

**COMMUNITY ASSISTANCE
PLANNING REPORT NO: 278
(2nd Edition)**



KENOSHA COUNTY HAZARD MITIGATION PLAN UPDATE: 2011-2015

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KENOSHA COUNTY DEPARTMENT OF PLANNING AND DEVELOPMENT

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MITIGATION PLAN UPDATE: 2011-2015**

Prepared by the

Southeastern Wisconsin Regional Planning Commission
Kenosha County Division of Emergency Management
Kenosha County Department of Planning and Development

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Chapter I

INTRODUCTION AND BACKGROUND

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 include 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 participating jurisdictions are listed in Table 1. The updated plan was prepared by the staffs of the Kenosha County Division of Emergency Management and the Southeastern

Table 1

JURISDICTIONS PARTICIPATING IN THE KENOSHA COUNTY ALL HAZARDS MITIGATION PLAN UPDATE: 2009-2010

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

^aDuring December 2009, a portion of the Town of Bristol incorporated as the Village of Bristol. The former Town had participated in the initial Kenosha County hazard mitigation plan.

^bOn July 4, 2010, the Village of Bristol annexed the Town of Bristol, consolidating the Village and Town into one entity, the Village of Bristol.

Source: SEWRPC.

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 is comprised of 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 Task Force, the County Planning and Development Division and Division of Emergency Management sought representatives from a cross-section of community interests. The chief elected official of each municipality in the County was invited to participate. Invitations were sent to over 47 people, including elected and appointed officials and representatives of law enforcement agencies, fire departments, public health departments, public works departments, and private sector firms. Also, the County issued a news release announcing the formation of the Task Force and inviting participation.

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

Table 2

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

Civil Division	Attendance at Task Force Planning Meetings			Provision of Data ^a	Review of Report
	September 28, 2009	February 24, 2009	June 22, 2010		
Cities Kenosha.....	X	--	X	X	X
Villages					
Bristol ^b	X	X	X	X	X
Paddock Lake	X	X	X	X	X
Pleasant Prairie.....	X	X	X	X	X
Silver Lake	--	--	--	X	--
Twin Lakes.....	--	X	--	X	X
Towns					
Brighton.....	--	--	--	X	--
Bristol ^b	X	X	X	X	X
Paris.....	--	--	--	X	--
Randall.....	X	--	--	X	X
Salem.....	X	X	X	X	X
Somers.....	X	X	--	X	X
Wheatland.....	X	--	X	X	X
County Kenosha County.....	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 July 4, 2010, the Village of Bristol annexed the Town of Bristol, consolidating the Village and Town into one entity, the Village of Bristol.

Source: SEWRPC.

activities, respectively, for the updated plan. Table 4 lists hazard mitigation activities undertaken by the municipalities in the County since the initial plan was issued in 2005.

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 Task Force 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.¹ 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

¹Federal 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. See also Federal Emergency Management Agency, State and Local Plan Interim Criteria under the Disaster Mitigation Act of 2000, July 11, 2002.

Table 3

**OUTREACH ACTIVITIES BY LOCAL COMMUNITIES IN
KENOSHA COUNTY RELATED TO HAZARD MITIGATION: 2005-2009**

Community	Activity
Kenosha County	Guide to Emergency Preparedness (available on County website) Fox River Flood Mitigation Program webpages Swine Flu webpage Division of Emergency Government webpages Division of Emergency Government Damage Hotline
City of Kenosha	City Website Meetings with residents on Forest Park Sanitary and Storm Sewer Study Production and distribution of brochures on stormwater for stormwater utility
Village of Bristol	Quarterly newsletter Village website Contract with Root-Pike WIN for stormwater education and outreach
Village of Paddock Lake	Quarterly newsletter Village website
Village of Pleasant Prairie	Monthly newsletter Village website
Village of Silver Lake	Village website
Village of Twin Lakes	Village website
Town of Brighton	Public posting at three locations Town website
Town of Bristol	Quarterly newsletter Town website Contract with Root-Pike WIN for stormwater education and outreach
Town of Paris	Town website
Town of Randall	Town website
Town of Salem	Town newsletter Town website
Town of Somers	Quarterly newsletter Town website
Town of Wheatland	Town website

Source: Kenosha County Division of Emergency Management, local municipalities, and SEWRPC.

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

Table 4

HAZARD MITIGATION ACTIVITIES IN KENOSHA COUNTY: 2005-2009

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
City of Kenosha	Shagbark Basin Project	--	--	2009
	Forest Park Area Storm Sewer Study	City	2009	Spring 2010
Village of Paddock Lake	236th Avenue Corridor	--	--	Ongoing
Village of Pleasant Prairie	Chiwaukee Prairie State Natural Area Additions	WDNR, Nature Conservancy, Chiwaukee Prairie Preservation Fund	--	September 2009
Village of Twin Lakes	Elizabeth Lake Lake Level and Spillway Hydraulic Evaluation	Village	2009	2009
Town of Brighton	Culvert Replacement at Brighton Creek at 18th Street	--	--	2006
	Hoosier Creek Brush Clearing	--	2009	Ongoing
Town of Bristol	Center Creek Hydrologic and Hydraulic Analysis	--	--	February 2009
	Center Creek Bank Stabilization	--	--	August 2009
	Lake George Flood Mitigation Project	--	Late 2009	Ongoing
Town of Salem	State Highway 83 Project	WisDOT, Village	--	2006
Town of Somers	Somers Branch Cleaning and Debushing	Village	--	Summer 2009
	Pike River Roadway Flooding Mitigation	FEMA, Town	--	--

Source: Kenosha County Division of Emergency Management, local municipalities, and SEWRPC.

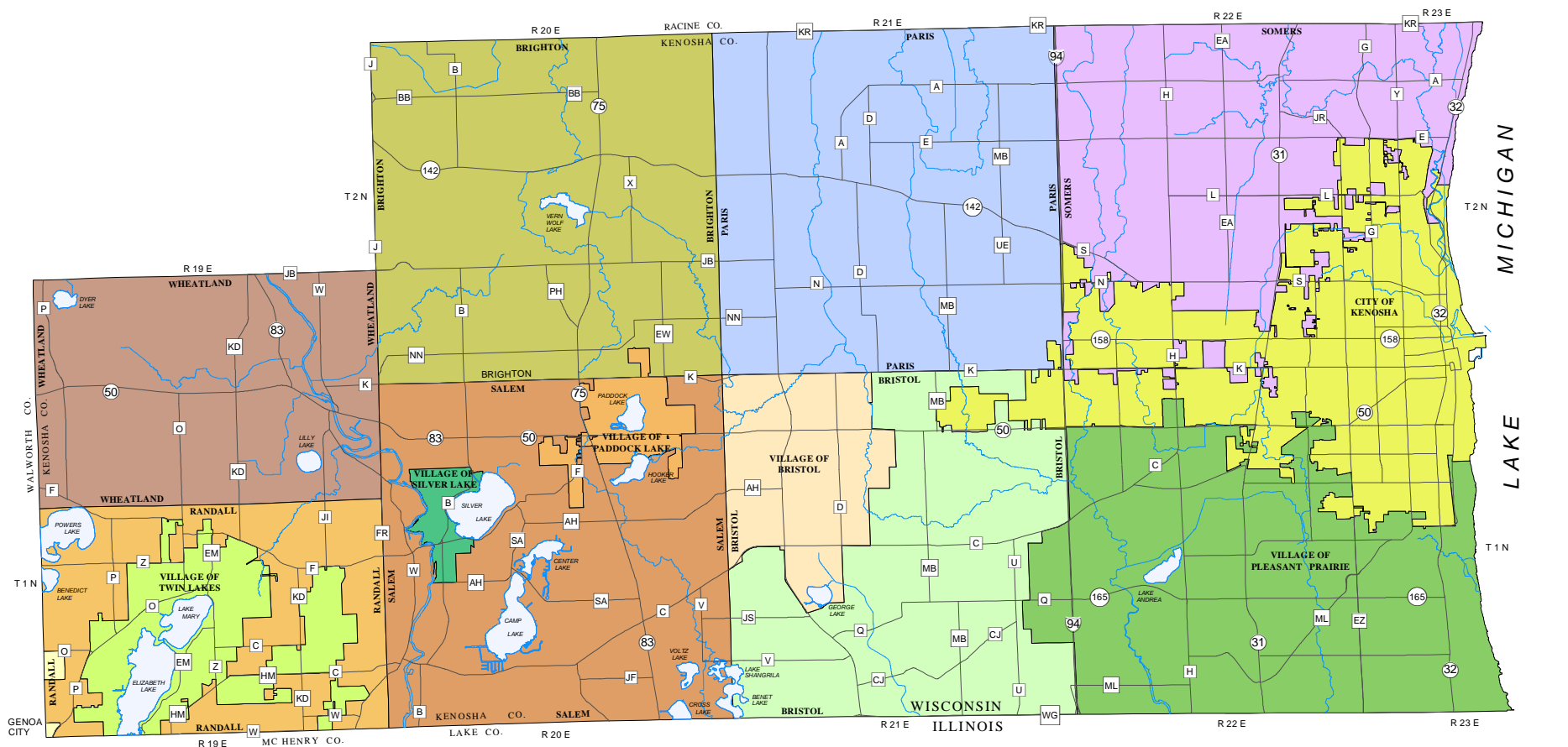
Kenosha County covers about 278 square miles and contains one city, all or parts of four villages, and seven towns as shown on Map 1.² There are all or parts of five natural watersheds and a total of about 4,800 acres of inland surface waters within the County. The County has a diversified natural resource 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.

²On July 4, 2010 the Village of Bristol annexed the Town of Bristol. As a result of this action, as of that date there were six towns in the County.

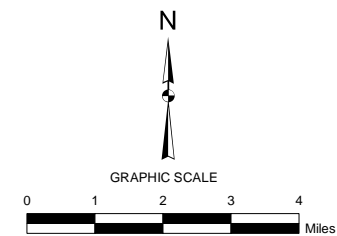
Map 1

CIVIL DIVISION BOUNDARIES IN KENOSHA COUNTY: 2009



NOTE: On July 4, 2010, the Village of Bristol annexed the Town of Bristol consolidating the two into one entity, the Village of Bristol.

Source: SEWRPC.



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 is 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*³ 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 and updated in 2009 and 2010 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 knowledgeable about, and directly involved in, hazard mitigation matters. The membership, formation, and active participation of the Task Force are documented in Appendix A of this report. In addition to formation and active participation of the Task Force, the plan development process included the following steps:

³*Wisconsin Emergency Management, State Hazard Mitigation Plan of Wisconsin, December 2008.*

- Collation and review of all pertinent reports relating to the hazard mitigation activities in Kenosha County;
- 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 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;⁴
- 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.

PLAN MAINTENANCE AND IMPLEMENTATION ACTIVITIES

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

⁴*SEWRPC Community Assistance Planning Report No. 299, A Multi-Jurisdictional Comprehensive Plan for Kenosha County: 2035, April 2010.*

safety. In addition the Kenosha County Division of Emergency Management makes information about emergency preparedness, including hazard mitigation, available to the public through its pages on Kenosha County's website.

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 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.

Implementation Activities

Since the adoption of the initial 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 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 STH 50 and 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 2009, the owners of 86 homes in the project area have participated in this voluntary buyout program. An additional 88 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.

The City of Kenosha completed the Shagbark Basin in 2009 at a cost of \$518,000. This is a stormwater management project located in the 3500 block of 39th Avenue, in an area directly tributary to Lake Michigan. The project enlarged an undersized dry detention basin to reduce local stormwater flooding. In fall 2009, the City also began a storm sewer study for the Forest Park area, which is also directly tributary to Lake Michigan. 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. The study includes public involvement and a condition and capacity analysis of the storm sewers. The study, which will prioritize storm sewer improvements to address flooding, is scheduled to be completed in spring 2010.

The Village of Paddock Lake approved a plan in 2009 to buy and tear down as many as seven homes that frequently flood along Unnamed Tributary No. 6 to Brighton Creek. The homes are scattered along a two-block area south of CTH K between 239th and 235th Avenues. The Village of Paddock Lake will use Federal hazard mitigation grants to cover 75 percent of the cost, State funds for 12.5 percent of the cost, and Village funds for the remaining 12.5 percent. The approximate cost to purchase, demolish and relocate is \$160,000 per residential structure.

The Village of Pleasant Prairie in 2009 submitted a Great Lakes Restoration Initiative proposal for a study on Tobin Creek to review flows and slope stabilization needs. In 2009 the Village also submitted applications for three Community Development Block Grants (CDBG) to mitigate stormwater flooding. The first project is the Spring Brook Innovation Center in an area directly tributary to Lake Michigan 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, which is also in an area directly tributary to Lake Michigan, calls for sewer system improvements in Carol Beach Unit 1 at a cost of \$790,000. The third project is in the Chateau Eau Plaines in the Des Plaines River watershed.

That project includes land acquisition and stormwater detention basin construction at a cost of \$1.5 million. The Village expects to receive word on the three CDBG applications in winter 2010.

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 is currently taking place and construction may happen in 2010 at an estimated cost of \$100,000.

In 2009, the Town of Bristol completed channel riprap work to provide erosion protection along a 700-foot-long reach of Center Creek, approximately a quarter mile south of STH 50. The cost of the project was approximately \$16,000. In 2010 or 2011 the Town plans to replace the culverts at 144th Avenue and Center Creek as recommended by SEWRPC. In 2009, the Town began pursuing with Kenosha County the voluntary buyout or floodproofing of seven homes on Lake George. The homes are located on the north side of the Lake, south of 101st Street, on 190th to 192th Avenues. The estimated value of the seven homes is \$1.05 million. The Town will pursue a grant through the Wisconsin Department of Commerce for this effort.

The Town of Brighton replaced the 18th Street main 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 secure funding to replace the deteriorated high flow relief pipe at this same location. The existing pipe is a 64-inch diameter corrugated steel pipe and the Town plans to replace it with a plastic pipe. 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 charges began in December 2009.

The Town of Salem indicated that the 83rd Street culvert on Unnamed Tributary No. 1 to Hooker Lake was replaced in 2006. The culvert was replaced by the Wisconsin Department of Transportation as part of the STH 83 project. The Town 10 percent match for the culvert replacement was estimated at \$5,000.

Following flood events in 2005 and 2008, the Town of Somers received FEMA grant money for repair of flood damages in the Pike River watershed. Repair work included road shoulders, a lift station, and other minor roadway repair work. The total FEMA reimbursement was \$25,400. In 2009, the Town completed a project to clean and debrush a short section of Somers Branch from CTH H east to the railroad tracks at a cost of \$5,000. In late 2009, the Town was also working on clearing a hydraulic restriction on a tributary to Somers Branch at an estimated cost of \$12,000.

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.

This hazard mitigation plan update was also 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 (see Appendix A).

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 draft plan were made available at the offices of Kenosha County Emergency Management, the Kenosha County Housing Authority, and on the SEWRPC website. 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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Chapter II

BASIC STUDY AREA INVENTORY AND ANALYSIS

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 13 civil divisions in Kenosha County are shown on Map 1 in Chapter I of this report. There are seven towns in Kenosha County, including Brighton, Bristol, Paris, Randall, Salem, Somers, and Wheatland.¹ In addition, there are five villages, which include Bristol, Paddock Lake, Pleasant Prairie, Silver Lake, and Twin Lakes, and the City of Kenosha located within the County. One change in civil divisions has 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. The total land area and proportion of the County within each civil division is presented in Table 5.

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 6. The resident population was 75,283 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 2000, there were 149,577 individuals residing in the County (Table 6). The

¹On July 4, 2010, the Village of Bristol annexed the Town of Bristol. As a result of this action, as of that date there were six towns in the County.

Table 5

**AREAL EXTENT OF CIVIL DIVISIONS
IN KENOSHA COUNTY: 2009**

Civil Division	Area (square miles) ^a
Cities	
Kenosha.....	27.0
Villages	
Bristol ^{b,c}	9.2
Paddock Lake.....	3.1
Pleasant Prairie.....	33.6
Silver Lake.....	1.4
Twin Lakes.....	10.0
Towns	
Brighton.....	35.8
Bristol ^{b,c}	24.1
Paris.....	35.9
Randall.....	13.9
Salem.....	32.0
Somers.....	28.4
Wheatland.....	24.1
Total	278.4

^aSum of civil division areas may not match County total area due to rounding.

^bOn December 1, 2009, a portion of the Town of Bristol incorporated as the Village of Bristol.

^cOn July 2, 2010, the Village of Bristol annexed the Town of Bristol.

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

Table 6

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

Year	Population	Change from Preceding Year Listed	
		Absolute	Percent
1950	75,283	- -	- -
1960	100,615	25,332	33.6
1970	117,917	17,302	17.2
1980	123,127	5,210	4.4
1990	128,181	5,054	4.1
2000	149,577	21,396	16.7
2005 ^a	158,219	8,642	5.8
2035 ^b	210,100	51,881	32.8

^aEstimate from the Wisconsin Department of Administration.

^bIntermediate growth projection from the SEWRPC 2035 land use plan.

Source: U.S. Bureau of the Census, Wisconsin Department of Administration, and SEWRPC.

County's estimated population in 2005 was 158,219. This represents an increase of almost 6 percent between 2000 and 2005. The population in Kenosha County is expected to increase through the year 2035, by approximately 33 percent.

The City of Kenosha is the most populous municipality in the County, with an estimated 93,785 residents, or about 59 percent of the County's population, in 2005. The next most populous communities are the Village of Pleasant Prairie, with an estimated 18,606 residents, and 12 percent of the County's population; and the Towns of Salem and Somers, with an estimated 11,074 and 9,352 residents, respectively, constituting about 7 percent and 6 percent, respectively, of the County's population. Based upon the 2000 census data, several communities in Kenosha County experienced a relative population increase of more than 20 percent from 1990 to 2000. These communities include the Villages of Pleasant Prairie, Silver Lake, and Twin lakes, and the Towns of Randall and Salem.

Households

Trends in the number of households in the County are shown in Table 7. The County experienced significant gains in the number of new households between 1970 and 2005. The rate of increase in the number of households has exceeded the rate of population increase. Between 1970 and 2005, the number of households increased by 69 percent, compared to a population increase of 34 percent. With the number of households increasing at a faster rate than the population, the number of persons per household has decreased.

Table 7

**NUMBER OF HOUSEHOLDS IN
KENOSHA COUNTY: 1970-2005**

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
2005 ^a	59,956	3,899	7.0

^aEstimate from the Wisconsin Department of Administration.

Source: U.S. Bureau of the Census, Wisconsin Department of Administration, and SEWRPC.

Table 8

**NUMBER OF JOBS IN KENOSHA
COUNTY: CENSUS YEARS 1970-2000**

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

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

Employment

Trends in job growth in the County are set forth in Table 8. 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 8, employment growth was significant in the County between 1970 and 2000, with an increase in the number of jobs from 42,715 to 68,654, or an increase of about 61 percent.

It should be noted, however, that of the employed Kenosha County residents—10,627 of the 72,053 workers in 2000, or about 15 percent—worked in Wisconsin outside of the County, and a substantial number of employed residents—20,937 workers, or about 29 percent, worked outside of the State.

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 2009 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 9.

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 2000 is set forth on Map 2 and in Table 10. Urban land uses occupied about 38,051 acres or 21 percent of the County in 2000. 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 17,264 acres, or 45 percent of the urban land uses and 10 percent of the total area of the County.

Table 9

EQUALIZED VALUE OF PROPERTY IN KENOSHA COUNTY BY MUNICIPALITY: 2009

Municipality	2009 Equalized Value	Percent Change from 2003
Cities		
Kenosha.....	\$6,799,688,900	55.6
Subtotal	\$6,799,688,900	55.6
Villages		
Paddock Lake.....	\$ 265,152,000	39.1
Pleasant Prairie	2,807,695,000	56.1
Silver Lake.....	197,287,700	46.3
Twin Lakes.....	884,404,500	57.9
Subtotal	\$4,154,539,200	54.8
Towns		
Brighton	\$ 205,280,800	41.6
Bristol ^a	603,573,400	44.5
Paris	233,480,700	40.2
Randall	550,378,000	46.3
Salem	1,216,792,700	52.7
Somers	800,978,100	41.7
Wheatland.....	350,424,200	56.9
Subtotal	\$3,960,907,900	47.2
Total^b	\$14,915,136,000	53.0

^aOn December 1, 2009 a portion of the Town of Bristol incorporated as the Village of Bristol. The equalized value shown here includes both the Town and Village of Bristol. On July 4, 2010, the Village of Bristol annexed the Town of Bristol.

^bThe total including the equalized value of the portion of the Village of Genoa City that is in Kenosha County is \$1,915,551,100. The Village is predominantly located in Walworth County and is not included under this plan.

Source: Wisconsin Department of Revenue and SEWRPC.

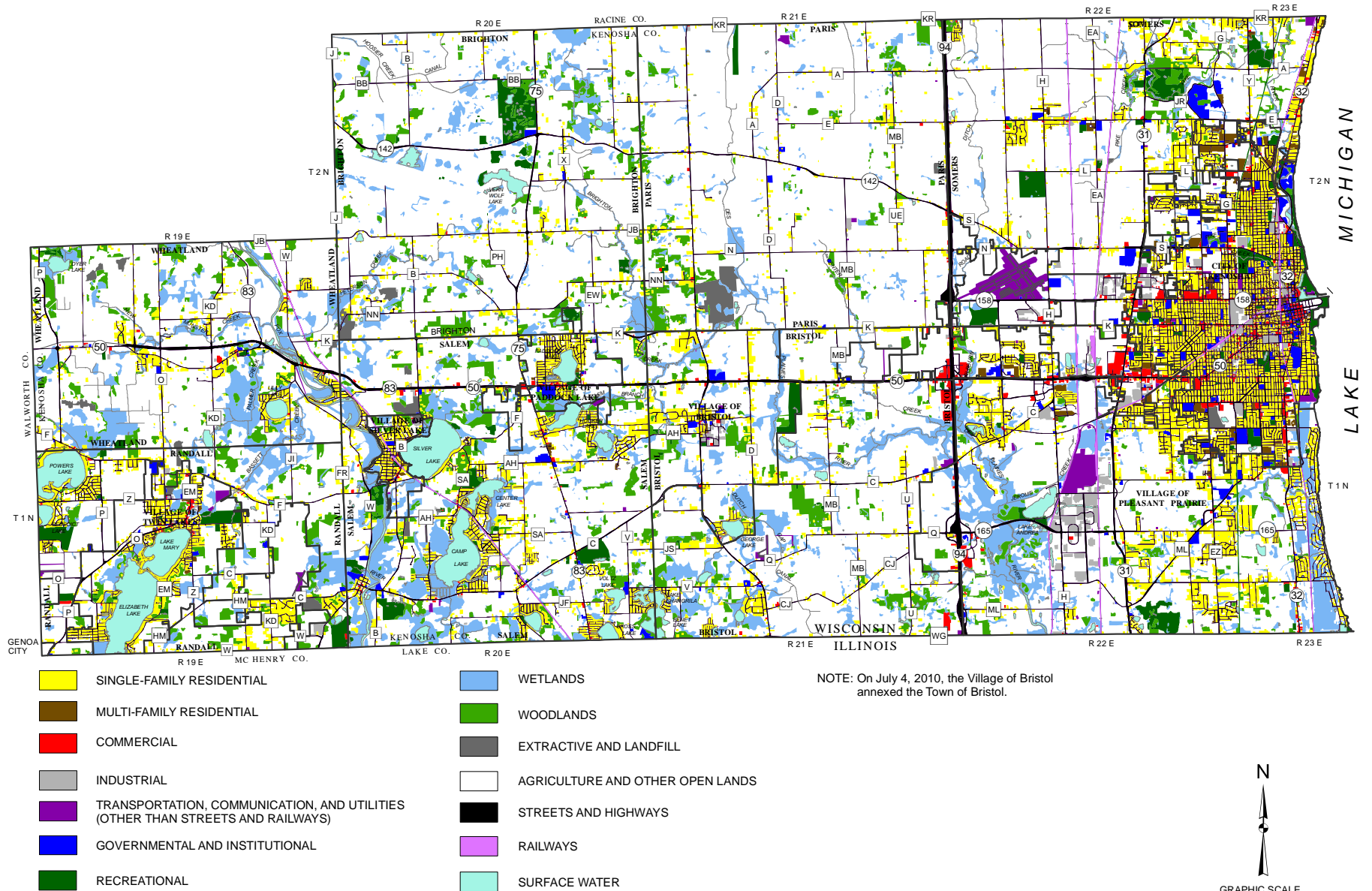
Land uses categorized as transportation, communication, and utilities constituted the second largest urban land use category in 2000, encompassing about 11,475 acres, or 30 percent of the area of all urban land and 6 percent of the total area of the County.

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

Mobile homes can be particularly vulnerable to some hazards such as high winds. Map 3 shows the locations of mobile home parks and individual mobile homes in Kenosha County. In 2000 there were 1,952 mobile homes located in the County. Most of these were located in 23 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 11.

Map 2

EXISTING LAND USE IN KENOSHA COUNTY: 2000



Source: SEWRPC.

Table 10

LAND USE IN KENOSHA COUNTY: 2000

Land Use Category ^a	Acres	Percent of Subtotal	Percent of County
Urban			
Residential.....	18,597	48.9	10.4
Commercial.....	1,443	3.8	0.8
Industrial.....	1,436	3.8	0.8
Transportation, Communications, and Utilities ^a	11,475	30.2	6.4
Governmental and Institutional.....	1,691	4.4	1.0
Recreational.....	3,409	8.9	1.9
Subtotal	38,051	100.0	21.3
Nonurban			
Agricultural.....	94,716	67.6	53.2
Woodlands.....	9,243	6.6	5.2
Wetlands.....	16,068	11.4	9.0
Surface Water.....	5,056	3.6	2.8
Extractive.....	518	0.4	0.3
Landfills.....	369	0.3	0.2
Open Lands ^b	14,181	10.1	8.0
Subtotal	140,151	100.0	78.7
Total	178,202	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.

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.² The year 2035 regional land use plan, as it applies to Kenosha County, is shown on Map 4. Planned urban areas, which are shown in orange on Map 4, are associated with the City of Kenosha; and adjacent urban areas in the Towns of Bristol, Randall, Salem, Somers, and the Villages of Bristol, Paddock Lake, Pleasant Prairie, Silver Lake, and Twin Lakes.

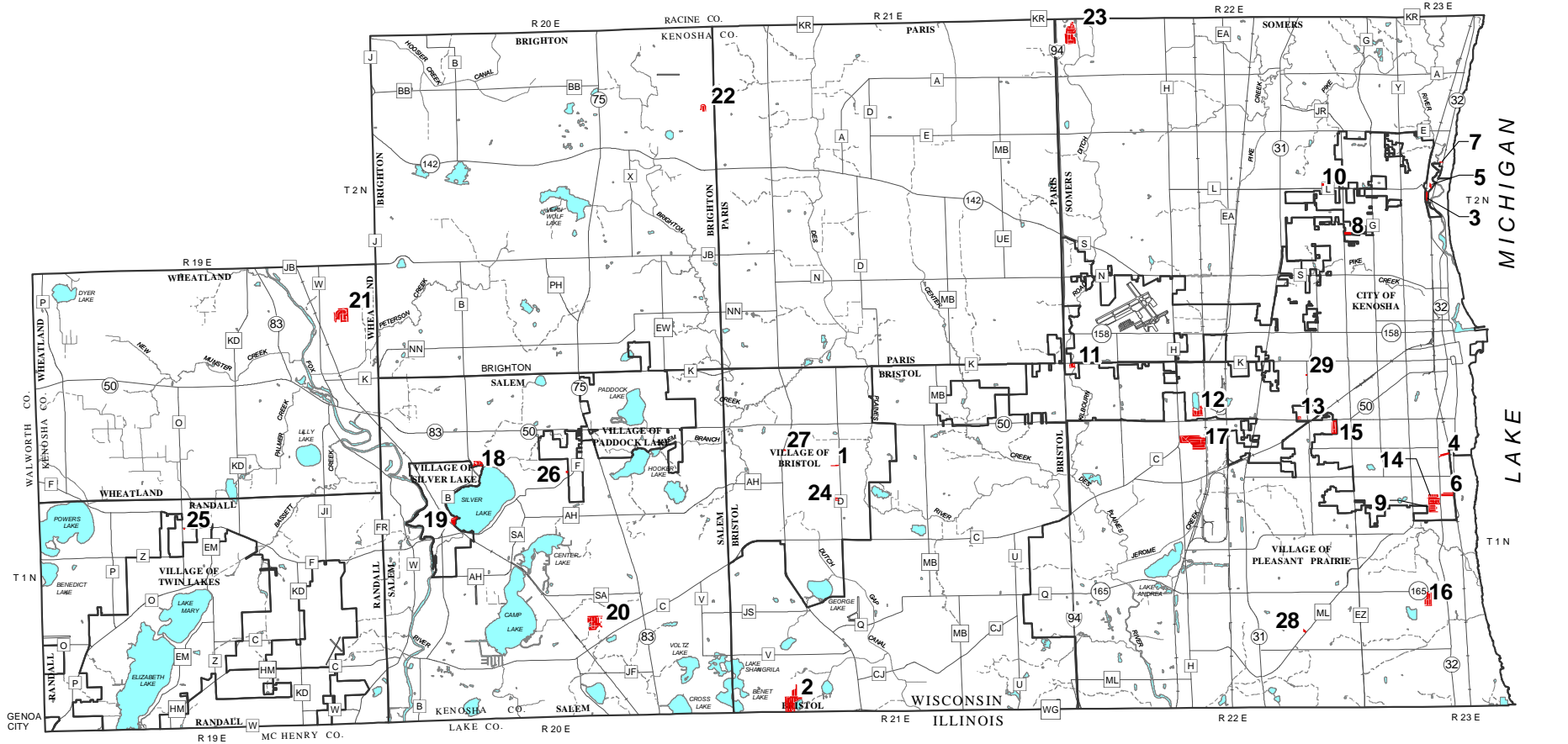
ENVIRONMENTAL CORRIDORS

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

²SEWRPC 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.

Map 3

MOBILE HOMES AND MOBILE HOME PARKS IN KENOSHA COUNTY: 2000



PARCELS DESIGNATED AS MOBILE HOMES AND MOBILE HOME PARKS

10 REFERENCE NUMBER (SEE TABLE 12)

NOTE: On July 4, 2010, the Village of Bristol annexed the Town of Bristol.

Source: SEWRPC.

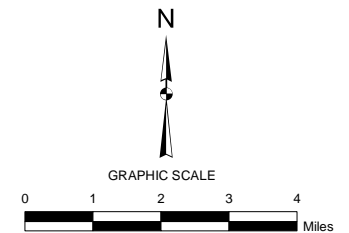


Table 11

MOBILE HOME PARKS AND MOBILE HOMES IN KENOSHA COUNTY: 2000

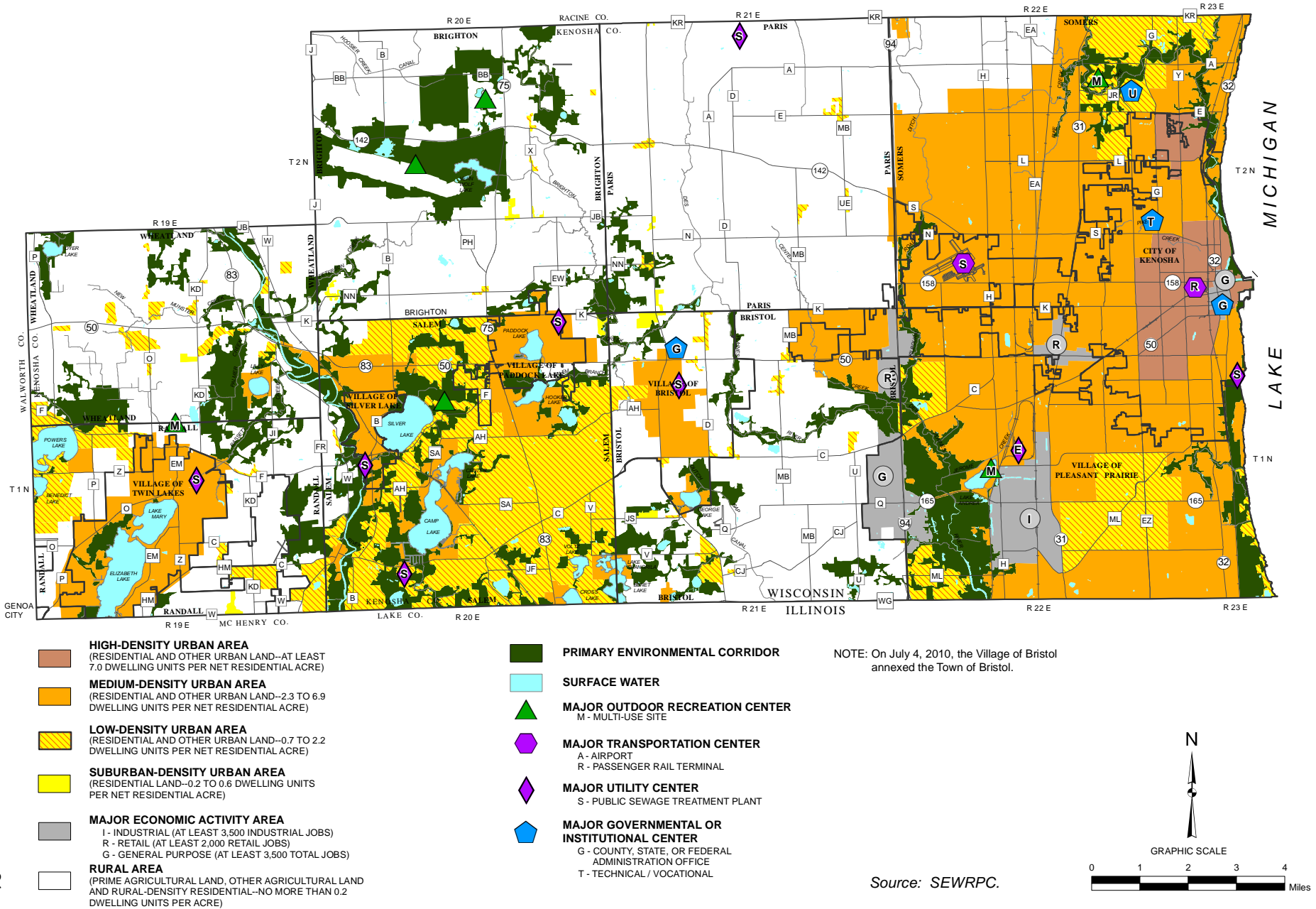
Number on Map 3	Mobile Home Park Name	Size (acres)	Number of Mobile Homes	Location
Mobile Home Parks				
1	Bristol Heights	1.8	7	Village of Bristol
2	Rainbow Lake Manor	36.6	220	Town of Bristol ^a
3	Alfords Park Mobile Home Court	2.7	37	Town of Somers
4	Alpine Village Mobile Home Park	4.2	46	City of Kenosha
5	Embassy Mobil Home Park	1.8	36	Town of Somers
6	Maple Lane Court	7.6	78	City of Kenosha
7	Mid-City Mobile Home Court	0.7	10	Town of Somers
8	Nelson's Hillcrest Mobile Home Park	4.0	49	Town of Somers
9	Oakwood Mobile Home Community	21.0	210	City of Kenosha
10	Pine Ridge Estates	0.9	2	Town of Somers
11	Pleasant Prairie Mobile Home Park	4.0	30	Town of Somers
12	Prairie Lake Estates	11.8	70	City of Kenosha
13	Scotty's Mobile Home Park	1.3	29	Village of Pleasant Prairie
14	Shorecrest Pointe Mobile Home Park	6.7	50	City of Kenosha
15	City View Mobile Home Park	11.2	100	Village of Pleasant Prairie
16	Timber Ridge Mobile Home Park	13.0	122	Village of Pleasant Prairie
17	Westwood Estates	46.8	248	Village of Pleasant Prairie
18	Lakewood Estates Mobile Home Park	6.8	28	Town of Salem
19	Lake Crest Mobile Home Park	6.2	54	Village of Silver Lake
20	Carefree Estates	25.5	136	Town of Salem
21	Wheatland Estates Mobile Home Court	26.9	163	Town of Wheatland
22	Shady Nook Mobile Home Park	5.9	49	Town of Brighton
23	Oakdale Estates	28.3	156	Town 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

^aOn July 4, 2010, the Village of Bristol annexed the Town of Bristol.

Source: Wisconsin Department of Commerce and SEWRPC.

Map 4

2035 REGIONAL LAND USE PLAN AS IT PERTAINS TO KENOSHA COUNTY



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 floodlands; 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 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 2000 there were 27,960 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 6,373 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 3,874 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 5.

SURFACE WATER RESOURCES AND FLOOD HAZARD AREAS

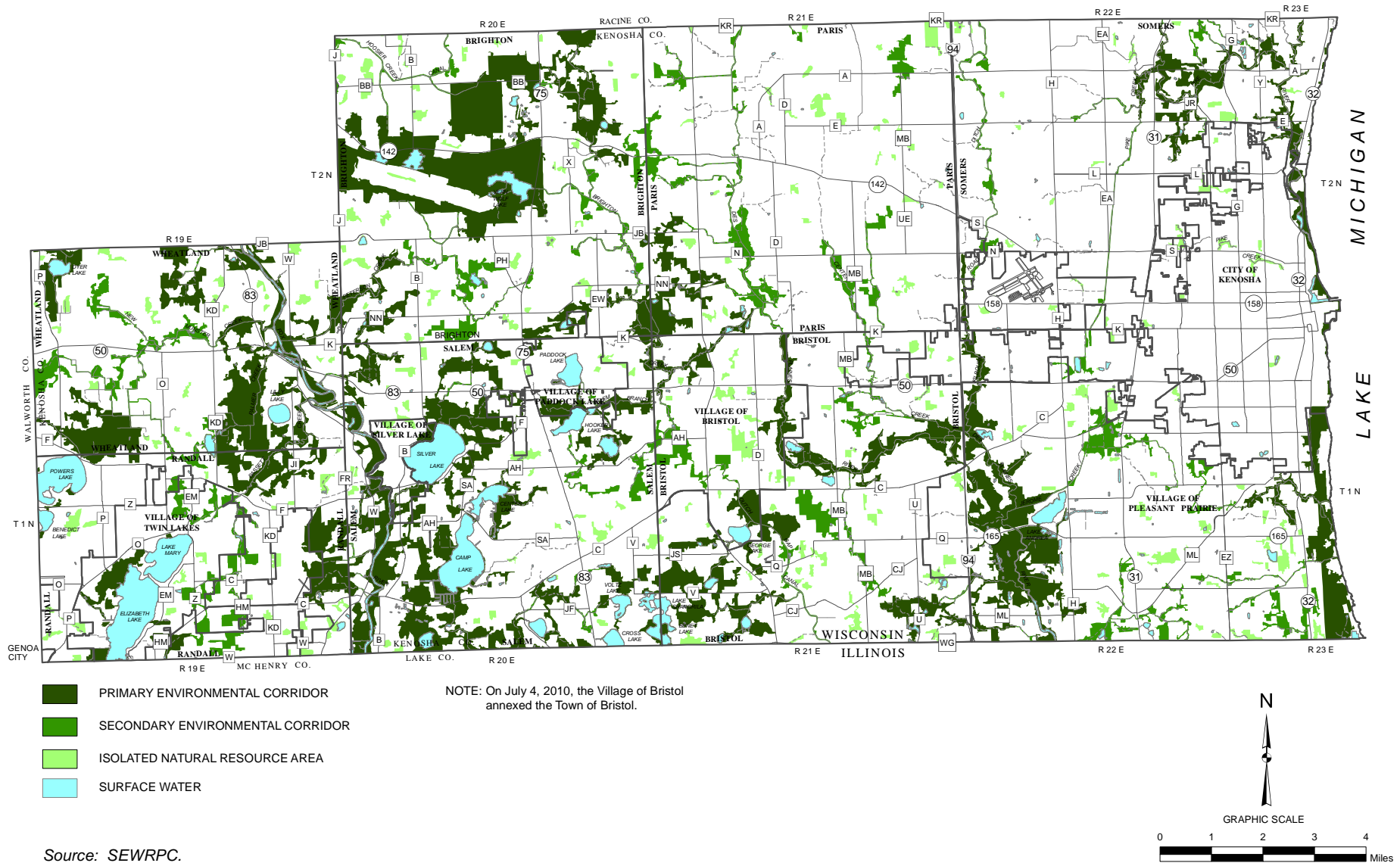
Surface water resources, consisting of streams and lakes, form a particularly important element of the natural resource base. Surface water resources provide recreational opportunities, influence the physical development of the County, and enhance its aesthetic quality. Watershed boundaries, wetlands, and major streams and lakes within the County are shown on Map 6.

