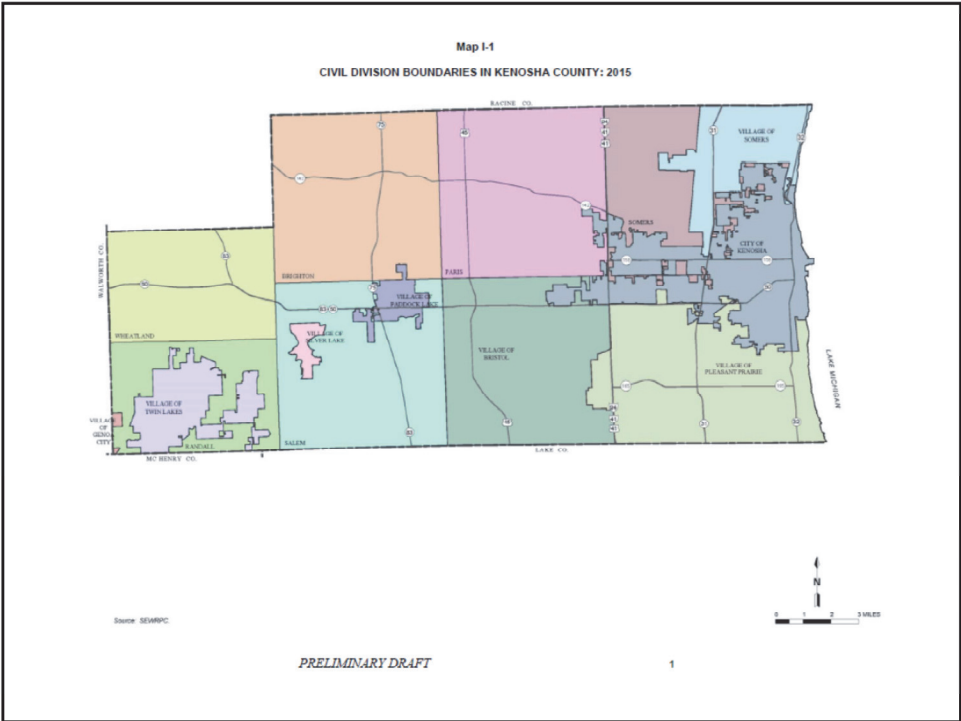
There being no further business, the meeting was adjourned by unanimous consent at 10:41 a.m.

CAPR-278-3 SUMMARY NOTES KENOSHA CTY HMP LPT MTG OCTOBER 23 2015 (00228583).DOC
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Exhibit A: Boxhorn Presentation (#228395)
Exhibit B: Hazard Experience Handout (#228411)

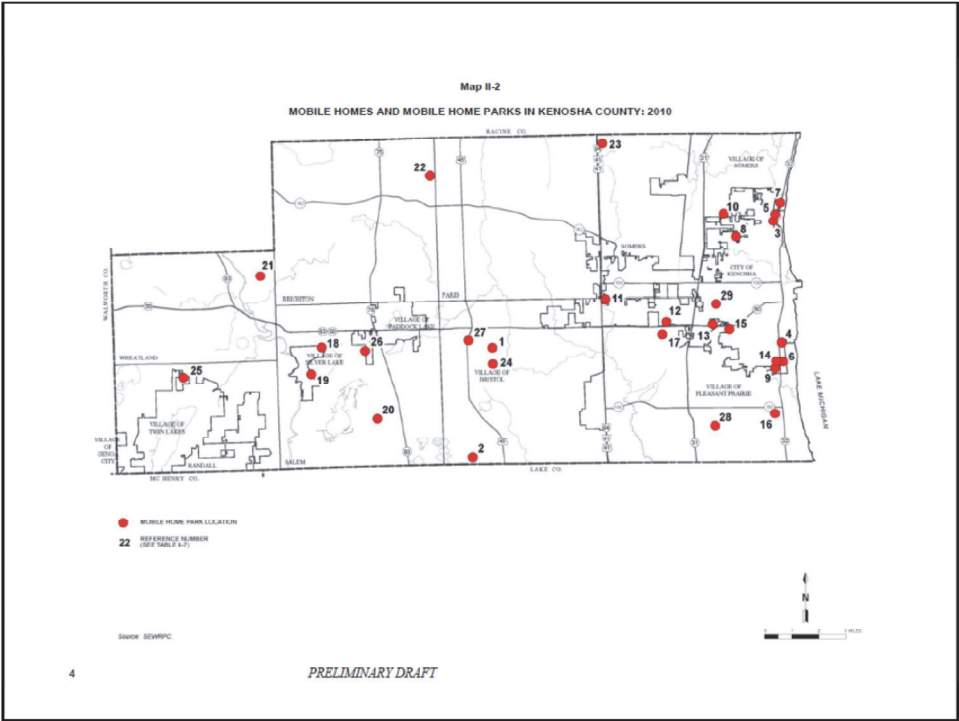
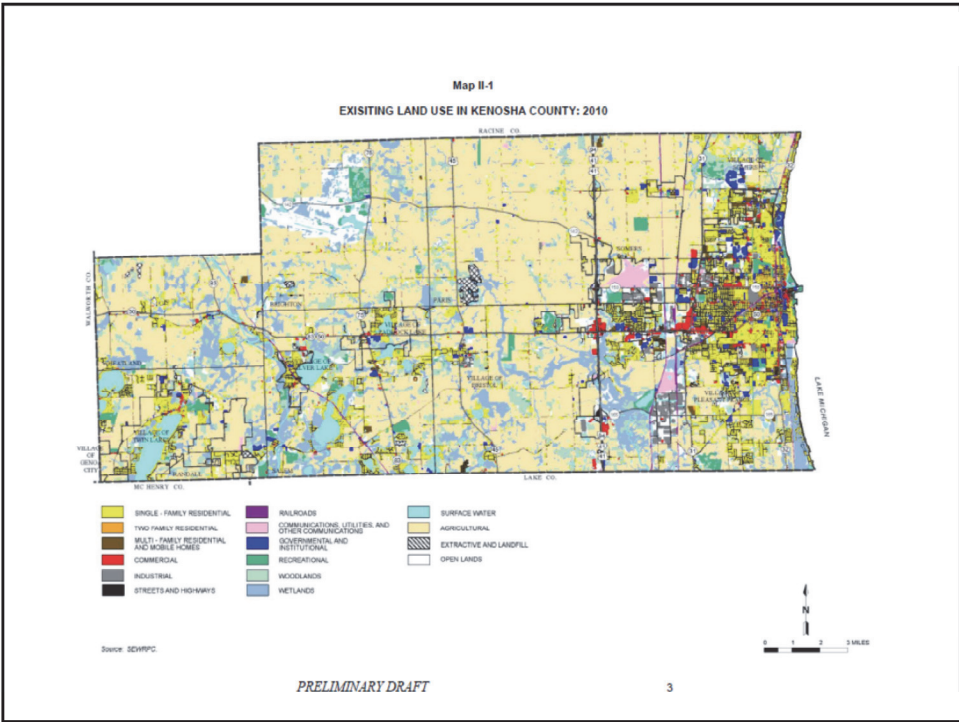
Exhibit A

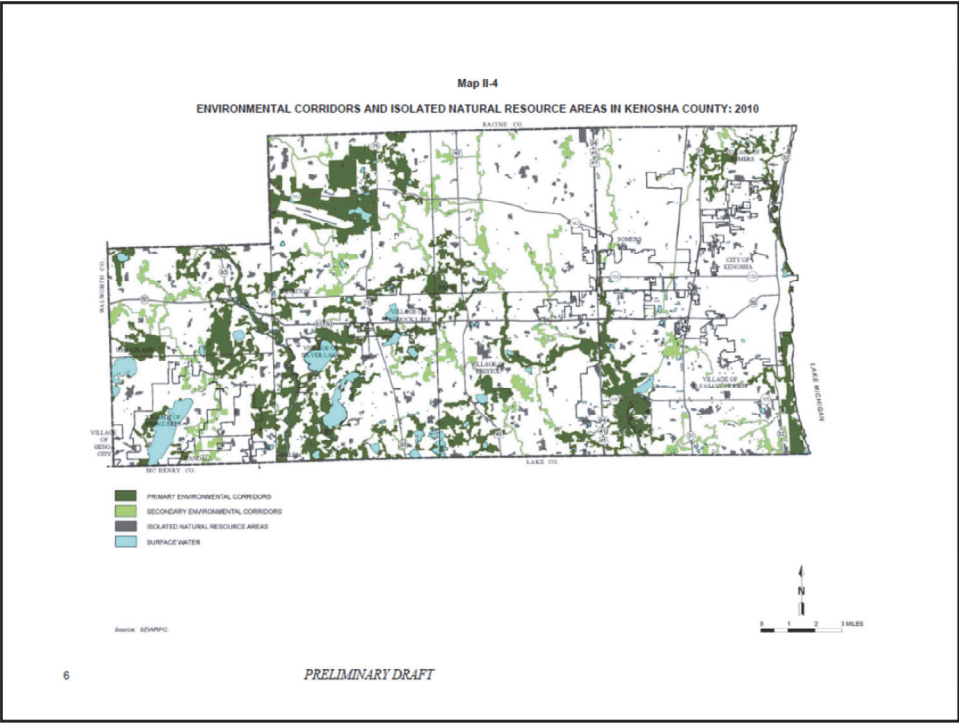
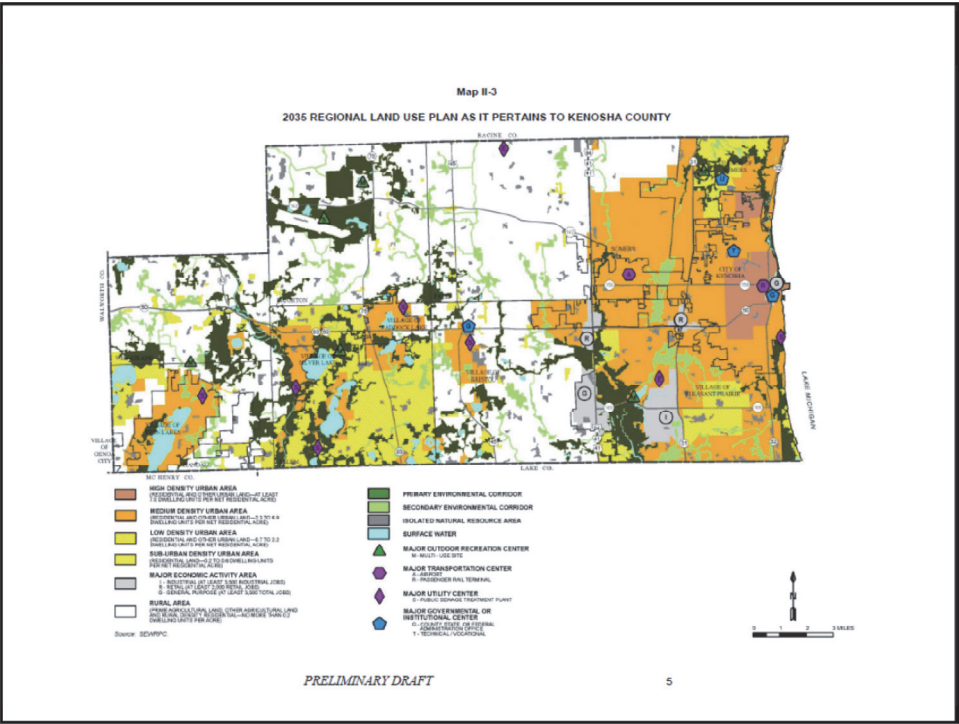




Chapter II

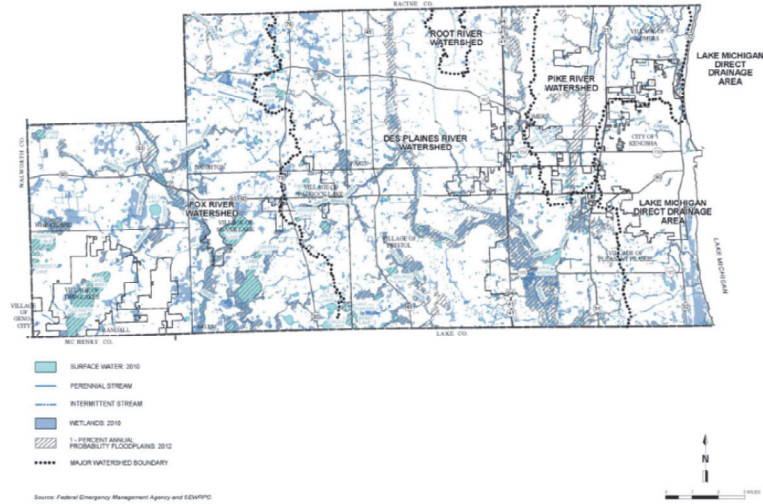
Basic Study Area Inventory and Analysis





Map II-5

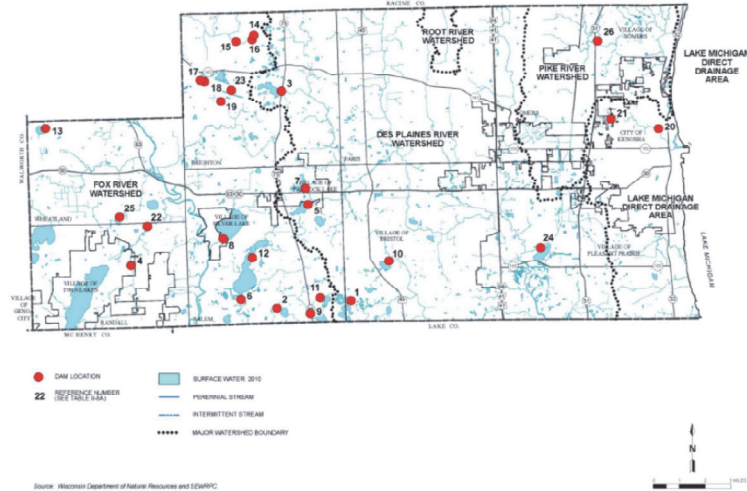
SURFACE WATERS, WETLANDS, AND FLOODPLAINS IN KENOSHA COUNTY: 2015



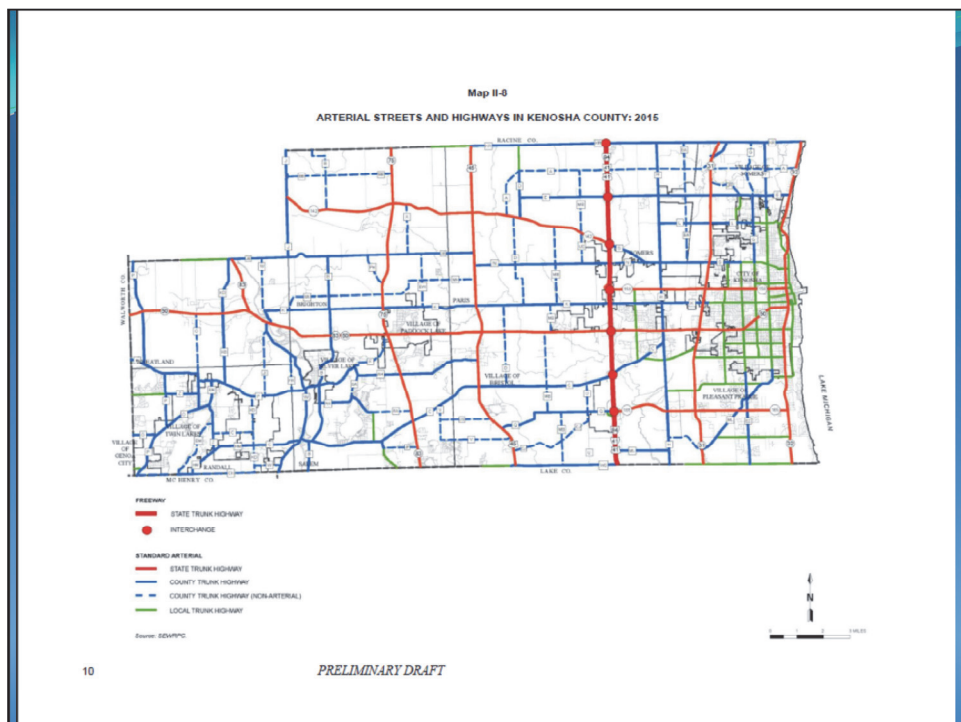
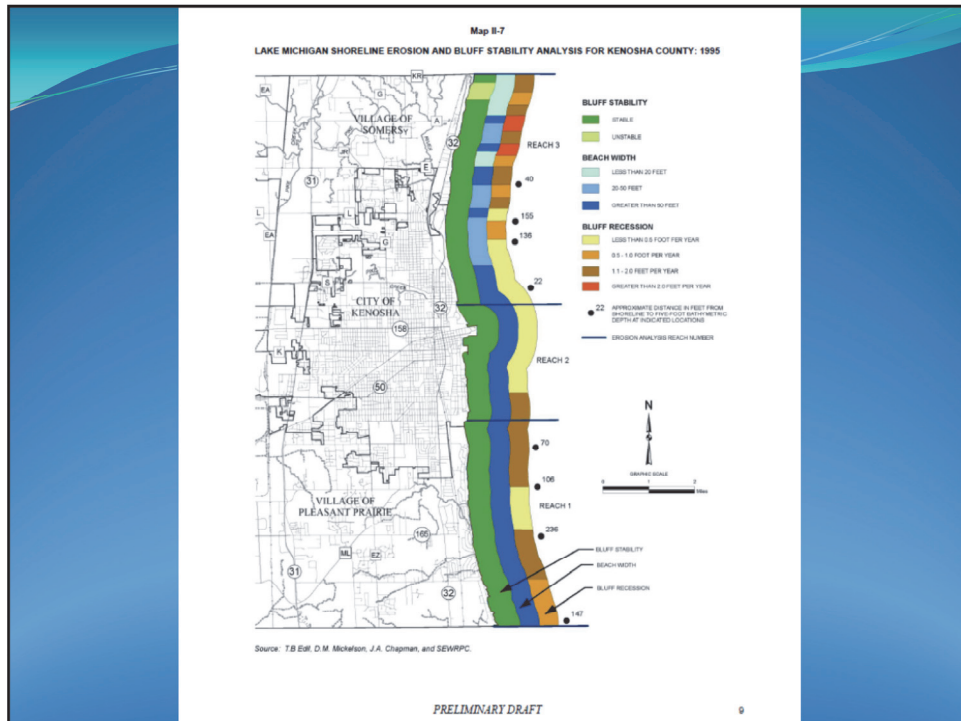
PRELIMINARY DRAFT

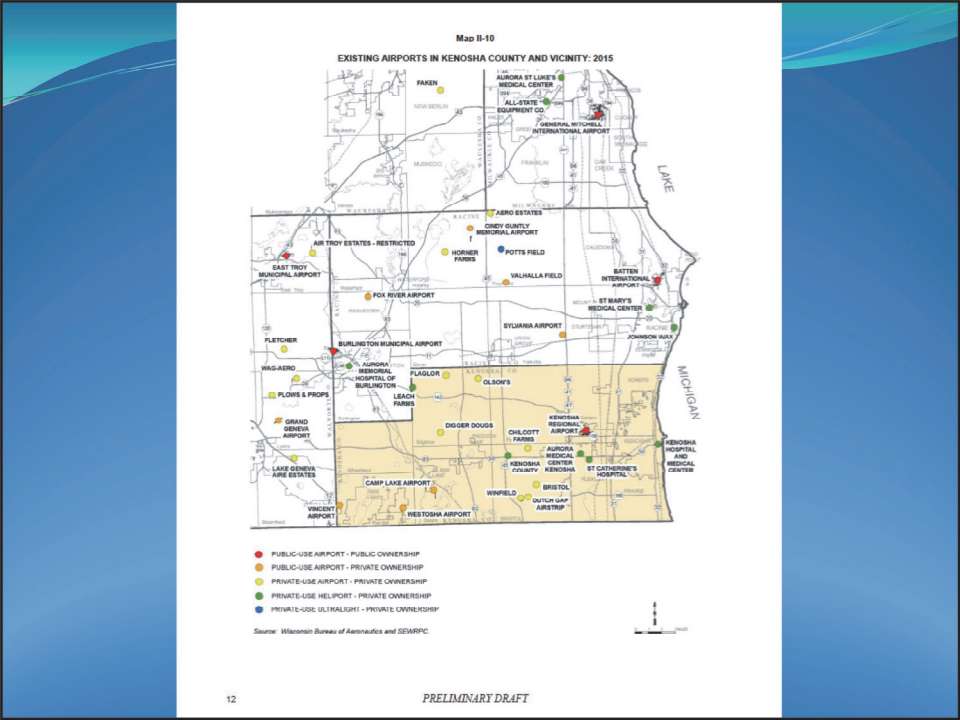
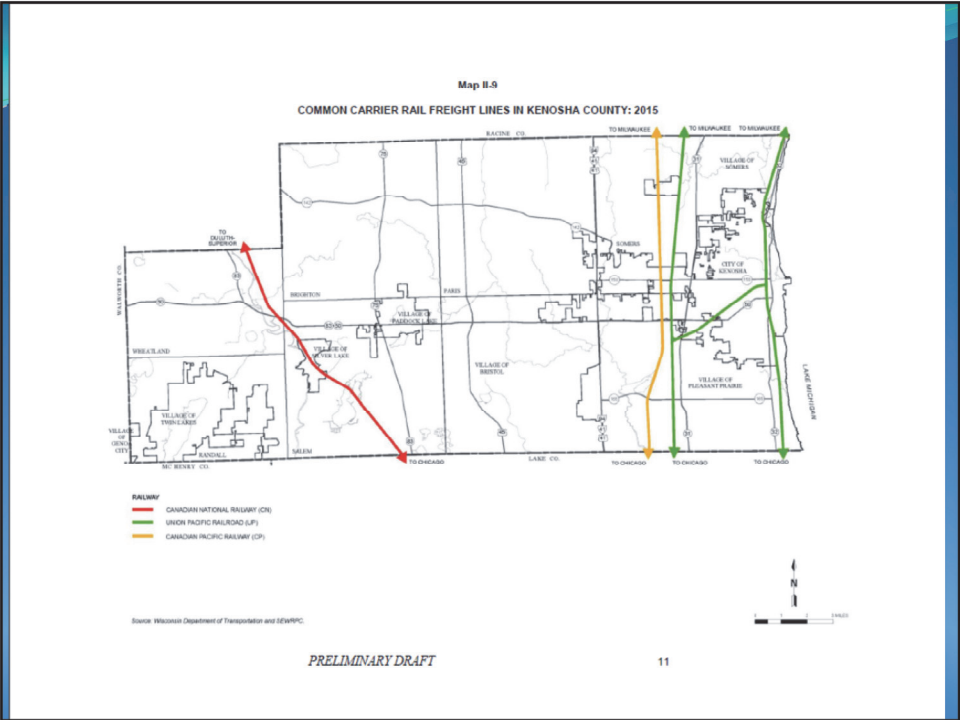
Map II-6

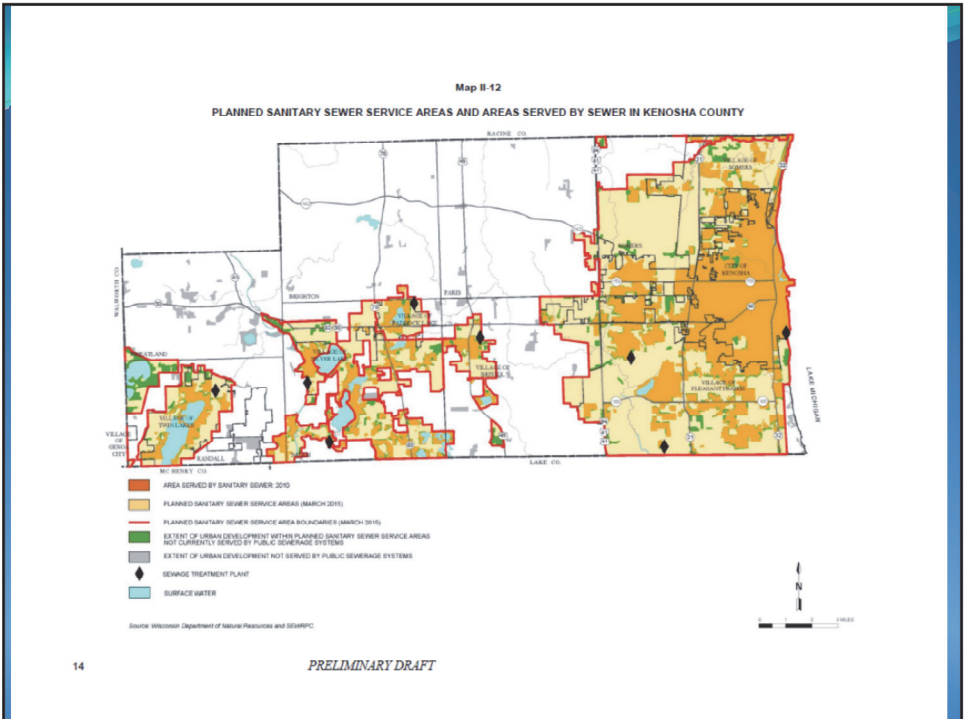
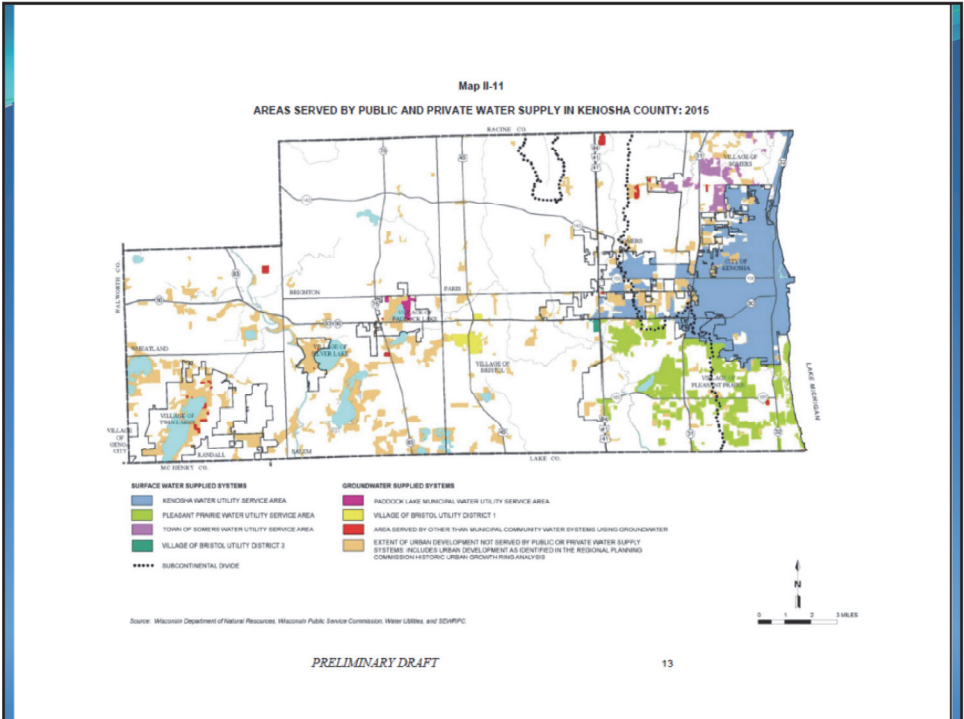
DAMS LOCATED WITHIN KENOSHA COUNTY: 2015

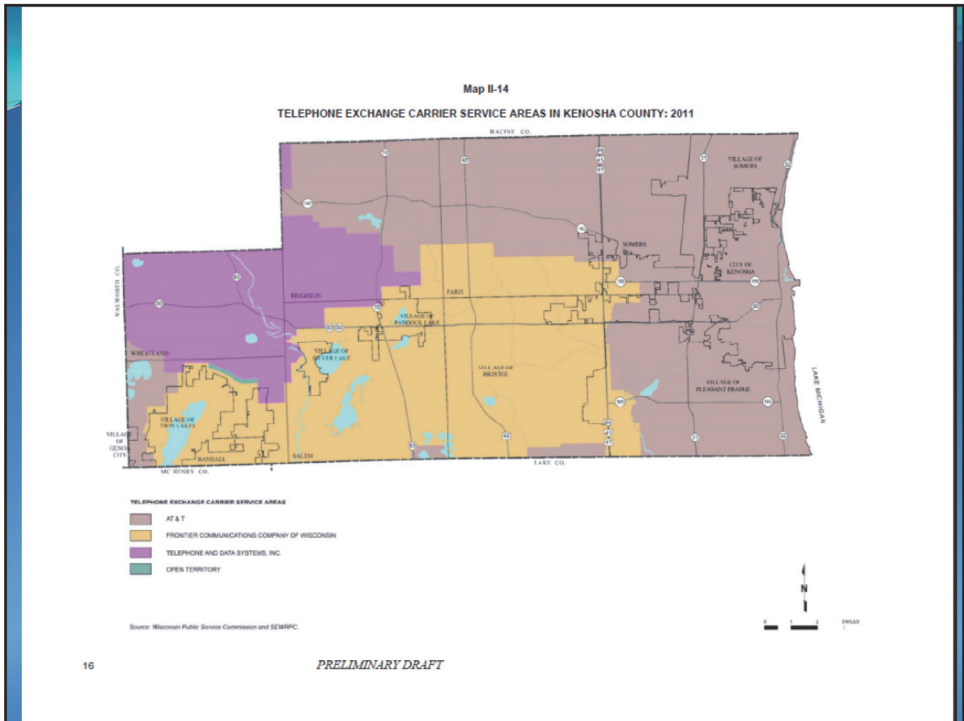
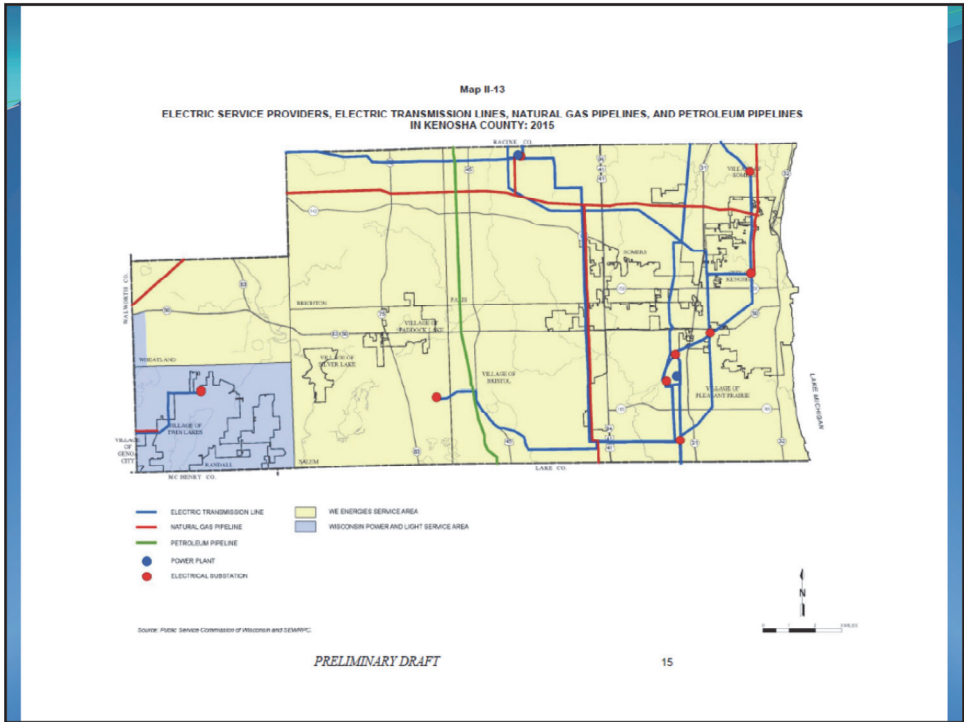


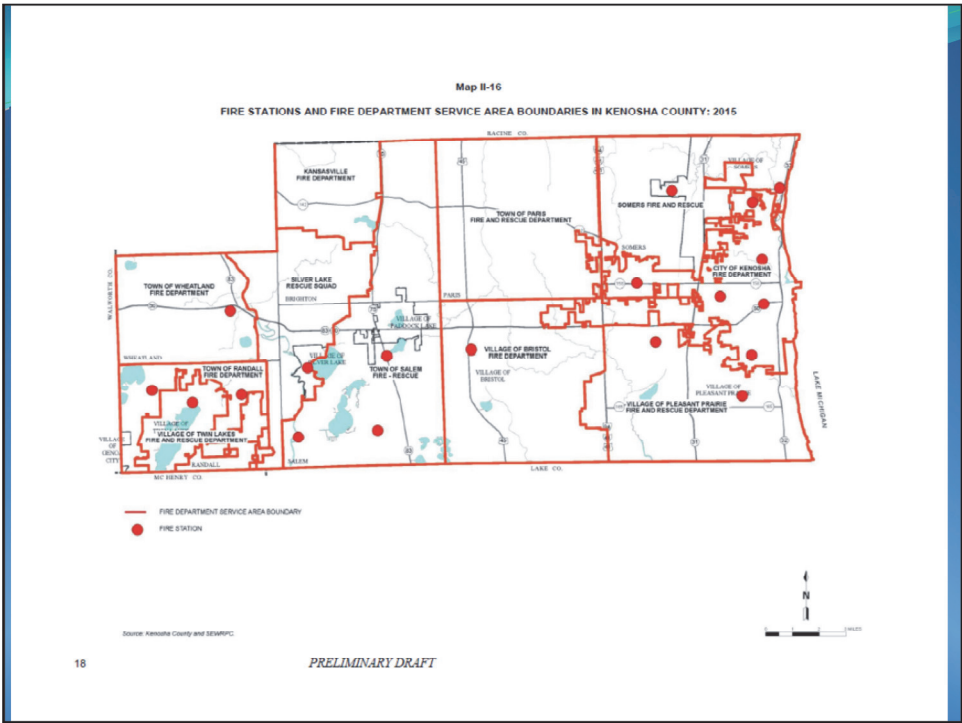
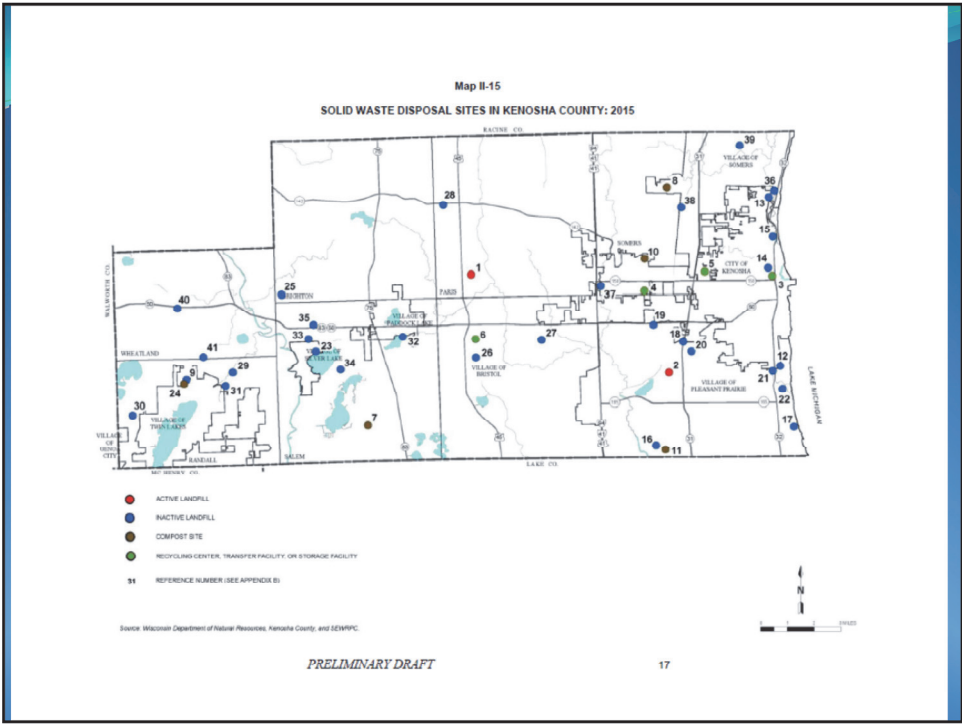
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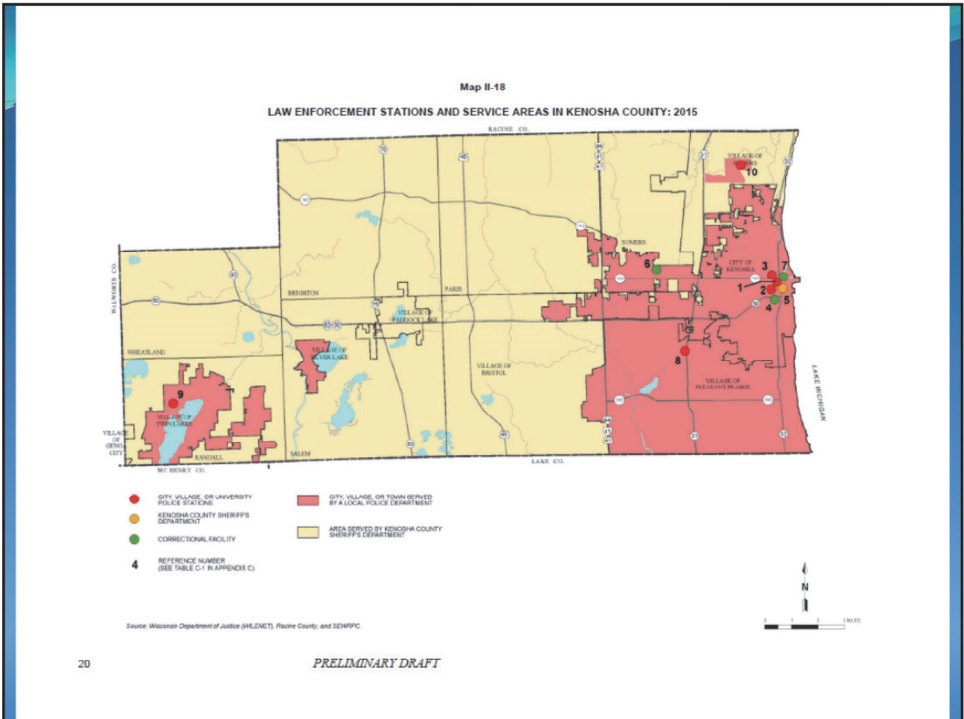
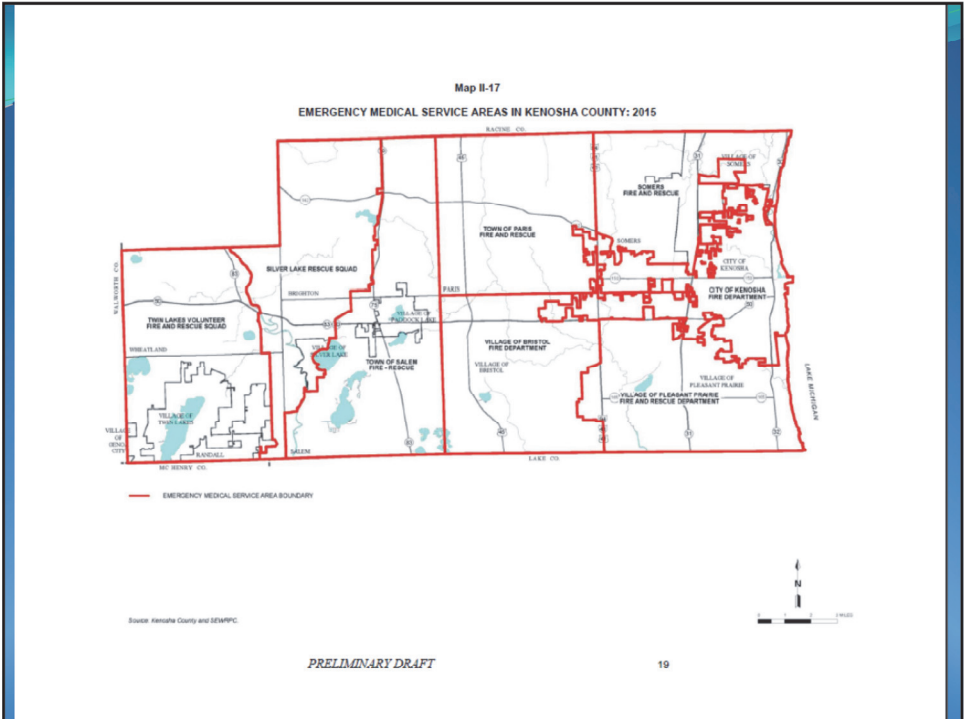


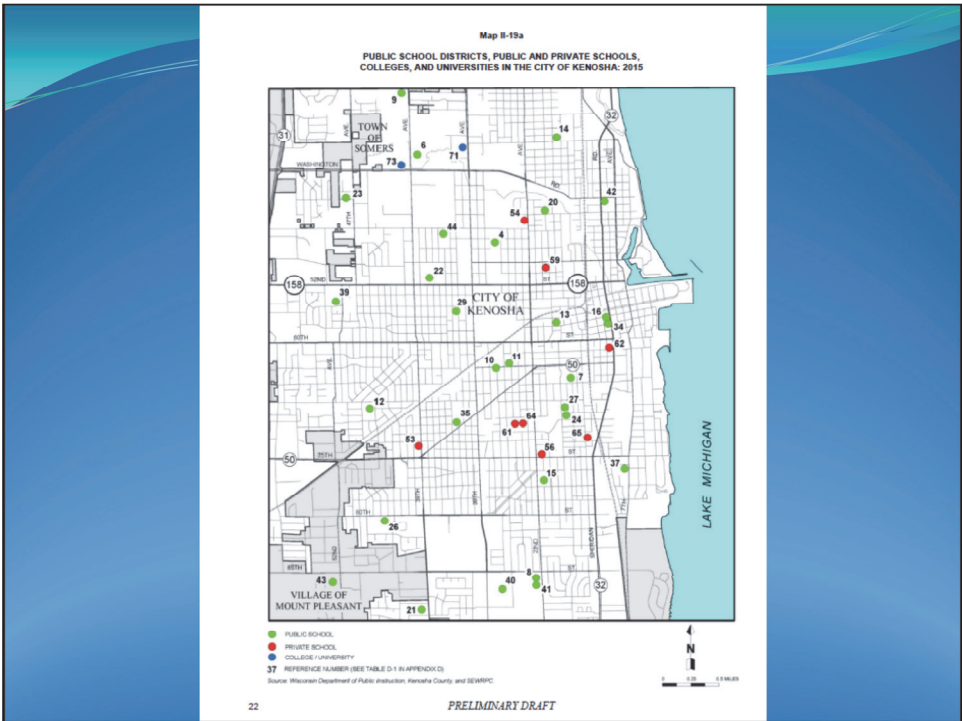
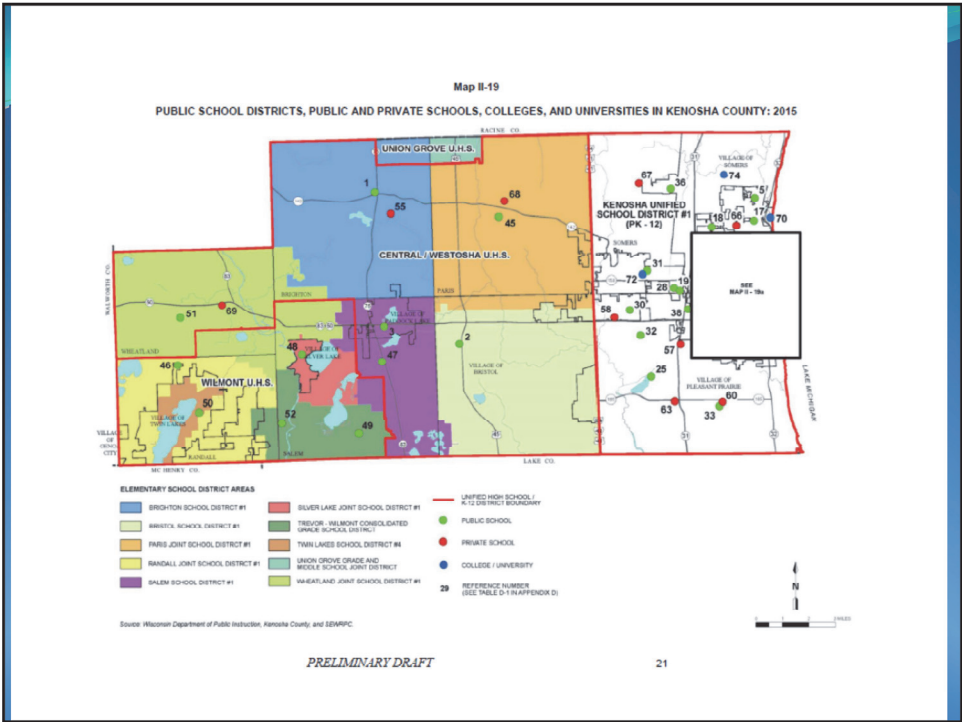


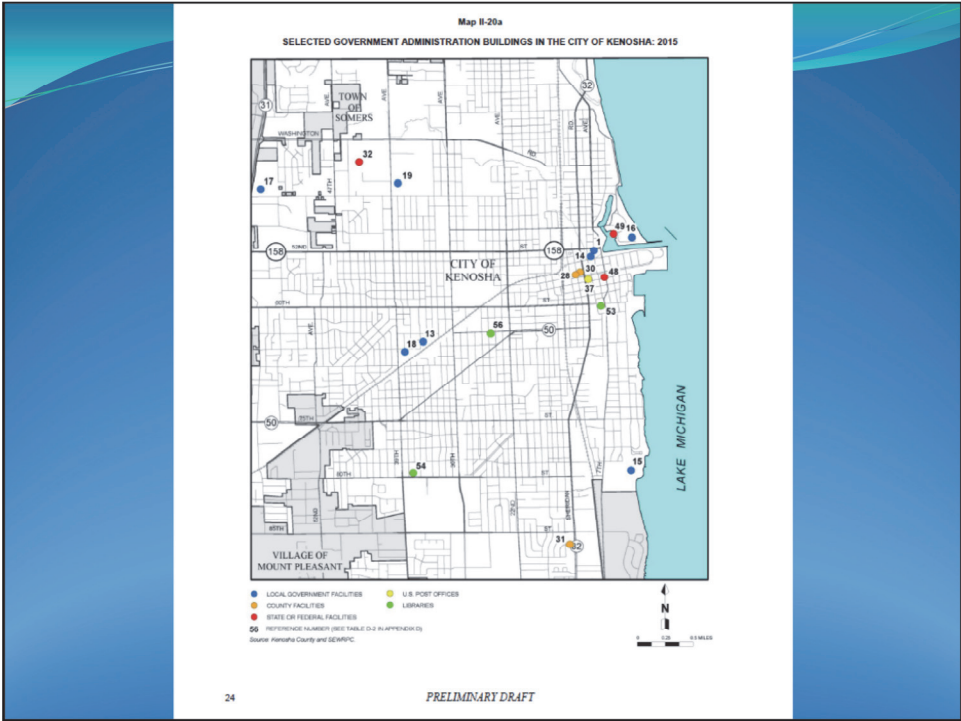
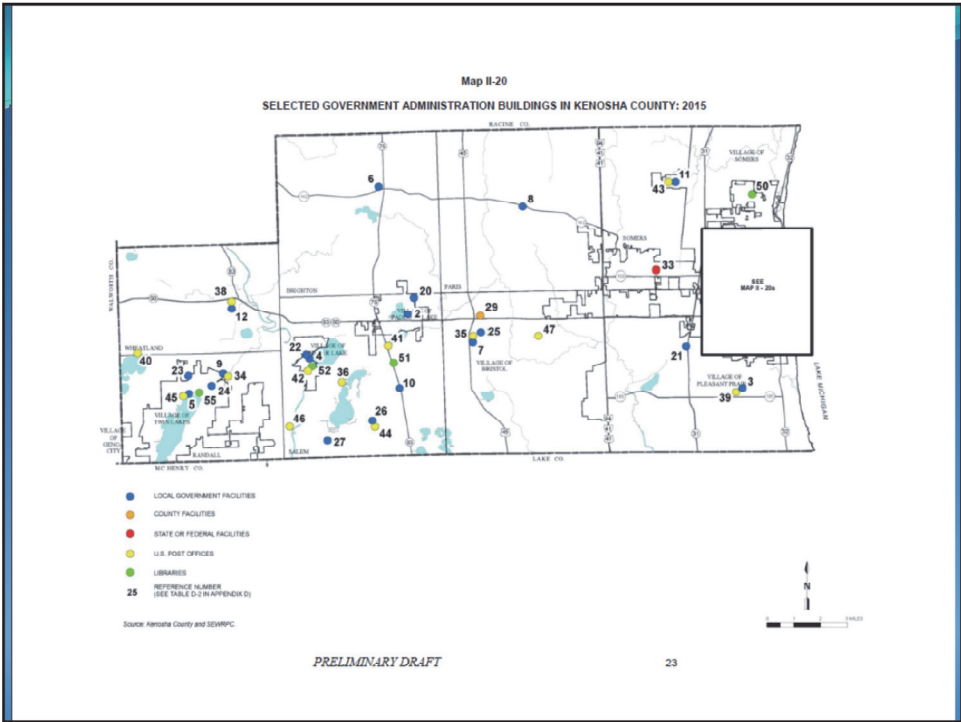


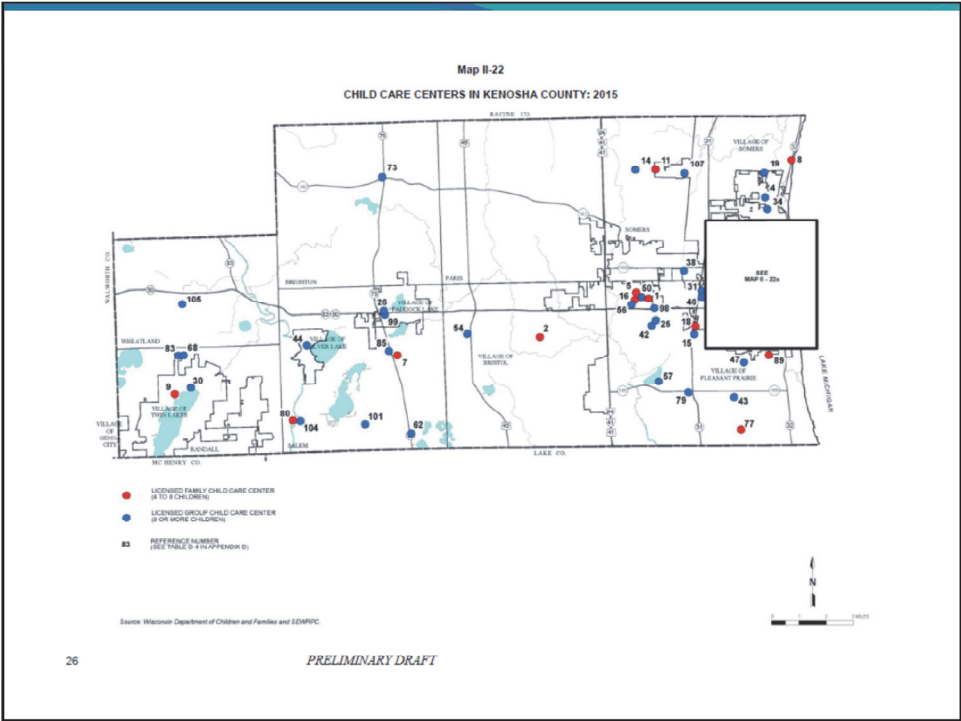
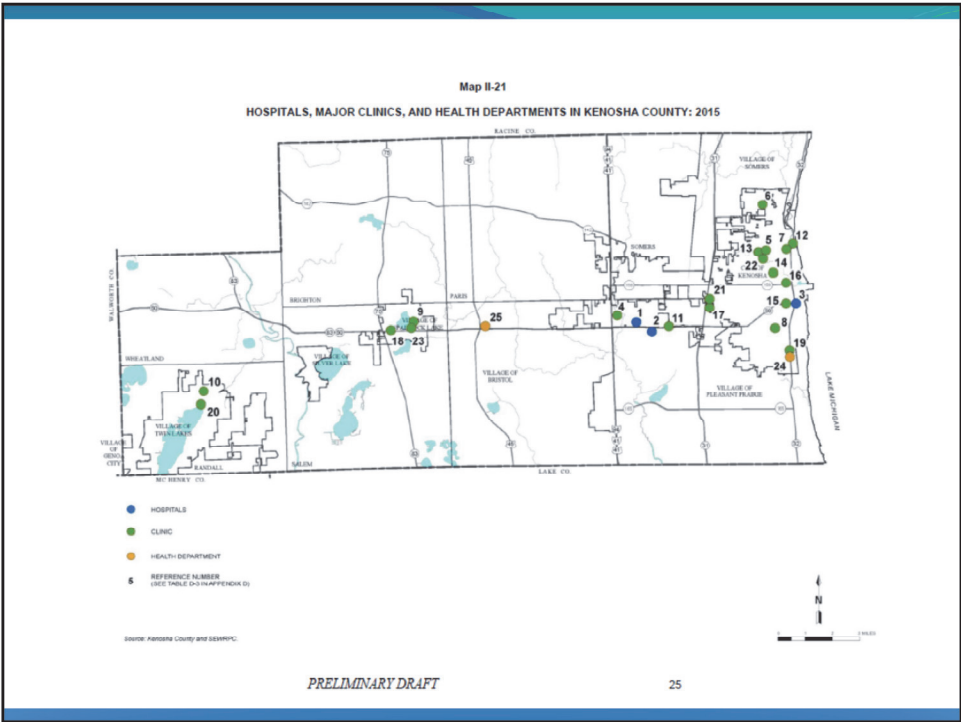