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 12.

Map 5

ENVIRONMENTAL CORRIDORS AND ISOLATED NATURAL RESOURCE AREAS IN KENOSHA COUNTY: 2005



Source: SEWRPC.

Map 6

SURFACE WATERS, WETLANDS, AND FLOODPLAINS IN KENOSHA COUNTY: 2009

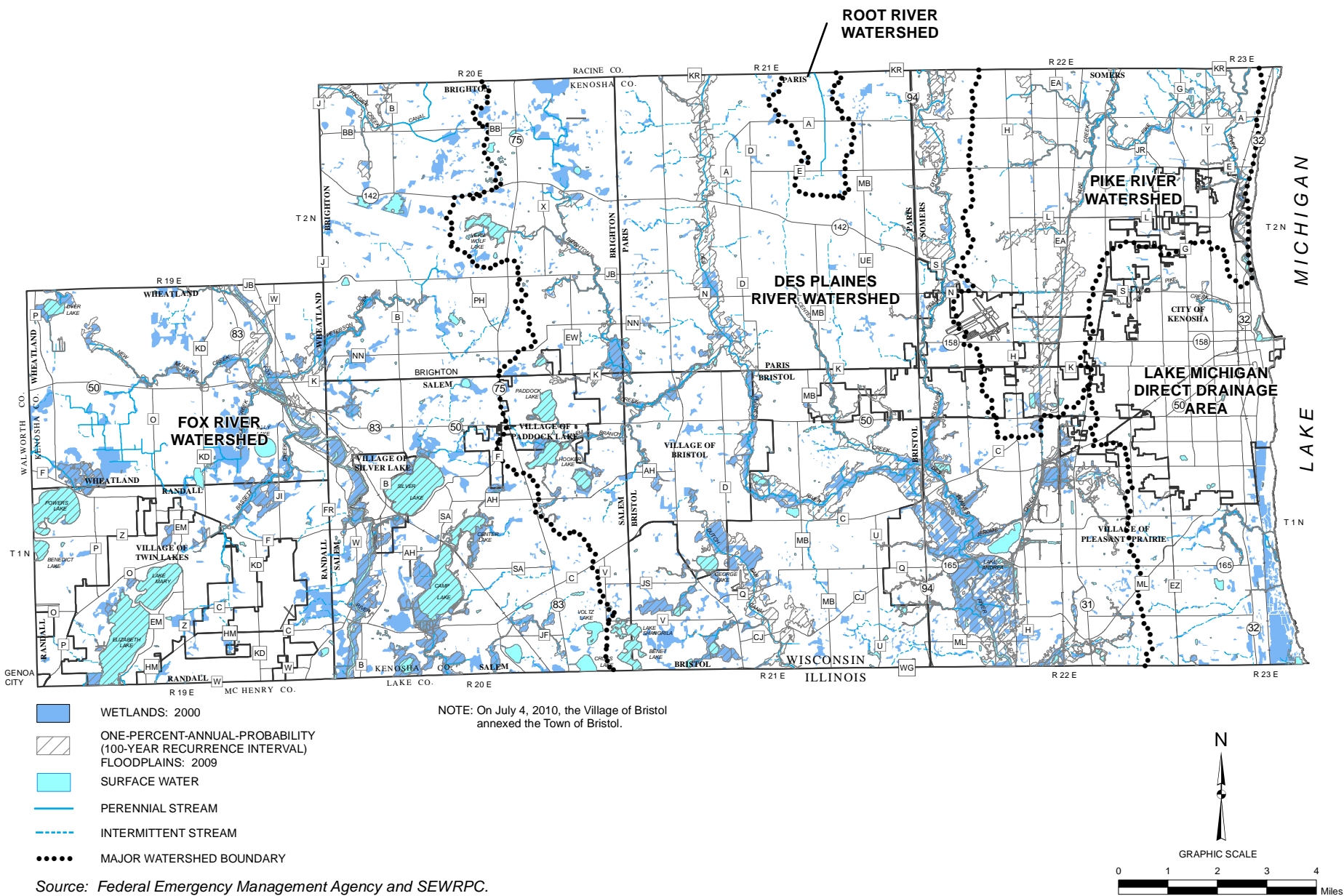


Table 12

LAKE MANAGEMENT DISTRICTS IN KENOSHA COUNTY: 2010

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
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

^aLocated in Walworth County.

Source: University of Wisconsin-Extension, and SEWRPC.

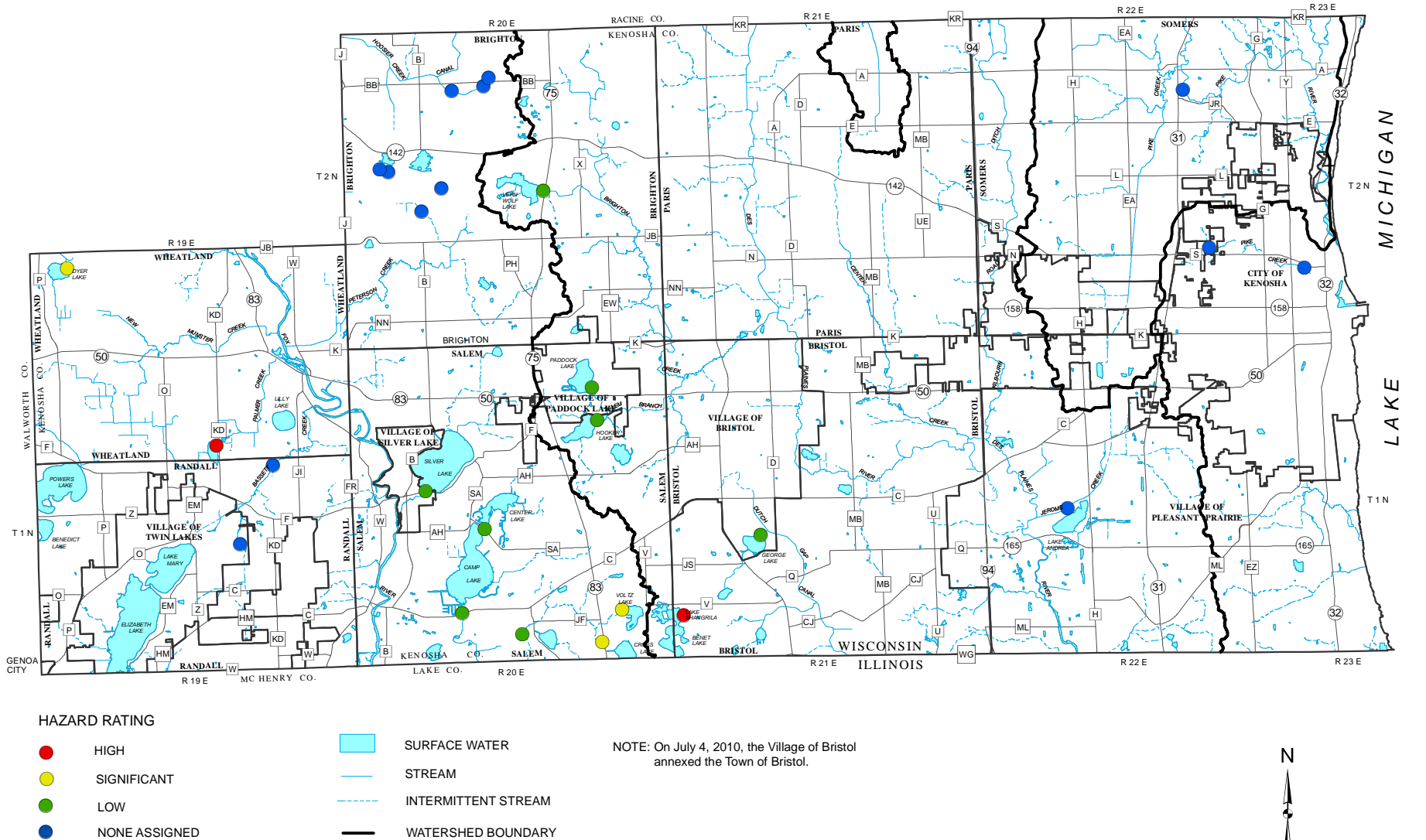
Floodlands are the wide, gently sloping areas contiguous to, and usually lying on both sides of, a stream channel. For planning and regulatory purposes, floodlands are normally defined as the areas, excluding the stream channel, subject to inundation by the one-percent-annual-probability (100-year recurrence interval) flood event. There is a 1 percent chance of this event being reached or exceeded in severity in any given year. Floodland 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. Floodland 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.

Floodlands identified by Kenosha County, SEWRPC, and the Federal Emergency Management Agency are shown on Map 6. Approximately 16,300 acres, or 9 percent of the total area of the County, are located within the one-percent-annual-probability flood hazard area. This total includes about 4,000 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 7. As shown on this map, of the 26 dams identified, two 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 mis-operation of the dam. Another four dams have been assigned significant hazard ratings indicating the potential for economic loss, environmental damage, or disruption of lifeline facilities.

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 are to be finalized in 2010 and is available as a digital file layer for the Kenosha County cadastral mapping system which covers the entire County.

Map 7

DAMS LOCATED WITHIN KENOSHA COUNTY: 2010



Source: Wisconsin Department of Natural Resources and SEWRPC.

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 1977³ and 1997,⁴ and in Kenosha County in 1989 and 1995. Such conditions can change over time since they are related, in part, to changes in, among other related factors, 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 2009, water levels in Lake Michigan were about 0.6 foot below average levels and about three feet below the high levels which occurred in 1986. While these relatively 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, the cyclic nature of the Great Lakes, a return to higher 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 8. These reaches were selected so as 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 current 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 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 8. 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.

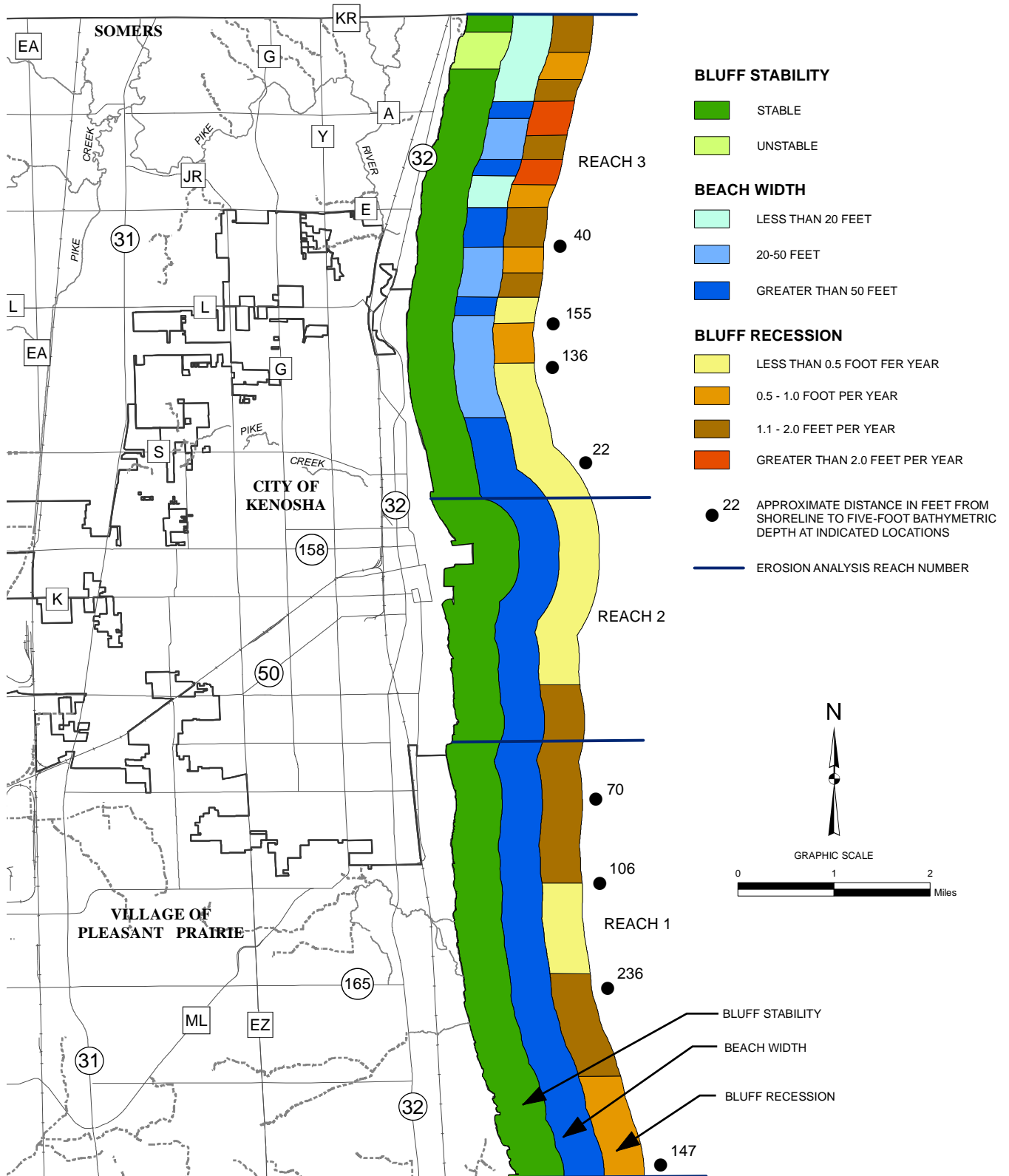
Increases in offshore depths can cause increased shore erosion problems. At the five sites in Kenosha County where offshore bathymetry was measured in 1995 and compared to 1977 data, changes in depths were not definitive. However, at the seven sites in neighboring northern Racine County, where offshore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

³D.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.*

⁴SEWRPC *Technical Report No. 86, Lake Michigan Shoreline Recession and Bluff Stability in Southeastern Wisconsin: 1995, December 1997.*

Map 8

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



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

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 9. As shown on Map 9, 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 9.

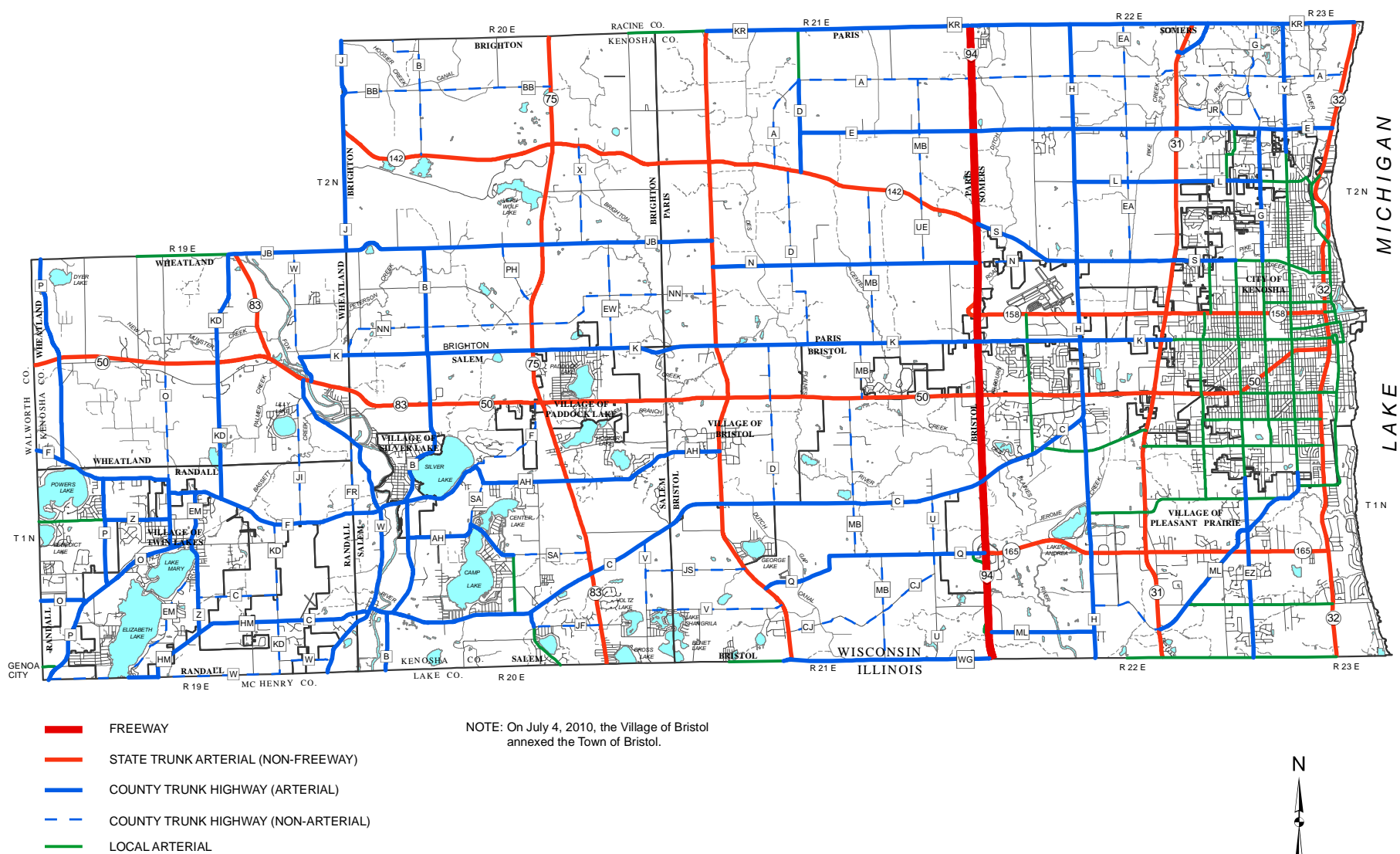
The traffic-carrying capacity of the arterial street system, while dependent upon a number of factors, is primarily a function of the number of traffic lanes and the type of facility. As shown in Table 13, a two-lane arterial generally has a design capacity of about 14,000 vehicles per average weekday, 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 13, 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.

ARTERIAL STREETS AND HIGHWAYS IN KENOSHA COUNTY: 2006



NOTE: On July 4, 2010, the Village of Bristol annexed the Town of Bristol.

Source: SEWRPC.

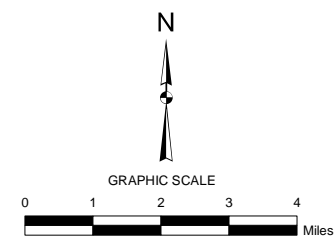


Table 13

**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.

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 2006, railway freight service was being provided within Kenosha County by three railway companies operating active mainline railway lines. As shown on Map 10, 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.

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, and most business and corporate jets. 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 2007, there were a total of 244 aircraft based in Kenosha County, a level which has increased slightly since 2003. The public-use airports in the County are shown on Map 11. 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 11.

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.

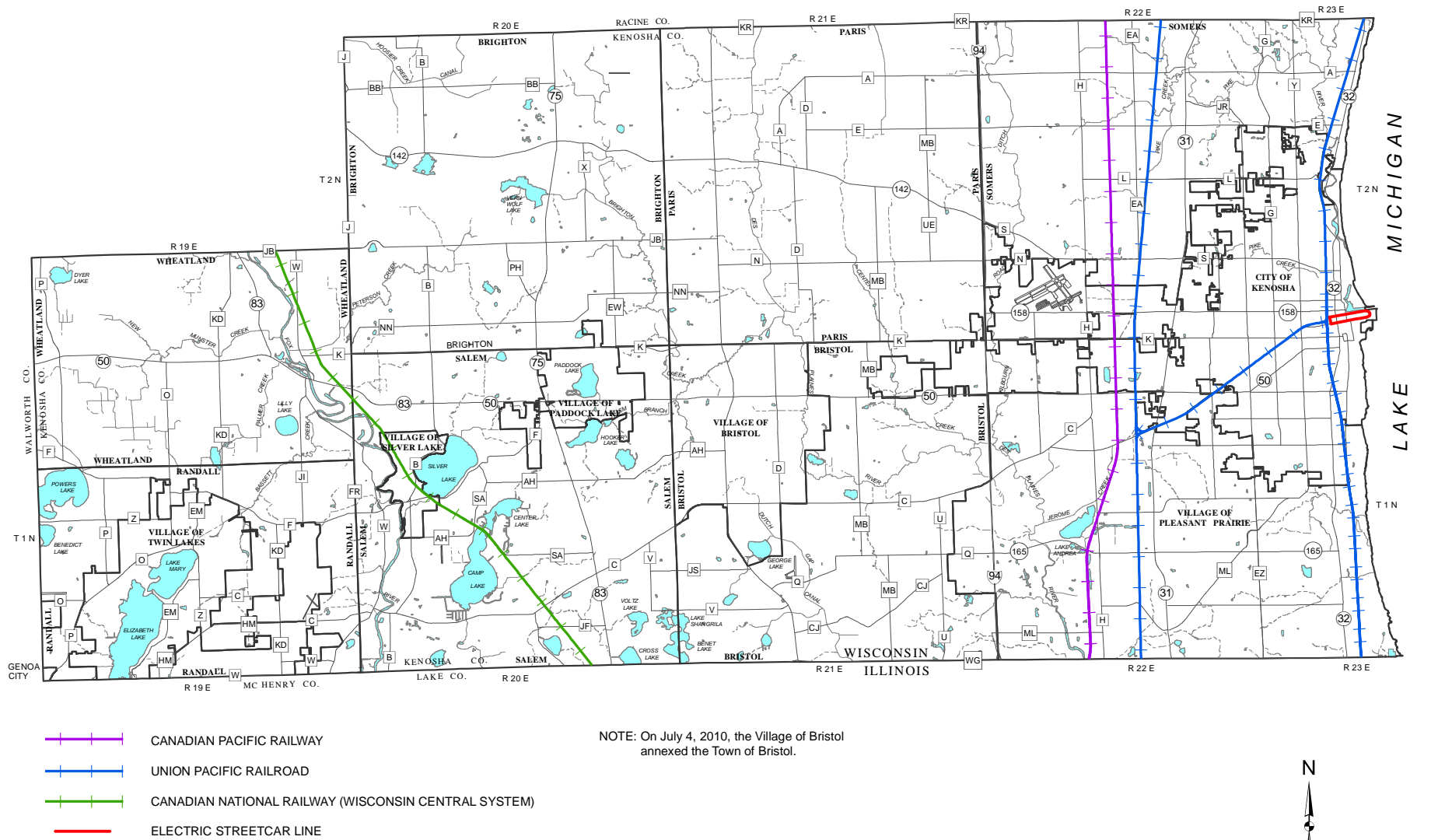
Public and Private Water Supply Systems

As of the year 2005, 88 percent of the County utilized private systems relying on groundwater as a water supply source for domestic, commercial, and agricultural use. The remaining areas of the County have access to public water supply systems. The areas served by public water supply are shown on Map 12. Of the persons served by public water supply, those residing in the City of Kenosha and portions of the Village of Pleasant Prairie and the Town of Somers receive water from the Kenosha Water Utility, which uses Lake Michigan as its supply.

The public water supply systems serving the Village of Bristol, the Town of Bristol, the Paddock Lake Municipal Water Utility, and the Van Woods Estates Waterworks Co., Inc., utilize groundwater as a supply. The uses of groundwater, as well as surface water, are summarized in Table 14. As shown in Table 14, approximately 15.3 million gallons per day (mgd) of Lake Michigan-derived surface water and about 0.3 mgd of groundwater supply are used by public water utility systems in the County. Considering all water uses, including industrial, commercial, agricultural, and private water supply, 17.4 mgd of surface water and 3.9 mgd of groundwater are 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 12. The remaining areas in the County served by public water supplies rely on groundwater pumping and treatment systems as a source of supply.

Map 10

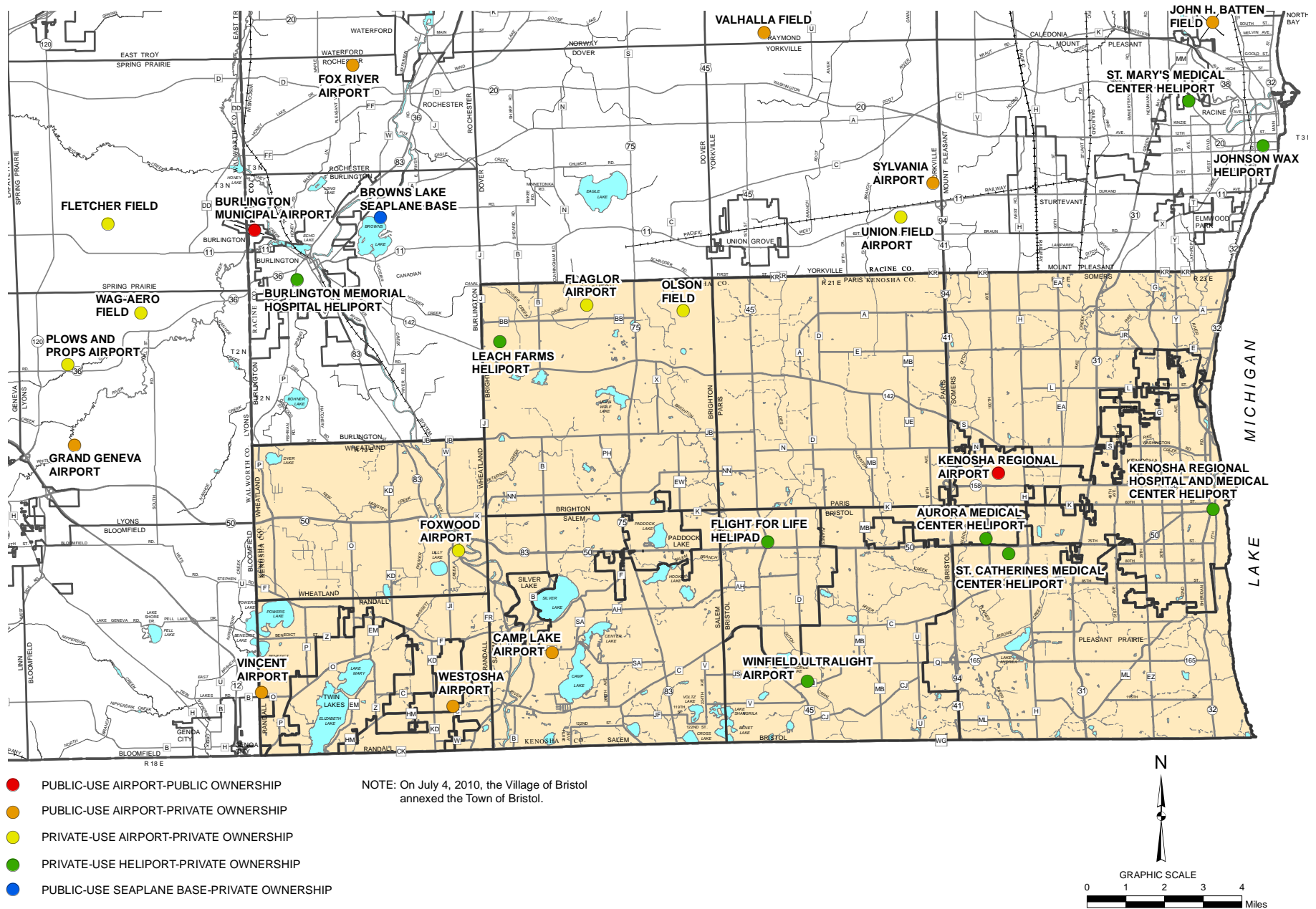
COMMON CARRIER RAIL FREIGHT LINES IN KENOSHA COUNTY: 2006



Source: Wisconsin Department of Transportation and SEWRPC.

Map 11

EXISTING AIRPORTS IN KENOSHA COUNTY AND VICINITY: 2005



Map 12

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

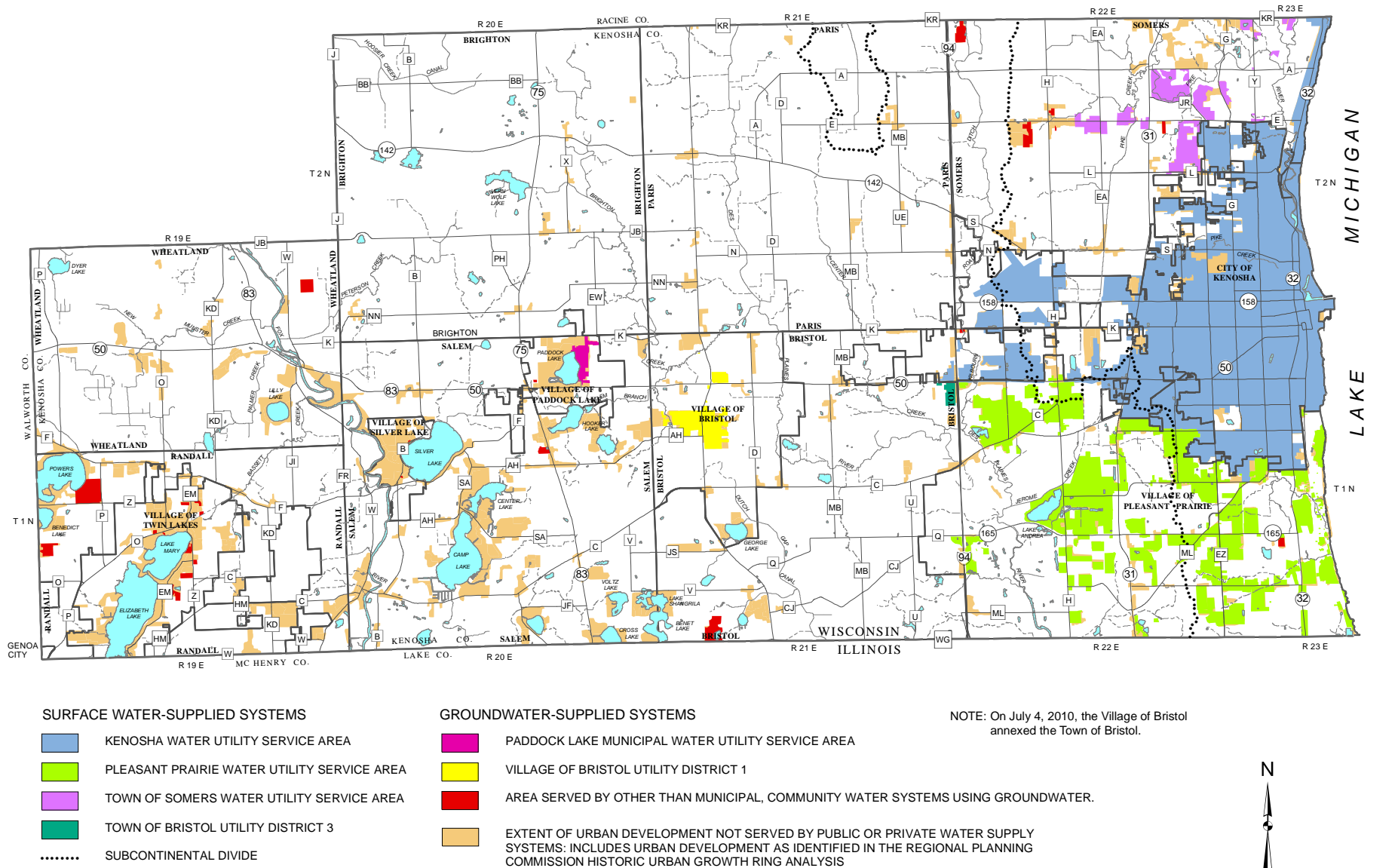


Table 14**ESTIMATED USE OF WATER IN KENOSHA COUNTY
IN 2005 IN MILLION GALLONS PER DAY**

Usage Category	Water Source	
	Surface Water	Groundwater
Public ^a	15.28	0.31
Industrial.....	1.95	0.05
Commercial	--	0.13
Irrigation	0.18	0.55
Agricultural	0.02	0.19
Aquaculture	--	0.18
Domestic	--	2.46
Total	17.43	3.87

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

Source: U.S. Geological Survey and SEWRPC.

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 protection 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 13. 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 Towns of Bristol and Salem, and the Villages of Paddock Lake, Silver Lake, and Twin Lakes. The existing and planned sewer service areas within the County are shown on Map 13.⁵

Private Utilities

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 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 14.

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.

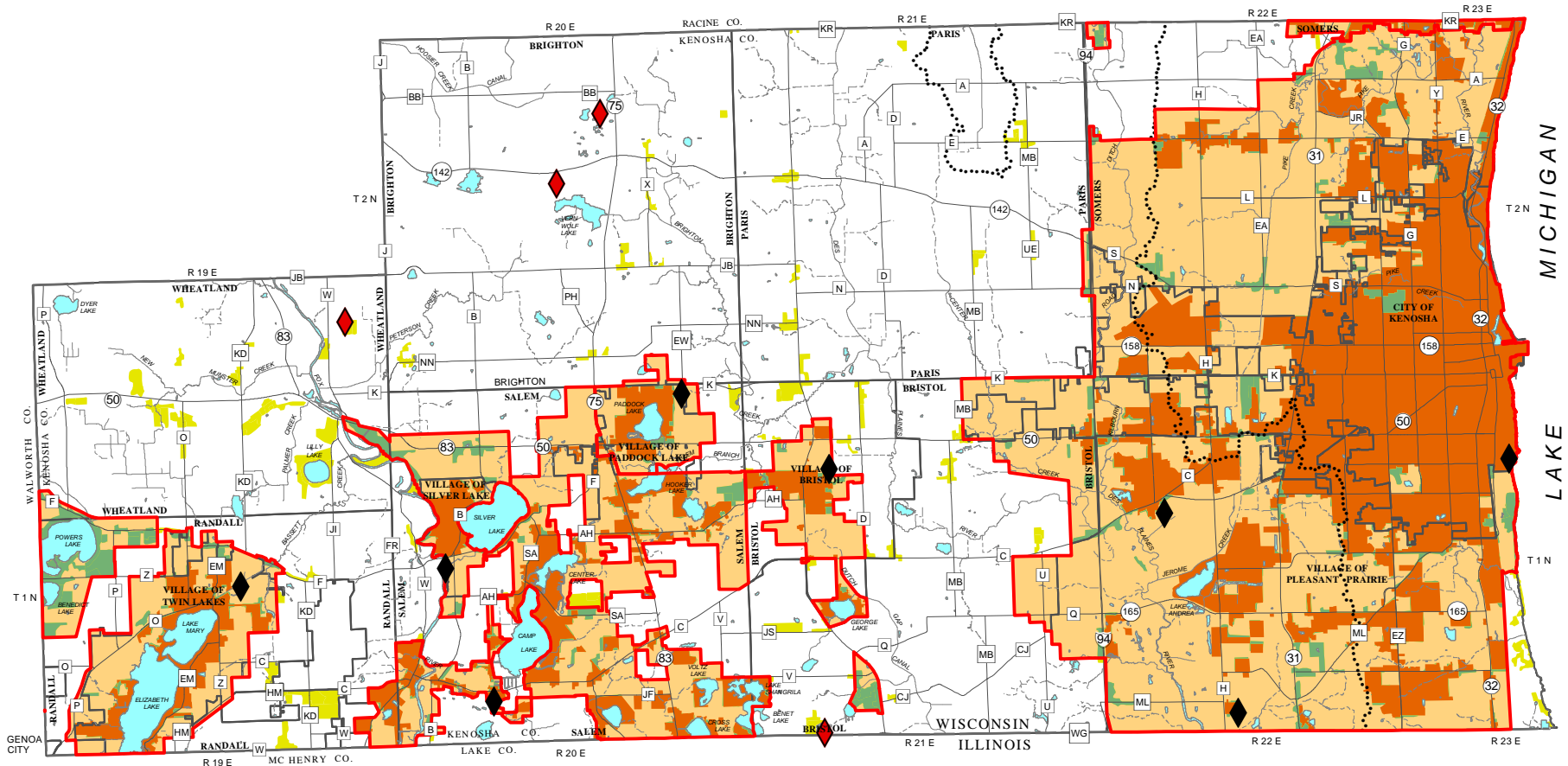
Liquid petroleum is also transported through Kenosha County by a main line owned and operated by West Shore Pipeline. The natural gas and liquid petroleum pipelines that cross Kenosha County are mainly used as major feeder lines between the cities of Milwaukee and Chicago.

Telephone service within Kenosha County is provided through a number of telephone companies. The service areas of the various operators are shown on Map 15. In general, telephone service is available on demand throughout the County. There is also an extensive system of cellular telecommunication facilities in Kenosha County. These facilities are also shown on Map 15.

⁵The Village of Pleasant Prairie is in the process of abandoning the two wastewater treatment plants shown on Map 13. By the end of 2010, the Village will be served by the Kenosha wastewater treatment plant.

Map 13

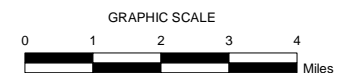
PLANNED SANITARY SEWER SERVICE AREAS AND AREAS SERVED BY SEWER IN KENOSHA COUNTY



- AREA SERVED BY SEWER: 2000
- PLANNED SANITARY SEWER SERVICE AREAS
- EXTENT OF URBAN DEVELOPMENT NOT SERVED BY PUBLIC SEWERAGE SYSTEMS
- EXTENT OF URBAN DEVELOPMENT WITHIN PLANNED SANITARY SEWER SERVICE AREAS NOT CURRENTLY SERVED BY PUBLIC SEWERAGE SYSTEMS
- PLANNED SANITARY SEWER SERVICE AREA BOUNDARIES
- PUBLICLY OWNED WASTEWATER TREATMENT PLANT
- PRIVATELY OWNED WASTEWATER TREATMENT PLANT

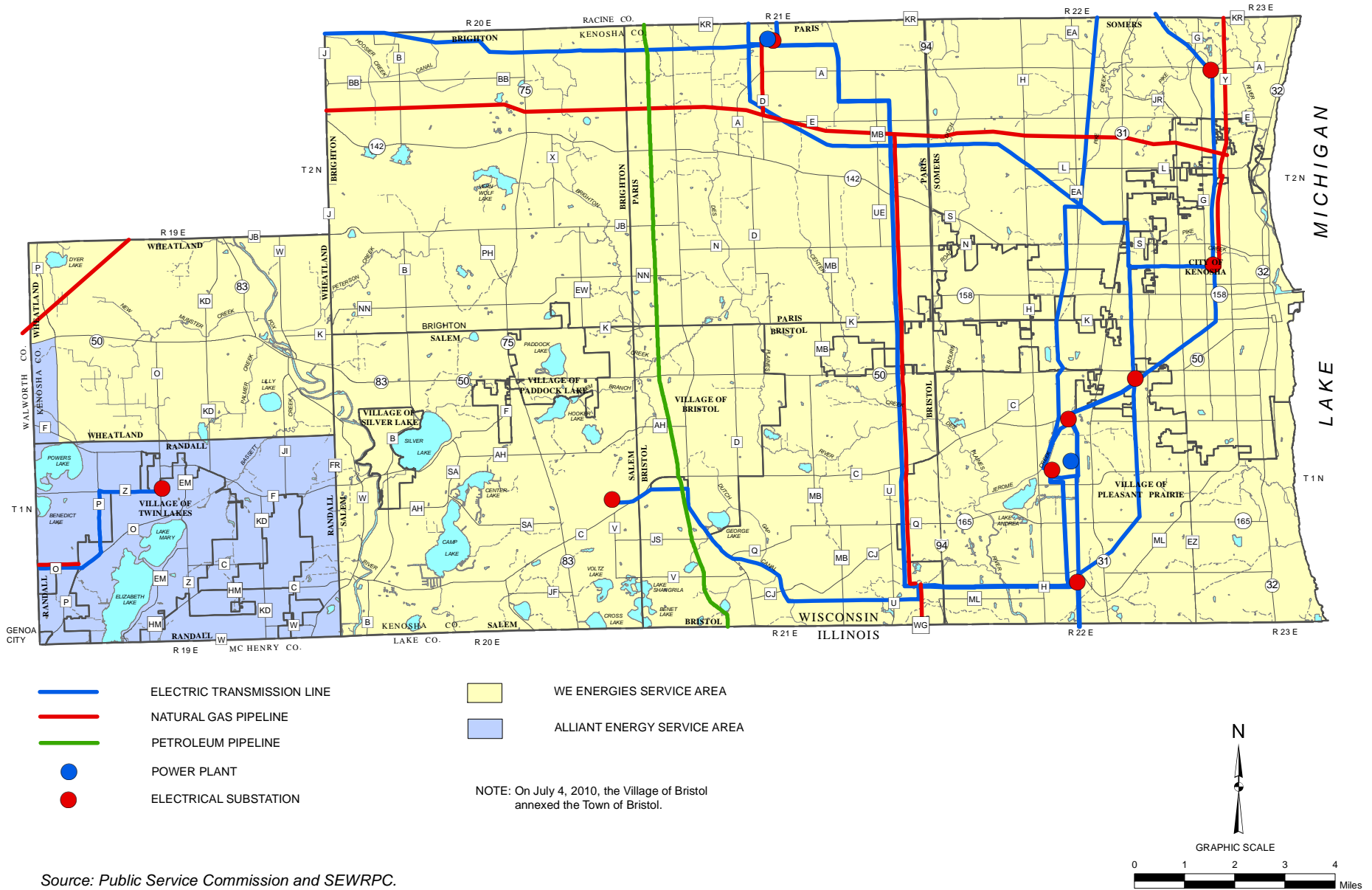
NOTES: The two wastewater treatment plants in the Village of Pleasant Prairie will be abandoned by the end of 2010 when the Village connects to the Kenosha plant.

On July 4, 2010, the Village of Bristol annexed the Town of Bristol.



Map 14

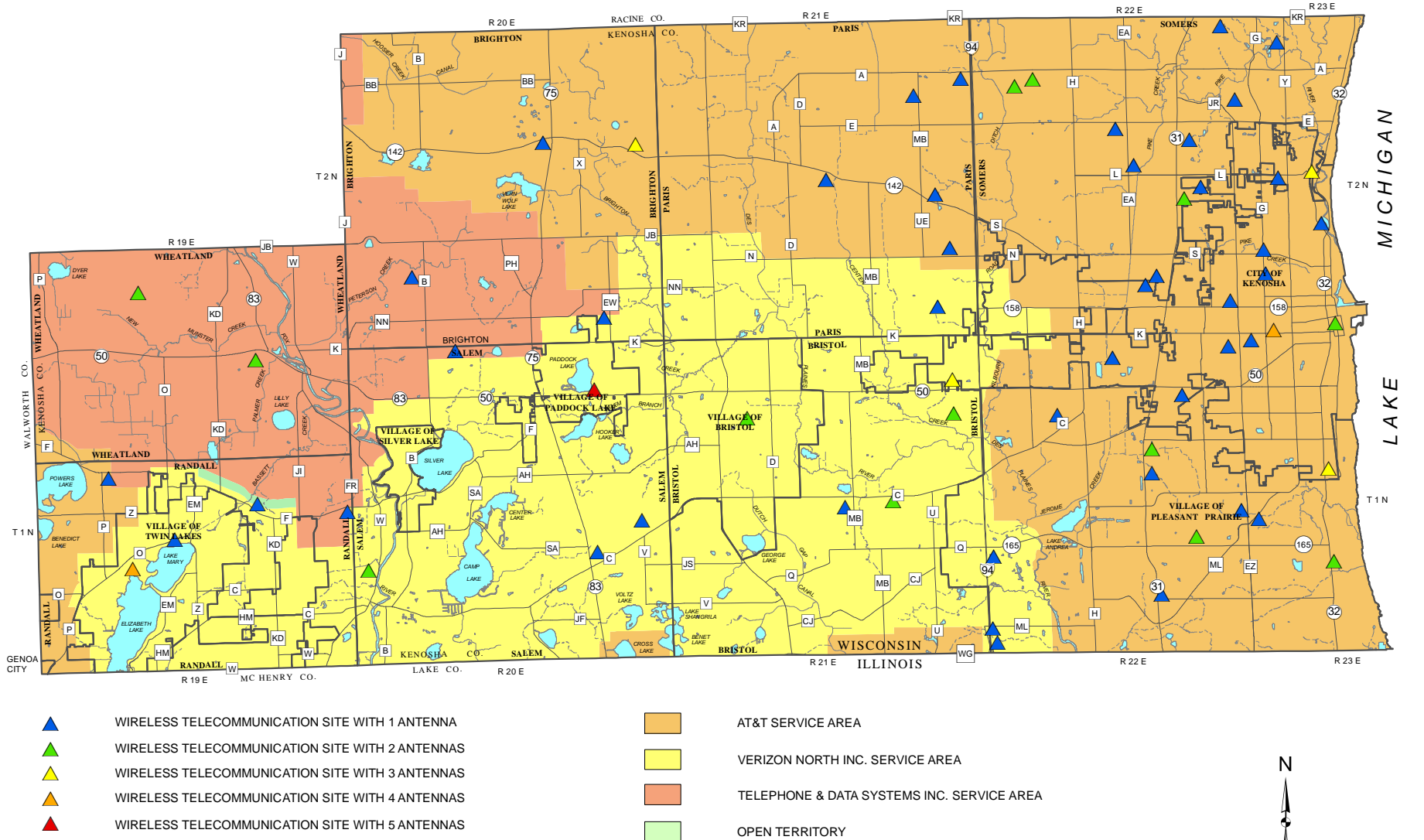
**ELECTRIC SERVICE PROVIDERS, ELECTRIC TRANSMISSION LINES,
NATURAL GAS PIPELINES, AND PETROLEUM PIPELINES IN KENOSHA COUNTY: 2006**



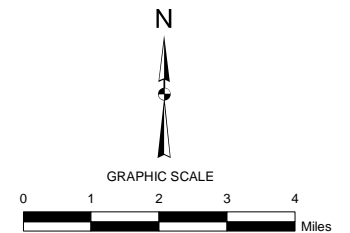
Source: Public Service Commission and SEWRPC.

Map 15

TELEPHONE EXCHANGE CARRIER SERVICE AREAS AND WIRELESS TELECOMMUNICATIONS FACILITIES IN KENOSHA COUNTY: 2005



NOTE: On July 4, 2010, the Village of Bristol annexed the Town of Bristol.



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 2009, 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 within the Village of Pleasant Prairie. There are 42 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 16. 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 17 through 19. 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 17. Table 15 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.

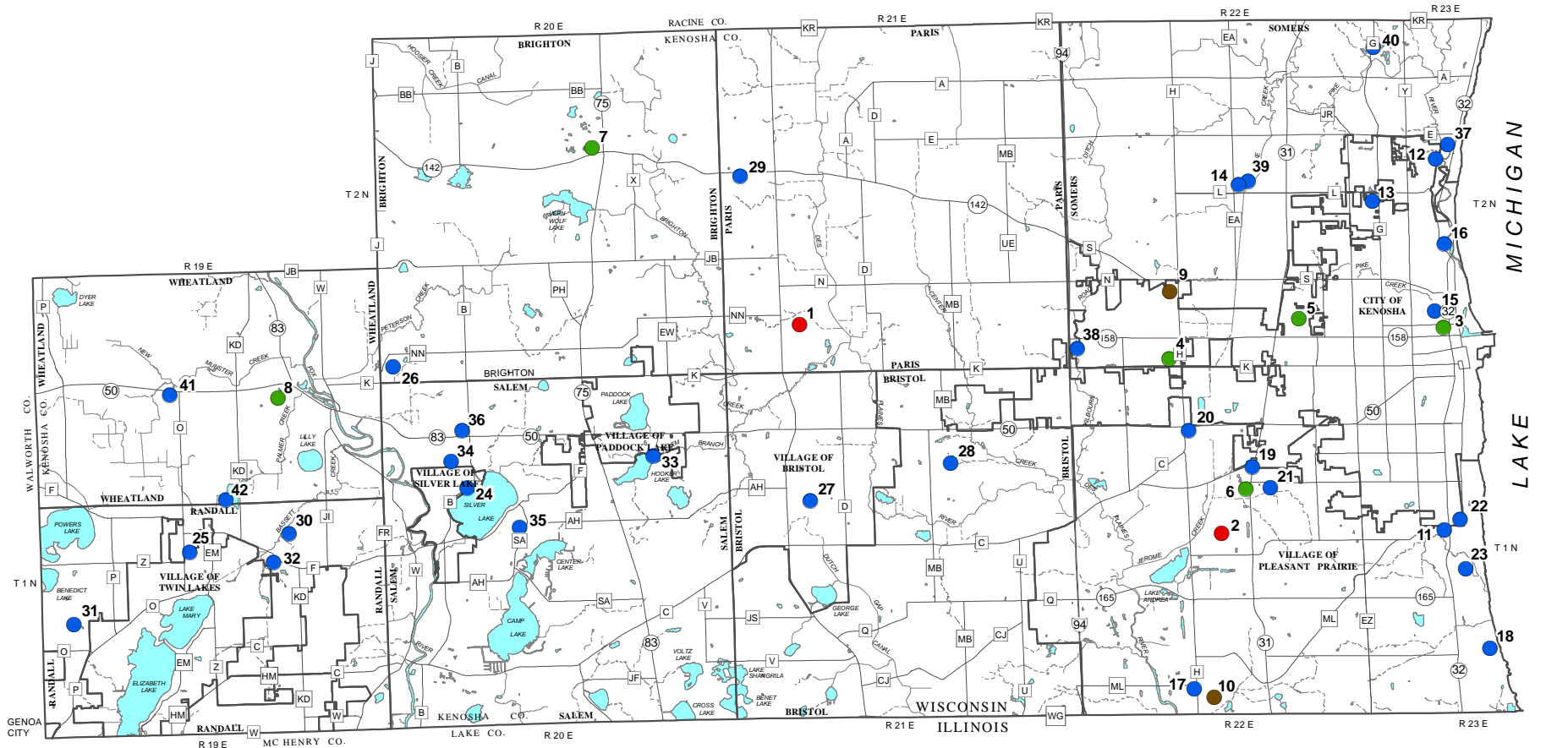
Each of the fire suppression departments in Kenosha County, except the Towns of Brighton, Randall, and Wheatland, and the Village of Paddock Lake, independently maintains an emergency medical service. Salem Rescue and Silver Lake Rescue provide rescue services in the Town of Brighton. Silver Lake Rescue 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 18.

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.

Map 16

SOLID WASTE DISPOSAL SITES IN KENOSHA COUNTY: 2006

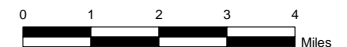


- ACTIVE LANDFILL
- INACTIVE LANDFILL
- COMPOST SITE
- RECYCLING CENTER, TRANSFER FACILITY, OR STORAGE FACILITY
- 9 REFERENCE NUMBER
(SEE APPENDIX B)

NOTE: On July 4, 2010, the Village of Bristol annexed the Town of Bristol.

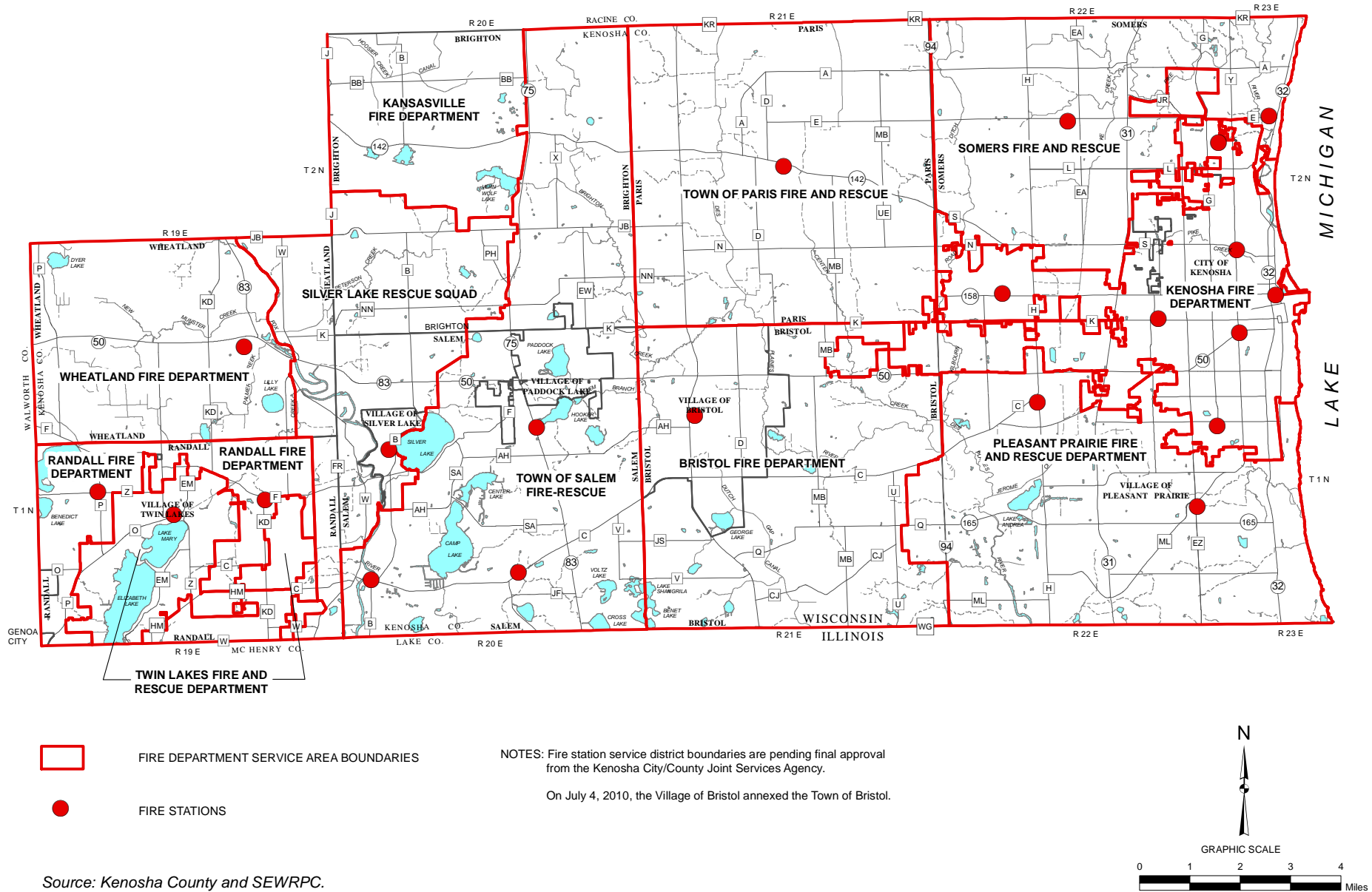


GRAPHIC SCALE



Map 17

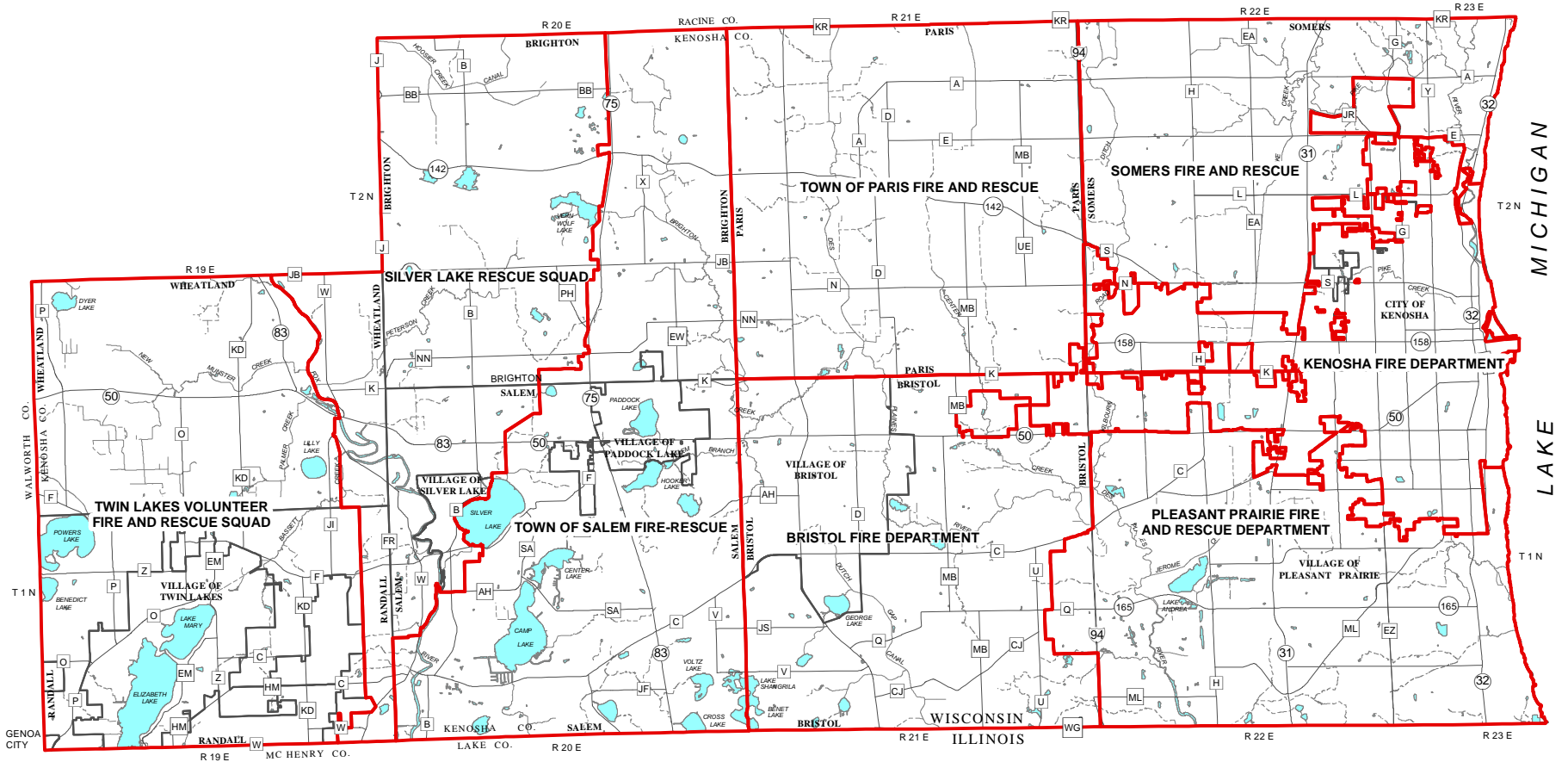
FIRE STATIONS AND FIRE DEPARTMENT SERVICE AREA BOUNDARIES IN KENOSHA COUNTY: 2008



Source: Kenosha County and SEWRPC.

Map 18

EMERGENCY MEDICAL SERVICE AREAS IN KENOSHA COUNTY: 2008



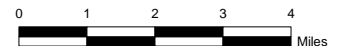
 EMERGENCY MEDICAL SERVICE AREA BOUNDARY

NOTES: Service area boundaries may not reflect areas for advanced life support emergency response.
Emergency medical service district boundaries are pending final approval from the Kenosha City/County Joint Services Agency.

On July 4, 2010, the Village of Bristol annexed the Town of Bristol.

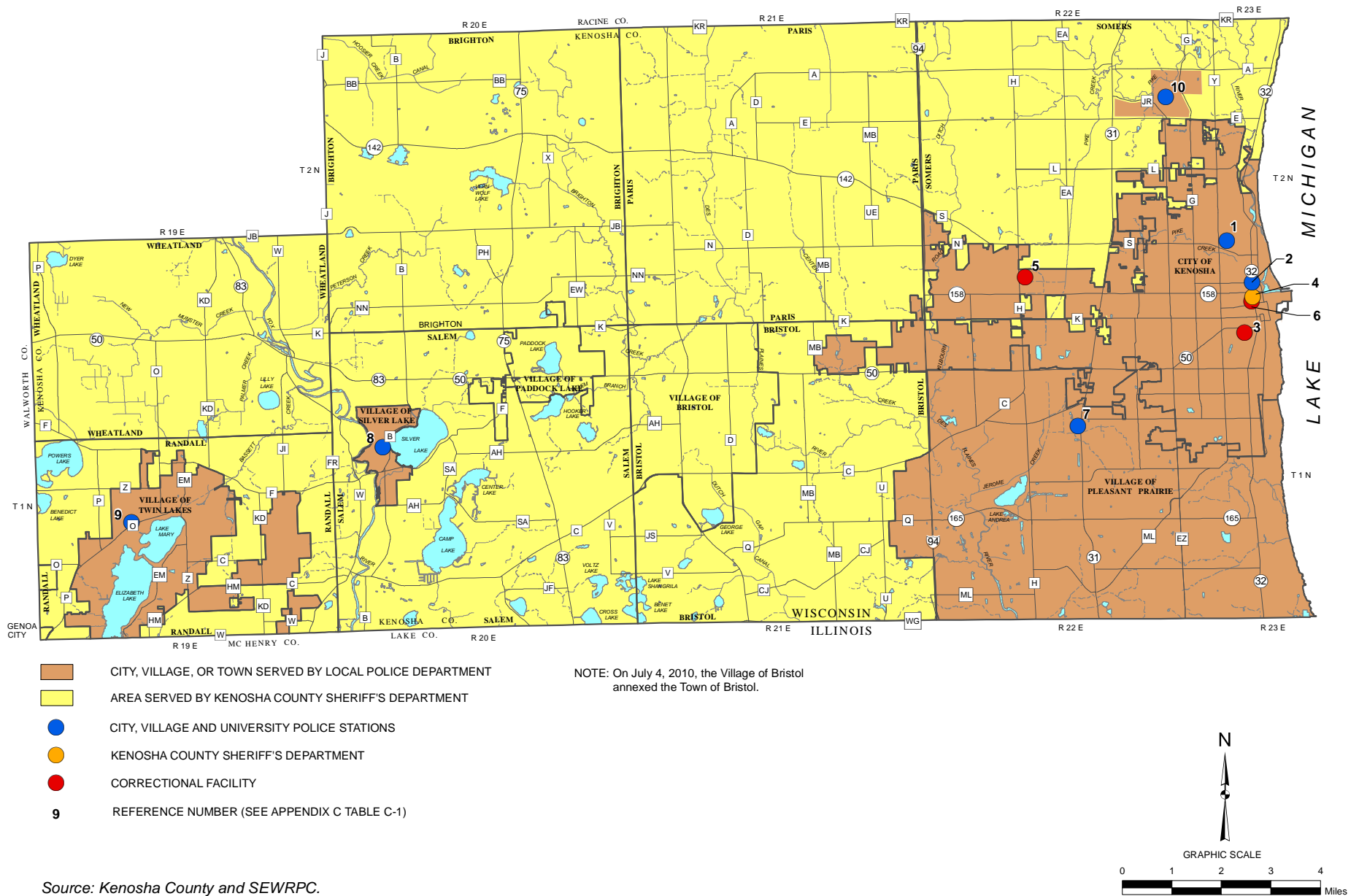


GRAPHIC SCALE



Map 19

LAW ENFORCEMENT STATIONS AND SERVICE AREAS IN KENOSHA COUNTY: 2008



Source: Kenosha County and SEWRPC.

Table 15

**WORKING STATUS OF FIRE DEPARTMENTS, EMERGENCY MEDICAL SERVICE PROVIDERS,
AND LAW ENFORCEMENT DEPARTMENTS SERVING KENOSHA COUNTY: 2008**

<u>Fire/Rescue Department</u> 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 (Paid On Call)	Contract with Salem Rescue (Part-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 – M	Paid On Call (Silver Lake Fire) – M	Part-time and Paid On Call (Silver Lake Rescue)- P	Full-time (Village Police Department, limited hours)
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 (Paid On Call), Silver Lake Fire (Paid On Call), and Kansasville Fire (Volunteer)	Contracts with Silver Lake Rescue (Private, Part-time and Paid On Call) and Salem Rescue (Part-time and Paid On Call)	County Sheriff Department
Town of Bristol – M ^a	Full-time and Paid On Call (Bristol Fire)	Full-time and Paid On Call (Bristol Fire)	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 – M	Paid On Call (Salem Fire)	Part-time and Paid On Call (Salem 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)	Contracts with Silver Lake Rescue (Part-time and Paid On Call) and Twin Lakes Fire and Rescue (Paid On Call)	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 July 4, 2010, the Village of Bristol annexed the Town of Bristol.

Source: Kenosha County Division of Emergency Management and SEWRPC.

Law Enforcement

Five 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 19. That map also shows the location of the State of Wisconsin, Department of Corrections, correctional facilities and County detention centers in Kenosha County.

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 20 through 24 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

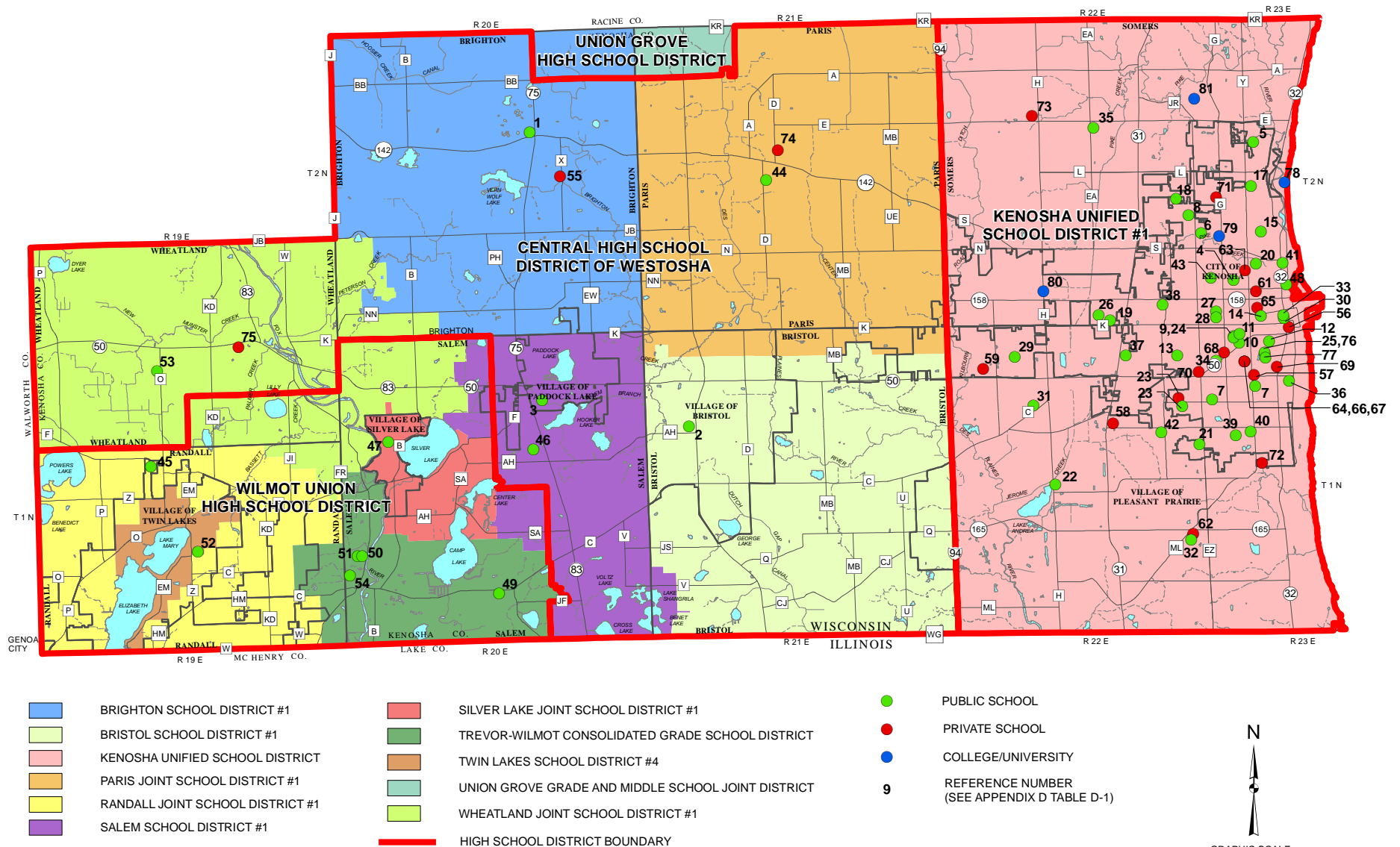
Public Law 99-499, the Superfund Amendment and Reauthorization Act (SARA/Title III) of 1986, and Wisconsin Act 342 set forth requirements for hazardous material reporting and safety planning. The primary reporting and centralized record-keeping related to hazardous materials is carried out under a partnership 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 2010, there were 128 identified users of extremely hazardous substances in Kenosha County. Of these facilities, nine were classified as planning facilities, 69 were classified as reporting facilities, and 50 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 128 facilities which are noted above as storing or producing hazardous materials are located throughout Kenosha County, as summarized in Table 16. A detailed listing of these facilities and location by address is available at the Kenosha County Office of Emergency Management.

Between 2007 and 2009, Kenosha County averaged 23 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.

Map 20

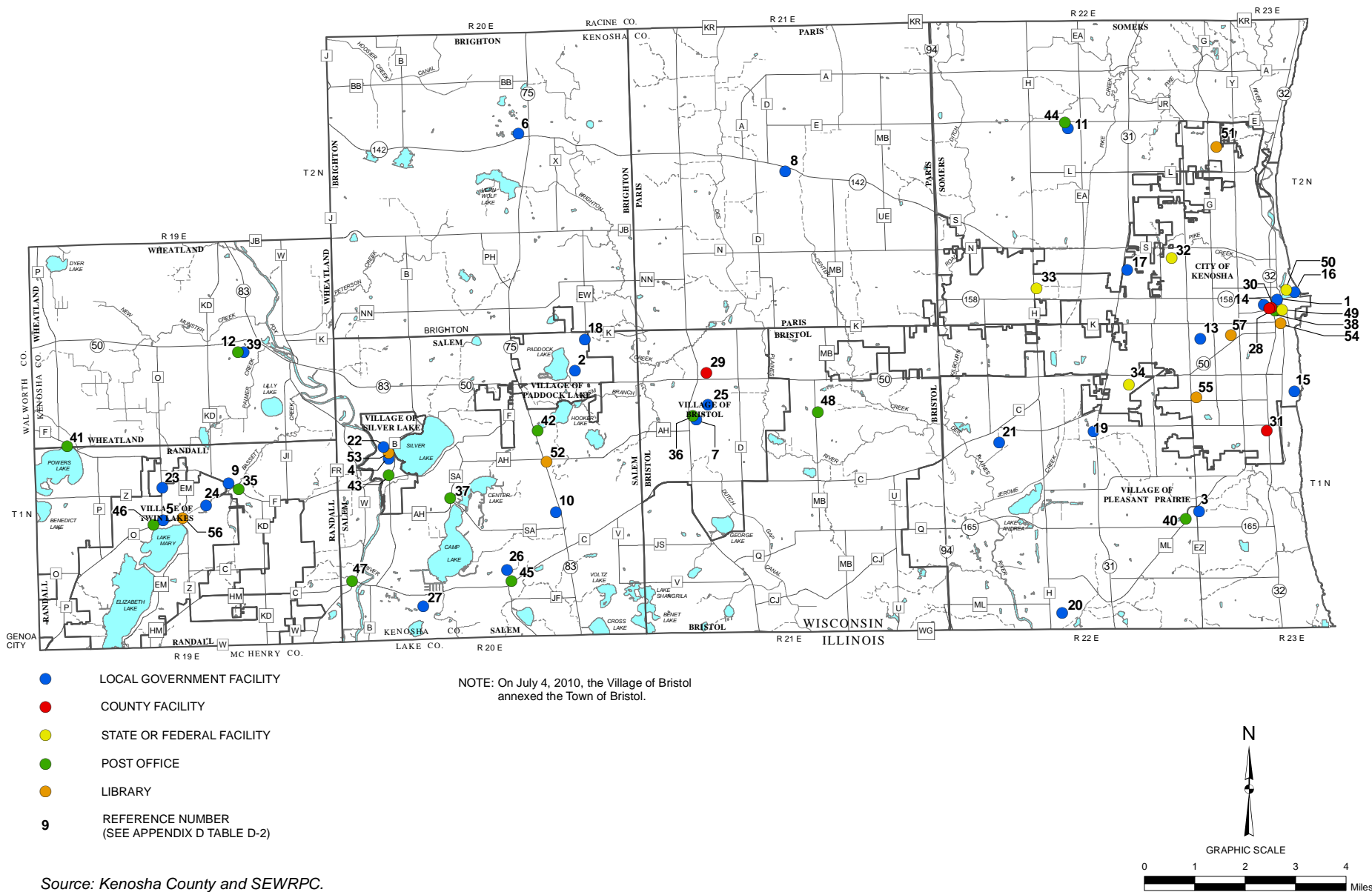
PUBLIC SCHOOL DISTRICTS, PUBLIC AND PRIVATE SCHOOLS, COLLEGES, AND UNIVERSITIES IN KENOSHA COUNTY: 2006



Source: Kenosha County, School Districts, and SEWRPC.