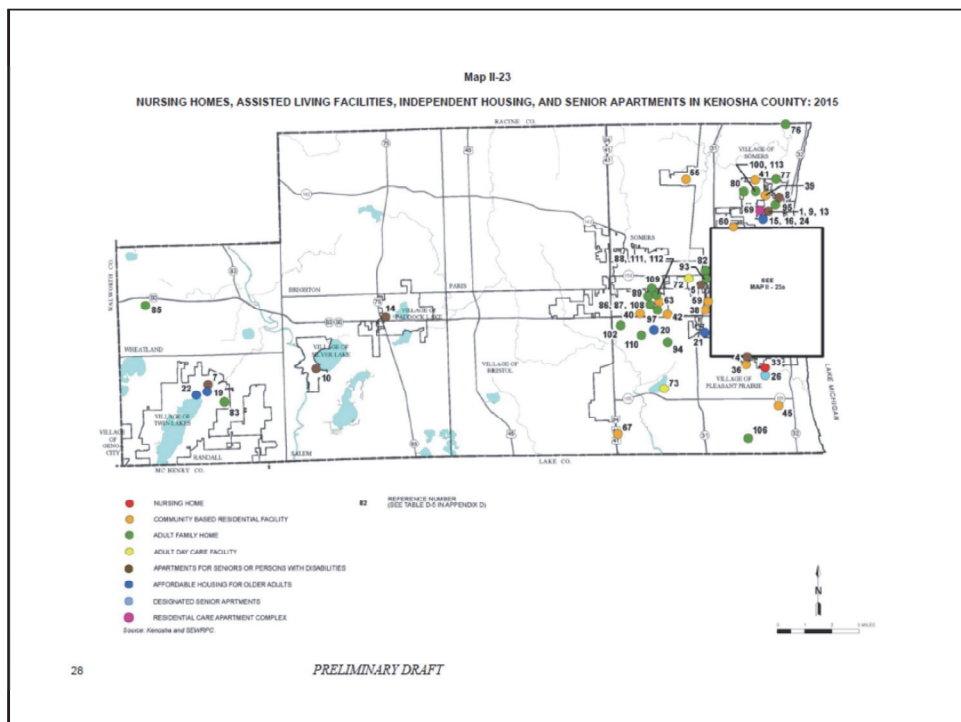
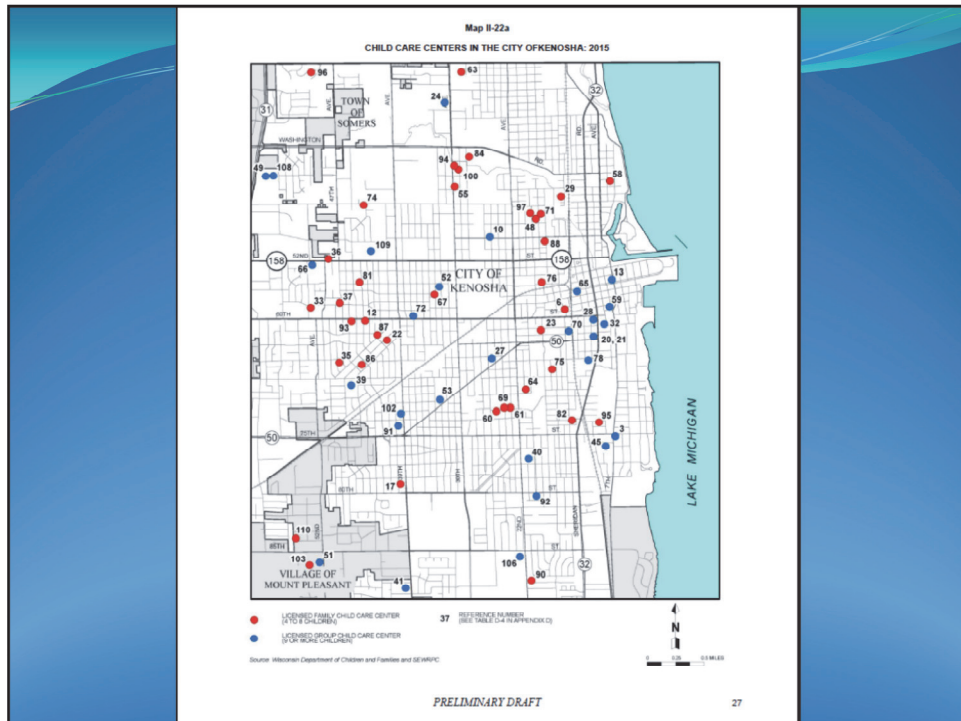


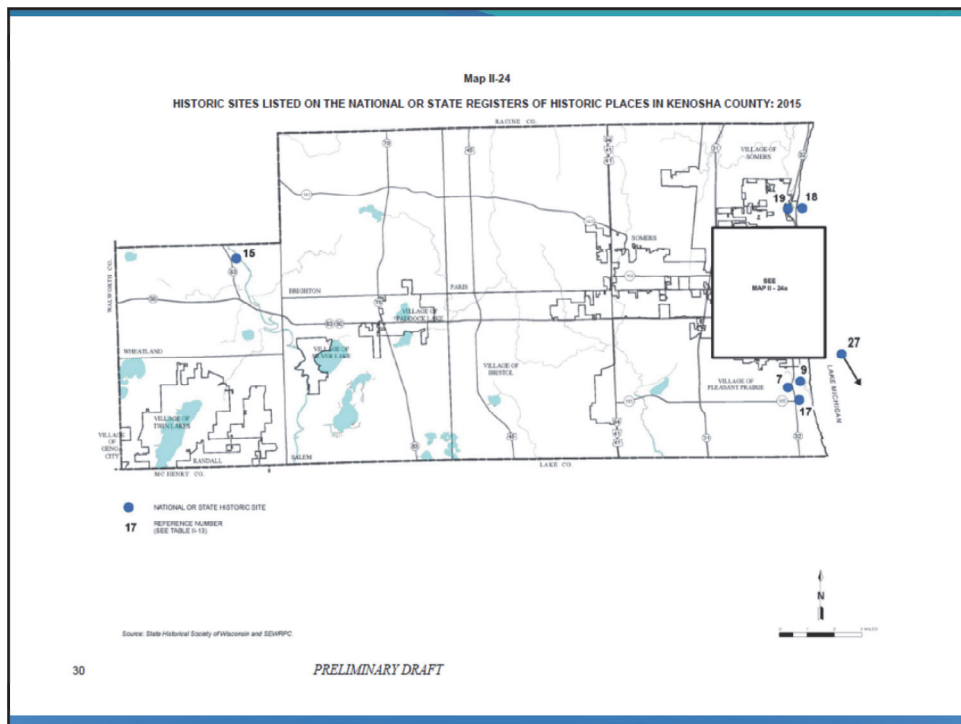
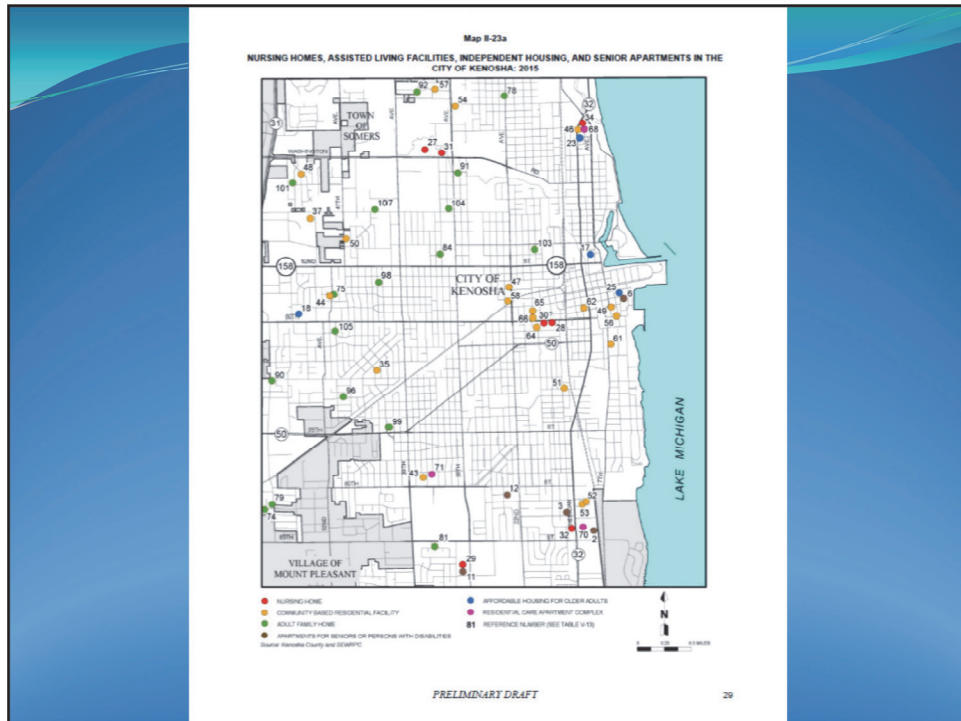


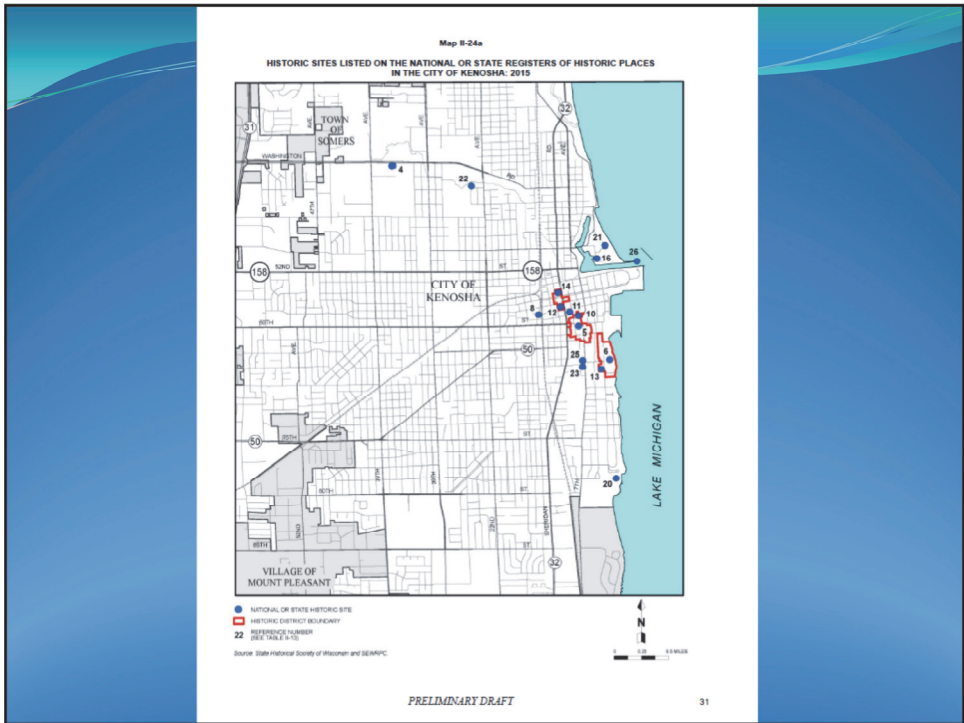












Hazard and Vulnerability Assessment Tool

Attachment 1
HAZARD AND VULNERABILITY ASSESSMENT TOOL
KENOSHA COUNTY HAZARD MITIGATION PLAN UPDATE

HAZARD	PROBABILITY		IMPACT		VULNERABILITY		TOTAL RISK
	Frequency of Occurrence	Severity of Impact	Physical Damage	Human Casualties	Property Damage	Displacement	
SEVERE	1-5	1-5	1-5	1-5	1-5	1-5	2-100%
01. Tornado	1	1	1	1	1	1	1%
02. Windstorm	1	1	1	1	1	1	1%
03. Ice Storm	1	1	1	1	1	1	1%
04. Hail	1	1	1	1	1	1	1%
05. Thunderstorm	1	1	1	1	1	1	1%
06. High Winds	1	1	1	1	1	1	1%
07. Lightning	1	1	1	1	1	1	1%
08. Fog	1	1	1	1	1	1	1%
09. Heavy Snowfall	1	1	1	1	1	1	1%
10. Ice Storm	1	1	1	1	1	1	1%
11. Ice Storm	1	1	1	1	1	1	1%
12. Ice Storm	1	1	1	1	1	1	1%
13. Ice Storm	1	1	1	1	1	1	1%
14. Ice Storm	1	1	1	1	1	1	1%
15. Ice Storm	1	1	1	1	1	1	1%
16. Ice Storm	1	1	1	1	1	1	1%
17. Ice Storm	1	1	1	1	1	1	1%
18. Ice Storm	1	1	1	1	1	1	1%
19. Ice Storm	1	1	1	1	1	1	1%
20. Ice Storm	1	1	1	1	1	1	1%
21. Ice Storm	1	1	1	1	1	1	1%
22. Ice Storm	1	1	1	1	1	1	1%
23. Ice Storm	1	1	1	1	1	1	1%
24. Ice Storm	1	1	1	1	1	1	1%
25. Ice Storm	1	1	1	1	1	1	1%
26. Ice Storm	1	1	1	1	1	1	1%
27. Ice Storm	1	1	1	1	1	1	1%
28. Ice Storm	1	1	1	1	1	1	1%
29. Ice Storm	1	1	1	1	1	1	1%
30. Ice Storm	1	1	1	1	1	1	1%
31. Ice Storm	1	1	1	1	1	1	1%
32. Ice Storm	1	1	1	1	1	1	1%
33. Ice Storm	1	1	1	1	1	1	1%
34. Ice Storm	1	1	1	1	1	1	1%
35. Ice Storm	1	1	1	1	1	1	1%
36. Ice Storm	1	1	1	1	1	1	1%
37. Ice Storm	1	1	1	1	1	1	1%
38. Ice Storm	1	1	1	1	1	1	1%
39. Ice Storm	1	1	1	1	1	1	1%
40. Ice Storm	1	1	1	1	1	1	1%
41. Ice Storm	1	1	1	1	1	1	1%
42. Ice Storm	1	1	1	1	1	1	1%
43. Ice Storm	1	1	1	1	1	1	1%
44. Ice Storm	1	1	1	1	1	1	1%
45. Ice Storm	1	1	1	1	1	1	1%
46. Ice Storm	1	1	1	1	1	1	1%
47. Ice Storm	1	1	1	1	1	1	1%
48. Ice Storm	1	1	1	1	1	1	1%
49. Ice Storm	1	1	1	1	1	1	1%
50. Ice Storm	1	1	1	1	1	1	1%
51. Ice Storm	1	1	1	1	1	1	1%
52. Ice Storm	1	1	1	1	1	1	1%
53. Ice Storm	1	1	1	1	1	1	1%
54. Ice Storm	1	1	1	1	1	1	1%
55. Ice Storm	1	1	1	1	1	1	1%
56. Ice Storm	1	1	1	1	1	1	1%
57. Ice Storm	1	1	1	1	1	1	1%
58. Ice Storm	1	1	1	1	1	1	1%
59. Ice Storm	1	1	1	1	1	1	1%
60. Ice Storm	1	1	1	1	1	1	1%
61. Ice Storm	1	1	1	1	1	1	1%
62. Ice Storm	1	1	1	1	1	1	1%
63. Ice Storm	1	1	1	1	1	1	1%
64. Ice Storm	1	1	1	1	1	1	1%
65. Ice Storm	1	1	1	1	1	1	1%
66. Ice Storm	1	1	1	1	1	1	1%
67. Ice Storm	1	1	1	1	1	1	1%
68. Ice Storm	1	1	1	1	1	1	1%
69. Ice Storm	1	1	1	1	1	1	1%
70. Ice Storm	1	1	1	1	1	1	1%
71. Ice Storm	1	1	1	1	1	1	1%
72. Ice Storm	1	1	1	1	1	1	1%
73. Ice Storm	1	1	1	1	1	1	1%
74. Ice Storm	1	1	1	1	1	1	1%
75. Ice Storm	1	1	1	1	1	1	1%
76. Ice Storm	1	1	1	1	1	1	1%
77. Ice Storm	1	1	1	1	1	1	1%
78. Ice Storm	1	1	1	1	1	1	1%
79. Ice Storm	1	1	1	1	1	1	1%
80. Ice Storm	1	1	1	1	1	1	1%
81. Ice Storm	1	1	1	1	1	1	1%
82. Ice Storm	1	1	1	1	1	1	1%
83. Ice Storm	1	1	1	1	1	1	1%
84. Ice Storm	1	1	1	1	1	1	1%
85. Ice Storm	1	1	1	1	1	1	1%
86. Ice Storm	1	1	1	1	1	1	1%
87. Ice Storm	1	1	1	1	1	1	1%
88. Ice Storm	1	1	1	1	1	1	1%
89. Ice Storm	1	1	1	1	1	1	1%
90. Ice Storm	1	1	1	1	1	1	1%
91. Ice Storm	1	1	1	1	1	1	1%
92. Ice Storm	1	1	1	1	1	1	1%
93. Ice Storm	1	1	1	1	1	1	1%
94. Ice Storm	1	1	1	1	1	1	1%
95. Ice Storm	1	1	1	1	1	1	1%
96. Ice Storm	1	1	1	1	1	1	1%
97. Ice Storm	1	1	1	1	1	1	1%
98. Ice Storm	1	1	1	1	1	1	1%
99. Ice Storm	1	1	1	1	1	1	1%
100. Ice Storm	1	1	1	1	1	1	1%

Total Risk: 100%

Source: State Historical Society of Wisconsin and SHRAPC

Hazard and Vulnerability Assessment Tool

1. Risk assessment based determined by

$$\text{Risk} = 100 \times \left[\frac{\text{probability}}{3} \times (\text{Human impact} + \text{Property impact} + \text{Business impact} + \text{Preparedness}) / (4 \times 3) \right]$$

2. Percent risk (0 to 100 percent)
3. Relative measure → Higher indicates greater perceived risk
4. Interquartile range is the range of the middle half of responses
5. Smaller interquartile range indicates greater agreement among team members → used to break ties

HVA Results – Top 10 Perceived Risks



1. Tornadoes



2. Heavy snow



3. Thunderstorms



4. Lightning



5. High straight-line wind

HVA Results – Top 10 Perceived Risks



6. Extreme cold



7. Blizzard



8. Stormwater Flooding



9. Riverine Flooding



10. Ice Storm

HVA Results – Other Notable Risks



Thunderstorm-related

11. Hail



Hazard Material Incidents

- 14. Railroads
- 15. Fixed Facilities
- 18. Roadways
- 36. Pipelines



Transportation-related

12. Roadway Accidents

HVA Results – Bottom Ten Perceived Risks

- | | |
|------------------------------------|-----------------------------------|
| 36. Loss of sewerage system | 41. Correctional center incidents |
| 37. Aviation accidents | 42. Earthquake |
| 38. Large-scale food contamination | 43. Land subsidence |
| 39. Dam failure | 44. Landslide |
| 40. Civil unrest | 45. Dust storm |

Hazard Identification

- FEMA requires the plan to address natural hazards
 - Examples:
 - Drought, Flooding, Thunderstorms, Tornadoes
- The plan can also address human-induced or technological hazards
 - Examples
 - Hazardous Material Incidents, Transportation Accidents

Damage Totals

Hazard	Years	Incidents	Property Damages	Crop Damages	Total Damages
Automobile Accidents	15	53,241	910,728,500	0	910,728,500
Flood	52	50	30,777,884	31,634,644	62,412,528
Thunderstorms/Wind	51	185	27,534,248	5,021,965	32,556,213
Tornadoes	51	13	25,386,789	0	25,386,789
Lightning	51	16	18,201,588	0	18,201,588
Railway Accidents	40	212	4,780,633	0	4,780,633
Drought	25	17	0	3,757,011	3,757,011
Pipeline Hazmat	39	5	3,018,699	0	3,018,699
Hail	51	51	244,327	61,204	305,531
Temperature Extremes	21	51	16,163	81,526	97,526
Winter Storms	21	105	42,762	0	42,762

Note: All damages are in 2014 dollars

Annual Damages

Hazard	Years	Incidents per Year	Annual Property Damages	Annual Crop Damages	Total Annual Damages
Automobile Accidents	15	3,549.14	60,715,233	0	60,715,233
Flood	52	0.96	591,882	608,359	1,200,241
Thunderstorms/Wind	51	3.63	539,887	98,470	638,357
Tornadoes	51	0.25	488,207	0	488,207
Lightning	51	0.31	356,894	0	356,894
Drought	25	0.68	0	150,280	150,280
Railway Accidents	40	5.30	119,516	0	119,516
Pipeline Hazmat	39	0.13	77,403	0	77,403
Hail	51	1.00	4,791	1,200	5,991
Temperature Extremes	21	2.43	770	3,874	4,644
Winter Storms	21	5.00	2,036	0	2,036

Fatality and Injury Totals

Hazard	Years	Incidents	Fatalities	Injuries	Total
Automobile Accidents	15	53,241	316	29,074	29,390
<i>Sexually-Transmitted Diseases</i>	9	7,686	0	7,686	7,686
<i>Communicable Diseases</i>	9	3,114	0	3,114	3,114
Railway Accidents	40	212	15	49	64
Thunderstorms/Wind	51	185	6	60	36
<i>Aviation Accidents</i>	51	144	11	11	22
Temperature Extremes	21	51	4	11	15
Tornadoes	52	13	0	15	15
Pipeline Hazmat Accidents	39	5	3	4	7
Lightning	51	16	1	5	6
Winter Storms	21	105	0	1	1
<i>Land Subsidence</i>	15	1	0	1	1
<i>Dam Failure</i>	1	1	0	1	1

Annual Fatalities and Injuries

Hazard	Years	Incidents per Year	Fatalities per Year	Injuries per year	Annual Total
Automobile Accidents	15	3,549.40	21.07	1,938.27	1,959.34
<i>Sexually-Transmitted Diseases</i>	9	854.00	0.00	854.00	854.00
<i>Communicable Diseases</i>	9	346.00	0.00	346.00	346.00
Railway Accidents	40	5.30	0.38	1.23	1.61
<i>Dam Failure</i>	1	1.00	0.00	1.00	1.00
Temperature Extremes	21	2.43	0.19	0.52	0.71
Thunderstorm/Wind	51	3.63	0.12	0.59	0.71
Tornadoes	52	0.25	0.00	0.29	0.29
<i>Aviation Accidents</i>	51	2.88	0.22	0.22	0.44
Pipeline Hazmat	39	0.13	0.08	0.10	0.18
Lightning	51	0.31	0.02	0.10	0.12
<i>Land Subsidence</i>	15	0.06	0.00	0.06	0.06
Winter Storms	21	5.00	0.00	0.05	0.05

Hazard Identification

- Hazards with confirmed incidences, but no confirmed damage estimates
 - *Earthquake, Fog*
- Hazards no confirmed incidences
 - *Dust Storms, Landslides, Nuclear Power Plant Incidents, Terrorism , Wild Fire*
- Hazards without data on incidences or damages
 - *Correctional Center Incidents, Loss of Sewerage System, Power Outages, School Violence, Transportation Hazmat, Workplace Violence*

Hazards Currently Profiled in the Plan

Natural Hazards

- | | |
|----------------------------------|-------------------------|
| 1. Drought | 6. Lightning |
| 2. Flooding | 7. Temperature Extremes |
| 3. Fog | 8. Thunderstorms/Wind |
| 4. Hail | 9. Tornadoes |
| 5. Lake Michigan Coastal Hazards | 10. Wild Fires |
| | 11. Winter Storms |

Hazards Currently Profiled in the Plan

Technological Hazards

- | | |
|---|-----------------------|
| 12. Contamination or Loss of Water Supply | 15. Railway Accidents |
| 13. Hazardous Material Incidents | 16. Roadway Accidents |
| 14. Power Outages | 17. Terrorism |

Hazards Not Profiled by the Plan

Natural Hazards

- | | |
|-----------------------|--------------------|
| 1. Agricultural Pests | 4. Earthquake |
| 2. Dam Failure | 5. Land Subsidence |
| 3. Dust Storms | 6. Landslide |

Hazards Not Profiled by the Plan

Technological Hazards

- | | |
|----------------------------------|--------------------------------------|
| 7. Aviation Accidents | 14. Landfill Incidents |
| 8. Civil Unrest | 15. Loss of Sewerage System |
| 9. Communicable Disease Outbreak | 16. Nuclear Power Plant Incident |
| 10. Communication Outage | 17. Power Plant Incident |
| 11. Correctional Center Incident | 18. School Violence |
| 12. Dirty Bomb | 19. Waterway Transportation Accident |
| 13. Fuel Shortage | 20. Workplace Violence |

Project Web Site

- <http://www.sewrpc.org/SEWRPC/communityassistance/Hazard-Mitigation-Planning.htm>
 - Agendas and other meeting materials
 - Summary notes from meetings
 - Presentations
 - Draft chapters as they are completed
 - Comment screen
 - Other ways to send a comment
- Email to jboxhorn@sewrpc.org

Exhibit B

Table 1

PRELIMINARY ESTIMATES OF HAZARD INCIDENTS AND DAMAGES AFFECTING KENOSHA COUNTY

Hazard ^a	Period	Incidents	Fatalities	Injuries	Property Damages (2014 dollars)	Crop Damages (2014 dollars)
Natural Hazards						
Drought	1980-2014	17	0	0	0	3,757,011
Flood	1963-2014	50	0	0	30,777,884	31,634,644
Fog	1999-2014	76	0	0	0	0
Hail	1964-2014	51	0	0	244,327	61,204
Lake Michigan Coastal Hazards	No Data	--	--	--	--	--
Lightning	1964-2014	16	1	5	18,201,588	0
Temperature Extremes	1994-2014	51	4	11	16,163	81,363
Thunderstorms/High Winds	1964-2014	185	6	30	27,534,248	5,021,965
Tornadoes	1963-2014	13	0	15	25,386,789	0
Water Supply Loss or Contamination	No Data	--	--	--	--	--
Winter Storms	1994-2014	105	0	1	42,762	0
Wild Fires	1994-2014	0	0	0	0	0
<i>Dam Failure</i>	<i>2014</i>	<i>1</i>	<i>0</i>	<i>1</i>	<i>0</i>	<i>0</i>
<i>Dust Storms</i>	<i>1959-2014</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>
<i>Earthquake</i>	<i>1957-2014</i>	<i>15</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>
<i>Land Subsidence</i>	<i>2000-2014</i>	<i>1</i>	<i>0</i>	<i>1</i>	<i>0</i>	<i>0</i>
<i>Landslides</i>	<i>2000-2014</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>
Human-Induced Hazards						
Automobile Accidents	1999-2013	53,241	316	29,074	910,728,500	0
Pipeline Hazmat Accidents	1976-2014	5	3	4	3,018,699	0
Power Outages	No Data	--	--	--	--	--
Railway Accidents	1975-2014	212	15	49	4,780,633	0
Terrorism	1970-2014	0	0	0	0	0
Transportation Hazmat Accidents	No Data	--	--	--	--	--
<i>Aviation Accidents</i>	<i>1965-2015</i>	<i>144</i>	<i>11</i>	<i>11</i>	<i>0</i>	<i>0</i>
<i>Communicable Diseases</i>	<i>2005-2013</i>	<i>3,114</i>	<i>--</i>	<i>--</i>	<i>--</i>	<i>--</i>
<i>Sexually-Transmitted Diseases</i>	<i>2005-2013</i>	<i>7,686</i>	<i>--</i>	<i>--</i>	<i>--</i>	<i>--</i>
<i>Correctional Center Incident</i>	<i>No Data</i>	<i>--</i>	<i>--</i>	<i>--</i>	<i>--</i>	<i>--</i>
<i>Loss of Sewerage System</i>	<i>No Data</i>	<i>--</i>	<i>--</i>	<i>--</i>	<i>--</i>	<i>--</i>
<i>Nuclear Power Plant Incident</i>	<i>2000-2014</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>	<i>0</i>
<i>School Violence</i>	<i>No Data</i>	<i>--</i>	<i>--</i>	<i>--</i>	<i>--</i>	<i>--</i>
<i>Waterway Transportations</i>	<i>No Data</i>	<i>--</i>	<i>--</i>	<i>--</i>	<i>--</i>	<i>--</i>
<i>Workplace Violence</i>	<i>No Data</i>	<i>--</i>	<i>--</i>	<i>--</i>	<i>--</i>	<i>--</i>

^aHazards in bold are currently profiled in the Kenosha County hazard mitigation plan. Hazards in italics are not currently profiled in the plan.

Source: SEWRPC.

Table 2

ANNUAL INCIDENCE OF HAZARDS AND DAMAGES AFFECTING KENOSHA COUNTY

Hazard ^a	Years of Record	Incidents per Year	Fatalities per Year	Injuries per Year	Annual Property Damages (2014 dollars)	Annual Crop Damages (2014 dollars)
Natural Hazards						
Drought	25	0.68	0.00	0.00	0	150,280
Flood	52	0.96	0.00	0.00	591,882	608,359
Fog	16	4.75	0.00	0.00	0	0
Hail	51	1.00	0.00	0.00	4,791	1,200
Lake Michigan Coastal Hazards	No Data	--	--	--	--	--
Lightning	51	0.31	0.02	0.10	356,894	0
Temperature Extremes	21	2.43	0.19	0.52	770	3,874
Thunderstorms/High Winds	51	3.63	0.12	0.59	539,887	98,470
Tornadoes	52	0.25	0.00	0.29	488,207	0
Water Supply Loss or Contamination	No Data	--	--	--	--	--
Winter Storms	21	5.00	0.00	0.05	2,036	0
Wild Fires	11	0.00	0.00	0.00	0	0
<i>Dam Failure</i>	<i>1</i>	<i>1.00</i>	<i>0.00</i>	<i>1.00</i>	<i>0</i>	<i>0</i>
<i>Dust Storms</i>	<i>56</i>	<i>0.00</i>	<i>0.00</i>	<i>0.00</i>	<i>0</i>	<i>0</i>
<i>Earthquake</i>	<i>58</i>	<i>0.22</i>	<i>0.00</i>	<i>0.00</i>	<i>0</i>	<i>0</i>
<i>Land Subsidence</i>	<i>15</i>	<i>0.06</i>	<i>0.00</i>	<i>0.06</i>	<i>0</i>	<i>0</i>
<i>Landslides</i>	<i>15</i>	<i>0.00</i>	<i>0.00</i>	<i>0.00</i>	<i>0</i>	<i>0</i>
Human-Induced Hazards						
Automobile Accidents	15	3,549.40	21.07	1,938.27	60,715,233	0
Pipeline Hazmat Accidents	39	0.13	0.08	0.10	77,403	0
Power Outages	No Data	--	--	--	--	--
Railway Accidents	40	5.30	0.38	1.23	119,516	0
Terrorism	45	0.00	0.00	0.00	0	0
Transportation Hazmat Accidents	No Data	--	--	--	--	--
<i>Aviation Accidents</i>	<i>51</i>	<i>2.88</i>	<i>0.22</i>	<i>0.22</i>	<i>0</i>	<i>0</i>
<i>Communicable Diseases</i>	<i>9</i>	<i>346.00</i>	<i>--</i>	<i>--</i>	<i>--</i>	<i>--</i>
<i>Sexually-Transmitted Diseases</i>	<i>9</i>	<i>854.00</i>	<i>--</i>	<i>--</i>	<i>--</i>	<i>--</i>
<i>Correctional Center Incident</i>	<i>No Data</i>	<i>--</i>	<i>--</i>	<i>--</i>	<i>--</i>	<i>--</i>
<i>Loss of Sewerage System</i>	<i>No Data</i>	<i>--</i>	<i>--</i>	<i>--</i>	<i>--</i>	<i>--</i>
<i>Nuclear Power Plant Incident</i>	<i>15</i>	<i>0.00</i>	<i>0.00</i>	<i>0.00</i>	<i>0</i>	<i>0</i>
<i>School Violence</i>	<i>No Data</i>	<i>--</i>	<i>--</i>	<i>--</i>	<i>--</i>	<i>--</i>
<i>Waterway Transportations</i>	<i>No Data</i>	<i>--</i>	<i>--</i>	<i>--</i>	<i>--</i>	<i>--</i>
<i>Workplace Violence</i>	<i>No Data</i>	<i>--</i>	<i>--</i>	<i>--</i>	<i>--</i>	<i>--</i>

^aHazards in bold are currently profiled in the Kenosha County hazard mitigation plan. Hazards in italics are not currently profiled in the plan.

Source: SEWRPC.

Table 3

HAZARDS CURRENTLY PROFILED IN THE KENOSHA COUNTY HAZARD MITIGATION PLAN

Natural Hazards	Human-Induced Hazards
Drought	Contamination or Loss of Water Supply
Flooding	Hazardous Material Incidents
Fog	Power Outages
Hail	Railway Accidents
Lake Michigan Coastal Hazards	Roadway Accidents
Lightning	Terrorism
Temperature Extremes	
Thunderstorms/High Winds	
Tornadoes	
Wild Fires	
Winter Storms	

Source: SEWRPC.

Table 4

HAZARDS THAT WERE CONSIDERED BUT ARE NOT PROFILED IN THE KENOSHA COUNTY HAZARD MITIGATION PLAN

Natural Hazards	Human-Induced Hazards
Agricultural Pests	Aviation Accidents
Dam Failure	Civil Unrest
Dust Storms	Communicable Disease Outbreak
Earthquake	Communication Outage
Land Subsidence	Correctional Center Incident
Landslide	Dirty Bomb
	Fuel Shortage
	Landfill Incidents
	Loss of Sewerage System
	Nuclear Power Plant Incident
	Power Plant Incident
	School Violence
	Waterway Transportation Accident
	Workplace Violence

Source: SEWRPC

Kenosha County Division of Emergency Management
Southeastern Wisconsin Regional Planning Commission

Notice of Meeting and Agenda

KENOSHA COUNTY HAZARD MITIGATION PLAN LOCAL PLANNING TEAM

DATE: May 5, 2016
TIME: 9:00 to 12:00 noon
PLACE: Kenosha County Center
Public Hearing Room
19600 - 75th Street
Bristol, Wisconsin

AGENDA:

1. Welcome
2. Introductions
3. Consideration of Summary Notes of October 23, 2015, Local Planning Team Meeting (a copy of the draft summary notes is available for download from the SEWRPC website at: <http://www.sewrpc.org/SEWRPC/communityassistance/Hazard-Mitigation-Planning.htm>)
4. Consideration of Chapter III, "Analysis of Hazard Conditions," of SEWRPC Community Assistance Planning Report No. 278 (3rd edition), *Kenosha County Hazard Mitigation Plan Update: 2016-2020* (a copy of the draft chapter is available for download from the SEWRPC website at: <http://www.sewrpc.org/SEWRPC/communityassistance/Hazard-Mitigation-Planning.htm>)
5. Consideration of Chapter IV, "Hazard Mitigation Goals," of SEWRPC Community Assistance Planning Report No. 278 (3rd edition), *Kenosha County Hazard Mitigation Plan Update: 2016-2020* (a copy of the draft chapter is available for download from the SEWRPC website at: <http://www.sewrpc.org/SEWRPC/communityassistance/Hazard-Mitigation-Planning.htm>)
6. Discussion of May 23, 2016 public meeting
7. Adjourn

Joseph E. Boxhorn
Secretary

Enclosures

CAPR-278 3RD ED MEETING NOTICE MAY 5 2016 (00231281).DOC
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04/08/16

SUMMARY NOTES OF THE MAY 5, 2016 MEETING OF THE KENOSHA COUNTY HAZARD MITIGATION PLAN LOCAL PLANNING TEAM

INTRODUCTION

The May 5, 2016 meeting of the Kenosha County Hazard Mitigation Plan Local Planning Team was convened at the Kenosha County Center at 9:10 a.m. The meeting was called to order by Lieutenant Gil Benn, Director of the Kenosha County Division of Emergency Management. Attendance was taken by circulating a sign-in sheet.

In attendance at the meeting were the following individuals:

Local Planning Team Members

Lt. Gil S. Benn, Chair	Director, Kenosha County Division of Emergency Management
Joseph E. Boxhorn, Secretary	Senior Planner, Southeastern Wisconsin Regional Planning Commission
Ray Arbet	Director, Kenosha County Department of Public Works
Andy M. Buehler	Director, Kenosha County Department of Planning and Development
William Glembocki	Chairman, Town of Wheatland
Robert Grieshaber	Safety-Risk Manager, University of Wisconsin-Parkside
Randy Kerkman	Administrator, Village of Bristol
John Klabecek	Director of Safety, Carthage College
Laura Kletti	Chief Environmental Engineer, Southeastern Wisconsin Regional Planning Commission
Dennis Linn	Captain, Twin Lakes Police Department
Doug McElmury	Chief, Pleasant Prairie Fire and Rescue
John Meland	Principal Specialist, Southeastern Wisconsin Regional Planning Commission
Mark Melotik	Director of Environmental Health, Kenosha County Department of Health
Aaron Owens	Planner, Southeastern Wisconsin Regional Planning Commission
Nakeisha N. Payne	Public Involvement and Outreach Specialist, Southeastern Wisconsin Regional Planning Commission
Tom Shircel	Assistant Village Administrator, Village of Pleasant Prairie
Mike Slover	Chief, Salem Fire and Rescue
David Smetana	Chief of Police, Village of Pleasant Prairie
Dan Treloar	Conservationist, Kenosha County Department of Planning and Development
Capt. Ken Weyker	Commander of Field Operations, Kenosha County Sheriff's Department
Tedi Winnett	Director, Kenosha County University of Wisconsin-Extension

Lt. Benn welcomed all attendees to the meeting. He noted that the Kenosha County hazard mitigation plan is required to be updated every five years, and that this would be the second update to the original plan. At the request of Lt. Benn, the team members introduced themselves.

CONSIDERATION OF THE SUMMARY NOTES OF THE OCTOBER 23, 2015, LOCAL PLANNING TEAM MEETING

Lt. Benn introduced Joseph Boxhorn, Senior Planner, Southeastern Wisconsin Regional Planning Commission (SEWRPC). At Lt. Benn's request, Mr. Boxhorn reviewed the summary notes from the October 23, 2015, meeting of the Local Planning Team. No questions or comments were offered on the summary notes. Mr. Boxhorn indicated that the Local Planning team members could send him any comments or corrections to the summary notes by electronic mail or through the comments screen on the project webpage. He stated that if he

receives no comments by May 13, 2016, he will consider the summary notes to present an accurate reflection of what transpired at the October 23, 2015, meeting.

CONSIDERATION OF CHAPTER III, “ANALYSIS OF HAZARD CONDITIONS,” OF SEWRPC COMMUNITY ASSISTANCE PLANNING REPORT NO. 278 (3RD EDITION), *KENOSHA COUNTY HAZARD MITIGATION PLAN UPDATE: 2016-2020*

At Lt. Benn’s request, Mr. Boxhorn reviewed the preliminary draft of Chapter III of the plan report. Mr. Boxhorn stated that material in the draft chapter that is either new or revised has been highlighted blue in the text. He noted that this was done to assist people reviewing the chapter. He indicated that the highlighting would be removed prior to publication of the final report.

Mr. Boxhorn stated that Chapter III does three things: 1) it documents how the hazards that the plan addresses were identified, 2) it briefly describes how the risks and vulnerabilities associated with these hazards were assessed, and 3) it presents a profile of each hazard addressed by the plan. He noted that, with some variation among hazards, the profiles follow a similar format which includes a definition and description of the hazard, a discussion of notable historical and recent instances of the hazard which affected Kenosha County, an assessment of the vulnerability of and potential impact to the County related to the hazard, a discussion of potential future changes in impacts from the hazard, and a discussion of any differences among communities in the risks they face from the hazard.

Mr. Boxhorn noted that he would display copies of the maps from Chapter III on the projection screen in the meeting room during discussion of the chapter.

[Secretary’s Note: Mr. Boxhorn’s presentation is attached herein as Exhibit A.]

Mr. Boxhorn reviewed the section of the draft chapter on hazard identification. He stated that this section incorporates the results and summary of the hazard and vulnerability assessment tool that the Local Planning Team completed at its April 22, 2015 meeting. He noted that this section also includes brief discussions of a number of hazards that the Local Planning Team considered for inclusion in the plan either during the initial development of the plan or the first update, but ultimately decided not to include.

Lt. Benn asked whether Chapter III makes any reference to the Kenosha County railway emergency response plan that his office is currently developing. Mr. Boxhorn replied that he was made aware of this planning effort after a draft of Chapter III was written. He added that when the railway emergency response plan is completed, he will review it and add references and text from the plan to the hazard mitigation plan as appropriate.

In reference to the section on nuclear power plants, Lt. Benn asked whether spent fuel and other radioactive wastes from the Point Beach Nuclear Power Plant in Two Rivers, Wisconsin were being stored onsite. Mr. Boxhorn answered that he believes it is.

[Secretary’s Note: Review of material at the website of the Federal Nuclear Regulatory Commission indicates spent fuel from the Point Beach plant is stored at an independent spent fuel storage installation at the plant.]

Mr. Boxhorn reviewed the vulnerability assessment analysis methods and procedure section of the plan. He stated that this section includes a new subsection describing changes in climate that are anticipated to occur between now and the middle of the 21st century. He indicated that this information will be used to address how climate change may affect the impacts of particular hazards. Mr. Boxhorn explained that the Federal Emergency Management Agency (FEMA) now requires that state hazard mitigation plans address climate change. He added that he expects that FEMA will require this of local plans at some time in the future.

Mr. Boxhorn reviewed the section on flooding and associated stormwater drainage problems. Lt. Benn asked whether most of the flooding in the County is riverine-related. Mr. Boxhorn replied that while most of the

flooding is riverine related, there have been stormwater-related instances of flooding. He noted that the draft chapter includes a new map, Map III-6, showing locations of reported roadway flooding during flood events and storms.

Lt. Benn noted that there has been repeated damage to infrastructure along the Lake Michigan coastline due to higher water levels in the Lake. He asked whether this is addressed in the flooding section. Mr. Boxhorn answered that coastal hazards such as this are addressed in a later section of the draft chapter.

Mr. Treloar noted that the Village of Somers has recently annexed parcels in the Town of Somers and asked that the maps in the report be updated to reflect this. Mr. Boxhorn indicated that this would be done.

[Secretary's Note: The maps in Chapters I through III have been updated to show civil division boundaries as of May 2016. To reflect these changes, the following changes have been made in text and tables:

Table II-1 in Chapter II has been revised to reflect the changes in civil division areal extents. The revised table is attached herein as Exhibit B.

In Table II-7 in Chapter II, the entry for location for mobile home park number 23 was revised to read: "Village of Somers."

In Table C-1 in Appendix C, the entry for municipality for the UW-Parkside Police and Public Safety was revised to read: "Village of Somers."

In Table C-2 in Appendix C, the entries for municipality for the Somers Fire and Rescue Stations 1 and 2 were revised to read: "Village of Somers."

In Table D-1 in Appendix D, the entries for community for schools number 67 and 74 were revised to read: "Village of Somers."

In Table D-2 in Appendix D, the entries for municipality for facilities number 11 and 43 were revised to read: "Village of Somers."

In Table D-5 in Appendix D, the entry for municipality for facility number 76 was revised to read: "Village of Somers."]

In reference to Maps III-2 and III-3, Mr. Buehler commented that his understanding is that there are more residential structures within the floodplain along Pike Creek in the Village of Somers than the three shown on the maps. He indicated that he would look into this and provide the information to SEWRPC staff.

[Secretary's Note: As of April 4, 2017 no additional data had been submitted. No changes were made to Maps III-2 and III-3.]

Mr. Boxhorn reviewed the section of thunderstorms, high winds, hail, and lightning. Ms. Winnett noted that Table III-13 indicates that a thunderstorm impacted Truesdell on July 12, 2014. She asked whether there is a community named Truesdell in Kenosha County. Mr. Boxhorn replied that Truesdell is the name of a historical unincorporated settlement in the County. He explained that the National Weather Service sometimes uses old settlement names when describing locations affected by storms.

Mr. Boxhorn reviewed the section on tornadoes. No questions or comments were offered on this section.

Mr. Boxhorn reviewed the section on extreme temperatures. He noted that the draft chapter gives a more complete discussion of extreme cold events than was present in previous versions of the plan. He added that the available

data on property damages and crop damages due to extreme temperatures were added to Table III-21. No questions or comments were offered on this section.

Mr. Boxhorn reviewed the section on Lake Michigan coastal hazards. He stated that he added descriptions of two historical events from the 1980s and an October 2014 event to this section. Lt. Benn noted that since 2010 there have been at least three storms that caused damage along the lakefront. Mr. McElmury noted that sandbagging along the lakefront prevented some damage in Pleasant Prairie. Mr. Arbet stated that changes in lake levels have been adding to the problems along the shoreline. He indicated that the County recently hired consultants to examine shoreline protection.

Mr. Boxhorn asked that the lakeshore communities provide him data regarding their experiences with coastal hazards and any plans that they may have for addressing it. He noted that he had requested information from Carthage College, but had not yet received it. Mr. Klabecek stated that he would try to obtain the information and forward it to the SEWRPC staff.

[Secretary's Note: As of April 4, 2017 no additional data had been submitted.]

Lt. Benn asked Mr. Boxhorn whether he had received a copy of the City of Kenosha's report on the damage to the City's lakefront that was caused by the October 2014 wave runup event. Mr. Boxhorn replied that he has not received a copy of that report. Lt. Benn indicated that he would provide a copy.

[Secretary's Note: Lt. Benn provided the SEWRPC staff with a copy of the City of Kenosha's report via electronic mail. The first full paragraph on page 58 of the draft chapter was revised to read as follows (text in bold is included here, and in similar subsequent Secretary's Notes, to indicate language changed or added onto the text. Text will not be bold in the report):

“Strengthening low pressure over the lower peninsula of Michigan in conjunction with a strong push of cold air over the relatively warm waters of Lake Michigan resulted in strong winds affecting the nearshore waters of Lake Michigan on October 31, 2014. Wind gusts were frequently between 39 and 49 miles per hour over nearshore waters with gusts of 54 miles per hour being reported at Kenosha. This wind produced 20-foot high waves which caused considerable damage along the lakefront in the City of Kenosha. The waves pushed rocks and debris onto Kennedy Drive. **While City crews were able to clean up the area, some sections of the revetment needed to have larger boulders restacked in order to obtain the required height. The cost of construction for doing this was estimated at \$50,000 to \$75,000 (2014 dollars).** At Southport Marina, waves undermined a boat storage facility causing its concrete floor to collapse. Waves also damaged **a concrete overlook at Harbor Park** and a cobblestone walkway along the harbor. **The costs of construction for repairing the overlook were estimated at \$150,000 (2014 dollars).** The greatest damage occurred at Southport Park, where waves impacted about 500 feet of shoreline. Damages included dislodging of riprap, severe erosion **and the failure of a stone revetment wall.** The estimated cost to rebuild about 450 feet of stone revetment wall and install additional protection against erosion at Southport Park was about **\$500,000 to \$550,000 (2014 dollars).**”]

Lt. Benn asked what solutions are available for addressing coastal hazards. Mr. Arbet replied that the shoreline can be armored. He indicated that this can also cause problems. He stated that Concordia University in Mequon built a seawall to address bluff erosion. Mr. Arbet noted that the effect of this wall has been to move the damage downshore. He added that this has resulted in several lawsuits.

Mr. Boxhorn reviewed the section on winter storms. No questions or comments were offered on this section.

Mr. Boxhorn reviewed the section on drought. He stated that Table III-26 is a new table which compares the records of crop losses resulting from drought in the National Climatic Data Center database to records of crop insurance indemnities paid in Kenosha County that listed drought as the cause of loss. He noted that there is little overlap between the data from the two sources. He indicated that when there was overlap between data from the two sources, he used the higher total to represent crop losses due to drought. No questions or comments were offered on this section.

Mr. Boxhorn reviewed the section on fires. No questions or comments were offered on this section.

Mr. Boxhorn reviewed the section on transportation accidents. He indicated that Map III-10, which shows crash rates on freeways and State Trunk Highways in the County has been updated. Lt. Benn stated that he expects to complete a County railway emergency response plan within the next few weeks. He indicated that he would provide a copy of this plan to the SEWRPC staff.

[Secretary's Note: Lt. Benn provided the SEWRPC staff with a draft copy of the County railway emergency response plan via electronic mail. The following paragraph was added after the second full paragraph on page 79:

“Trains can travel through Kenosha County at any hour of the day and on any day of the week. The cargo carried by freight trains passing through the County includes crude oil and other hazardous substances. Amtrak passenger trains run on the same tracks as the freight trains transporting commodities. The combined presence of dangerous commodities and passenger transport on the same tracks results in a substantial risk exposure for both suburban and rural areas of the County in the event of an accident or derailment. In addition, there are impediments to emergency response for rail emergencies. These include, but are not limited to, tracks passing through areas that are difficult-to-access or that have limited available water supply and seasonal impacts. These impediments can affect emergency response times and the availability of first responders for the initial response.”]

Mr. Boxhorn reviewed the section on fog. No questions or comments were offered on this section.

Mr. Boxhorn reviewed the section on contamination and loss of water supply. He stated that the draft contains new subsections which separate discussion of groundwater-related problems and surface water-related problems. He noted that this section also has new text that discusses molybdenum contamination in some areas of the shallow aquifer, problems with frazil ice at surface water intakes, and problems with water main breaks and frozen water laterals.

Lt. Benn asked what the source of the molybdenum contamination is. Mr. Boxhorn replied that the source is not certain. He added that it might be related to landfilled coal ash, it might be natural or it may be from some other source. Mr. Melotik noted that some areas in Racine and Waukesha Counties are also affected. Mr. Smetana asked whether the molybdenum contamination is the reason for the City of Waukesha's request to divert water from Lake Michigan for water supply purposes. Mr. Boxhorn replied that the diversion request is not related to the molybdenum contamination. He explained that the molybdenum contamination is found in the shallow sand and gravel and dolomite aquifers, while the problems leading to Waukesha's request are related to the deep sandstone aquifer.

Mr. Boxhorn reviewed the section on hazardous material incidents. He stated that this section now includes text on rail-based shipments of crude oil. Lt. Benn asked whether most of the pipeline incidents involved petroleum. Mr. Boxhorn replied that most of the pipeline incidents involved natural gas. Lt. Benn stated that he expects to complete a hazardous materials commodity flow and responder training assessment for the County within the next few weeks. He indicated that he would provide a copy of this plan to the SEWRPC staff.

[Secretary's Note: Lt. Benn provided the SEWRPC staff with a copy of the County hazardous materials commodity flow and responder training assessment via electronic mail. The following sentence was added to the end of the last paragraph on page 90:

“A recent examination of hazardous material commodity flow through Kenosha County found that fixed facilities in the County that are required to file Tier II Reporting forms reported using, storing, or producing 75 different hazardous chemicals.⁶⁹”

⁶⁹*Kenosha County Local Emergency Planning Committee, Hazardous Materials Commodity Flow and Responder Training Assessment for Kenosha County (WI), April 2016.*”

The footnotes following this footnote in the chapter were renumbered.

The following paragraphs were added after the second full paragraph on page 94:

“In 2016, Kenosha County examined the flow of hazardous materials through the County via several elements of the County's transportation network, including highways, railways, waterways, and airports.⁷³ As part of this study, random observations of traffic were conducted on highways at eight locations in the County. These observations noted the information displayed on the required hazardous material placards shown on vehicles carrying hazardous material cargo. The study found that the number of vehicles displaying placards that passed these sites ranged between 0 vehicles per hour and 5.43 vehicles per hour, with an average of 2.18 vehicles per hour. Vehicles transporting hazardous materials were observed more frequently on IH-94 than on State trunk highways. Average numbers of vehicles observed transporting hazardous materials on IH-94 and State trunk highways were 4.19 vehicles per hour and 0.92 vehicles per hour, respectively. The placards observed indicate that vehicles traveling on highways in the County carry a variety of hazardous substances. Specific placards for 32 different substances were observed, including placards for 18 substances reported as being used, stored or produced by fixed facilities in the County through their Tier II reports. Specific placards were also observed for 14 substances not reported on Tier II reports from any facilities in the County. Placards giving general descriptions of seven categories of hazardous substances were also observed on vehicles traveling along highways in the County.

The study made written requests to railroads providing freight service through the County for manifest information regarding hazardous materials carried along their lines. The railroads' responses indicated that hazardous materials from all classes within the U.S. Department of Transportation's hazard classification are transported through Kenosha County by rail. These classes include explosives, flammable and non-flammable gases, flammable and combustible liquids, flammable solids, spontaneously combustible materials, water-reactive substances, oxidizing agents, organic peroxides, toxic substances, radioactive materials, corrosive substances, and miscellaneous hazardous materials. In addition, the Canadian Pacific Railway indicated that they ship three to five train-loads of Bakken crude oil through the County per week. The Union Pacific Railway responded that their shipments of crude oil through the County are below the one million gallon per week threshold requiring specific reporting.

The study also found that there is minimal flow of hazardous materials through Kenosha County by water or air. The U.S. Coast Guard indicated that there are no bulk shipments of dangerous goods being transported by water on Lake Michigan that would come near the Kenosha County shoreline. Staff at the Kenosha Regional Airport reported that they have not had to deal administratively with any hazardous material cargo.

Kenosha County recently assessed the levels of training that first response personnel in the County have received relative to discovering and responding to releases of hazardous substances.⁷⁴ Federal regulations set forth in 29 CFR 1910.120(q)(6) of the *Code of Federal Regulations* require that emergency responders receive training on responding to releases of hazardous substances. These regulations specify that the level of training an emergency responder receives is to be based upon the responder's duties and functions within the response organization. The regulations also specify that emergency responders receive annual refresher training. Section SPS 332.50 of the *Wisconsin Administrative Code* adopts the regulations set forth in 29 CFR 1910 by reference.

The regulations specify five levels of training for first responders:

- Awareness level training for responders who are likely to witness or discover a hazardous material release and report it to the appropriate authorities;
- Operations level training for responders who are likely to respond to a hazardous material release as part of the initial response and who, from a safe distance, function to keep the hazard contained and prevent it from spreading;
- Technician level training for responders who approach the point of release and seek to stop the release;
- Specialist level training consisting of more directed or specific knowledge of the substances to be contained for responders who provide support for technician level responders and act as site liaisons with other governmental authorities regarding site activities; and
- Incident commander level training for responders who will assume control of the incident scene beyond the first responder awareness level.

Individuals who respond to a hazardous material incident are required to be trained to the minimum of an Operations level. Any sort of offensive operation relative to an incident, such as closing vessel valves, plugging leaks, or installing over pack drums, requires personnel trained to the Technician level.

The study surveyed fire, law enforcement, emergency medical service (EMS),⁷⁵ and public works agencies within Kenosha County to assess the level of initial training and status of refresher training received by their personnel. Most of the agencies in the County responded. Fire departments within the County that replied to the survey indicated that all of their responders had received Awareness level training. In addition, about 84 percent of these responders had received Operations level training and about 9 percent had received Technician level training. The fire departments that replied to the survey reported that about 68 percent of their responders had received refresher training within the past year. The law enforcement, EMS, and public works agencies that replied to the survey reported that all of their responders had received

Awareness level training. None of these agencies reported having personnel who were trained to the Operations or Technician levels. Law enforcement agencies reported that about 40 percent of their responders had received refresher training within the past year. EMS services reported that about 22 percent of their responders had received refresher training within the past year. Public works agencies reported that none of their employees had received refresher training within the past year.

⁷³*Kenosha County Local Emergency Planning Committee, April 2016, op. cit.*

⁷⁴*Ibid.*”

⁷⁵*Assessment of EMS personnel only addresses those EMS services that are not a part of a fire department or a combined fire and rescue department. EMS personnel who are part of a fire department or a combined fire and rescue department are included in the assessment of fire department.*

The footnotes following this footnote in the chapter were renumbered.]