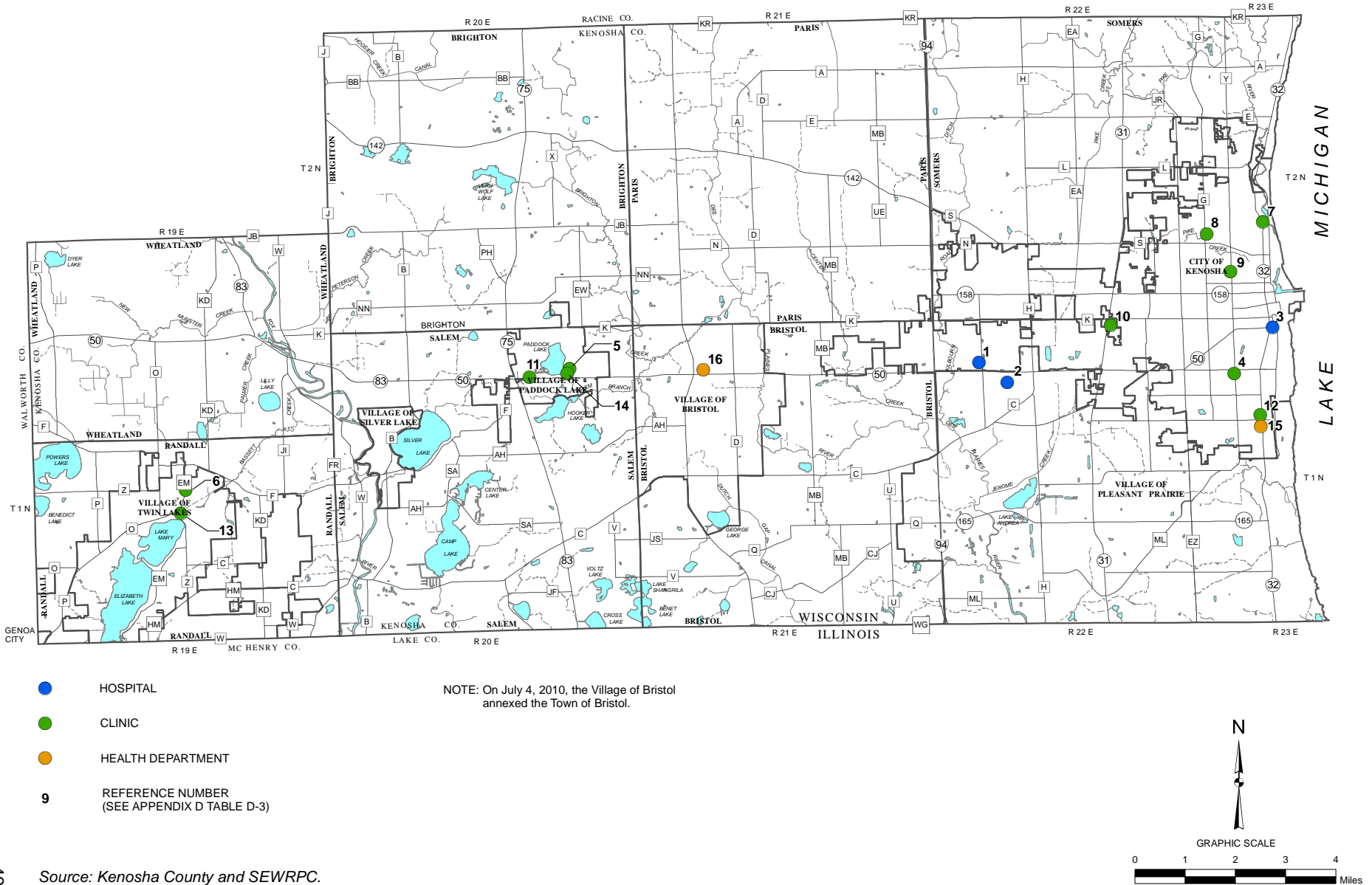
Map 21

SELECTED GOVERNMENT ADMINISTRATION BUILDINGS: 2006



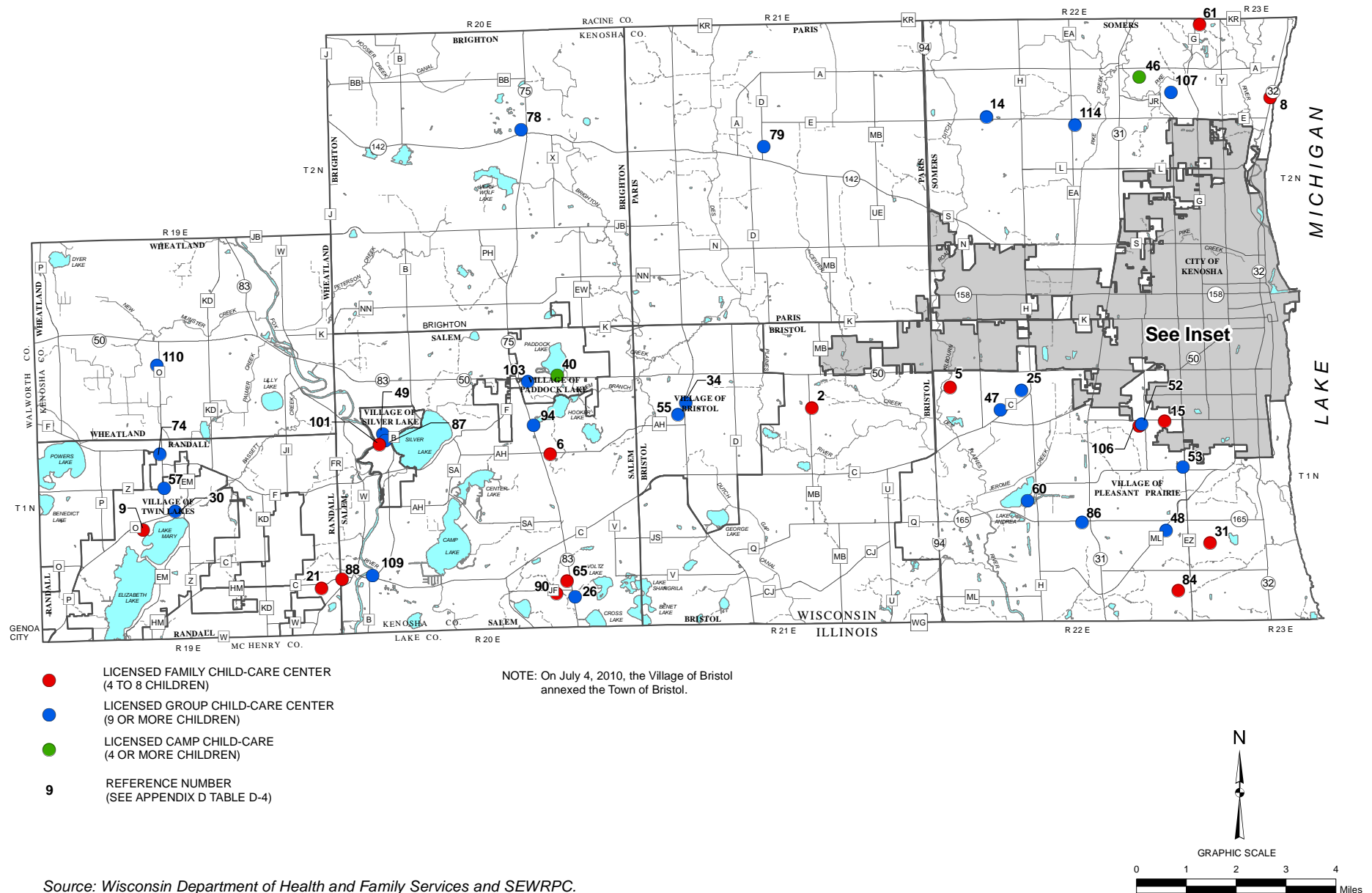
Map 22

HOSPITALS, MAJOR CLINICS, AND HEALTH DEPARTMENTS IN KENOSHA COUNTY: 2006



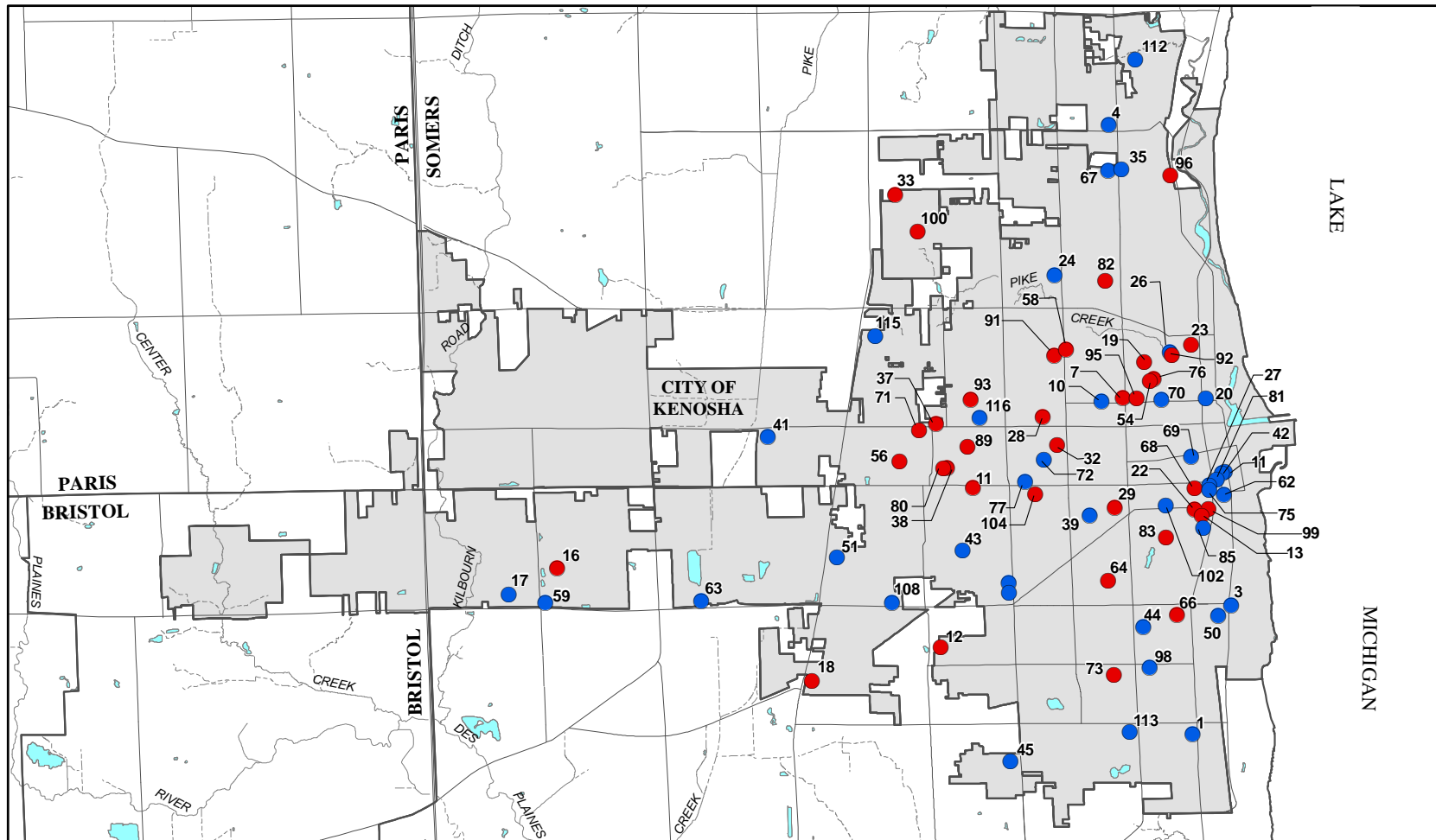
Map 23

CHILD CARE CENTERS IN KENOSHA COUNTY: 2006

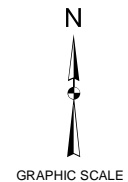


Source: Wisconsin Department of Health and Family Services and SEWRPC.

INSET to Map 23

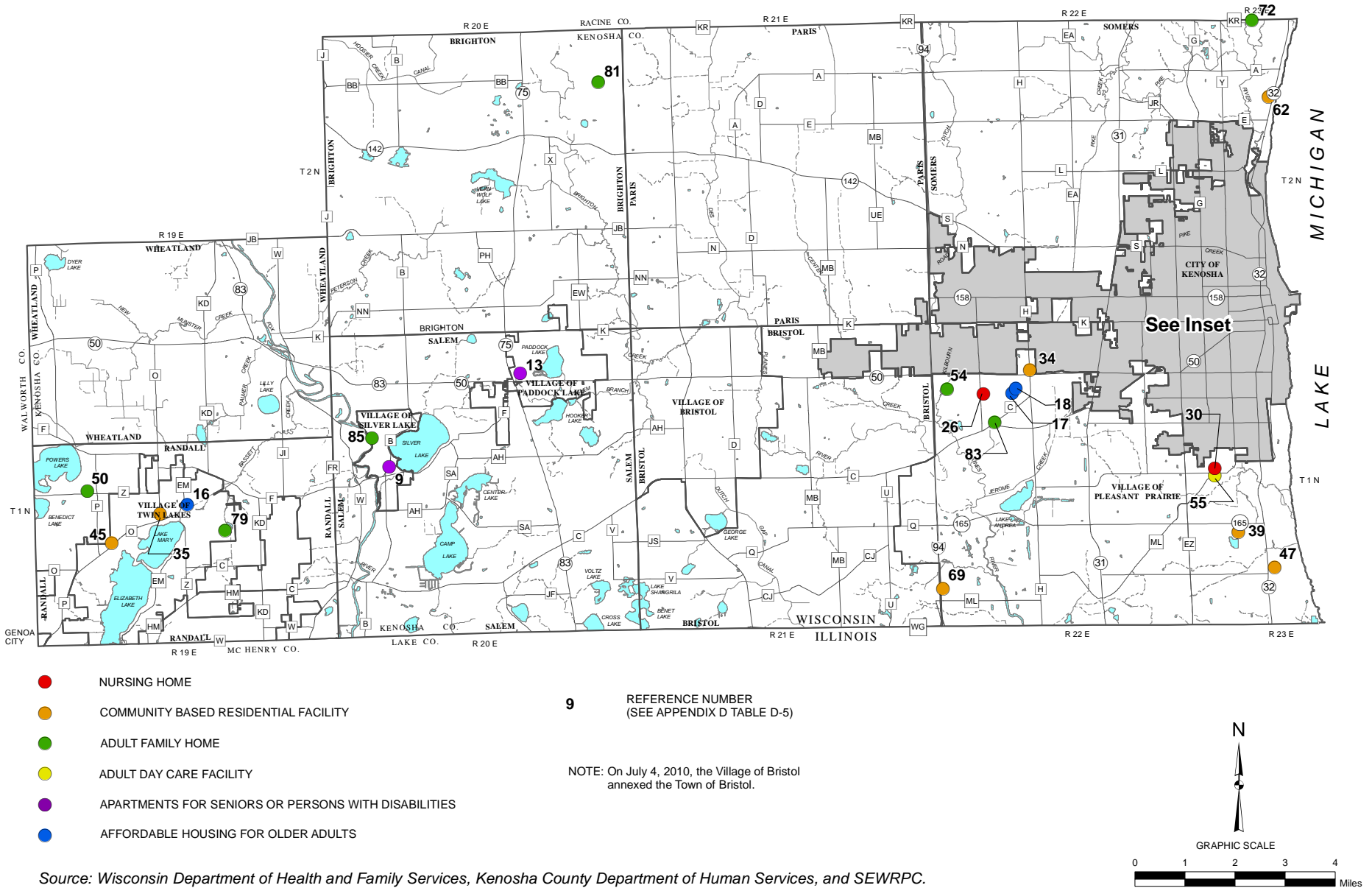


- LICENSED FAMILY CHILD-CARE CENTER
(4 TO 8 CHILDREN)
- LICENSED GROUP CHILD-CARE CENTER
(9 OR MORE CHILDREN)
- 9 REFERENCE NUMBER
(SEE APPENDIX D TABLE D-4)



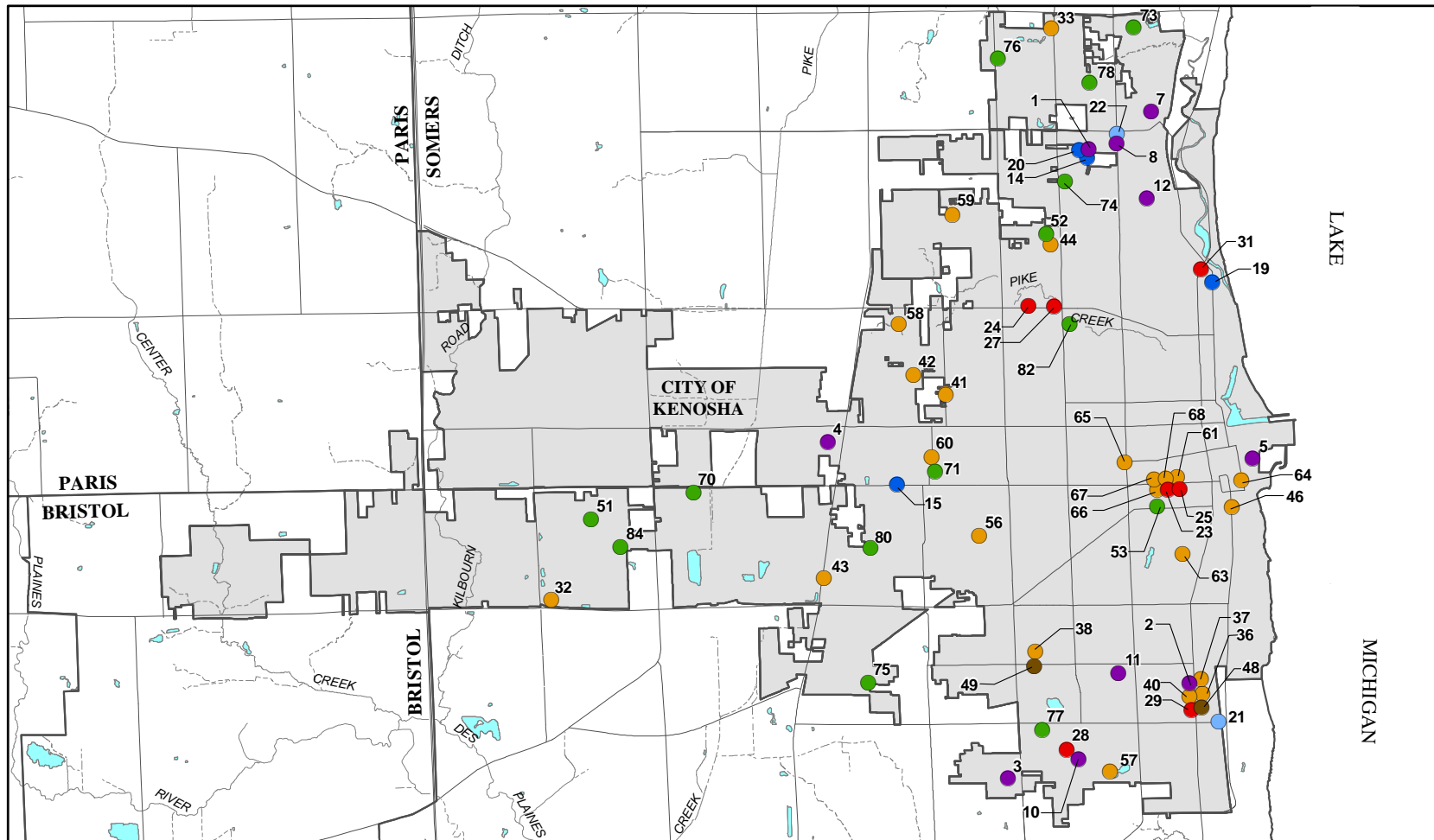
Map 24

NURSING HOMES, ASSISTED LIVING FACILITIES, INDEPENDENT HOUSING, AND SENIOR APARTMENTS IN KENOSHA COUNTY: 2007



Source: Wisconsin Department of Health and Family Services, Kenosha County Department of Human Services, and SEWRPC.

INSET to Map 24



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

9

REFERENCE NUMBER
(SEE APPENDIX D TABLE D-5)



GRAPHIC SCALE

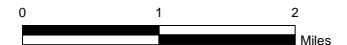


Table 16

**CIVIL DIVISION LOCATION OF FACILITIES
THAT STORE HAZARDOUS MATERIALS: 2010**

Municipality	Number of Facilities		
	Reporting Only	Planning Only	Reporting and Planning
Cities			
Kenosha	31	3	14
Subtotal	31	3	14
Villages			
Bristol ^{a,b}	2	0	2
Paddock Lake	1	0	0
Pleasant Prairie	15	2	26
Silver Lake	0	0	0
Twin Lakes	3	0	0
Subtotal	21	2	28
Towns			
Brighton	0	1	0
Bristol ^a	4	1	0
Paris	4	0	1
Randall	0	0	1
Salem	3	0	4
Somers	5	2	2
Wheatland	1	0	0
Subtotal	17	4	8
Total	69	9	50

^aOn December 1, 2009, a portion of the Town of Bristol was incorporated as the Village of Bristol.

^bOn July 4, 2010, the Village of Bristol annexed the Town of Bristol.

Source: Kenosha County Division of Emergency Management.

zoning authority conferred in Section 62.23 of the *Wisconsin Statutes*. Town zoning, however, is 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.

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 2006, there were 21 individual sites, three historic districts, and one mound site⁶ 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 2006 are presented on Table 17 and on Map 25, 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, floodland 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 18, 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

⁶A 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.

Table 17

HISTORIC SITES AND DISTRICTS IN KENOSHA COUNTY ON THE NATIONAL REGISTER OF HISTORIC PLACES: 2006

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

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

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

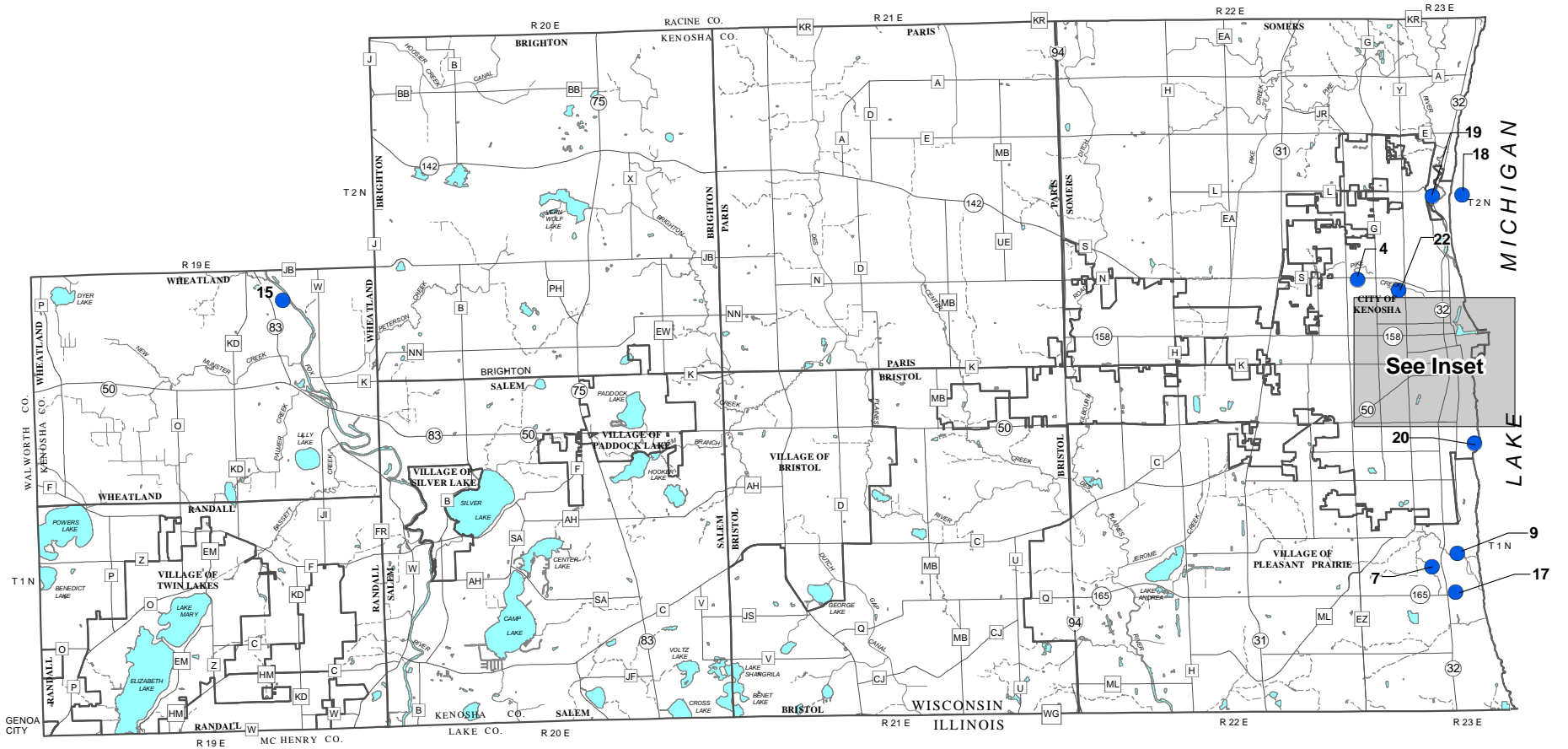
Floodland Zoning

Section 87.30 of the *Wisconsin Statutes* requires that counties, with respect to their unincorporated areas, cities, and villages adopt floodland zoning to preserve the floodwater conveyance and storage capacity of the 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 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 floodland 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 downstream flood flows and stages. The County Shoreland and Floodplain Zoning Ordinance applies in all of the unincorporated areas of the towns in Kenosha County, and that ordinance requires the provision of compensatory floodwater storage. All incorporated cities and villages where floodplains have been identified have adopted floodland zoning ordinances.⁷

⁷The Village of Paddock Lake adopted a floodland zoning ordinance in 2008.

Map 25

HISTORIC SITES LISTED ON THE NATIONAL OR STATE REGISTERS OF HISTORIC PLACES IN KENOSHA COUNTY: 2006

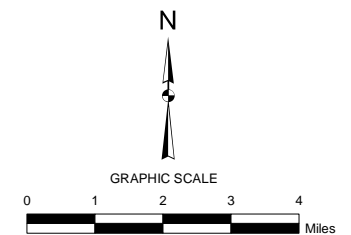


● NATIONAL OR STATE HISTORIC SITE

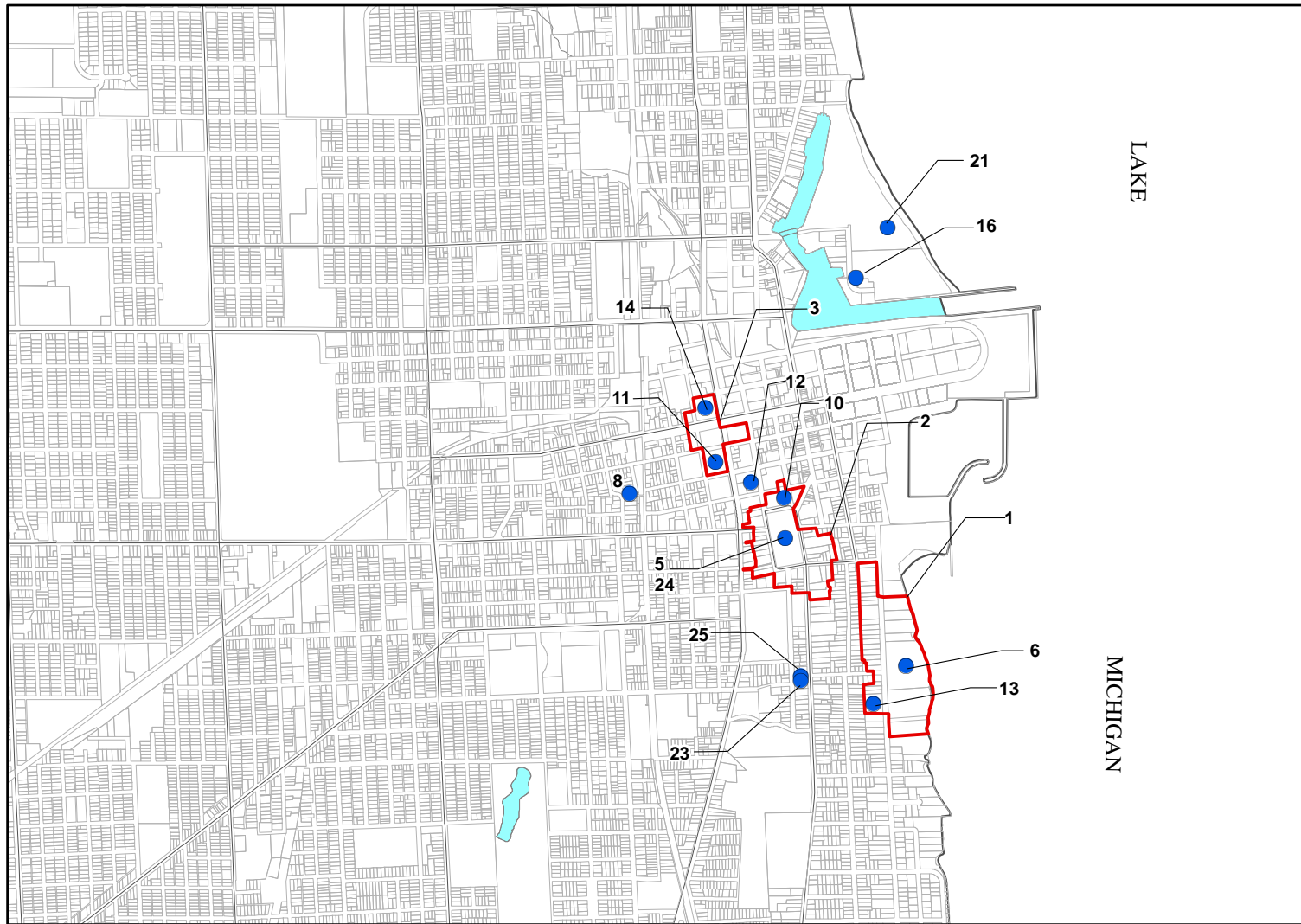
2 REFERENCE NUMBER
(SEE TABLE 17)

NOTE: On July 4, 2010, the Village of Bristol
annexed the Town of Bristol.

Source: SEWRPC.



INSET to Map 25



- HISTORIC DISTRICT BOUNDARY
- NATIONAL OR STATE HISTORIC SITE
- 9 REFERENCE NUMBER
(SEE TABLE 17)

Source: SEWRPC.

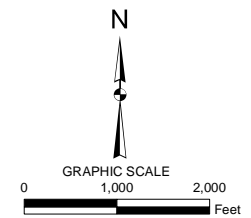


Table 18

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, revised annually in September	Kenosha County General Zoning Shoreland and Floodplain Zoning Ordinance. Revised September 5, 2006. Section 12.26-1, pages 12-139 through 12-150 and Section 12.18-1 through 12.18-9, pages 12-50 through 12-51
City of Kenosha	Adopted	Adopted	Adopted	Adopted	Adopted	Zoning Ordinance for the City of Kenosha, Wisconsin. 1998. Section 3.0 (3.20, 3.21, and 3.23)
Village of Bristol ^b	County ordinance ^b	County ordinance ^b	Adopted	County ordinance ^b	Updated version adopted 05/10/2010	Kenosha County Ordinance ^c
Village of Paddock Lake	Adopted	None	Adopted	Adopted	Revised, but not adopted as of 02/19/04	Village of Paddock Lake Zoning Ordinance. April 1994. Section 12.05, pages 12-49. Section 12.18, pages 44-46. Section 12.26, pages 115-144
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	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 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 Bristol ^b	County ordinance	County ordinance	Adopted	County ordinance	Updated version adopted 05/10/2010	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	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 December 1, 2009, a portion of the Town of Bristol incorporated as the Village of Bristol. On July 4, 2010, the Village of Bristol annexed the Town of Bristol.

^cIt is anticipated that the County Ordinances will continue to apply on an interim basis as the Village of Bristol organizes following incorporation.

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

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 a navigable lake, pond, or flowage, or 300 feet of a navigable stream, or, to the landward side of the floodplain, whichever distance is greater, within their unincorporated areas. Minimum standards for county shoreland zoning ordinances are set forth in Chapter NR 115 of the *Wisconsin Administrative Code*. Chapter NR 115 sets forth minimum requirements regarding lot sizes and 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 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*.

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 Michigan coastal erosion management study for Kenosha County. 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

Kenosha County has developed an emergency operations plan⁸ which sets forth an all-hazards action plan. The County revises this plan annually in September. 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. Kenosha County's emergency operations plan notes that the County is exposed to many hazards that have the potential for disrupting the community, causing damage, and creating casualties. In addition to flooding, the plan recognizes that the County is vulnerable to other natural hazards, including tornadoes and severe weather; technological hazards; accidents involving hazardous materials; terrorism and civil disorder; and utility hazards, such as power failure and water shortages or contamination.

⁸Kenosha County, Wisconsin, Kenosha County Emergency Operations Plan, *Kenosha County, Kenosha Wisconsin, 2003, revised September 2009.*

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.

Chapter III

ANALYSIS OF HAZARD CONDITIONS

In order 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 this updated 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 All Hazards Mitigation Plan Task Force, 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 Task Force.

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 19.

As part of the updating process, the Task Force reevaluated the hazards to be considered using a hazard and vulnerability assessment tool. 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 September 28, 2009, meeting of the Kenosha County Hazard Mitigation Task Force, with 15 surveys being returned and analyzed. For each of 46 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 46 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.

Table 19

**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.

Results

The results from the assessment tool are summarized in Table 20. The average level of risk for hazards ranged from 11.5 percent for the lowest ranked hazard (correctional center incident) to 61.5 percent for the highest ranked hazard (riverine flooding). Eight of the 10 highest average risks belonged to natural hazards related to meteorological causes, mostly causes associated with either winter weather or severe storms. The remaining two of the 10 highest average risks belong to technological or human-induced hazards. The interquartile ranges for the 10 hazards with the highest average risks tended to be relatively large, indicating a diversity of opinion among Task Force members as to the level of risk posed by each of these hazards. In some instances, such as the hazards posed by riverine flooding, there was general agreement among Task Force members that the risk was relatively high, but disagreement as to just how high. The exception to this pattern was for thunderstorms. The interquartile range associated with this hazard was quite low, indicating a high degree of agreement among Task Force members as to the 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, natural hazards related to biological organisms, and hazards related to human behavior. The interquartile ranges for the 10 hazards with the lowest average risks were low, indicating strong agreement among Task Force 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 initial plan was drafted 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 21 provides a summary of estimated damages and public assistance from disasters and emergencies in Kenosha County, both Presidential declarations and nondeclared, from 1990 through 2009.

Between 1990 and 2009, Kenosha County has had seven 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 10 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 21 were reported to the Kenosha County Division of Emergency Management. For those events, about \$5.2 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 21.

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. Since 1959, Kenosha County has experienced 388 weather hazard events, as summarized in Table 22. Those hazard events were estimated to have caused almost \$104 million in damages, with 28 percent of that damage being crop damages.

Table 20

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
D4. Workplace Violence	0.0	66.7	20.1	36	8
School Violence	11.1	66.7	28.2	21	25

Table 20 (continued)

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 21

**SUMMARY OF ESTIMATED DISASTER DAMAGES AND ASSISTANCE IN KENOSHA COUNTY FOR
SELECTED FEDERALLY DECLARED AND NONDECLARED DISASTERS AND EMERGENCIES: 1990-2009**

Date of Disaster	Estimated Damages (property and crop)	State and Federal Assistance		
		Public Assistance	Individual Assistance	Total Assistance
1993 – Flooding.....	\$ 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	18,350,000	1,072,372	77,865	1,150,237
2001 – Snow	N/A	323,609	0	323,609
2004 – Severe Storms/Flooding.....	26,825,000	N/A	146,165	146,165
2007 – Severe Storms/Flooding.....	900,000	N/A	225,418	225,418
2008 – Snow	N/A	617,849	0	617,849
2008 – Severe Storms/Tornadoes/Flooding	21,640,000	471,319 ^a	439,524	910,843
2009 – Flooding	12,495,000	N/A	N/A	N/A
Total	\$80,860,000	\$4,271,253	\$890,372	\$5,161,625

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 22

**WEATHER HAZARD EVENTS RECORDED IN KENOSHA COUNTY, WISCONSIN
FROM 1959 THROUGH JULY 2009 (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
Drought.....	11	0	0	0	263,318
Tornado.....	11	0	15	22,989,526	0
Lightning.....	15	1	5	16,452,880	0
Snow and Ice.....	36	0	0	0	0
Temperature Extremes.....	41	4	11	14,700	0
Fog	42	0	0	0	0
Flood	45	0	0	27,833,749	28,835,955
Hail	47	0	0	222,201	0
Thunderstorms/High Winds.....	140	1	12	6,634,720	377,116
Total	388	6	43	\$74,147,776	\$29,476,389

^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 2008 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), and the National Environmental Satellite, Data and Information Service (NESDIS).

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 22, there was about \$67 million in hazard-related property damages and expenses and \$29 million in crop damages reported to be associated with hazards that took place in the years 2000 through 2009. Many of these damages were associated with a small number of tornado and flooding events that took place near the end of the decade. 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 data summarized in Table 22 shows that thunderstorms and high winds, followed by hail, flooding, fog, and temperature extremes, are the most frequent weather hazards. Floods, followed by tornadoes, lightning, and thunderstorms and high winds are the most damaging weather hazards; and extreme temperature, primarily heat, followed by thunderstorms and high winds and lightning are the most deadly weather hazards that have occurred over the past 50 years. 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, as shown on Table 23. Over the period 1983 through 2008, there have been 372 thunderstorm-related watches or warnings and 91 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.

Table 23

KENOSHA COUNTY SEVERE WEATHER HISTORY: 1983-2008

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
Total	210	162	79	12

Source: National Oceanic and Atmospheric Administration National Climatic Data Center, and Kenosha County Division of Emergency Management.

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 Plan Task Force.

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 Task Force. The hazards to be specifically considered in the plan and their ranking are summarized in Table 24, 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

Table 24

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 Plan Task Force, and SEWRPC.

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 20.¹

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 they 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 24 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 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 24.

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.

¹The rankings in Table 24 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 20. It is important to note that some of the natural hazards listed in Table 24 represent combinations of hazards listed in Table 20. For example, while specific risks associated with thunderstorms, such as hail and lightning are listed separately in Table 20, they are combined into one category in Table 24.

Dam Failure Flooding

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.

Kenosha County chose to focus on dam failure flooding as a minimal risk hazard since discussions with County departments and the Task Force identified dam failure flooding as having a limited chance of occurring. Between 1990 and 2008 there was no loss of life associated with dam failures in the State, including Kenosha County. Due to the limited threat of physical injury and death from dam failure flooding in Kenosha County, this hazard will not be considered in depth in subsequent sections of this report, but flooding, such as dam failure flooding, is briefly addressed under the section of flooding and stormwater drainage problems.

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 .² 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 August 2009. 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.

²U.S. Geological Survey, "2008 United States National Seismic Hazard Maps," USGS Fact Sheet 2008-3018, April 2008.

Table 25

REPORTED CASES OF SELECTED COMMUNICABLE DISEASES REPORTED IN KENOSHA COUNTY: 2007

Disease	Number of Reported Cases
Campylobacter Enteritis	22
Giardiasis	11
Hepatitis Type A	<5
Hepatitis Type B ^a	12
Hepatitis Type C	102
Legionnaire's Disease	0
Lyme	0
Measles	0
Meningitis, Aseptic	7
Meningitis, Bacterial	<5
Mumps	0
Pertussis	<5
Salmonellosis	53
Shigellosis	<5
Tuberculosis	0
Sexually Transmitted Diseases	
Chlamydia trachomatis	566
Genital Herpes	114
Gonorrhea	119
Syphilis	<5
Immunizations (children in grades K-12) by Compliance	
Compliant	29,964
Noncompliant	135
Percent Compliant	99.6

^aIncludes all positive HBsAg test results.

Source: Wisconsin Department of Health Services Bureau of Health, "Public Health Profiles Wisconsin 2007," September 2009.

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 2007, there were more than 1,006 reported incidents of communicable infectious diseases within Kenosha County, as shown in Table 25, based upon data published by the Wisconsin Department of Health Services. The majority of these diseases were sexually transmitted diseases which comprised 799 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, 135 children were noncompliant and pose a potential health risk in Kenosha County.

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 systems 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 at least 40,000 SSOs each year throughout the United States. The untreated sewage from these overflows can contaminate our waters, causing serious water quality problems. In some cases it may cause health and safety concerns as well as significant property loss. Loss of a sewerage 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 2000, about 26,400 acres, or about 15 percent of Kenosha County, was provided with public sanitary sewer service. About 133,800 persons, or 89 percent of the County's population, resided in those areas that are served by public sanitary sewer systems in 2000. 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 2000, only about 16,000 persons, or 11 percent of the Kenosha County population,

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 526 workplace homicides in 2006 in the United States, out of a total of 5,840 fatal work injuries. Both of these totals have decreased since 2001. Homicide is the second leading cause of death on the job, second only to motor vehicle crashes. Most nonfatal workplace assaults occur in service settings such as hospitals, nursing homes, and social service agencies.

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 19 percent of the electricity produced in Wisconsin.³ This amount of energy is produced by two nuclear power plants (three reactors) located in the State. Two of these power plants, Point Beach Unit 1 and Unit 2, are located in Two Rivers, Wisconsin, which is approximately 13 miles north by northwest of Manitowoc. The third power plant is the Kewaunee Nuclear Power Plant that is located in Carlton, Wisconsin, which is approximately 35 miles southeast of Green Bay. 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 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

³Wisconsin Office of Energy Independence, "Wisconsin Energy Statistics, 2008," 2008.

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.

There are two additional nuclear power plant (Units 1 and 2 in Zion, Illinois) that were permanently shut down on February 13, 1998.⁴ 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 has converted the turbine-generators into synchronous condensers and has isolated the spent fuel pool within a fuel building “nuclear island.” The plant has been placed in SAFSTOR, where it will remain until about 2013 when the decommissioning trust fund will be sufficient to conduct DECON (immediate dismantlement) activities. Under SAFSTOR, often considered “delayed DECON,” a nuclear facility is maintained and monitored in a condition that allows the radioactivity to decay; afterwards, it is dismantled. 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, 2000.⁵

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 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.

⁴U.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.

⁵*Ibid.*

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 2006 there were over 65,000 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 2007, there were over 240 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, Waste and Materials Management Bureau, 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).⁶

As summarized in Chapter II, as of 2009, there were two active and 32 inactive landfill sites located throughout Kenosha County (see Map 16 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.⁷ 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 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.

⁶See *Code of Federal Regulations Title 40, Part 258* (<http://www.epa.gov/epacfr40/chapt-I.info/subch-I/>), 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.

⁷Wisconsin Department of Natural Resources, *Waste Management Activities in Wisconsin*, <http://www.dnr.state.wi.us/org/aw/wm/>, revised July 10, 2003.

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.

Communications Outage

Communications 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 power outage that affected 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 outages 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 and ranked. 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.⁸ 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 2000 large-scale orthophotographs. All of the mapping was done utilizing geographic information system (GIS) ArcMap 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; 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 and National Oceanic and Atmospheric Administration's National Climatic Data Center 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 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.

⁸*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. See also Federal Emergency Management Agency, State and Local Plan Interim Criteria under the Disaster Mitigation Act of 2000, July 11, 2002.*

A vulnerability description has been included for each of the applicable hazards listed in Table 24.

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. As indicated in Table 26, there are 13 existing dams in Kenosha County for which hazard ratings have been assigned 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.⁹ Because of the presence of two high hazard and three significant hazard dams in the County, future evaluation of floodplain areas related to dam failure should be considered. There are also 20 major lakes in Kenosha County. Floodlands are the wide, gently sloping areas contiguous to, and usually lying on both sides of, a stream channel. For planning and regulatory purposes, floodlands are normally defined as the areas subject to inundation by the one-percent-annual-probability (100-year recurrence interval) flood event. The floodlands shown on Map 6 in Chapter II of this report have been identified by Kenosha County, SEWRPC, and FEMA. Approximately 16,300 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 mitigation is the potential for increased flooding due to dam failures. Since there are a number of dams in Kenosha County, including six 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 are to be finalized in 2010, and which include all of the communities in the 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 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.

⁹Chapter 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.”

Table 26

WISCONSIN DEPARTMENT OF NATURAL RESOURCES DAM INVENTORY INFORMATION: 2010

Number on Map 7	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
6	1269	Hooker Lake	Carl Bryzek	Carl Bryzek Farm, LLC	Salem	30.02	Small	1.0	3.0	87.0	180.0	Low
7	1270	Camp Lake	Camp Lake	Kenosha County DPW	Salem	30.03	Large	0.3	7.2	461.0	1,500.0	Low
8	1271	Paddock Lake 3	--	Vince Paddock	Salem	30.04	Small	2.0	3.0	130.0	300.0	Low
9	1272	Silver Lake	Jack Erb	Brian Sullivan	Salem	30.05	Small	1.0	2.0	464.0	920.0	Low
10	1273	Cross Lake	B.J. Corbin	Harbhajan Singh Samra	Salem	30.07	Small	3.0	4.0	87.0	270.0	Significant
11	1274	Lake George	John Haterlein	George Wronowski	Bristol	30.09	Small	4.0	6.0	59.0	290.0	Low
12	1275	Voltz Lake	--	Unknown	Salem	30.11	Small	3.0	5.0	52.0	200.0	Significant
13	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
14	1277	Dyer Lake	--	Kenosha Boy Scouts of America	Wheatland	30.13	Small	3.0	6.0	52.0	200.0	Significant

Source: Wisconsin Department of Natural Resources and SEWRPC.

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.

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 floodland 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 completed for the watershed in 1969¹⁰ under the direction of the SEWRPC Fox River Watershed Committee. The plan was subsequently amended in 1975.¹¹ 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 Bureau¹² 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.

¹⁰*SEWRPC Planning Report No. 12, A Comprehensive Plan for the Fox River Watershed, April 1969.*

¹¹*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.*

¹²*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.*

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.¹³ 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.¹⁴

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 1983¹⁵ under the direction of the SEWRPC Pike River Watershed Committee. The plan was subsequently amended in 1996.¹⁶ 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 a 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 factors, including possible backwater effects from a storm-induced seiche on Lake Michigan aggravated by static

¹³After 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.

¹⁴The 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 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.

¹⁵SEWRPC Planning Report No. 35, A Comprehensive Plan for the Pike River Watershed, June 1983.

¹⁶SEWRPC Amendment to the Pike River Watershed Plan, Kenosha and Racine Counties, March 1996.

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 1966¹⁷ 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.

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 1985.¹⁸ 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.

¹⁷SEWRPC Planning Report, No. 9, A Comprehensive Plan for the Root River Watershed, July 1966.

¹⁸SEWRPC 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.

Description of Recent Flood Events

Since 1990, there have been 45 flood events reported by the National Climatic Data Center affecting Kenosha County. Those flood events were reported to have caused property damages totaling, in 2008 dollars, about \$56.7 million, of which \$28.8 million was related to crop damages. 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 \$250,000 in damages to homes in the Towns of Wheatland and Salem and the Village of Silver Lake. 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 flows 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 \$250,000 in damages to homes in the Towns of Wheatland and Salem and the Village of Silver Lake. 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.
- June 1996. Heavy rains caused the Fox River to crest at 2.15 feet over flood stage with an estimated \$100,000 in property damages in Kenosha County.
- 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 \$900,000 in property damages in Kenosha County. 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. Damage estimates in Kenosha County exceeded \$6 million between municipal infrastructure, private property, and crop damages. 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 flows 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.
- 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 damages were estimated at \$10.0 million. 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 \$100,000 were reported.

- 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 \$300,000 while crop damages of about \$600,000 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 \$2.7 million along with an additional \$2.0 million of crop damages.
- 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 \$3.0 million, with additional public sector costs related to cleanup and other miscellaneous items of about \$170,000.

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 6 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 26. 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.

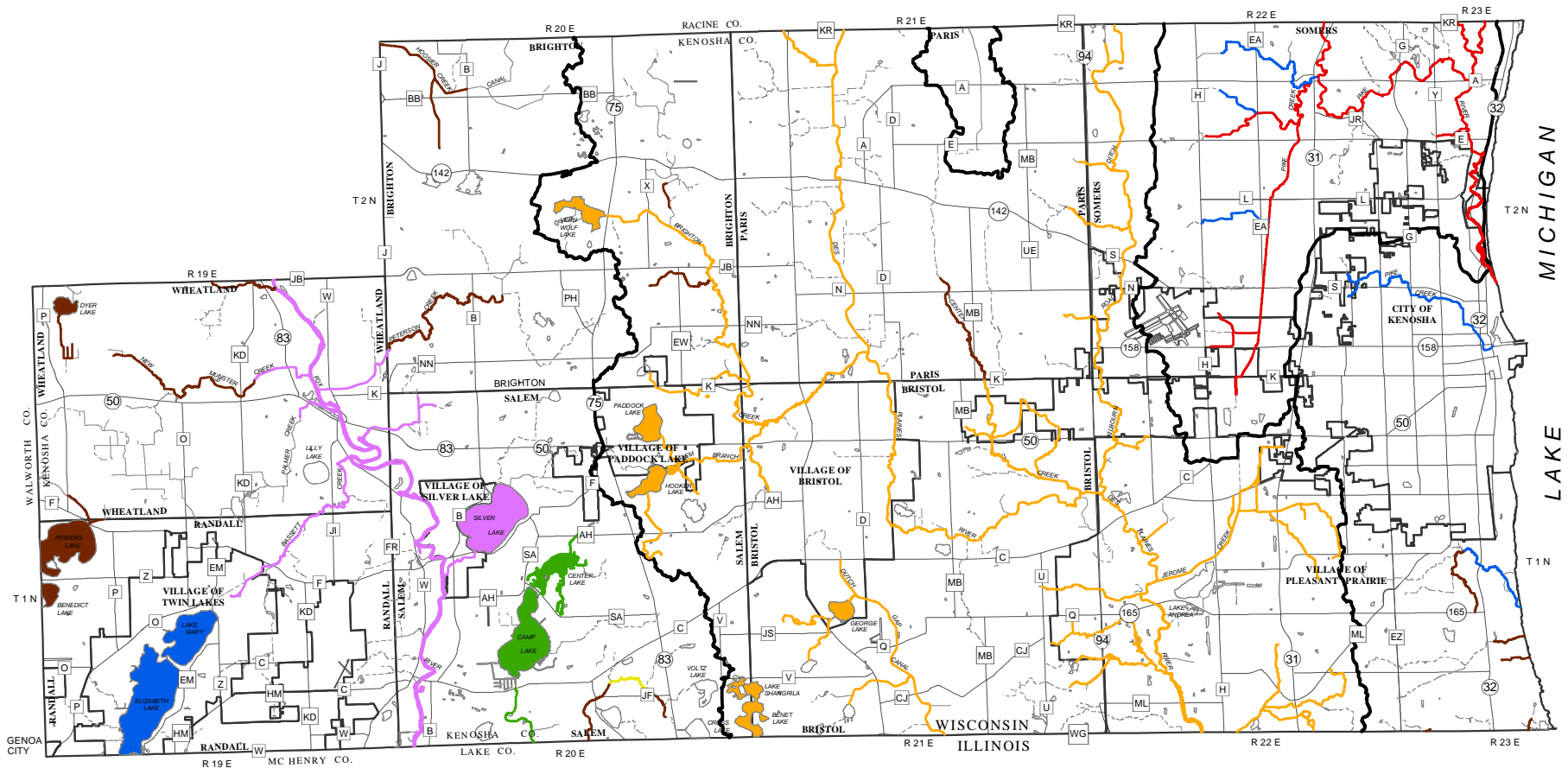
A review of the community assets described in Chapter II indicate the potential for flooding impacts to: 1) a variety of floodprone residential, commercial, and other developed land uses; 2) agricultural lands; 3) roadway transportation facilities; and 4) critical community facilities. No significant 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 359 structures estimated to be located within the one-percent-annual-probability (100-year recurrence interval) flood hazard areas of Kenosha County.¹⁹ The locations of these

¹⁹*The original hazard mitigation plan identified 396 structures in the one-percent-annual-probability floodplain. Since that time there were 29 floodplain structures purchased and removed by Kenosha County and the Town of Wheatland. An additional eight structures are no longer identified as subject to flooding based upon updated floodplain boundary information.*

Map 26

SOURCES OF FLOOD HAZARD DATA FOR STREAM REACHES IN KENOSHA COUNTY: 2009



- STREAM REACHES FOR WHICH FLOOD FLOWS AND STAGES WERE DEVELOPED UNDER THE DES PLAINES RIVER WATERSHED STUDY-UPDATE OF THE FLOOD INSURANCE STUDY (FIS)
- STREAM REACHES FOR WHICH FLOOD FLOWS AND STAGES WERE DEVELOPED UNDER THE FOX RIVER WATERSHED STUDY AND UPDATED UNDER THE FIS
- STREAM REACHES FOR WHICH FLOOD FLOWS AND STAGES WERE DEVELOPED UNDER THE PIKE RIVER WATERSHED STUDY-UPDATE OF 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
- APPROXIMATE DELINIATIONS UNDER THE FIS
- WATERSHED BOUNDARY

NOTE: On July 4, 2010, the Village of Bristol annexed the Town of Bristol.



GRAPHIC SCALE



structures are shown on Maps 27 and 28. There are 312 residential structures; 16 industrial, business, and commercial structures; two 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 are to be finalized in 2010.

There are 22 structures in Kenosha County that are considered by FEMA to be a repetitive- or substantial-loss property. Repetitive-loss structures are those that have two or more flood insurance claims of at least \$1,000 each. In 2009, two of these properties were purchased and were awaiting removal by the County. An additional five properties were proposed for acquisition and removal pending the receipt of Federal Hazard Mitigation Grant Program funding. In addition to the 22 structures identified, 10 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 27 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 2009, the total value of the 359 structures that are identified as being subject to flooding or stormwater drainage problems was about \$44.0 million. Damages expected during a one-percent-probability flood event are estimated to be \$6.3 million and annual average damages are estimated to be \$1.1 million.

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 29 and 30 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 29), and fire and police stations (see Map 30). None of these facilities are located within the flood hazard areas. However, 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 355 buildings identified as critical community facilities in Kenosha County. A listing of those facilities can be found in Appendix D. These buildings are geographically distributed throughout the County. However, the primary shelters are considered to be the 81 schools shown on Map 29 and listed in Appendix D. These schools are distributed throughout the County. None of these schools are located within the identified flood hazard areas.

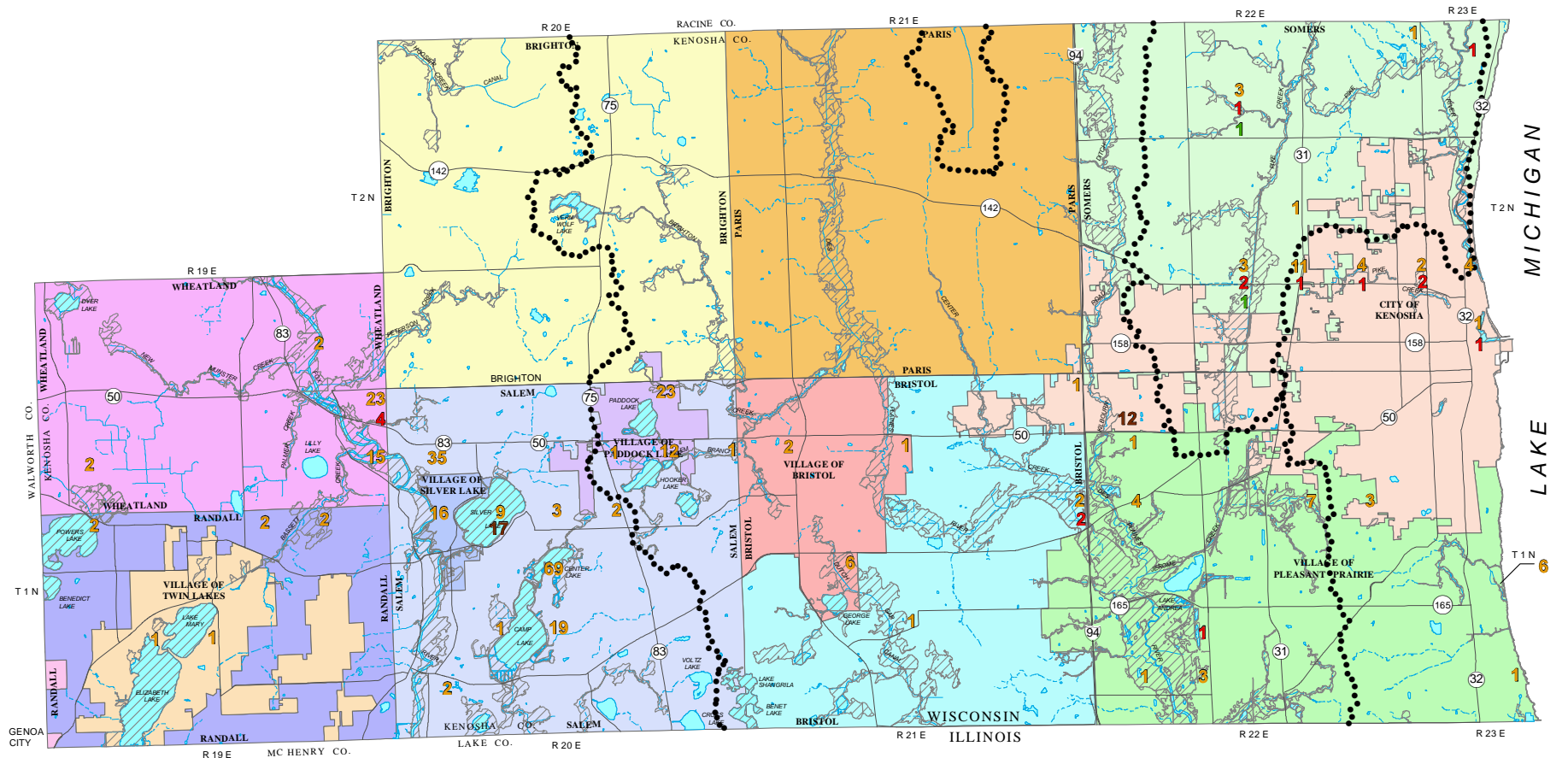
As can be seen by review of Maps 29 and 30, the floodplain overtops a number of arterial and collector streets in the County. This particular impact occurs in the Towns of Salem and Wheatland and the Village of Silver Lake along the Fox River corridor; the Villages of Bristol, Paddock Lake and Pleasant Prairie and the Towns of Brighton, Bristol, and Paris in the Des Plaines River watershed; and the Town 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.

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.






Map 27

NUMBER OF STRUCTURES WITHIN FLOOD HAZARD AREAS BY CIVIL DIVISION JURISDICTION IN KENOSHA COUNTY: 2009



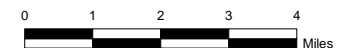
- | | |
|-----|---|
| 312 | RESIDENTIAL STRUCTURES WITHIN U.S. PUBLIC LAND SURVEY SECTION |
| 16 | COMMERCIAL STRUCTURES WITHIN SECTION |
| 2 | AGRICULTURAL STRUCTURES WITHIN SECTION |
| 29 | MOBILE HOMES WITHIN SECTION |

NOTE: On July 4, 2010, the Village of Bristol annexed the Town of Bristol.

-  ONE-PERCENT ANNUAL-PROBABILITY (100-YEAR RECURRENT INTERVAL) FLOODPLAINS: 2009
 SURFACE WATER
 PERENNIAL STREAM
 INTERMITTENT STREAM
 MAJOR WATERSHED BOUNDARY

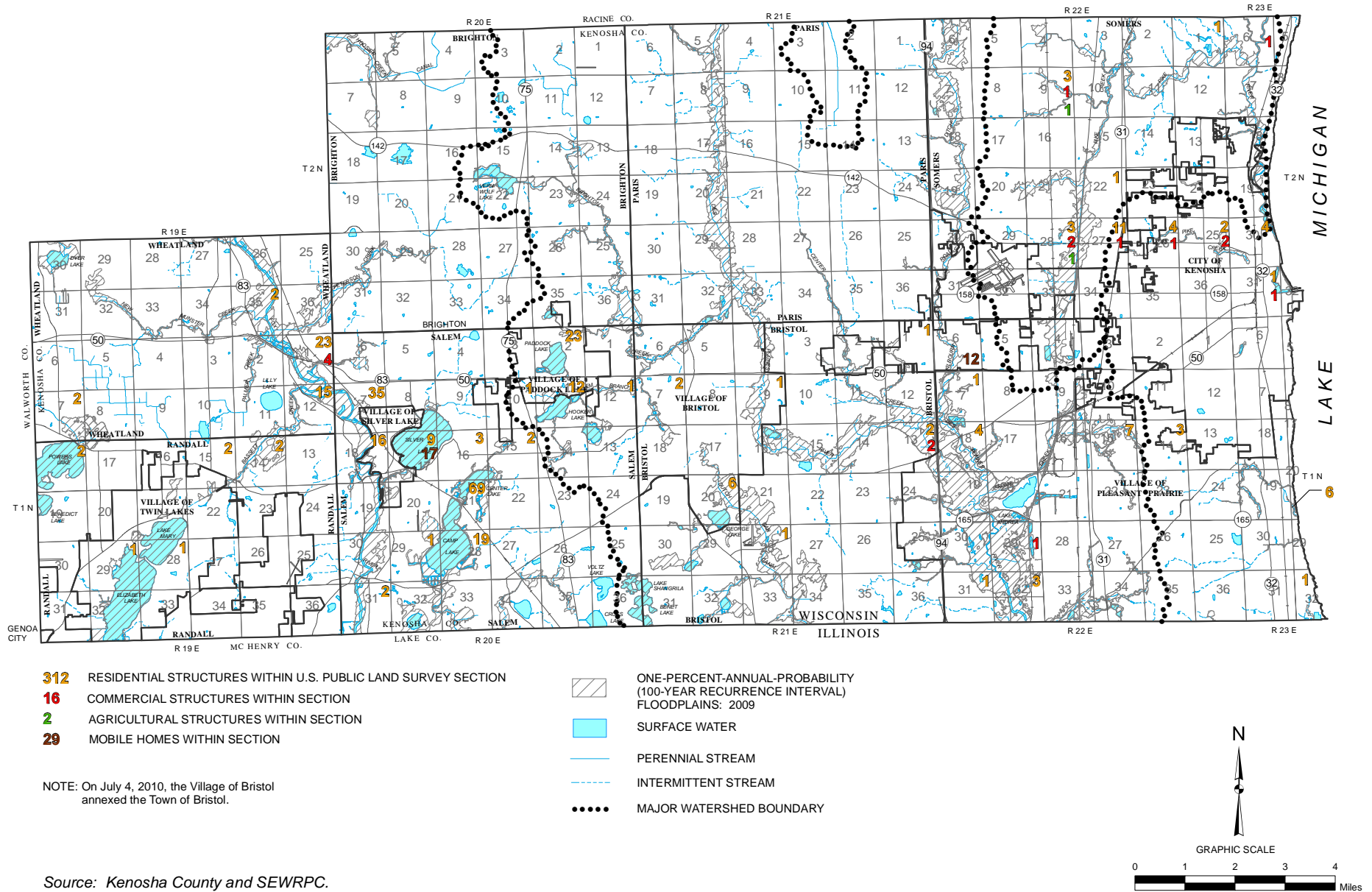


GRAPHIC SCALE



Map 28

NUMBER OF STRUCTURES WITHIN FLOOD HAZARD AREAS BY U.S. PUBLIC LAND SURVEY SECTION IN KENOSHA COUNTY: 2009



Source: Kenosha County and SEWRPC.

Table 27

STRUCTURE FLOOD DAMAGE SUMMARY: KENOSHA COUNTY, WISCONSIN

Annual Probability of Flood Occurrence	Number of Structures in Floodplain	Flood Damages		
		Direct	Indirect	Total
1 Percent	359	\$5,342,400	\$985,020	\$6,327,420
2 Percent	262	3,279,790	560,640	3,840,430
10 Percent	149	1,405,310	210,810	1,616,120
Average Annual	- -	\$ 926,641	\$145,423	\$1,072,064

Source: Kenosha County Department of Planning and Development and SEWRPC.

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 Bristol, 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 \$29 million over the period of 1950 to 2009. Thus, the average annual damages in the County can be approximated at \$483,000 per year. There are 6,182 acres of agricultural land located within the studied floodplain areas. Thus, the average annual flood damage is about \$78 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.²⁰ 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 is estimated to be \$58,000.

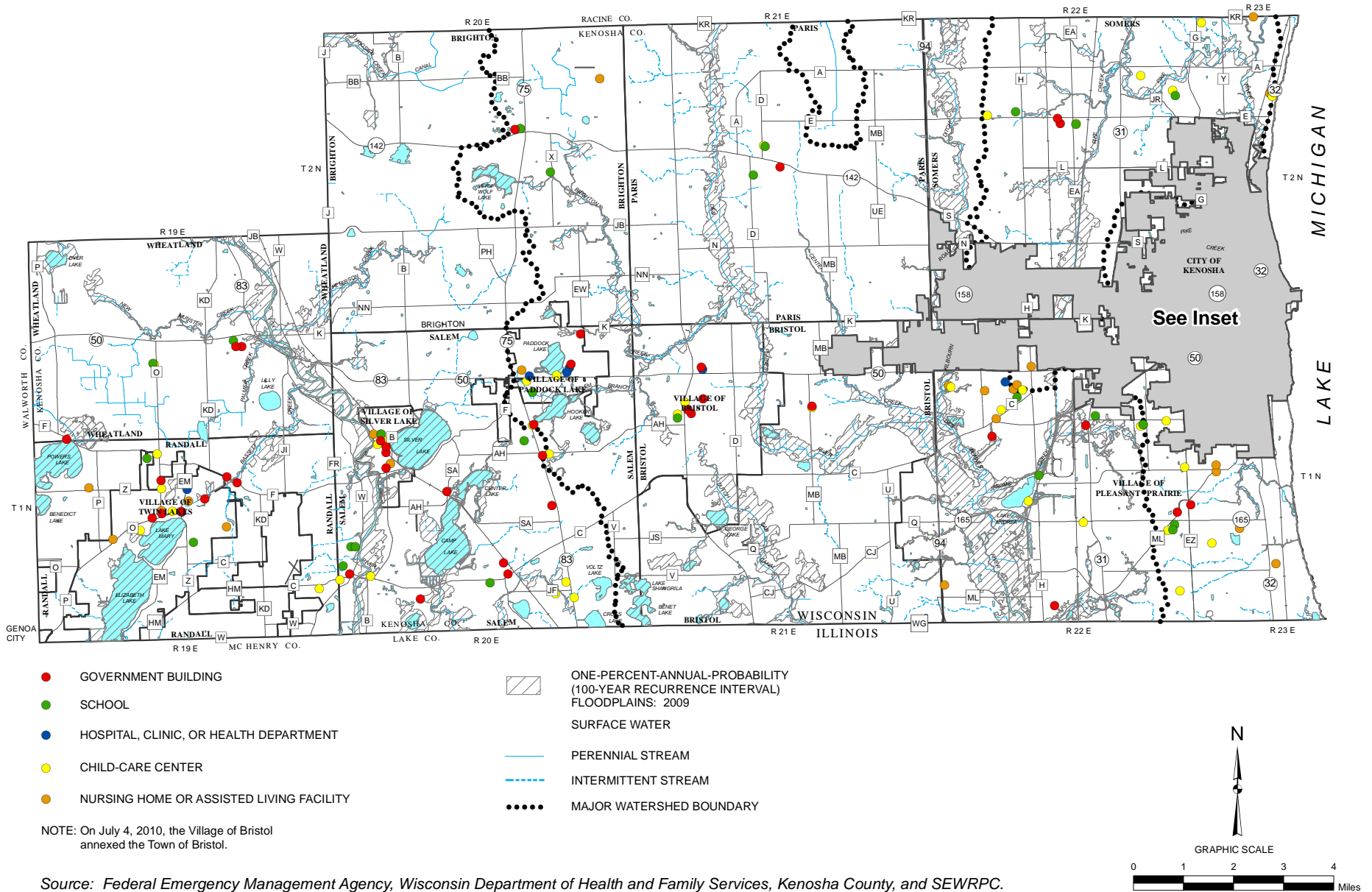
Stormwater Drainage Problems

Because of the interrelationship between stormwater management and floodland 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

²⁰SEWRPC Planning Report No. 44, A Comprehensive Plan For The Des Plaines River Watershed, June 2003.

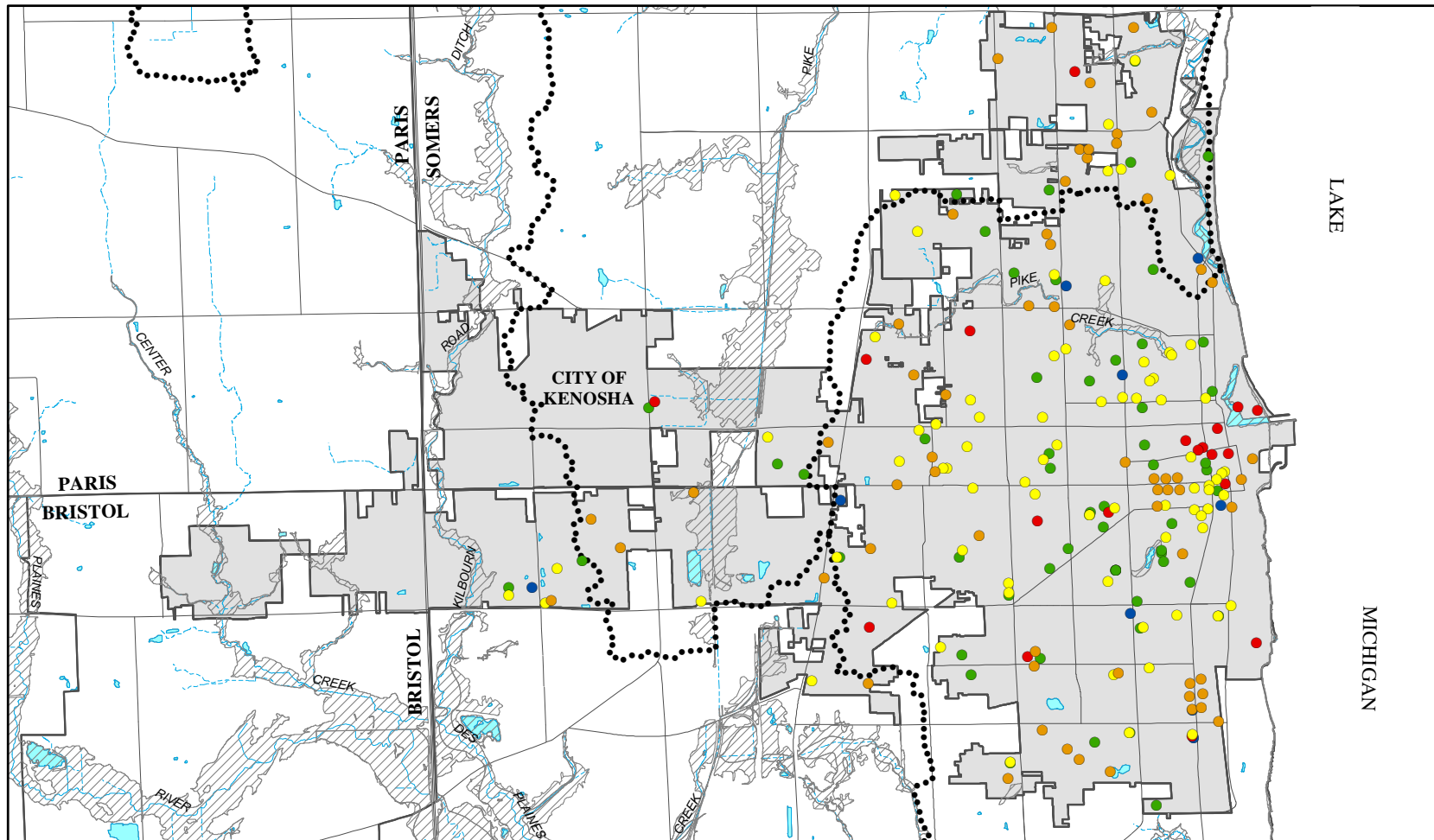
Map 29

LOCATION OF CRITICAL COMMUNITY FACILITIES IN RELATION TO FLOODLANDS IN KENOSHA COUNTY: 2006

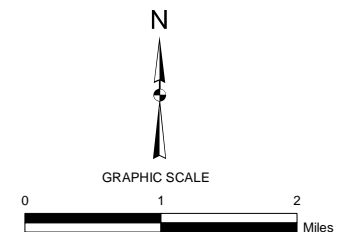


Source: Federal Emergency Management Agency, Wisconsin Department of Health and Family Services, Kenosha County, and SEWRPC.

INSET to Map 29



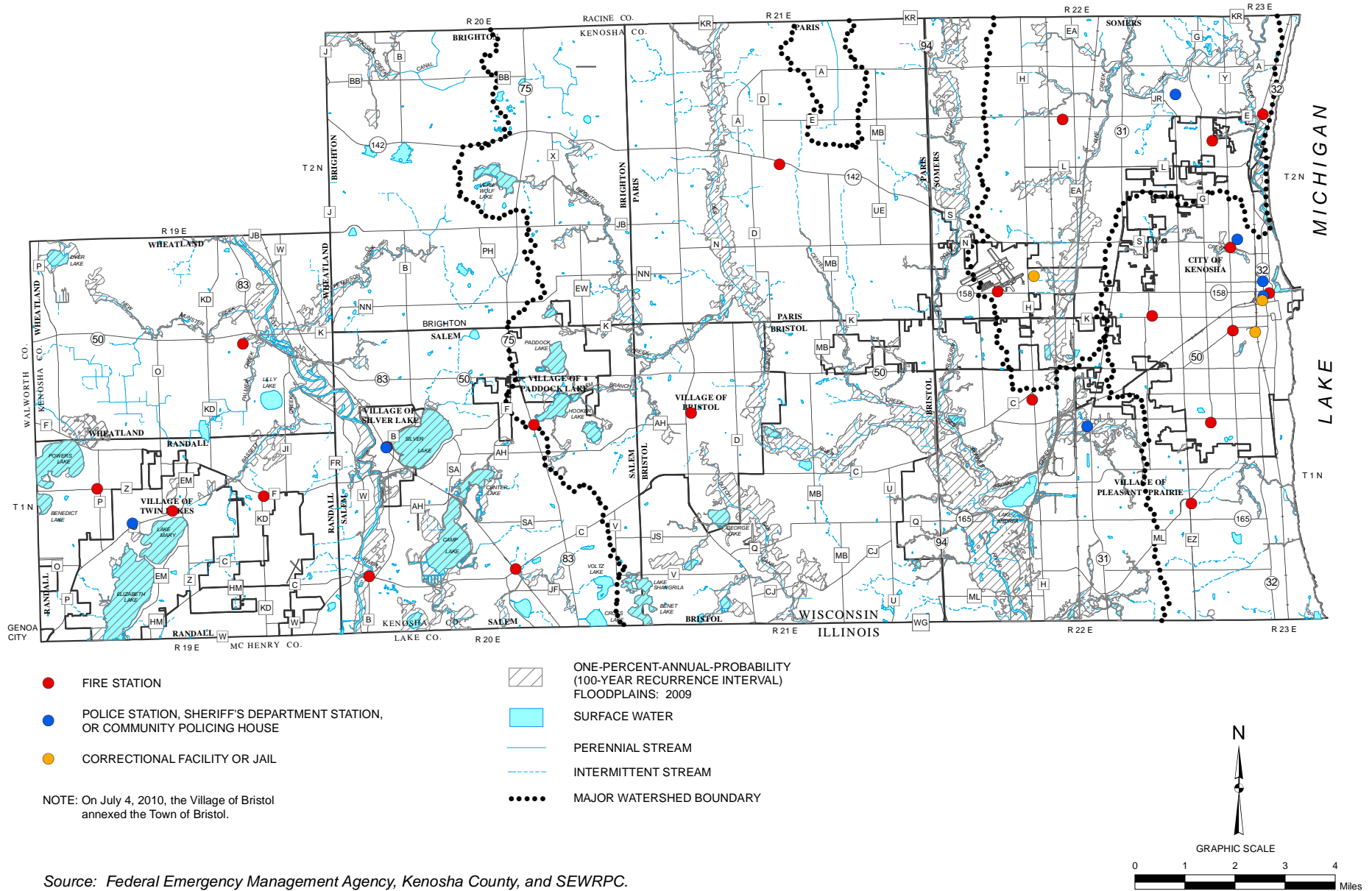
- GOVERNMENT BUILDING
- SCHOOL
- HOSPITAL, CLINIC, OR HEALTH DEPARTMENT
- CHILD-CARE CENTER
- NURSING HOME OR ASSISTED LIVING FACILITY
- ONE-PERCENT-ANNUAL-PROBABILITY (100-YEAR RECURRENCE INTERVAL) FLOODPLAINS: 2009
- SURFACE WATER
- PERENNIAL STREAM
- INTERMITTENT STREAM
- MAJOR WATERSHED BOUNDARY



Source: Federal Emergency Management Agency, Wisconsin Department of Health and Family Services, Kenosha County and SEWRPC.

Map 30

LAW ENFORCEMENT AND FIRE STATIONS IN RELATION TO FLOODPLAINS IN KENOSHA COUNTY: 2008



Source: Federal Emergency Management Agency, Kenosha County, and SEWRPC.

Table 28

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				Percent Increase
		2000		2035		
		Area (square miles)	Percent of Total	Area (square miles)	Percent of Total	
Des Plaines River.....	133.0	19.3	14.5	39.3	29.5	104
Fox River.....	937.6	201.5	21.5	276.0	29.4	37
Lake Michigan Direct Drainage.....	N/A	N/A	N/A	N/A	N/A	N/A
Pike River.....	51.5	17.0	33.2	43.3	84.7	155
Root River.....	197.6	63.9	32.3	98.5	49.8	54

^aIncludes the watersheds located within Kenosha County where flooding conditions occur.

^bIncludes entire Wisconsin watershed area within and beyond Kenosha County.

Source: SEWRPC.

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 28. For the Root River Watershed, more detailed data under current and future conditions by land use category is documented in the regional water quality management plan update for the greater Milwaukee watersheds.²¹ The changes in urban land use over the 35-year period from 2000 through 2035 range from 37 percent, or about 1 percent per year, in the Fox River watershed to 155 percent, or 4.4 percent per year, in the Pike River watershed.

An approximation of the expected increase in flood flows resulting from land use changes, in the absence of mitigating measures, is summarized in Table 29. For the Fox River watershed, studies conducted under a March 1995 water level control plan²² indicated only a modest increase in flood flows in Racine County just upstream of Kenosha County, ranging from 1 to 2 percent, depending upon the type of storm event, over a 10-year period from 1990 to 2000 due to changes in land use. Similar potential increased flow impacts may be expected along the Fox River in Kenosha County. For the Des Plaines and Pike River watersheds, increases in flood flow of up to 10 percent are anticipated, while for the Root River watershed the increase would be a more modest 2 to 4 percent.

²¹SEWRPC Planning Report No. 50, A Regional Water Quality Management Plan Update for the Greater Milwaukee Watersheds, December 2007; SEWRPC Technical Report No. 39, Water Quality Conditions and Sources of Pollution in the Greater Milwaukee Watersheds, November 2007.

²²SEWRPC Memorandum Report No. 102, op. cit.

Table 29

**POTENTIAL INCREASE IN FLOOD
FLOWS DUE TO URBANIZATION**

Watershed	Potential Range of Percent Increases in Flood Flows Over a 10-Year Period ^a
Des Plaines River	1-10
Fox River	1-2
Lake Michigan Direct Drainage	N/A
Pike River	3-8
Root River.....	2-4

^aRange is based upon a range of recurrence intervals and types of flood events.

Source: SEWRPC.

plan for the watershed²⁴ show that along those stream reaches where channelization is recommended, peak flood stages may be expected to decrease, thus mitigating the impact of future flow increases. Along the Lower Pike River, where channelization is not recommended, the increased flood flows due to future urbanization may be expected to result in slightly increased flood stages; however, because local floodplain zoning is based on flood profiles and floodplain delineations determined for planned land use conditions, at risk development would not be allowed in the floodplain and the possible stage increases would not be expected to cause flooding of buildings. More detailed data pertaining to peak flood flows and flood stages under planned land use and planned channel conditions can be found in the full plan reports.

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 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.

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 29 and 30, 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 27 and 28), 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 30, along with the basis of special consideration over and above the countywide consideration.

It should be noted that the changes in flood flows resulting from future land use changes is considered to be conservatively high, as they are based upon no significant impact due to stormwater management measures and other programs designed to mitigate increases in flood flows. As discussed later in this report, there are a number of programs in place that will tend to largely 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. For the Des Plaines River watershed, studies conducted under the June 2003 comprehensive plan for the watershed²³ indicated that full implementation of the recommended flood control and stormwater management measures would result in decreases in peak flow of about 10 to 50 percent, with the decreases being less overall for the more extreme floods than for the more frequent events. Within the Pike River watershed, studies conducted under the June 1983 comprehensive

²³SEWRPC Planning Report, No. 44, op. cit.