Mr. Boxhorn reviewed the section on terrorism. He noted that descriptions of some historical and recent incidents of terrorism that occurred in the State of Wisconsin were added to the section. No questions or comments were offered on this section.

Mr. Boxhorn reviewed the section on power outages. He explained that the section is meant to address long-term power outages. He stated that text has been added to the section describing some recent outages in the County. He noted that these were taken mostly from media reports. He added that the section also contains brief descriptions of two major events that occurred outside Wisconsin. He noted that this was done to give a sense of the impacts of a large long-term outage.

Lt. Benn asked whether changes in climate will result in Kenosha County experiencing more ice storms. Mr. Boxhorn answered that this is hard to tell from the modeling results. He added that the models do project that freezing rain episodes may occur more frequently, so his guess is that ice storms may become more common.

Mr. Melotik noted that he recalls a power outage that affected Kenosha County for several days in the 1990s. He added that he does not know the date of the event. Mr. Boxhorn replied that he was unable to find any reference to or information on this particular outage.

Mr. Arbet asked whether We Energies was the primary source of the data on power outages. Mr. Boxhorn replied that the information came from the National Climatic Data Center storm events database and media reports. He noted that We Energies’ website gives good information about the locations and magnitudes of outages as they are occurring. He continued that We Energies does not keep this information up on their website after power is restored. He added that the We Energies website does not indicate the cause of an outage.

Mr. Arbet asked whether data were available documenting power outages that were not weather related. He noted that these data could give some insight as to the condition of the power grid. Mr. Boxhorn replied that he obtained what data were available.

[Secretary’s Note: While specific, event related data on the causes of power outages were not available, We Energies website provides a general breakdown on the causes of outages The following sentences were added to the end of the third full paragraph on page 100:

“We Energies indicates that 29 percent of outages are caused by normal wear and tear on electricity generation, transmission, and distribution equipment; 27 percent are

caused by weather such as lightning, wind, rain, snow, heat, cold, and ice; 20 percent are caused by fallen trees and tree growth; 11 percent are caused by animal contact; 7 percent are caused by human actions, including accidents and vandalism; and 7 percent are caused by other events.”]

Mr. Boxhorn asked that Local Planning Team members provide him with any additional data their organizations have that would help refine the risk analyses on the hazards discussed in Chapter III.

**CONSIDERATION OF CHAPTER IV, “HAZARD MITIGATION GOALS”
OF SEWRPC COMMUNITY ASSISTANCE PLANNING REPORT NO. 278 (3RD
EDITION), *KENOSHA COUNTY HAZARD MITIGATION PLAN UPDATE: 2016-2020***

At Lt. Benn’s request, Mr. Boxhorn reviewed the preliminary draft of Chapter IV of the plan report. Mr. Boxhorn stated that the goals, objectives, and standards set forth in this chapter are largely taken from other plans that are being implemented in the County. He explained that these goals serve to link the hazard mitigation plan to these other plans.

Mr. Boxhorn proposed making no changes to the plan’s existing goals, objectives, and standards set forth in Chapter IV. He noted that the only changes in the draft chapter are updating of some references and recognition of the incorporation of the Village of Somers. The consensus of the Local Planning Team was to accept the existing goals, objectives, and standards.

DISCUSSION OF MAY 23, 2016 PUBLIC MEETING

Mr. Boxhorn stated that the Kenosha County Division of Emergency Management and SEWRPC will be holding a public meeting on the update of the hazard mitigation plan at 6:00 p.m. on May 23, 2016, at the Kenosha County Center in Bristol. He indicated that the purpose of this meeting is to familiarize interested members of the public with the updating efforts and to answer questions and receive comments about the plan. He noted that members of the Local Planning team are welcome to attend this meeting, but their attendance is not required. He added that FEMA does require that at least two public meetings be held during the planning process to give the public an opportunity to comment on the plan during the drafting process.

OTHER BUSINESS

Lt. Benn commented that it would be useful to compile a list of mobile home parks that have and do not have safe rooms. Mr. Melotik noted that notations could be placed in Health Department files. Lt. Benn indicated that mitigation funding is available through FEMA and the Wisconsin Division of Emergency Management to assist in constructing safe rooms.

Mr. Boxhorn stated that he is beginning to update Chapters V and VI. He asked the members of the Local Planning Team to provide him with information about measures that their communities are considering for addressing the hazards profiled in Chapter IV. As examples of types of projects, he cited resizing of culverts to reduce local flooding, installation of safe rooms, and installation or upgrading of warning systems. He added that he would also appreciate if the communities would inform him of recently completed projects. Mr. Melotik asked whether this includes annual exercises that the Health Department conducts. Mr. Boxhorn answered that that it does include these.

Mr. Boxhorn reminded the Local Planning Team that materials related to updating the County hazard mitigation plan are posted on the SEWRPC website.

Lt. Benn and Mr. Boxhorn thanked the members of the Local Planning Team for their participation in the plan updating effort.

**REVISIONS TO CHAPTER II SUBMITTED BY
MIKE SLOVER, CHIEF, SALEM FIRE/RESCUE**

Prior to the May 5, 2016, meeting of the Local Planning Team, Chief Slover provided information to the SEWRPC staff on changes in the service areas of Town of Salem Fire/Rescue, the Silver Lake Fire Department, the Silver Lake Rescue Squad, and Kansasville Fire and Rescue. Chief Slover provided maps showing the revised service areas for fire and emergency medical services (EMS). He stated that Town of Salem Fire and Rescue is now providing fire and EMS service for the Village of Silver Lake. He noted that Silver Lake fire station listed in Table C-2 in appendix C is now the Town of Salem Fire/Rescue Station 4.

[Secretary’s Note: Maps II-16 and II-17 in Chapter II have been revised to show the changes submitted by Chief Slover. The revised maps are attached herein as Exhibit C. The entry for the Silver Lake Fire Department station in Table C-2 has been revised to indicate that it is Town of Salem Fire/Rescue-Station 4.]

Chief Slover indicated that the working status of Town of Salem Fire/Rescue has gone to Full Time and Paid On Call.

[Secretary’s Note: Table II-11 in Chapter II has been revised to reflect the changes in service areas and working status reported by Chief Slover.]

**REVISIONS TO CHAPTERS II AND III SUBMITTED BY DOUG
MCELURY, CHIEF, VILLAGE OF PLEASANT PRAIRIE FIRE AND RESCUE**

Subsequent to the May 5, 2016, meeting of the Local Planning Team, Chief McElmury notified the SEWRPC staff through electronic mail that the location of one of the Village of Pleasant Prairie’s fire stations has changed. A copy of Chief McElmury’s email is attached herein as Exhibit D.

[Secretary’s Note: Maps II-16 in Chapter II and III-5 in Chapter III have been revised to show the change submitted by Chief McElmury. The revised maps are attached herein as Exhibit C. The address for the Village of Pleasant Prairie Fire Station No. 1 in Table C-2 has been revised to 3801 Springbrook Road, Pleasant Prairie 53158.]

ADJOURNMENT

There being no further business, the meeting was adjourned by unanimous consent at 10:37 a.m.

CAPR-278-3 SUMMARY NOTES KENOSHA CTY HMP LPT MTG MAY 5 2016 (00231815).DOC
500-1112
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4/12/17, 4/13/17, 4/14/17

- Exhibit A: Boxhorn Presentation (#231607)
- Exhibit B: Table II-1 from #224149
- Exhibit C: Revised Maps II-16, II-17, and III-5 (Joe can provide)
- Exhibit D: Email from Doug McElmury (#232007)

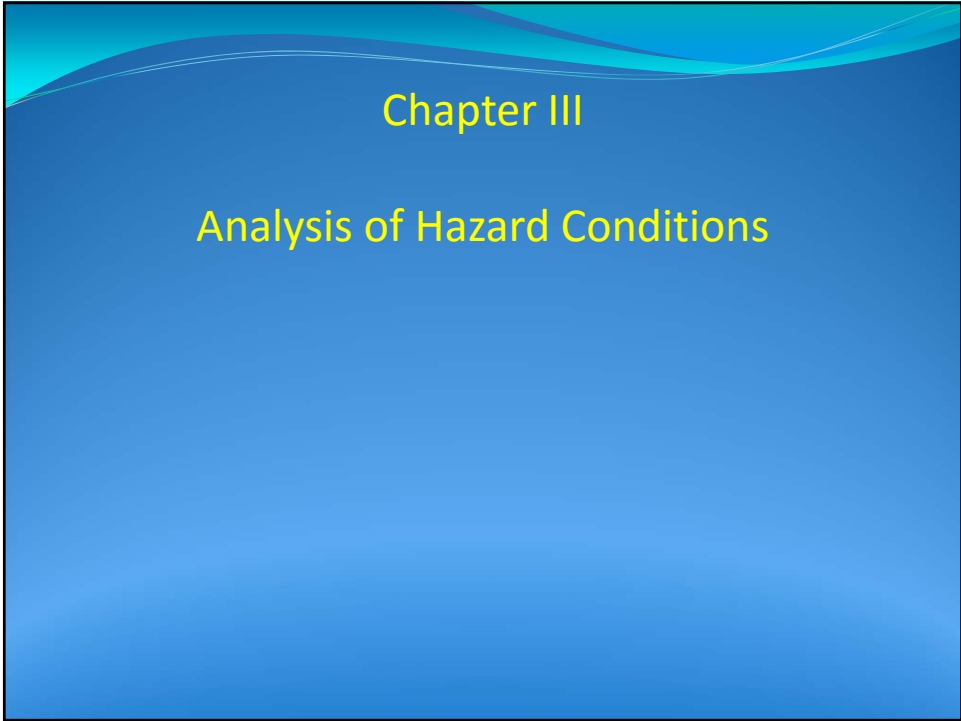


**Kenosha County Hazard Mitigation Plan:
Local Planning Team Meeting**
May 5, 2016

SEWRPC
Serving the counties of
Dane, DeKalb,
Crawford, Franklin, Grant,
Washington, and Winnebago

Joseph E. Boxhorn, Ph.D., Senior Planner
Southeastern Wisconsin Regional Planning Commission

231607



Chapter III

Analysis of Hazard Conditions

Chapter III Overview

- Documents the identification of the hazards that the plan addresses
 - This includes brief descriptions of hazards that are not addressed but were considered for inclusion during the initial plan or one of the updates
- Describes how risks and vulnerabilities were assessed
- Gives a profile of each hazard addressed by the plan

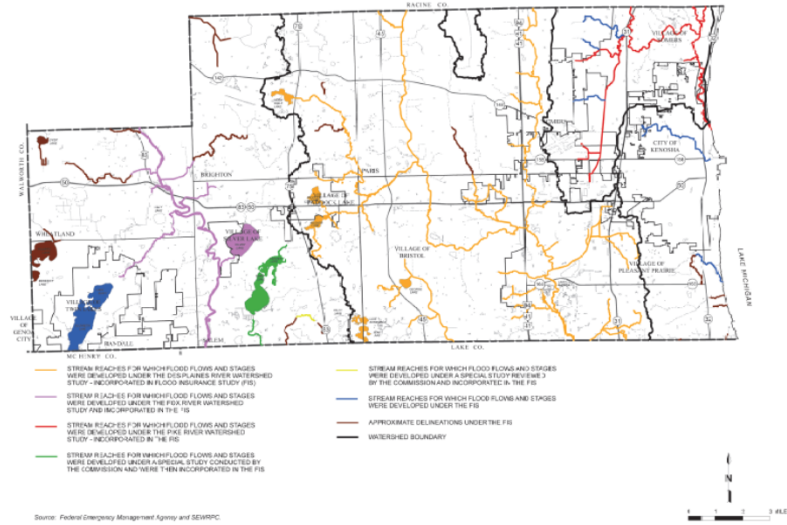
Hazard Profiles

- Most profiles follow a similar format
 - Definition and description of the hazard
 - Description of notable historical events that affected the County
 - Description of some notable recent events that affected the County
 - Assessment of vulnerabilities to the hazard and community impacts from the hazard
 - Description of potential future changes in impacts
 - Discussion of any differences among communities in risks

PRELIMINARY DRAFT

Map III - 1

SOURCES OF FLOOD HAZARD DATA FOR STREAM REACHES IN KENOSHA COUNTY: 2015

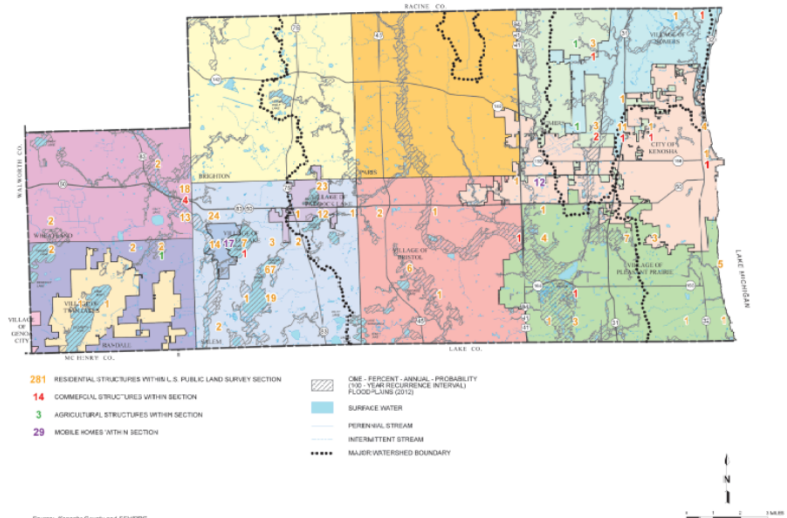


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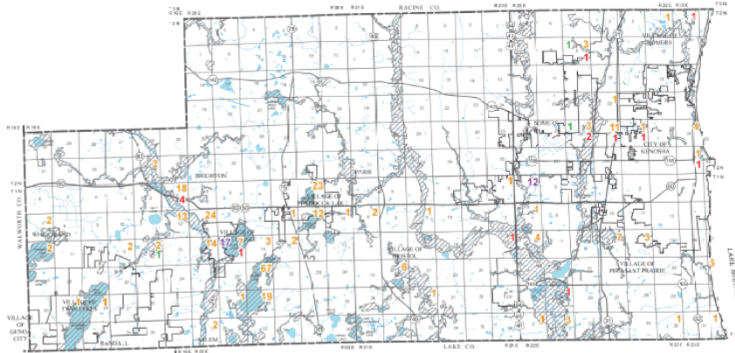
Map III - 2

NUMBER OF STRUCTURES WITHIN FLOOD HAZARD AREAS BY CIVIL DIVISION IN KENOSHA COUNTY: 2015



PRELIMINARY DRAFT

Map III - 3
NUMBER OF STRUCTURES WITHIN FLOOD HAZARD AREAS BY U.S. PUBLIC LAND SURVEY SECTION IN KENOSHA COUNTY: 2015



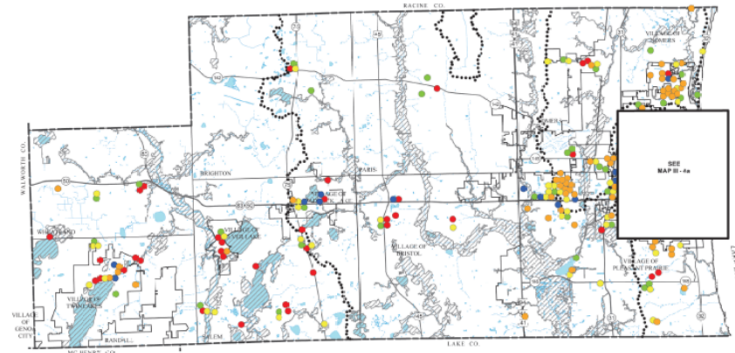
- 281 RESIDENTIAL STRUCTURES WITHIN U.S. PUBLIC LAND SURVEY SECTION
 - 14 COMMERCIAL STRUCTURES WITHIN SECTION
 - 3 AGRICULTURAL STRUCTURES WITHIN SECTION
 - 29 MOBILE HOMES WITHIN SECTION
- ONE PERCENT ANNUAL PROBABILITY FLOODPLAINS (DFTD)
 - SURFACE WATER
 - PERENNIAL STREAM
 - INTERMITTENT STREAM
 - MAJOR WATERSHED BOUNDARY

Source: Kenosha County and DEMAPC

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PRELIMINARY DRAFT

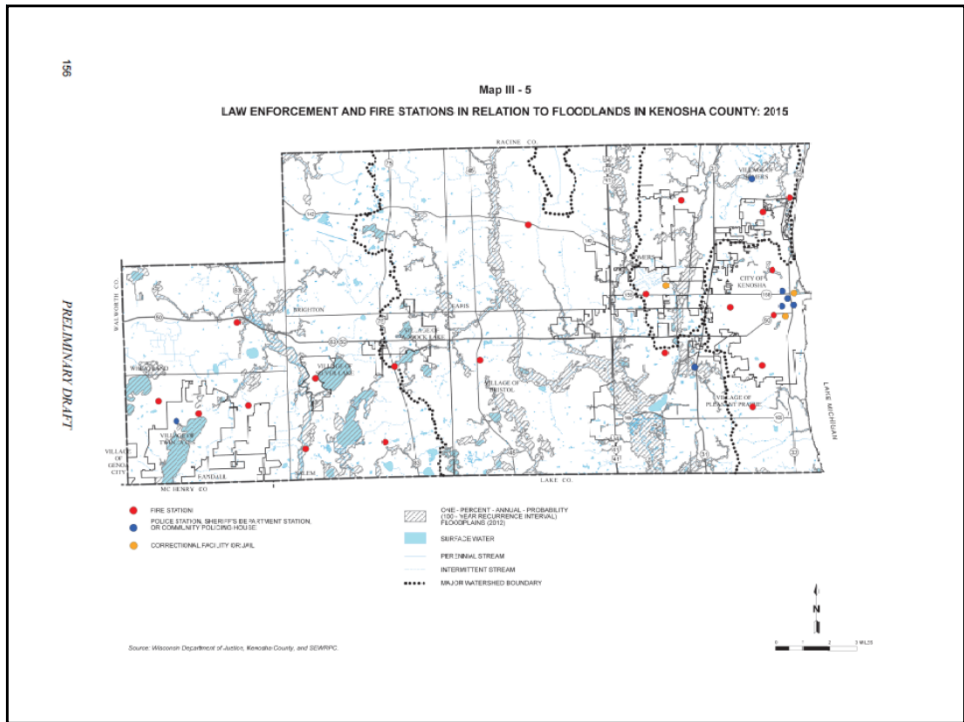
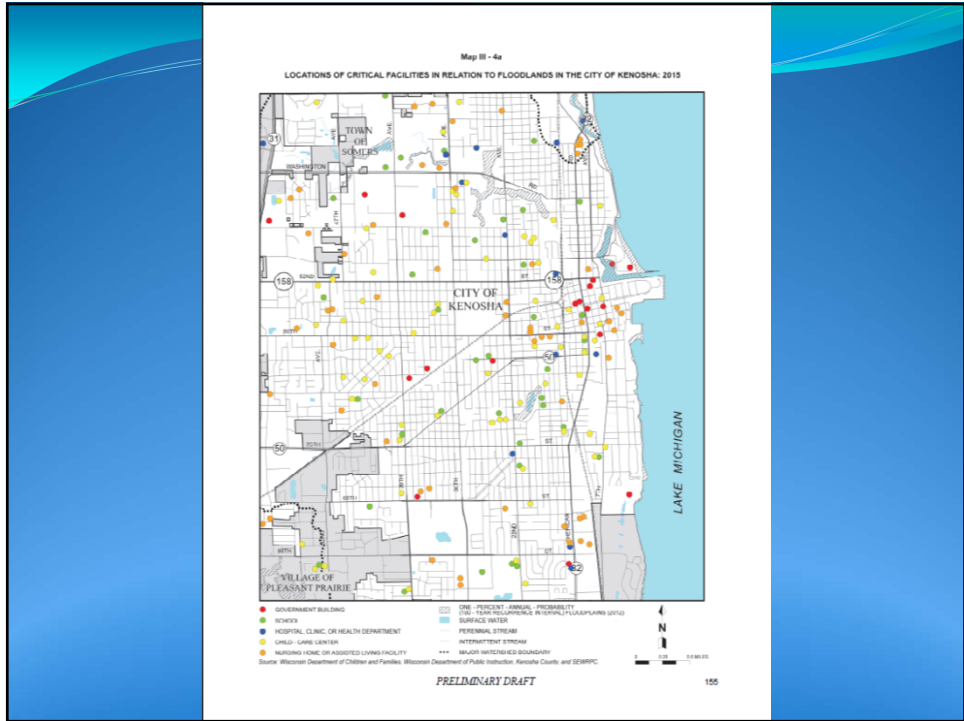
Map III - 4
LOCATIONS OF CRITICAL FACILITIES IN RELATION TO FLOODLANDS IN KENOSHA COUNTY: 2015

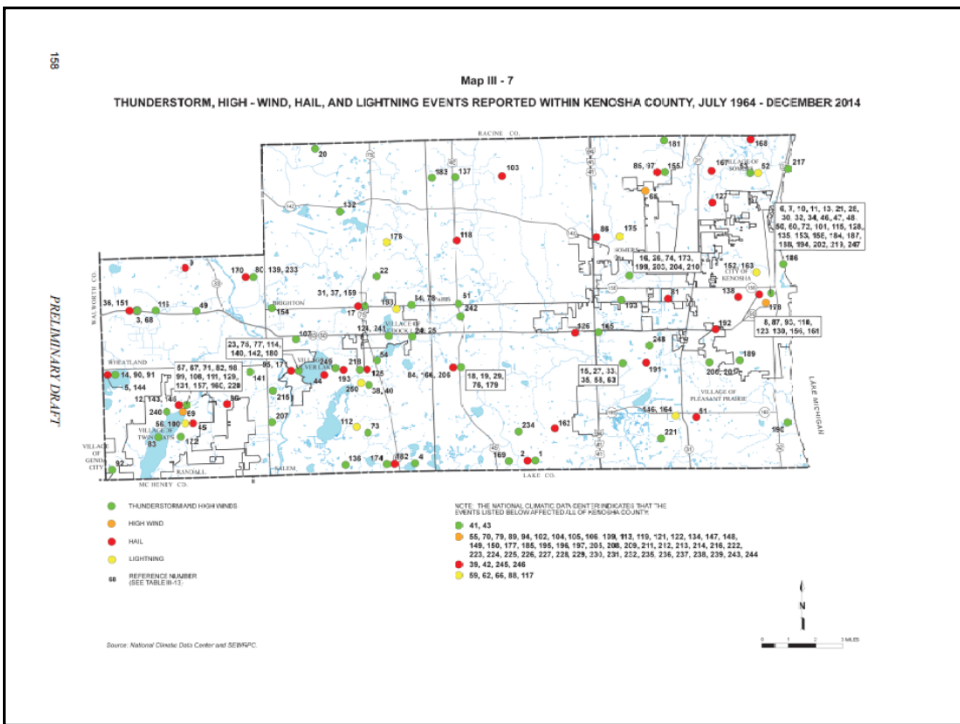
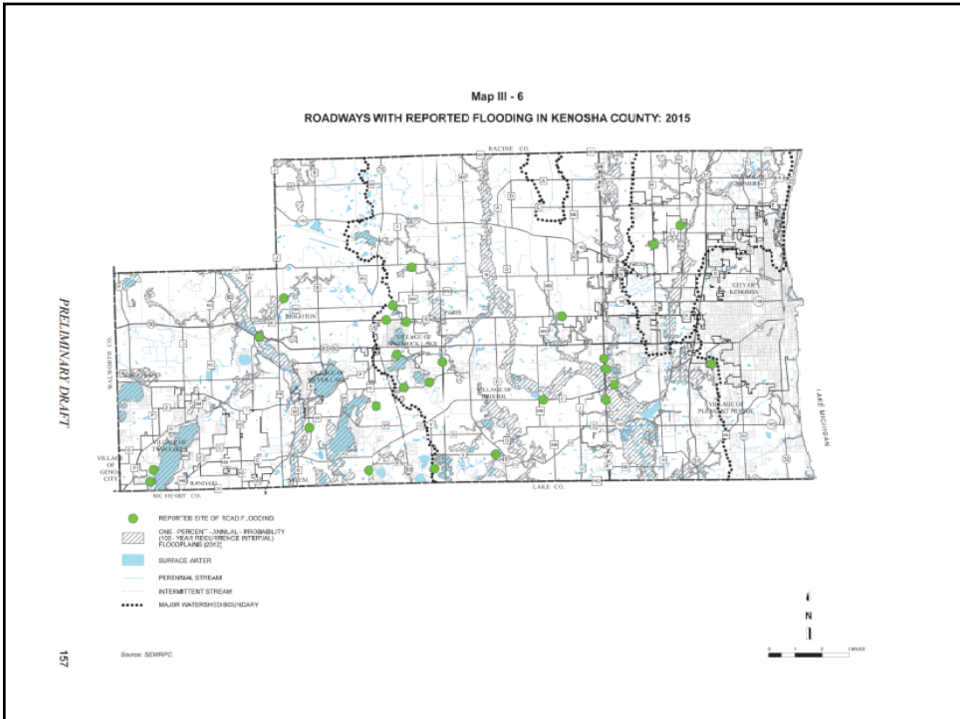


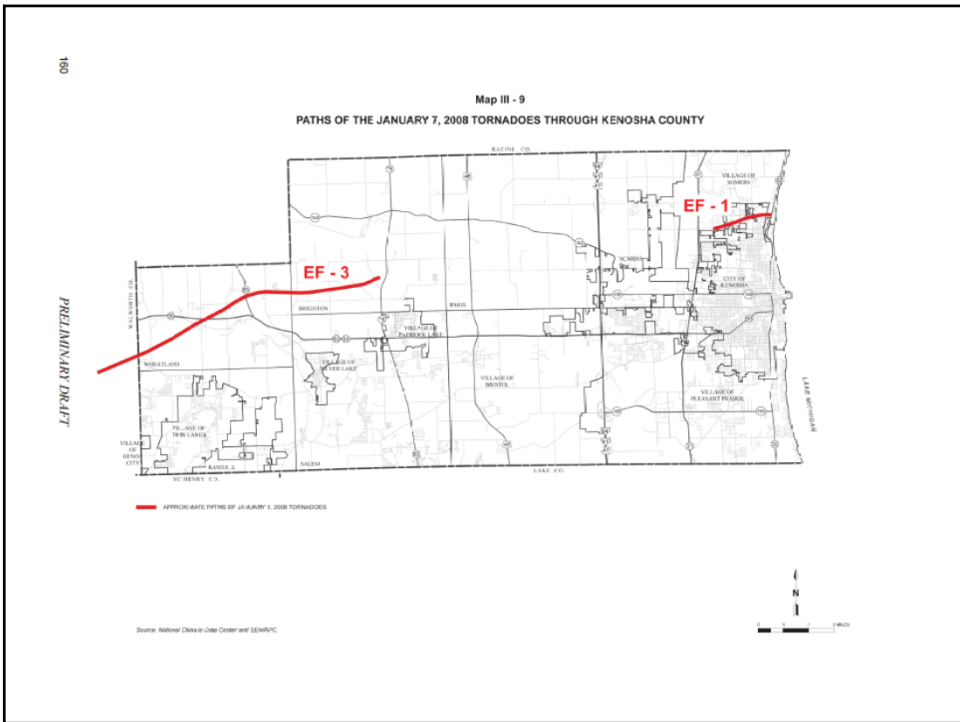
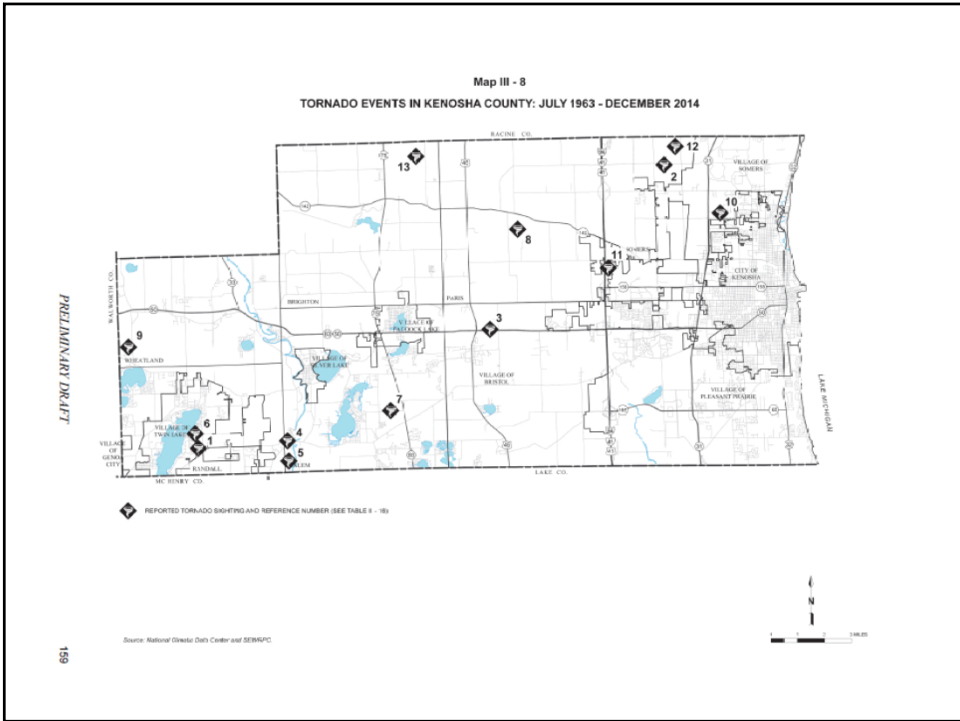
- GOVERNMENT BUILDING
 - SCHOOL
 - HOSPITAL, CLINIC, OR HEALTH CARE FACILITY
 - CHILD-CARE CENTER
 - NURSING HOME OR ASSISTED LIVING FACILITY
- ONE PERCENT ANNUAL PROBABILITY FLOODPLAINS (DFTD)
 - SURFACE WATER
 - PERENNIAL STREAM
 - INTERMITTENT STREAM
 - MAJOR WATERSHED BOUNDARY

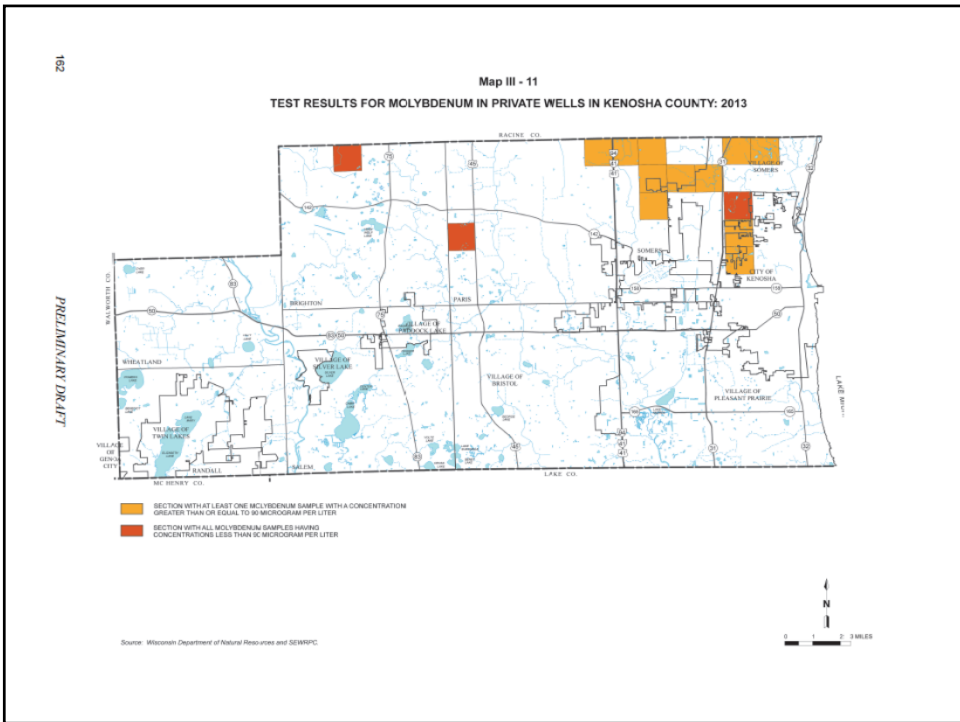
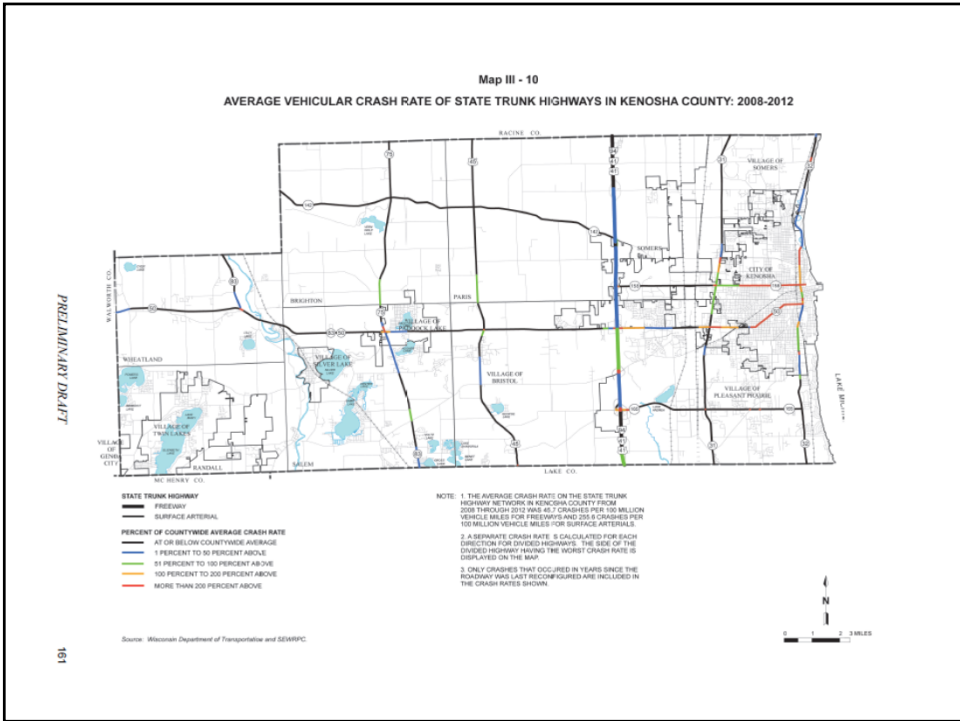
Source: Wisconsin Department of Children and Families, Wisconsin Department of Public Instruction, Kenosha County, and DEMAPC

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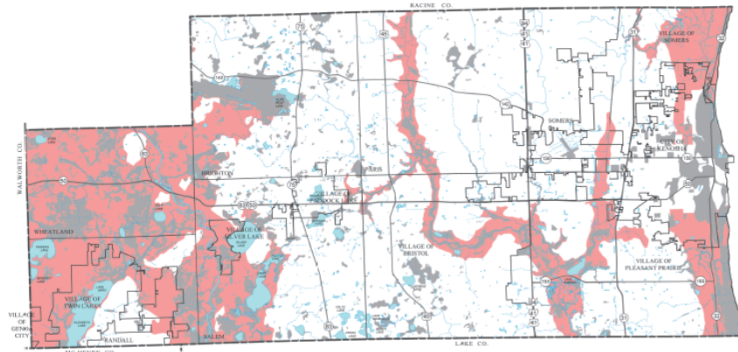








Map III - 12
AREAS NATURALLY VULNERABLE TO GROUNDWATER CONTAMINATION IN KENOSHA COUNTY



■ AREAS WITH A HIGH CONTAMINATION POTENTIAL BASED UPON A COMBINATION OF FACTORS
■ AREAS WHERE SOIL ATTENUATION OF POLLUTANTS IS CATEGORIZED AS LOW
■ SURFACE WATER

NOTES: GROUNDWATER CONTAMINATION POTENTIAL IS RELATED TO SOIL PHYSICAL PROPERTIES AND TO THE PROXIMITY OF GROUNDWATER TO THE SOIL SURFACE ACTIVITIES THAT MAY CREATE GROUNDWATER QUALITY PROBLEMS ARE LISTED IN TABLE B-33

Source: Wisconsin Geological and Natural History Survey and DEWRPC



Chapter IV

Hazard Mitigation Goals

Hazard Mitigation Goals

1. A spatial distribution of the various land uses that minimizes hazards and dangers to health, welfare, and safety as well as further enhancing the economic base of the County, and will result in a compatible arrangement of land uses properly related to the existing and proposed supporting transportation, utility, public safety, and public facility systems.
2. A spatial distribution of the various land uses that maintains biodiversity and will result in the protection and wise use of the natural resources of the County, including its soils, inland lakes and streams, groundwater, wetlands, woodlands, and natural areas and critical species habitats.

Hazard Mitigation Goals

3. An integrated transportation system that, through its location, capacity, and design, will safely, economically, and effectively serve the existing and proposed land use pattern and promote the implantation of the land use plan, meeting the current and anticipated travel demand and minimizing the potential for accidents and the associated toll on life and property damage.
4. The provision of facilities necessary to maintain a high quality of fire and police protection and emergency medical services throughout the County.

Hazard Mitigation Goals

5. The development of a stormwater and floodplain management system that reduces the exposure of people to drainage- and flooding-related inconvenience and to health and safety hazards and that reduces the exposure of real and personal property to damage through inundation resulting from flooding and inadequate stormwater drainage.
6. The identification of high erosion risk Lake Michigan shoreline areas and the development of a coastal erosion management program that reduces the exposure of people and real and personal property to shoreline erosion and bluff recession.

Hazard Mitigation Goals

7. The identification and development of programs that complement County and local emergency operations plans to mitigate the potential exposure to health and safety and the exposure of real and personal property resulting from a broad range of hazards that are unpredictable and not geographically specific in nature.
8. Communications interoperability throughout the County among all First Responders, so as to be able to quickly and effectively respond to any incident to prevent the loss of life and to save property.

Public Meeting on Hazard Mitigation Plan

- May 23, 2016
 - 6:00 pm
 - Kenosha County Center
- Review progress on the plan update to date
- Seek public input
 - Problem areas relative to hazards
 - Potential mitigation measures and projects
 - Comments on draft plan

Project Web Site

- <http://www.sewrpc.org/SEWRPC/communityassistance/Hazard-Mitigation-Planning.htm>
 - Agendas and other meeting materials
 - Summary notes from meetings
 - Presentations
 - Draft chapters as they are completed
 - Comment screen
 - Other ways to send a comment
- Email to jboxhorn@sewrpc.org

EXHIBIT B

Table II-1

AREAL EXTENT OF CIVIL DIVISIONS
IN KENOSHA COUNTY: 2016

Civil Division	Area (square miles)	Percentage of County Area
Cities		
Kenosha	27.9	10.0
Villages		
Bristol.....	33.1	11.9
Genoa City	0.2	<0.1
Paddock Lake.....	3.1	1.1
Pleasant Prairie	33.6	12.1
Silver Lake ^a	1.4	0.5
Somers ^b	25.3	9.1
Twin Lakes	10.0	3.6
Towns		
Brighton	35.8	12.8
Paris	35.2	12.7
Randall	13.9	5.0
Salem ^a	31.9	11.5
Somers ^b	2.9	1.0
Wheatland	24.1	8.7
Total	278.4	100.0

^aOn November 21, 2016 the Wisconsin Department of Administration approved a cooperative plan submitted by the Village of Silver Lake and the Town of Salem. Effective February 14, 2017 the two municipalities merged to become the Village of Salem Lakes.

^bOn April 24, 2015, a portion of the Town of Somers incorporated as the Village of Somers.

Source: U.S. Bureau of the Census and SEWRPC.

SEWRPC Community Assistance Planning Report No. 278-3ED

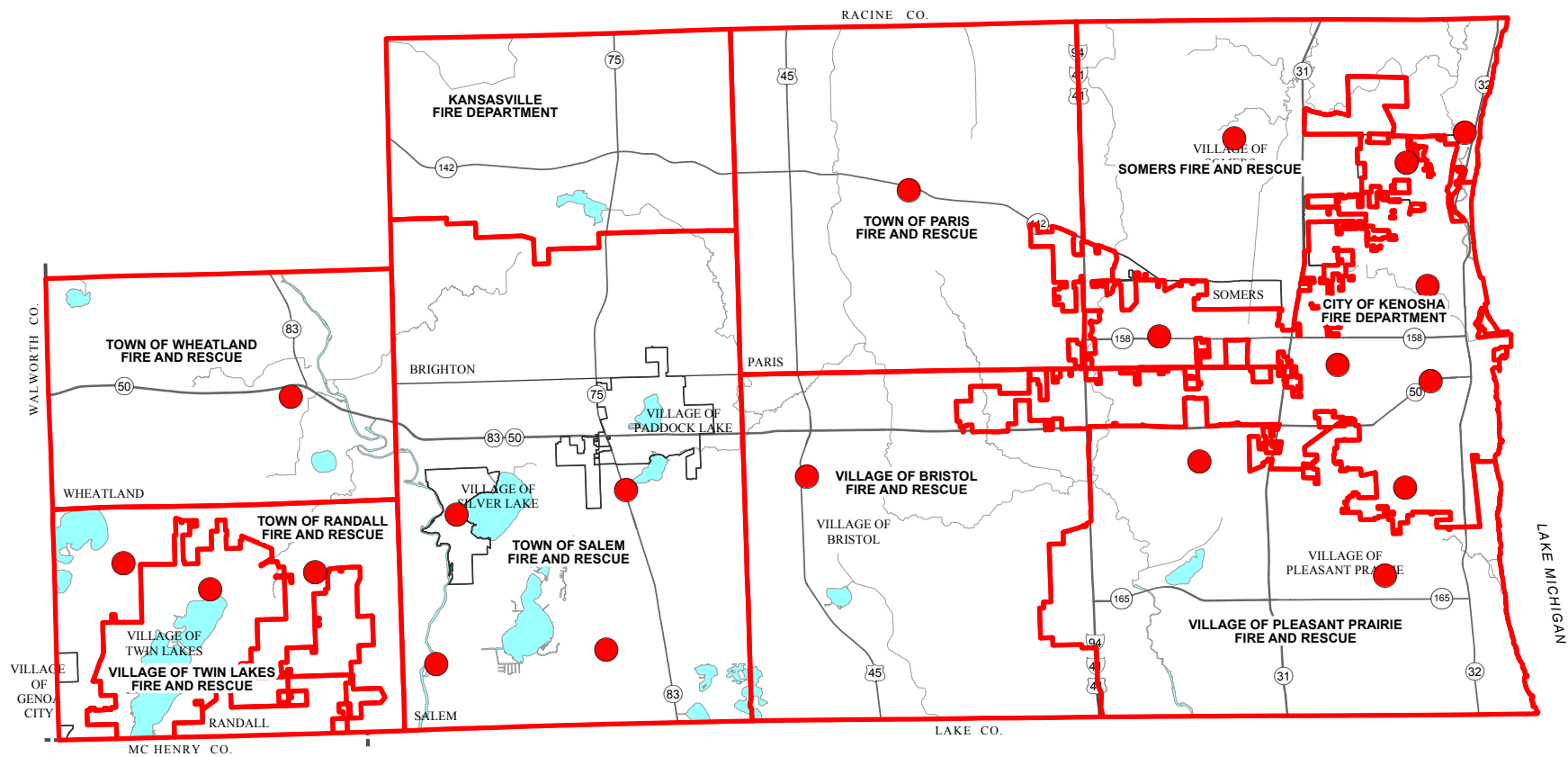
KENOSHA COUNTY HAZARD MITIGATION PLAN UPDATE: 2016-2020

EXHIBIT C

MAPS

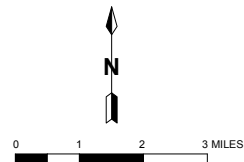
Map II - 16

FIRE STATIONS AND FIRE DEPARTMENT SERVICE BOUNDARIES IN KENOSHA COUNTY: 2016



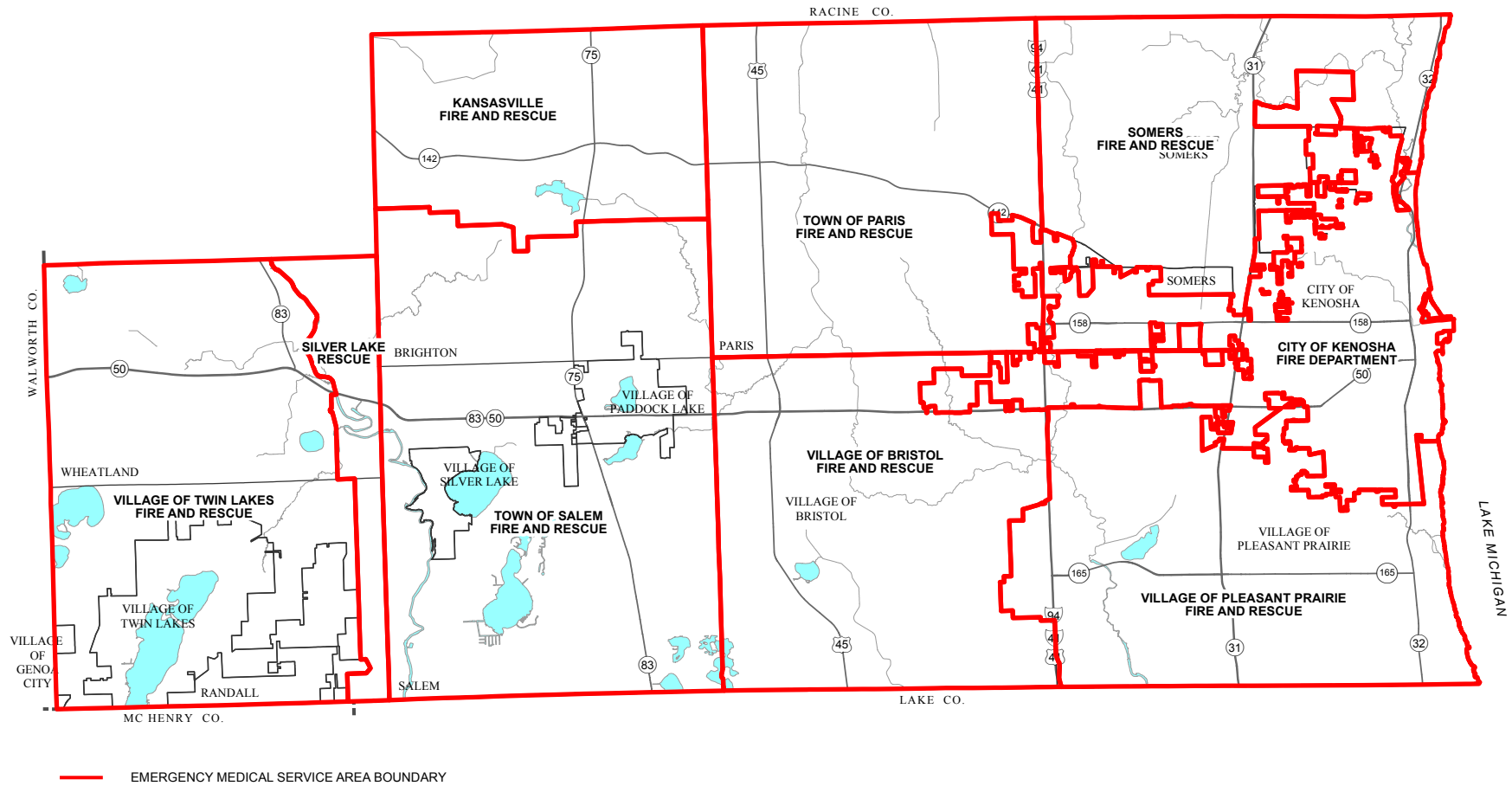
- FIRE DEPARTMENT SERVICE AREA BOUNDARY
- FIRE STATION

Source: Kenosha County and SEWRPC.

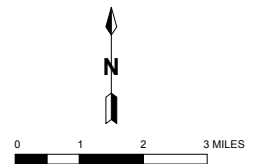


Map II - 17

EMERGENCY MEDICAL SERVICE AREAS IN KENOSHA COUNTY: 2016

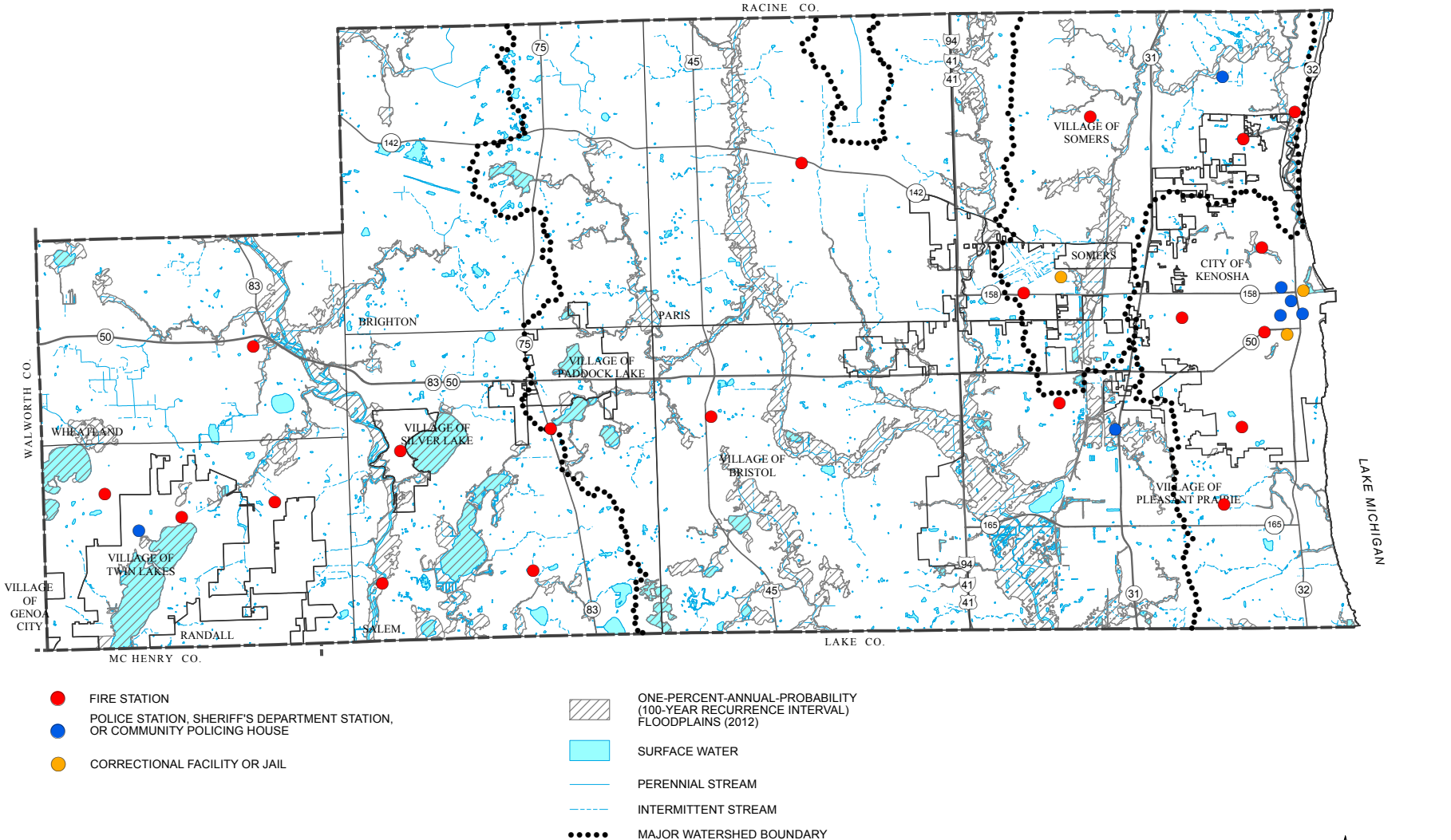


Source: Kenosha County and SEWRPC.

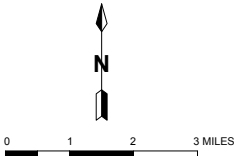


Map III - 5

LAW ENFORCEMENT AND FIRE STATIONS IN RELATION TO FLOODLANDS IN KENOSHA COUNTY: 2015



Source: Wisconsin Department of Justice, Kenosha County, and SEWRPC.



Boxhorn, Joseph E.

From: Boxhorn, Joseph E.
Sent: Monday, May 16, 2016 9:34 AM
To: 'Doug McElmury'
Subject: RE: Hazard Mitigation Plan- Update Meeting

Thanks Doug. We'll update this on the map in Chapter II and in the table in Appendix C.

Joe

From: Doug McElmury [mailto:dmcelmury@plprairiewi.com]
Sent: Thursday, May 12, 2016 9:58 AM
To: 'Gil Benn' ; Boxhorn, Joseph E.
Subject: RE: Hazard Mitigation Plan- Update Meeting

I just had one update for the HMP in Pleasant Prairie and that is the address for Fire Station #1 has changed. The new address is 3801 Springbrook Rd., Pleasant Prairie, WI 53158 and the old address of 9915 39th Ave. is no longer a fire station but is still the Village Hall address.

Kenosha County Division of Emergency Management
Southeastern Wisconsin Regional Planning Commission

Notice of Meeting and Agenda

KENOSHA COUNTY HAZARD MITIGATION PLAN LOCAL PLANNING TEAM

DATE: April 27, 2017
TIME: 9:00 to 11:00 a.m.
PLACE: Kenosha County Center
Public Hearing Room
19600 - 75th Street
Bristol, Wisconsin

AGENDA:

1. Welcome
2. Introductions
3. Consideration of Summary Notes of May 5, 2016, Local Planning Team Meeting
[NOTE: All meeting materials are available for download from the SEWRPC website at: <http://www.sewrpc.org/HMP>

Scroll down to the “Kenosha County Hazard Mitigation Plan Update” section and click on the desired file.]

4. Consideration of Chapter V, “Hazard Mitigation Strategies,” of SEWRPC Community Assistance Planning Report No. 278 (3rd edition), *Kenosha County Hazard Mitigation Plan Update: 2016-2020* (a copy of the draft chapter is available for download from the SEWRPC website at: <http://www.sewrpc.org/SEWRPC/communityassistance/Hazard-Mitigation-Planning.htm>)
5. Consideration of Chapter VI, “Hazard Mitigation Goals,” of SEWRPC Community Assistance Planning Report No. 278 (3rd edition), *Kenosha County Hazard Mitigation Plan Update: 2016-2020* (a copy of the draft chapter is available for download from the SEWRPC website at: <http://www.sewrpc.org/SEWRPC/communityassistance/Hazard-Mitigation-Planning.htm>)
6. Discussion of upcoming public meeting
7. Review of plan approval and adoption process
8. Adjourn

Joseph E. Boxhorn
Secretary

CAPR-278 3RD ED MEETING NOTICE APRIL 26, 2017 (00236982).DOCX
500-1112
LKH/JEB
04/12/17, 04/12/17

**SUMMARY NOTES OF THE APRIL 27, 2017 MEETING OF THE
KENOSHA COUNTY HAZARD MITIGATION PLAN LOCAL PLANNING TEAM**

INTRODUCTION

The April 27, 2017 meeting of the Kenosha County Hazard Mitigation Plan Local Planning Team was convened at the Kenosha County Center at 9:03 a.m. The meeting was called to order by Lieutenant Horace Staples, Director of the Kenosha County Division of Emergency Management. Attendance was taken by circulating a sign-in sheet.

In attendance at the meeting were the following individuals:

Local Planning Team Members

Lt. Horace Staples, Chair	Director, Kenosha County Division of Emergency Management
Joseph E. Boxhorn, Secretary	Senior Planner, Southeastern Wisconsin Regional Planning Commission
Andy M. Buehler	Director, Kenosha County Department of Planning and Development
Jeffrey Cross	Engineering Assistant, Southeastern Wisconsin Regional Planning Commission
Roger Field	Director of Production, Kenosha Water Utility
Christine Flahive	Captain, City of Kenosha Police Department
Laura Herrick	Chief Environmental Engineer, Southeastern Wisconsin Regional Planning Commission
Peter Jung	Lieutenant, Village of Pleasant Prairie Police Department
John Klabecek	Director of Security, Carthage College
Doug McElmury	Chief, Village of Pleasant Prairie Fire and Rescue
Chris Parisey	Administrator, Kenosha County Housing Authority; Planner, Southeastern Wisconsin Regional Planning Commission
Steve Wlahovich	Erosion Inspector, Village of Pleasant Prairie
Tedi Winnett	Director, Kenosha County University of Wisconsin-Extension

Lt. Staples welcomed all attendees to the meeting. He informed the Local Planning Team that he was the new Director of the Kenosha County Division of Emergency Management in the wake of Lieutenant Gil Benn's retirement. He noted that the Kenosha County hazard mitigation plan is required to be updated every five years, and that this would be the second update to the original plan. At the request of Lt. Staples, the team members introduced themselves.

**CONSIDERATION OF THE SUMMARY NOTES OF
THE MAY 5, 2016, LOCAL PLANNING TEAM MEETING**

Lt. Staples introduced Joseph Boxhorn of the Southeastern Wisconsin Regional Planning Commission (SEWRPC) staff. At Lt. Staples's request, Mr. Boxhorn reviewed the summary notes from the May 5, 2016, meeting of the Local Planning Team. No questions or comments were offered on the summary notes. On a motion by Mr. Buehler that was seconded by Mr. Field, the May 5, 2016, summary notes were approved.

**CONSIDERATION OF CHAPTER V, "HAZARD MITIGATION STRATEGIES,"
OF SEWRPC COMMUNITY ASSISTANCE PLANNING REPORT NO. 278 (3RD
EDITION), *KENOSHA COUNTY HAZARD MITIGATION PLAN UPDATE: 2017-2021***

At Lt. Staples's request, Mr. Boxhorn reviewed the preliminary draft of Chapter V of the plan report. Mr. Boxhorn stated that material in the draft chapters that is either new or revised has been highlighted blue in the text. He noted that this was done to assist people reviewing the chapter. He also noted that Map and Table numbers in the text

were highlighted yellow for editing purposes only. He indicated that the highlighting would be removed prior to publication of the final report.

Mr. Boxhorn stated that Chapter V does three things: 1) it presents and evaluates alternative approaches to mitigating each hazard, 2) it identifies and recommends priority mitigation measures for each hazard, and 3) it looks at costs and benefits and prioritizes hazards. He noted that the flooding section of Chapter V is organized by plan element and watershed. He explained that the sections on other hazards follow a standard format: 1) identification of alternative mitigation strategies, 2) review of current programs—Federal, State, and local, 3) evaluation of alternatives and identification of mitigation actions, 4) discussion of any multijurisdictional considerations, and 5) recommendation of priority mitigation measures.

Mr. Boxhorn noted that he would display copies of the maps from Chapter V on the projection screen in the meeting room during discussion of the chapter.

[Secretary’s Note: Mr. Boxhorn’s presentation is attached herein as Exhibit A.]

Mr. Boxhorn reviewed the section of the draft chapter on flooding and related stormwater drainage problems. He noted that changes had occurred in state law relative to shoreland zoning. He also noted that numbers and data related to environmentally sensitive areas and park and open space sites in Kenosha County had been updated since the first plan update. He stated that elements of the County park and open space plan that are incorporated into the hazard mitigation plan are shown on Maps V-1 and V-2 in the report. He stated that ownership of large park and open space sites is shown on Map V-3 in the report. He also noted that local plans relevant to these recommendations are listed in Appendix E of the plan.

Mr. Boxhorn reviewed the section of the draft chapter on floodplain management element. He stated that this section is organized by watershed, and that mitigation measures pertaining to each watershed are shown on Maps V-4 and V-5 in the report. He added that the Kenosha County Board’s action for budgeting for acquiring properties in the floodplain is noted in the introduction of this section.

Mr. Boxhorn reviewed the subsection on floodplain management in the Fox River watershed. Mr. Parisey stated that 103 properties were acquired in the Fox River watershed project area since the first plan update, and that there are now 70 properties remaining in the project area. Mr. Buehler noted that since the fall of 2016 two additional properties were acquired in the Fox River watershed using County funds. He added that he would provide the information. Mr. Boxhorn replied that this information will be added to the plan.

[Secretary’s Note: Following the April 27, 2017 meeting of the Local Planning Team, Mr. Buehler provided SEWRPC staff, via electronic mail, a list detailing the funds used to purchase residences and lots in the Fox River floodplain from years 2014 through 2016. A copy of Mr. Buehler’s email is included hereto as Exhibit B. SEWRPC staff discussed this matter further with staff from the Kenosha County Housing Authority. Based upon these discussions, the third and fourth sentences in the first paragraph on page 6 were revised to read as follows (text in bold is included here to indicate language changed or added onto the text. Text will not be bold in the report):

“In total, the owners of **106** homes have participated in this program since its inception. An additional **70** homes are eligible for participation.”]

Mr. Parisey stated that John Meland of the SEWRPC staff has submitted an application on behalf of the Kenosha County Housing Authority for \$400,000 from the Hazard Mitigation Grant Program to fund four property acquisitions in the Fox River Flood Mitigation project area.

Mr. Boxhorn reviewed the subsection on floodplain management in the Root River watershed. No questions or comments were offered on this section.

Mr. Boxhorn reviewed the subsection on floodplain management in the Pike River watershed. No questions or comments were offered on this section.

Mr. Boxhorn reviewed the subsection on floodplain management in the Des Plaines River watershed. No questions or comments were offered on this section.

Mr. Boxhorn reviewed the subsection on floodplain management in the Lake Michigan direct drainage area. No questions or comments were offered on this section.

Mr. Boxhorn reviewed the section on stormwater management elements. No questions or comments were offered on this section.

Mr. Boxhorn reviewed the section on the public information and education element. Ms. Winnett stated that the University of Wisconsin-Extension releases flood-related materials to inform the public on appropriate actions to undertake in response to flood incidents. She added that these materials are released every time a flood occurs. Mr. Boxhorn replied that a reference to these flood related materials will be added to the report.

[Secretary's Note: The following sentence was added after the third sentence in the first full paragraph on page 21 of Chapter V:

“In addition, when flooding occurs the University of Wisconsin-Extension distributes materials to the public on appropriate actions in response to flooding incidents.”]

Mr. Boxhorn reviewed the section on the secondary plan element. He stated that this section includes a number of recommendations that do not fit in the earlier categories of the chapter. No questions or comments were offered on this section.

Mr. Boxhorn reviewed the section on the National Flood Insurance Program (NFIP) and floodplain map updating efforts. He stated that this section was updated to reflect the changes in NFIP participation since the first plan update. He noted that a paragraph had been added to this section to reflect that the additional examination of floodplains in the Fox River watershed has begun through the Federal Emergency Management Agency's (FEMA) Risk Mapping, Assessment, and Planning (Risk MAP) Program. He also noted that a paragraph had been added to this section to reflect Kenosha County's participation in the Community Rating System (CRS) Program. Mr. Buehler stated that the Village of Somers has applied to participate in the NFIP, but he is unsure of the status of their application. He added that the Village of Salem Lakes has not yet submitted an application to participate in the NFIP. He noted that Kenosha County was reapproved to participate in the CRS program in the spring of 2016, and that CRS approval must be updated every five years.

[Secretary's Note: Following the April 27, 2017 meeting of the Local Planning Team, Mr. Buehler provided SEWRPC staff with a letter confirming the renewal of Kenosha County's rating in the CRS program. A copy of Mr. Buehler's email is included herein as Exhibit B.]

Mr. Boxhorn reviewed the section on thunderstorms, high winds, hail, and lightning. He stated that this section was reorganized, and that previous editions discussed thunderstorms, hail, and lightning separately. He noted that the reorganization of this section consolidates all of the discussion. He also noted that some of the highlighted text in this section indicates text that had been moved from the old hail or lightning subsections.

Mr. Boxhorn stated that in response to a request made by Lt. Benn, he placed a greater emphasis on recommending installation of community safe rooms for mobile home parks. He noted that Kenosha County has several mobile home parks, and that Lt. Benn was concerned about the availability of shelter at some of these parks. Mr. Boxhorn stated that he also developed a prioritization of mobile home parks for the installation of shelters. He noted that this effort was documented in Appendix N of the report. He added that greater emphasis was also placed on recommending the installation of safe rooms at mobile home parks in the section of the plan addressing tornadoes.

Mr. Boxhorn stated that he added a recommendation to the thunderstorm section that farmers be encouraged to purchase crop insurance. No questions or comments were offered on this section.

Mr. Boxhorn reviewed the section on tornadoes. He stated that the main change to this section was that greater emphasis was placed on the installation of community safe rooms in mobile home parks. No questions or comments were offered on this section.

Mr. Boxhorn reviewed the section on extreme temperatures. No questions or comments were offered on this section.

Mr. Boxhorn reviewed the section on Lake Michigan Coastal Hazards. He stated that information was added to this section to recognize that the Wisconsin Department of Natural Resources (WDNR) may allow landowners to place temporary measures to address erosion that threatens structures on their properties. Mr. Buehler stated that he was unsure of the status of the new FEMA study on shoreline wave run-up. Ms. Herrick replied that the study will have new draft maps this summer.

[Secretary's Note: FEMA is conducting a coastal analysis and mapping study to produce updated digital flood insurance rate maps (DFIRMs) for coastal counties around the Great Lakes. This study will update the coastal storm surge elevations for the shorelines. The resulting DFIRMS may have V zones in those shoreline areas that do not have bluffs, which is a new designation for Wisconsin. Per an electronic mail message from Christopher Olds of the WDNR, it is anticipated that draft maps will be submitted to FEMA in early June 2017 and that a State briefing with FEMA concerning the maps will be conducted about two weeks after the submission. It is also anticipated that a flood risk review meeting will be conducted with the impacted communities during late July 2017 and that comments will be accepted after this meeting. It is anticipated that FEMA will provide responses to comments and any necessary edits to the maps about five weeks after this meeting. A copy of the electronic mail message from Mr. Olds is included herein in Exhibit C. The following paragraph was added after the first paragraph on page 47:

“FEMA is conducting a coastal analysis and mapping study to produce updated DFIRMs for coastal counties around the Great Lakes. This study will update the coastal storm surge elevations for the shorelines. The resulting DFIRMS may have V zones in those shoreline areas that do not have bluffs. It is anticipated that draft maps will be submitted to FEMA in early June 2017 and that a State briefing with FEMA concerning the maps will be conducted about two weeks after the submission. It is also anticipated that a flood risk review meeting will be conducted during late July 2017 and that community comments will be accepted after this meeting.”]

Mr. Boxhorn reviewed the section on winter storms. No questions or comments were offered on this section.

Mr. Boxhorn reviewed the section on drought. He stated that several alternatives which were added to this section were carried over into priority mitigation measures. He noted that these alternatives include drought emergency plans, local water conservation programs, and allowing and encouraging drought-resistant landscaping. No questions or comments were offered on this section.

Mr. Boxhorn reviewed the section on fog. No questions or comments were offered on this section.

Mr. Boxhorn reviewed the section on fires. Mr. McElmury stated that the Town of Salem Fire/Rescue's name will be changed to Salem Lakes Fire/Rescue. Mr. Buehler asked whether the maps in this section were updated to remove the Village of Silver Lake. Mr. Boxhorn replied that because the merger of the Village Silver Lake and the Town of Salem occurred so late in the planning process, footnotes will be added to the maps and tables to indicate that the merger has occurred.

Mr. Boxhorn reviewed the section on transportation accidents. He stated that a number of alternatives were added to this section, which came from SEWRPC's Vision 2050 regional land use and transportation plan. He noted that some of the alternatives were carried into priority mitigation measures. He stated that several other recommendations from Vision 2050 were also added to this section. No questions or comments were offered on this section.

Mr. Boxhorn reviewed the section on contamination and loss of water supply. He stated that several alternatives intended to address problems with lead service lines and plumbing fixtures were added to this section. He added these were carried over into recommended mitigation measures. Mr. Buehler asked whether the City of Kenosha Water Utility was taking action to address the contamination of the water supply caused by lead water service lines and lead plumbing fixtures. Mr. Field replied that most water service lines have a section that is owned by the water utility and a section that is owned by the customer. He explained that current regulations do not allow water utilities to use ratepayer funds to replace the privately-owned portions of the water services. He indicated that the Wisconsin Senate was considering a bill that would allow utilities to use ratepayer funds to address this. Mr. Field noted that the City of Kenosha Water Utility has also increased the amount of testing of drinking water for lead in schools and child care centers.

Mr. Boxhorn reviewed the section on hazardous materials incidents. He stated that several alternatives were added to this section that came out of the commodity flow study and the County railway emergency response plan that Lt. Benn sent him. He stated that other recommendations were also added to this section. No questions or comments were offered on this section.

Mr. Boxhorn reviewed the section on terrorism. No questions or comments were offered on this section.

Mr. Boxhorn reviewed the section on power outages. He stated that alternatives were added to this section, as well as an outreach recommendation that came out of a Wisconsin Emergency Management (WEM) table top exercise. No questions or comments were offered on this section.

Mr. Boxhorn reviewed the summary section of the draft chapter. He stated that a ranking of hazards in priority was shown in Appendix H. He added that a cost-benefit analysis for the measures included in the Kenosha County Hazard Mitigation Plan was shown in Table V-8 of the report.

Mr. McElmury stated that there was no mention of the Type 4 Hazardous Materials Team of Kenosha County in the hazardous materials incidents section of the draft chapter. He noted that this team responds to ninety percent of the hazardous materials incidents that occur in the County. He added that the members of the team are trained and equipped at the technician level. Mr. Boxhorn replied that information on the team will be added to the chapter.

[Secretary's Note: The following sentence was added to the last paragraph of page 82:

“In addition, there are county-based Type IV teams consisting of personnel drawn from local fire departments.”

The following sentences were added to the end of the second paragraph on page 83:

“Kenosha County's Type IV hazardous materials response team has active members drawn from four fire departments in the County. All of the members of this team are trained to Technician level. This team addresses about 90 percent of the hazardous material incidents that occur in the County.”]

There being no further discussion, Mr. Buehler moved that the Local Planning Team approve the preliminary draft of Chapter V of the plan report as revised based upon the discussion. The motion was seconded by Mr. McElmury. The Local Planning Team voted to approve the draft chapter.

CONSIDERATION OF CHAPTER VI, “PLAN ADOPTION, IMPLEMENTATION, MAINTENANCE, AND REVISION” OF SEWRPC COMMUNITY ASSISTANCE PLANNING REPORT NO. 278 (3RD EDITION), KENOSHA COUNTY HAZARD MITIGATION PLAN UPDATE: 2017-2021

At Lt. Staples’s request, Mr. Boxhorn reviewed the preliminary draft of Chapter VI of the plan report. Mr. Boxhorn stated that this chapter discusses plan adoption, refinement, and review, and presents plan implementation strategies. He noted that this chapter includes an updated inventory of potential funding sources for implementation. He stated that potential funding sources are listed by hazard in Table VI-1, and that they are also listed in Appendix J. He noted that contact information for funding programs was shown in Appendix K.

Mr. Buehler asked whether funding was available for community safe rooms to be installed in mobile home parks. Mr. Boxhorn replied that the installation of such safe rooms is currently a priority for the Wisconsin Division of Emergency Management (WEM). He noted that WEM has funded several safe rooms at other locations in the State and that the State Hazard Mitigation Officer has indicated that WEM will support applications for funding installation through the Hazard Mitigation Grant Program and the Pre-Disaster Mitigation Programs. Lt. Staples stated that Wheatland Estates Mobile Home Park has expressed interest in installing a community safe room. Mr. Parisey added that the Wisconsin Housing Alliance may have programs that could provide funds for installing safe rooms in mobile home parks.

Mr. Boxhorn stated that during review of the last edition of the plan, FEMA requested that implementation responsibilities be assigned to specific departments and agencies. He noted that these assignments are shown in Table VI-2. Mr. Boxhorn asked that Local Planning Team members inform him if there are more appropriate departments in their municipalities to carry out specific recommendations than the ones that were assigned.

There being no further discussion, Mr. Buehler made a motion to approve the preliminary draft of Chapter VI of the plan report. The motion was seconded by Ms. Winnett and approved by the Local Planning Team.

DISCUSSION OF MAY 2, 2017 PUBLIC MEETING

Mr. Boxhorn stated that the Kenosha County Division of Emergency Management and SEWRPC would be holding a public meeting on the update of the hazard mitigation plan at 6:00 p.m. on May 2, 2017, at the Kenosha County Center in Bristol. He indicated that the purpose of this meeting is to familiarize interested members of the public with the updating efforts and to answer questions and receive comments about the plan. He noted that members of the Local Planning team are welcome to attend this meeting, but their attendance is not required. He added that FEMA requires that at least two public meetings be held during the planning process to give the public an opportunity to comment on the plan during the drafting process.

REVIEW OF PLAN APPROVAL AND ADOPTION PROCESS

Mr. Boxhorn stated that the plan update will be revised following the public meeting based on comments from the Local Planning Team and the public. He noted that the updated plan would then be sent to WEM for review. He added that SEWRPC would make any revisions requested by WEM, and the plan update would then be submitted to FEMA for review. He noted that following completion of any requested revisions, FEMA will indicate that the plan is approvable upon adoption. He explained that at this point, the Kenosha County Board must formally adopt the plan. He noted that, following adoption by the County Board, the incorporated municipalities in the County will need to formally adopt the plan. He explained that communities will not be eligible for funding through the Hazard Mitigation Grant Program (HGMP), the Pre-Disaster Mitigation Grant Program (PDM), or the Flood Mitigation Assistance (FMA) Program unless they adopt the plan. He indicated that adoption by the County covers the unincorporated towns.

ADJOURNMENT

There being no further business, the meeting was adjourned by unanimous consent at 10:20 a.m.

CAPR-278-3 SUMMARY NOTES KENOSHA CTY HMP LPT MTG APRIL 27 2017 (00237196).DOCX

500-1112

MGH/LKH/JEB/JAC

05/04/17, 05/05/17, 05/05/17, 05/23/17

Exhibit A: Boxhorn Presentation (#237045)

Exhibit B: Email from Andy Buehler to Joe Boxhorn (#237276, include attached pdf file)

Exhibit C: Email from Christopher Olds to Laura Herrick (#237275)

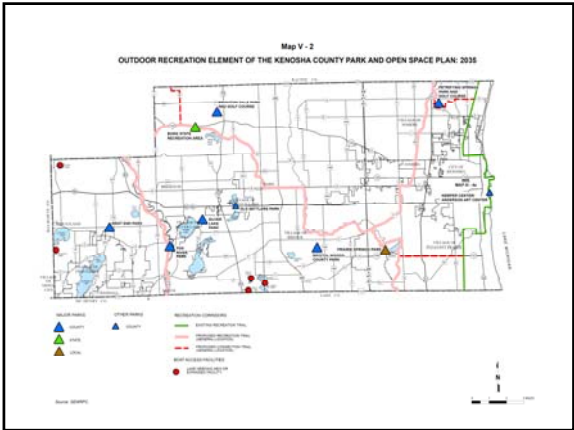
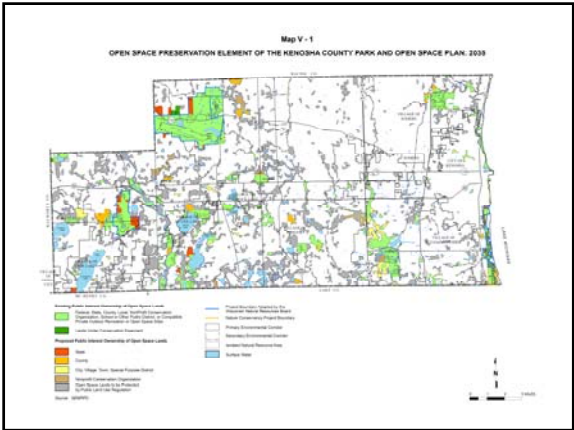


Chapter V Overview

- Presents and evaluates alternative approaches to mitigating each hazard
- Identifies and recommends priority mitigation measures for each hazard
- Flooding section is organized by plan element and watershed
- Sections for other hazards follow a standard format
- Summary section looks at costs and benefits and prioritizes hazards

Hazard Sections

- Most profiles follow a similar format
 - Identification of alternative mitigation strategies
 - Nonstructural, structural, public information and education
 - Review of current programs
 - Federal, State, and Local
 - Evaluation of alternatives and identification of mitigation actions
 - Multijurisdictional considerations
 - Priority mitigation measures



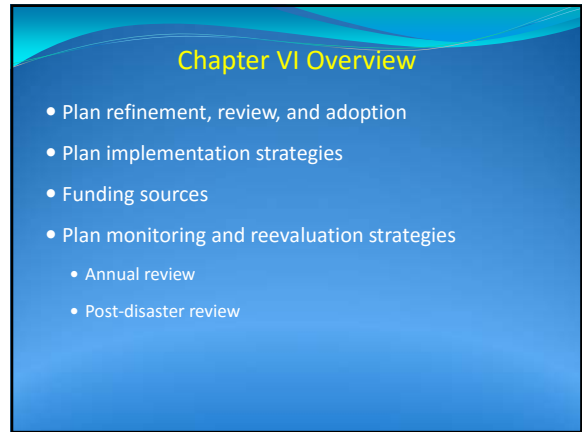
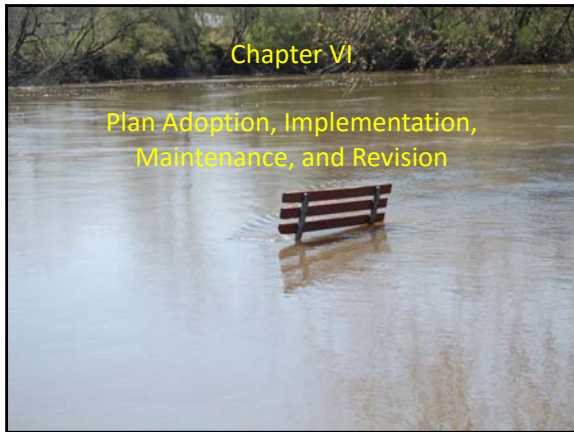


Table VI-1
KENOSHA COUNTY HAZARD MITIGATION PLAN SUMMARY AND IMPLEMENTATION STRATEGIES

Measure	Responsible Organization	Estimated Cost (2017 \$)	Priority	Plan Implementation Status	Estimated Funding Program
Land Use and Environmental, Structural, and Construction Measures	• Precipitation and water logging	0	3	Plan implementation is in progress	1.0, 2.0, 3.0, 4.0, 5.0, 6.0, 7.0, 8.0, 9.0, 10.0, 11.0, 12.0, 13.0, 14.0, 15.0, 16.0, 17.0, 18.0, 19.0, 20.0, 21.0, 22.0, 23.0, 24.0, 25.0, 26.0, 27.0, 28.0, 29.0, 30.0, 31.0, 32.0, 33.0, 34.0, 35.0, 36.0, 37.0, 38.0, 39.0, 40.0, 41.0, 42.0, 43.0, 44.0, 45.0, 46.0, 47.0, 48.0, 49.0, 50.0, 51.0, 52.0, 53.0, 54.0, 55.0, 56.0, 57.0, 58.0, 59.0, 60.0, 61.0, 62.0, 63.0, 64.0, 65.0, 66.0, 67.0, 68.0, 69.0, 70.0, 71.0, 72.0, 73.0, 74.0, 75.0, 76.0, 77.0, 78.0, 79.0, 80.0, 81.0, 82.0, 83.0, 84.0, 85.0, 86.0, 87.0, 88.0, 89.0, 90.0, 91.0, 92.0, 93.0, 94.0, 95.0, 96.0, 97.0, 98.0, 99.0, 100.0
	• Environmentally sensitive areas and open space preservation activities	0	3	Plan implementation is in progress	1.0, 2.0, 3.0, 4.0, 5.0, 6.0, 7.0, 8.0, 9.0, 10.0, 11.0, 12.0, 13.0, 14.0, 15.0, 16.0, 17.0, 18.0, 19.0, 20.0, 21.0, 22.0, 23.0, 24.0, 25.0, 26.0, 27.0, 28.0, 29.0, 30.0, 31.0, 32.0, 33.0, 34.0, 35.0, 36.0, 37.0, 38.0, 39.0, 40.0, 41.0, 42.0, 43.0, 44.0, 45.0, 46.0, 47.0, 48.0, 49.0, 50.0, 51.0, 52.0, 53.0, 54.0, 55.0, 56.0, 57.0, 58.0, 59.0, 60.0, 61.0, 62.0, 63.0, 64.0, 65.0, 66.0, 67.0, 68.0, 69.0, 70.0, 71.0, 72.0, 73.0, 74.0, 75.0, 76.0, 77.0, 78.0, 79.0, 80.0, 81.0, 82.0, 83.0, 84.0, 85.0, 86.0, 87.0, 88.0, 89.0, 90.0, 91.0, 92.0, 93.0, 94.0, 95.0, 96.0, 97.0, 98.0, 99.0, 100.0
Structural/Non-Structural/Other Measures	• Flood Risk Mitigation	0	3	Plan implementation is in progress	1.0, 2.0, 3.0, 4.0, 5.0, 6.0, 7.0, 8.0, 9.0, 10.0, 11.0, 12.0, 13.0, 14.0, 15.0, 16.0, 17.0, 18.0, 19.0, 20.0, 21.0, 22.0, 23.0, 24.0, 25.0, 26.0, 27.0, 28.0, 29.0, 30.0, 31.0, 32.0, 33.0, 34.0, 35.0, 36.0, 37.0, 38.0, 39.0, 40.0, 41.0, 42.0, 43.0, 44.0, 45.0, 46.0, 47.0, 48.0, 49.0, 50.0, 51.0, 52.0, 53.0, 54.0, 55.0, 56.0, 57.0, 58.0, 59.0, 60.0, 61.0, 62.0, 63.0, 64.0, 65.0, 66.0, 67.0, 68.0, 69.0, 70.0, 71.0, 72.0, 73.0, 74.0, 75.0, 76.0, 77.0, 78.0, 79.0, 80.0, 81.0, 82.0, 83.0, 84.0, 85.0, 86.0, 87.0, 88.0, 89.0, 90.0, 91.0, 92.0, 93.0, 94.0, 95.0, 96.0, 97.0, 98.0, 99.0, 100.0
	• Flood Risk Mitigation	0	3	Plan implementation is in progress	1.0, 2.0, 3.0, 4.0, 5.0, 6.0, 7.0, 8.0, 9.0, 10.0, 11.0, 12.0, 13.0, 14.0, 15.0, 16.0, 17.0, 18.0, 19.0, 20.0, 21.0, 22.0, 23.0, 24.0, 25.0, 26.0, 27.0, 28.0, 29.0, 30.0, 31.0, 32.0, 33.0, 34.0, 35.0, 36.0, 37.0, 38.0, 39.0, 40.0, 41.0, 42.0, 43.0, 44.0, 45.0, 46.0, 47.0, 48.0, 49.0, 50.0, 51.0, 52.0, 53.0, 54.0, 55.0, 56.0, 57.0, 58.0, 59.0, 60.0, 61.0, 62.0, 63.0, 64.0, 65.0, 66.0, 67.0, 68.0, 69.0, 70.0, 71.0, 72.0, 73.0, 74.0, 75.0, 76.0, 77.0, 78.0, 79.0, 80.0, 81.0, 82.0, 83.0, 84.0, 85.0, 86.0, 87.0, 88.0, 89.0, 90.0, 91.0, 92.0, 93.0, 94.0, 95.0, 96.0, 97.0, 98.0, 99.0, 100.0

Table VI-2
SUMMARY OF KENOSHA COUNTY HAZARD MITIGATION MEASURES AND PRIMARY IMPLEMENTING GOVERNMENTAL UNITS AND AGENCIES

Measure	Responsible Organization	City of Kenosha	Village of Beloit	Village of Watrous	Village of Racine	Village of Port Washington	Village of Port Jervis	Village of Port Byron	Village of Port Clinton	Village of Port Hope	Village of Port Jefferson	Village of Port Washington	Village of Port Jervis	Village of Port Byron	Village of Port Clinton	Village of Port Hope	Village of Port Jefferson
• Precipitation and water logging	KCRB	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
• Environmentally sensitive areas and open space preservation activities	KCRB	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
• Flood Risk Mitigation	KCRB	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y

SEWRPC Community Assistance Planning Report No. 278-3ED
KENOSHA COUNTY HAZARD MITIGATION PLAN UPDATE: 2016-2020
Appendix J
POTENTIAL FUNDING PROGRAMS TO IMPLEMENT PLAN RECOMMENDATIONS

FUNDING PROGRAM DESCRIPTIONS

Reference Number	Administration of Grant Program	Name of Funding Program	Eligibility	Types of Projects and Funding Eligible Criteria	Application Process	Application Deadline
1	U.S. Federal Emergency Management Agency (FEMA)	Hazard Mitigation Grant Program	State agencies and participating National Flood Insurance Program (NFIP) communities	1. Flood damage reduction 2. Flood prevention 3. Flood protection 4. Flood control 5. Flood control 6. Flood control 7. Flood control 8. Flood control 9. Flood control 10. Flood control 11. Flood control 12. Flood control 13. Flood control 14. Flood control 15. Flood control 16. Flood control 17. Flood control 18. Flood control 19. Flood control 20. Flood control 21. Flood control 22. Flood control 23. Flood control 24. Flood control 25. Flood control 26. Flood control 27. Flood control 28. Flood control 29. Flood control 30. Flood control 31. Flood control 32. Flood control 33. Flood control 34. Flood control 35. Flood control 36. Flood control 37. Flood control 38. Flood control 39. Flood control 40. Flood control 41. Flood control 42. Flood control 43. Flood control 44. Flood control 45. Flood control 46. Flood control 47. Flood control 48. Flood control 49. Flood control 50. Flood control 51. Flood control 52. Flood control 53. Flood control 54. Flood control 55. Flood control 56. Flood control 57. Flood control 58. Flood control 59. Flood control 60. Flood control 61. Flood control 62. Flood control 63. Flood control 64. Flood control 65. Flood control 66. Flood control 67. Flood control 68. Flood control 69. Flood control 70. Flood control 71. Flood control 72. Flood control 73. Flood control 74. Flood control 75. Flood control 76. Flood control 77. Flood control 78. Flood control 79. Flood control 80. Flood control 81. Flood control 82. Flood control 83. Flood control 84. Flood control 85. Flood control 86. Flood control 87. Flood control 88. Flood control 89. Flood control 90. Flood control 91. Flood control 92. Flood control 93. Flood control 94. Flood control 95. Flood control 96. Flood control 97. Flood control 98. Flood control 99. Flood control 100. Flood control	10/1/16 to 9/30/17	
2	FEMA	Flood Mitigation Assistance (Flood Mitigation)	State agencies and participating NFIP communities	1. Flood damage reduction 2. Flood prevention 3. Flood protection 4. Flood control 5. Flood control 6. Flood control 7. Flood control 8. Flood control 9. Flood control 10. Flood control 11. Flood control 12. Flood control 13. Flood control 14. Flood control 15. Flood control 16. Flood control 17. Flood control 18. Flood control 19. Flood control 20. Flood control 21. Flood control 22. Flood control 23. Flood control 24. Flood control 25. Flood control 26. Flood control 27. Flood control 28. Flood control 29. Flood control 30. Flood control 31. Flood control 32. Flood control 33. Flood control 34. Flood control 35. Flood control 36. Flood control 37. Flood control 38. Flood control 39. Flood control 40. Flood control 41. Flood control 42. Flood control 43. Flood control 44. Flood control 45. Flood control 46. Flood control 47. Flood control 48. Flood control 49. Flood control 50. Flood control 51. Flood control 52. Flood control 53. Flood control 54. Flood control 55. Flood control 56. Flood control 57. Flood control 58. Flood control 59. Flood control 60. Flood control 61. Flood control 62. Flood control 63. Flood control 64. Flood control 65. Flood control 66. Flood control 67. Flood control 68. Flood control 69. Flood control 70. Flood control 71. Flood control 72. Flood control 73. Flood control 74. Flood control 75. Flood control 76. Flood control 77. Flood control 78. Flood control 79. Flood control 80. Flood control 81. Flood control 82. Flood control 83. Flood control 84. Flood control 85. Flood control 86. Flood control 87. Flood control 88. Flood control 89. Flood control 90. Flood control 91. Flood control 92. Flood control 93. Flood control 94. Flood control 95. Flood control 96. Flood control 97. Flood control 98. Flood control 99. Flood control 100. Flood control	10/1/16 to 9/30/17	
3	FEMA	Flood Mitigation Assistance (Flood Mitigation)	State agencies and participating NFIP communities	1. Flood damage reduction 2. Flood prevention 3. Flood protection 4. Flood control 5. Flood control 6. Flood control 7. Flood control 8. Flood control 9. Flood control 10. Flood control 11. Flood control 12. Flood control 13. Flood control 14. Flood control 15. Flood control 16. Flood control 17. Flood control 18. Flood control 19. Flood control 20. Flood control 21. Flood control 22. Flood control 23. Flood control 24. Flood control 25. Flood control 26. Flood control 27. Flood control 28. Flood control 29. Flood control 30. Flood control 31. Flood control 32. Flood control 33. Flood control 34. Flood control 35. Flood control 36. Flood control 37. Flood control 38. Flood control 39. Flood control 40. Flood control 41. Flood control 42. Flood control 43. Flood control 44. Flood control 45. Flood control 46. Flood control 47. Flood control 48. Flood control 49. Flood control 50. Flood control 51. Flood control 52. Flood control 53. Flood control 54. Flood control 55. Flood control 56. Flood control 57. Flood control 58. Flood control 59. Flood control 60. Flood control 61. Flood control 62. Flood control 63. Flood control 64. Flood control 65. Flood control 66. Flood control 67. Flood control 68. Flood control 69. Flood control 70. Flood control 71. Flood control 72. Flood control 73. Flood control 74. Flood control 75. Flood control 76. Flood control 77. Flood control 78. Flood control 79. Flood control 80. Flood control 81. Flood control 82. Flood control 83. Flood control 84. Flood control 85. Flood control 86. Flood control 87. Flood control 88. Flood control 89. Flood control 90. Flood control 91. Flood control 92. Flood control 93. Flood control 94. Flood control 95. Flood control 96. Flood control 97. Flood control 98. Flood control 99. Flood control 100. Flood control	10/1/16 to 9/30/17	

SEWRPC Community Assistance Planning Report No. 278-3ED
KENOSHA COUNTY HAZARD MITIGATION PLAN UPDATE: 2016-2020
Appendix K
FUNDING PROGRAMS CONTACT INFORMATION

Administration of Grant Program	Name of Grant Program	Address	Phone Number	Internet Web Address
Federal Emergency Management Agency (FEMA)	Hazard Mitigation Grant Program	Federal Emergency Management Agency 200 West Madison Street, 6th Floor Chicago, IL 60602	(312) 438-2000	https://www.fema.gov/hazards/hazards-mitigation-grant-program
FEMA	Flood Mitigation Assistance (Flood Mitigation)	Federal Emergency Management Agency 200 West Madison Street, 6th Floor Chicago, IL 60602	(312) 438-2000	https://www.fema.gov/hazards/hazards-mitigation-grant-program
U.S. Army Corps of Engineers (USACE)	Small Flood Damage Reduction Program	U.S. Army Corps of Engineers 2215 S. LaSalle Street, Suite 1300 Chicago, IL 60608	(312) 845-6330	www.usace.army.mil
U.S. Army Corps of Engineers (USACE)	Emergency Bank Protection Program	U.S. Army Corps of Engineers 2215 S. LaSalle Street, Suite 1300 Chicago, IL 60608	(312) 228-4740	
U.S. Department of Agriculture (USDA)	Watershed Protection and Flood Prevention Program	Washington, Department of Agriculture National Resources Conservation Service 1400 Independence Avenue SW Washington, DC 20250	(202) 725-3413	https://www.nrcs.usda.gov/wps/portal/nrcs/main/national/watershed/watershed-protection-and-flood-prevention-program
USDA	Water and Waste Disposal Systems for Rural Communities	U.S. Department of Agriculture Rural Utilities Service Water and Community Programs 1400 Independence Avenue SW Washington, DC 20250	(202) 880-2670	https://www.rurdev.usda.gov/water/water-protection-program

Public Meeting on Hazard Mitigation Plan

- May 2, 2017
 - 6:00 pm
 - Kenosha County Center
- Review the plan update
- Seek public input
 - Answer questions
 - Mitigation measures and projects
 - Comments on draft plan

Remaining Effort on Plan Update

- Public Meeting
- Review by the Wisconsin Division of Emergency Management
 - Any necessary revisions
- Review by the Federal Emergency Management Agency
 - Any necessary revisions
- Formal adoption by the Kenosha County Board
 - Covers the Towns
- Formal adoption by the governing bodies of the incorporated municipalities of the County

Project Web Site

- <http://www.sewrpc.org/HMP>
 - Agendas and other meeting materials
 - Summary notes from meetings
 - Presentations
 - Draft of the plan report
 - Comment screen
 - Other ways to send a comment
- Email to jboxhorn@sewrpc.org

From: Andy Buehler <Andy.Buehler@kenoshacounty.org>
Sent: Thursday, April 27, 2017 11:29 AM
To: Boxhorn, Joseph E.
Cc: Herrick, Laura K.
Subject: Kenosha County - CRS & Floodplain Purchases
Attachments: 2993_001.pdf

Joe,

Attached is the CRS renewal confirmation.

Below is the funds used to purchase residences and lots in the Fox River Floodplain.

(In 2014 \$20,000 was used for John Meland to purchase a home that he was short FEMA money; Russell: 6904 317th Ave. 2 parcels, one home. February 14, 2014)

In Fox River Floodplain, with FEMA funds, 152 parcels, 100 homes.

In Fox River Floodplain, with County funds, 10 parcels, 4 homes.

- 1) Kathy Ventura: 31932 77th St. Wheatland; 2 parcels, one home. \$30,000 February 12, 2014.
- 2) Gwen Ozga and Parnell Ruiz: 7538 314th Ave. Salem; 4 parcels, one home. \$58,000 April 25, 2016.
- 3) James & Karla Shuemate: 31617 77th St. Salem; 2 parcels, one home. \$42,000 September 9, 2016.
- 4) Alan Investments: 6932 318th Ave. Salem; 2 parcels, one home. \$32,000 February 10, 2017.

Let me know if you have any questions.

Andy.

Andy M. Buehler | *Director of Planning & Development* | Kenosha County Department of Public Works and Development Services | 19600 75th Street 185-3, Bristol, WI 53104 | Ph: (262)-857-1892 | <http://www.kenoshacounty.org/index.aspx?nid=656>



INSURANCE SERVICES OFFICE, INC.

LOU ANN PATELLARO, CFM / EMAIL lpatellaro@iso.com
CELL (954) 651-5021 PH/FAX (708) 634-3040

April 8, 2016

Dan Treloar
County Conservationist
19600 - 75th Street, Suite 185-3
Bristol, Wisconsin 53104

Dear Mr. Treloar:

Enclosed are the preliminary results regarding credits for your Community Rating System (CRS) Cycle Verification. At the present time, I have verified 2,898 credit points for the Kenosha County, Wisconsin. This results in a continuation of a CRS Classification of 5 for your community.

Attached is a draft verification report and draft credit calculation worksheet AW-720, which contains an overall point summary. **Please note that the information provided is subject to acceptance by DHS/FEMA.**

Thank you for your cooperation during my visit. If you have any questions or when I can be of future assistance, please do not hesitate to contact me.

Respectfully yours,

Lou Ann Patellaro

Lou Ann Patellaro, CFM
ISO/CRS Specialist

Enclosure

cc: Jim Kreuser, Executive for Kenosha County
Michelle Staff, NFIP Coordinator State of Wisconsin
Julia McCarthy, FEMA Region V
Sherry Harper, ISO Technical Coordinator



Kenosha County, WI

Verified Class 5

NFIP Number: 550523

Cycle

Date of Verification Visit: June 15, 2015

This Verification Report is provided to explain the recommendations of Insurance Services Office, Inc. (ISO) to DHS/FEMA concerning credits under the Community Rating System (CRS) for the above named community.

A total of 2898 credit points are verified which results in a recommendation that the community remain classified as a CRS Class 5. The community has met the Class 5 prerequisite with a Building Code Effectiveness Grading Schedule (BCEGS) Classification of 5/5. The following is a summary of our findings with the total CRS credit points for each activity listed in parenthesis:

Activity 310 – Elevation Certificates: The Division of Planning Operations maintains elevation certificates for new and substantially improved buildings. Copies of elevation certificates are made available upon request. (38 points)

Activity 320 – Map Information Service: Credit is provided for furnishing inquirers with basic flood zone information from the community's latest Flood Insurance Rate Map (FIRM). Credit is also provided for the community furnishing additional FIRM information, information about problems not shown on the FIRM, historical flood information, and natural floodplain functions. The service is publicized annually and records are maintained. (90 points)

Activity 330 – Outreach Projects: Credit is provided for informational outreach projects that include FEMA brochures kept in at least 5 locations, general outreach projects that include at least 5 different press releases in newspapers, radio station announcements twice per year, a newsletter publication to Dam and Special Flood Hazard Area (SFHA) properties, and a targeted repetitive loss outreach project. These projects are disseminated annually. (170 points)

Activity 340 – Hazard Disclosure: Credit is provided for state regulations requiring disclosure of flood hazards. Real estate agents provide a brochure advising prospective buyers about insurance and checking property flood hazards. (18 points)

Activity 350 – Flood Protection Information: Documents relating to floodplain management are available in the reference section of the Salem Community Library. Credit is also provided for floodplain information displayed on the community's website. (55 points)

Activity 410 – Floodplain Mapping: Credit is provided for conducting and adopting flood studies for areas not included on the flood insurance rate maps and that exceed minimum mapping standards. Credit is also provided for a cooperating technical partnership agreement with FEMA. (65 points)

Activity 420 – Open Space Preservation: Credit is provided for preserving approximately 73 percent of the SFHA as open space, protecting open space land with deed restrictions, and preserving open space land in a natural state. (1119 points)

Activity 430 – Higher Regulatory Standards: Credit is provided for enforcing regulations that require development limitations, freeboard for new and substantial improvement construction, cumulative substantial improvement and local drainage protection. Credit is also provided for the enforcement of building codes, a Building Code Effectiveness Grading Schedule (BCEGS) Classification of 5/5 and state mandated regulatory standards. (225 points)

Activity 440 – Flood Data Maintenance: Credit is provided for maintaining and using digitized maps in the day to day management of the floodplain. Credit is also provided for maintaining copies of all previous FIRMs and Flood Insurance Study Reports. (166 points)

Activity 450 – Stormwater Management: The community enforces regulations for stormwater management, soil erosion control and water quality. (251 points)

Section 502 – Repetitive Loss Category: Based on the updates made to the NFIP Report of Repetitive Losses as of May 31, 2012, Kenosha County, Wisconsin has 18 repetitive loss properties and is a Category C community for CRS purposes. The community is required to submit either a Repetitive Loss Area Analysis or Floodplain Management Plan. (No credit points are applicable to this section)

Activity 510 – Floodplain Management Planning: Credit is provided for the adoption and implementation of the Kenosha County Hazard Mitigation Plan update adopted February 20, 2012. A progress report must be submitted on an annual basis. An update to the credited plan will be due by October 1, 2018. (185 points)

Activity 520 – Acquisition and Relocation: Credit is provided for acquiring and relocating 83 buildings from the community's regulatory floodplain. (494 points)

Activity 630 – Dams: Credit is provided for a State Dam Safety Program. (22 points)

Activity 710 – County Growth Adjustment: All credit in the 400 series is multiplied by the growth rate of the county to account for growth pressures. The growth rate for Kenosha County is 1.05.

Attached is the Community Calculations Worksheet that lists the verified credit points for the Community Rating System.

CEO Name / Address:

Jim Kreuser
Executive for Kenosha
1010 56TH Street
Kenosha, Wisconsin 53140

CRS Coordinator Name / Address:

Dan Treloar
County Conservationist
19600 - 75TH Street Suite 185-3
Kenosha, Wisconsin 53140
(262) 857-1895

Date Report Prepared: March 18, 2016

Community : Kenosha County, WI

NFIP Number : 550523

720 COMMUNITY CREDIT CALCULATIONS (Cycle):

CALCULATION SECTION :

Verified Activity Calculations:	Credit
c310 38	38
c320 90	90
c330 170	170
c340 18	18
c350 55	55
c360	
c370	
c410 62 x CGA 1.05 =	65
c420 1066 x CGA 1.05 =	1119
c430 214 x CGA 1.05 =	225
c440 158 x CGA 1.05 =	166
c450 239 x CGA 1.05 =	251
c510 185	185
c520 494	494
c530	
c540	
c610	
c620	
c630 22	22

Community Classification Calculation:

cT = total of above	cT = <u>2898</u>
Community Classification (from Table 110-1):	Class = <u>5</u>

CEO Name/Address:

Jim Kreuser
Executive for Kenosha
1010 56TH Street
Kenosha, Wisconsin 53140

CRS Coordinator Name/Address:

Dan Treloar
County Conservationist
19600 - 75TH Street Suite 185-3
Kenosha, Wisconsin 53140
(262) 857-1895

Date Report Prepared: March 18, 2016

AW-720

From: Herrick, Laura K.
Sent: Thursday, May 04, 2017 9:08 AM
To: Boxhorn, Joseph E.; Owens, Aaron W.; Cross, Jeffrey
Cc: Beauchaine, Megan A.; Printz, Ronald J.
Subject: FW: Lake Michigan coastal floodplain draft maps

FYI – An update on the Lake Michigan coastal floodplain mapping below from the WDNR. Revised draft FEMA floodplain maps for the Lake Michigan coast should be out in July 2017, with a review and comment period to follow.

The website below has not been updated in a while due to a rework of the floodplain maps. Mapping will have V zones in non-bluff areas which will be new for our State.

<http://www.greatlakescoast.org/great-lakes-coastal-analysis-and-mapping/>

Laura

From: Olds, Christopher J - DNR [mailto:Christopher.Olds@wisconsin.gov]
Sent: Thursday, May 04, 2017 8:51 AM
To: Herrick, Laura K.
Subject: RE: Lake Michigan coastal draft maps

Laura,

The data will be uploaded to FEMA's GeoPortal in about a month, we will have a state briefing concerning the maps with FEMA 2 weeks after that and then the flood risk review meeting (workmap meetings) will be on or about the week of 7/23/17. Comments can be submitted anytime after that with FEMA providing comment responses and any necessary map edits 5 weeks after the meeting.

We are committed to service excellence.

Visit our survey at <http://dnr.wi.gov/customersurvey> to evaluate how I did.

CHRIS OLDS, PE

Floodplain Engineer

Wisconsin Department of Natural Resources

Phone: (608) 266-5606

Christopher.Olds@wi.gov



dnr.wi.gov



From: Herrick, Laura K. [mailto:lherrick@sewrpc.org]
Sent: Thursday, April 27, 2017 3:00 PM
To: Olds, Christopher J - DNR
Subject: Lake Michigan coastal draft maps

Chris,

We had a meeting today with Kenosha County regarding their Hazard Mitigation Plan. Do you have an estimate of when the draft coastal FEMA maps will be given to the communities for review? And any info on timeline for comment period and potential panels? We will add to the plan text accordingly.

Thanks for the insights!

Laura Kletti Herrick P.E., CFM
Chief Environmental Engineer
Southeastern Wisconsin Regional Planning Commission
W239 N1812 Rockwood Drive
P.O. Box 1607
Waukesha, WI 53187-1607
Direct 262-953-3224
lherrick@sewrpc.org

Figure A-3

RELEVANT REGIONAL AND LOCAL ADVISORY COMMITTEES: 2017

KENOSHA COUNTY MULTI-JURISDICTIONAL ADVISORY COMMITTEE

Erin Decker, Chair.....	Kenosha County Supervisor
John Holloway, Vice-Chair.....	Chairman, Town of Paris Planning Commission
Dennis Faber.....	Supervisor, Town of Salem
Mike Farrell.....	President, Village of Bristol
William Glembocki, Jr.	Chairman, Town of Wheatland
John Kiel.....	Chairman, Town of Brighton
Jeffrey B. Labahn	Director, City of Kenosha Department of Community Development and Inspections
Joanne Maggio	Village of Silver Lake
Mark Molinaro	Chair, Town of Somers
George Stoner.....	President, Village of Somers
Jean Werbie-Harris.....	Community Development Director, Pleasant Prairie Fire and Rescue

**KENOSHA COUNTY
JURISDICTIONAL HIGHWAY PLANNING COMMITTEE**

Gary A. Sipsma, Chair..... Director of Highways/Highway Commissioner, Kenosha County
Kevin J. Muhs, Secretary.....Deputy Director, Southeastern Wisconsin Regional Planning Commission
Bill Antti.....President, Village of Genoa City
Mitch Batuzich Community Planner, Federal Highway Administration, U.S. Department of Transportation
Shelly Billingsley..... Director of Public Works/City Engineer, City of Kenosha
Andy M. Buehler..... Director of Planning and Development, Kenosha County
Terry Burns..... President, Village of Paddock Lake
Matt Fineour Village Engineer, Village of Pleasant Prairie
Jennifer Fredrick..... Administrator, Village of Twin Lakes
Virgil Gentz..... Chairman, Town of Paris
William Glembocki Chairman, Town of Wheatland
Randall Kerkman..... Administrator, Village of Bristol
John Kiel..... Chairman, Town of Brighton
Mark Molinaro Chair, Town of Somers
Bruce Nopenz President, Village of Silver Lake
Robert Stoll..... Chairperson, Town of Randall
George Stoner President, Village of Somers
Diann Tesar Chairman, Town of Salem
Brett Wallace Director, Southeast Region, Wisconsin Department of Transportation

**ADVISORY COMMITTEE ON TRANSPORTATION SYSTEM
 PLANNING AND PROGRAMMING FOR THE ROUND LAKE BEACH-
 MCHENRY-GRAYSLAKE, IL-WI URBANIZED AREA (WISCONSIN PORTION)**

- Gary A. Sipsma, Chair..... Director of Highways/Highway Commissioner, Kenosha County
 Kevin J. Muhs, Secretary.....Deputy Director, Southeastern Wisconsin Regional Planning Commission
 Bill Antti.....President, Village of Genoa City
 Donna Brown-Martin Director, Bureau of Planning and Economic Development, Division of
 Transportation Investment Management, Wisconsin Department of
 Transportation
 Terry Burns..... President, Village of Paddock Lake
 Michael A. Davies Wisconsin Division Administrator, Federal Highway Administration, U.S.
 Department of Transportation
 William Glembocki Chairman, Town of Wheatland
 Randall Kerkman..... Administrator, Village of Bristol
 John Kiel..... Chairman, Town of Brighton
 Peter T. McMullen Program and Planning Analyst, Bureau of Air Management, Wisconsin
 Department of Natural Resources
 Kenneth Monroe.....President, Village of Bloomfield
 Cheryl L. Newton Environmental Protection Specialist, U.S. Environmental Protection Agency, Region V
 Eric A. Nitschke, P.E.....Director of Central Services, Walworth County Public Works Department
 Bruce Nopenz President, Village of Silver Lake
 Daniel Schoonover Chairman, Town of Bloomfield
 Robert Stoll..... Chairperson, Town of Randall
 Diann Tesar Chairman, Town of Salem
 Brett Wallace Director, Southeast Region, Wisconsin Department of Transportation
 William Wheeler Community Planner, Federal Transit Administration-Region 5, U.S.
 Department of Transportation

REGIONAL WATER SUPPLY PLANNING ADVISORY COMMITTEE

Dr. Kurt W. Bauer, Chair ... Executive Director Emeritus, Southeastern Wisconsin Regional Planning Commission
Michael G. Hahn, Secretary Executive Director, Southeastern Wisconsin Regional Planning Commission
Julie A. Anderson Director of Public Works and Development Services, Racine County
Kenneth R. Bradbury Hydrogeologist/Professor, Wisconsin Geological and Natural History Survey
Andy M. Buehler Director of Planning and Development, Kenosha County
Thomas J. Bunker Representative, Water and Wastewater Utility, City of Racine
Douglas S. Cherkauer Professor of Hydrogeology Emeritus, University of Wisconsin-Milwaukee
Michael P. Cotter Director, Walworth County Land Use and Resource Management Department
Charles A. Czarkowski... Water Supply Specialist, Wisconsin Department of Natural Resources, Southeast Region
Brian Dranzik
Commissioner, Southeastern Wisconsin Regional Planning Commission;
Director of Transportation, Milwaukee County Department of Transportation
Daniel S. Duchniak General Manager, Waukesha Water Utility, City of Waukesha
Charles P. Dunning Hydrologist, U.S. Geological Survey
Franklyn A. Ericson
Director, Worldwide Safety, Health, Environment and Quality Operations,
S.C. Johnson & Son, Inc.
David Ewig Water Utility Superintendent, City of Port Washington
Thomas M. Grisa Director, Department of Public Works, City of Brookfield
Jeffrey A. Helmuth .. Hydrogeologist Program Coordinator, Wisconsin Department of Natural Resources, Madison
John Hemauer Water Utility Manager, City of West Bend
Kristine S. Hillmer Executive Director, Metropolitan Builders Association of Greater Milwaukee
Andrew A. Holschbach Director, Ozaukee County Land and Water Management Department
Matt Janecke Administrator/Clerk, Town of Lisbon
Eric J. Kiefer Manager, North Shore Water Utility
Carrie M. Lewis Superintendent, Milwaukee Water Works, City of Milwaukee
Mark Lurvey Agricultural Business Operator, Lurvey Turf Nursery
Michael P. Rau President, City Water, LLC
Jay Shambeau Administrator, Planning and Parks Department, Washington County
Dale Shaver Director, Waukesha County Department of Parks and Land Use
Edward St. Peter General Manager, Water Utility, City of Kenosha
Michael J. Sullivan General Manager, Water and Sewer Utility, City of Oak Creek
James Surfus Senior Environmental Engineer, MillerCoors, LLC
Daniel S. Winkler Director of Public Works and Utilities, City of Lake Geneva

ADVISORY COMMITTEE ON REGIONAL LAND USE PLANNING

Julie A. Anderson, Chair Director of Public Works and Development Services, Racine County
Jennifer Andrews Director of Community Development, City of Waukesha
Robert J. Bauman Alderman, City of Milwaukee
Andy M. Buehler Director of Planning and Development, Kenosha County
Harlan Clinkenbeard City Planner, City of Pewaukee
Michael P. Cotter Director, Walworth County Land Use and Resource Management Department
Brian Dranzik Commissioner, Southeastern Wisconsin Regional Planning Commission;
Director of Transportation, Milwaukee County Department of Transportation
Henry Elling Administrator, Village of Summit
Charles Erickson Community Development Manager, City of Greenfield
Daniel F. Ertl Director of Community Development, City of Brookfield
Jason Fruth Planning and Zoning Manager, Waukesha County
Debra Jensen Planning Services Supervisor, Milwaukee Metropolitan Sewerage District
Vanessa Koster Planning Manager, City of Milwaukee Department of City Development
Jeffrey B. Labahn Director, City of Kenosha Department of Community Development and Inspections
Joseph Liebau, Jr. Secretary's Director, Southeast Region Wisconsin Department of Natural Resources
Patricia T. Najera City Plan Commissioner, City of Milwaukee
Mark Piotrowicz City Planner/Operations Manager, City of West Bend
Brandi Richter District Conservationist, Kenosha-Milwaukee-Racine-Walworth-Waukesha
Counties, U.S. Natural Resources Conservation Service
Matthew Sadowski Assistant Director/Principal Planner, City of Racine
Steven J. Schaer Manager of Planning and Zoning, City of West Allis
Sheri Schmit Deputy Director, Southeast Region, Wisconsin Department of Transportation
Douglas Seymour Director of Community Development, City of Oak Creek
Debora Sielski Deputy Planning and Parks Administrator, Manager of Planning Division, Washington County
Andrew T. Struck Director, Planning and Parks Department, Ozaukee County
Todd Stuebe Director of Community Development, City of Glendale
Randy L. Tetzlaff Director of Planning and Development, City of Port Washington
Teig Whaley-Smith Director, Department of Administrative Services, Milwaukee County

KENOSHA COUNTY LOCAL EMERGENCY PLANNING COMMITTEE

James Huff, Chair.....Kenosha County Deputy Medical Examiner
Michael Boozer Chief Executive Officer, ChemReport, Inc.
Rick K. Dodge District 5 Supervisor, Kenosha County Board
Scott Ferguson.....Southeast Regional Spill Coordinator, Wisconsin Department of Natural Resources
Kerry Gloss.....Director of Water Resources, City of Kenosha Water Utility
Cynthia Johnson Director/Health Officer, Kenosha County Division of Health
Samantha Kerkman61st Assembly District State Representative
Doug McElmury..... Fire Chief, Village of Pleasant Prairie
David McGrath..... News Reporter, WGTD Radio, Kenosha
Lt. Horace J. Staples.....Director, Kenosha County Division of Emergency Management
Capt. Aaron Strom..... Training Officer, Somers Fire and Rescue
Michael Tarasik.....Safety Supervisor, Roundy’s Supermarkets, Inc.