²⁴SEWRPC Planning Report No. 35, op. cit.

Table 30

**COMMUNITIES IN KENOSHA COUNTY WITH
SPECIAL FLOOD AND RELATED STORMWATER
DRAINAGE CONSIDERATIONS**

Community	Reason for Special Consideration
City of Kenosha	15 structures estimated to be in flood hazard area
Village of Bristol	Nine 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	30 structures estimated to be in flood hazard area
Village of Silver Lake	47 structures estimated to be in flood hazard area
Village of Twin Lakes	Two structures estimated to be in flood hazard area
Town of Bristol ^a	Three structures estimated to be in flood hazard area. Substantial agricultural flood damages
Town of Paris	Substantial agricultural flood damages
Town of Randall	Six structures estimated to be in flood hazard area
Town of Salem	136 structures estimated to be in flood hazard area, 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	38 structures estimated to be in flood hazard area
Town of Wheatland	46 structures estimated to be in flood hazard area

NOTE: See Maps 27 and 28.

^aOn July 4, 2010, the Village of Bristol annexed the Town of Bristol.

Source: SEWRPC.

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. However, 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.²⁵ 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

²⁵National Weather Service Forecast Office.

(measured or implied by tree and/or structural damage), or a tornado.²⁶ 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.²⁷ 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. Whereas, 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.

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.²⁸ 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

²⁶*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.*

²⁷*National Weather Service, Milwaukee/Sullivan Weather Forecast Office.*

²⁸*Wisconsin Emergency Management Department of Military Affairs, State of Wisconsin Hazard Mitigation Plan, July 2001.*

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 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.²⁹ 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 untold numbers of 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 contain a higher number of lightning events compared to 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.

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

²⁹*National Oceanic and Atmospheric Administration.*

other natural hazards examined in Kenosha County, as shown in Table 22. 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 119 thunderstorms and 129 high-wind events have been recorded in Kenosha County during the 46-year period from July 1964 through July 2009. These events are shown on Map 31, and documented in terms of their magnitude and impact in Table 31, based upon data published by the National Climatic Data Center. As shown in Table 31 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 five deaths, 32 injuries, and about \$39.4 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 10, 1998. This event struck south-central and southeastern Wisconsin and caused four deaths, 14 injuries, and \$15.9 million (in 2008 dollars) in damages to property and crops. Two 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 \$156,000.

From July 1964 to July 2009, 46 major hailstorms were reported in Kenosha County that resulted in significant property damage throughout the southeastern areas of Wisconsin (see Map 31). In all, the National Climatic Data Center has recorded about \$222,200 (in 2008 dollars) in property damage from these hailstorm events as shown in Table 31. 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.

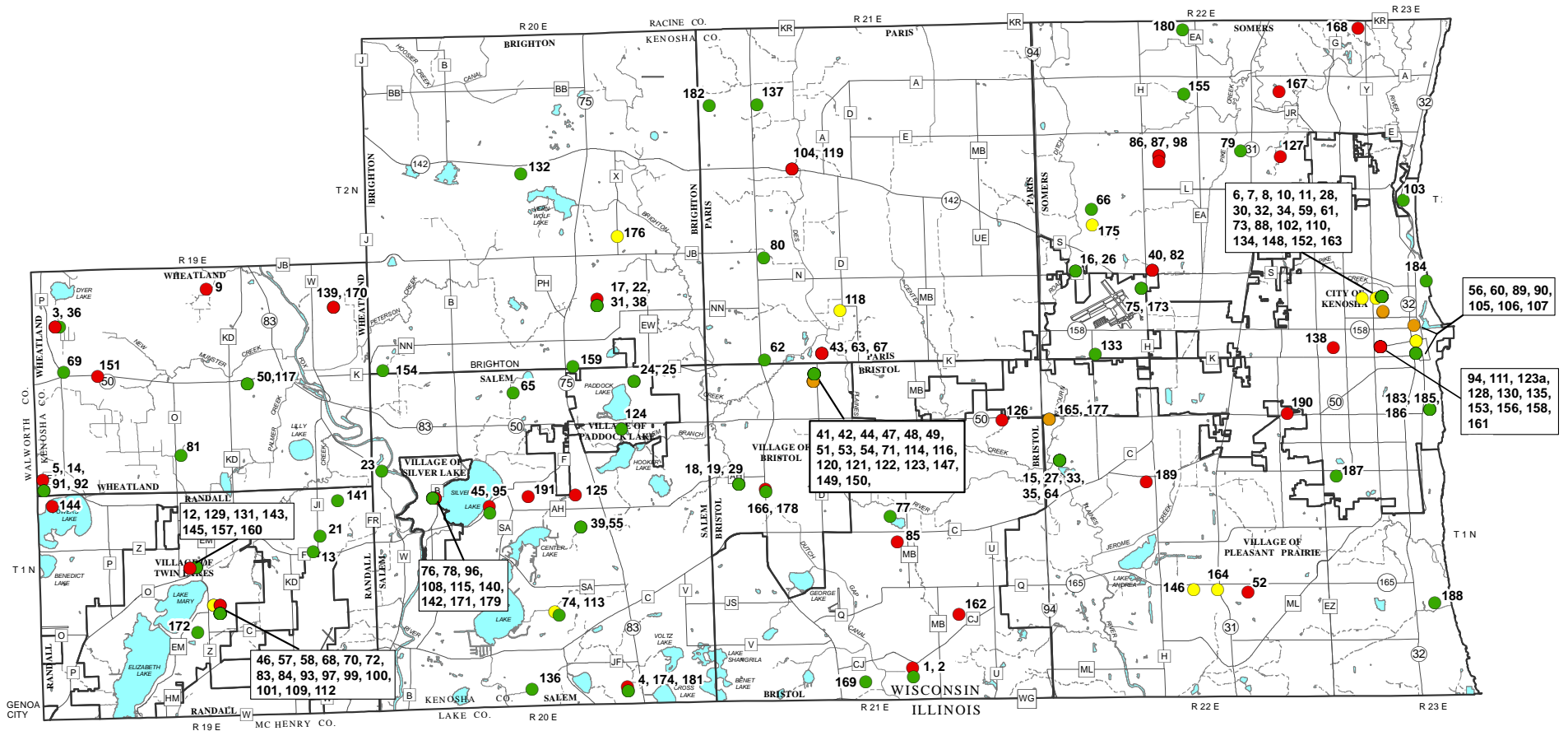
From July 1964 to July 2009, 15 lightning events were reported in Kenosha County that resulted in significant property damage throughout the southeastern areas of Wisconsin (see Map 31). In all, the National Climatic Data Center has recorded \$16.5 million (in 2008 dollars) in property damage, one death, and five injuries from these lightning events, as shown in Table 31. 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 \$15.0 million (in 2008 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 \$160,000 in property damages. 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 \$1.2 million (in 2008 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 40-years as shown on Map 31, the locations of storm impact points is widely scattered throughout the County.

Map 31

THUNDERSTORM, HIGH-WIND, HAIL, AND LIGHTNING EVENTS REPORTED WITHIN KENOSHA COUNTY: JULY 1964 THROUGH JULY 2009



- THUNDERSTORM AND HIGH-WIND
- HIGH WIND
- HAIL
- LIGHTNING
- 68 REFERENCE NUMBER (SEE TABLE 31)

NOTE: On July 4, 2010, the Village of Bristol annexed the Town of Bristol.

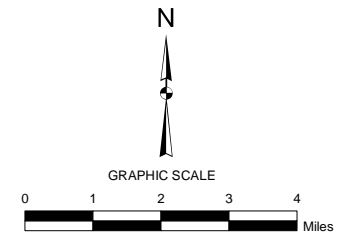


Table 31

THUNDERSTORM, HIGH-WIND, HAIL, AND LIGHTNING EVENTS REPORTED IN KENOSHA COUNTY FROM JULY 1964 THROUGH JULY 2009

Number on Map 31	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	--	--
35	06/17/1992	Kenosha County	X	X	--	--	75 knots	0	0	--	--
36	06/25/1992	Kenosha County	--	--	X	--	0.75 inches	0	0	--	--
38	06/25/1992	Kenosha County	--	--	X	--	0.75 inches	0	0	--	--
39	08/25/1992	Kenosha County	X	X	--	--	0 knots	0	0	--	--
40	04/18/1994	Town of Salem	X	X	--	--	70 knots	0	0	--	--
41	04/18/1994	Kenosha County	--	--	X	--	1.75 inches	0	0	--	--
42	04/18/1994	Kenosha County	X	X	--	--	0 knots	0	0	72,698.69	--
43	07/12/1994	Kenosha County	X	X	--	--	50 knots	0	0	--	--
44	07/12/1994	Kenosha County	--	--	X	--	0.75 inches	0	0	1,453.98	--
45	07/21/1994	Kenosha County	X	X	--	--	0 knots	0	0	7,269.87	7,269.87

Table 31 (continued)

Number on Map 31	Date	City/Village/Town	Event Type				Magnitude	Reported Damages ^a			
			Thunderstorm	High Winds	Hail	Lightning		Deaths	Injuries	Property Damage ^b	Crop Damage ^b
46	04/18/1995	Village of Silver Lake	--	--	X	--	1.00 inches	0	0	--	--
47	04/18/1995	Village of Twin Lakes	--	--	X	--	1.00 inches	0	0	--	--
48	06/07/1995	Kenosha County	X	X	--	--	0 knots	0	0	--	--
49	07/15/1995	Kenosha County	X	X	--	--	55 knots	0	0	--	--
50	07/15/1995	Kenosha County	X	X	--	--	65 knots	0	0	70,718.56	--
51	07/27/1995	New Munster	X	X	--	--	0 knots	0	0	--	--
52	07/27/1995	Kenosha County	X	X	--	--	0 knots	0	0	--	--
53	07/27/1995	Pleasant Prairie	--	--	X	--	1.75 inches	0	0	--	--
54	07/27/1995	Kenosha County	--	--	--	X	N/A	0	0	14,143.71	--
55	08/28/1995	Kenosha County	X	X	--	--	0 knots	0	0	--	--
56	08/28/1995	Town of Salem	X	X	--	--	0 knots	0	0	--	--
57	03/20/1996	Kenosha County	X	X	--	--	0 knots	0	1	42,974.61	--
58	04/14/1996	Village of Twin Lakes	--	--	--	X	N/A	0	1	--	--
59	04/19/1996	Village of Twin Lakes	X	X	--	--	0 knots	0	0	961,223.21	--
60	04/19/1996	Village of Pleasant Prairie	X	X	--	--	0 knots	0	0	1,510,493.63	--
61	05/11/1996	Kenosha County	--	--	--	X	N/A	0	0	6,865.88	--
62	06/21/1996	Kenosha County	X	X	--	--	0 knots	0	0	2,746.35	--
63	07/24/1996	Town of Bristol	X	X	--	--	0 knots	0	0	13,731.76	--
64	10/16/1996	Kenosha County	--	--	--	X	N/A	0	0	20,597.64	--
65	10/29/1996	Village of Pleasant Prairie	X	X	--	--	0 knots	0	0	13,731.76	--
66	10/29/1996	Village of Paddock Lakes	X	X	--	--	0 knots	0	0	27,463.52	--
67	04/06/1997	Town of Somers	X	X	--	--	67 knots	0	2	402,690.92	--
68	06/20/1997	Kenosha County	--	--	--	X	N/A	1	0	--	--
69	07/18/1997	Village of Twin Lakes	X	X	--	--	0 knots	0	9	1,342,303.06	--
70	07/26/1997	Slades Corners	X	X	--	--	0 knots	0	0	2,684.61	--
71	09/29/1997	Village of Twin Lakes	X	X	--	--	0 knots	0	0	1,342.30	--
72	03/08/1998	Kenosha County	X	X	--	--	0 knots	0	0	284,050.35	--
73	05/28/1998	Village of Twin Lakes	X	X	--	--	0 knots	0	0	13,211.65	--
74	05/31/1998	Kenosha County	X	X	--	--	0 knots	0	0	2,642.33	--
75	06/18/1998	Trevor	X	X	--	--	0 knots	0	0	2,642.33	--
76	06/25/1998	City of Kenosha	X	X	--	--	50 knots	0	0	--	--
77	06/25/1998	Village of Silver Lake	X	X	--	--	0 knots	0	0	66,058.22	--
78	06/25/1998	Town of Bristol	X	X	--	--	0 knots	0	0	264,432.88	--
79	07/20/1998	Village of Silver Lake	X	X	--	--	0 knots	0	0	6,605.82	--
80	07/21/1998	Kenosha County	X	X	--	--	87 knots	0	0	264,232.88	264,232.88
81	11/10/1998	Kenosha County	X	X	--	--	0 knots	4	14	13,740,110.00	2,113,863.08
82	05/16/1999	Town of Wheatland	X	X	--	--	0 knots	0	0	49,123.54	--
83	05/16/1999	Kenosha County	--	--	X	--	1.75 inches	0	0	1,292.73	--
84	06/06/1999	Village of Twin Lakes	X	X	--	--	0 knots	0	0	1,292.73	--
85	07/23/1999	Village of Twin Lakes	X	X	--	--	0 knots	0	0	3,995.18	--
86	03/08/2000	Town of Bristol	--	--	X	--	0.75 inches	0	0	--	--
87	05/17/2000	Town of Somers	--	--	X	--	1.00 inches	0	0	--	--
88	05/18/2000	Town of Somers	--	--	X	--	0.75 inches	0	0	--	--
89	05/18/2000	Kenosha County	--	--	X	--	0.75 inches	0	0	--	--
90	05/18/2000	Kenosha County	--	--	--	X	N/A	0	0	100,017.36	--
91	05/24/2000	Kenosha County	--	X	--	--	0 knots	0	0	3,750.65	--

Table 31 (continued)

Number on Map 31	Date	City/Village/Town	Event Type				Magnitude	Reported Damages ^a			
			Thunderstorm	High Winds	Hail	Lightning		Deaths	Injuries	Property Damage ^b	Crop Damage ^b
92	06/13/2000	Powers Lake	X	X	--	--	0 knots	0	0	1,250.22	--
93	06/13/2000	Powers Lake	X	X	--	--	0 knots	0	0	6,251.08	--
94	08/05/2000	Village of Twin Lakes	X	X	--	--	0 knots	0	0	1,250.22	--
95	09/11/2000	Kenosha County	--	--	X	--	1.00 inches	0	0	12,502.17	--
96	04/07/2001	Kenosha County	X	X	--	--	57 knots	0	1	--	--
97	05/14/2001	Village of Silver Lake	--	--	X	--	1 inch	0	0	--	--
98	05/14/2001	Village of Twin Lakes	--	--	X	--	1.00 inches	0	0	--	--
99	05/14/2001	Town of Somers	--	--	X	--	1.00 inches	0	0	--	--
100	06/11/2001	Village of Twin Lakes	X	X	--	--	52 knots	0	0	18,242.47	--
101	07/22/2001	Village of Twin Lakes	X	X	--	--	52 knots	0	0	--	--
102	07/22/2001	Village of Twin Lakes	--	--	--	X	N/A	0	4	--	--
103	08/09/2001	Kenosha County	X	X	--	--	52 knots	0	0	30,404.11	--
104	09/19/2001	Kenosha County	X	X	--	--	0 knots	0	0	--	--
105	10/23/2001	Town of Paris	--	--	X	--	0.75 inches	0	0	--	--
106	10/25/2001	City of Kenosha	X	X	--	--	56 knots	0	0	--	--
107	12/05/2001	City of Kenosha	X	X	--	--	0 knots	0	0	127,697.27	--
108	03/09/2002	City of Kenosha	X	X	--	--	0 knots	0	0	87,381.90	--
109	04/18/2002	Village of Silver Lake	X	X	--	--	52 knots	0	0	4,788.05	--
110	06/03/2002	Village of Twin Lakes	X	X	--	--	56 knots	0	0	89,775.92	--
111	06/03/2002	Kenosha County	X	X	--	--	50 knots	0	0	--	--
112	06/03/2002	Kenosha County	--	--	X	--	0.88 inches	0	0	--	--
113	08/21/2002	Village of Twin Lakes	X	X	--	--	56 knots	0	0	--	--
114	09/29/2002	Trevor	--	--	--	X	N/A	0	0	1,197,012.30	--
115	05/11/2003	Kenosha County	X	X	--	--	50 knots	0	0	58,505.00	--
116	07/06/2003	Village of Silver Lake	X	X	--	--	52 knots	0	0	--	--
117	07/06/2003	Kenosha County	X	X	--	--	52 knots	0	0	--	--
118	07/15/2003	New Munster	X	X	--	--	52 knots	0	0	--	--
119	07/15/2003	Kenosha County	--	--	--	X	N/A	0	0	40,953.50	--
120	08/28/2003	Town of Paris	--	--	X	--	1.00 inches	0	0	--	--
121	11/12/2003	Kenosha County	X	X	--	--	39 knots	0	0	60,845.20	--
122	03/07/2004	Kenosha County	--	X	--	--	49 knots	0	0	3,134.45	--
123	03/14/2004	Kenosha County	--	X	--	--	39 knots	0	0	2,963.48	--
123A	04/18/2004	Kenosha County	--	X	--	--	43 knots	0	0	15,957.20	--
124	05/20/2004	Paddock Lake	X	X	--	--	61 knots	0	0	28,495.00	--
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	--	--
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	11,398.00	--
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	1,937.66	--
135	03/30/2005	Kenosha	X	X	--	--	52 Knots	0	0	3,307.20	--
136	06/04/2005	Trevor	X	X	--	--	52 Knots	0	0	--	--
137	06/04/2005	Paris	X	X	--	--	52 Knots	0	0	--	--

Table 31 (continued)

Number on Map 31	Date	City/Village/Town	Event Type				Magnitude	Reported Damages ^a			
			Thunderstorm	High Winds	Hail	Lightning		Deaths	Injuries	Property Damage ^b	Crop Damage ^b
138	06/05/2005	Kenosha	--	--	X	--	1.75 inches	0	0	--	--
139	07/23/2005	New Munster	X	X	--	--	52 knots	0	0	1,102.40	--
140	07/23/2005	Silver Lake	X	X	--	--	52 knots	0	0	1,102.40	--
141	07/23/2005	Silver Lake	X	X	--	--	52 knots	0	0	1,102.40	--
142	07/23/2005	Silver Lake	X	X	--	--	52 knots	0	0	1,102.40	--
143	09/22/2005	Twin Lakes	--	--	X	--	1.75 inches	0	0	--	--
144	09/22/2005	Powers Lake	--	--	X	--	1.75 inches	0	0	--	--
145	09/22/2005	Twin Lakes	--	--	X	--	1.50 inches	0	0	--	--
146	10/02/2005	Pleasant Prairie	--	--	--	X	N/A	0	0	5,512.00	--
147	01/24/2006	Kenosha County	--	X	--	--	39 knots	0	0	5,340.00	--
148	03/13/2006	Kenosha County	--	X	--	--	56 knots	0	0	--	--
149	03/31/2006	Kenosha County	--	X	--	--	39 knots	0	0	2,848.00	--
150	05/11/2006	Kenosha County	--	X	--	--	36 knots	0	0	1,225.06	--
151	05/17/2006	Twin Lakes	--	--	X	--	0.75 inches	0	0	--	--
152	05/24/2006	Kenosha	--	--	--	X	N/A	0	0	1,068.00	--
153	07/09/2006	Kenosha	X	X	--	--	56 knots	0	0	53,400.00	--
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	5,340.00	--
158	07/17/2006	Kenosha	X	X	--	--	56 knots	0	0	21,360.00	--
159	07/20/2006	Paddock Lake	X	X	--	--	52 knots	0	0	10,680.00	--
160	07/27/2006	Twin Lakes	X	X	--	--	52 knots	0	0	5,340.00	--
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	14,952,000.00	--
164	08/24/2006	Pleasant Prairie	--	--	--	X	N/A	0	0	160,200.00	--
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	155,760.00	--
170	06/21/2007	Wheatland	--	--	X	--	1.00 inches	0	0	207,680.00	--
171	06/21/2007	Silver Lake	--	--	X	--	0.88 inches	0	0	--	--
172	07/09/2007	Twin Lakes	X	X	--	--	52 knots	0	0	31,152.00	--
173	07/09/2007	Kenosha Regional Airport	X	X	--	--	50 knots	0	0	77,880.00	--
174	07/10/2007	Bristol	X	X	--	--	50 knots	0	0	--	--
175	07/10/2007	Somers	--	--	--	X	N/A	0	0	3,115.20	--
176	08/14/2007	Brighton	--	--	--	X	N/A	0	0	41,536.00	--
177	12/23/2007	Kenosha County	--	X	--	--	50 knots	0	0	2,076.80	--
178	06/05/2008	Bristol	X	X	--	--	56 knots	0	0	20,000.00	--
179	06/08/2008	Silver Lake	X	X	--	--	56 knots	0	0	25,000.00	--
180	06/08/2008	Somers	X	X	--	--	56 knots	0	0	--	--
181	06/20/2008	Camp Lake	--	--	X	--	0.88 inches	0	0	--	--
182	06/28/2008	Paddock Lake	X	X	--	--	50 knots	0	0	--	--
183	06/28/2008	Downtown Kenosha	X	X	--	--	56 knots	0	0	50,000.00	--
184	03/24/2009	Downtown Kenosha	X	X	--	--	56 knots	0	0	--	--

Table 31 (continued)

Number on Map 31	Date	City/Village/Town	Event Type				Magnitude	Reported Damages ^a			
			Thunderstorm	High Winds	Hail	Lightning		Deaths	Injuries	Property Damage ^b	Crop Damage ^b
185	06/08/2009	Downtown Kenosha	X	X	--	--	50 knots	0	0	--	--
186	06/18/2009	Downtown Kenosha	X	X	--	--	56 knots	0	0	--	--
187	06/19/2009	Downtown Kenosha	X	X	--	--	56 knots	0	0	--	--
188	06/19/2009	Downtown Kenosha	X	X	--	--	56 knots	0	0	5,034.00	--
189	06/19/2009	Pleasant Prairie	--	--	X	--	1.00 inches	0	0	--	--
190	06/19/2009	Downtown Kenosha	--	--	X	--	1.00 inches	0	0	--	--
191	07/23/2009	Silver Lake	--	--	X	--	1.00 inches	0	0	--	--
--	Total	--	119	129	46	15	--	5	32	36,970,605.31	2,385,365.83

^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 2008 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), and the National Environmental Satellite, Data and Information Service (NESDIS).

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 historic events have resulted in about \$124,500 of reported damages per event. 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 six thunderstorm and related storm events per year in Kenosha County.

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

Based upon historical data, Kenosha County can expect to experience an average of 4.2 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.

Changes in land use can have an impact on the potential for thunderstorm and related hazards to occur. 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 IV.

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 tornadoprone 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 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 32. Tornado intensities under this scale range from F0 events, representing the tornados doing the smallest amount of damage, to F5 events, representing the tornados doing the greatest amount of damage. Wind velocities necessary to produce the particular damage are often associated with

Table 32**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 33**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.

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 33. 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, which events are characterized by strong

downdrafts, initiated by a thunderstorm, 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 watches are 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.

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 34).

A total of 11 tornadoes have been recorded in Kenosha County during the 46-year period between July 1963 to July 2009, or about one tornado every four years. Of the tornadoes reported for Kenosha County during that period, four were uncategorized events, four were F0 or EF0 events, two 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 32, and documented in terms of their magnitude and impact in Table 34, based upon data published by the National Climatic Data Center. In total, these 11 tornadoes have resulted in about \$23 million in property damages. On average, there are about 22 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

Table 34

TORNADO EVENTS REPORTED IN KENOSHA COUNTY: JULY 1963 THROUGH JULY 2009

Number on Map 32	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	176,019.10	0.00
2	June 9, 1974	Town of Somers	F1	2	50	0	0	1,092,344.85	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	12,161.64	0.00
9	January 7, 2008	Town of Wheatland	EF3	9 ^b	200	0	15	13,700,000.00	0.00
10	January 7, 2008	Town of Somers	EF1	2	75	0	0	7,900,000.00	0.00
11	June 19, 2009	City of Kenosha	EF0	1	50	0	0	0.00	0.00
Total	--	--	--	--	--	0	15	22,989,525.95	0.00

NOTE: N/A indicates data not available.

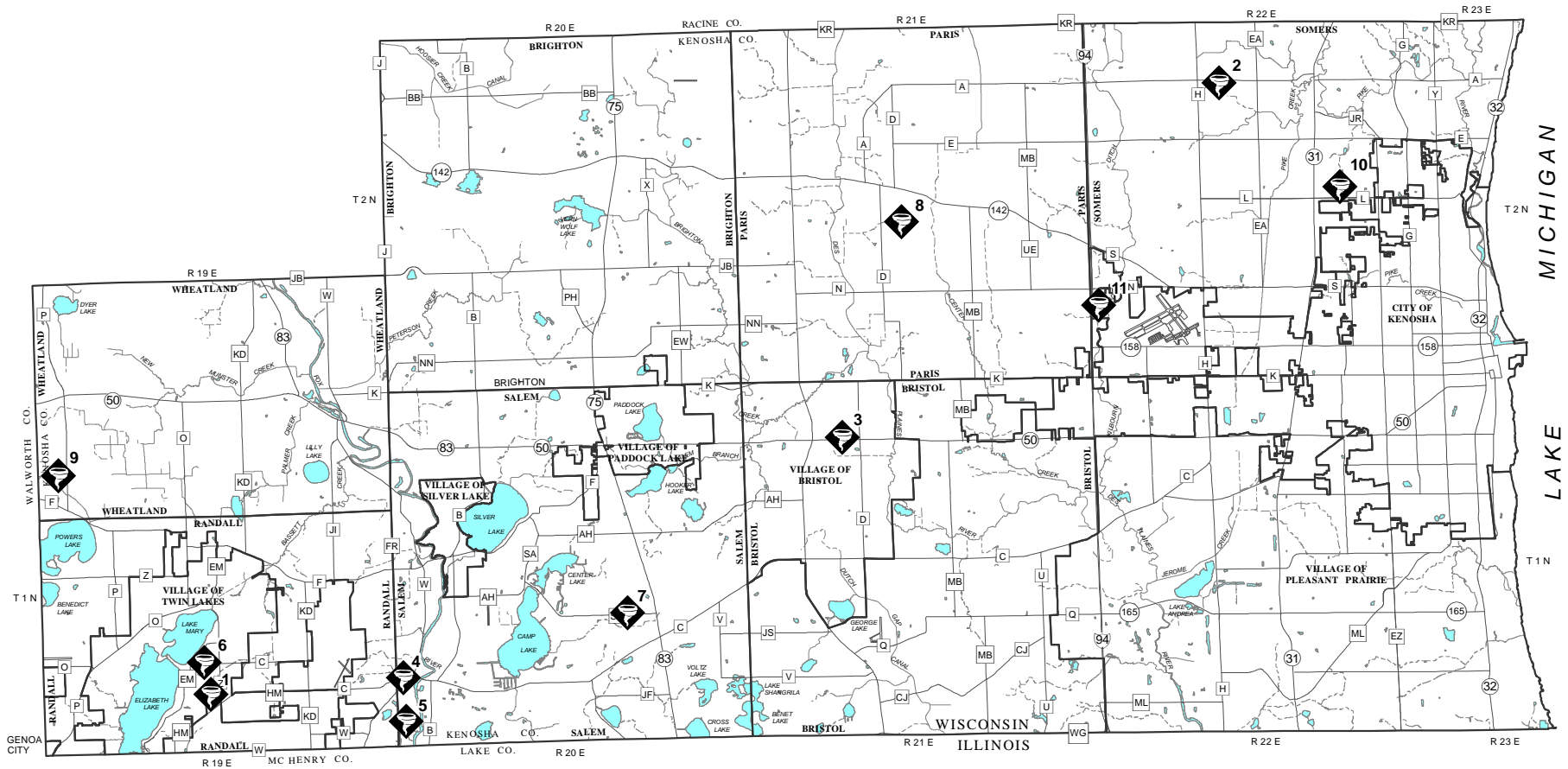
^aDollar values were adjusted to year 2008 by using the average annual Consumer Price Index (CPI) values from the U.S. Department of Labor, Bureau of Labor Statistics.

^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.

Map 32

TORNADO EVENTS REPORTED WITHIN KENOSHA COUNTY: JULY 1963 THROUGH JULY 2009



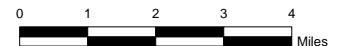
11

REPORTED TORNADO SIGHTING AND REFERENCE NUMBER (SEE TABLE 34)

NOTE: On July 4, 2010, the Village of Bristol annexed the Town of Bristol.



GRAPHIC SCALE



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 33.

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 \$13.7 million 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 \$7.9 million 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.

Vulnerability and Community Impacts Assessment

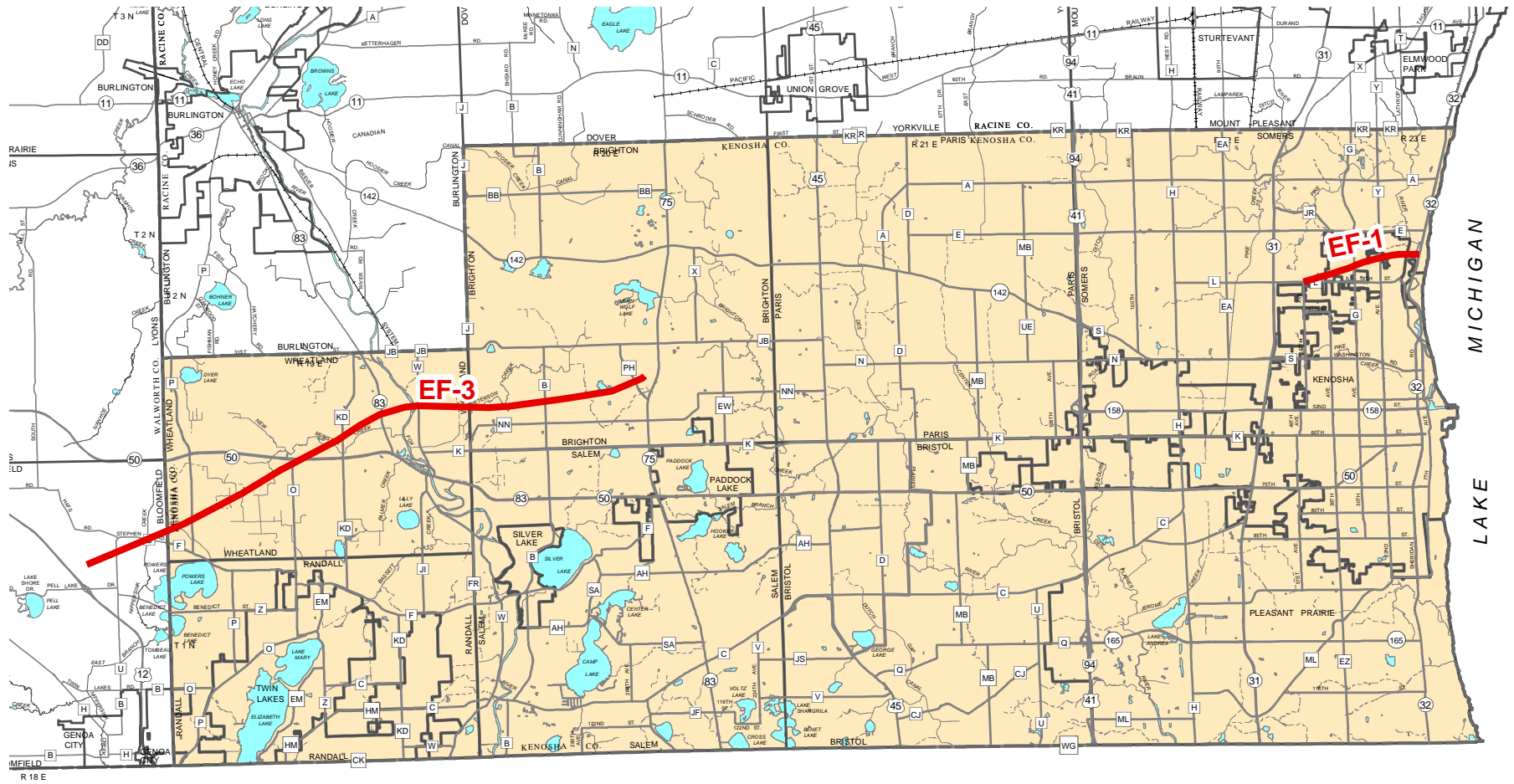
In order to assess the vulnerability of the Kenosha County area to tornado and related storm hazards, a review of the community assets described in Chapter II was made which indicates the potential for significant tornado impacts to: 1) a variety of residential, commercial, and other developed land uses; 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 F1 and F2 tornado events during the past 50-years within southeastern Wisconsin, shown on Map 32, 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 \$23 million of reported damages; however, two events were responsible for a large percentage of the total damages. Thus, the average damages cost is not considered to be representative.

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.

Map 33

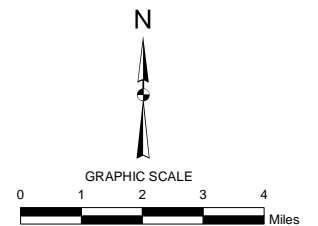
PATHS OF THE JANUARY 7, 2008 TORNADOES THROUGH KENOSHA COUNTY



APPROXIMATE PATHS OF JANUARY 7, 2008 TORNADOES

NOTE: On July 4, 2010, the Village of Bristol annexed the Town of Bristol.

Source: National Weather Service.



Potential Future Changes in Tornado Conditions

Changes in land use can have an impact on the potential for tornado 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 IV.

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.” Heat deaths occur quietly, without headline-making destruction. The Centers for Disease Control and Prevention reports that on average, 688 people die each year, nationwide from excessive heat, more than lightning, tornadoes, floods, and hurricanes combined.³⁰ 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 35 to depict extreme high and low temperatures and the departure from average temperatures recorded in the period from 1990 through 2008. The average annual high and low temperatures for these two stations are 94.8°F and -11.2°F for the City of Burlington and 95.7°F and -7.7°F for the City of Kenosha during this period. Prolonged exposure to either of these 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. A measure of discomfort and the level of risk posed to people in high risk groups is the Heat Index (HI) that is expressed in degrees Fahrenheit (°F) and equals a relative humidity (RH) adjustment added to the actual air temperature. For example, if the air temperature is 94°F and the RH is 55 percent; the HI would equal 106°F (see Table 36). 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 37.³¹ 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

³⁰U.S. Centers for Disease Control and Prevention, “Heat-Related Deaths—United States, 1999-2003,” Morbidity and Mortality Weekly Reports, Volume 55, July 28, 2008.

³¹High-risk groups include the very young, the old, and persons with chronic health conditions.

Table 35

**AVERAGE AND DEPARTURE FROM AVERAGE TEMPERATURE
CHARACTERISTICS WITHIN KENOSHA COUNTY: 1990-2008**

Date	Burlington Inland Site				Kenosha Lakeshore Site			
	High Temperature (°F)	Low Temperature (°F)	Average Annual Temperature (°F)	Departure from Average Temperature (°F)	High Temperature (°F)	Low Temperature (°F)	Average Annual Temperature (°F)	Departure from Average Temperature (°F)
1990	N/A	N/A	N/A	N/A	96	-8	46.5	-0.3
1991	98	-10	- .a	- .a	98	-5	48.8	2.0
1992	90	-15	45.9	-0.2	89	-9	46.3	-0.5
1993	92	-13	45.1	-1.0	94	-5	46.3	0.0
1994	96	-26	45.6	-0.6	94	-24	47.3	1.0
1995	105	-8	45.9	-0.3	103	-7	47.0	0.7
1996	95	-27	43.5 ^b	-2.6	94	-23	45.0	-1.3
1997	93	-13	44.5	-1.7	94	-11	46.7	0.4
1998	94	-7	49.4	3.2	96	-3	51.3 ^b	5.0
1999	100	-22	47.2 ^b	1.1	104	-14	49.6	3.3
2000	96	-15	46.1 ^b	-0.1	90	-5	48.7	2.4
2001	94	-8	- .a	- .a	97	1	49.6	3.3
2002	97	-9	47.1	1.2	98	-7	49.7	2.4
2003	94	- .a	- .a	- .a	98	-5	47.2	0.0
2004	90	-13	45.7	-0.1	91	-10	48.6	1.3
2005	95	10	46.9	1.1	101	-2	49.6	2.3
2006	95	14	47.6	1.8	98	11	49.9	2.7
2007	90	-19	46.5 ^b	0.7	94	-13	48.9	1.7
2008	92	-10	44.3	-1.6	90	-8	46.7 ^b	-0.5
Average	94.8	-11.2	46.1	0.06	95.7	-7.7	48.1	1.4

NOTE: N/A indicates data not available.

^aTen or more daily values missing.

^bAverage and/or total values computed with one to nine daily values missing.

Source: National Oceanic and Atmospheric Administration and SEWRPC.

and adults with respiratory problems. 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

Table 36

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 37

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.

- **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.

During the period from 1982 through 2008, 31 people died in Wisconsin due to exposure to cold. When vehicle accidents and fatalities, fires due to dangerous use of heaters, and other winter weather fatalities are also considered, it increases the severity of severe cold periods. Exposure to extreme cold temperatures can cause hypothermia and frostbite; can lead to loss of fingers and toes; or cause permanent kidney, pancreas, and liver injury, and even death. A major winter storm can last for several days and be accompanied by high winds, freezing rain or sleet, heavy snowfall, and cold temperatures. Wind chill is not the actual temperature, but rather 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. A wind chill of -20°F will cause frostbite in just 30 minutes. Frostbite is damage to body tissue caused by extreme cold. Frostbite causes a loss of feeling and a white or pale appearance in extremities, such as fingers, toes, ear lobes, or the tip of the nose. Hypothermia is a condition brought on when the body temperature drops to less than 95°F. Hypothermia may cause lasting kidney, liver, and pancreas problems or death. Warning signs include uncontrollable shivering, memory loss, disorientation, incoherence, slurred speech, drowsiness, and apparent exhaustion. Infants and elderly people are most susceptible. Fifty percent of all cold-related injuries are expected to occur in people over 60 years old, more than 75 percent will happen to men, and about 20 percent will occur in the home.

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.