KENOSHA COUNTY TRAFFIC SAFETY COMMISSION

Lt. Thomas Puidokas, Chair Kenosha County Sheriff’s Department
Kyle AmlongTrooper, Wisconsin State Patrol
David Beth..... Kenosha County Sheriff
Corey Foster Regional Program Manager, Bureau of Traffic Safety, Wisconsin Department of Transportation
Virgil Gentz Chairman, Town of Paris
Patrice Hall Kenosha County Medical Examiner
Roger JohnsonFormer Village Trustee, Village of Silver Lake
Capt. Edo Maccari City of Kenosha Police Department
Joyce Murphy Traffic Materials Engineer, Wisconsin Department of Transportation
Dan Reilly..... Deputy Chief of Police, Village of Pleasant Prairie
Gary A. Sipsma Director of Highways/Highway Commissioner, Kenosha County
Keith Wynstra.....Former Trooper, Wisconsin State Patrol

Figure A-4
PUBLIC MEETINGS

**PUBLIC INFORMATION MEETING SCHEDULED
ON HAZARD MITIGATION PLAN UPDATE
FOR KENOSHA COUNTY**

Citizens are invited to a public information meeting related to the mitigation of impacts from natural and human-induced hazards in Kenosha County, Wisconsin. This session will provide an opportunity to learn more about, and to comment on, the of the County's hazard mitigation plan which will be documented in the Southeastern Wisconsin Regional Planning Commission (SEWRPC) Community Assistance Planning Report No. 278, 3rd Edition, *Kenosha County Hazard Mitigation Plan Update: 2016-2020*. The plan includes recommendations related to reducing damages from t hazards such as flooding and related stormwater drainage problems; weather-related hazards such as tornadoes, winter storms, and severe thunderstorms; and hazardous material incidents in Kenosha County and the municipalities within Kenosha County. This plan constitutes an update of the initial hazard mitigation plan which was adopted by the County in 2005, updated in 2010, and was completed in order for the County and the cities and villages within the County to maintain eligibility for hazard mitigation funding through the Federal Emergency Management Agency. Copies of the draft report chapters completed to date are now available for review on the SEWRPC web site at

<http://www.sewrpc.org/SEWRPC/communityassistance/Hazard-Mitigation-Planning.htm>

The plan is being prepared by SEWRPC, in cooperation with the Kenosha County Office of Emergency Management and the County Department of Planning and Development. Preparation of the plan was guided by a Hazard Mitigation Local Planning Team consisting of elected and appointed officials from the County and the cities, villages, and towns in the County; agency and business representatives; and citizens from throughout the County knowledgeable in hazard mitigation matters.

The meeting will be held from 6:00-7:30 p.m. on Monday, May 23, 2016 at the Kenosha County Center, 19600 - 75th Street, Bristol, Public Hearing Room.

The session will begin with a presentation by the Commission staff at 6:00 p.m. This will be followed by a meeting in "open house" format from 6:30-7:30 p.m., which will provide an opportunity to meet one-on-one or in small groups with the Commission and County staffs to receive information, ask questions, and provide written comment.

Persons with special needs are asked to contact Kenosha County Emergency Management at 262-605-7900 a minimum of 72 hours in advance of the public session date so that appropriate arrangements can be made. Affected may be site access and/or mobility, materials review or interpretation, or active participation, including the submission of comments.

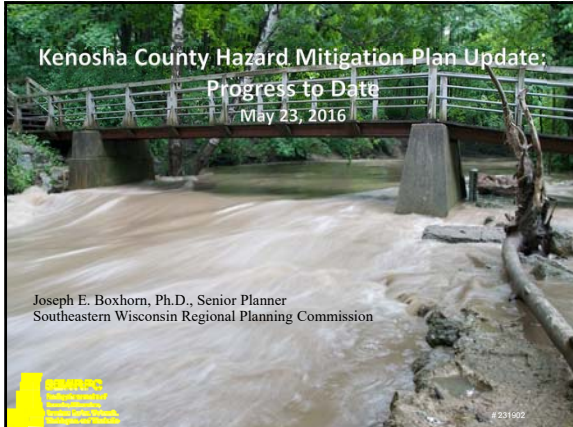
In addition to providing comments at the public meeting, written comments may also be submitted by U.S. mail or through a comment screen on the Commission's website. This comment screen may be found at:

<http://www.sewrpc.org/SEWRPC/communityassistance/Hazard-Mitigation-Planning/Kenosha-County-Comment-Form.htm>

To ask questions, or to submit written comments on the Hazard Mitigation Plan Update, please contact:

**Southeastern Wisconsin Regional Planning Commission
Joseph E. Boxhorn, Senior Planner
W239 N1812 Rockwood Drive
P.O. Box 1607
Waukesha, Wisconsin 53187-1607
Phone: 262-547-6721 Fax: 262-547-1103
e-mail: jboxhorn@sewrpc.org**

**Kenosha County Hazard Mitigation Plan Update:
Progress to Date**
May 23, 2016



Joseph E. Boxhorn, Ph.D., Senior Planner
Southeastern Wisconsin Regional Planning Commission

SEWRPC
Southeastern Wisconsin Regional Planning Commission
1000 Wisconsin Avenue, Suite 1000
Kenosha, WI 53142
Phone: 907-324-3000
Fax: 907-324-3001
www.sewrpc.com

#231-922

Agenda for Meeting

- Discuss purpose of plan update
- Review the work completed to date
- Seek information
 - Problem areas related to hazards
 - Potential mitigation measures and projects
- Answer questions on the plan update
- Take comments on plan update

What is Hazard Mitigation?

- “Mitigation is any sustained action taken to eliminate or reduce the long-term risk to human life and property from natural and technological hazards”—FEMA
- Actions to reduce the damages that result when disasters occur





Photo from Kenosha, WI



Photo from Soldiers Grove, WI

What is Hazard Mitigation?

- Mitigation is not:
 - Emergency response
 - Crisis management
 - Disaster preparation and recovery
- Mitigation focuses on reducing the impacts from hazard events when they occur

Why Do We Mitigate Hazards?




- Disasters are costly
- State and Federal assistance are insufficient
- We can prevent future damages
- Lesser impacts mean a quicker response and recovery process
- Can do this locally

Kenosha County Hazard Mitigation Plan

- Includes all of the municipalities in the County
- Sets forth strategies for mitigating impacts of several natural and technological hazards
- Maintains eligibility for hazard mitigation funding from the Federal Emergency Management Agency (FEMA)
 - FEMA requires that local hazard mitigation plans be updated and revised every five years

Kenosha County Hazard Mitigation Plan

- Initial plan developed 2004-2005
 - Report published 2005
- First update conducted 2009-2010
 - Coordinated with development of the County comprehensive plan
 - Report published 2010
- Current update conducted 2015-2016
 - Anticipate that the report will be published later this year



Kenosha County Hazard Mitigation Plan

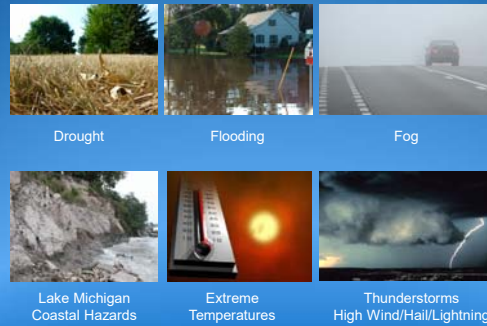
- Plan development and updating is overseen by a Local Planning Team
 - Team includes elected officials, appointed officials, department and agency representatives, business representatives, knowledgeable citizens
 - Law enforcement, fire, and EMS departments; public works and engineering departments, planning departments, conservation departments, private sector firms, nonprofit agencies, and educational institutions
- Staff include Kenosha County Emergency Management Division, SEWRPC, Kenosha County Planning and Development Department

Plan Components to Review and Revise

- Review implementation activities
- Update inventories of natural and built features
- Review and reevaluate identification of hazards
- Update and reevaluate risk analysis
- Review and revise mitigation goals
- Review and revise mitigation strategies
- Update plan adoption, implementation, and maintenance strategies
 - Update inventory of potential funding sources

Natural Hazards Profiled in the Plan

(Required by FEMA)



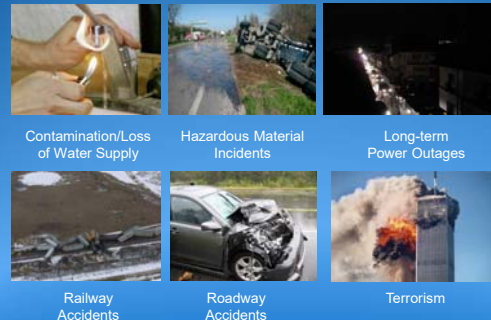
Natural Hazards Profiled in the Plan

(Required by FEMA)



Technological Hazards Profiled in the Plan

(Optional under FEMA rules)



Risk Analysis—Hazard Profiles

- Most profiles follow a similar format
 - Definition and description of the hazard
 - Description of notable historical events that affected the County
 - Description of some notable recent events that affected the County
 - Assessment of vulnerabilities to the hazard and community impacts from the hazard
 - Description of potential future changes in impacts
 - Discussion of any differences among communities in risks

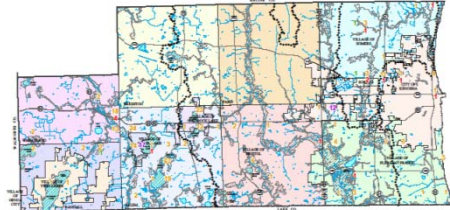
Average Annual Damages

Hazard	Years	Incidents per Year	Annual Property Damages	Annual Crop Damages	Total Annual Damages
Automobile Accidents	15	3,549.40	59,925,327	0	59,925,327
Flood	52	0.96	591,882	608,359	1,200,241
Thunderstorms/Wind/Hail/Lightning	51	4.90	901,748	99,670	1,001,418
Tornadoes	51	0.25	497,780	0	497,780
Drought	25	0.68	0	150,280	150,280
Lake Michigan Coastal	27	0.11	125,315	0	125,315
Railway Accidents	40	5.30	119,516	0	119,516
Pipeline Hazmat	39	0.13	77,403	0	77,403
Temperature Extremes	21	2.43	770	3,874	4,644
Winter Storms	21	5.00	2,036	0	2,036
Transportation Hazmat	44	1.34	650	0	650

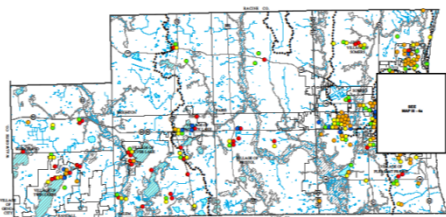
Average Annual Fatalities and Injuries

Hazard	Years	Incidents per Year	Fatalities per Year	Injuries per year	Annual Total
Automobile Accidents	15	3,549.40	21.27	1,937.87	1,959.14
Railway Accidents	40	5.30	0.38	1.23	1.61
Thunderstorm/Wind/Hail/Lightning	51	4.90	0.14	0.67	0.81
Temperature Extremes	21	2.43	0.19	0.52	0.71
Tornadoes	52	0.25	0.00	0.29	0.29
Pipeline Hazmat Accidents	39	0.13	0.08	0.10	0.18
Winter Storms	21	5.00	0.00	0.05	0.05
Transportation Hazmat Accidents	44	1.34	0.00	0.02	0.02

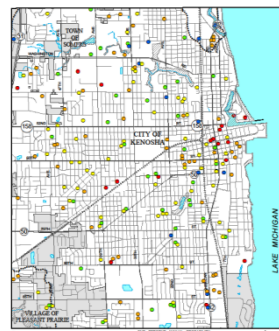
Map III - 2
NUMBER OF STRUCTURES WITHIN FLOOD HAZARD AREAS BY CIVIL DIVISION IN KENOSHA COUNTY: 2015

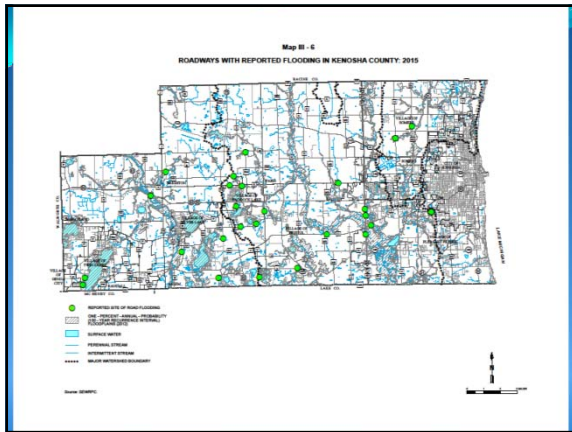


Map III - 4
LOCATIONS OF CRITICAL FACILITIES IN RELATION TO FLOODLANDS IN KENOSHA COUNTY: 2015



Map III - 4a
LOCATIONS OF CRITICAL FACILITIES IN RELATION TO FLOODLANDS IN THE CITY OF KENOSHA: 2015





Hazard Mitigation Goals

1. A spatial distribution of the various land uses that minimizes hazards and dangers to health, welfare, and safety as well as further enhancing the economic base of the County, and will result in a compatible arrangement of land uses properly related to the existing and proposed supporting transportation, utility, public safety, and public facility systems.
2. A spatial distribution of the various land uses that maintains biodiversity and will result in the protection and wise use of the natural resources of the County, including its soils, inland lakes and streams, groundwater, wetlands, woodlands, and natural areas and critical species habitats.

Hazard Mitigation Goals

3. An integrated transportation system that, through its location, capacity, and design, will safely, economically, and effectively serve the existing and proposed land use pattern and promote the implementation of the land use plan, meeting the current and anticipated travel demand and minimizing the potential for accidents and the associated toll on life and property damage.
4. The provision of facilities necessary to maintain a high quality of fire and police protection and emergency medical services throughout the County.

Hazard Mitigation Goals

5. The development of a stormwater and floodplain management system that reduces the exposure of people to drainage- and flooding-related inconvenience and to health and safety hazards and that reduces the exposure of real and personal property to damage through inundation resulting from flooding and inadequate stormwater drainage.
6. The identification of high erosion risk Lake Michigan shoreline areas and the development of a coastal erosion management program that reduces the exposure of people and real and personal property to shoreline erosion and bluff recession.

Hazard Mitigation Goals

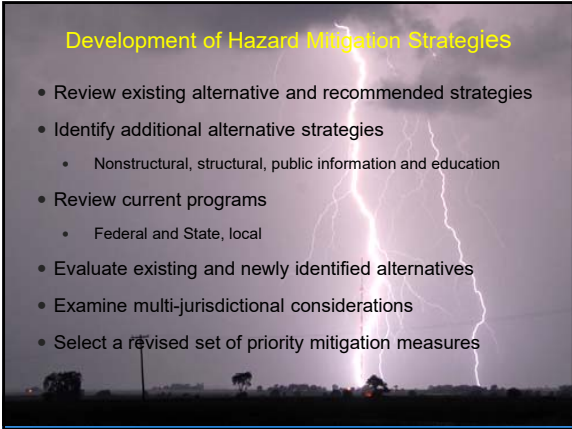
7. The identification and development of programs that complement County and local emergency operations plans to mitigate the potential exposure to health and safety and the exposure of real and personal property resulting from a broad range of hazards that are unpredictable and not geographically specific in nature.
8. Communications interoperability throughout the County among all First Responders, so as to be able to quickly and effectively respond to any incident to prevent the loss of life and to save property.

Remaining Work

- Review and update recommended hazard mitigation measures
- Review and update plan adoption, implementation, and maintenance measures

Development of Hazard Mitigation Strategies

- Review existing alternative and recommended strategies
- Identify additional alternative strategies
 - Nonstructural, structural, public information and education
- Review current programs
 - Federal and State, local
- Evaluate existing and newly identified alternatives
- Examine multi-jurisdictional considerations
- Select a revised set of priority mitigation measures



Current Plan's Flood Mitigation Strategies

Floodland and wetland zoning and zoning review

Preservation of open space and sensitive areas

Purchase, demolition, and removal or flood proofing of 318 structures

Channel cleaning, maintenance, or rehabilitation for selected streams

Stormwater management planning and regulation

Stormwater management facility maintenance

Restoration of prairies and wetlands

Survey of buildings near flood hazard areas

National Flood Insurance Program map updating



Current Plan's Mitigation Strategies for Weather-related Hazards

Maintain early warning systems

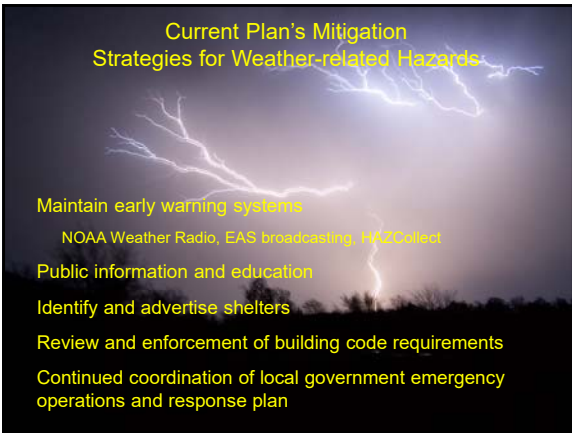
NOAA Weather Radio, EAS broadcasting, HAZCast

Public information and education

Identify and advertise shelters

Review and enforcement of building code requirements

Continued coordination of local government emergency operations and response plan



Current Plan's Mitigation Strategies for Human-induced Hazards

Public information and education

Driver safety, hazardous materials, public health, power outages

Continued coordination of emergency response

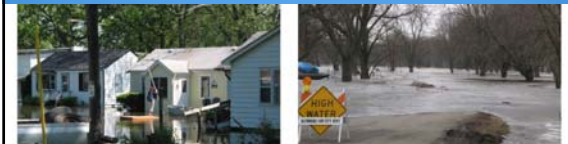
Governmental units, emergency responders

Continued support of training, equipping, planning, and preparedness for emergency responders



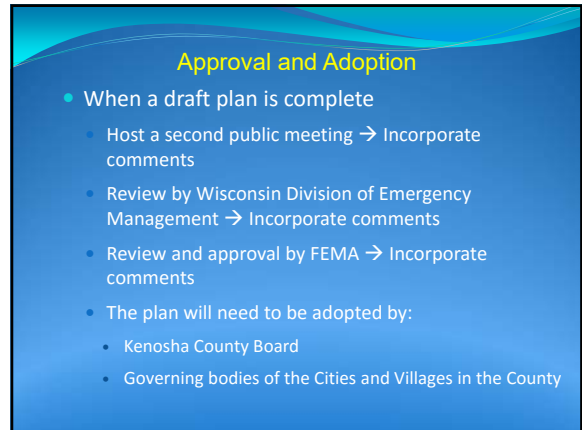
Implementation Strategies

- Update estimates of mitigation measure costs
- Summarize benefits of implementing mitigation measures
- Designate lead management agencies
- Update current implementation status
- Identify potential sources of funding and technical assistance



Approval and Adoption

- When a draft plan is complete
 - Host a second public meeting → Incorporate comments
 - Review by Wisconsin Division of Emergency Management → Incorporate comments
 - Review and approval by FEMA → Incorporate comments
 - The plan will need to be adopted by:
 - Kenosha County Board
 - Governing bodies of the Cities and Villages in the County



Project Web Site

- <http://www.sewrpc.org/SEWRPC/communityassistance/Hazard-Mitigation-Planning.htm>
 - Agendas and other meeting materials
 - Summary notes from meetings
 - Presentations
 - Draft chapters as they are completed
 - Comment screen
 - Other ways to send a comment
- [Email to jboxhorn@sewrpc.org](mailto:jboxhorn@sewrpc.org)

SUMMARY OF THE MAY 23, 2016 PUBLIC INFORMATION MEETING FOR THE KENOSHA COUNTY HAZARD MITIGATION PLAN UPDATE

The May 23, 2016 public information meeting for the Kenosha County hazard mitigation plan update was convened at the Kenosha County Center at 6:10 p.m. The meeting was called to order by Lieutenant Gil Benn, Director of the Kenosha County Division of Emergency Management. Attendance was taken by circulating a sign-in sheet.

In attendance at the meeting were the following individuals:

Attendees

Jason Arnott	Reporter, Southern Lake Newspaper
Pat Dunn	Trustee, Village of Silver Lake
Tom Burger	Kenosha/Racine Amateur Radio Emergency Services (ARES/RACES)

Staff

Lt. Gil S. Benn	Director, Kenosha County Division of Emergency Management
Joseph E. Boxhorn	Senior Planner, Southeastern Wisconsin Regional Planning Commission
Zijia Li	Engineer, Southeastern Wisconsin Regional Planning Commission
Aaron Owens	Planner, Southeastern Wisconsin Regional Planning Commission
Nakeisha N. Payne	Public Involvement and Outreach Specialist, Southeastern Wisconsin Regional Planning Commission

Lt. Benn welcomed all attendees to the meeting. He noted that the Kenosha County hazard mitigation plan is required to be updated every five years, and that this would be the second update to the original plan. Lt. Benn introduced Joseph Boxhorn of the Southeastern Wisconsin Regional Planning Commission (SEWRPC) staff.

Mr. Boxhorn gave a short presentation on the plan update effort.

[Secretary's Note: Mr. Boxhorn's presentation is attached herein as Exhibit A.]

Mr. Boxhorn stated that hazard mitigation involves taking actions to reduce the impacts caused by hazard events. He explained that local units of government must have an approved hazard mitigation plan in order to be eligible for certain grant programs administered by the Federal Emergency Management Agency. He added that the current planning effort is updating the County's plan.

Mr. Boxhorn reviewed the history of the County hazard mitigation plan. He noted that all of the cities, villages, and towns in the County are covered by the plan. He added that all of these local units of government are participating in plan development.

Mr. Boxhorn reviewed the progress to date on updating the hazard mitigation plan. He indicated that at this point a number of tasks have been completed including: reviewing implementation of recommendations from previous editions of the plan, updating inventories of natural and built features in the County, reviewing and re-evaluating the selection of hazards that the plan addresses, updating and revising the risk analyses related to these hazards, and reviewing and re-evaluating the hazard mitigation goals and objectives of the plan. He noted that preliminary drafts have been completed of four chapters of the plan report. He explained that these chapters document the tasks that have been completed.

Mr. Boxhorn stated that several tasks remain to be completed as part of the plan update. He explained that these include reviewing, updating, and revising recommended mitigation measures; updating estimated costs of recommended mitigation measures; reviewing and updating recommended plan adoption, implementation, and maintenance measures; and updating the inventory of potential funding sources for implementing recommended mitigation measures. He added that these tasks will be documented in two chapters that have yet to be completed.

Mr. Boxhorn stated that materials related to the update of the Kenosha County hazard mitigation plan can be found on the hazard mitigation planning page on the SEWRPC website. He noted that meeting materials, draft chapters, and presentations from planning meetings are posted there. He indicated that the page also has a comment screen that members of the public can use to submit questions or comments on the plan.

[Secretary's Note: The hazard mitigation planning page can be found on the SEWRPC website at:
<http://www.sewrpc.org/SEWRPC/communityassistance/Hazard-Mitigation-Planning.htm>]

Following Mr. Boxhorn's presentation there was discussion among staff and members of the public about areas within the County experiencing problems from specific hazards and potential mitigation projects.

Mr. Dunn stated that the owner of a flood prone property located in the portion of the Fox River buyout program for flood prone buildings project area has recently passed away. He added that no relative or other heir can be found. He indicated that the Village is interested in removing the structure.

There being no further business, the meeting was adjourned at 7:10 p.m.

CAPR-278-3 SUMMARY OF KENOSHA CTY HMP PUBLIC MTG MAY 23 2016 (00232234).DOC
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JEB
5/26/16

Exhibit A: Boxhorn Presentation (#231902)

**PUBLIC INFORMATION MEETING SCHEDULED
ON HAZARD MITIGATION PLAN UPDATE
FOR KENOSHA COUNTY**

Citizens are invited to a public information meeting related to the mitigation of impacts from natural and human-induced hazards in Kenosha County, Wisconsin. This session will provide an opportunity to learn more about, and to comment on, the County's hazard mitigation plan which will be documented in the Southeastern Wisconsin Regional Planning Commission (SEWRPC) Community Assistance Planning Report No. 278, 3rd Edition, *Kenosha County Hazard Mitigation Plan Update: 2017-2021*. The plan includes recommendations related to reducing damages from hazards such as flooding and related stormwater drainage problems; weather-related hazards such as tornadoes, winter storms, and severe thunderstorms; and hazardous material incidents in Kenosha County and the municipalities within Kenosha County. This plan constitutes an update of the initial hazard mitigation plan which was adopted by the County in 2005, updated in 2011, and was completed in order for the County and the cities and villages within the County to maintain eligibility for hazard mitigation funding through the Federal Emergency Management Agency. Copies of the draft report chapters completed to date are now available for review on the SEWRPC web site under the heading "Kenosha County Hazard Mitigation Plan Update":

<http://www.sewrpc.org/HMP>

The plan is being prepared by SEWRPC, in cooperation with the Kenosha County Division of Emergency Management and the County Department of Planning and Developments. Preparation of the plan has been guided by a Hazard Mitigation Local Planning Team consisting of elected and appointed officials from the County and the cities, villages, and towns in the County; agency and business representatives; and citizens from throughout the County knowledgeable in hazard mitigation matters.

The meeting will be held from 6:00-7:00 p.m. on Tuesday, May 2, 2017 at the Kenosha County Center, Public Hearing Room, 19600 75th Street, Bristol, Wisconsin.

The session will begin with a presentation by the Commission staff at 6:00 p.m. This will be followed by a meeting in "open house" format from 6:30-7:00 p.m., which will provide an opportunity to meet one-on-one or in small groups with the Commission and County staffs to receive information, ask questions, and provide written comment.

Persons with special needs are asked to contact Kenosha County Division of Emergency Management at 262-605-7900 a minimum of 72 hours in advance of the public session date so that appropriate arrangements can be made. Affected needs may include site access and/or mobility, materials review or interpretation, or active participation, including the submission of comments.

In addition to providing comments at the public meeting, written comments may also be submitted by U.S. mail or through a comment screen on the Commission's website. This comment screen may be found at:

<http://www.sewrpc.org/SEWRPC/communityassistance/Hazard-Mitigation-Planning/Kenosha-County-Comment-Form.htm>

To ask questions, or to submit written comments on the Hazard Mitigation Plan Update, please contact:

**Southeastern Wisconsin Regional Planning Commission
Joseph E. Boxhorn, Senior Planner
W239 N1812 Rockwood Drive
P.O. Box 1607
Waukesha, Wisconsin 53187-1607
Phone: 262-547-6721 Fax: 262-547-1103
E-mail: jboxhorn@sewrpc.org**



Agenda for Meeting

- Discuss purpose of plan update
- Review the updated plan
- Answer questions on the plan update
- Take comments on plan update

Plan Documentation

SEWRPC Community Assistance Planning Report No. 278 (3rd edition), *Kenosha County Hazard Mitigation Plan Update: 2017-2021*

Participating Jurisdictions

• City of Kenosha	• Village of Twin Lakes
• Village of Bristol	• Town of Paris
• Village of Paddock Lake	• Town of Randall
• Village of Pleasant Prairie	• Town of Salem
• Village of Silver Lake	• Town of Somers
• Village of Somers	• Town of Wheatland

During the planning effort, Silver Lake and Salem merged to form the Village of Salem Lakes

What is Hazard Mitigation?

- “Mitigation is any sustained action taken to eliminate or reduce the long-term risk to human life and property from natural and technological hazards”—FEMA
- Actions to reduce the damages that result when disasters occur

What is Hazard Mitigation?

- Mitigation is not:
 - Emergency response
 - Crisis management
 - Disaster preparation and recovery
- Mitigation focuses on reducing the impacts from hazard events when they occur

Why Do We Mitigate Hazards?



- Disasters are costly
- State and Federal assistance are insufficient
- We can prevent future damages
- Lesser impacts mean a quicker response and recovery process
- Can do this locally

Kenosha County Hazard Mitigation Plan

- Includes all of the municipalities in the County
- Sets forth strategies for mitigating impacts of several natural and technological hazards
- Maintains eligibility for hazard mitigation funding from the Federal Emergency Management Agency (FEMA)
 - FEMA requires that local hazard mitigation plans be updated, revised, and reapproved every five years
 - Hazard Mitigation Grant Program, Flood Mitigation Assistance Program, and the Pre-Disaster Mitigation Program

Kenosha County Hazard Mitigation Plan

- Initial plan developed 2004-2005
 - Report published 2005
- First update conducted 2009-2010
 - Coordinated with development of the County comprehensive plan
 - Report published 2010
- Current update conducted 2015-2017
 - The report will be published later this year



Kenosha County Hazard Mitigation Plan

- Plan development and updating is overseen by a Local Planning Team
 - Team includes elected officials, appointed officials, department and agency representatives, business representatives, knowledgeable citizens
 - Law enforcement, fire, and EMS departments; public works and engineering departments, planning departments, conservation departments, private sector firms, nonprofit agencies, and educational institutions
- Staff include Kenosha County Emergency Management Division, SEWRPC, Kenosha County Planning and Development Department

Reviewed and Revised Plan Components

(Described in Chapter I)

- Reviewed implementation activities
- Updated inventories of natural and built features
- Reviewed and reevaluated identification of hazards
- Updated and reevaluated risk analysis
- Reviewed and revised mitigation goals
- Reviewed and revised mitigation strategies
- Updated plan adoption, implementation, and maintenance strategies
 - Updated inventory of potential funding sources

Inventory Data

(Chapter II)

- Demographic characteristics
- Existing and planned land use
- Surface water and Lake Michigan Shoreline
 - One-percent-annual-probability floodplains
- Transportation and utility systems
- Critical community facilities
- Existing programs and regulations

Hazard Identification

(Chapter III)

- Local Planning Team input
 - Hazard and Vulnerability Assessment tool
- Past hazard experience
 - Frequency of occurrence
 - Property and crop damages
 - Fatalities and injuries

Natural Hazards Profiled in the Plan

(Required by FEMA)



Drought

Flooding

Fog



Lake Michigan Coastal Hazards

Extreme Temperatures

Thunderstorms High Wind/Hail/Lightning

Natural Hazards Profiled in the Plan

(Required by FEMA)



Tornado

Wild Fire

Winter Storms

Technological Hazards Profiled in the Plan

(Optional under FEMA rules)



Contamination/Loss of Water Supply

Hazardous Material Incidents

Long-term Power Outages



Transportation Accidents

Terrorism

Risk and Vulnerability Analysis

(Chapter III)

- Most profiles follow a similar format
 - Definition and description of the hazard
 - Description of notable recent and historical events that affected the County
 - Assessment of vulnerabilities to the hazard and community impacts from the hazard
 - Description of potential future changes in impacts
 - Discussion of any differences among communities in risks

Average Annual Damages

Table #12
PRIORITY RANKING OF NATURAL AND OTHER HAZARDS AFFECTING KENOSHA COUNTY BASED UPON PROPERTY AND CROP DAMAGE

Order Based on Risk Potential ¹	Natural and Other Hazards	Period of Record	Number of Incidents and Year (per year)	Total Property Damage per Year (dollars) ²	Total Crop Damage per Year (dollars) ²	Sum of Property and Crop Damage per Year (dollars)	Priority Ranking Based on Analysis
1	Transportation Accidents	1980-2010	2,376	\$214,440,000	0	\$214,440,000	1
2	Flooding	1980-2010	43	\$40,000,000	\$10,000,000	\$50,000,000	2
3	Thunderstorms, High Wind, Hail, and Lightning	1980-2010	63	\$12,500,000	\$10,000,000	\$22,500,000	3
4	Tornadoes	1980-2010	2	\$8,000,000	0	\$8,000,000	4
5	Drought	2000-2009	6	0	\$6,000,000	\$6,000,000	5
6	Hazardous Material Incidents	1980-2010	2	\$5,000,000	0	\$5,000,000	6
7	Extreme Temperatures	1980-2010	3	\$3,000,000	0	\$3,000,000	7
8	Winter Storms	1980-2010	3	\$3,000,000	0	\$3,000,000	8
9	Fog	1980-2010	3	0	0	0	9
10	Transportation Incidents	2000-2010	3	0	0	0	10
11	Lake Michigan Coastal Hazards	1970-1999	1	0	0	0	11
12	Fires	1980-2010	1	0	0	0	12
13	Power Outages	1980-2010	1	0	0	0	13
14	Contamination or Loss of Water Supply	1980-2010	1	0	0	0	14

¹Priority Ranking indicates the relative order of the hazards assigned to the **Priority Ranking** column. **Priority Ranking** is based upon the sum of the total property and crop damage per year for each hazard. **Priority Ranking** is based upon the sum of the total property and crop damage per year for each hazard. **Priority Ranking** is based upon the sum of the total property and crop damage per year for each hazard.

²Dollar values were adjusted to year 2010 by using the average annual Consumer Price Index (CPI) values from the U.S. Department of Labor, Bureau of Labor Statistics.

³Only direct economic losses from years 1970 through 2010 and indirect economic losses from 1970 through 2010.

⁴Only direct economic losses from years 1970 through 2010 and indirect economic losses from 1970 through 2010.

⁵Incidents have been reported, but no data are available to calculate averages.

⁶No data available.

Source: National Climatic Data Center; U.S. Department of Agriculture, **National Agricultural Statistics Service**; U.S. Department of Transportation, Office of Pipeline Safety; Missouri Department of Transportation; Kenosha County Division of Emergency Management and Disaster.

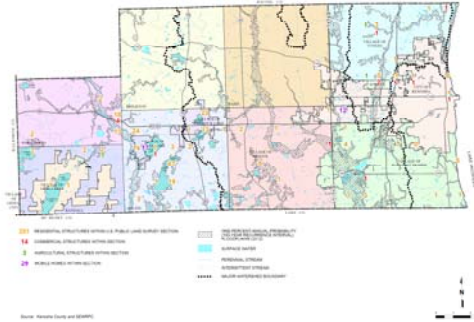
Average Annual Fatalities and Injuries

Table II-1
PRIORITY RANKING OF NATURAL AND OTHER HAZARDS AFFECTING KENOSHA COUNTY BASED UPON MORTALITY AND INJURY

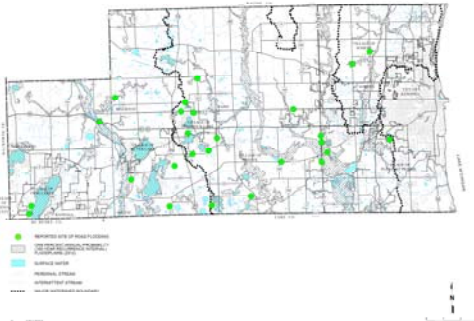
Other Based on	Natural and Other Hazards	Period of Record	Number of Incidents per Year (average)	Number of Mortality per Year (average)	Number of Injuries per Year (average)	Sum of Average Mortality and Injuries per Year	Priority Ranking Based on Analysis
Personnel	Transportation Accidents	1980-2010	1,000	10	1,000	1,010	1
	Thunderstorms, High Winds, Hail, and Lightning	1980-2010	10	0	10	10	2
	Extreme Temperatures	1980-2010	10	0	10	10	3
	Droughts	1980-2010	10	0	10	10	4
	Recreational Water Incidents	1980-2010	10	0	10	10	5
	Energy Disasters	1980-2010	10	0	10	10	6
	Flooding	1980-2010	10	0	10	10	7
	Earthquake Hazards	2000-2010	10	0	10	10	8
	Drought	2000-2010	10	0	10	10	9
	Large Damages Coastal Erosion	1970-1990	1.1 (per year)	0	1.1	1.1	10
	Power Outages	1980-2010	10	0	10	10	11
	Fire	1980-2010	10	0	10	10	12
	Contamination of Lake of Water Quality	1980-2010	10	0	10	10	13

These numbers indicate the total number of the hazards assigned by the Kenosha County Hazard Mitigation Plan (Kenosha County Hazard Mitigation Plan) for the period of record. The numbers are based on the number of incidents reported to the Kenosha County Emergency Management and Disaster Relief Center (EMDC) for the period of record. The numbers are based on the number of incidents reported to the EMDC for the period of record. The numbers are based on the number of incidents reported to the EMDC for the period of record.

Map II - 2
NUMBER OF STRUCTURES WITHIN FLOOD HAZARD AREAS BY CIVIL DIVISION IN KENOSHA COUNTY: 2015



Map II - 4
ROADWAYS WITH REPORTED FLOODING IN KENOSHA COUNTY: 2015



Map II - 8
TORNADO EVENTS IN KENOSHA COUNTY: JULY 1963 - DECEMBER 2014



Hazard Mitigation Goals (Chapter IV)

1. A spatial distribution of the various land uses that minimizes hazards and dangers to health, welfare, and safety as well as further enhancing the economic base of the County, and will result in a compatible arrangement of land uses properly related to the existing and proposed supporting transportation, utility, public safety, and public facility systems.
2. A spatial distribution of the various land uses that maintains biodiversity and will result in the protection and wise use of the natural resources of the County, including its soils, inland lakes and streams, groundwater, wetlands, woodlands, and natural areas and critical species habitats.

Hazard Mitigation Goals

3. An integrated transportation system that, through its location, capacity, and design, will safely, economically, and effectively serve the existing and proposed land use pattern and promote the implementation of the land use plan, meeting the current and anticipated travel demand and minimizing the potential for accidents and the associated toll on life and property damage.
4. The provision of facilities necessary to maintain a high quality of fire and police protection and emergency medical services throughout the County.

Hazard Mitigation Goals

- The development of a stormwater and floodplain management system that reduces the exposure of people to drainage- and flooding-related inconvenience and to health and safety hazards and that reduces the exposure of real and personal property to damage through inundation resulting from flooding and inadequate stormwater drainage.
- The identification of high erosion risk Lake Michigan shoreline areas and the development of a coastal erosion management program that reduces the exposure of people and real and personal property to shoreline erosion and bluff recession.

Hazard Mitigation Goals

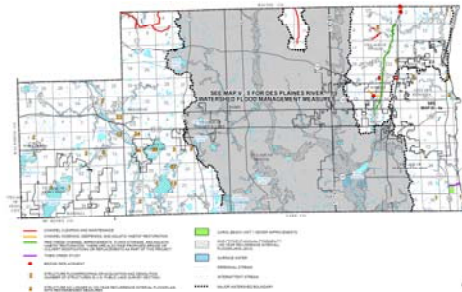
- The identification and development of programs that complement County and local emergency operations plans to mitigate the potential exposure to health and safety and the exposure of real and personal property resulting from a broad range of hazards that are unpredictable and not geographically specific in nature.
- Communications interoperability throughout the County among all First Responders, so as to be able to quickly and effectively respond to any incident to prevent the loss of life and to save property.

Development of Hazard Mitigation Strategies

(Chapter V)

- Identified alternative strategies
 - Nonstructural, structural, public information and education
- Reviewed current programs
 - Federal and State, local
- Evaluation of alternatives and identification of mitigation actions
- Identified multi-jurisdictional considerations
- Select and set forth a revised set of priority mitigation measures

Map V - 4
RECOMMENDED FLOODPLAIN MANAGEMENT MEASURES FOR THE KENOSHA COUNTY HAZARD MITIGATION PLAN: 2017



Flood Mitigation Strategies

- Floodland and wetland zoning and zoning review
- Preservation of open space and sensitive areas
- Purchase, demolition, and removal or flood proofing of 277 structures
- Channel cleaning, maintenance, or rehabilitation for selected streams
- Stormwater management planning and regulation
- Stormwater management facility maintenance
- Restoration of prairies and wetlands
- Survey of buildings near flood hazard areas



National Flood Insurance Program (NFIP) map updating
Continued participation in NFIP Community Rating Systems

Mitigation Strategies for Weather-related Hazards

Maintain early warning systems

NOAA Weather Radio, EAS broadcasting, HAZCast

Public information and education

Identify and advertise shelters

Installation of community storm shelters at mobile home parks

Review and enforcement of building code requirements

Continued coordination of local government emergency operations and response plan

Mitigation Strategies for Human-induced Hazards

Public information and education

Driver safety, hazardous materials, public health, power outages

Continued coordination of emergency response

Governmental units, emergency responders

Continued support of training, equipping, planning, and preparedness for emergency responders



Plan Implementation (Chapter VI)

- Updated estimates of mitigation measure costs
- Summarized benefits of implementing mitigation measures
- Designated lead management agencies
- Updated current implementation status
- Identified potential sources of funding



Approval and Adoption

- When a draft plan is complete
 - Incorporate comments
 - Review by Wisconsin Division of Emergency Management → Incorporate comments
 - Review and approval by FEMA → Incorporate comments
 - The plan will need to be adopted by:
 - Kenosha County Board
 - Governing bodies of the Cities and Villages in the County

Project Web Site

- <http://www.sewrpc.org/HMP>
 - Agendas and other meeting materials
 - Summary notes from meetings
 - Presentations
 - Draft chapters as they are completed
 - Comment screen
 - Other ways to send a comment
 - Please send comments by May 12, 2017
- Email to jboxhorn@sewrpc.org

**SUMMARY OF THE MAY 2, 2017 PUBLIC INFORMATION MEETING
FOR THE KENOSHA COUNTY HAZARD MITIGATION PLAN UPDATE**

The May 2, 2017 public information meeting for the Kenosha County hazard mitigation plan update was convened at the Kenosha County Center at 6:10 p.m. The meeting was called to order by Lieutenant Horace Staples, Director of the Kenosha County Division of Emergency Management. Attendance was taken by circulating a sign-in sheet.

In attendance at the meeting were the following individuals:

Attendees

None

Staff

Lt. Horace J. Staples	Director, Kenosha County Division of Emergency Management
Joseph E. Boxhorn	Senior Planner, Southeastern Wisconsin Regional Planning Commission
Laura K. Herrick	Chief Environmental Engineer, Southeastern Wisconsin Regional Planning Commission

Mr. Boxhorn gave a short presentation on the plan update effort.

[Secretary's Note: Mr. Boxhorn's presentation is attached herein as Exhibit A.]

Mr. Boxhorn stated that materials related to the update of the Kenosha County hazard mitigation plan can be found on the hazard mitigation planning page on the SEWRPC website. He noted that meeting materials, draft chapters, and presentations from planning meetings are posted there. He indicated that the page also has a comment screen that members of the public can use to submit questions or comments on the plan.

[Secretary's Note: The hazard mitigation planning page can be found on the SEWRPC website at:
<http://www.sewrpc.org/HMP>]

There being no further business, the meeting was adjourned at 7:00 p.m.

CAPR-278-3 SUMMARY OF KENOSHA CTY HMP PUBLIC MTG MAY 2 2016 (00237261).DOCX
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Exhibit A: Boxhorn Presentation (#237047)

SEWRPC Community Assistance Planning Report No. 278-3ED

KENOSHA COUNTY HAZARD MITIGATION PLAN UPDATE: 2017-2021

Appendix B

**SOLID WASTE DISPOSAL SITES
 IN KENOSHA COUNTY: 2015**

[Blue highlighting indicates additions or revisions to the previous edition of the plan.]

Identification Number ^a	Municipality	Location by U.S. Public Land Survey	Operator
Active Landfills			
1	Town of Paris	NW S32 T2N, R21E	Waste Management of Wisconsin – Pheasant Run
2	Village of Pleasant Prairie	E S9 T1N, R22E	We Energies Pleasant Prairie Ash Landfill
Recycling Centers, Transfer Stations, and Storage Facilities			
1	Town of Paris	NW S32 T2N, R21E	Waste Management of Wisconsin – Pheasant Run
3	City of Kenosha	NE NW S31 T2N, R22E	City of Kenosha Transfer Facility and Recycling Center
4	City of Kenosha	SE SE S32 T2N, R22E	Emco Chemical Distributors Storage Facility
5	City of Kenosha	NW NW S35 T2N R22E	Veolia Recycling Center
6	Village of Bristol	NW SW S8 R20E T1N	Village of Bristol Recycling Center
Compost Sites			
7	Town of Salem	NW SE S27 T1N R20E	Town of Salem Yard Waste Drop Off Site
8	Village of Somers	NE NE S16 T2N R22E	Village of Somers Yard Waste Centre
9	Village of Twin Lakes	SE SE S16 T1N R19E	Village of Twin Lakes Yard Waste Recycling Center
10	City of Kenosha	NE SE S29 T2N, R22E	City of Kenosha Compost Site
11	Village of Pleasant Prairie	SW SE S33 T1N, R22E	Village of Pleasant Prairie Compost Site
Inactive Landfills			
12	Village of Pleasant Prairie	SE SW S18 T1N, R23E	Rogers Tree Service
13	Village of Somers	SE NE S18 T2N, R23E	James Burns/Ted Radtke
14	City of Kenosha	NE NW S31 T2N, R23E	N. S. Koos and Sons
15	City of Kenosha	SW NE S19 T2N, R23E	St. George's Cemetery
16	Village of Pleasant Prairie	SE NE S33 T1N, R22E	City of Kenosha and Village of Pleasant Prairie Landfill
17	Village of Pleasant Prairie	SE SW S29 T1N, R23E	Daniel Dorece
18	Village of Pleasant Prairie	SW NW S10 T1N, R22E	Gerald Kramer
Inactive Landfills (continued)			
19	Village of Pleasant Prairie	NE SW S8 T1N, R22E	Harry Crow and Son, Inc.
20	Village of Pleasant Prairie	E NW S15 T1N, R22E	Harry Crow and Son, Inc.

Appendix B (continued)

Identification Number ^a	Municipality	Location by U.S. Public Land Survey	Operator
21	Village of Pleasant Prairie	SE SW S18 T1N, R23E	Kenosha Drive-In
22	Village of Pleasant Prairie	SW NE S18 T1N, R23E	Luckason
23	Village of Silver Lake	SE SW S8 T1N, R20E	Silver Lake Landfill
24	Village of Twin Lakes	SW SE S16 T1N, R19E	Village of Twin Lakes Landfill
25	Town of Brighton	NW SW S31 T2N, R20E	Town of Brighton Landfill
26	Town of Bristol	NE NW S17 T1N, R21E	Town of Bristol Landfill
27	Town of Bristol	NE SE S10 T1N, R21E	Kenosha Bowman, Inc.
28	Town of Paris	SW NE S18 T2N, R21E	Thomas Hancock
29	Town of Randall	NW SW S14 T1N, R19E	New Munster Deep Pit (WDNR)
30	Town of Randall	NW NE S30 T1N, R19E	Nippersink Manor Resort
31	Town of Randall	NW NW S23 T1N, R19E	Town of Randall Landfill
32	Town of Salem	SW NE S11 T1N, R20E	C. Bryzek (Fish Dump)
33	Town of Salem	SE NW S8 T1N, R20E	Kenosha County Highway Department
34	Town of Salem	NW SW S16 T1N, R20E	Salvation Army
35	Town of Salem	SE SW S5 T1N, R20E	Town of Salem Landfill
36	Village of Somers	SW NE S18 T2N, R23E, 13th Court	No Name Dump (Private)
37	Town of Somers	NE SW S31 T2N, 22E	Town of Somers
38	Village of Somers	SE SW S15 T2N, R22E	Town of Somers Landfill
39	Village of Somers	NW SE S1 T2N, R22E	Warren Hansche
40	Town of Wheatland	NE NW S04 T1N, R19E	Dan Peterson Property
41	Town of Wheatland	SE SW S10 T1N, R19E	Town of Wheatland

NOTE: The inventory data on this table is subject to periodic change due to the nature of the facilities. For the most recent data, the Wisconsin Department of Natural Resources should be contacted.

^aSee Map II-15 in Chapter II of this report.

Source: Wisconsin Department of Natural Resources and SEWRPC.

SEWRPC Community Assistance Planning Report No. 278-3ED

KENOSHA COUNTY HAZARD MITIGATION PLAN UPDATE: 2017-2021

Appendix C

**POLICE STATIONS, COUNTY SHERIFF OFFICES,
 AND FIRE STATIONS IN KENOSHA COUNTY: 2015**

[Blue highlighting indicates additions or revisions to the previous edition of the plan.]

Table C-1

POLICE STATIONS, COUNTY SHERIFF OFFICES OR SUBSTATIONS, AND CORRECTIONAL FACILITIES

Identification Number ^a	Facility Name	Municipality	Address
1	City of Kenosha Police	City of Kenosha	1000 – 55th Street, 53140
2	Rotary Safety Center	City of Kenosha	5716 – 14th Avenue, 53140
3	Boys and Girls Club-Crime Prevention Unit	City of Kenosha	1300 – 52nd Street, 53140
4	Kenosha Correctional Center	City of Kenosha	6353 – 14th Avenue, 53143
5	Kenosha Sheriff's Department	City of Kenosha	1000 – 55th Street, 53140
6	Kenosha Sheriff's Department Detention Center	City of Kenosha	4777 – 88th Avenue, 53140
7	Kenosha Sheriff's Department Pretrial Facility	City of Kenosha	927 – 54th Street, 53140
8	Pleasant Prairie Police	Village of Pleasant Prairie	8600 Green Bay Road, 53158
9	Twin Lakes Police	Village of Twin Lakes	920 Lance Drive, P.O. Box 549, 53181
10	UW-Parkside Police and Public Safety	Village of Somers	900 Wood Road, P.O. Box 2000 Kenosha, WI 53141-2000
11	Wisconsin State Patrol	City of Waukesha	N/A

^aIdentification number corresponds to digital file data for Map II-18 in Chapter II of this report.

Source: Kenosha County Division of Emergency Management and SEWRPC.

Table C-2

FIRE STATIONS AND EMERGENCY MEDICAL RESCUE DEPARTMENTS

Facility Name	Municipality	Address
Bristol Fire Department	Village of Bristol	8301 – 198th Avenue, 53104
Kansasville Fire Department	Kansasville/ Union Grove	23730 Durand Avenue, 53182
Kenosha Fire Department – Station 2 (Engine)	City of Kenosha	8530 – 30th Avenue, 53142
Kenosha Fire Department – Station 3 (Medical Unit)	City of Kenosha	2121 Roosevelt Road, 53143
Kenosha Fire Department – Station 4 (Engine, Ladder, Medical Unit, Shift Commander, Administrative Offices)	City of Kenosha	4810 – 60th Street, 53144
Kenosha Fire Department – Station 5 (Engine, Medical Unit)	City of Kenosha	2125 Washington Road, 53140
Kenosha Fire Department – Station 6 (Engine)	City of Kenosha	2615 – 14th Place, 53144
Kenosha Fire Department – Station 7 (Engine, Medical Unit)	City of Kenosha	9700 – 52nd Street, 53144
LJH Ambulance	City of Kenosha	6611 – 28th Avenue, P.O. Box 1227, 53141
Medix Ambulance	City of Burlington	147 Industrial Drive, P.O. Box 652, 53105
Paris Fire and Rescue Department	Town of Paris	16607 Burlington Road, Union Grove, WI 53182
Pleasant Prairie Fire Department – Station 1	Village of Pleasant Prairie	3801 Springbrook Road, 53158
Pleasant Prairie Fire Department – Station 2	Village of Pleasant Prairie	8044 – 88th Avenue, 53158
Randall Fire Department	Town of Randall	34524 Bassett Road, P.O. Box 8, Bassett, 53101
Randall Fire Department	Town of Randall	38820 – 93rd Street, P.O. Box 8, Powers Lake, 53159
Town of Salem Fire/ Rescue – Station 1	Town of Salem	11252 254th Court, Trevor, 53179
Town of Salem Fire/ Rescue – Station 2	Town of Salem	8339 Antioch Road, P.O. Box 142, Salem, 53168
Town of Salem Fire/ Rescue – Station 3	Town of Salem	30400 Wilmot Road, P.O. Box 306, Wilmot, 53192
Town of Salem Fire/ Rescue – Station 4	Town of Salem	113 S. First Street, P.O. Box 1061, 53170
Silver Lake Rescue Department	Village of Silver Lake	209 E. Lake Street, P.O. Box 776, 53170
Somers Fire and Rescue Department – Station 1	Village of Somers	7511 – 12th Street, P.O. Box 126, 53171
Somers Fire and Rescue Department – Station 2	Village of Somers	812 – 12th Street, 53171
Twin Lakes Fire and Rescue Department	Village of Twin Lakes	236 E. Main Street, P.O. Box 964, 53181
Scout Leaders Rescue	Village of Silver Lake	P.O. Box 457, 53170
Wheatland Fire Department	New Munster/ Town of Wheatland	34011 Geneva Road, 53152

Source: Kenosha County Division of Emergency Management and SEWRPC.