Table 38

**EXTREME TEMPERATURE EVENTS IN KENOSHA COUNTY
JANUARY 1994 THROUGH AUGUST 2009**

Date	Time	Type	Deaths	Injuries
January 13, 1994.....	6:00 a.m.	Cold	0	0
June 14, 1994.....	12:00 p.m.	Heat wave	0	0
October 12, 1995.....	2:00 p.m.	Record warmth	0	0
December 9, 1995.....	3:00 a.m.	Extreme cold	0	0
January 30, 1996.....	2:00 a.m.	Extreme wind chill	1	0
January 31, 1996.....	12:00 a.m.	Extreme cold	0	0
February 1, 1996.....	12:00 a.m.	Extreme cold	0	0
January 17, 1997.....	12:00 a.m.	Extreme cold	0	1
March 26, 1998.....	6:00 a.m.	Record warmth	0	0
July 19, 1998.....	11:00 a.m.	Excessive heat	0	10
November 23, 1998.....	12:00 p.m.	Excessive heat	0	0
December 1, 1998.....	12:00 a.m.	Excessive heat	0	0
January 5, 1999.....	12:00 a.m.	Extreme cold	0	0
July 4, 1999.....	3:00 a.m.	Excessive heat	0	0
July 23, 1999.....	2:00 a.m.	Excessive heat	0	0
July 29, 1999.....	8:00 a.m.	Excessive heat	0	0
November 8, 1999.....	12:00 p.m.	Record warmth	0	0
November 13, 1999.....	1:00 p.m.	Record warmth	0	0
January 22, 2000.....	12:00 a.m.	Extreme cold	0	0
July 21, 2001.....	12:00 a.m.	Excessive heat	0	0
July 31, 2001.....	11:00 a.m.	Excessive heat	0	0
August 6, 2001.....	11:00 a.m.	Excessive heat	2	0
April 15, 2002.....	1:00 p.m.	Excessive heat	0	0
June 20, 2002.....	12:00 a.m.	Excessive heat	0	0
June 22, 2002.....	12:00 p.m.	Excessive heat	0	0
June 30, 2002.....	12:00 a.m.	Excessive heat	0	0
July 1, 2002.....	6:00 a.m.	Excessive heat	0	0
July 8, 2002.....	11:00 a.m.	Excessive heat	0	0
July 21, 2002.....	12:00 a.m.	Excessive heat	0	0
July 24, 2005.....	2:00 p.m.	Excessive heat	0	0
December 18, 2005.....	12:00 a.m.	Cold/wind chill	0	0
February 17, 2006.....	6:00 p.m.	Cold/wind chill	0	0
February 18, 2006.....	6:00 p.m.	Cold/wind chill	0	0
July 16, 2006.....	5:00 p.m.	Heat	0	0
July 30, 2006.....	6:00 p.m.	Heat	0	0
August 1, 2006.....	12:00 a.m.	Heat	0	0
February 3, 2007.....	9:00 a.m.	Cold/wind chill	0	0
February 5, 2007.....	3:00 a.m.	Extreme cold/wind chill	0	0
February 5, 2007.....	10:00 a.m.	Cold/wind chill	0	0
January 25, 2008.....	12:00 a.m.	Cold/wind chill	1	0
January 30, 2008.....	2:00 a.m.	Cold/wind chill	0	0
Total	--	--	4	11

Source: National Climatic Data Center.

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 38 lists the extreme and record high and low temperature events that affected Kenosha County during the period January 1994 through August 2009.

Extreme Heat

The most 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.

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 39).

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, through the morning hours of February 18, 2006, in the wake of the winter storm on the previous two days. After daytime maximum readings 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 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

Table 39

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.

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.

The most recent 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 up to 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.

Between January 1994 and August 2009, about \$14,700 in property damages, in 2008 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 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.

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 2.7 extreme temperature 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.

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 Town 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 40. 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.³² The second hazard, flooding from high lake levels, is being considered, along with flooding in other areas of the County. As shown on Maps 27 and 28, there are nine structures identified in the floodplain associated with Lake Michigan. Those floodplain areas are delineated on the

³²SEWRPC Technical Report No. 36, Lake Michigan Shoreline Recession and Bluff Stability in Southeastern Wisconsin: 1995, December 1997.

Table 40**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
Town of Somers	27,636	33.4
Total	82,630	100.0

Source: SEWRPC.

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 August 2009 were about eight inches below normal, but well above the historic record low levels set in 1964 and 1965.

A 1997 report of Lake Michigan shoreline erosion and bluff stability³³ 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 had, on several occasions, caused deaths by drowning of people who were swept in to 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.³⁴ 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

³³SEWRPC Technical Report No. 36, Lake Michigan Shoreline Recession and Bluff Stability in Southeastern Wisconsin: 1995, December 1995.

³⁴Ibid.

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.

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. Because of the zoning procedures that are in place, this situation has not occurred. In fact, because of the procedures set forth in the County zoning ordinance and the actions that have been taken by local units of government and individuals to construct and maintain shoreline protection measures, the current vulnerability to coastal erosion has been decreased, compared to the 1980 conditions. These ongoing mitigation measures are described further in Chapter IV. This phenomenon has been documented in the previous report section that notes a decrease in shoreline erosion over time. The most current Lake Michigan shoreline erosion and bluff stability conditions, as summarized on Map 8 in Chapter II, are likely to remain similar or become less severe over time as ongoing mitigation measures are carried out.

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 8 in Chapter II, hazard areas have been identified within three of the 12 general-purpose local units of government in the County: the City of Kenosha, the Village of Pleasant Prairie, and the Town of Somers. In addition, there is a need for continued surveillance of coastal conditions in those municipalities City of Kenosha, the Village of Pleasant Prairie, and the Town of Somers (see Table 41).

Table 41

**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
Town 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 8 in Chapter II of this report.

Source: SEWRPC.

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 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 a temperature of 32 degrees Fahrenheit or below;
- **Sleet**—Solid grains or pellets of ice formed by the freezing of raindrops or the refreezing of largely melted snowflakes. This ice does not cling to surfaces; 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 35 major winter storm events reported since 1994. All of these storms contained some form of snow, sleet, freezing rain, or slippery road conditions (see Table 42). A heavy snowstorm may cause schools and businesses to close, delay or cancel airline flights, and create treacherous roadway travel conditions.

Table 42

WINTER STORM AND ICE STORM EVENTS IN KENOSHA COUNTY: JANUARY 1994 THROUGH JANUARY 2009

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
February 3, 2008	Far Southeastern Wisconsin	Winter weather	0	0
February 25, 2008	Southern Wisconsin	Winter weather	0	0
January 9, 2009.....	South-central and Southeast Wisconsin	Winter weather	0	0
--	--	Total	0	0

Source: National Climatic Data Center.

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 1982-2008. 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 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.

Vulnerability and Community Impacts Assessment

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 42). 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. Generally, Kenosha County is hit by two winter storm events per year.

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 2.2 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, the average annual number of events is not expected to change.

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

Climatologists define drought as a period of abnormally dry and/or unusually hot weather sufficiently prolonged for the corresponding deficiency of water to cause a "serious hydrologic imbalance." When a serious hydrologic imbalance occurs in Wisconsin, soil moisture reserves, groundwater supplies, lake levels, and stream flows are negatively influenced. Water-dependent industries, including agriculture, public utilities, forestry, and tourism can potentially be affected. Two types of drought are experienced in Wisconsin, including Kenosha County: agricultural and hydrologic. Agricultural drought is a dry period of sufficient length and intensity that markedly reduces crop yields. Hydrologic drought is a dry period of sufficient length and intensity to affect lake and stream levels and the height of the groundwater table. These two types of drought may, but do not necessarily, occur at the same time.

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.

Description of Recent Drought Events

On Thursday, July 25, 2002, Wisconsin officially joined the other 49 states in being classified as having drought-like conditions, according to the National Oceanic and Atmospheric Administration's climate prediction center. Because of the lack of rain, 45 percent of the territory in the country's contiguous states was experiencing a severe or extreme drought. At a national level, this is the largest drought seen since 1934, when 64 percent of the country was affected. In 1987-1988 Wisconsin experienced its most severe drought in recent history, at that time 37 percent of the country was hit by similarly hot and dry conditions. 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, 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. 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.

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 \$262,000³⁵ in indemnities were paid to farmers in the County from Federal crop insurance programs in 2003 for damages related to drought.

³⁵*This loss has been adjusted to 2008 dollars.*

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 \$624,000³⁶ in indemnities were paid to farmers in the County from Federal crop insurance programs in 2005 for damages related to drought.

Vulnerability and Community Impacts Assessment

Kenosha County is vulnerable to agricultural drought as there are about 94,716 acres of farmland comprising 53.2 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 16,068 acres of wetlands (9.0 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.

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.

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.

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

³⁶Ibid.

includes all of the communities in the County, except the City of Kenosha and portions of the Village of Pleasant Prairie and the Town 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 includes 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 9,243 acres, or about 5 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 \$15.0 million (in 2008 dollars) in property damages were reported in the City.

No wildfires or forest fires have been reported by the National Climatic Data Center for Kenosha County from January 1950 through October 2009.

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.

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.³⁷ Hence, the transportation system of Kenosha County 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 9 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 1.24 in the year 2007, with a total of 737 persons being killed in Wisconsin motor vehicle traffic crashes. Of those crashes with fatalities, 23 percent involved alcohol, 13 percent involved speed, and 22 percent involved both alcohol and speed as primary drive contributing factors. Crashes that occurred on County trunk highways and local roads accounted for 57 percent of all crashes within Wisconsin. Among the fatalities in the year 2007, within Wisconsin, 52 pedestrians, 10 bicyclists, and 110 motorcyclists were killed.³⁸

³⁷*SEWRPC Planning Report No. 49, A Regional Transportation System Plan for Southeastern Wisconsin: 2035, June 2006.*

³⁸*Wisconsin Department of Transportation, 2007 Wisconsin Traffic Crash Facts, December 2008.*

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 10 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 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, trespassing incidents, and other incidents. Within the United States from 1994 through 2008 there were approximately 200 collisions, 2,000 derailments, 1,500 train yard accidents, 3,500 railway-crossing incidents, and 900 trespassing incidents per year. These averages hide one important trend: The number of railway-crossing incidents has decreased steadily at an average rate of slightly less than 5 percent per year, from about 5,000 incidents per year in 1994 to about 2,400 incidents per year in 2008. 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.³⁹ The remaining railway crossings are grade-separated overpasses or underpasses. Within the State of Wisconsin from 1994 through 2008, there were an average of 49 train accidents (not including railway-crossing incidents) per year and 102 railway-crossing incidents per year. Among these railway-crossing incidents, there were an average of eight fatalities and 39 injuries per year. In addition, from 1994 to 2008 there was an average of 11 trespasser-related casualties per year in Wisconsin. These averages obscure trends toward fewer railway accidents in the State. Over the period 2002 through 2008, there were an average of 35 train accidents (not including railway-crossing incidents) and 68 railway-crossing incidents per year. Among these railway crossing incidents, there were an average of five fatalities and 22 injuries per year. Over the same period, there was an average of nine trespasser-related casualties per year in Wisconsin.

Description of Recent Transportation Accident Events

Roadways

From 1997 to 2008, there were an average of 3,648 motor vehicle crashes that caused about 23 fatalities per year as reported within Kenosha County and shown in Table 43, based upon data published by the Wisconsin Department of Transportation. Table 43 indicates that the number of accidents and fatalities increased during this 12-year period. The data show that during the period 1997 through 2001, there were an average of 3,521 accidents per year and an average of 21 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. Kenosha County data for the years 1997-2007, provided by the Wisconsin Department of Transportation, further indicated that the total number of fatalities associated with vehicle crashes is greatest during the summer and winter months of May through August and December through February compared to other months of the year. Based upon data from 1999-2007, the average numbers of vehicle crashes involving injuries and associated injuries were lowest during the month of February and highest during the summer months of June through September. During this period the numbers of vehicle crashes involving injuries and associated injuries ranged from lows of 64 crashes and 98 injuries in February 2001 to highs of 168 crashes and 251 injuries in June 2005.

³⁹*U.S. Department of Transportation, National Highway-Rail Crossing Inventory File, April 12, 2009.*

Table 43

**MOTOR VEHICLE-RELATED ACCIDENTS
AND FATALITIES REPORTED IN
KENOSHA COUNTY: 1997-2008**

Year	Automobile Accidents	Fatalities
1997	3,553	22
1998	3,439	18
1999	3,415	14
2000	3,798	22
2001	3,399	28
2002	3,599	20
2003	3,633	24
2004	3,797	26
2005	3,792	25
2006	3,505	25
2007	3,865	20
2008	3,984	29
Average	3,648	23

Source: Wisconsin Department of Transportation, Department of Motor Vehicles, and SEWRPC.

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.

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 2007, 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 29 percent of the traffic-related fatalities and injuries that occurred in 2007. 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 2007 occurred on Saturdays between the hours of 10:00 p.m. to 6:00 a.m., followed by Fridays between the hours of 10:00 p.m. to 6:00 a.m. and 2:00 p.m. to 10:00 p.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.

As Map 34 indicates, during the period of 1996 to 1998, there were several segments on IH 94 that exceeded the Kenosha County freeway system average crash rate of 70.6 crashes per 100 million vehicle-miles.⁴⁰ These segments are primarily located at on and off ramp locations, with the most dangerous freeway segment near the IH 94 interchanges with the STH 50 and CTH S and E intersections.

In 2007, of 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, there were a total of nine deaths and 1,500 injuries, and an estimated economic loss of about \$60 million in total damages (see Table 44). In total, 284 of these accidents were speed-related, 220 were alcohol-related, 64 involved motorcyclists, 60 involved bicycles, and 38 involved pedestrians.

Railways

From 1975 through 2008 there were a total of 65 reported railway accidents reported within Kenosha County. These events are documented in terms of their type of accident and casualties in Table 45, based upon data published by the Federal Railroad Administration. As shown in Table 45, these accidents ranged from zero to seven events per year. In total, these accident events have resulted in one death and 18 injuries within Kenosha County since 1975.

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

⁴⁰SEWRPC Planning Report No. 47, A Regional Freeway Reconstruction System Plan for Southeastern Wisconsin, May 2003.

Table 44

**MOTOR VEHICLE ACCIDENT TYPES, FATALITIES, INJURIES, AND ECONOMIC LOSSES
REPORTED AMONG MUNICIPALITIES WITHIN KENOSHA COUNTY: 2007**

Municipality	Types of Accidents					Losses			
	Bike	Pedestrian	Motorcycle	Alcohol	Speed	Fatalities	Injuries	Property Damage Accidents	Total Estimated Economic Loss ^a
Village of Pleasant Prairie.....	6	2	8	36	107	4	307	250	\$13,985,800
Village of Twin Lakes.....	0	0	2	7	12	1	18	37	2,030,400
City of Kenosha	54	36	54	177	255	4	1,175	1,188	43,683,600
Total	60	38	64	220	284	9	1,500	1,472	\$59,699,800

^aEconomic loss was calculated using 2006 National Safety Council estimates plus 3.0 percent to account for inflation. Cost multipliers used were: Fatality, \$1,249,000; Incapacitating injury, \$64,000; Nonincapacitating injury, \$21,000; Possible injury, \$11,900; and Property damage, \$8,500.

Source: Wisconsin Department of Transportation, Department of Motor Vehicles; and SEWRPC.

Weather conditions can also significantly contribute to the numbers of vehicle-related accidents and associated injuries and deaths as shown in Tables 46 and 47. 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 2007, in terms of fatalities, which were associated with 11 fatalities and 364 injuries (see Table 46). 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 47. However, snow and slush road conditions, combined with snowy weather, are associated with the greatest numbers of vehicle-related accidents within Wisconsin in 2007.

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.

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.

Table 45

RAILWAY ACCIDENTS REPORTED WITHIN KENOSHA COUNTY FROM 1975-2008

Year	Type of Accident						Losses	
	Rail Equipment	Railway Crossing	Human Error	Signal Error	Track Error	Other	Fatalities	Injuries
1975	2	0	2	0	0	1	0	0
1976	1	1	1	0	0	0	0	1
1977	1	0	0	0	0	1	0	0
1978	0	0	1	0	0	1	0	0
1979	1	0	0	0	1	1	0	0
1980	0	0	0	0	0	1	0	0
1981	0	0	1	0	1	0	0	0
1982	0	0	0	0	1	2	0	0
1983	1	0	0	0	2	1	0	1
1984	0	0	0	0	0	0	0	0
1985	0	0	0	0	0	1	0	0
1986	0	0	0	0	1	1	0	0
1987	1	0	0	0	0	2	0	0
1988	0	0	2	0	1	0	0	0
1989	0	0	0	0	1	0	0	0
1990	1	0	0	0	0	0	0	0
1991	0	1	0	0	0	0	0	0
1992	0	0	0	0	0	0	0	0
1993	1	0	0	0	0	0	0	0
1994	0	0	0	0	0	0	0	0
1995	0	0	0	0	1	0	0	0
1996	0	0	1	0	1	0	0	0
1997	0	0	0	0	0	0	0	0
1998	0	0	0	0	0	0	0	0
1999	1	0	0	0	0	0	0	0
2000	0	0	0	0	0	0	0	0
2001	0	0	0	0	1	1	0	0
2002	0	0	0	0	0	2	0	0
2003	0	0	1	0	0	0	0	0
2004	0	7	0	0	0	0	0	5
2005	0	3	1	0	0	0	0	4
2006	0	1	0	0	0	0	1	2
2007	0	3	0	0	1	0	0	5
2008	0	0	0	0	0	0	0	0
Total	10	18	10	0	12	15	1	18

Source: Federal Railroad Administration and SEWRPC.

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.

Map 34

CRASH RATES ON THE FREEWAY SYSTEM IN KENOSHA COUNTY: 1996-1998

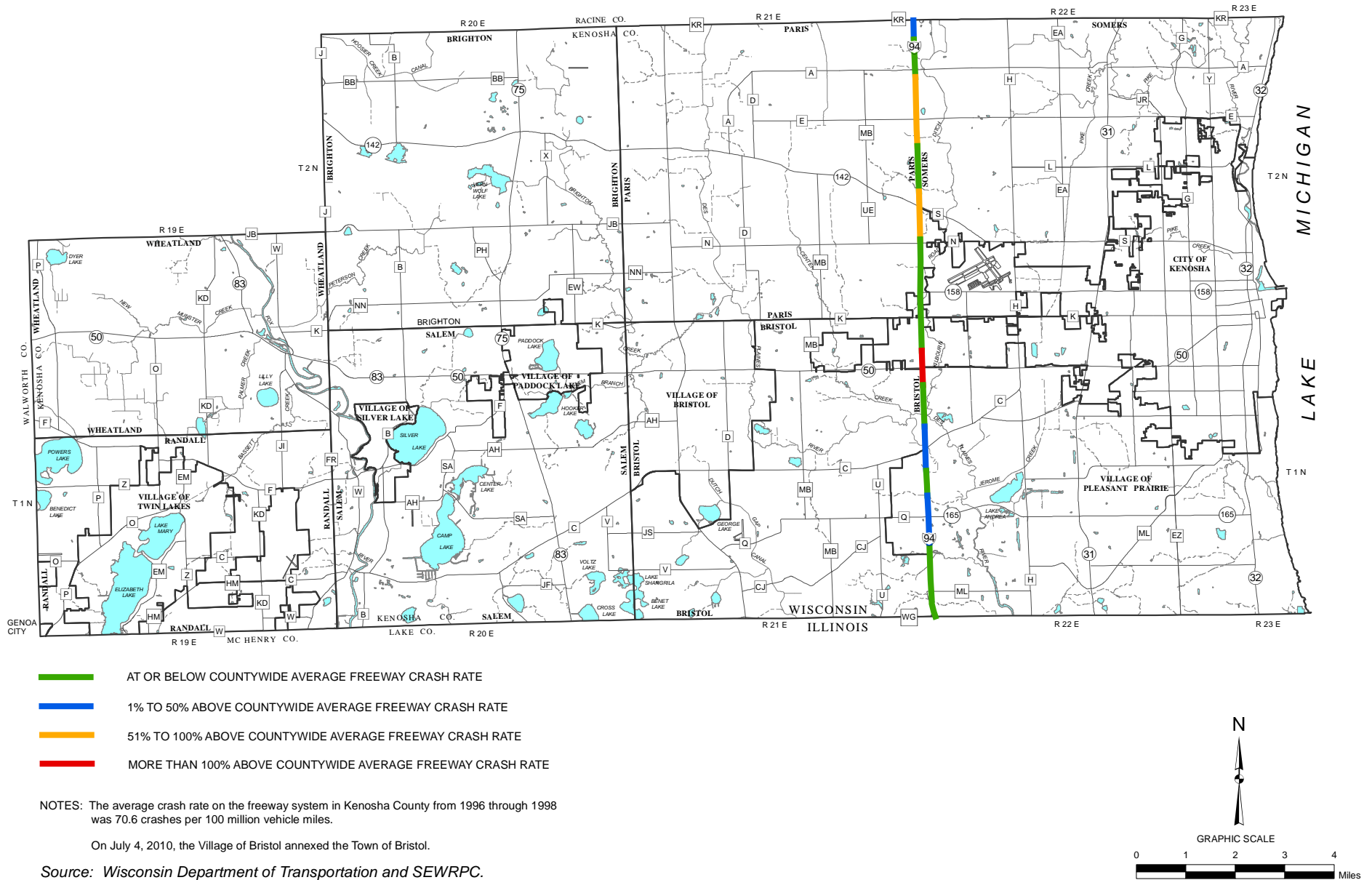


Table 46

**SUMMARY OF ACCIDENT FATALITIES, INJURIES, AND PROPERTY DAMAGES
AMONG WEATHER CONDITIONS REPORTED WITHIN THE STATE OF WISCONSIN: 2007**

Weather Conditions	Fatal Crashes	Injury Crashes	Property Damage Crashes	Total Crashes	Total	
					Fatalities	Injuries
Clear	355	18,970	33,578	52,903	398	26,636
Cloudy	203	11,071	21,592	32,866	238	15,582
Snow.....	33	2,663	9,060	11,756	34	3,729
Rain	33	2,351	4,572	6,956	36	3,346
Blowing Sand/Dirt/Snow	5	247	695	947	5	356
Sleet/Hail	3	229	583	815	3	341
Fog/Smog/Smoke	11	255	503	769	11	364
Severe Crosswinds.....	2	34	68	104	2	56
Other.....	0	4	16	20	0	4
Unknown.....	10	224	17,753	17,987	10	262
Total	655	36,048	88,420	125,123	737	50,676

Source: Wisconsin Department of Transportation Bureau of Transportation Safety and SEWRPC.

Table 47

**TOTAL NUMBER OF ACCIDENTS AMONG WEATHER AND ROAD CONDITIONS
REPORTED WITHIN THE STATE OF WISCONSIN: 2007**

Weather Conditions	Road Conditions							Total
	Dry	Wet	Snow/Slush	Ice	Sand/Mud/Dirt/Oil	Other	Unknown	
Clear	47,002	1,530	2,080	1,094	187	95	915	52,903
Cloudy	22,319	5,209	3,351	1,300	103	40	544	32,866
Snow.....	46	598	9,665	1,296	0	0	151	11,756
Rain	78	6,645	73	51	10	4	94	6,956
Blowing Sand/Dirt/Snow	15	15	580	318	2	1	16	947
Sleet/Hail	4	146	265	383	1	0	16	815
Fog/Smog/Smoke	140	454	30	28	3	1	13	769
Severe Crosswinds.....	34	9	31	29	0	0	1	104
Other.....	5	10	1	1	0	0	2	20
Unknown.....	464	48	162	27	4	4	17,278	17,987
Total	70,208	14,664	16,238	4,527	310	146	19,030	125,123

Source: Wisconsin Department of Transportation Bureau of Transportation Safety and SEWRPC.

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, 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 September 2009, 43 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 2007 fog, smog, or smoke played a role in 769 traffic accidents in the State of Wisconsin, with 11 fatalities and 364 injuries (see Table 46). 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.

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 Task Force members for development of this plan update ranked contamination or loss of water supply as having the 22nd highest perceived risk among 46 possible hazard event types.

As noted in Chapter II, about 17.4 million gallons per day (mgd) of surface water and 3.9 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 48 lists the active public and community private water supply systems in Kenosha County.

Groundwater Quality

Approximately 70 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

Table 48

ACTIVE COMMUNITY WATER SUPPLY SYSTEMS IN KENOSHA COUNTY^a

Water System Name	Population Served	Primary Water Source Type
425 Holy Hill Apartments	50	Groundwater
52nd Avenue Water Group	35	Groundwater
Bella Villa Apartments.....	30	Groundwater
Bristol Heights MHP	45	Groundwater
Town of Bristol Waterworks	598	Groundwater
Carefree Estates MHP	300	Groundwater
Colonial View Apartments	25	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	93,000	Surface water
Knolls Water Cooperative	400	Groundwater
Lake View Apartments	30	Groundwater
Lakecrest Mobile Home Park	88	Groundwater
Lakewood Village Apartments.....	125	Groundwater
Lincoln Crest Apartments.....	32	Groundwater
Meadowview Village Apartments	46	Groundwater
Nippersink Wisconsin Well Service.....	91	Groundwater
Oakdale Estates MHP.....	220	Groundwater
Paddock Lake Waterworks	945	Groundwater
Pleasant Prairie MHP	40	Groundwater
Pleasant Prairie Water Utility	7,462	Purchased surface water
Prairie Apartments 1 & 2.....	150	Groundwater
Prairie Apartments 3 & 4.....	125	Groundwater
Rainbow Lake Manor MHP	350	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
St. Benedicts Abbey.....	58	Groundwater
Tan Oak Apartments.....	325	Groundwater
Twin Lakes Complex.....	50	Groundwater
Twin Lakes Park Water Coop	150	Groundwater
Van Woods Estates	80	Groundwater
Village Plaza Apartments	28	Groundwater
Wheatland Estates.....	450	Groundwater
Whispering Pines Apartments.....	30	Groundwater
- -	107,813	- -

^aThe Timber Ridge Apartments' water system is listed as being considered a private system serving fewer than 25 persons as of November 9, 2009.

Source: U.S. Environmental Protection Agency, Safe Drinking Water Information System, January 20, 2010 and Wisconsin Department of Natural Resources Public Water Supply System Database, January 20, 2010.

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.

Sources of Contamination

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 49.

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; and
- Major facility malfunction or shutdown.

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.

Table 49

**HUMAN ACTIVITIES THAT MAY CREATE GROUNDWATER
QUALITY PROBLEMS IN KENOSHA COUNTY**

Originating on the Land	Originating Below Land Surface
Above-Ground Storage Tanks	Above Water Table
Accidental Spills	Animal waste storage facilities
Agricultural Activities:	Landfills
Animal Feedlots	Leakage:
Fertilizer and Pesticide Storage, Mixing, and Loading	Underground storage tanks
Fertilizer and Pesticide Application	Underground pipelines
Irrigation Return Flow	Sewers
Silage and Crop Residue Piles	Septic tanks
Highway Deicing	Surface wastewater impoundments
Liquid waste Spreading or Spraying (sewage, sludge, septage, whey)	Sumps, dry wells
Stockpiles (chemicals, salt), Dumps	Waste disposal in dry excavations
Infiltration of Contaminated Surface Water or Precipitation	Below Water Table
	Groundwater development:
	Abandoned wells and holes
	Improper well construction
	Overpumping
	Illegal drainage or disposal wells
	Waste disposal in wet excavations

Source: Wisconsin Geological and Natural History Survey and SEWRPC.

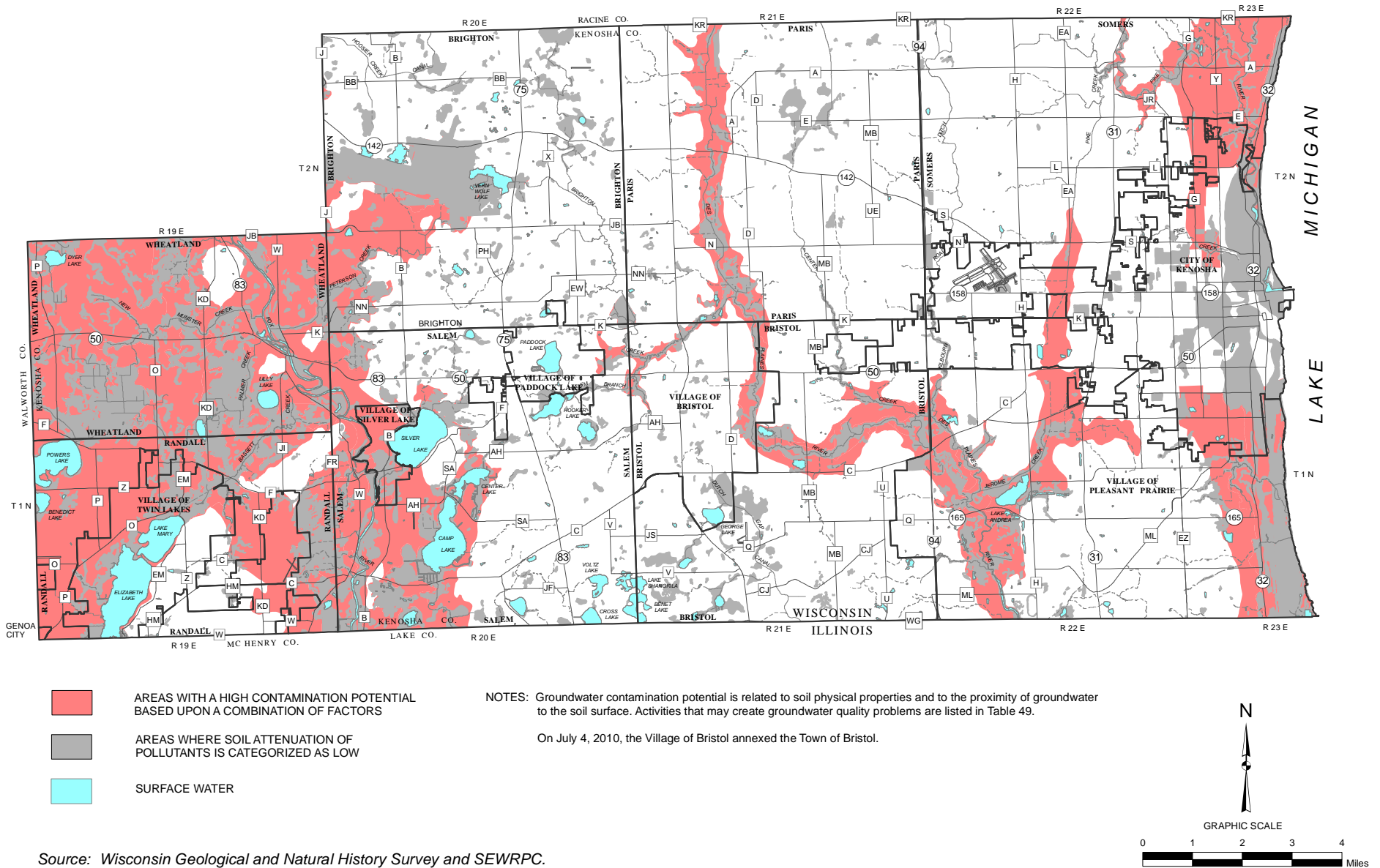
There are several factors that affect the contamination potential of groundwater resources. Many of those factors are related to soil physical properties and to the proximity of groundwater to the soil surface. Some of the soil properties that can affect groundwater quality include permeability of the 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 35). 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.⁴¹

⁴¹D.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.

Map 35

AREAS NATURALLY VULNERABLE TO GROUNDWATER CONTAMINATION IN KENOSHA COUNTY



Source: Wisconsin Geological and Natural History Survey and SEWRPC.

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.

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.⁴² 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 169 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.

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.

⁴²Wisconsin 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.*

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 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 9 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.

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.

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 2,473 transportation-related hazardous material incidents reported over the period 2000 through 2008.⁴³ These resulted in four deaths and 47 injuries. In slightly less than half of these incidents, there was no damage to property. Property damages in those incidents that had damages ranged up to about \$250,000. The total damages reported as resulting from these incidents were about \$2.9 million.

⁴³*U.S. Department of Transportation Pipeline and Hazardous Materials Safety Administration Incident Report Database, accessed on August 19, 2009.*

Table 50

NATURAL GAS DISTRIBUTION ACCIDENTS IN KENOSHA COUNTY: 1984-2008

Date	Municipality	Fatalities	Injuries	Property Damage ^a
February 6, 1985	Village of Twin Lakes	0	0	\$2,001,000
July 20, 1986	City of Kenosha	1	0	137,508
Total	- -	1	0	\$2,138,508

^aDollar values were adjusted to year 2008 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.

Description of Recent Hazardous Materials Incident Events

Between 2007 and 2009, Kenosha County averaged 23 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 2000 through 2008, 10 transportation-related hazardous materials incidents were reported in Kenosha County.⁴⁴ All were relatively minor. These incidents resulted in no deaths or injuries. Property damage was reported for three incidents, with the total damages reported being about \$8,600 in 2008 dollars. All of these incidents were related to roadways.

In contrast, a total of two pipeline incidents were recorded in Kenosha County during a 25-year period between the years 1984 through 2008. These events are documented in terms of their magnitude and impact in Table 50, based upon data published by the Federal Department of Transportation, Office of Pipeline Safety. As shown in Table 50, there has not been an incident since 1986, which demonstrates a very low probability of occurrence within Kenosha County. In total, these pipeline incidences have resulted in one death, no injuries, and \$2.8 million⁴⁵ in property damages within Kenosha County. This data indicates that hazardous material incidents are relatively rare, but can cause considerable property damage and have a relatively low risk in terms of 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.

⁴⁴Ibid.

⁴⁵These damages have been adjusted to 2008 dollars.

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 the unlawful use of force, violence, or biological attack against persons or property to intimidate or coerce a government, the civilian population, or any segment of either, in the furthering of political or social objectives. 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. Several terrorist action possibilities are listed and briefly described below.

Bombing

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.

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.

Chemical/Biological/Nuclear 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 as possible.

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.

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.

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. The National Counterterrorism Center's Worldwide Incidents Tracking System lists no incidents of terrorism having occurred in the State of Wisconsin between 2004 and 2009.⁴⁶ Also, throughout the State of Wisconsin a number of political activist, domestic terrorist and/or organized hate groups may be operating.⁴⁷

Vulnerability, Community Impacts, and Multi-Jurisdictional Assessment

A review of the community assets described in Chapter II indicate the potential for significant terrorism-related hazard impacts to: 1) a variety of residential, commercial, and other developed land uses; 2) roadway transportation system; 3) utilities; 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, such as a county fair.

⁴⁶<http://wits.nctc.gov> accessed January 25, 2010

⁴⁷*Federal Bureau of Investigation, "Terrorism in the United States 1998."*

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.⁴⁸ Hence, this category was also considered to be a significant potential component of and, therefore, incorporated as part of the appropriate 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 this 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

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 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.

Vulnerability and Community Impacts Assessment

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 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.

⁴⁸*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.*

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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 That plan incorporates and updates elements from other pertinent County and Regional Plans as appropriate. In addition, the Town of Randall, and the Villages of Paddock Lake and Twin Lakes have adopted their own comprehensive plans, which will be incorporated into the County 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

¹*SEWRPC Community Assistance Planning Report No. 299, A Multi-Jurisdictional Comprehensive Plan for Kenosha County: 2035, April 2010.*

²*SEWRPC Community Assistance Planning Report No. 131, A Park and Open Space Plan for Kenosha County, November 1987.*

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 floodland 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 floodland management planning. This is accomplished at the watershed level by developing comprehensive watershed plans that include floodland 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 floodland 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.

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 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.

³SEWRPC Planning Report No. 48, A Regional Land Use Plan for Southeastern Wisconsin: 2035, June 2006.

⁴SEWRPC 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.

⁵SEWRPC Planning Report No. 35, A Comprehensive Plan for the Pike River Watershed, June 1983.

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 51 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.

Table 51

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. Floodlands 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 51 (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 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.

OBJECTIVES AND STANDARDS

1. In order to prevent significant property damage and safety hazards, the major components of the stormwater management system and the floodland 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 51 (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 the updated plan, the Kenosha County Hazard Mitigation Task Force 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 Task Force 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 Task Force'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 Task Force 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 floodland and environmentally sensitive lands preservation element, a floodland 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.

Floodland and Environmentally Sensitive Lands Preservation Element

Floodland 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 floodland 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. The significant portion of the environmentally sensitive lands within the County, including wetlands, woodlands, and floodlands, are under protective ownership and/or zoning.

Floodplain Zoning and Wetland Preservation Zoning

As summarized in Table 18 in Chapter II of this report, floodland management regulations include the floodplain district zoning ordinances and shoreland or shoreland wetland zoning ordinances. The floodplain zoning ordinances are intended to preserve the floodwater conveyance and storage capacity of floodplain areas to prevent the location of new 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 ongoing or has been or is carried out by the local units of government in the County. In Kenosha County, in 1995, there were 21 major park and open space sites, encompassing 8,230 acres. Of these park and open space sites, eight were owned and maintained by the County, 11 were owned and maintained by the Wisconsin Department of Natural Resources, and one was owned and maintained by the Village of Pleasant Prairie. The 1987 County park and open space plan,¹ amended in 1999,² provides for the preservation of environmental

¹SEWRPC Community Assistance Planning Report No. 131, A Park and Open Space Plan for Kenosha County, November 1987.

²SEWRPC Amendment to A Park and Open Space Plan for Kenosha County, October 1999.

corridors and isolated natural resource areas. That plan is summarized on Map 36. The current status of ownership of park and open space sites by the County and State is shown on Map 37. 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.

Floodland 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 38 and 39. It should be noted that, as reported in Chapter III, as of November 2009 there are 22 structures considered by the Federal Emergency Management Agency (FEMA) to be repetitive- or substantial-loss properties in Kenosha County.

Floodland 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.³ 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 insofar as possible 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.⁴ 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 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

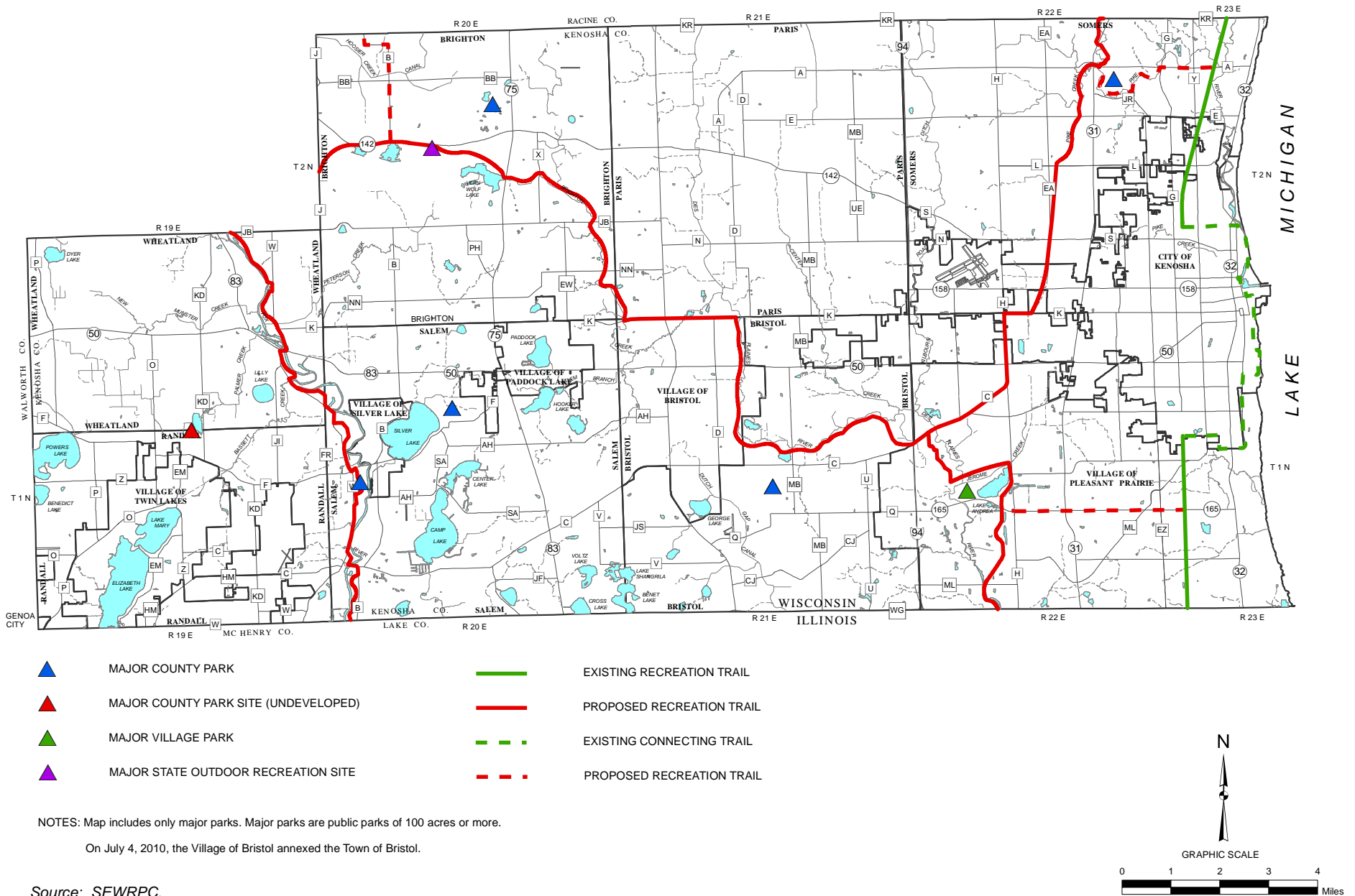
In 2009, the Village of Twin Lakes completed a hydraulic evaluation to establish Elizabeth Lake levels and to explore spillway changes to discharge more flow at higher lake elevations. Spillway modification design work is currently taking place and construction may occur in 2010 at an estimated cost of \$100,000.