SEWRPC Community Assistance Planning Report No. 278-3ED

KENOSHA COUNTY HAZARD MITIGATION PLAN UPDATE: 2017-2021

Appendix D

**CRITICAL COMMUNITY FACILITIES
 IN KENOSHA COUNTY**

[Blue highlighting indicates additions or revisions to the previous edition of the plan.]

Table D-1

SCHOOLS

Number on Map 20	Facility Name	Community	Address
Brighton School District No. 1			
1	Brighton Elementary School	Town of Brighton	1200 – 248th Avenue, Kansasville, 53139
Bristol School District No. 1			
2	Bristol Elementary School	Village of Bristol	20121 – 83rd Street, 53104
Central High School District of Westosha			
3	Westosha Central High School	Village of Paddock Lake	24617 – 75th Street, Salem, 53168
Kenosha Unified School District No. 1			
4	Edward Bain School of Language and Art	City of Kenosha	2600 – 50th Street, 53140
5	Bose Elementary School	City of Kenosha	1900 – 15th Street, 53140
6	Bradford High School	City of Kenosha	3700 Washington Road, 53144
7	Brass Community School	City of Kenosha	6400 – 15th Avenue, 53143
8	The Brompton School	City of Kenosha	8518 – 22nd Avenue, 53143
9	Bullen Middle School	City of Kenosha	2804 – 39th Street, 53144
10	Cesar Chavez Learning Station (Head Start)	City of Kenosha	6300 – 27th Avenue, 53143
11	Dimensions of Learning (Charter School K-8)	City of Kenosha	6218 – 25th Avenue, 53140
12	Forest Park Elementary School	City of Kenosha	6810 – 45th Avenue, 53142
13	Frank Elementary School	City of Kenosha	1816 – 57th Street, 53140
14	Grant Elementary School	City of Kenosha	1716 – 35th Street, 53140
15	Grewenow Elementary School	City of Kenosha	7714 – 20th Avenue, 53143
16	Harborside Academy	City of Kenosha	913 – 57th Street, 53140
17	Harvey Elementary School	City of Kenosha	2012 – 19th Avenue, 53140
18	Hillcrest High School	City of Kenosha	4616 – 24th Street, 53144
19	Indian Trail Academy	City of Kenosha	6800 – 60th Street, 53144
20	Jefferson Elementary School	City of Kenosha	1832 – 43rd Street, 53140
21	Jeffery Elementary School	City of Kenosha	4011 – 87th Street, 53142

Table D-1 (continued)

Number on Map 20	Facility Name	Community	Address
Kenosha Unified School District No. 1 (continued)			
22	Kenosha 4-Year-Old Kindergarten	City of Kenosha	3600 – 52nd Street, 43144
23	Kenosha eSchool	City of Kenosha	4808 – 41st Place, 53140
24	Kenosha School of Enhance Technology Curriculum	City of Kenosha	6811 – 18th Avenue, 53143
25	Lakeview Technology Academy	Village of Pleasant Prairie	9449 – 88th Avenue, 53158
26	Lance Middle School	City of Kenosha	4515 – 80th Street, 53142
27	Lincoln Middle School	City of Kenosha	6729 – 18th Avenue, 53143
28	Mahone Middle School	City of Kenosha	6900 – 60th Street, 53144
29	McKinley Elementary School	City of Kenosha	5520 – 32nd Avenue, 53144
30	Nash Elementary School	City of Kenosha	6801 – 99th Avenue, 53142
31	Phoenix Project	City of Kenosha	4777 – 88th Avenue 53144
32	Pleasant Prairie Elementary School	Village of Pleasant Prairie	9208 Wilmot Road, 53158
33	Prairie Lane Elementary School	Village of Pleasant Prairie	10717 – 47th Avenue, 53158
34	Reuther Central High School	City of Kenosha	913 – 57th Street, 53140
35	Roosevelt Elementary School	City of Kenosha	3322 Roosevelt Road, 53142
36	Somers Elementary School	Village of Somers	1245 – 72nd Avenue, 53144
37	Southport Elementary School	City of Kenosha	723 – 76th Street, 53143
38	Stocker Elementary School	City of Kenosha	6315 – 67th Street, 53142
39	Strange Elementary School	City of Kenosha	5414 – 49th Avenue, 53144
40	Tremper High School	City of Kenosha	8560 – 26th Avenue, 53143
41	Vernon Elementary School	City of Kenosha	8518 – 22nd Avenue, 53143
42	Washington Middle School	City of Kenosha	811 Washington Road, 53140
43	Whittier Elementary School	Village of Pleasant Prairie	8542 Cooper Road, 53158
44	Wilson Elementary School	City of Kenosha	4520 – 33rd Avenue, 53144
Paris J1 School District			
45	Paris Consolidated Elementary School	Town of Paris	1901 – 176th Avenue, Kenosha, 53144
Randall J1 School District			
46	Randall Consolidated School	Town of Randall	37101 – 87th Street, P.O. Box 38, Bassett, 53101
Salem School District			
47	Salem Consolidated Elementary School	Town of Salem	8828 Antioch Road, P.O. Box 160, 53168
Silver Lake J1 School District			
48	Riverview Elementary School	Village of Silver Lake	300 Prosser Street, P.O. Box 69, 53170
Trevor-Wilmot Consolidated Grade School District			
49	Trevor Grade School	Trevor/Town of Salem	26325 Wilmot Road, 53179
Twin Lakes School District No. 4			
50	Lakewood Elementary School	Village of Twin Lakes	1218 Wilmot Avenue, 53181
Wheatland J1 School District			
51	Wheatland Center School	Town of Wheatland	6606 – 368th Avenue, Burlington, 53105
Wilmot UHS School District			
52	Wilmot Union High School	Wilmot/ Town of Salem	11112 – 308th Avenue, 53192-0008

Table D-1 (continued)

Number on Map 20	Facility Name	Community	Address
Private Schools			
53	All Saints Catholic School – South Campus	City of Kenosha	7400 – 39th Avenue, 53142
54	All Saints Catholic School – North Campus	City of Kenosha	4400 – 22nd Avenue, 53140
55	Providence Catholic School – West Campus	Town of Brighton	1714 – 240th Avenue, Kansasville, 53139
56	Bethany Lutheran	City of Kenosha	2100 – 75th Street, 53143
57	Christ Lutheran Academy	City of Kenosha	2026 – 22nd Avenue, 53140
58	Christian Life School	City of Kenosha	10700 – 75th Street, 53142
59	Friedens Lutheran	City of Kenosha	5043 – 20th Avenue, 53140
60	Good Shepard Lutheran	Village of Pleasant Prairie	4311 – 104th Street, 53158
61	Kenosha Montessori	City of Kenosha	2401 – 69th Street, 53143
62	Montessori Children’s House	City of Kenosha	920 – 61st Street #103, 53143
63	Pleasant Prairie Renaissance School	Village of Pleasant Prairie	10450 – 72nd Avenue, 53158
64	St. Joseph Catholic Academy-Upper Campus	City of Kenosha	2401 – 69th Street, 53143
65	St. Joseph Catholic Academy-Lower Campus	City of Kenosha	7207 – 14th Avenue, 53143
66	St. Peter Grade School	City of Kenosha	2224 – 30th Avenue, 53144
67	Shoreland Lutheran High School	Village of Somers	9026 – 12th Street, 53171
68	Providence Catholic School	Town of Paris	1481 – 172nd Avenue, 53182
69	St. Alphonsus School	Town of Wheatland	6211 – 344th Avenue, P.O. Box 922, New Munster, 53152
Colleges and Universities			
70	Carthage College	City of Kenosha	2001 Alford Park Drive, 53140-1994
71	Gateway Technical College – Kenosha Campus	City of Kenosha	3520 – 30th Avenue, 53144
72	Gateway Technical College – Aviation Center	City of Kenosha	4940 – 88th Avenue, 53144
73	Herzing University	City of Kenosha	4006 – Washington Road, 53144
74	University of Wisconsin – Parkside	Village of Somers	900 Wood Road, P.O. Box 2000, Kenosha, 53141-2000

Source: Wisconsin Department of Public Instruction, Kenosha County Division of Emergency Management, and SEWRPC.

Table D-2

SELECTED GOVERNMENT ADMINISTRATION BUILDINGS

Number on Map 21	Facility Name	Municipality	Address
City, Village, and Town Halls			
1	Kenosha Municipal Building	City of Kenosha	625 – 52nd Street, 53140
2	Paddock Lake Municipal Building	Village of Paddock Lake	6969 – 236th Avenue, Salem, 53168
3	Pleasant Prairie Municipal Building	Village of Pleasant Prairie	9915 – 39th Avenue, 53158
4	Silver Lake Village Hall	Village of Silver Lake	113 S. First Street, 53170
5	Twin Lakes Village Hall	Village of Twin Lakes	108 E. Main Street, P.O. Box 1094, 53181
6	Brighton Town Office	Town of Brighton	25000 Burlington Road, P.O. Box 249, Kansasville, 53139
7	Bristol Municipal Building	Village of Bristol	19801 – 83rd Street, P.O. Box 187, 53104
8	Paris Safety Building	Town of Paris	16607 Burlington Road, Union Grove, 53182
9	Randall Town Hall	Town of Randall	34530 Bassett Road, 53101
10	Salem Municipal Building	Town of Salem	9814 Antioch Road, Hwy. 83, P.O. Box 443, 53168
11	Somers Town Office Building	Village of Somers	7511 – 12th Street, P.O. Box 197, 53171
12	Wheatland Town Hall	Town of Wheatland	34315 Geneva Road, P.O. Box 797, New Munster, 53152-0797
Other Local Government Facilities			
13	City of Kenosha Street Department	City of Kenosha	6415 – 35th Avenue, 53140
14	Joseph McCarthy Transit Center	City of Kenosha	724 – 54th Street, 53140
15	Kenosha Wastewater Treatment Plant	City of Kenosha	7843 – 3rd Avenue, 53143
16	Kenosha Water Production Plant	City of Kenosha	100 – 51st Place, 53140
17	Kenosha Water Utility	City of Kenosha	4401 Green Bay Road, 53144
18	City of Kenosha Fleet Maintenance	City of Kenosha	3725 – 65th Street, 53140
19	Kenosha Area Transit	City of Kenosha	4303 – 39th Avenue, 53144
20	Village of Paddock Lake Wastewater Treatment Plant	Village of Paddock Lake	23201 – 62nd Street, Paddock Lake, 53168
21	Roger Prange Municipal Building	Village of Pleasant Prairie	8600 Green Bay Road, 53158
22	Village of Silver Lake Public Works Building	Village of Silver Lake	123 E. Northwater Street, Silver Lake, 53170
23	Twin Lakes Public Works	Village of Twin Lakes	800 Burlington Avenue, 53170
24	Twin Lakes Wastewater Treatment Plant	Village of Twin Lakes	901 Gatewood Drive, 53170
25	Town of Bristol Public Works Garage and Wastewater Utility	Village of Bristol	8101 – 195th Avenue, 53104
26	Town of Salem Highway Building	Town of Salem	11200 285th Court, Trevor
27	Salem Utility District Wastewater Treatment Plant	Town of Salem	28733 Wilmot Road, Trevor
County Facilities			
28	Kenosha County Administration Building	City of Kenosha	1010 – 56th Street, 53140
29	Kenosha County Center Building	Village of Bristol	19600 – 75th Street, 53104
30	Kenosha County Courthouse	City of Kenosha	912 – 56th Street, 53140
31	Kenosha County Department of Human Services	City of Kenosha	8600 Sheridan Road, 53143
State Facilities			
32	National Guard Armory	City of Kenosha	4200 – 43rd Avenue, 53144
33	Wisconsin Department of Transportation—Division of Motor Vehicles	City of Kenosha	4911 – 88th Avenue, Kenosha, 53144

Table D-2 (continued)

Number on Map 21	Facility Name	Municipality	Address
U.S. Post Offices			
34	Bassett	Town of Randall	34341 Bassett Road, Bassett, 53101
35	Bristol	Village of Bristol	8223 – 199th Avenue, 53104
36	Camp Lake	Town of Salem	9540 Camp Lake Road, Hwy. AH, Camp Lake, 53109
37	Kenosha	City of Kenosha	5605 Sheridan Road, 53140
38	New Munster	Town of Wheatland	34315 Geneva Road, New Munster, 53152
39	Pleasant Prairie	Village of Pleasant Prairie	4225 – 101st Street, 53158
40	Powers Lake	Town of Randall	39705 Bloomfield Road, Powers Lake, 53159
41	Salem	Town of Salem	24913 – 83rd Place, Salem 53168
42	Silver Lake	Village of Silver Lake	739 S. Cogswell Drive, Silver Lake 53170
43	Somers	Village of Somers	7621 – 12th Street, Somers 53171
44	Trevor	Town of Salem	25930 Wilmot Road, Trevor, 53179
45	Twin Lakes	Village of Twin Lakes	170 Lance Drive, Twin Lakes, 53181
46	Wilmot	Town of Salem	30725 – 113th Street, Wilmot, 53192
47	Woodworth	Town of Bristol	8105 – 160th Avenue, Woodworth
Other Federal Facilities			
48	Social Security Administration	City of Kenosha	5624 – 6th Avenue, 53140
49	US Coast Guard	City of Kenosha	5036 – 4th Avenue, 53140
Public Libraries			
50	Northside Kenosha Public Library	City of Kenosha	1500 – 27th Avenue, Kenosha, 53140
51	Salem Community Library	Town of Salem	24615 – 89th Street, Salem, 53168
52	Silver Lake Community Library	Village of Silver Lake	729. S. Cogswell Drive, Silver Lake, 53170
53	Simmons Kenosha Public Library	City of Kenosha	711 – 59th Place, Kenosha, 53140
54	Southwest Kenosha Public Library	City of Kenosha	7979 – 38th Avenue, Kenosha, 53142
55	Twin Lakes Community Library	Village of Twin Lakes	110 S. Lake Avenue, Twin Lakes, 53181
56	Uptown Kenosha Public Library	City of Kenosha	2419 – 63rd Street, Kenosha, 53143

Source: Kenosha County Division of Emergency Management and SEWRPC.

Table D-3

HOSPITALS, MAJOR CLINICS, AND HEALTH DEPARTMENTS

Number on Map 22	Facility Name	Municipality	Address
Hospitals ^a			
1	Aurora Medical Center—Kenosha	City of Kenosha	10400 – 75th Street, 53142
2	St. Catherine's Medical Center Campus	Village of Pleasant Prairie	9555 – 76th Street, 53158
3	Kenosha Medical Center Campus	City of Kenosha	6308 – 8th Avenue, 53143-5082
Clinics ^b			
4	Aurora Advanced Healthcare-Kenosha 118th Avenue	City of Kenosha	6811 – 118th Avenue, 53142
5	Aurora Advanced Healthcare-Gateway	City of Kenosha	3601 – 30th Avenue, 53144
6	Aurora Advanced Healthcare-Kenosha 15th Place	City of Kenosha	2707 – 15th Place, 53140
7	Aurora Advanced Healthcare-Kenosha 35th Street	City of Kenosha	1020 – 35th Street, 53140
8	Aurora Health Center—Kenosha	City of Kenosha	7540 – 22nd Avenue, 53143
9	Aurora Health Center—Paddock Lake	Village of Paddock Lake	25320 – 75th Street, 53168
10	Aurora Health Center—Twin Lakes	Village of Twin Lakes	700 N. Lake Avenue, 53181
11	Children's Hospital—Kenosha Clinic	City of Kenosha	8500 – 75th Street
12	Family Medical Center North	City of Kenosha	3200 Sheridan Road, 53140
13	Family Practice Associates	City of Kenosha	3535 – 30th Avenue, 53144
14	Kenosha Community Health Center	City of Kenosha	4536 – 22nd Avenue, 53140
15	Kenosha Community Health Center	City of Kenosha	6226 – 14th Avenue, 53143
16	Kenosha Community Health Center	City of Kenosha	1330 – 52nd Street, 53140
17	Kenosha Pediatrics	City of Kenosha	6125 Green Bay Road
18	Kenosha Pediatrics at Paddock Lake	Village of Paddock Lake	24906 – 75th Street, Salem, 53168
19	Sheridan Medical Complex	City of Kenosha	8400 Sheridan Road, 53143
20	Twin Lakes Clinic	Village of Twin Lakes	118 S. Lake Avenue, 53181
21	United Health System Physician Clinic—Northcentral	City of Kenosha	6127 Green Bay Road, 53142
22	United Health System Physician Clinic—Northside	City of Kenosha	3610 – 30th Avenue, 53140
23	United Health System Physician Clinic—Paddock Lake	Village of Paddock Lake	7322 – 236th Avenue, 53168
26	United Hospital System Physician Clinic—Somers	Village of Somers	3400 Market Lane, 53171
Health Departments			
24	Kenosha County Public Health	City of Kenosha	8600 Sheridan Road, 53143
25	Kenosha County Public Health	Village of Bristol	19600 – 75th Street, 53104

^aA hospital is defined as a place that provides 24-hour nursing/medical care to diagnose and treat short-term illnesses and/or injuries

^bA clinic is defined as an establishment that provides a variety of medical services by more than one physician and/or other medical personnel on an out-patient basis. Clinics limited to treating a specific type of illness are not listed.

Source: Kenosha County Division of Emergency Management and SEWRPC.

Table D-4

CHILD CARE CENTERS IN KENOSHA COUNTY: 2015

Number on Map 23	Facility Name	Municipality	Address	Class ^a	Capacity
1	A Creative Learning Childcare	City of Kenosha	9413 – 68th Street	Family	8
2	ABC Child Care	Town of Bristol	8215 – 160th Avenue, Woodworth	Family	8
3	Allendale Academy, LLC	City of Kenosha	7507 – 7th Avenue, 53143	Group	50
4	Almost Home Academy	City of Kenosha	1760 – 22nd Avenue	Group	113
5	Ann's Wonderland Family Child Care	City of Kenosha	6716 – 99th Avenue	Family	6
6	Appletree Day Care	City of Kenosha	5810 – 14th Avenue	Family	6
7	April's Child Care	Town of Salem	24403 – 89th Street	Family	8
8	Baby Bear's Family Daycare	Village of Somers	974 Sheridan Road	Family	8
9	Beautiful & Loving Children Daycare	Village of Twin Lakes	422 Elm Court	Family	8
10	Play 2 Learn Child Development Center	City of Kenosha	2506 – 50th Street	Group	25
11	Beth Culver	Village of Somers	1171 – 88th Avenue	Family	6
12	Bright Beginnings Child Care	City of Kenosha	4319 – 60th Street	Family	8
13	Bright from the Start Intergenerational Center	City of Kenosha	5522 – 6th Avenue, Suite 100	Group	98
14	Busy Bee's Child Care Center, LLC	Village of Somers	9918 – 12st Street, 53144	Group	50
15	Caterpillar College Preschool	Village of Pleasant Prairie	8411 Old Green Bay Road	Group	50
16	Children R Us	City of Kenosha	10025 – 69th Street	Family	8
17	Childrens Place Home Day Care	City of Kenosha	7929 – 40 Avenue	Family	8
18	Circle of Friends Family Day Care	City of Kenosha	8131 – 68th Avenue	Family	8
19	Cornerstone Academy	City of Kenosha	1230 – 22nd Avenue	Group	120
20	Count Your Blessings Ccd & Lrng Ctr	City of Kenosha	6213 – 10th Avenue	Group	24
21	Dream Catchers Childcare Center	City of Kenosha	6215 – 10th Avenue	Group	33
22	Elizabeth's Day Care Center	City of Kenosha	4107 Wilson Road	Family	8
23	Estrellitas Brillantes	City of Kenosha	6104 – 18th Avenue	Family	8
24	Every Child's Place, Inc.	City of Kenosha	3220 – 30th Avenue, 53144	Group	172
25	Extended Love Child Development Center	Village of Pleasant Prairie	9191 – 80th Street, 53158	Group	226
26	First Friends Preschool, LLC	Town of Salem	7316 – 250th Avenue	Group	30
27	First Step Academy	City of Kenosha	6410 – 25th Avenue	Group	208
28	First United Day Care Center	City of Kenosha	919 – 60th Street, 53140	Group	90
29	Gean's Helping Hand in Home Child Care	City of Kenosha	1331 – 44th Street	Family	8
30	Grace Lutheran Child Development Center	Village of Twin Lakes	248 E. Main Street, 53181	Group	84
31	Growing Green Child Development Center	City of Kenosha	6435 Green Bay Road	Group	152
32	Here We Grow Academy, LLC	City of Kenosha	6032 – 8th Avenue	Group	75
33	Jeanna's Child Care	City of Kenosha	5807 – 52nd Avenue	Family	8
34	Just Kid Inn Day Care Center, Inc.	City of Kenosha	2037 – 22nd Avenue, 53140	Group	93
36	Just Like Home Daycare	City of Kenosha	6513 – 48th Avenue	Family	8
36	Kaleck Family Child Care Center	City of Kenosha	4816 – 52nd Street	Family	8
37	Kelly's Home Day Care	City of Kenosha	4712 – 58th Street	Family	8
38	Kenosha YMCA CFB	City of Kenosha	7101 – 53rd Street, 53144	Group	92
39	Kenosha YMCA Forrest Park	City of Kenosha	6810 – 45th Avenue, 53142	Group	35
40	Kids Castle-Grewenow	City of Kenosha	7714 – 20th Avenue, 53143	Group	28

Table D-4 (continued)

Number on Map 23	Facility Name	Municipality	Address	Class ^a	Capacity
41	Kenosha YMCA Jeffery	City of Kenosha	4011 – 87th Street, 53140	Group	40
42	Kenosha YMCA Pleasant Prairie	Village of Pleasant Prairie	9208 Wilmot Road, 53158	Group	35
43	Kenosha YMCA Prairie Lane	Village of Pleasant Prairie	10717 – 47th Avenue, 53158	Group	35
44	Riverview Kid's Club	Village of Silver Lake	300 Prosser Street, 53170	Group	50
45	Kids Castle-Southport	City of Kenosha	723 – 76th Street, 53143	Group	25
46	Kenosha YMCA Stocker	City of Kenosha	6315 – 67th Street, 53142	Group	35
47	Kiddie Kare Akadaemie, Ltd.	Village of Pleasant Prairie	9244 – 39th Avenue, 53158	Group	77
48	Kiddie Karousel	City of Kenosha	4700 – 18th Avenue	Family	8
49	Kids Castle	City of Kenosha	4211 Green Bay Road	Group	155
50	Kids Castle Before and After School	City of Kenosha	6801 – 99th Avenue	Group	80
51	Kids Castle Before and After School- Whi	City of Kenosha	8542 Cooper Road	Group	40
52	Kids Castle - McKinley	City of Kenosha	5520 – 32nd Avenue	Group	17
53	Kids Castle-Roosevelt	City of Kenosha	33225 Roosevelt Road	Group	50
54	Kid's Club – Bristol Grade School	Village of Bristol	20121 – 83rd Street, 53104	Group	91
55	Kid's World	City of Kenosha	4217 – 30th Avenue	Family	8
56	La Petite Academy—Kenosha	City of Kenosha	10320 – 74th Avenue	Group	131
57	Lakeview Recplex Preschool	Village of Pleasant Prairie	9900 Terwall Terrace	Group	140
58	Lena Thomas	City of Kenosha	517 – 42nd Street-Lower	Family	6
59	Library Square School Child Day Care	City of Kenosha	5900 – 7th Avenue	Group	65
60	Lil' Rugrats	City of Kenosha	2509 – 71st Street	Family	8
61	Little Angels Child Care	City of Kenosha	2308 – 71st Street	Family	6
62	Little Bear Learning Center	Town of Salem	12027 Antioch Road, Trevor	Group	43
63	Little Lambs Day Care	City of Kenosha	2811 – 28th Place	Family	6
64	Little Sneebers Child Care	City of Kenosha	6813 – 21st Avenue-Lower	Family	6
65	Lov N Care Children's Academy	City of Kenosha	1115 – 56th Street, 53140	Group	88
66	Lov N Care Children's Academy III	City of Kenosha	5109 – 52nd Street	Group	127
67	Loving Hearts Family Childcare	City of Kenosha	5548 – 33rd Avenue	Family	8
68	Messiah Christian Preschool	Village of Twin Lakes	8720 – 368th Avenue, 53181	Group	24
69	Mini Miracles Child Care, LLC	City of Kenosha	2400 – 71st Street	Family	8
70	Minnie's Little Angels	City of Kenosha	6111 – 14th Avenue, #14	Group	55
71	Morning Glory's Family Day Care	City of Kenosha	4605 – 18th Avenue	Family	8
72	Mt. Zion Preschool	City of Kenosha	5927 – 37th Avenue, 53144	Group	30
73	My Little School House Brighton LOC	Town of Brighton	1200 – 248th Avenue, Kansasville	Group	18
74	One Way in the World	City of Kenosha	4305 – 45th Street	Family	8
75	Patty's Safe Haven	City of Kenosha	6611 – 17th Avenue	Family	8
76	Paula Perez	City of Kenosha	1810 – 55th Street	Family	6
77	Peggy's Place	Village of Pleasant Prairie	12115 – 44th Avenue	Family	8
78	Caritas Felices	City of Kenosha	1015 – 65th Place	Group	44
79	Pleasant Prairie Renaissance School	Village of Pleasant Prairie	10450 – 72nd Avenue, 53158	Group	120
80	Precious Few Child Care	Town of Salem	31105 Highway C, Wilmot, 53192	Family	8
81	Precious Little Children	City of Kenosha	4406 – 55th Street	Family	8

Table D-4 (continued)

Number on Map 23	Facility Name	Municipality	Address	Class ^a	Capacity
82	Precious Moments Home Childcare	City of Kenosha	7303 – 14th Avenue	Family	6
83	Randall Kids Club	Town of Randall	37101 – 87th Street, Burlington	Group	37
84	Rejennia Adams	City of Kenosha	3915 – 28th Avenue	Family	6
85	Salem Kid's Club	Town of Salem	8828 Antioch Road	Group	113
86	Sharesa Bernier	City of Kenosha	4519 Wilson Road	Family	6
87	Sharon Pfaff	City of Kenosha	4108 Harding Road	Family	6
88	Sistas of Love Child Care Center	City of Kenosha	5016 – 17th Avenue	Family	6
89	Small Wonders	City of Kenosha	9022 – 24th Avenue	Family	8
90	Snuggles in Home Daycare	City of Kenosha	2114 – 87th Place	Family	6
91	St. Mary's Children's Learning Center	City of Kenosha	7401 – 40th Avenue, 53142	Group	62
92	St. Mary's Lutheran Nursery School	City of Kenosha	2001 – 80th Street, 53143	Group	37
93	Star Bright Child Care Center	City of Kenosha	6015 – 46th Avenue	Family	8
94	Strive 4 More Daycare	City of Kenosha	4017 – 30th Avenue	Family	6
95	Teddy Bear Day Care	City of Kenosha	911 – 73rd Street	Family	8
96	Teresa's Treasures	City of Kenosha	5115 – 29th Place	Family	8
97	Theresa Hanson	City of Kenosha	4530 – 19th Avenue	Family	6
98	The Goddard School	City of Kenosha	7420 – 91st Avenue	Group	132
99	A Place to Grow Play and Education Center	Town of Salem	24929 – 75th Street, 53168	Group	27
100	Tiny Miracles	City of Kenosha	4032 – 29th Avenue	Family	8
101	Trevor-Wilmot Kids Club	Town of Salem	26325 Wilmot Road, Trevor	Group	41
102	Trinity Cooperative Preschool	City of Kenosha	7104 – 39th Avenue, 53142	Group	37
103	Tuesday's Child Family Child Care	Village of Pleasant Prairie	8545 – 54th Avenue	Family	8
104	Westosha Head Start	Town of Salem	30100 Wilmot Road, P.O. Box 57, Wilmot, 53192	Group	51
105	Wheatland Kids Club	Town of Wheatland	6606 – 368th Avenue, Burlington, 53105	Group	42
106	Kids Castle-Vernon	City of Kenosha	8518 – 22nd Avenue	Group	17
107	Kids Castle-Bose	Village of Somers	1245 – 72nd Avenue	Group	29
108	Kids Castle Before and After School Program-North	City of Kenosha	4211 Green Bay Road	Group	60
109	X-Cite Kenosha	City of Kenosha	4212 – 52nd Street	Group	44
110	Zivka's Daycare	City of Kenosha	5524 – 84th Street	Family	8

^aLicensing rules create separate requirements for three categories of licensed child care. Group child care centers serve nine or more children. Family childcare centers serve four to eight children. Camps include whole-day and part-day camps and activity programs offered by traditional camps, colleges, and sports programs. Some camp activity programs are intended for young children as theme-focused day care, while others constitute nonresidential options for older campers pursuing special interests.

Source: Wisconsin Department of Children and Families and SEWRPC.

Table D-5

ASSISTED LIVING FACILITIES AND INDEPENDENT HOUSING IN KENOSHA COUNTY: 2015

Number on Map 24	Facility Name	Municipality	Address
Apartments for Seniors or Persons With Disabilities			
1	Assisi Homes of Kenosha	City of Kenosha	1860 – 27th Avenue
2	Beech Pointe	City of Kenosha	910 – 85th Street
3	Forest Towers Metro	City of Kenosha	8218 – 14th Avenue
4	Joanne Apartments	City of Kenosha	8827 – 41st Avenue
5	Kenosha Garden Apartments	City of Kenosha	5430 – 64th Avenue
6	Lakeside Towers	City of Kenosha	5800 – 3rd Avenue
7	Meadowview Village Apartments	Village of Twin Lakes	450 Lincoln Drive
8	Northpoint Crossings	City of Kenosha	1724 Birch Road
9	Saxony Manor	City of Kenosha	1876 – 22nd Avenue
10	Silver Crest Apartments	Village of Silver Lake	630 S. Cogswell Drive
11	Tanglewood Apartments	City of Kenosha	3020 – 87th Place
12	Tuscan Villa Apartments	City of Kenosha	8051 – 25th Avenue
13	Villa Nova Apartments	City of Kenosha	2401 – 18th Street
14	Village Plaza Apartments	Village of Paddock Lake	25166 – 72nd Street
Affordable Housing for Older Adults			
15	Celebre Place	City of Kenosha	1870 – 27th Avenue
16	Glenwood Apartments	City of Kenosha	1920 – 27th Avenue
17	Harborside Commons	City of Kenosha	716 51st Place
18	Kenosha Commons	City of Kenosha	5500 – 60th Street
19	Lincoln Crest Apartments	Village of Twin Lakes	410 Lincoln Drive
20	Prairie Ridge Senior Campus	Village of Pleasant Prairie	7900 – 94th Avenue
21	Prairie Village Senior Apartments	Village of Pleasant Prairie	9500 – 81st Street
22	Residences on Main	Village of Twin Lakes	305 E. Main Street
23	St. Catherine Commons	City of Kenosha	3524 – 7th Avenue
24	Villa Ciera	City of Kenosha	1940 – 27th Avenue
25	Virginia Towers	City of Kenosha	5710 – 4th Avenue
Senior Apartments with Supportive Services			
26	St. Joseph's Villa Apartments	City of Kenosha	9250 – 29th Street
Nursing Homes			
27	Brookside Care Center	City of Kenosha	3506 Washington Road
28	Claridge House	City of Kenosha	1519 – 60th Street
29	Hospitality Nursing/Rehabilitation Center	City of Kenosha	8633 – 32nd Avenue
30	Kenosha Estates Rehabilitation and Care Center	City of Kenosha	1700 – 60th Street
31	Manorcare Health Services – Kenosha	City of Kenosha	3100 Washington Road
32	Sheridan Medical Complex	City of Kenosha	8400 Sheridan Road
33	St. Joseph's Home	City of Kenosha	9244 – 29th Avenue
34	Water's Edge Rehabilitation and Care Center	City of Kenosha	3415 N. Sheridan Road
Community Based Residential Facilities			
35	Advocate Homes, LLC	City of Kenosha	6555 Pershing Boulevard
36	Aspen Home	City of Kenosha	6225 – 91st Street
37	Azura Memory Care of Kenosha North	City of Kenosha	4600 – 52nd Avenue
38	Azura Memory Care of Kenosha South	City of Kenosha	7135 – Green Bay Road
39	Birch Home	City of Kenosha	1549 – 25th Avenue

Table D-5 (continued)

Number on Map 24	Facility Name	Municipality	Address
Community Based Residential Facilities (continued)			
40	Brookdale Kenosha	City of Kenosha	10108 – 74th Street
41	Brookdale Kenosha North	City of Kenosha	3109 – 12th Street
42	Brookdale Pleasant Prairie	Village of Pleasant Prairie	7377 – 88th Avenue
43	Canterbury Home of Kenosha	City of Kenosha	7924 – 36th Avenue
44	Caralott	City of Kenosha	4901 – 56th Street
45	Carey Manor	Village of Pleasant Prairie	10628 – 22nd Avenue
46	Casa del Mare	City of Kenosha	3508 – 7th Avenue
47	Columbus House	City of Kenosha	2210 – 55th Street
48	Cottonwood	City of Kenosha	5415 Adams Road
49	Dayton Residential Care	City of Kenosha	521 – 59th Street
50	Edwards House	City of Kenosha	4831 – 47th Avenue
51	Genesis Options Residential Program	City of Kenosha	6755 – 14th Avenue
52	Harbor Village East	City of Kenosha	1130 – 82nd Street
53	Harbor Village West	City of Kenosha	1150 – 82 Street
54	Harmony of Kenosha	City of Kenosha	3109 – 30th Avenue
55	Home Inspired Senior Living	City of Kenosha	1201 Village Centre Drive
56	Kare Center	City of Kenosha	510 – 60th Street
57	Linden Home	City of Kenosha	3216 – 29th Street
58	Open Arms	City of Kenosha	2217 – 56th Street
59	Parkside Manor	City of Kenosha	6300 – 67th Street
60	Ravenswood	City of Kenosha	2615 – 45th Street
61	South Winds	City of Kenosha	6305 – 7th Avenue
62	St. James Manor	City of Kenosha	910 – 59th Street
63	Sycamore Home	City of Kenosha	9211 – 66th Street
64	Transition House I	City of Kenosha	6024 – 18th Avenue
64	Transition House II	City of Kenosha	5905 – 19th Avenue
66	Transitional Living Services	City of Kenosha	1834 – 60th Street
67	Windy Oaks	Village of Pleasant Prairie	11831 – 120th Court
Residential Care Apartment Complexes			
68	Casa del Mare	City of Kenosha	3508 – 7th Avenue
69	Celebre Place	City of Kenosha	1870 – 27th Avenue
70	Meadowmere Southport Assisted Living	City of Kenosha	8351 Sheridan Road
71	Regent Manor	City of Kenosha	7905 – 36th Avenue
Adult Day Care Facilities			
72	Easter Seals Adult Day Care Services at Kenosha YMCA	City of Kenosha	7101 53rd Street
73	Lake View Recplex	Village of Pleasant Prairie	9900 Terwall Terrace
Adult Family Homes			
74	Alder Home	City of Kenosha	8212 – 61st Street
75	Alpha Homes of Wisconsin IX	City of Kenosha	5603 – 49th Avenue
76	Alpha Homes of Wisconsin VIII	Village of Somers	101 – 11th Avenue
77	Alpha Homes of Wisconsin X	City of Kenosha	1822 – 12th Place
78	Alpha Homes of Wisconsin XI	City of Kenosha	2922 – 22nd Avenue
79	Alpha Homes of Wisconsin XII	City of Kenosha	8114 – 60th Avenue
80	Alpha Homes of Wisconsin XIII	City of Kenosha	1481 – 39th Avenue
81	Alpha Homes of Wisconsin XIV	City of Kenosha	3506 – 85th Place

Table D-5 (continued)

Number on Map 24	Facility Name	Municipality	Address
Adult Family Homes (continued)			
82	Cara Care	City of Kenosha	6316 53rd Street
83	CLA Twin Lakes	Village of Twin Lakes	1222 Winged Foot Drive
84	Emerald Home	City of Kenosha	5044 32nd Avenue
85	Eternal Hope	Town of Randall	9255 – 392nd Avenue, Powers Lake
86	Fall Home	City of Kenosha	6531 94th Avenue
87	Four Seasons Residential Living Winter Home	City of Kenosha	6429 94th Avenue
88	Harvest Home	City of Kenosha	9208 66th Street
89	Hawthorne Home	City of Kenosha	6244 – 95th Avenue
90	Hickory Home	City of Kenosha	5915 – 67th Street
91	Independent Living Adult Family Home	City of Kenosha	4004 – 29th Avenue
92	Juniper Home	City of Kenosha	3513 29th Street
93	Kings Care Residential	City of Kenosha	6320 – 53rd Street
94	Lauer Adult Family Home	Village of Pleasant Prairie	8770 83rd Place
95	Magnolia's Assisted Living and Transportation	City of Kenosha	1757 – 20th Avenue
96	Magnolia's Assisted Living on 69th	City of Kenosha	4802 – 69th Street
97	New Seasons Winter Home	City of Kenosha	7003 – 92nd Avenue
98	Peace and Serenity Residential AFH	City of Kenosha	5405 – 42nd Avenue
99	Pershing Place	City of Kenosha	7409 Pershing Boulevard
100	Pines Home	City of Kenosha	3104 – 15th Street
101	Raymond John and Stephen Lloyd, LLC	City of Kenosha	5500 – 41st Street
102	Reindl Home	Village of Pleasant Prairie	7851 – 115th Avenue
103	Restoring Hope Adult Family Services	City of Kenosha	5020 – 18th Avenue
104	Sandalwood	City of Kenosha	4415 – 31st Avenue
105	Serenity Home Health Care, LLC	City of Kenosha	6038 – 49th Avenue
106	Serenity Home Health Care, LLC II	Village of Pleasant Prairie	12129 – 43rd Avenue
107	Southern Hope Homes, LLC	City of Kenosha	4202 – 45th Street
108	Spring Home	City of Kenosha	6525 – 94th Avenue
109	Summer Home 2	City of Kenosha	6009 94th Court
110	Summer Manor	Village of Pleasant Prairie	10212 – 82nd Street
111	Sunrise Home	City of Kenosha	6504 – 92nd Avenue
112	Sunset Home	City of Kenosha	6430 – 92nd Avenue
113	Willow Home	City of Kenosha	3102 – 15th Street

Source: Wisconsin Department of Health Services, Kenosha County Department of Human Services, and SEWRPC.

KENOSHA COUNTY HAZARD MITIGATION PLAN UPDATE: 2017-2021

Appendix E

**PLANS WITH OPEN SPACE ELEMENTS
CONSISTENT WITH REGIONAL PLAN
RECOMMENDATIONS: KENOSHA COUNTY**

Land Use and Comprehensive Plans		
Community	Plans Prepared by	Date
City of Kenosha	City of Kenosha/SEWRPC	April 2010
Village of Paddock Lake	Vandewalle & Associates, Inc.	April 2005
Village of Pleasant Prairie	SEWRPC	December 1995 ^a
Village of Bristol	Meehan and Company, Inc.	September 2006
Town of Paris	Camiros, Ltd.	April 1995
Town of Salem	Meehan and Company, Inc./SEWRPC	March 2010 ^b
Town of Somers	SEWRPC	December 1995
Town of Wheatland	SEWRPC	May 2010

Park and Open Space Plans		
Community	Plans Prepared by	Date
City of Kenosha	SAA Design Group	July 2011
Village of Paddock Lake	Vandewalle & Associates, Inc.	September 2006
Village of Pleasant Prairie	Village of Pleasant Prairie	May 2013
Village of Silver Lake	Vandewalle & Associates, Inc.	September 2003
Village of Twin Lakes	Ruekert & Mielke, Inc.	November 2005
Village of Bristol	Meehan and Company, Inc.	January 2009
Town of Randall	Ruekert & Mielke, Inc.	April 2008
Town of Salem	SEWRPC	March 2005
Town of Somers	Ruekert & Mielke, Inc.	October 2009

^aThe Village of Pleasant Prairie has prepared neighborhood plans to detail the land use element of the Kenosha Urban Planning District Plan.

^bThe Town of Salem has also adopted 11 neighborhood plans to detail the Town land use plan. These were prepared by Meehan and Company, Inc. and adopted by the Town Board during the period November 2004 to October 2007.

Source: SEWRPC.KENOSHA CO APPENDIX E DRAFT (00224132).DOC
500-1112
JEB/mid
06/01/16

Appendix F

**EXAMPLES OF OUTREACH MATERIAL PUBLISHED
BY THE WISCONSIN DEPARTMENT OF HEALTH
SERVICES AND THE WISCONSIN DIVISION OF
EMERGENCY MANAGEMENT FOR INFORMATIONAL
AND EDUCATIONAL EFFORTS DIRECTED TOWARD
SOLVING LOCAL HOMEOWNERS' FLOODING
PROBLEMS**

KENOSHA CO APPENDIX F DRAFT (TITLE) (00224133).DOC
500-1112
JEB/pk
03/06/15 From APD-B FINAL CAPR-278-2ED (#157600)

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Wisconsin Flood Toolkit



Wisconsin
Department of Health Services
Division of Public Health
Bureau of Environmental and Occupational Health

P-00631 (3/2014)

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Wisconsin
Department of Health Services
Division of Public Health
Bureau of Environmental and Occupational Health



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Introduction

Purpose

The purpose of this flood toolkit is to provide information to local governments, health departments, and citizens in Wisconsin about preparing for and responding to flood events. The toolkit focuses on providing background information, practical guidance, strategies, media releases, talking points, definitions, and useful reference materials on this topic. The guides in this toolkit may be copied and printed onto local government or health agency letterhead for distribution to residents affected by flood. Additional documents may be found in Appendix B, Additional Resources.

Background

Although Wisconsin does not have exceptionally steep terrain, mountain slopes, or low-lying coastlands, significant areas of the state are flooded every year. Flooding in Wisconsin is generally caused by the accumulation of excessive surface runoff in low-lying flat areas or the



Image Source: [WICCI](#)

overflowing of rivers and lakes. Routine annual flooding poses a danger to human life and safety, causes significant damage to property and infrastructure, and negatively affects the state's economy. From 1990 to 2008, Wisconsin experienced eight flood-related fatalities¹ and countless injuries caused by responding to and recovering from flood events. Flooding in southwestern Wisconsin in 2008 was responsible for property damage, agricultural losses, and business losses with an estimated value of \$764 million to \$1 billion.² Based on these data, preparing for flood events remains a priority for Wisconsin governmental units, citizens, and businesses.

Climate Trends

Long-term trend analysis of Wisconsin's climate indicates that the state is becoming warmer and wetter. Climate data has provided evidence that parts of southern and western Wisconsin have had an increase in annual precipitation of 7 inches above the 1950-2006 average. After analyzing historical climate data from 1950 to 2006 and developing downscaled local climate models, University of Wisconsin climate scientists created potential climate projections based on the historical trends and scientifically validated models.³ Several of the modeled outcomes suggest that flooding may become much more likely, and more intense, in coming years.

These projections suggest that Wisconsin emergency planners may be faced with more precipitation, coming in more frequent and intense storms, and more runoff, especially during the winter when soil may be frozen.³

Health Impacts

These projections also suggest that Wisconsin may need to prepare for many more public health impacts due to flooding, including drowning, contaminated drinking water, damaged and dangerous property, and exposure to mold. Emergency planning must consider flooding needs, such as access to safe food and drinking water, safe use of electrical and heating appliances, and transportation out of flood zones.

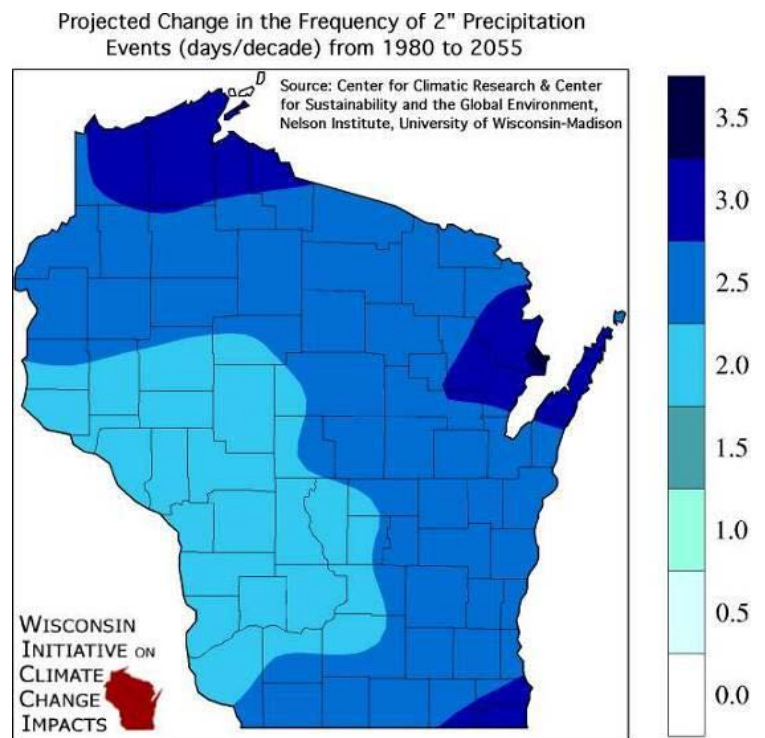


Image Source: [WICCI](#)

Flood Response and Recovery Guidance

Under the Wisconsin “Home Rule” principle, flood preparedness and response are considered local activities. The local or county Emergency Management office, health agency, or police/fire first responders will be the lead agency during a flood event. However, when requested, state resources will be provided to assist and support the local response.



Image Source: [Google](#)



Definitions

Surface Water Flooding

Flooding due to increased flow volumes in river and stream beds reaching over their banks, increased flow volumes released from breached dams and impoundments, high volumes of overland flow (runoff), or increased recharge causing lake water levels to rise over their shorelines.

Groundwater Flooding

Flooding due to increased recharge causing the water table to rapidly rise, either forcing water to flood above the ground surface or forcing water by hydraulic pressure through cracks and crevices and into basements.

Septic System

A privately owned and operated home wastewater disposal system which includes: conventional septic tank/drain field systems, dry wells, holding tanks, mound systems, and alternative treatment systems.

Safe Water Supply

Drinking water is considered to be “safe” when it is determined to be free of coliform bacteria by a certified laboratory following approved standard methods. The accepted standard is “0” colony-forming units (cfu) of coliform bacteria per 100-ml of water or a “negative” result using a presence/absence sampling medium.

Flood/Flash Flood Watch

Flooding or flash flooding is possible in the flood watch area.

Flood/Flash Flood Warning

Flooding or flash flooding is already occurring or will occur soon in the warning area.

Guide 1: General Flood Information

Do NOT swim or bathe in rivers, streams, creeks, or lakes in flooded areas!



Surface Water

For public beaches and access points to surface water, contact your local parks department or local health department for monitoring information at these sites. Additional information on recreational water testing can be found at the Wisconsin State Lab of Hygiene webpage.

Flood waters may contain many contaminants, such as:

- ◆ Sewage
- ◆ Fertilizer
- ◆ Manure
- ◆ Gasoline
- ◆ Pesticides
- ◆ Hazardous materials
- ◆ Large pieces of debris, such as tree limbs, boulders, metal objects, sharp objects like nails and glass, fence posts, etc.

Local Public Health Department Contact Information:

Water Testing Information: <http://www.slh.wisc.edu/environmental/microbiology/>

Drinking Water Issues

Be sure to check with your [local health department](#) regarding well testing kits, well disinfection information, or available flooding resources.

Municipal Water Users

- Turn on and run faucets for at least five minutes before using water for drinking or food preparation.
- If a "boil water" notice is issued, follow any directions given by the Wisconsin Department of Natural Resources, local water utility, or [local health department](#).

Private Well Owners

- Private well owners whose well has been flooded should assume that flooded wells are contaminated.
- Do not drink or bathe in water from a private well that has been or is flooded.
- Wait until floodwaters have receded before sampling or disinfecting your well.
- To sample your water supply yourself, obtain a well water testing kit from your [local public health department](#).
- If contamination is found, [disinfect your well/water supply](#). See guide on Well Disinfection.
- Until the test results are known, follow these procedures to ensure safe drinking water:
 - Drink bottled water or water from a known, safe source.
 - If necessary, you can make water safe to drink by boiling it for five minutes.
- When in doubt, if the water is **CLOUDY, ODOROUS, COLORED - DO NOT DRINK THE WATER!**

Private sewage systems that are flooded are no longer reliable. Portable toilets or other facilities should be used.

Sewage may backflow from your septic or municipal system through floor drains, toilets, etc. Any affected areas, such as basements, must be cleaned and disinfected, as with a chlorine solution. Anything that cannot be cleaned should be thrown out.

→ Private Sewage Systems

For more information contact your [local zoning office](#), [code administrator](#), or [sanitary inspection office](#).

Guide 2: Flood Preparedness

Secure your home:

- Contact your local health department to familiarize yourself with community emergency plans.
- Speak to your insurance company about flood coverage.
- List emergency numbers and contacts near phones.
- If you live in a flood zone, raise electrical components, furnace, and water heater above flood zone level.
- Install backflow valves for drains, toilets, and other sewer connections.
- Install sump pumps with backup power.

In case of a flood watch or warning:

- Gather emergency supplies (see next page).
- Stay informed – listen to local weather reports.
- Turn off power.
- If time allows:
 - Bring outdoor possessions indoors and secure them.
 - Fill bathtubs, sinks, and plastic bottles with clean water.
- **Do not walk through water.** If water levels begin to rise, immediately seek higher ground.
- Prepare for evacuation:
 - Make transportation arrangements and make sure the gas tank is full.
 - Check on friends, family, and neighbors that may be isolated or unaware of the situation.
 - Collect important documents including ID cards, insurance cards, and medical records.
 - Map a safe evacuation route in advance.

In case of an ordered evacuation:

- Turn off the gas, electricity, and water.
- Disconnect appliances.
- Listen to evacuation orders and follow evacuation route.
 - Take emergency supplies, as outlined on the next page.
- Avoid flood zones and remain informed by listening to weather reports.

<http://www.bt.cdc.gov/disasters/floods/readiness.asp>

http://www.redcross.org/images/MEDIA_CustomProductCatalog/m4340128_Flood.pdf



ESSENTIAL MODERN SURVIVAL KIT



WATER

Potable water in suitable containers for immediate drink-ability, and a water filter for purifying after you run out of bottled water.

***Note: Have one gallon per person per day for at least three days.**



FOOD

High calorie foods such as high calorie energy bars or MRE (meals-ready-to-eat) are vital to maintain sufficient energy to keep going.

***Note: Pack at least a three-day supply of non-perishable food- and don't forget the manual can opener!**



EXTRA CLOTHING

Even if it's warm outside, if you get in trouble without extra clothes, hypothermia becomes a risk. Bring a stocking hat and rain jacket; and avoid cotton which is worthless when wet.



BODY WARMERS

Body warmers. Bring reflective "aluminized" space blanket or survival blanket to retain body heat, catalytic heater and bottled gas fuel.



SHELTER

Small tent, tarp with grommets, large plastic trash bag as poncho or expedient shelter roof.



SUNGLASSES

Good vision is essential. There are some great sunglasses out there that will enhance your vision, provide polarization for water or snow, and will prevent eye fatigue.



SANITATION

Toilet paper, hygiene products, soap, hand-towel and any other body care products you may need.



FIRST AID KIT

First aid kit. Keep at least the basics: band aids, sterile gauze, disinfectant, first aid manual, medical tape, medical scissors, disposable gloves, tweezers, cotton swabs and a thermometer.



EXTRA CASH

Extra cash will enable you to purchase the supplies you did not include and other necessary items. Although it may not be needed or deemed useless in the event of a major disaster, it is always good to keep some emergency cash on hand. A good amount to save is \$50 for a disaster survival kit.



MEDICATIONS

Medications. There should be at least a seven-day supply of any prescription and non-prescription medications used by family members in your disaster survival kit.



MATCHES

'Strike Anywhere' matches, not the type that you must strike on the box. Store the matches in a water-tight case. Keeping a lighter and a fire starter in addition to matches are a good idea.



POCKET KNIFE

A multi-purpose tool with a knife is ideal.



MAP

Simply having a good map of the region you're in could get you out of trouble. Know how to read and navigate with maps.



COMPASS

A compass is ideal for establishing bearings while used in conjunction with a map. A GPS isn't so good for that.



FLASHLIGHT

And extra batteries. A LED flashlight, preferably a head-mounted style, is the best choice. Even though LED flashlight batteries last a considerable time, keep extras.



PERSONAL DOCS

Important personal documents like proof of address, insurance policies, birth certificates and passports should be stored together in an area with easy access in case of a natural disaster.



WEATHER RADIO

A small weather radio will keep you informed of the conditions outside and where to seek shelter or emergency personnel during and after a natural disaster.



CELL PHONE

And chargers. The towers may be down following a natural disaster, but emergency personnel will get them repaired fast for communication. Keep a cell phone with a wall and car charger handy.

SOURCES:

<http://modernsurvivalblog.com/survival-kit/>

<http://www.idealhomegarden.com/home-improvement/disaster-survival-kit>

http://en.wikipedia.org/wiki/Survival_kit

Guide 3: Disinfecting Your Well and Water System

DO NOT TURN ON THE PUMP!

- Step 1:** Close the valves so you will bypass your water softener and any other water treatment equipment. A strong chlorine solution can damage this equipment. You should disinfect these devices separately following the manufacturer's instructions.
- Step 2:** Calculate the amount of bleach needed for your well according to the following table:

Depth of Water	Diameter of Well					
	0.5 foot	1 foot	2 feet	3 feet	4 feet	5 feet
10 feet	1/2 cup	1-3/4 cups	7 cups	1 gal	1-3/4 gal	2-3/4 gal
20 feet	1 cup	3-1/2 cups	14 cups	2 gal	3-1/2 gal	5-1/2 gal
30 feet	1-1/2 cups	5-1/4 cups	1-1/4 gal	3 gal	5-1/4 gal	8-1/4 gal
40 feet	2 cups	7 cups	1-3/4 gal	4 gal	7 gal	11 gal
50 feet	2-1/2 cups	8-3/4 cups	2-1/4 gal	5 gal	8-3/4 gal	13-3/4 gal

Notes:

- Use only unscented household liquid chlorine bleach.
- Bleach concentrations can vary between 5% and 6%.
- Quantities given in this table are approximate and are rounded to the nearest practical measurement. Amounts given are calculated in accordance with reaching a chlorine concentration of 100 mg/L.

Key:

- gal: gallon
- 1 cup = 8 fluid ounces
- 1 gallon = 16 cups

http://www.cdc.gov/healthywater/emergency/safe_water/wells/disinfection_wells_bored.html

- Step 3:** Using water from a known, safe source, add a volume of water – at least as great as the volume of water standing in the well – and the bleach into new, clean garbage cans or other comparable containers.
 - When handling bleach, wear rubber hand and eye protection.
- Step 4:** Turn off the power supply to the well, remove your well cap or seal, and note any issues with the well that may need repair.



- Step 5:** Carefully pour the bleach solution down the well in one continuous pour.
- Step 6:** Connect a new, clean hose to a nearby hose faucet and turn the electrical power back on.
- Step 7:** Turn the water faucet on and recirculate the chlorinated solution through the hose and back to the well. Be sure you rinse the inside surface of the casing, all the way down to the bottom of the well.
- Step 8:** Turn off the electrical power and drain both the pressure tank and the water heater. (Doing this will allow the water from these tanks to be totally replaced by the chlorinated solution.)
- Step 9:** Turn the electrical power to the pump back on. Let the well water refill the pressure tank and water heater.
- Step 10:** Turn on every water faucet, both inside and outside, until you can smell chlorine in each one.
- Step 11:** Turn off every faucet, and allow the chlorine solution to remain in the well and plumbing system at least overnight, but preferably for 24 hours.
- Step 12:** Flush the chlorine solution from the entire water system by using a hose connected to an outside faucet. Run the chlorinated water out of the system, but not into your septic system or into surface waters.
- Step 13:** Keep running the water until you can no longer notice a smell of chlorine at any faucets.
- Step 14:** Wait a few days, and then resample your well water to make sure it is bacteriologically safe to drink.



Guide 4: Re-entering Your Home

A home that is flooded might be contaminated with mold or sewage, which can cause health risks for your family. There might also be safety risks if your gas and electric service was interrupted. The following tips will help you avoid or reduce health and safety risks as you re-enter your home.



Avoid the Flood Zone

- **Turn Around, Don't Drown®**: The Centers for Disease Control and Prevention (CDC) reports that **half of all flood-related drowning occurs when a vehicle is driven into floodwaters**. The next highest percentage is due to walking into or near flood waters.
- **Two feet of rushing water can carry away most vehicles, and six inches can knock over an adult.**
- Stay out of areas that are barricaded or closed.



Natural Gas Safety

- **If you notice a natural gas odor when entering your home, do NOT enter. Immediately call your local utility company or fire department.**
- Have your furnace or gas appliance inspected by a professional repair person, and then have them relight the appliance or furnace.
- While waiting for your furnace to be relighted, do NOT use other heating sources, such as gas space heaters, grills, or other appliances, that can give off dangerous fumes.
- **Carbon monoxide produced by gas appliances is dangerous and can be fatal.** If using a portable generator, keep it outside and far away from the building. Breathing the exhaust fumes from a portable generator could result in death in minutes.





Electrical Safety

- **Never turn power on or off while standing in water.**
- Have your electrical system inspected by an electrical contractor or building inspector.
- **Any electrical outlets that were submerged MUST be inspected for safety.**
- If you have electrical problems, call your local utility company.
- Electrical appliances that were exposed to water must be completely dry before use. Note: Electrical motors that were submerged probably will not work (e.g., refrigerator motor).
- If you use electric heaters, be careful to place them away from items that can burn. **Do not leave electric heaters unattended.**



Water Damage



Image Source: [Google](#)

Note: Damaged or wet flooring, carpeting, furniture, drywall, insulation, etc., should be removed and disposed of to prevent mold growth. In case of water damage, contact your [local public health department](#) for a list of plumbers and a flood brochure.

- Buildings that have been flooded should be inspected by a building inspector for structural damage before re-occupancy.
- If your basement is flooded, don't rush to pump it out. If you drain your basement too quickly, the pressure outside the walls will be greater than the pressure inside, which may cause the basement floor and walls to crack and collapse.
- Broken water pipes may have created puddles in your home. **Using electrical appliances while standing in water can cause electric shock or electrocution.**
- If you receive a cut or puncture wound while cleaning your home, tetanus shots are available through your [local public health department](#).
- If you are on municipal water, run water faucets for at least five minutes before using water for drinking or food preparation. If a "boil water" notice is issued, follow any directions given by the Department of Natural Resources, the local utility company, or your [local public health department](#).



Guide 5: What to do with Food after a Flood

Type of Food	Proper Action after Flood
Baby formula	Use only pre-prepared, canned baby formula that requires no added water.
Food not in waterproof containers	Discard if they have come into contact with floodwaters.
Canned foods	Discard if damaged. (Undamaged, commercially canned foods can be saved if you remove the can labels, wash cans, and disinfect with one cup bleach to five gallons of water. Re-label cans, including expiration date, with a marker.)
Screw caps, snap lids, crimped caps (soda pop bottles), twist caps, flip tops, and home-canned foods	Discard if they have come into contact with floodwaters.
Refrigerated or frozen food	Check food for spoilage by odor and appearance. Perishable foods left at room temperature for more than two hours should be thrown out. Frozen food that has thawed should be thrown out.



Guide 6: Cleaning and Sanitizing with Bleach after an Emergency

Cleaning and sanitizing your household after an emergency is important to help prevent the spread of illness and disease.

Using Cleaning and Sanitizing Products

1. Wash surfaces with soap and warm, clean water to remove dirt and debris.
2. Sanitize surfaces with a bleach solution (see below for instructions to make a bleach solution).

It is critical to read and follow the safety instructions on any product you use. Below are important safety guidelines when using sanitizing products:

- **WARNING: Never mix bleach with ammonia or any other cleaner.** This creates toxic gases that are dangerous and can cause serious injury. Ammonia is commonly found in window cleaners – *check the cleaner bottle to see if it contains ammonia.*
- Wear rubber boots, gloves, and eye protection.
- If using bleach mixtures indoors, open windows and doors to allow fresh air to enter.

Cleaning and Sanitizing with Bleach

Use regular unscented 5% household bleach and follow the instructions in the attached charts.



Recommendations for Cleaning and Sanitizing Various Surfaces with Bleach and Water

<i>Area or Item to be Cleaned</i>	<i>Amount of Bleach and Water to Mix</i>		<i>Cleaning Steps</i>
	Bleach Amount	Water Amount	
Clean and Sanitize Food Cans and Surfaces			
Food surfaces that may have touched floodwaters (Examples: countertops, cups and plates, flatware) Note: Throw away wooden cutting boards, infant toys, baby bottle nipples, and pacifiers.	1 teaspoon	1 gallon	<ol style="list-style-type: none"> 1. Wash with soap and warm, clean water. 2. Rinse with clean water. 3. Dip or rinse in a sanitizing solution of 1 teaspoon of bleach per 1 gallon of clean water. 4. Allow to air-dry.
Food cans that are not bulging, open, or damaged	1 cup	5 gallons	<ol style="list-style-type: none"> 1. Remove can labels. 2. Wash cans with soap and warm, clean water. 3. Dip cans in mixture of 1 cup of bleach per 5 gallons of water. 4. Allow to air-dry. 5. Re-label cans with permanent marker.



Clean and Sanitize Other Household Surfaces and Items

Surfaces that do not soak up water and that may have touched floodwaters (Examples: floors, stoves, sinks, certain toys, countertops, and tools)	1 cup	5 gallons	<ol style="list-style-type: none">1. Clean surface with soap and warm, clean water.2. Rinse with clean water.3. Sanitize using a mixture of 1 cup of bleach to 5 gallons of water.4. Allow to air-dry.
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Clean Mold Growth From Hard Surfaces

Mold growth on hard surfaces (Examples: floors, walls, windows, stoves, sinks, certain toys, countertops, flatware, plates, and tools)	1 cup	1 gallon	<ol style="list-style-type: none">1. Mix 1 cup of bleach in 1 gallon of water.2. Wash surfaces with the bleach/water mixture.3. If surfaces are rough, scrub them with a stiff brush.4. Rinse surfaces with clean water.5. Allow to air-dry.
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Source: [CDC](#)



Guide 7: Mold Cleanup with Bleach

Before you clean

Fungi (molds) need a source of moisture, a source of organic matter, and proper temperature. After a flood event, the floodwaters will have soaked carpeting, furniture, building materials (drywall, wood studs, flooring, etc.), creating a suitable environment for mold growth. These materials must be removed or completely dried out to prevent mold from growing. Areas inside your home that have poor air movement and retain moisture are likely areas for future mold growth. Remove any sources of moisture, and repair damage that may contribute to moisture.



Image Source: [Google](#)



Image Source: [FEMA](#)

If I see mold in my home should it be tested?

Testing for mold is generally not necessary. If you can **see and smell it**, you have a mold problem. In flood situations, mold growth may begin on the back side of wet drywall, between building substrates, or under wet carpeting. It may not be visible, but you may notice a musty or moldy smell. Elimination of wet, flood-damaged building materials, furnishings, and personal items will be necessary to prevent mold problems. If ongoing mold problems occur, it is recommended that you have a thorough inspection to determine the cause of the mold growth. The Wisconsin Department of Health Services recommends that you hire a consultant specializing in building assessments to evaluate your entire house.

How can I clean up mold in my home?

Occasionally, mold can be found in the bathroom - on a windowsill, shower curtain, or wall.

This mold can be wiped off the surface with a damp cloth and cleaning agent (e.g., window or bathroom cleaner).

Preventing mold growth requires controlling the moisture source. This may be as simple as using a dehumidifier or fixing a simple leak.

For larger mold problems (about 10 square feet), follow the instructions on the next pages.

Get Rid of Mold

After a flood, mold will grow in your house. It can make you sick. You will need to clean your house.



Take things that were wet for 2 or more days outside.

Things that stayed wet for 2 days have mold growing on them even if you can't see it.

Take out stuff made of cloth, unless you can wash them in **hot** water. Also take out stuff that can't be cleaned easily (like leather, paper, wood, and carpet).

Use bleach to clean mold off hard things (like floors, stoves, sinks, certain toys, countertops, flatware, plates, and tools).

Follow these steps:

- Never mix bleach with ammonia or other cleaners.
- Wear rubber boots, rubber gloves, goggles, and N-95 mask.
- Open windows and doors to get fresh air when you use bleach.
- Mix no more than 1 cup of bleach in 1 gallon of water.
- Wash the item with the bleach and water mixture.
- If the surface of the item is rough, scrub the surface with a stiff brush.
- Rinse the item with clean water.
- Dry the item or leave it out to dry.

Recommendations from the Centers for Disease Control and Prevention

Image source: [CDC](https://www.cdc.gov)

Step 1: **Preparation Phase** – What you need:

- Plastic sheets, at least 4 mm thick, to cover door openings, floors, and vents
- A breathing respirator that covers mouth and nose with HEPA cartridges
- Three spray bottles/plant misters
- Paper towels or disposable rags
- Heavy-duty plastic garbage bags
- General household cleaner (without ammonia)
- Regular household bleach (between 1% to 5% chlorine)
 - Note: Bleach is typically not necessary to clean up mold, unless a sewage release occurred. In that case, both mold and bacteria can be reduced by using a bleach solution as a final disinfecting rinse.
- Latex or rubber gloves and goggles
- A one-cup measuring container
- Three buckets that will hold at least one gallon of water each
- Commercial grade HEPA vacuum
 - Do not use a home vacuum since it is not designed for this type of work. Contact your local health department to find out where to rent a HEPA vacuum in your area.
- Dehumidifier
 - Do not use a fan since it can cause mold spores to be released.

Step 2: **Mixing Phase**

- **Spray bottle #1:** Mix general household cleaner and water in a bucket; then transfer to spray bottle (follow manufacturer's instructions).
- **Spray bottle #2:** Add 1 cup bleach to every gallon of tap water in a bucket; then transfer to spray bottle.
 - Note: Bleach is necessary when there has been a gray (laundry) or black (sewage) water release. Use precautionary measures, such as gloves and eyewear, when handling bleach.
- **Spray Bottle #3:** Clean, warm water for rinsing.

WARNING: Do not mix bleach with household cleaners that contain ammonia. If ammonia is mixed with bleach, a toxic gas can form, causing serious injury or death.

Step 3: **Application and Cleaning Phase**

- Prepare the work area:
 - Seal off the room from the rest of the house with the plastic and tape.
 - Keep children and animals out of the work area.
 - Do not eat, drink, use gum/tobacco, or smoke at any time during cleaning.
 - Use a dehumidifier prior to, during, and after the cleanup to keep areas dry and prevent mold from reoccurring.

CAUTION: The bleach solution is irritating and harmful to the skin, eyes, and clothing. Avoid direct

contact with the bleach by wearing rubber gloves, respirator, and goggles during the entire mixing and cleaning process.

- Removing the mold:
 - **Removing visible mold** – Spray with general household cleaner (spray bottle #1). Start from the top and work down, changing towels frequently. Discard towels in plastic bag. Rinse the same area with clean water on a damp towel or lightly spray with warm rinse water in a spray bottle (spray bottle #3) and wipe with a clean towel.
 - Repeat until all visible mold is gone.
 - **Removing mold and water** – Spray with bleach solution (spray bottle #2), wipe affected area of mold, and let set for 15 minutes. Rinse the area with a damp towel using clean, warm water or by lightly spraying with warm rinse water in a spray bottle (spray bottle #3) and wiping with a clean towel.

Step 4: **Cleaning up the Work Area**

- Once the surface is dry to the touch, use the HEPA vacuum to remove allergens. Place HEPA vacuum bag into a garbage bag. Tightly tie the garbage bag and dispose of it as you would your everyday household garbage.
- Flush wastewater down a toilet, utility sink, or floor drain.
- Change out of your cleaning clothes and wash them separately from your family's laundry.
- Wash hands and face.

- At this point, you can apply paint or other coating to the surface. You may wish to use a paint/coating that contains a fungicide to prevent future mold growth. Be sure to follow the manufacturer's instructions and recommendations when using any mold-resistant paint or paint additive. Remember, these are also pesticides and may have adverse health effects on some individuals.

- **Note on Use of Ozone Air Cleaners:**

Do not use ozone air cleaners to kill mold. Ozone air cleaners generate ozone: a known respiratory irritant. The U.S. Environmental Protection Agency (EPA) does not recommend using ozone-generating air cleaners for treating indoor mold problems. If a contractor recommends the use of an ozone-generating air cleaner to treat mold problems in your home, please file a complaint with the Department of Agriculture, Trade, and Consumer Protection at 1-800-422-7128.



Guide 8: Suggested Talking Points about Floods

These talking points may be inserted into Message Maps for outreach broadcasts pre-flood, during the flood, and post-flood. See the example on the following page.

Pre-Flood Event Messages

- Prepare a family plan, and have emergency telephone numbers available.
- Assemble a disaster supply kit with enough food, water, and other supplies for at least 72 hours.
- Obtain a National Weather Service (NWS) Emergency Band Radio or portable radio. Have extra batteries.
- Follow the guidance provided in broadcasted flood warnings.

During the Flood Event Messages

- Follow broadcasted evacuation guidance.
- Stay out of floodwaters if possible. Floodwaters may contain bacterial contaminants, hazardous substances, and debris or sharp objects.
- Don't travel into or through floodwaters, if possible. Obey warning and road-closed signs.
- Don't attempt to save household possessions during the flood event. Wait until dangerous flood conditions have passed.

Post-Flood Event Messages

- Be sure the flood zone has been secured and hazardous conditions (e.g., downed power lines) have been eliminated.
- Before entering into any building, be sure the building has been inspected for structural integrity and that hazards (e.g., natural gas leaks) have been eliminated.
- Attempt to assess damage and losses, and estimate value of damage to provide a community-wide damage assessment.
- Attempt to begin cleanup assessment and identify options quickly to minimize water damage and environmental contamination issues.

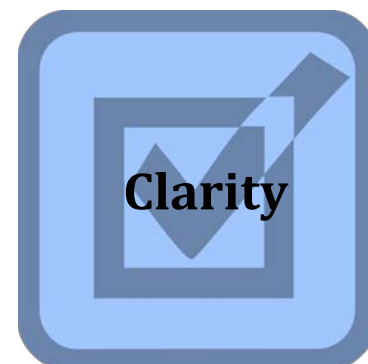
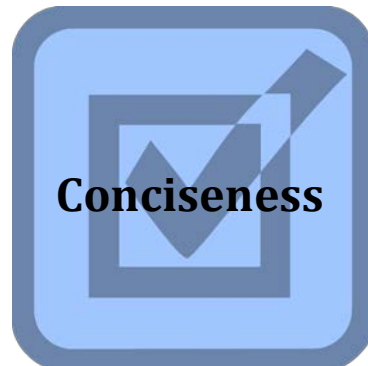


Guide 9: Message Maps during a Flood Event

Message mapping is one of the most important risk communication tools that public health agencies can employ. The goal of a message map is to convey important information in a concise and straightforward fashion.

General guidelines to follow when creating a message map include:

- Stick to three key messages or one key message with three parts for each underlying concern or specific question.
- Keep key messages brief. The reader should ideally spend less than 10 seconds per line.
- Develop messages that are easily understood by the target audience. (For communications with the general public, use a 6th to 8th grade readability level.)
- Place messages within a message set. The most important messages should occupy the first and last positions.
- Develop key messages that cite credible third parties.
- Use graphics and other visual aids to enhance key messages.
- Keep a positive tone. Messages should be solution oriented and constructive. Try to balance negative messages with positive ones.⁴
- Avoid unnecessary uses of the words no, not, never, nothing, and none.⁵



The following is a message map that could be used when addressing the general public regarding flood response and safety.

Main Message: “At this time, the City/County of _____ has experienced significant flooding. To help you and your loved ones stay safe during this event...”

Key Messages (3 key messages)	Supporting Information (3 items of supporting information for each key message)
<p>Message 1: Follow broadcasted evacuation guidance.</p>	<p>Supporting Information 1: Listen to messages being broadcast by Emergency Management, your local news media, or your local governmental leaders regarding evacuation procedures.</p> <p>Supporting Information 2: Those living alone can be isolated and unaware of the dangers posed by flooding.</p> <p>Supporting Information 3: Check on your neighbors, friends, and relatives.</p>
<p>Message 2: Stay out of flood waters, if at all possible.</p>	<p>Supporting Information 1: Floodwaters may contain many contaminants, including bacteria, viruses, hazardous wastes, debris, and sharp objects.</p> <p>Supporting Information 2: Half of all flood-related drowning occurs when a vehicle is driven into floodwaters. Follow this advice: Turn Around, Don't Drown®.⁵</p> <p>Supporting Information 3: The next highest percentage of drowning is due to walking into or nearby floodwaters.</p>
<p>Message 3: Don't attempt to save or salvage personal items during the flood.</p>	<p>Supporting Information 1: Wait until flooding has receded before attempting to salvage belongings.</p> <p>Supporting Information 2: Don't attempt to enter the flood zone until authorities have declared the area safe.</p> <p>Supporting Information 3: Don't return to a flood-damaged home until it has been inspected for structural safety and hazards.</p>



Appendix A: References

- 1 National Weather Service Weather Forecast Office, Milwaukee/Sullivan, WI. Floods and Flash Floods. (<http://www.crh.noaa.gov/mkx/?n=flashfloodflyer>)
- 2 National Weather Service. Hydrologic Information Center – Flood Loss Data. (<http://www.nws.noaa.gov/hic/index.shtml>)
- 3 Climate projections in this toolkit come from: Wisconsin’s Changing Climate: Impacts and Adaptation. 2011. Wisconsin Initiative on Climate Change Impacts. Nelson Institute for Environmental Studies. UW-Madison and Wisconsin Department of Natural Resources, Madison, WI.
- 4 Covello VT. Message mapping. Accessed March 7, 2014 at: http://www.orau.gov/cdcynergy/erc/content/activeinformation/resources/Covello_message_mapping.pdf
- 5 National Weather Service. Turn Around Don’t Drown®. (<http://tadd.weather.gov/tadd-intro.shtml>)

Appendix B: Additional Resources

Wisconsin Department of Health Services (DHS): Flood Hazards and Recovery

<http://www.dhs.wisconsin.gov/flood/index.htm>

DHS: West Nile Virus and Mosquito Bite Prevention

<http://www.dhs.wisconsin.gov/communicable/ArboviralDiseases/WestNileVirus/index.htm>

Wisconsin Emergency Management, "Ready Wisconsin": Flooding

<http://readywisconsin.wi.gov/flooding/default.asp>

American Red Cross: Flood Safety

<http://www.redcross.org/prepare/disaster/flood>

American Red Cross: Flood Information in Other Languages

<http://www.redcross.org/prepare/disaster-safety-library>

American Red Cross: Flood Safety Checklist

http://www.redcross.org/images/MEDIA_CustomProductCatalog/m4340128_FloodSafetyChecklist.pdf

Federal Emergency Management Agency (FEMA)

<http://www.fema.gov/>

FEMA Spanish Language Portal

<http://www.fema.gov/es/>

Federal Centers for Disease Control and Prevention (CDC): Floods

<http://emergency.cdc.gov/disasters/floods/>

Federal Environmental Protection Agency (EPA): Flood Cleanup (Booklet)

http://www.epa.gov/iaq/flood/flood_booklet_en.pdf

Federal Environmental Protection Agency (EPA): Mold Guide

<http://www.epa.gov/mold/pdfs/moldguide.pdf>

Federal Environmental Protection Agency (EPA): National Stormwater Calculator

<http://www.epa.gov/nrmrl/wswrd/wq/models/swc/>

List of Wisconsin Local Public Health Departments

<http://www.dhs.wisconsin.gov/localhealth/>

List of Wisconsin Tribal Health Directors

<http://www.dhs.wisconsin.gov/localhealth/>

List of County Building, Code, and Zoning Officials

http://www.wccadm.com/staff_directory.htm





Are You **READY WISCONSIN?**

✓ Get a Kit

✓ Make a Plan

✓ Be Informed

Floods

Know the Terms

Flood Watch

Flooding is possible. Tune in to NOAA Weather Radio All Hazards, commercial radio, or local television for information.

Flash Flood Watch

Flash flooding is possible. Be prepared to move to higher ground; listen to NOAA Weather Radio, commercial radio, or television for information.

Flood Warning

Flooding is occurring or will occur soon; if advised to evacuate, do so immediately.

Flash Flood Warning

A flash flood is occurring; seek higher ground on foot immediately.



Know What to Do

If a flood is likely in your area, you should:

- ◆ Listen to the radio or television for information.
- ◆ Be aware that flash flooding can occur. If there is any possibility of a flash flood, move immediately to higher ground. Do not wait for instructions to move.
- ◆ Be aware of streams, drainage channels, canyons, and other areas known to flood suddenly. Flash floods can occur in these areas with or without such typical warnings as rain clouds or heavy rain.
- ◆ If you must prepare to evacuate, you should do the following:
- ◆ Secure your home. If you have time, bring in outdoor furniture. Move essential items to an upper floor.
- ◆ Turn off utilities at the main switches or valves if instructed to do so. Disconnect electrical appliances. Do not touch electrical equipment if you are wet or standing in water.
- ◆ If you have to leave your home, remember these evacuation tips:
- ◆ Do not walk through moving water. Six

inches of moving water can make you fall.

If you have to walk in water, walk where the water is not moving. Use a stick to check the firmness of the ground in front of you.

- ◆ Do not drive into flooded areas. If floodwaters rise around your car, abandon the car and move to higher ground if you can do so safely. You and the vehicle can be quickly swept away.

Driving Flood Facts

The following are important points to remember when driving in flood conditions:

- ◆ Six inches of water will reach the bottom of most passenger cars causing loss of control and possible stalling.
- ◆ A foot of water will float many vehicles.
- ◆ Two feet of rushing water can carry away most vehicles including sport utility vehicles (SUVs) and pick-ups.

Wisconsin Emergency Management

<http://ready.wi.gov>

Phone: 608-242-3232 Fax: 608-242-3247

SEWRPC Community Assistance Planning Report No. 278-3ED

KENOSHA COUNTY HAZARD MITIGATION PLAN UPDATE: 2017-2021

Appendix G

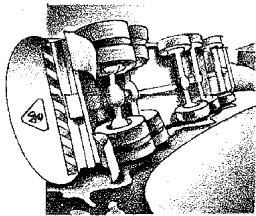
HOMEOWNER DISASTER PREPARATION INFORMATION

KENOSHA CO APPENDIX G DRAFT (TITLE) (00224134).DOC
500-1112
JEB/pk
03/06/15 From APD-G FINAL CAPR-278-2ED (#157602)

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Your Family Disaster Supplies Kit

Disasters happen anytime and anywhere. And when disaster strikes, you may not have much time to respond.

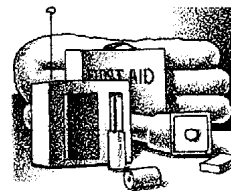


A highway spill of hazardous material could mean instant evacuation.

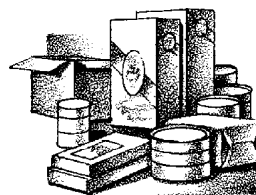


A winter storm could confine your family at home. An earthquake, flood, tornado or any other disaster could cut off basic services—gas, water, electricity and telephones—for days.

After a disaster, local officials and relief workers will be on the scene, but they cannot reach everyone immediately. You could get help in hours, or it may take days. Would your family be prepared to cope with the emergency until help arrives?



Your family will cope best by preparing for disaster *before* it strikes. One way to prepare is by assembling a Disaster Supplies Kit. Once disaster hits, you won't have time to shop or search for supplies. But if you've gathered supplies in advance, your family can endure an evacuation or home confinement.



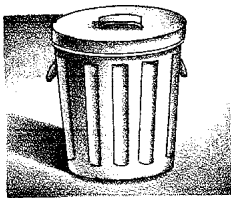
To prepare your kit

- Review the checklist in this brochure.
- Gather the supplies that are listed. You may need them if your family is confined at home.
- Place the supplies you'd most likely need for an evacuation in an easy-to-carry container. These supplies are listed with an asterisk (*).

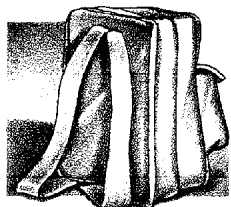


SUPPLIES

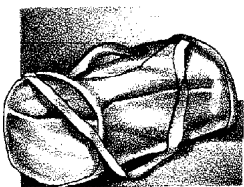
T here are six basics you should stock in your home: water, food, first aid supplies, clothing and bedding, tools and emergency supplies and special items. Keep the items that you would most likely need during an evacuation in an easy-to-carry container—suggested items are marked with an asterisk (*). Possible containers include



a large, covered trash container,



camping backpack,



or a duffle bag.

Water

Store water in plastic containers such as soft drink bottles. Avoid using containers that will decompose or break, such as milk cartons or glass bottles. A normally active person needs to drink at least two quarts of water each day. Hot environments and intense physical activity can double that amount. Children, nursing mothers and ill people will need more.

- Store one gallon of water per person per day (two quarts for drinking, two quarts for food preparation/sanitation)*
- Keep at least a three-day supply of water for each person in your household.



Food

Store at least a three-day supply of non-perishable food. Select foods that require no refrigeration, preparation or cooking and little or no water. If you must heat food, pack a can of sterno. Select food items that are compact and lightweight.

*Include a selection of the following foods in your Disaster Supplies Kit:

- Ready-to-eat canned meats, fruits and vegetables
- Canned juices, milk, soup (if powdered, store extra water)
- Staples — sugar, salt, pepper
- High energy foods — peanut butter, jelly, crackers, granola bars, trail mix
- Vitamins
- Foods for infants, elderly persons or persons on special diets
- Comfort/stress foods — cookies, hard candy, sweetened cereals, lollipops, instant coffee, tea bags



First Aid Kit

Assemble a first aid kit for your home and one for each car. A first aid kit* should include:

- Sterile adhesive bandages in assorted sizes
 - 2-inch sterile gauze pads (4-6)
 - 4-inch sterile gauze pads (4-6)
 - Hypoallergenic adhesive tape
 - Triangular bandages (3)
 - 2-inch sterile roller bandages (3 rolls)
 - 3-inch sterile roller bandages (3 rolls)
 - Scissors
 - Tweezers
 - Needle
 - Moistened towelettes
 - Antiseptic
 - Thermometer
 - Tongue blades (2)
 - Tube of petroleum jelly or other lubricant
 - Assorted sizes of safety pins
 - Cleansing agent/soap
 - Latex gloves (2 pair)
 - Sunscreen
- Non-prescription drugs
- Aspirin or nonaspirin pain reliever
 - Anti-diarrhea medication
 - Antacid (for stomach upset)
 - Syrup of Ipecac (use to induce vomiting if advised by the Poison Control Center)
 - Laxative
 - Activated charcoal (use if advised by the Poison Control Center)

Contact your local American Red Cross chapter to obtain a basic first aid manual.

Tools and Supplies

- | | |
|---|--|
| <input type="checkbox"/> Mess kits, or paper cups, plates and plastic utensils* | <input type="checkbox"/> Needles, thread |
| <input type="checkbox"/> Emergency preparedness manual* | <input type="checkbox"/> Medicine dropper |
| <input type="checkbox"/> Battery operated radio and extra batteries* | <input type="checkbox"/> Shut-off wrench, to turn off household gas and water |
| <input type="checkbox"/> Flashlight and extra batteries* | <input type="checkbox"/> Whistle |
| <input type="checkbox"/> Cash or traveler's checks, change* | <input type="checkbox"/> Plastic sheeting |
| <input type="checkbox"/> Non-electric can opener, utility knife* | <input type="checkbox"/> Map of the area (for locating shelters) |
| <input type="checkbox"/> Fire extinguisher: small canister, ABC type | |
| <input type="checkbox"/> Tube tent | Sanitation |
| <input type="checkbox"/> Pliers | <input type="checkbox"/> Toilet paper, towelettes* |
| <input type="checkbox"/> Tape | <input type="checkbox"/> Soap, liquid detergent* |
| <input type="checkbox"/> Compass | <input type="checkbox"/> Feminine supplies* |
| <input type="checkbox"/> Matches in a waterproof container | <input type="checkbox"/> Personal hygiene items* |
| <input type="checkbox"/> Aluminum foil | <input type="checkbox"/> Plastic garbage bags, ties (for personal sanitation uses) |
| <input type="checkbox"/> Plastic storage containers | <input type="checkbox"/> Plastic bucket with tight lid |
| <input type="checkbox"/> Signal flare | <input type="checkbox"/> Disinfectant |
| <input type="checkbox"/> Paper, pencil | <input type="checkbox"/> Household chlorine bleach |



Clothing and Bedding

*Include at least one complete change of clothing and footwear per person.

- | | |
|--|--|
| <input type="checkbox"/> Sturdy shoes or work boots* | <input type="checkbox"/> Hat and gloves |
| <input type="checkbox"/> Rain gear* | <input type="checkbox"/> Thermal underwear |
| <input type="checkbox"/> Blankets or sleeping bags* | <input type="checkbox"/> Sunglasses |



Special Items

Remember family members with special needs, such as infants and elderly or disabled persons.

For Baby*

- Formula
- Diapers
- Bottles
- Powdered milk
- Medications

For Adults*

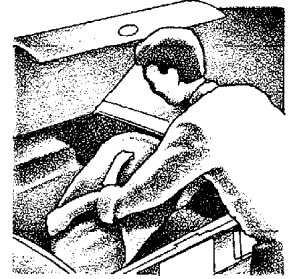
- Heart and high blood pressure medication
- Insulin
- Prescription drugs
- Denture needs
- Contact lenses and supplies
- Extra eye glasses

- Entertainment** - games and books

- Important Family Documents**
Keep these records in a waterproof, portable container.

- Will, insurance policies, contracts, deeds, stocks and bonds
- Passports, social security cards, immunization records
- Bank account numbers
- Credit card account numbers and companies
- Inventory of valuable household goods, important telephone numbers
- Family records (birth, marriage, death certificates)

- Store your kit in a convenient place known to all family members. Keep a smaller version of the Disaster Supplies Kit in the trunk of your car.



- Keep items in air tight plastic bags.
- Change your stored water supply every six months so it stays fresh.
- Rotate your stored food every six months.
- Re-think your kit and family needs at least once a year. Replace batteries, update clothes, etc.
- Ask your physician or pharmacist about storing prescription medications.



CREATE A FAMILY DISASTER PLAN

To get started...

Contact your local emergency management or civil defense office and your local American Red Cross chapter.

- Find out which disasters are most likely to happen in your community.
- Ask how you would be warned
- Find out how to prepare for each.

Meet with your family.

- Discuss the types of disasters that could occur.
- Explain how to prepare and respond.
- Discuss what to do if advised to evacuate.
- Practice what you have discussed.

Plan how your family will stay in contact if separated by disaster.

- Pick two meeting places:
 - 1) a location a safe distance from your home in case of fire.
 - 2) a place outside your neighborhood in case you can't return home.
- Choose an **out-of-state** friend as a "check-in-contact" for everyone to call.

Complete these steps.

- Post emergency telephone numbers by every phone.
- Show responsible family members how and when to shut off water, gas and electricity at main switches.

- Install a smoke detector on each level of your home, especially near bedrooms; test monthly and change the batteries two times each year.
- Contact your local fire department to learn about home fire hazards.
- Learn first aid and CPR. Contact your local American Red Cross chapter for information and training

Meet with your neighbors.

Plan how the neighborhood could work together after a disaster. Know your neighbor's skills (medical, technical). Consider how you could help neighbors who have special needs, such as elderly or disabled persons. Make plans for child care in case parents can't get home.

Remember to practice and maintain your plan.



The Federal Emergency Management Agency's Community and Family Preparedness Program and the American Red Cross Community Disaster Education Program are nationwide efforts to help people prepare for disasters of all types. For more information, please contact your local emergency management office and American Red Cross chapter. This brochure and other preparedness materials are available by calling FEMA at 1-800-480-2520, or writing: FEMA, P.O. Box 2012, Jessup, MD 20794-2012. Publications are also available on the World Wide Web at:

FEMA's Web site: <http://www.fema.gov>

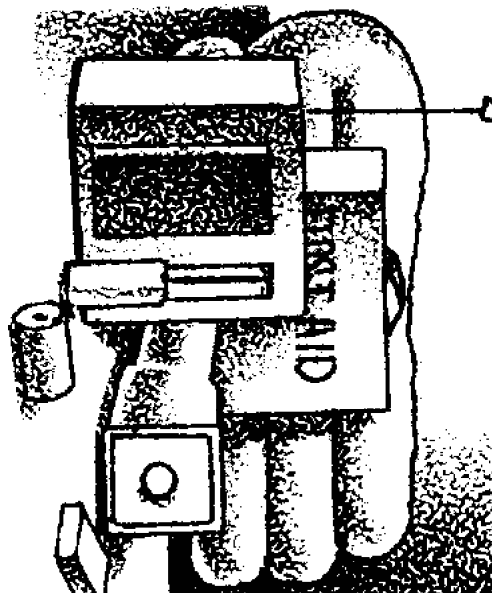
American Red Cross Web site: <http://www.redcross.org>

Local sponsorship provided by:

FEMA L- 189
ARC 4463

EARTHQUAKE • TORNADO • WINTER STORM • FIRE

Federal Emergency
Management Agency



Your
Family Disaster Supplies Kit

HURRICANE • FLASH FLOOD • HAZARDOUS MATERIALS SPILL

Appendix H

HAZARD RISK ANALYSIS AND PRIORITIZATION: 2016

NATURAL AND OTHER HAZARD RISK ANALYSIS

The major natural and other hazards that have been identified as potentially affecting Kenosha County have been ranked by risk to assist in developing a mitigation plan (see [Table V-8 in Chapter V](#) of this report, and [Tables V1-1 and VI-2 in Chapter VI](#) of this report). Additional description of natural and other hazards as well as the vulnerability assessment of Kenosha County to these hazards have been identified and summarized in Chapter III of this report. These priority rankings were based upon the number of incidences per year, number of mortalities, number of injuries, property damage, and crop damage inventories and analyses set forth in Chapter III. Specifically, this prioritization is based upon the protection of human life and health and protection from property [and crop](#) damages throughout the County. Therefore, the major indicators of hazard severity used to rank the natural and other hazards to Kenosha County are based upon the deaths and injuries versus economic losses resulting from such hazards and summarized in [Tables H-1 and H-2](#), respectively.

As identified in the vulnerability assessment of natural and other hazards to Kenosha County in Chapter III, the magnitude and consequent risk of a particular hazard is dependent upon a number of factors that include, but are not limited to, time (*e.g.*, time of year for thunderstorm events and transportation-related hazards, and time in terms of how long an event may last such as drought), size or scale, frequency of occurrence, population size potentially impacted, and amount of urban growth or development potentially impacted. This does not indicate that rural areas are any more or less important than urban areas; however, it does indicate that the more urbanized areas have a greater chance of loss in terms of human death, injury, and property damage per hazard event. It is also important to note, as identified in Chapter III, that many disaster events are compound in nature and not the result of a single event, such as increased coastal erosion and flooding hazards during a severe thunderstorm event. Nonetheless, since the causes of disasters of the past will likely be the best predictor of future disasters, an attempt was made to normalize all of the hazard incidences to an annual average in order to understand the relative potential level of risk each hazard poses to Kenosha County on an annual basis (see [Tables H-1 and H-2](#)).

Ranking Severity of Natural Hazards

Death and Injury

Using the data from the various sources summarized in the vulnerability assessment of Chapter III, the priority natural and human-induced hazards identified in Table III-8 were ranked with respect to their severity in terms of the sum of the number of annual death and injuries they caused and then by frequency of occurrence of each type of hazard event as shown in Table H-1.

Six of the 14 identified hazards are associated with mortality and injury, as shown in Table H-1. These hazards in order of appearance include: transportation-related accidents; thunderstorms, hail, and lightning events; extreme temperatures; tornadoes; hazardous material incidents; and winter storms. The remaining hazards have never been recorded to be associated with human mortality or injury within Kenosha County based upon known data.

Transportation-related accidents pose the greatest risk to human life and injury compared to any other hazard within Kenosha County. As summarized in the vulnerability and community impact assessment in Chapter III, transportation-related accidents are not expected to change significantly in the future due to their dependence upon a number of factors that include the type of vehicle, density of traffic, type of roadway, type of driver, road conditions, weather conditions, and safety equipment. There were several segments on IH 94 that exceeded the Kenosha County freeway system average crash rate of 45.7 crashes per 100 million vehicle-miles as shown on Map III-10. These are primarily located at on and off ramp locations.

Thunderstorms, high wind, hail, and lightning, as a group, represent the second most costly hazard in terms of injuries and lost lives. They pose a significant risk to public health and safety within Kenosha County. The vulnerability and community impact assessment indicates that the entire county is at risk from these hazards as shown on Map III-7 in Chapter III of this report. These events are highly unpredictable in terms of exactly where they may occur and how powerful they might be.

Temperature extremes are ranked as posing the third highest risk of injury or death in Kenosha County. The vulnerability and community impact assessment in Chapter III identified that this hazard was primarily related to public health concerns, and the individuals at greatest risk are the very young, the very old, and sick persons within the community.

Tornadoes are ranked as the fourth hazard posing the fourth largest risk of injury and death in Kenosha County. Like thunderstorms exactly where tornadoes may occur and how severe they may be are highly unpredictable. The entire County is at risk from tornadoes.

Hazardous material incidents are the fifth most costly hazard in terms of injuries and lost lives affecting Kenosha County. Hazardous material incidents may occur through releases from fixed facilities or pipelines or during transportation of such materials. In Kenosha County, these incidents cause an average of less than one death or injury per year.

Winter storms are the sixth most costly hazard in terms of injuries and lost lives affecting Kenosha County. In Kenosha County, these incidents cause an average of less than one death or injury per year.

The remaining eight hazards have not been recorded as causing mortality and injury in Kenosha County based upon known data. These include fog, flooding, terrorism incidents, drought, fires, Lake Michigan coastal erosion, power outages, and contamination or loss of water supply. It is important to note that although flooding and drought have not been recorded to cause mortality and injury, these hazards rank among the top eight recorded to be associated with significant property damage costs to Kenosha County (see Table H-2). This illustrates that there are significant differences in the ranking of hazards depending upon whether the ranks are derived by comparing hazard based upon their impacts on human life and injury or by comparing hazards based upon the damages to property and crops that result from hazard incidents (see Property Damage section below).

Table H-1 also shows that contamination or loss of water supply has not been recorded to have occurred in Kenosha County. Due to the potential impact on human life and health, the high potential for a mass casualty incident related to this hazard, and the fact that such incidents have been recorded elsewhere in the State of Wisconsin, this hazard was incorporated into the updated all-hazard mitigation plan in the implementation strategies by the Kenosha County Hazard Mitigation Local Planning Team (see Appendix A of this report).

The priority rankings based upon death and injury in this update are similar to those presented in the previous update of the Kenosha County hazard mitigation plan. While the rank order of most of the hazards in terms of mortality and injuries has changed, the ranks of all but one hazard are within two positions of their ranking in the previous update of the plan. In addition, the top seven most costly hazards in terms of mortality and injuries in this update include six of the seven hazards that were found to be among the most costly in the previous plan update.

Property Damage

Another way to assess the vulnerability of Kenosha County to natural and other hazards is to examine the property damage they cause. Again, using the data from the various sources summarized in the vulnerability assessment of Chapter III, natural and man-made hazards in Kenosha County were ranked with respect to their severity in terms of the annual sum of the property and crop damage caused and then by frequency of occurrence of each type of hazard event as shown in Table H-2.

Property or crop damages have been identified for **eight** of the 14 priority hazards. These hazards in order of appearance based upon total annual property damages, include: transportation accidents; flooding; thunderstorms, **high wind**, hail, and lightning; tornadoes; drought; hazardous material incidents; extreme temperatures, **and winter storms**. Among these hazards, transportation-related accidents were identified as **resulting in** the greatest **amount of damage to** property **and crops in** Kenosha County. As summarized in the vulnerability and community impact assessment in Chapter III, transportation-related accidents are not expected to change significantly in the future due to their dependence upon a number of factors that include the type of vehicle, density of traffic, type of roadway, type of driver, road conditions, weather conditions, and safety conditions.

Natural hazards associated with flooding, severe weather, and drought comprised **six** of the **eight** most costly hazards relative to property and crop damage in Kenosha County. The severe weather-related hazards include thunderstorms/high wind, lightning, and hail; tornadoes; extreme temperatures; **and winter storms**. Among these hazards, flooding was identified as **posing** the second greatest risk to property **of** any hazard within Kenosha County. As shown on **Maps III-2 through III-6**, in Chapter III, the vulnerability and community impact assessment indicates that flooding hazard risks are associated with the major river and lake systems within and adjacent to Kenosha County and include the Fox River, Root River, Pike River, Des Plaines River, and minor streams tributary to the Lake Michigan watershed (see **Map II-1** in Chapter II of this report). The impact assessment further indicates that, due to the economic importance and extent of agriculture acreage in Kenosha County, flooding is also the second most costly hazard in terms of potential crop damage compared to all other hazards.

Severe thunderstorms, high wind, hail, and lightning, as a group, and tornadoes rank as the third and fourth most costly hazards, respectively, relative to property damage, in the County. Severe thunderstorms, high wind, hail, and lightning create greater property damages than all other severe weather-related hazards combined. While the property damage associated with a single severe tornado may be greater than that caused by a single severe thunderstorm, tornadoes occur much less frequently. In any case, the vulnerability and community impact assessment indicates that the entire County is at risk from these hazards, as shown on **Maps III-7 through III-9** in Chapter III of this report. These events are highly unpredictable in terms of where they may occur and how powerful they may be.

Drought ranked as the fifth most costly hazard in Kenosha County in terms of property damage due to crop losses. Temperature extremes ranked as the seventh most costly hazard in the County. Both of these hazards have the potential to seriously affect Kenosha County by causing crop losses, as discussed in the vulnerability assessment in Chapter III.

Hazardous material incidents comprise the sixth most costly hazard in Kenosha County in terms of property damages. Given that many of the incidents are transportation-related, the entire County is at risk from this hazard.

Winter storms represent the eighth most damaging hazard impacting Kenosha County.

While incidences of the remaining six hazards as shown in Table H-2 have been reported in Kenosha County sufficient data regarding these hazards were not available to allow calculation of the average annual damages associated with them.

The priority rankings based upon property and crop damage in this update are similar to those presented in the first update of the Kenosha County hazard mitigation plan. The rank order of most of the hazards in terms of property and crop damage is unchanged. The major difference is that sufficient data are now available to estimate the average annual property and damages that are attributable to winter storms.

RANKING SUMMARY

Hazard severity can be assessed and ranked in a variety of ways. The purpose of ranking hazards is to help set priorities and direct more resources to address those hazards of the greatest severity. However, the kinds of mitigation actions that will be needed and warranted in the Kenosha County Hazard Mitigation Plan depend on the type of vulnerability to be addressed. Some hazards, such as excessive heat and lightning, are unlikely to cause a disaster, but they can be fatal and therefore are serious hazards. Vulnerability to such hazards can best be addressed by preventive measures such as public information to encourage hazard awareness and personal protection. Other hazards such as flooding are pervasive and devastating, and may require a variety of tools—mapping, building codes, zoning laws, insurance, elevation or acquisition of floodprone structures and public awareness—to effectively reduce the risk of disaster. However, flooding might not result in more fatalities than a heat wave. In general, ranking hazards by the number of deaths that they cause shifts the focus away from major and largely avoidable disasters such as floods. Weather hazards that have caused past Wisconsin disasters are probably the hazards that will cause future disasters. However, the types of natural and man-made hazards that result in fatalities remain a public health and safety concern, which is why these hazards were incorporated by the Kenosha County Hazards Mitigation Plan Local Planning Team into the updated hazard mitigation plan and implementation strategies, as summarized in Chapter V of this report.

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Appendix H

HAZARD RISK ANALYSIS AND PRIORITIZATION: 2016

TABLES

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Table H-1

PRIORITY RANKING OF NATURAL AND OTHER HAZARDS AFFECTING KENOSHA COUNTY BASED UPON MORTALITY AND INJURY

Order Based on Local Planning Team Perception ^a	Natural and Other Hazards	Period of Record	Number of Incidents per Year (average)	Number of Mortalities per Year (average)	Number of Injuries per Year (average)	Sum of Average Mortality and Injury Incidences per Year	Priority Ranking Based on Analysis
6	Transportation Accidents	1999-2013 ^b	3,554.7	21.45	1,939.50	1,960.95	1
3	Thunderstorms, High Wind, Hail, and Lightning	1964-2014	4.9	0.14	0.69	0.83	2
4	Extreme Temperatures	1994-2014	2.9	0.19	0.52	0.71	3
1	Tornadoes	1963-2014	0.2	0.00	0.29	0.29	4
8	Hazardous Material Incidents.....	1971-2014 ^c	1.4	0.08	0.12	0.20	5
2	Winter Storms	1994-2014	5.0	0.00	0.01	0.01	6
10	Fog	1999-2014	4.8	0.00	0.00	0.00	7
5	Flooding	1993-2014	2.1	0.00	0.00	0.00	8
12	Terrorism Incidents	2000-2014	0.3	0.00	0.00	0.00	9
13	Drought	2002-2014	0.3	0.00	0.00	0.00	10
9	Lake Michigan Coastal Erosion.....	1975-1995	1.1 (feet of erosion per year)	0.00 ^d	0.00 ^d	0.00 ^d	11
7	Power Outages	--	-- ^d	-- ^d	-- ^d	-- ^d	12
11	Fires	--	-- ^d	-- ^d	-- ^d	-- ^d	13
14	Contamination or Loss of Water Supply	--	-- ^e	-- ^e	-- ^e	-- ^e	14

^aThese numbers indicate the ranked order of the hazards assigned by the Kenosha County Hazard Mitigation Plan Local Planning Team through responses given in the Hazard and Vulnerability Assessment Tool (HVA). Where hazards listed in the HVA have been consolidated for analysis and planning purposes, the order is based upon the highest rank given in the HVA. For more details see Hazard Identification section and Table III-3 in Chapter III in this report.

^bData reflect automobile accidents from years 1999 through 2013 and railroad accidents from years 1975 through 2014.

^cData reflect pipeline-related incidents from years 1976 through 2014 and transportation-related incidents from years 1971 through 2014.

^dIncidents have been reported, but no data available to calculate averages.

^eNo data available are available.

Source: National Climatic Data Center; U.S. Department of Transportation, Office of Pipeline Safety; Wisconsin Department of Transportation; Kenosha County Division of Emergency Management; and SEWRPC.

Table H-2

PRIORITY RANKING OF NATURAL AND OTHER HAZARDS AFFECTING KENOSHA COUNTY BASED UPON PROPERTY AND CROP DAMAGE

Order Based on Local Planning Team Perception ^a	Natural and Other Hazards	Period of Record	Number of Incidents per Year (average)	Total Property Damage per Year (dollars) ^b	Total Crop Damage per Year (dollars) ^b	Sum of Property and Crop Damage per Year (dollars) ^b	Priority Ranking Based on Analysis
6	Transportation Accidents	1999-2014 ^c	3,554.7	60,044,843 ^c	0	60,044,843 ^c	1
5	Flooding	1993-2014	4.8	591,882	608,359	1,200,241	2
3	Thunderstorms, High Wind, Hail, and Lightning	1964-2014	4.9	901,748	99,670	1,001,418	3
1	Tornadoes	1963-2014	0.2	488,207	0	488,207	4
13	Drought	2002-2014	0.3	0	150,280	150,280	5
8	Hazardous Material Incidents	1971-2014 ^d	1.4	85,627 ^d	0	85,627 ^d	6
4	Extreme Temperatures	1994-2014	2.9	770	3,874	4,644	7
2	Winter Storms	1994-2014	5.0	1,044	0	1,044	8
10	Fog	1999-2014	4.8	0	0	0	9
12	Terrorism Incidents	2000-2014	0.3	0	0	0	10
9	Lake Michigan Coastal Erosion	1975-1995	1.1 (feet of erosion per year)	--	--	--	11
11	Fires	-- ^e	-- ^e	-- ^e	-- ^e	-- ^e	12
7	Power Outages	--	-- ^e	-- ^e	-- ^e	-- ^e	13
14	Contamination or Loss of Water Supply	--	-- ^f	-- ^f	-- ^f	-- ^f	14

^aThese numbers indicate the ranked order of the hazards assigned by the Kenosha County Hazard Mitigation Plan Local Planning Team through responses given in the Hazard and Vulnerability Assessment Tool (HVA). Where hazards listed in the HVA have been consolidated for analysis and planning purposes, the order is based upon the highest rank given in the HVA. For more details see Hazard Identification section and Table III-3 in Chapter III in this report.

^bDollar values were adjusted to year 2014 by using the average annual Consumer Price Index (CPI) values from the U.S. Department of Labor, Bureau of Labor Statistics.

^cData reflect automobile accidents from years 1999 through 2013 and railroad accidents from years 1975 through 2014.

^dData reflect pipeline-related incidents from years 1976 through 2014 and transportation-related incidents from years 1971 through 2014.

^eIncidents have been reported, but no data are available to calculate averages.

^fNo data available.

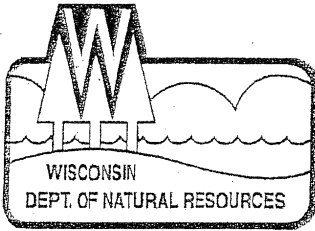
Source: National Climatic Data Center; U.S. Department of Agriculture Risk Management Agency, U.S. Department of Transportation, Office of Pipeline Safety; Wisconsin Department of Transportation; Kenosha County Division of Emergency Management; and SEWRPC.

Appendix I

**WISCONSIN DEPARTMENT OF NATURAL RESOURCES
CORRESPONDENCE REGARDING STANDARD
EMERGENCY OPERATION PLAN
FOR WATER SUPPLY FACILITIES**

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State of Wisconsin \ DEPARTMENT OF NATURAL RESOURCES

Scott McCallum, Governor
Darrell Bazzell, Secretary

101 S. Webster St.
Box 7921
Madison, Wisconsin 53707-7921
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October 8, 2001

Subject: Water System Security

Dear Water System Owner:

The events of September 11, 2001 will likely have profound affects on all our lives over the coming months and years. One effect that is already noticeable in the transportation industry is heightened security. The water supply industry, like the transportation industry, serves hundreds of millions of people every day. Therefore, as primary protectors of public health, we must be mindful of our responsibility to protect our customers and citizens against the potential of contaminated drinking water.

Toward that end, the Department would like to share with you some of our suggestions which may help keep your water system secure from external contamination, both intentional and accidental. Please keep in mind that the majority of these suggestions are either required by current State regulations or have been long recognized as sound operational security practices. We strongly urge you to implement as many of these suggestions as you find applicable and practicable in your individual situations.

The Department requests that every community water system perform a security analysis for their facilities. A standard emergency operation plan should be in place in event of mechanical failures, power outages, unsafe samples and threats or acts of terrorism.

Consider these basic security measures:

1. Cover all openings into reservoirs, treatment system vents and intakes with heavy hardware cloth, welded rods or other metal louvers resistant to removal. Code has always required these to be covered with fine mesh screen to exclude vermin. Now, these should also be designed to prevent intentional access. Frequent, regular inspections should be done of all vents in areas accessible to the public.
2. Lock all pumphouses, reservoirs, booster stations and other remote facilities.
3. Restrict public access, especially by vehicles, to reservoir and pump house service roads. Be mindful of the possibility of large vehicles that could contain explosives and the proximity they can access. This can be accomplished with substantial locked gates, staggered concrete barriers, grading moats or by parking a large vehicle (snow plow, garbage truck).
4. Prohibit parking/stopping on public roadways adjacent to reservoirs, pump stations, treatment facilities within proximity where vehicle bomb explosions could impact facilities.

5. Request increased routine police patrols in sensitive areas and strict parking enforcement.
6. Operators should visit all facilities daily and maintain a log.
7. Install security lighting, motion detectors and TV cameras.
8. Maintain effective disinfection capability. Chlorine, ozone and UV can be effective in destroying many biological agents. Acquire emergency disinfection equipment now if not already chlorinating.
9. Maintain a free chlorine residual at the ends of the distribution system of at least 0.2ppm. A free chlorine residual of 0.5 ppm could reasonably inactivate most biological agents likely to be used by terrorists.
10. Maintain chemical additives (fluoride, alum, lime) etc. under secure conditions that discourage tampering. Assure that containers delivered by suppliers are intact, secure and quality checked as feasible. Use only reliable sources and known contractors.
11. Develop a list of alternate, emergency water sources within the community such as industrial, commercial and private wells. Update inspection and testing programs for these wells pursuant to NR811.10. Develop plans with neighboring communities for mutual assistance to provide emergency water.
12. Train operators and plant personnel in security awareness. To prevent sabotage, think how would *you* attack your system? Then take measures to discourage or prevent such schemes from being effective.
13. Restrict access to water main maps and plans of all facilities. Seek legal counsel on open records requests to obtain facility plans. Contact consultants, contractors and regulators who have plans in their possession and require guarantees that access to their copies be secured. Access to water distribution maps is most sensitive.
14. Consider the reliability and security status of current and former personnel.
15. Post the chain of action for reporting threats or acts of terrorism: Call local law enforcement first. Local law enforcement authorities would in turn contact Wisconsin Emergency Management and the Federal Bureau of Investigation if it is determined that tampering has actually occurred at your water system. Second, call your local health department, the local health department will in turn call the Division of Health and Family Services Emergency Hotline at 1-608-258-0099. Have a plan for rapid public notification in place and practice it.
16. Join a security network such as Infragard, and/or contact American Waterworks Association to become part of their security information system by e-mailing: security@awwa.org. Consider hiring a professional consulting firm such as Sandia National Labs to develop a security plan. Visit the following websites on water system security: www.infragard.net , www.wi-infragard.com , www.awwa.org , www.awwa.org/waterweek/wwlast.htm , www.amwa.net/isac/

In addition to the preceding suggestions, the Department has been actively reviewing and revising our own emergency management plans and we have taken the initial steps to try to obtain additional formal training for our staff. We intend to highlight security as an issue in upcoming sanitary surveys and water system inspections and you can expect continued emphasis from our staff regarding water system emergency plans. Please remember that while the tragic events of September 11 may be the impetus for some of this emphasis, system security and emergency planning are essential for many types of natural

catastrophes. The tornado damage in the Village of Siren this year, comes to mind. Finally, please rest assured that as we get additional information and are able to offer it to you, we will do so.

While we have not yet established a formal organizational conduit for information requests, please direct any questions you might have regarding security or emergency planning to our Regional Drinking Water Experts through your assigned regional drinking water specialist or engineer. If information is needed beyond the expertise of our Regional Staff and Experts, they will forward requests to central office staff for answers or advice.

Thank you for doing your part to protect Wisconsin's drinking water.

Sincerely,

Jill D. Jonas, Director
Bureau of Drinking Water & Groundwater

cc: Regional DG Experts
Regional Water Leaders
Barb, Zellmer, AD/5
Susan Sylvester, AD/5
Bill Sonzogni, SLH
Lynda Knobeloch, DHFS, Division of Health
Dave Sheard, PSC

SEWRPC Community Assistance Planning Report No. 278-3ED

KENOSHA COUNTY HAZARD MITIGATION PLAN UPDATE: 2017-2021

Appendix J

POTENTIAL FUNDING PROGRAMS TO IMPLEMENT PLAN RECOMMENDATIONS

FUNDING PROGRAM DESCRIPTIONS

Reference Number	Administrator of Grant Program	Name of Funding Program	Eligibility	Types of Projects and Funding Eligibility Criteria	Assistance Provided	Application Deadline
1	U.S. Federal Emergency Management Agency (FEMA)	Hazard Mitigation Grant Program	State agencies and participating National Flood Insurance Program (NFIP) communities, private nonprofit organizations	<ol style="list-style-type: none"> 1. Floodproofing 2. Relocation 3. Elevation of structures 4. Property acquisition 5. Safe room construction 	75 percent Federal cost-share assistance; 12.5 percent State match and 12.5 percent local match required ^a	Within 60 days of a Presidential disaster declaration
2	FEMA	Flood Mitigation Assistance Grant Program	State agencies and participating NFIP communities	<ol style="list-style-type: none"> 1. Elevation, relocation, or demolition of insured structures 2. Acquisition 3. Dry floodproofing 4. Minor structural projects 5. Beach nourishment activities 	\$ 20 million available nationally; ^b 75 percent Federal cost-share assistance; 25 percent local match required; two types of grants: Planning grant and project grant ^d	Varies
3	FEMA	Homeland Security Preparedness Technical Assistance Program	State and local governments	<ol style="list-style-type: none"> 1. Implementation of National Infrastructure Protection Plan 2. Strengthen chemical, biological, radiological, nuclear, and explosive detection, response, and decontamination capability 	No statutory matching requirements. Amounts awarded vary based on the scope of the project	Varies
4	FEMA	National Training and Education Division	State and local first responders	<ol style="list-style-type: none"> 1. Provides preparedness training and exercise support to first responders in the event of a weapons of mass destruction event 2. Provides assistance for local units of government to obtain terrorism readiness equipment 	Provides over 150 training courses for first responders	Varies

Appendix J (continued)

Reference Number	Administrator of Grant Program	Name of Funding Program	Eligibility	Types of Projects and Funding Eligibility Criteria	Assistance Provided	Application Deadline
5	FEMA	Pre-Disaster Mitigation Program	States and local communities	<ol style="list-style-type: none"> 1. Acquisition and relocation of structures in flood hazard areas 2. Floodproofing 3. Minor structural projects 4. Flood control projects for critical facilities 5. Management costs 6. Informational activities 7. Plan preparation 8. Technical assistance 9. Safe room construction 	75 percent Federal cost-share assistance; 25 percent State or local match is required;	Varies
6	FEMA	Public Assistance Program	State agencies and local communities	<ol style="list-style-type: none"> 1. Rebuilding infrastructure damaged during a flood 2. Building infrastructure for portions of a community that are to be relocated outside of floodplains 3. Limited assistance with structural elevation and relocation 	75 percent Federal cost-share assistance; the State determines the local match	Within 30 days of a Presidential disaster declaration
7	U.S. Army Corps of Engineers (USACE)	Clearing and Snagging for Flood Control Program	State and local units of government	<ol style="list-style-type: none"> 1. Removal of obstructions that restrict flood flows of navigable waters 2. Projects must be designed and constructed by the Corps 	Project studies are in most cases at Federal expense; 65 percent Federal cost-share assistance is provided for project implementation and cannot exceed \$500,000; a local match of 35 percent is required	None
8	USACE	Emergency Streambank Protection Program	Local communities	<ol style="list-style-type: none"> 1. Bank protection of highways, highway bridges, essential public works, churches, hospitals, schools, and other nonprofit public services from flood induced erosion 	Federal share cannot exceed \$1,500,000 for a given project; cost-share program with local match of 35 percent for design and construction required	Continuous
9	USACE	Flood Hazard Mitigation and Aquatic Ecosystem Restoration Program	Local governments	<ol style="list-style-type: none"> 1. Flood hazard mitigation to include relocation of threatened structures 2. Riverine ecosystem restoration such as conservation or restoration of natural floodwater storage areas 3. Planning activities to determine responses to future flood situations 4. Project areas must be in a floodplain 	50 percent for studies and 65 percent for project implementation of Federal cost-share assistance; 35 to 50 percent local match is required	Undetermined

Appendix J (continued)

Reference Number	Administrator of Grant Program	Name of Funding Program	Eligibility	Types of Projects and Funding Eligibility Criteria	Assistance Provided	Application Deadline
10	USACE	Flood Damage Reduction Program	State and local units of government	<ol style="list-style-type: none"> 1. Projects designed to reduce the impact of flood events 2. Projects must be designed and constructed by the Corps 	50 to 65 percent Federal cost-share assistance above \$100,000 and cannot exceed \$10,000,000; 35 to 50 percent local match is required	None
11	USACE	Hurricane and Storm Damage Reduction Program	State agencies and local units of government	<ol style="list-style-type: none"> 1. Beach nourishment 2. Floodproofing 3. Other structural and nonstructural storm damage reduction projects 	Federal share cannot exceed \$5,000,000 for a given project; cost-share program with local match of 35 percent for design and construction required	Varies
12	USACE	Water Resources Development and Flood Control Acts	Local governments	<ol style="list-style-type: none"> 1. Water resources planning assistance 2. Emergency streambank and shoreline protection 	50 percent for studies and 65 percent for project implementation of Federal cost-share assistance; 35 to 50 percent local match is required	None
13	U.S. Department of Agriculture (USDA)	Watershed Protection and Flood Prevention Program	State and local units of government	<ol style="list-style-type: none"> 1. Watershed protection 2. Flood prevention measures 3. Projects are intended to be larger scale 4. Watersheds can be no larger than 250,000 acres 	Up to 100 percent Federal cost-share assistance for flood control prevention; typical project range is \$3.5 to \$5.0 million in Federal financial assistance	Ongoing
14	USDA	Water and Waste Disposal Loan & Grant Program	Local units of government, nonprofit organizations, associations, and districts	<p>Funds may be used to finance the acquisition, construction, or improvement of:</p> <ol style="list-style-type: none"> 1. Drinking water sourcing, treatment, storage, and distribution; 2. Sewage collection, transmission, treatment, and disposal; 3. Stormwater collection, transmission, and disposal. 	Long-term, low interest loans. If funds are available, grants may be combined with a loan if necessary to keep user costs reasonable	Determined by State USDA office
15	U.S. Department of Agriculture, Farm Services Agency (FSA)	Conservation Reserve Program	Individual landowners in a 10- or 15-year contract	<ol style="list-style-type: none"> 1. Riparian buffers 2. Trees 3. Windbreaks 4. Grassed waterways 	50 percent Federal cost-share assistance; 50 percent local match from individual; an annual rental payment for the length of the contract is also provided	Annually or ongoing ^C

Appendix J (continued)

Reference Number	Administrator of Grant Program	Name of Funding Program	Eligibility	Types of Projects and Funding Eligibility Criteria	Assistance Provided	Application Deadline
16	USDA FSA	Conservation Reserve Enhancement Program	Individual landowners in a 10- or 15-year contract	<ol style="list-style-type: none"> 1. Filter strips 2. Riparian buffers 3. Grassed waterways 4. Permanent grasses (only in specially designated grassland project areas) 5. Wetland development and restoration 	50 percent Federal cost-share assistance; one-time signing incentive payment (up to \$150 per acre); practice incentive payment (about 40 percent of cost of establishing practice); annual rental payment; State of Wisconsin lump sum payment; Wisconsin practice incentive payment (about 20 percent of cost of establishing practice)	Ongoing
17	USDA Natural Resources Conservation Service (NRCS)	Emergency Conservation Program	Individual landowners	<ol style="list-style-type: none"> 1. Regrading and shaping farmland 2. Restoring conservation structures 3. Redistribution of eroded soil 4. Debris removal 5. Projects must be in response to natural disaster 	Up to 64 percent Federal cost-share assistance; the remaining percentage is the landowner's responsibility	After a designated State or Presidential disaster declaration
18	NRCS	Emergency Watershed Protection Program	Individual landowners provided they have a local sponsor such as a local unit of government	<ol style="list-style-type: none"> 1. Sale of agricultural floodprone lands to NRCS for floodplain easements 2. Land must have a history of repeated flooding (at least twice in the past 10 years) 3. Landowner retains most of the rights as before the sale 4. NRCS has authority to restore the floodplain function and value 	The USDA pays the landowner one of three options: a geographic rate, a value based on the assessment of the land in agricultural production, or an offer made by the landowner; 75 percent Federal cost-share assistance; 25 percent local match is required ^d	Variable
19	NRCS	Environmental Quality Incentives Program	Individual landowners in a three-year contract	<ol style="list-style-type: none"> 1. Animal waste management practices 2. Soil erosion and sediment control practices 3. Nutrient management 4. Groundwater protection 5. Habitat improvement 	Up to 75 percent Federal cost-share assistance; 25 percent local match is required	Annually ^d

Appendix J (continued)

Reference Number	Administrator of Grant Program	Name of Funding Program	Eligibility	Types of Projects and Funding Eligibility Criteria	Assistance Provided	Application Deadline
20	U.S. Department of Health and Human Services, National Institutes of Health	National Institute of Environmental Health Sciences (NIEHS) HAZMAT Disaster Preparedness Training Program	Public and private nonprofit organizations involved in responding to hazardous material incidents	Provides training to: <ol style="list-style-type: none"> 1. Augment prevention and preparedness in a variety of high-risk settings 2. Enhance safety and health training of hazardous material workers, emergency responders, and skilled support personnel 3. Ensure responders are aware of site-specific hazards and mitigation techniques prior to and during response activities 	No statutory matching requirements.	Contact NIEHS headquarters for deadline
21	U.S. Department of Health and Human Services, National Institutes of Health	National Institute of Environmental Health Sciences (NIEHS) Hazardous Waste Worker Health and Safety Training	Public and private nonprofit organizations involved in hazardous waste clean up	<ol style="list-style-type: none"> 1. Development institutional competency to provide training and education to hazardous waste workers 2. Development of model health and safety training programs regarding hazardous materials 3. Training and education in emergency response to a hazardous waste incident 	No statutory matching requirements. Grants generally range from \$24,000 to \$3.4 million	Contact NIEHS headquarters for deadline
22	U.S. Department of Homeland Security	Program to Prepare Communities for Complex Coordinated Terrorist Attacks	States, local governments, Federally recognized tribal governments	<ol style="list-style-type: none"> 1. Identifying capability gaps related to preparing for, preventing, and responding to a complex coordinated terrorist attack 2. Development and/or updating plans, annexes, and processes to address the identified gaps 3. Training personnel and the whole community to implement the plans and processes and build needed capacities 4. Conducting exercises to validate capabilities 	Up to \$2.5 million	February 10
23	U.S. Department of Housing and Urban Development	Community Development Block Grant Program	Local governments	<ol style="list-style-type: none"> 1. Relocation and demolition 2. Housing Grants to fund the rehabilitation of housing to meet current building codes 3. Construction of public facilities and improvements 	75 to 100 percent Federal cost-share assistance; 0 to 25 percent local match may be required	May 27

Appendix J (continued)

Reference Number	Administrator of Grant Program	Name of Funding Program	Eligibility	Types of Projects and Funding Eligibility Criteria	Assistance Provided	Application Deadline
24	U.S. Department of Housing and Urban Development	Community Development Block Grant Program	Local governments	<ol style="list-style-type: none"> 1. Emergency response activities related to flood events 2. Long-term needs related to flooding issues 	75 to 100 percent Federal cost-share assistance; 0 to 25 percent local match may be required	After a Presidential disaster declaration
25	U.S. Department of Housing and Urban Development	Healthy Homes Production Grant Program	State, tribal, and local governments	<ol style="list-style-type: none"> 1. Identify and remediate priority (significant) housing-related health and safety hazards in privately-owned, low income rental or owner occupied housing 2. Projects that comprehensively address multiple residential health and safety issues 	Up to \$2,000,000 Federal assistance; Minimum 10 percent match required	June
26	USEPA	Environmental Education Grants Program	Local or State education agencies, colleges, and nonprofit organizations, State environmental agencies, and noncommercial education broadcasting agencies	<ol style="list-style-type: none"> 1. Improving environmental education teaching skills 2. Educating teachers, students, or the public about human health problems 3. Building capacity for environmental education programs 4. Education communities 5. Educating the public through print, broadcast, or other media 	\$3.4 million available nationally ^b ; locally, grants are for \$5,000; \$5,000 to \$25,000; and up to \$125,000, up to 75 percent of the project cost, a 25 percent match is required	Mid-November
27	USEPA	Targeted Watershed Grants	Watershed organizations nominated by State Governors or Tribal leaders	<ol style="list-style-type: none"> 1. Watershed-based projects to protect water resources 2. Training and technical assistance to local partnerships 	75 percent maximum Federal cost-share assistance. Minimum 25 percent non-Federal match	November
28	U.S. Fire Administration	Assistance to Firefighters Grant Program	Counties; city, village, township fire departments, and nonaffiliated EMS organizations	<ol style="list-style-type: none"> 1. Firefighter and EMT training 2. Firefighting and EMS equipment 3. Firefighter personal protective equipment 	80 percent Federal cost-share assistance for communities with population greater than 50,000; 90 percent for communities with population less than 50,000 but greater than 20,000; 95 percent for communities with population less than 20,000	See program guidance
29	U.S. Fire Administration	Fire Management Assistance Grants	States, Indian tribal governments, and local governments	Provides assistance for the mitigation, management, and control of any fire burning of public or privately owned forest or grassland that threatens such destruction as would constitute a major disaster	75 percent Federal cost-share assistance; 25 percent State and local match	Rolling

Appendix J (continued)

Reference Number	Administrator of Grant Program	Name of Funding Program	Eligibility	Types of Projects and Funding Eligibility Criteria	Assistance Provided	Application Deadline
30	U.S. Fire Administration	Fire Prevention and Safety Grants (FP&S)	County, city, village, and township fire departments	<ol style="list-style-type: none"> 1. Public education 2. Arson prevention 3. Prevention-related training 4. Fire prevention activities 5. Risk Assessments 	Cost-share matching fund requirements dependent upon size of population served by the Fire Department	See program guidance
31	U.S. Fire Administration	National Fire Academy	Persons with substantial involvement in fire prevention and control, emergency medical services, fire-related emergency management activities, or allied professions	Provides tuition-free training in firefighting, prevention, emergency medical services, and related areas	Provides tuition-free training in firefighting, prevention, emergency medical services, and related areas	June 15 for fall semester, December 15 for spring semester
32	U.S. Fire Administration	National Fire Academy Training Assistance Student Stipend Reimbursement Program	Members of fire departments or sponsoring department	Provides travel stipends for students attending National Fire Academy courses	Travel reimbursement	Rolling
33	U.S. Fish and Wildlife Service (FWS)	North American Wetlands Conservation Fund	State and public agencies	<ol style="list-style-type: none"> 1. Property acquisition for the protection of wetlands that migratory birds, fish, and wildlife are dependent on 2. Wetland restoration and protection projects 3. Habitat restoration projects 	50 percent Federal cost-share assistance; 50 percent local match is required	February, July
34	FWS	Partners for Fish and Wildlife Habitat Restoration Program	Private landowners for a 10-year-minimum contract	<ol style="list-style-type: none"> 1. Restoration of degraded wetlands, native grasslands, stream and riparian corridors, and other habitat areas 	Full cost-share and technical assistance; individual projects cannot exceed \$25,000	Continuous
35	U.S. Small Business Administration	Disaster Loan Program	Homeowners, renters, and businesses	<ol style="list-style-type: none"> 1. Property repair 2. Property replacement 3. Meeting building code requirements 4. Involuntary relocations out of a special flood hazard area 	Low interest loans	After a Presidential disaster declaration
36	Wisconsin Emergency Management	Hazards Mitigation Section	State and local units of government	<ol style="list-style-type: none"> 1. Mitigation Planning 2. Technical Assistance 3. Mitigation Projects 	75 percent Federal cost-share assistance; 25 percent local match	Continuous
37	Wisconsin Department of Natural Resources (WDNR)	Municipal Flood Control Grants Chapter NR 199 of the <i>Wisconsin Administrative Code</i>	Cities, villages, towns, metropolitan sewerage districts	<ol style="list-style-type: none"> 1. Acquisition and removal of structures 2. Flood proofing and elevation of structures 3. Riparian restoration projects 4. Acquisition of vacant land or purchase of easements 5. Construction of stormwater and groundwater facilities related to flood control and riparian restoration projects 6. Flood mapping 	70 percent State cost-share assistance; 30 percent local match	March 15 of even-numbered years

Appendix J (continued)

Reference Number	Administrator of Grant Program	Name of Funding Program	Eligibility	Types of Projects and Funding Eligibility Criteria	Assistance Provided	Application Deadline
38	WDNR	Lake Planning Grant Program, Chapter NR 190 of the <i>Wisconsin Administrative Code</i>	Local units of government, lake districts, town sanitary districts, qualified school districts, qualified lake associations, and qualified nonprofit conservation organizations	<ol style="list-style-type: none"> Gathering and analyzing water quality information Land use planning within lake watersheds Gathering and compiling demographic information pertinent to individual lakes Developing lake management plans 	Up to 67 percent State cost-share assistance, not to exceed \$8,000 for small-scale projects or \$25,000 for large-scale projects; 33 percent local match is required; lakes are eligible for more than one grant, however, the total amount of State dollars cannot exceed \$100,000	December 10
39	WDNR	Lake Protection Grant Program, Chapter NR 191 of the <i>Wisconsin Administrative Code</i>	Local units of government, lake districts, town sanitary districts, qualified school districts, qualified lake associations, and qualified nonprofit conservation organizations	<ol style="list-style-type: none"> Land acquisition for easement establishment Wetland restoration Lake restoration projects Other projects involving lake improvement 	75 percent State cost-share which cannot exceed \$200,000 for land acquisition or lake management plan implementation or \$100,000 for wetland and shoreline habitat restoration; 25 percent local match is required	February 1
40	WDNR	Lake Classification and Local Ordinance Development Grants, Section NR 191.30 of the <i>Wisconsin Administrative Code</i>	Local units of government, lake districts	Development or improvement of ordinances related to conservancy, wetland, shoreland, floodplain, construction erosion control, stormwater control or other ordinances with water quality or lake protection benefit.	75 percent State cost-share, not to exceed \$50,000	December 10
41	WDNR	Forest Fire Protection Grant Program	Fire department, county/area fires associations	<ol style="list-style-type: none"> Personal protective equipment Forest fire training Forest fire prevention and wildland urban interface Forest fire suppression materials Communication equipment Dry hydrant installation 	50 percent State cost share; grants of \$750-\$10,000 for fire departments, \$5,000-\$25,000 for county/area fire associations	July 1
42	WDNR	Land and Water Conservation Fund Program	Counties, cities, villages, towns, school districts	<ol style="list-style-type: none"> Land acquisition or development that will provide opportunities for outdoor recreation Property with frontage on rivers, streams, lakes, estuaries, and reservoirs that will provide water-based outdoor recreation Property that provides special recreation opportunities, such as floodplains, wetland, and areas adjacent to scenic highways 	50 percent State cost-share assistance; 50 percent local match is required	May 1

Appendix J (continued)

Reference Number	Administrator of Grant Program	Name of Funding Program	Eligibility	Types of Projects and Funding Eligibility Criteria	Assistance Provided	Application Deadline
43	WDNR	Remediation and Redevelopment Spills and Releases program	Responsible party	Provide technical assistance and support within the agency and to those outside the agency	Provide technical assistance and support	Department will take emergency action to remove or contain a spill at the expense of the responsible party
44	WDNR	River Management Grant Program, Section NR 195.05 of the <i>Wisconsin Administrative Code</i>	Local units of government, lake districts, town sanitary districts, qualified river management associations, and qualified nonprofit conservation organizations	<ol style="list-style-type: none"> 1. River restoration projects 2. Educational projects 3. Activities associated with river management plan implementation 4. Ordinance development 5. Installation of practices to control nonpoint source pollution 	75 percent State cost-share assistance; 25 percent local match is required; Grant not to exceed \$50,000	February 1
45	WDNR	Land/Easement Acquisition for River Management Section NR 195.13 of the <i>Wisconsin Administrative Code</i>	Local units of government, lake districts, town sanitary districts, qualified river management associations, and qualified nonprofit conservation organizations	Land acquisition and easements for river protection	75 percent State cost-share assistance; 25 percent local match is required; Grant not to exceed \$50,000	February 1
46	WDNR	Stewardship Grant Program, Chapter NR 47 of the <i>Wisconsin Administrative Code</i>	Local government and nonprofit conservation organizations	<ol style="list-style-type: none"> 1. Streambank protection projects 2. Land acquisition of stream corridors for water quality improvement 	50 percent State cost-share assistance; 50 percent local match is required	May 1
47	WDNR	Stewardship Grant Program, Urban Green Space Program	Local units of government, lake protection and rehabilitation districts, and nonprofit conservation organizations	<ol style="list-style-type: none"> 1. Land acquisition for greenway space in urban areas, protection of scenic or ecological features, and wildlife habitat improvement 	50 percent State cost-sharing assistance; 50 percent local match is required	May 1
48	WDNR	Targeted Runoff Management Grants, Chapter 120 of the <i>Wisconsin Administrative Code</i> ; in the future, specific rural nonpoint source abatement measures will be funded under proposed Chapter NR 151 of the <i>Wisconsin Administrative Code</i>	Counties, cities, villages, regional planning commissions, tribal governments, and special purpose lake, sewerage, and sanitary districts	<ol style="list-style-type: none"> 1. Complying with nonpoint source performance standards 2. Improving 303(d) waters 3. Protecting outstanding water resources 4. Compliance with a notice of discharge for an animal feeding operation 5. Addressing a water quality concern of national or statewide importance, such as the Upper Mississippi River concerns 	70 percent State cost-share assistance; 30 percent local match is required. Large-scale agricultural projects receive typical grants of \$500,000 to \$1 million small-scale rural and urban projects cannot exceed \$150,000	April 15
49	WDNR	Urban Rivers Grant Program	Local units of government and nonprofit conservation organizations	<ol style="list-style-type: none"> 1. Land acquisition to preserve open areas in urban environments adjacent to streams and rivers 	50 percent State cost-share assistance; 50 percent local match is required	May 1

Appendix J (continued)

Reference Number	Administrator of Grant Program	Name of Funding Program	Eligibility	Types of Projects and Funding Eligibility Criteria	Assistance Provided	Application Deadline
50	WDNR	Urban Nonpoint Source and Stormwater Grants Program. Funding is through Chapter NR 155 of the <i>Wisconsin Administrative Code</i>	Counties, cities, villages, regional planning commissions, tribal governments, and special purpose lake, sewerage, and sanitary districts	<ol style="list-style-type: none"> 1. Planning 2. Educational and information activities 3. Ordinance development and enforcement 4. Training 5. Storm water detention ponds 6. Streambank and shoreline stabilization 	70 percent State cost-share assistance for projects not involving construction, requiring a 30 percent local match; 50 percent State cost-share assistance for projects involving construction, requiring a 50 percent local match	April 15
51	WDNR	Wisconsin Forest Landowner Grant Program	Individual landowners ^e	<ol style="list-style-type: none"> 1. Stream buffers 2. Streambank stabilization 3. Wetland Restoration 	Up to 50 percent cost-share for the preparation of management plans and implementation of designated practices, maximum cost-share of \$10,000 per year	Ongoing
52	WDNR	Safe Drinking Water Loan Program	Local governments	Provides subsidized interest rate loans to municipalities seeking to fund wastewater and storm water infrastructure projects.	Loans at subsidized interest rates	October 31
53	University of Wisconsin Cooperative Extension	Extension Disaster Education Network	Local communities	Provides Community education and public information programs promoting hazard awareness and mitigation concepts	Education and Information provided through the University of Wisconsin System	Continuous
54	Wisconsin Department of Administration	Wisconsin Coastal Management	State and local units of government, nonprofit organizations, and tribal agencies	Enhancement and restoration of coastal resources within the state's coastal zone	Approximately \$1,300,000 is available to all counties adjacent to Lakes Superior and Michigan	November 4
55	Wisconsin Department of Agriculture, Trade and Consumer Protection (DATCP)	Land and Water Resource Management Program	Individual landowners	<ol style="list-style-type: none"> 1. Grassed waterways 2. Manure storage systems 3. Grade stabilization structure 4. Well abandonment 5. Conservation tillage 	50 to 70 percent State cost-share assistance; 30 to 50 percent individual cost-share is required; in the case of financial hardship, up to 90 percent cost-share assistance can be obtained from the State	December 31
56	Wisconsin Public Service Commission (WPSC)	Telecommunications, Water, Gas and Electric Divisions	Local communities	Incorporate disaster resistance into regulation development, land use practices and environmental impacts of public utilities	General Utility Assistance	Continuous
57	National Oceanic and Atmospheric Administration (NOAA)	Coastal and Estuarine Land Conservation Program	Public agencies	<ol style="list-style-type: none"> 1. Protect, restore, and enhance Great Lakes coastal wetland 2. Protect restore, and enhance coastal and riparian habitats in the Great Lakes basin 	50 percent Federal cost-share not to exceed \$1,500,000; requires 50 percent non-federal match	October 10

Appendix J (continued)

Reference Number	Administrator of Grant Program	Name of Funding Program	Eligibility	Types of Projects and Funding Eligibility Criteria	Assistance Provided	Application Deadline
59	Seno K/RLT Conservancy	Stewardship Grant Program, Urban Green Space Program	Land trusts, local units of government, and nonprofit organizations	1. Land acquisition for greenway space in urban areas, protection of scenic or ecological features, and wildlife habitat improvement	Funding on a project basis	Continuous
60	Great Lakes Protection Fund	Great Lakes Protection Fund	State and local units of government, nonprofit organizations and individuals	1. To improve the health of the Great Lakes 2. To promote the interdependence of healthy ecological and economic systems 3. To support innovative, creative, and venturesome ideas	Finance the total cost of accepted projects	Continuous applications process
61	Joyce Foundation	Joyce Foundation Grant program	State and local units of government, nonprofit organizations and individuals	1. To improve the health of the Great Lakes 2. To promote the interdependence of healthy ecological and economic systems 3. To support innovative, creative, and venturesome ideas 4. Developing improved regulatory approaches 5. Better understanding of the supply of and demand for Great Lakes water 6. Creating transportation alternatives to reduce over reliance on automobiles	Finance the total cost of accepted projects	Grant proposals are considered at meetings of the Foundation's Board of Directors in April, July, and December
62	National Fish and Wildlife Foundation (NFWF)	Wal-Mart Stores, Inc. Acres for America	State and local units of government, nonprofit conservation organizations	1. Acquisition or permanent easement for conservation of habitat	\$2.5 million available annually; minimum 50 percent local match required, higher local match preferred	Preproposals due May 19 Full proposals due July 28
63	NFWF	Five-Star Restoration Program	State agencies, local governments, tribal governments, educational institutions, and 501(c) nonprofit organizations	1. Wetland restoration projects 2. Riparian restoration projects 3. Projects must be part of a larger watershed project 4. Projects must have at least five contributing parties	\$2,500,000 available nationally annually; project awards range from \$20,000 to \$50,000, average award \$30,000; minimum 50 percent local match required, higher local match preferred	January 31

Appendix J (continued)

Reference Number	Administrator of Grant Program	Name of Funding Program	Eligibility	Types of Projects and Funding Eligibility Criteria	Assistance Provided	Application Deadline
64	NFWF	Sustain Our Great Lakes Community Grant Program	State agencies, local governments, tribal governments, educational institutions, and 501(c) nonprofit organizations	<ol style="list-style-type: none"> Restoring aquatic connectivity through means such as dam removal and bridge and culvert replacement Stream restoration, enhancement, and protection projects Coastal wetland restoration, enhancement, and protection projects Installation of green infrastructure Projects must be in Great Lakes watershed 	Grant awards range from \$50,000 to \$1,500,000. No match is required; however, the ratio of matching funds offered is considered during review with grants that meet or exceed a one-to-one match ratio being more competitive.	February 21
65	Wisconsin Department of Transportation (WisDOT)	Transportation Alternatives Program	Local governments, regional transportation authorities, transit agencies, natural resource or public land agencies, school districts, tribal governments	<ol style="list-style-type: none"> On- and off-road facilities for pedestrians and bicyclists Infrastructure-related projects and systems that will provide safe routes for non-drivers Community improvement projects Environmental mitigation activities 	80 percent State match; minimum of \$300,000 for infrastructure projects, minimum of \$50,000 for non-infrastructure projects. No maximum, but grants exceeding \$1,000,000 are unlikely	January 29
66	WisDOT	Freight Railroad Infrastructure Improvement Program	Counties, municipalities, railroads, transit commissions	<p>Projects that:</p> <ol style="list-style-type: none"> Rehabilitate a rail line segment Improve transportation efficiency Promote safety 	Loans not to exceed \$3,000,000	Ongoing
67	WisDOT	Highway Safety Improvement Program	Local governments	<ol style="list-style-type: none"> Intersection safety improvements Installing guardrails, signs, pavement markings Corridor signal upgrades Warning devices or elimination of hazards at rail crossings 	90 percent Federal reimbursement; 10 percent match required, State pay match on projects on State trunk highways, local government pays match on local streets and highways	August 15, February 15
68	NOAA	Coastal Ecosystem Resilience Grant Program	States, local, and tribal governments, higher education institutions, non-profit and for-profit organizations	Strengthen the resilience of coastal ecosystems and decrease the vulnerability of communities to extreme weather	Federal share of two-thirds of project costs, one-third non-Federal match required; typical grant is between \$250,000 and \$750,000	August 16
69	State Farm Companies Foundation	State Farm Good Neighbor Citizenship Company Grants	Government entities, educational institutions, 501(c)(3) nonprofit organizations, 501(c)(4) volunteer fire companies, 501(c)(6) chambers of commerce	<ol style="list-style-type: none"> Auto and Road safety Teen driver education Home safety and fire prevention Disaster preparedness and recovery 	Grants of \$5,000 or more	October 30

NOTE: Table was updated in 2016 as a part of the plan update process.

Appendix J (continued)

^aThe nonFederal share is 25 percent. In Wisconsin, the State Division of Emergency Management pays 12.5 percent and the local community pays 12.5 percent.

^bMunicipalities must have a flood mitigation plan to be eligible for a project grant..

^cTwo types of sign-up are available for CRP: continuous CRP, which has no timeline and is used for small sensitive tracts of land and regular CRP, which has an annual sign up application period and is used for large tracts of land.

^dEQIP in southeastern Wisconsin provides minimal funding.

^eApplicants must have a Forest Stewardship Plan prepared by a forester in place on their land or be applying to have one prepared.

^eApplicants must have a Forest Stewardship Plan prepared by a forester in place on their land or be applying to have one prepared.

Source: SEWRPC.

KENOSHA CO APPENDIX J DRAFT (00224137).DOC

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MGH/LKH/JEB/mid

01/18/17, 01/24/17, 03/03/17

Appendix K (continued)

Administrator of Grant Program	Name of Grant Program	Address	Phone Number	Internet Web Address
USDA, Farm Services Agency (FSA)	Conservation Reserve Program Conservation Reserve Enhancement Program	U.S. Department of Agriculture Farm Services Agency 1012 Vine Street Union Grove, WI 53182	(262) 878-3353	www.fsa.usda.gov
USDA, Natural Resources Conservation Service (NRCS)	Emergency Watershed Protection Program	U.S. Department of Agriculture Natural Resources Conservation Service 8030 Excelsior Drive Madison, WI 53717	(608) 662-4422	www.nrcs.usda.gov
NRCS	Emergency Conservation Program Conservation Stewardship Program Environmental Quality Incentives Program	U.S. Department of Agriculture Natural Resources Conservation Service 1012 Vine Street Union Grove, WI 53182	(262) 878-1243	www.nrcs.usda.gov
U.S. Department of Health and Human Services, National Institute of Environmental Health Sciences	HAZMAT Disaster Preparedness Training Program Hazardous Waste Worker Health and Safety Training	National Institute of Environmental Health Sciences Worker Education and Training Program 111 T.W. Alexander Drive Research Triangle Park, NC 27709	(919) 541-3345	https://www.niehs.nih.gov/careers/hazmat/about_wetp/hdpt/index.cfm
U.S. Department of Homeland Security	Program to Prepare Communities for Complex Coordinated Terrorist Attacks	Federal Emergency Management Agency Office of Counterterrorism and Security Preparedness 500 C Street S.W. Washington, D.C. 20472	(202) 646-2500	https://www.fema.gov/media-library/assets/documents/127506
U.S. Department of Housing and Urban Development (HUD)	Community Development Block Grant Program	U.S. Department of Housing and Urban Development Office of Community Planning and Development Office of Block Grant Assistance State and Small Cities Division, Room 7184 451 7th Street, SW Washington, DC 20410	(202) 708-1112	https://portal.hud.gov/hudportal/HUD?src=/program_offices/comm_planning/communitydevelopment/programs
HUD	Healthy Homes Production Grant Program	U.S. Department of Housing and Urban Development Room 8236 451 7th Street, SW Washington, DC 20410	(202) 402-5769	https://portal.hud.gov/hudportal/HUD?src=/program_offices/healthy_homes/hhi/hhd
U. S. Environmental Protection Agency (USEPA)	Environmental Education Grants Program	Megan Gavin U.S. EPA Region 5 77 West Jackson Boulevard Mail Code AT-18J Chicago, IL 60604	(312) 353-2000	https://www.epa.gov/education/environmental-education-ee-grants

Appendix K (continued)

Administrator of Grant Program	Name of Grant Program	Address	Phone Number	Internet Web Address
USEPA	Targeted Watershed Grants	Paul Thomas U.S. EPA Region 5 77 West Jackson Boulevard Mail Code AT-18J Chicago, IL 60604	(312) 886-7742	--
U.S. Fire Administration	Assistance to Firefighters Grant Program Fire Prevention and Safety Grants Staffing for Adequate Fire and Emergency Response Grants National Fire Academy	U.S. Fire Administration 16825 South Seton Avenue Emmitsburg, MD 21727 Federal Emergency Management Agency Region V 536 South Clark Street, 6th Floor Chicago, IL 60605	(301) 447-1000	https://www.usfa.fema.gov/ https://www.fema.gov/assistance-firefighters-grant-program-info
U.S. Fish and Wildlife Service (FWS)	North American Wetlands Conservation Fund	U. S. Fish and Wildlife Service Division of Bird Habitat Conservation 5275 Leesburg Pike Falls Church, VA 22041-3803	(703)-358-1784	www.fws.gov/birdhabitat/Grants/NAWCA/
FWS	Partners for Fish and Wildlife Habitat Restoration Program	U. S. Fish and Wildlife Service Branch of Habitat Restoration 5275 Leesburg Pike Falls Church, VA 22041-3803	(703)-358-2332	www.fws.gov/partners/
U.S. Small Business Administration	Disaster Loan Program	U.S. Small Business Administration 409 3rd St, SW Washington DC 20416	(800) 659-2955	https://www.sba.gov/loans-grants/see-what-sba-offers/sba-loan-programs/disaster-loans
Wisconsin Emergency Management	Hazard Mitigation Section	Wisconsin Emergency Management 2400 Wright Street P.O. Box 7865 Madison, WI 53707-7865	(608) 242-3232	emergencymanagement.wi.gov/
Wisconsin Department of Natural Resources (WDNR)	Municipal Flood Control Grants	Jeff Soellner Wisconsin Department of Natural Resources- CF/2 P.O. Box 7921 Madison, WI 53707-7921	(608) 267-7152	http://dnr.wi.gov/Aid/MunFloodControl.html
WDNR	Lake Planning Grant Program Lake Protection Grant Program Lake Classification Grant Program	Wisconsin Department of Natural Resources Lake Coordinator-Southeast Region 141 NW Barstow Street, Room 180 Waukesha, WI 53188	(262) 574-2130	http://dnr.wi.gov/Aid/SurfaceWater.html

Appendix K (continued)

Administrator of Grant Program	Name of Grant Program	Address	Phone Number	Internet Web Address
WDNR	Forest Fire Protection Grant	Jennifer Feyerherm Wisconsin Department of Natural Resources- CF/2 P.O. Box 7921 Madison, WI 53707-7921	(608) 266-1967	http://dnr.wi.gov/Aid/ForestFireProtection.html
WDNR	Land and Water Conservation Fund	Jennifer Gihring Wisconsin Department of Natural Resources- CF/2 P.O. Box 7921 Madison, WI 53707-7921	(608) 264-6138	http://dnr.wi.gov/Aid/fedLWCF.html http://dnr.wi.gov/Aid/LWCF.html
WDNR	Remediation and Redevelopment Program	Wisconsin Department of Natural Resources 2300 N. Dr. Martin Luther King Jr. Drive Milwaukee, WI 53212	(414) 263-8557	dnr.wi.gov/topic/brownfields/rrprogram.html
WDNR	River Management Grant Program	Craig Helker Wisconsin Department of Natural Resources 9531 Rayne Rd., Ste. 4, Sturtevant, WI 53177	(262) 884-2357	http://dnr.wi.gov/Aid/SurfaceWater.html
WDNR	Stewardship Grant Program Urban Rives Grant Program	Jim Ritchie Wisconsin Department of Natural Resources 2300 N. Dr. Martin Luther King Jr. Drive P.O. Box 12436 Milwaukee, WI 53212	(414) 263-8610	http://dnr.wi.gov/topic/Stewardship/
WDNR	Targeted Runoff Management Grants Urban Nonpoint Source and Storm Water Grants Program	Peter Wood 2300 N. Dr. Martin Luther King Jr. Drive P.O. Box 12436 Milwaukee, WI 53212	(414) 263-8716	http://dnr.wi.gov/Aid/TargetedRunoff.html http://dnr.wi.gov/Aid/UrbanNonpoint.html
WDNR	Wisconsin Forest Landowner Grant Program	Jeff Soellner Wisconsin Department of Natural Resources- CF/2 P.O. Box 7921 Madison, WI 53707-7921	(608) 267-7152	http://dnr.wi.gov/Aid/ForestLandowner.html
WDNR	Safe Drinking Water Loan Program	Nicole Mathews Wisconsin Department of Natural Resources- CF/2 P.O. Box 7921 Madison, WI 53707-7921	(608) 266-0849	http://dnr.wi.gov/Aid/EIF.html
University of Wisconsin - Extension	Extension Disaster Education Network	UW-Extension Headquarters 432 N. Lake Street Madison, WI 53706	(608) 262-3980	lgc.uwex.edu/Disaster/index.html
WDOA	Wisconsin Coastal Management	Wisconsin Coastal Management Program Department of Administration 101 East Wilson Street Madison, WI 53702	(608) 267-9788	http://www.doa.state.wi.us/Divisions/Intergovernmental-Relations/Wisconsin-Coastal-Management/grant-program/

Appendix K (continued)

Administrator of Grant Program	Name of Grant Program	Address	Phone Number	Internet Web Address
Wisconsin Department of Agriculture Trade and Consumer Protection (DATCP)	Land and Water Resource Management Program	Wisconsin Department of Agriculture, Trade and Consumer Protection Agricultural Resource Management 2811 Agriculture Drive P.O. Box 8911 Madison, WI 53708	(608) 224-4500	www.datcp.state.wi.us
	Farmland Preservation Program		(608) 224-4621	https://datcp.wi.gov/Pages/Programs_Services/FarmlandPreservation.aspx
Wisconsin Public Service Commission	Public Utilities Assistance	Wisconsin Public Service Commission 610 North Whitney Way, P.O. Box 7854 Madison, Wisconsin 53707-7854	(608) 266-5481	psc.wi.gov/
National Oceanic and Atmospheric Administration (NOAA)	Coastal and Estuarine Land Conservation Program	Elaine Vaudreuil (CELCP Manager) Office for Coastal Management (OCM), NOAA Ocean Service 1305 East-West Hwy, N/OCM6 Silver Spring, MD 20910	(240) 533-0821	coast.noaa.gov/czm/landconservation/
NOAA	Coastal Resilience Grant Program	Lisa Warr Office for Coastal Management (OCM), NOAA Ocean Service 1305 East-West Hwy, N/OCM6 Silver Spring, MD 20910	(240) 533-0815	https://coast.noaa.gov/resilience-grant/
Seno K/RLT Conservancy	Urban Green Space Program Stewardship Grant Program	Seno K/RLT Conservancy 3606 Dyer Lake Road Burlington, WI 53105	(262) 539-3222	senokrlt.org/
Great Lakes Protection Fund	Great Lakes Protection Fund Grants Program	Great Lakes Protection Fund 1560 Sherman Avenue, Suite 1370 Evanston, IL 60201	(847) 425-8150	www.glpf.org
Joyce Foundation	Joyce Foundation Grant Program	The Joyce Foundation 321 North Clark Street Suite 1500 Chicago, Illinois 60654	(312) 782-2464	www.joycefdn.org
National Fish and Wildlife Foundation (NFWF)	Five Star Restoration Program Wal-Mart Stores, Inc. Acres for America Program Sustain Our Great Lakes Program	National Fish and Wildlife Foundation 1133 15th Street, NW, Suite 1100 Washington, DC 20005	(202) 857-0166	http://www.nfwf.org/fivestar/Pages/home.aspx http://www.nfwf.org/acresforamerica/Pages/home.aspx http://www.nfwf.org/greatlakes/Pages/home.aspx
Wisconsin Department of Transportation (WisDOT)	Transportation Alternatives Program Highway Safety Improvement Program	Robert Schmidt Wisconsin Department of Transportation 141 NW Barstow Street P.O. Box 798 Waukesha, WI 53187-0798	(262) 548-8789	http://wisconsindot.gov/Pages/doing-bus/local-gov/astnce-pgms/aid/tap.aspx http://wisconsindot.gov/Pages/doing-bus/local-gov/astnce-pgms/highway/hsip.aspx

Appendix K (continued)

Administrator of Grant Program	Name of Grant Program	Address	Phone Number	Internet Web Address
WisDOT	Freight Railroad Infrastructure Improvement Program	Rich Kedzior Railroads and Harbors Section Wisconsin Department of Transportation 4802 Sheboygan Avenue Madison WI 53705	(608) 266-7094	http://wisconsindot.gov/Pages/doing-bus/local-gov/astnce-pgms/aid/friip.aspx
State Farm Companies Foundation	State Farm Good Neighbor Citizenship Company Grants	State Farm Insurance One State Farm Plaza Bloomington, IL 61710	--	https://www.statefarm.com/about-us/community/education-programs/grants-scholarships/company-grants

NOTE: Table was updated in 2016 as a part of the plan update process.

^aA complete listing of U.S. government assistance programs can be found at the Catalog of Federal Domestic Assistance web site: www.cfda.gov.

Source: SEWRPC.

KENOSHA CO APPENDIX K DRAFT (00224138).DOC
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01/18/17, 01/24/17, 03/03/17

Appendix L

PRIORITIZATION OF MOBILE HOME PARKS FOR INSTALLATION OF COMMUNITY SAFE ROOMS

As part of the second update of the Kenosha County Hazard mitigation plan, the Director of the Kenosha County Division of Emergency Management requested that a scheme be developed for prioritizing the mobile home parks within the County for installation of community safe rooms to provide residents of these parks shelter during severe storms such as tornadoes and severe thunderstorms. It was felt that such a prioritization would help to direct the County Division of Emergency Management in deciding which opportunities to seek for the installation of such shelters. This appendix describes the prioritization scheme that was developed in response to the Director's request and presents the results of the prioritization.

METHODS

The prioritization scheme assigns points to each mobile home park in Kenosha County based upon five factors:

1. Size of the mobile home park,
2. Proximity of the mobile home park to a public building that could serve as a storm shelter,
3. Capacity of any nearby public building that could serve as a storm shelter,
4. Presence of special need populations in the mobile home park, and
5. Whether the park gives instructions to its residents regarding where to seek shelter in a severe storm.

The available points are scaled so that any park can receive between zero and 10 points, with higher scores indicating higher priority for installation of safe rooms. Mobile home parks with scores between seven and ten (inclusive) were assigned high priority. Mobile home parks with scores of five and six were assigned medium priority. Mobile home parks with scores between zero and four were assigned low priority.

Points were assigned based upon two data sources: the inventories documented in Chapter II of this report and an inventory of mobile home parks conducted by the Kenosha County Division of Emergency Management in August 2016. The following subsections describe how points were assigned for each of the factors.

Mobile Home Park Size

Mobile home park size was based upon counts made from 2010 aerial photographs. These are listed in Table II-7 in Chapter II. Points were assigned on the following basis:

- Parks with 50 or fewer mobile homes received zero points,
- Parks with 51-100 mobile homes received one point,
- Parks with 101-200 mobile homes received two points,
- Parks with 201-250 mobile homes received three points, and
- Parks with more than 250 mobile homes receive four points.

Proximity to a Public Building that Could Serve as a Shelter

Mobile home parks were assessed based upon their proximity to fire stations and to the Kenosha County Jobs Center. These buildings were selected because some mobile home parks advise their residents to seek shelter in them in the event of a severe storm. In addition, unlike many other public buildings they are likely to be open or opened in the event of a major storm. Points were assigned on the following basis:

- If the nearest potential shelter was within one mile of the park, the park received zero points,
- If the nearest potential shelter was more than one mile away but within two miles of the park, the park received one point, and
- If the nearest potential shelter was more than two miles from the park, the park received two points.

Capacity of the Nearest Potential Shelter

Two methods were used to assign points for the capacity of the nearest potential shelter.

Those mobile home parks that were more than one mile away from the nearest potential shelter received two additional points. The rationale for this is that if shelter is more than a mile away, its capacity will probably not be an issue because few people from the park will have the time or opportunity to reach it in an emergency.

For those mobile home parks within one mile of the nearest shelter, the capacity of the nearest shelter was assessed by comparing the amount of parking available at or immediately adjacent to the shelter to the number of mobile

homes in the park or parks within one mile of the shelter. Note that this comparison assumes one car per mobile home. Points were assigned to parks on the following basis:

- If the shelter had sufficient parking for all of the cars from the mobile homes it would serve, the park or parks, received zero points;
- If the shelter did not have sufficient parking for all of the cars from the mobile homes it would serve, but had sufficient parking for at least 50 percent of those cars, the park or parks received one point; and
- If the shelter did not have sufficient parking to accommodate 50 percent of the cars from the mobile homes it would serve, the park or parks received two points.

Presence of Special Needs Populations

Presence of special needs populations were determined based upon whether mobile home parks were listed as retirement communities or residences for people over 55 years of age. Those parks that were so listed received one point. All other parks received zero points.

Instructions to Residents on Where to Seek Shelter in a Storm

Those parks that provide residents with a recommendation for where to seek shelter during a severe storm or other emergency received zero points. Those parks that do not offer such a recommendation received one point.

PRIORITIZATION RESULTS

The results of the prioritization are given in Table L-1. Based on the prioritization analysis, five mobile home parks are considered to be high priority sites for installation of community safe rooms: Rainbow Lakes Manor, City View Manufactured Home Communities, Wheatland Estates Mobile Home Court, Oakdale Estates, and Westwood Mobile Home Park. Installation of community safe rooms in these five mobile home parks would provide shelter to the residents of about 1,000 mobile homes in the event of a severe storm or other emergency. An additional seven mobile home parks are considered to be medium priority sites for installation of community safe rooms. Installation of community safe rooms in these mobile home parks would provide shelter to the residents of about 380 mobile homes in the event of a severe storm or other emergency. Finally, 10 mobile home parks are considered to be low priority sites for the installation of community safe rooms. Five of these parks are within close proximity of adequate shelters. Installation of community safe rooms in the remaining five mobile home parks would provide shelter to the residents of about 200 mobile homes in the event of a severe storm or other emergency.

It should be noted that the interest that owners and operators of mobile home parks in Kenosha County may have in installing safe rooms in their parks has not been assessed. Thus, any such interest could not be taken into account in this prioritization. While this prioritization is meant to provide guidance in seeking opportunities to install community safe rooms, it is important to recognize that opportunities may present themselves without regard to the

priority given in this prioritization scheme. Because of this, such opportunities should be considered upon their merits, regardless of the priority given in Table L-1, when they occur.

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03/15/17, 03/23/17

Table L-1
PRIORITIZATION OF MOBILE HOME PARKS IN
KENOSHA COUNTY FOR INSTALLATION OF COMMUNITY SAFE ROOMS

Park	Municipality	ID on Map II-7	Park Size	Proximity to Shelter	Shelter Capacity	Special Needs	Safety Advice	Total Score	Priority
Rainbow Lakes Manor	Village of Bristol	2	4	2	2	1	1	10	High
City View Manufactured Home Communities	Village of Pleasant Prairie	15	2	1	2	1	1	7	High
Wheatland Estates Mobile Home Court	Town of Wheatland	21	2	2	2	0	1	7	High
Oakdale Estates	Town of Somers	23	2	2	2	0	1	7	High
Westwood Mobile Home Park	Village of Pleasant Prairie	17	4	1	2	0	0	7	High
Lakewood Estates Mobile Home Park	Town of Salem ^a	18	0	1	2	1	1	5	Medium
Bristol Heights	Village of Bristol	1	0	2	2	0	1	5	Medium
Kenosha Estates	Village of Somers	3	0	2	2	0	1	5	Medium
Prairie Lake Estates	City of Kenosha	12	1	1	2	0	1	5	Medium
Shorecrest Pointe Mobile Home Park	City of Kenosha	14	1	1	2	0	1	5	Medium
Timber Ridge Manufactured Home Park	Village of Pleasant Prairie	16	2	1	2	0	0	5	Medium
Shady Nook Mobile Home Park	Town of Brighton	22	0	2	2	0	1	5	Medium
Kenosha Estates	Village of Somers	5	0	1	2	0	1	4	Low
Pleasant Prairie Mobile Home Park	Town of Somers	11	0	1	2	0	1	4	Low
Scotty's Mobile Home Park	Village of Pleasant Prairie	13	0	1	2	0	1	4	Low
Lake Crest Mobile Home Park	Village of Silver Lake ^a	19	1	0	2	0	1	4	Low
Oakwood Mobile Home Community	City of Kenosha	9	3	0	0	0	0	3	Low
Carefree Estates	Town of Salem ^a	20	2	0	0	0	1	3	Low
Maple Lane Mobile Home Park	City of Kenosha	6	1	0	0	0	1	2	Low
Nelson's Hillcrest Mobile Home Park	Village of Somers	8	0	1	0	0	1	2	Low
Alpine Mobile Home Park	City of Kenosha	4	0	0	0	0	1	1	Low
Mid-City Mobile Home Park	Village of Somers	7	0	0	0	0	1	1	Low

^aOn November 21, 2016 the Wisconsin Department of Administration approved a cooperative plan submitted by the Village of Silver Lake and the Town of Salem. Effective February 14, 2017 the two municipalities merged to become the Village of Salem Lakes. As of February 14, 2017, the plan implementation responsibilities for the Village of Silver Lake and the Town of Salem are assigned to the Village of Salem Lakes.

Source: SEWRPC.

SEWRPC Community Assistance Planning Report No. 278-3ED

KENOSHA COUNTY HAZARD MITIGATION PLAN UPDATE: 2017-2021

Appendix M

ADOPTING RESOLUTIONS

KENOSHA CO APPENDIX M DRAFT (TITLE) (00224140).DOC
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03/06/15 From APD-M FINAL CAPR-278-2ED (#157618)

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