³*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.*

⁴*U.S. Army Corps of Engineers, Stage 2 Documentation Report, Fox River, Illinois-Wisconsin Flood Control, November 1987. U.S. Army Corps of Engineers, Final Feasibility Study for Fox River and Tributaries, Illinois and Wisconsin, August 1984.*

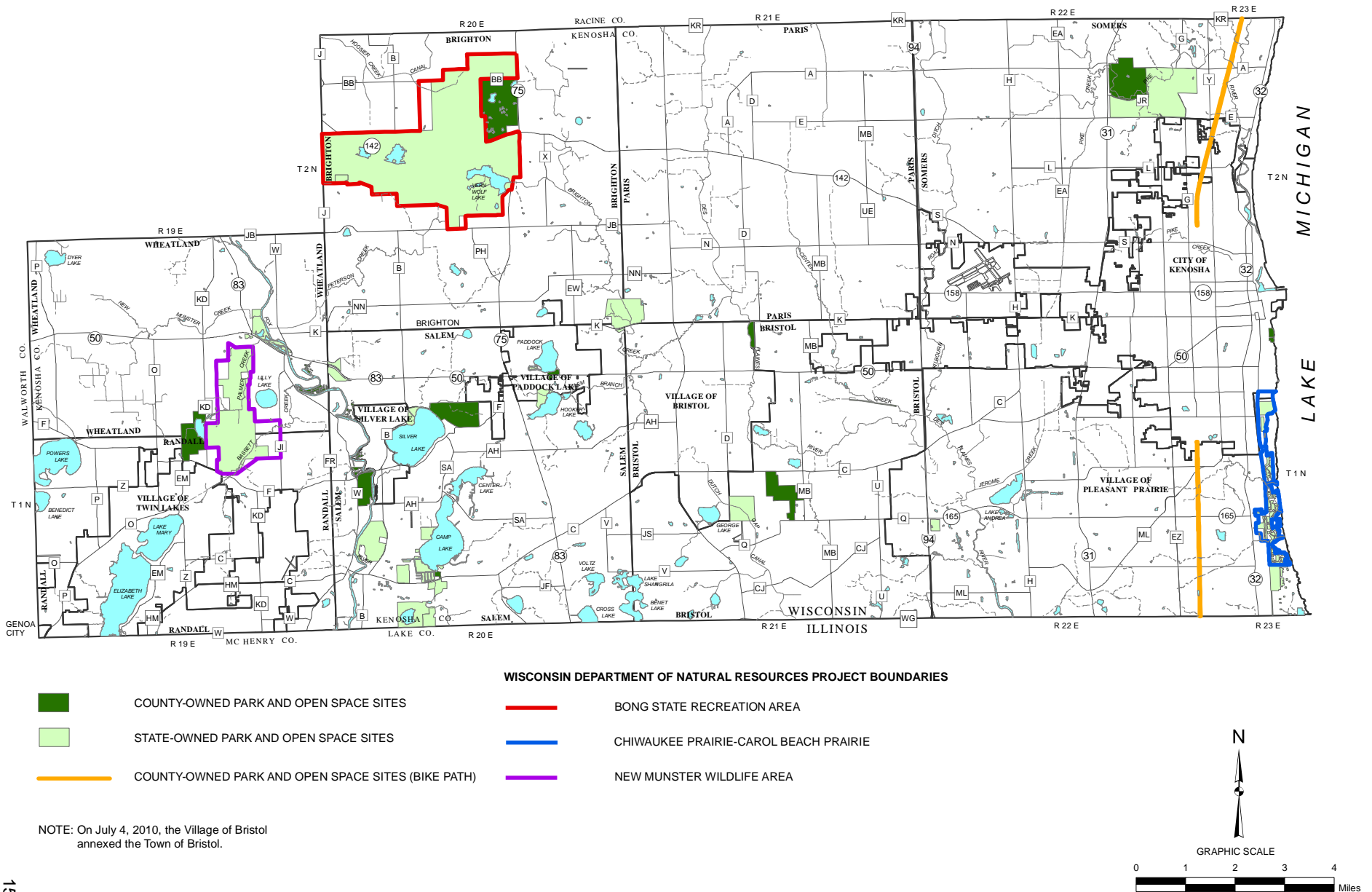
Map 36

OUTDOOR RECREATION ELEMENT OF THE KENOSHA COUNTY PARK AND OPEN SPACE PLAN: 1999



Map 37

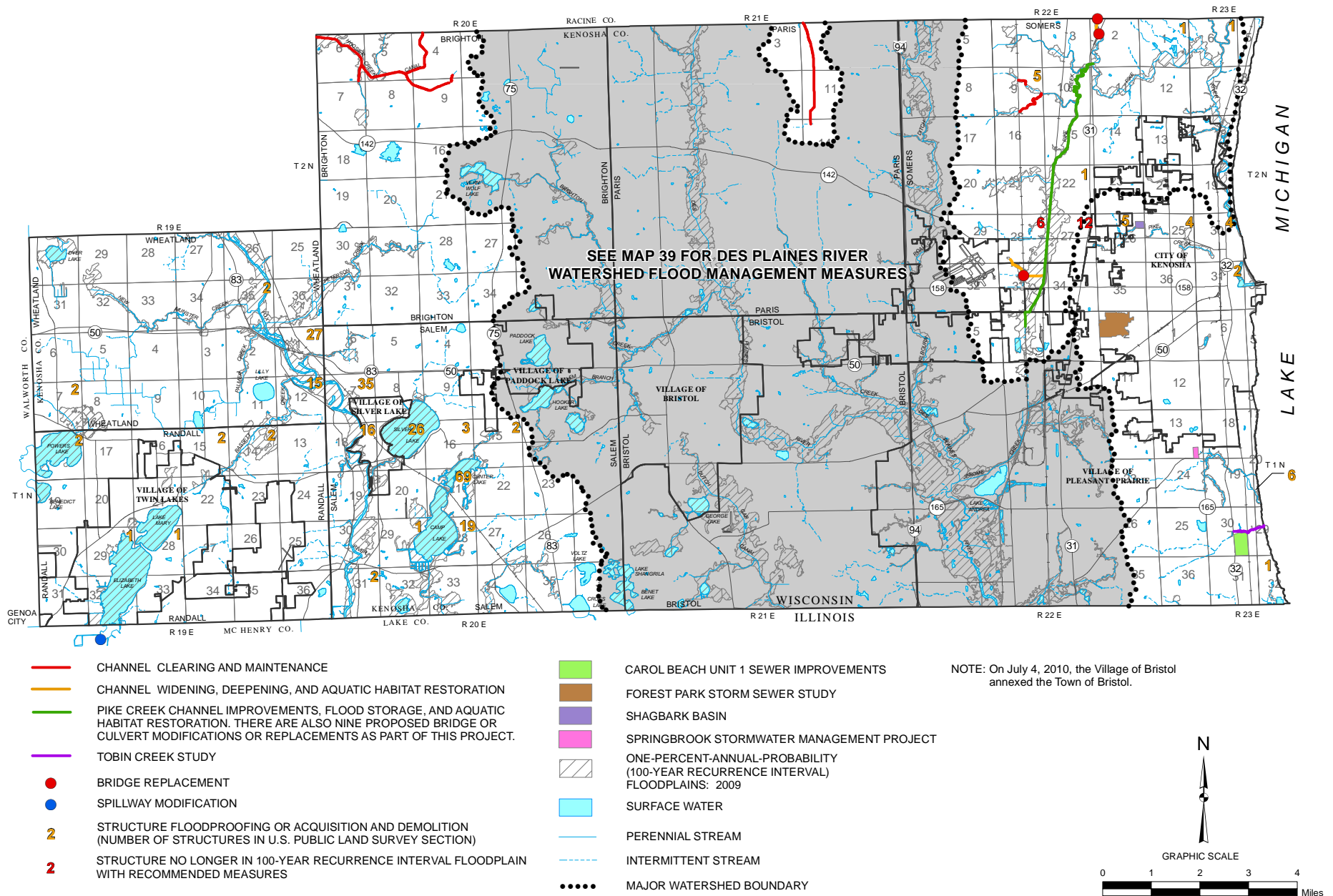
KENOSHA COUNTY AND WISCONSIN DEPARTMENT OF NATURAL RESOURCES PARK AND OPEN SPACE SITES: 2006



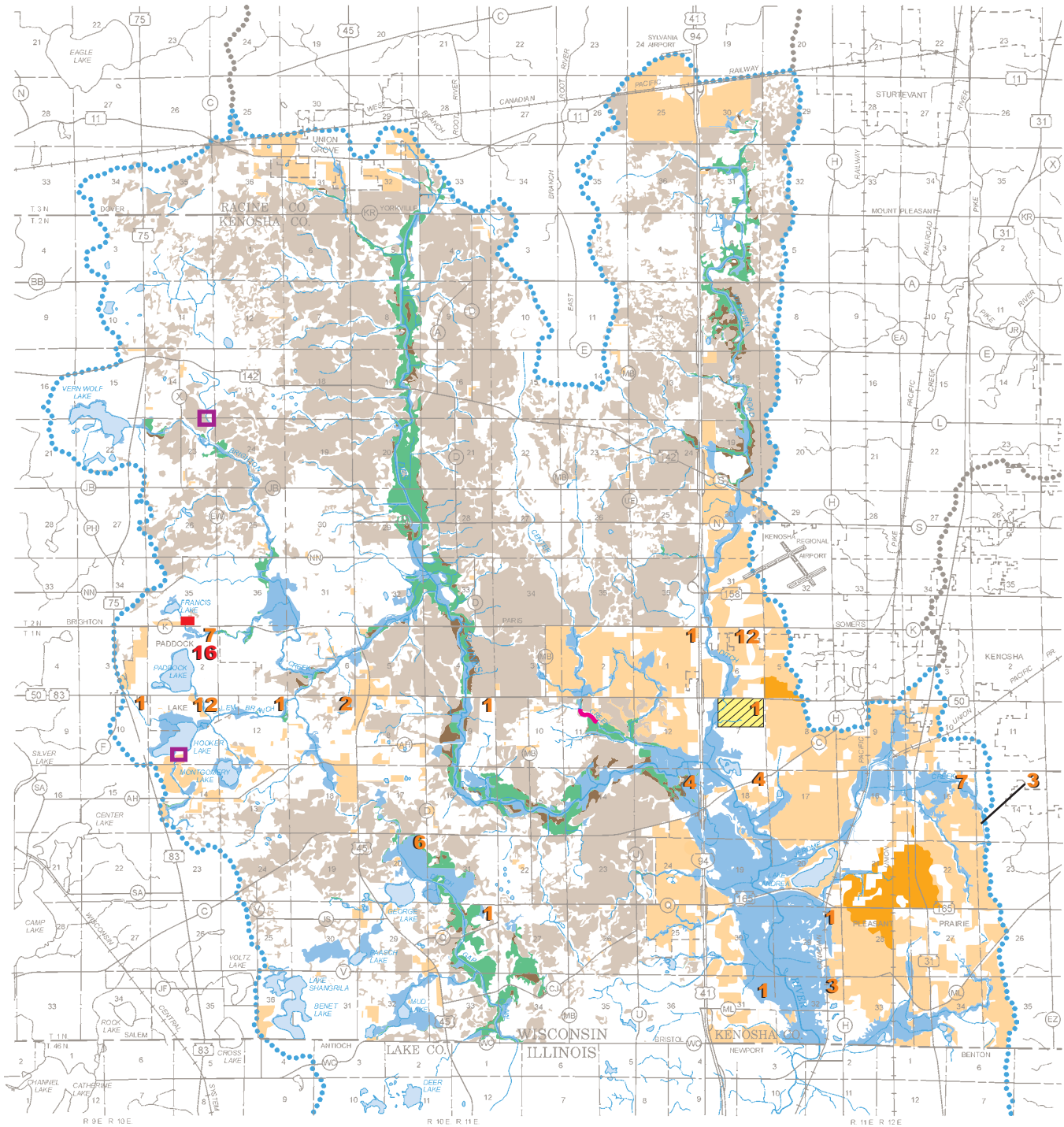
Source: Wisconsin Department of Natural Resources, Kenosha County, and SEWRPC.

Map 38

RECOMMENDED FLOODLAND MANAGEMENT MEASURES FOR THE KENOSHA COUNTY HAZARD MITIGATION PLAN: 2010

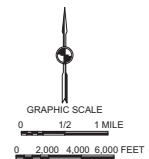


RECOMMENDED FLOODLAND AND STORMWATER MANAGEMENT MEASURES AND RECENTLY-COMPLETED PROJECTS FOR THE DES PLAINES RIVER WATERSHED



- 100-YEAR RECURRENCE INTERVAL FLOODLANDS—PLANNED LAND USE AND EXISTING CHANNEL CONDITIONS
- POTENTIAL WETLAND RESTORATION AREAS LOCATED WITHIN THE 100-YEAR RECURRENCE INTERVAL FLOODPLAIN
- POTENTIAL PRAIRIE RESTORATION AREAS LOCATED OUTSIDE THE 100-YEAR RECURRENCE INTERVAL FLOODPLAIN
- POTENTIAL PRAIRIE RESTORATION AREAS LOCATED WITHIN THE 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
- CULVERT REPLACEMENTS
- DETENTION FACILITY
- STRUCTURE FLOODPROOFING OR ACQUISITION AND DEMOLITION (NUMBER OF STRUCTURES IN U.S. PUBLIC LAND SURVEY SECTION)
- STRUCTURE NO LONGER IN 100-YEAR RECURRENCE INTERVAL FLOODPLAIN WITH RECOMMENDED MEASURES



The recommended floodland 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.

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 charges will first appear on December 2009 tax bills.

In 2009, FEMA completed a Loss Avoidance Study for the flooded building along the Fox River in Kenosha County that have been acquired and demolished.⁵ 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 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 (see Appendix A for committee member list). The measures were then adapted for use in the current hazard mitigation planning program. As shown on Map 38, 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 227 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 December 28, 2009, a total of 86 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 22 structures still considered by FEMA to be a repetitive- or substantial-loss property in Kenosha County. All 22 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.

⁵*Federal Emergency Management Agency, Loss Avoidance Study, Wisconsin, Property Acquisition and Structure Demolition, September 2009.*

Table 52

**PRINCIPAL FEATURE AND COST OF THE RECOMMENDED FLOODLAND
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 227 structures ^b	\$28,670.1	--	Partially implemented and ongoing ^c
2. Elizabeth Lake	Spillway modifications	100.0	--	Design work in progress
3. Hoosier Creek and tributaries	Brush clearing	250.0	--	First assessment December 2009
	Total	\$29,020.1	--	--

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 2008 dollars.

^bNumber of structures as of December 28, 2009.

^cStructure removal to be carried out at discretion of property owners.

Source: SEWRPC.

As shown in Table 52, the estimated capital cost of implementing the Fox River watershed floodland management plan element would be \$29.0 million (in 2008 dollars). Table 52 also shows the current implementation status of the plan element.

Floodland Management Plan for the Root River Watershed

In 1966, SEWRPC adopted a comprehensive plan for the Root River watershed.⁶ 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 insofar as possible 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.

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 38, 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:

⁶SEWRPC Planning Report No. 9, *A Comprehensive Plan for the Root River Watershed*, July 1966.

Table 53

**PRINCIPAL FEATURE AND COST OF THE RECOMMENDED FLOODLAND
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	\$51.4	\$1.6	Not 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 2008 dollars.

Source: SEWRPC.

- Channel clearing and maintenance on the East Branch of the Root River Canal. The Kenosha County portion of the plan proposes channel debris clearing 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.

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 53, the estimated capital cost of implementing the Root River watershed portion of the Kenosha County floodland management plan element would be \$51,400. Table 53 also shows the current implementation status of the plan element.

Floodland Management Plan for the Pike River Watershed

In 1983, SEWRPC adopted a comprehensive plan for the physical development of the Pike River watershed.⁷ That plan was further amended as it relates to Kenosha County in 1987⁸ and 1996.⁹ 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 insofar as possible 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.

⁷SEWRPC Planning Report No. 35, *A Comprehensive Plan for the Pike River Watershed*, June 1983.

⁸SEWRPC Amendment to the Pike River Watershed Plan, City of Kenosha/Town of Somers, June 1987.

⁹SEWRPC Amendment to the Pike River Watershed Plan, Kenosha and Racine Counties, March 1996.

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 combinations of structural and nonstructural management measures were evaluated for each of the most floodprone reaches in the watershed.

Recent Local Actions

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 was working on clearing 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 38, 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 54, the estimated capital cost of implementing the Pike River watershed portion of the Kenosha County floodland management plan element would be \$16.4 million. Table 54 also shows the current implementation status of each plan element.

Floodland 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.¹⁰ 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 insofar as possible 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 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. The homes, which were identified as being flood-prone under the Des Plaines River watershed study, are scattered along a two-block area south of Highway K between 239th and 235th Avenues. Federal grants will cover approximately 87.5 percent of the costs, with the Village paying the remaining 12.5 percent. The approximate cost to purchase, demolish and relocate is \$160,000 per residential structure.

¹⁰SEWRPC Planning Report No. 44, A Comprehensive Plan for the Des Plaines River Watershed, June 2003.

Table 54

**PRINCIPAL FEATURES AND COSTS OF THE RECOMMENDED FLOODLAND
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	\$ 135.3	\$ 0.6	Not implemented ^c
2. Upper Pike River	Bridge replacements, STH 31 and CTH KR	966.5	- -	Not implemented
3. Upper Pike River	Aquatic habitat restoration, CTH KR to river mile 10.80 ^b	70.9	- -	Not implemented
4. Pike River Watershed – Kenosha County	Remove eight structures ^d	1,010.4	- -	Not implemented ^e
5. Pike Creek	Channel Improvements, floodwater detention storage, bridge replacements, and aquatic habitat restoration.	12,136.5	20.3	Not implemented
6. Airport Branch and Tributary to Airport Branch	Channel improvements, bridge replacement, aquatic habitat restoration	2,016.8	1.6	Not implemented
7. Somers Branch and tributary	Channel cleaning	17.0	- -	Implemented
8. Pike River – Town of Somers	2005 and 2008 flood mitigation repair work	25.4	- -	FEMA grant received
	Total	\$16,378.8	\$22.5	- -

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 2008 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 2005.

^eStructure removal to be carried out at discretion of property owners.

Source: SEWRPC.

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 secure funding to replace the deteriorated high flow relief pipes at this same location. The existing pipe is a 64-inch corrugated steel pipe that the Town plans to replace with a plastic pipe.

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 \$1.05 million. 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 \$16,000. 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 39, 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 44 residential, commercial, and agricultural structures.
 - Elevation of four 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.

- Unnamed Tributary No. 1 to Hooker Lake.
- Replacement of the culvert under 83rd Street. As indicated above, this culvert was replaced in 2006.

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 Paddock Lake and Pleasant Prairie, and the urban areas of the Towns of Bristol, 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 Towns of Bristol and 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.¹¹
- 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.
- 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.

¹¹*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. As of June 2010, FEMA was in the process of developing updated digital flood information rate maps based on the floodplain delineations and flood profiles developed under the Des Plaines River watershed study.*

- Providing property owners with information regarding the extent of flood hazard areas.
- Publicizing the watershed study through news media and a public hearing.
- 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.

As shown in Table 55, the estimated capital cost of implementing the Des Plaines River watershed floodland management plan element would be \$84.7 million. That amount represents the cost of implementing measures in both Racine and Kenosha Counties.

Floodland 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 Town of Somers, immediately adjacent to the Lake. There are three sub-basins 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 micro-topography, dominated by a ridge-and-swale wetland-prairie complex that offers habitat for several rare and endangered plant and animal species. A 1985 plan¹² 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.

¹²SEWRPC *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.*

Table 55

**PRINCIPAL FEATURES AND COSTS OF THE RECOMMENDED FLOODLAND
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	\$49,515.8 ^b	\$473.9	Ongoing
b. Restore Prairie Conditions on 6.0 Square Miles of Agricultural Land	Prairie Restoration ^c	19,560.7	25.2 to 1,778.8 ^d	Second level planning in progress
c. Restore Wetland Conditions on 3.1 Square Miles of Agricultural Land in the 100-Year Floodplain	Wetland Restoration ^c	8,655.3	13.3 to 916.0	Second level planning in progress
d. Land Rental Cost for Restored Wetlands and Prairies	- -	- -	849.6	Planning in progress
e. Floodproof 44 Residential, Commercial, and Agricultural Structures	Floodproofing	856.2		Not implemented
f. Elevate Four Residential Structures	Elevation	385.0		Not implemented
g. Acquire and demolish 13 Houses and Agricultural Structures ^e	- -	1,807.8		Second level planning in progress
h. Upper Des Plaines River Sediment Monitoring	Stream flow and water quality gage	19.9		Not implemented
	Stream channel cross-sections	53.1 ^f		Not implemented
	Subtotal	\$80,687.9	\$1,362.0 to \$4,018.0 ^d	- -
Brighton Creek				
a. Replace the 18th Street Crossing	- -	\$ 87.0		Implemented
Center Creek				
a. Riprap Work on 700 Feet of Channel	- -	\$ 16.0		Implemented
Unnamed Tributary to Des Plaines River				
a. Chateau Eau Plaines Stormwater Pond	- -	\$ 1,500.0		Village of Pleasant Prairie submitted CDBG in 2009, but funds were not received
Unnamed Tributary No. 6 to Brighton Creek				
a. Provide a Centralized Detention Storage Facility North of CTH K	- -	\$ 788.5		Not implemented
b. Improve Storm Sewer	- -	463.3		Not implemented
c. Acquire and Demolish Seven Houses	- -	1,120.0		Village of Paddock Lake has applied for Federal grants
	Subtotal	\$ 2,371.8	\$8.0	- -
Unnamed Tributary No. 1 to Hooker Lake				
a. Replace Existing Culvert under 83rd Street	- -	\$ 50.0	\$0.1	Implemented
	Total	\$84,712.7	\$1,370.1 to \$4,026.1 ^g	- -

NOTE: The principal features identified are the recommended alternatives from SEWRPC Planning Report No. 44, *A Comprehensive Plan for the Des Plaines River Watershed*, June 2003.

Footnotes to Table 55

^aAmounts are shown in 2008 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 2005.

^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.

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 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 38, 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. 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.
- Continued implementation of the land acquisition recommendation for the Chiwaukee Prairie-Carol Beach area identified in SEWRPC Community Assistance Planning Report No. 88.

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.

Table 56

**PRINCIPAL FEATURE AND COST OF THE FLOODLAND MANAGEMENT
ELEMENT FOR THE LAKE MICHIGAN DIRECT DRAINAGE WATERSHED**

Component Location	Capital Cost		Annual Operation and Maintenance Cost (thousands of dollars)	Implementation Status
	Description	Cost (thousands of dollars)		
1. Pike Creek–Town of Somers and City of Kenosha	Remove 13 structures ^a	\$1,641.9 ^b	--	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	\$5,962.4 ^b	\$150.2	Essentially Complete
3. Tobin Creek	Study to review flows and slope stabilization needs	\$ 117.0	--	GLRI funding not received
4. Stormwater Projects	Storm sewer study for Forest Park area	\$ 125.4	--	Public involvement and scope development started in 2009
	Shagbark Basin	518.0	--	Completed in 2009
	Spring Brook Innovation Center stormwater management project	725.0	--	CDBG received 2010
	Elevation of one residence in Village of Pleasant Prairie	69.0	--	CDBG received 2010
	Carol Beach Unit 1 sewer system improvements	790.0	--	Village of Pleasant Prairie submitted CDBG in 2009, but funds not received
	Total	\$9,948.7	\$150.2	--

^aNumber of structures as of April 2005.

^bAmount shown is in 2008 dollars.

^cStructure removal to be carried out at discretion of property owners.

Source: SEWRPC.

- 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 56, the estimated cost of implementing the Lake Michigan Direct Drainage watershed floodland management element would be \$9.9 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 Paddock Lake, Pleasant Prairie, Silver Lake and Twin Lakes, and the Towns of Bristol, Salem, and Somers. 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.¹³

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 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 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 \$6.2 million dollars for 2010-2020.

¹³Within 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.

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 and is scheduled to be completed in spring 2010 at a cost of \$125,400 to the City's stormwater utility.

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. The third project is for sewer system improvements in Carol Beach Unit 1 at a cost of \$790,000. 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 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 Paddock Lake, Pleasant Prairie, Silver Lake and Twin Lakes, and the Towns of Bristol, 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 sub-element 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 sub-element involves preparation and distribution of educational and self-help materials and provision of educational programs. With regard to this sub-element, 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. Appendix F shows an example of a self-help guide for local property owners that was prepared for one community.

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.

This involvement may be accomplished, in part, through the participation of Citizen Corps. Citizen Corps was created to help coordinate volunteer activities that will make communities safer, stronger, and better prepared for people to respond to any emergency situation. Citizen Corps is coordinated nationally by FEMA, in conjunction and cooperation with other Federal entities, State and local governments, first responders and emergency managers, and the volunteer community. Citizen Corps activities include:

- Educating residents about disaster preparedness;
- Implementing public education and outreach efforts;
- Providing training to improve citizen preparedness, prevention, and response capabilities;
- Promoting the importance of drills in the home, workplace, and school;
- Coordinating citizen participation in community disaster response activities; and
- Coordinating volunteer opportunities that support local efforts in mitigation, preparedness, response, and recovery.

The activities of Citizen Corps are coordinated through local Citizen Corps councils. In March 2006, the Kenosha and Racine Citizen Corps officially joined to become one council.

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 Paddock Lake, 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).¹⁴ 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

¹⁴*Upon issuance by FEMA of updated digital flood insurance rate maps, the Village of Paddock Lake will also participate in the NFIP.*

Table 57

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	12/05/1996	09/02/1982
Villages						
Bristol ^a	Yes	--	--	--	--	--
Paddock Lake	Yes	No ^b	None ^b	None ^b	None ^b	None ^b
Pleasant Prairie	Yes	Yes	--	12/05/1996	12/05/1996	04/03/1998
Silver Lake	Yes	Yes	12/28/1973	09/01/1978	09/01/1978	09/01/1978
Twin Lakes	Yes	Yes	06/07/1974	06/01/1982	06/01/1982	06/01/1982
Towns						
Brighton	Yes	Yes	04/16/1976 ^c	02/17/1982 ^c	12/05/1996 ^c	02/17/1982 ^c
Bristol ^a	Yes	Yes	04/16/1976 ^c	02/17/1982 ^c	12/05/1996 ^c	02/17/1982 ^c
Paris	Yes	Yes	04/16/1976 ^c	02/17/1982 ^c	12/05/1996 ^c	02/17/1982 ^c
Randall	Yes	Yes	04/16/1976 ^c	02/17/1982 ^c	12/05/1996 ^c	02/17/1982 ^c
Salem	Yes	Yes	04/16/1976 ^c	02/17/1982 ^c	12/05/1996 ^c	02/17/1982 ^c
Somers	Yes	Yes	04/16/1976 ^c	02/17/1982 ^c	12/05/1996 ^c	02/17/1982 ^c
Wheatland	Yes	Yes	04/16/1976 ^c	02/17/1982 ^c	12/05/1996 ^c	02/17/1982 ^c
County Kenosha County	Yes	Yes	04/16/1976	02/17/1982	12/05/1996	02/17/1982

^aOn December 1, 2009, a portion of the Town of Bristol incorporated as the Village of Bristol. On July 4, 2010 the Village of Bristol annexed the Town of Bristol.

^bThe Village intends to initiate participation in the NFIP when updated digital flood insurance rate maps are issued.

^cIn Wisconsin, towns are covered under county eligibility in the National Flood Insurance Program.

Source: Federal Emergency Management Agency.

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. 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 57.

FEMA has completed a preliminary 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. An open house was held to review the Preliminary FIS and DFIRM on September 19, 2007. Participants in the Open House included community government officials and the public. It is anticipated that the Kenosha County FIS and DFIRM will become effective near the end of 2010.

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 Regulation and Licensing, Bureau of Direct Licensing and Real Estate.

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 100-Year 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 will be reflected on the FEMA DFIRMs that are being 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. Thus, this plan calls for Kenosha County or the appropriate municipality to survey the adjacent low-grade elevations adjacent to buildings and the first-floor elevations of buildings that have been identified as remaining in or near the 100-year 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 67 LOMC have been submitted for Kenosha County properties from 1997 to 2009. 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, 57 properties have effective LOMA. Another nine 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 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

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. However, Kenosha County averages only 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.

Thunderstorms and High Wind

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. Through review by the Kenosha County Hazard Mitigation Plan Task Force, the following measures to reduce vulnerability to high winds have been identified as viable for this update of 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 encourage provision of safe rooms, especially in structures that do not have a basement. Building code provisions considered may include requirements, such as construction methods that employ cross-bracing, anchoring of walls to foundation, and anchoring roof rafters to walls (also mitigates tornado risk) and measures to provide wind protection and retrofits for vulnerable features, such as windows, garage doors, patio doors, double-wide entry doors, siding, and bracing for walls and rafters (also mitigates tornado risk). Additional building code provisions may include requirements related to using tie-downs and proper anchoring of mobile and manufactured homes and anchoring of attachments, such as carports and porches, to mobile and manufactured homes.

Structural

- Establish, update, and/or monitor public early warning systems and networks;
- 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;
- Promote saferooms;
- Bury and protect power and utility lines; 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;
- 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.

Hailstorms

Hailstorms tend to occur in conjunction with severe thunderstorms. A severe thunderstorm weather advisory or advance warning system may indicate that large or damaging hail is imminent. During a hail storm personal safety is the first priority and persons should seek shelter and stop driving to avoid any accidents. The aforementioned advance warning systems allows some actions to reduce hail damage to vehicles and some property, but little can be done to protect structures or crops in the field. Through review by the Kenosha County Hazard Mitigation Plan Task Force, the following measures to reduce vulnerability to hail are identified as viable for this update of the County hazard mitigation plan.

Nonstructural

- Review local building codes to determine if revisions are needed to increase requirements for hail-impact-resistant roofing and other materials.

Public Informational and Educational Programming

- Increase public education and awareness of the potential severity of hailstorms.

Lightning

All of Kenosha County is at risk from lightning and 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 Task Force, the following measures to reduce vulnerability to lightning are identified as viable for this update of the County hazard mitigation plan.

Nonstructural

- Enforce existing local ordinances, in terms of adequate grounding of newly constructed buildings; and
- Local fire suppression departments should obtain and maintain equipment to help detect or mitigate lightning-related fires, such as thermal imaging devices.

Structural

- 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

- Promote public awareness of proven lightning safety guidelines to reduce the risk of lightning hazards;
- Support public information regarding lightning hazards and cost effective mitigation measures;
- Help produce and distribute educational materials on lightning safety to the public;

- Encourage residents to develop a Family Emergency Preparedness Plan and to use proper fire alarm systems; and
- Encourage the expansion of the availability of the NOAA All Hazard Weather Radio severe weather alert systems.

Current Programs

Federal and State Programs

The National Weather Service issues severe thunderstorm watches and warnings when there is a threat of severe weather conditions, including high winds, hail, lightning, and tornadoes. 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. The Wisconsin Division of Emergency Management, 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. 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 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.

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, two within the Village of Twin Lakes, one within each of the Villages of Paddock Lake and Silver Lake, two within the Village of Bristol, two within the Town of Bristol, three within each of the Towns of Salem and Somers, and one within each of the Towns of Brighton, Paris, Randall, and Wheatland.

Evaluation of Alternatives and Identification of Mitigation Actions

Based upon review of the above by the Kenosha County Hazard Mitigation Plan Task Force 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 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.

In addition, feasible, nonstructural and structural mitigation actions include ordinance review and possible refinement, which may be applicable at the town, city, or village levels to encourage use of appropriate building codes; 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 Task Force 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. 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. Citizen Corps may be able to provide assistance in these educational efforts;
- Review and enforce building code ordinance requirements; and
- Continue coordination of emergency operations and response 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 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 Plan Task Force 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 five 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 Plan Task Force, the following measures to reduce vulnerability to tornadoes 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 ability of structures to withstand greater wind velocities and encourage provision of safe rooms, especially in structures that do not have a basement. Building code provisions considered may include requirements, such as construction methods that employ cross-bracing, anchoring of walls to foundation, and anchoring roof rafters to walls, and measures to provide wind protection and retrofits for vulnerable features, such as windows, garage doors, patio doors, double-wide entry doors, siding, and bracing for walls and rafters;
- Conduct of an inventory and inspection of facilities to ensure the quality, quantity, and accessibility of adequate tornado shelters;
- Ensure that mobile and manufactured housing is securely anchored; and
- Establish safe and appropriate locations for temporary debris deposal sites.

Structural

- Establish, update, and/or monitor public early warning systems and networks;
- 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;
- 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 thunderstorms;
- 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 severe thunderstorm watches and warnings when there is a threat of severe weather conditions, including high winds, hail, lightning, and tornadoes. 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. The National Weather Service also has an extensive public information program to educate people about the dangers of tornadoes and related hazards and assist in preventing related deaths and injuries. The Wisconsin Division of Emergency Management, 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. In addition, numerous other organizations, including the American Red Cross, provide public safety information regarding tornadoes.

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.

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. The frequency assigned to Kenosha and Racine Counties is 162.450 megahertz. In addition, tornado and related hazard warnings from NOAA All Hazard 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 satellites, high definition television, and video dial tones. This system uses the same digital protocols as NOAA All Hazard Weather Radio. Nationally, the National Weather Service generates about 80 percent of EAS activations primarily for short-duration weather warnings and watches.

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 contains 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, two within the Village of Twin Lakes, one within each of the Villages of Paddock Lake and Silver Lake, two within the Village of Bristol, two within the Town of Bristol, three within each of the Towns of Salem and Somers, and one within each of the Towns of Brighton, Paris, Randall, and Wheatland.

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 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. 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.

In addition, feasible, nonstructural and structural mitigation actions include ordinance review and possible refinement, which may be applicable at the town, city, or village levels to encourage use of appropriate building codes; 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 Task Force (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;
- 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;
- 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. Citizen Corps may be able to provide assistance in these educational efforts;

- Review and 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 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

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.

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 Plan Task Force, 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; and
- Increase coverage and use of NOAA All Hazard Weather Radio and EAS broadcasts.

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 National Weather Service issues advisory statements to media, emergency management, and public health officials in advance of and during conditions of excessive heat. 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.

The Wisconsin Division of Emergency Management, 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. 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 a number of brochures, booklets, and pamphlets 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. 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 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 Task Force (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;
- Increase coverage and use of NOAA All Hazard Weather Radio and EAS broadcasts; and
- Promote educational and informational programming. Citizen Corps may be able to provide assistance in these educational efforts.

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 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 Plan Task Force 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 Plan Task Force 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. 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).
- Construct and maintain 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.
- Relocate buildings within a high-risk area. (This option can be viable in instances where the building can be moved by conventional methods at a cost equal to, or less than, 30 percent of the value of an equivalent building located on secure ground.)
- Conduct an assessment of the effectiveness of shoreline protection structures in the County.
- 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 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 58, the estimated cost of implementing the Lake Michigan Coastal area floodland management element would be \$1.14 million.

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. FEMA has initiated the public comment period which is scheduled to end June 28, 2010. 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.

Table 58

**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 nine structures ^b	\$1,136.7	- -	Not implemented ^c

^aAmounts shown are in 2008 dollars.

^bNumber of structures as of April 2005.

^cStructure removal to be carried out at discretion of property owners.

Source: SEWRPC.

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 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 Town of Somers have adopted shoreland zoning ordinances that apply to the Lake Michigan shoreland area. 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.

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 Town 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 Task Force (see Appendix A), the following mitigation activities related to Lake Michigan coastal hazards are included as priority mitigation measures in the updated Kenosha County Hazard Mitigation Plan:

- Continue enforcement and review of the County shoreland regulations and policies relating to setbacks for new development 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 proper property owner shoreline and bluff management actions. Citizen Corps may be able to provide assistance in these educational efforts.

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 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 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, unsuspected 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 and snow may be associated with a winter storm. In review by the Kenosha County Hazard Mitigation Plan Task Force, 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. Building code provisions considered may include requirements, such as construction methods that employ cross-bracing, anchoring of walls to foundation, and anchoring roof rafters to walls (also mitigates tornado risk) and measures to provide wind protection and retrofits for vulnerable features, such as windows, garage doors, patio doors, double-wide entry doors, siding, and bracing for walls and rafters.
- Review the energy efficiency and winter readiness of critical facilities and housing in the community.

Structural

- 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;
- 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 Wisconsin Division of Emergency Management, 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 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.

In the event of severe winter weather, the National Weather Service posts winter weather bulletins. These bulletins consist of advisories, watches, and warnings that are issued concerning expected winter weather conditions. Some are used to alert the public of potentially dangerous weather related advisories for events such as snow, winter weather, freezing rain or freezing drizzle, and blowing snow. Others are used to warn the public of more serious weather situations that could pose a threat to life and property: winter storm watch and winter storm, heavy snow, blizzard, ice storm, and sleet warnings. These 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.

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.

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 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 blinding and ice. 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 Task Force (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;
- Increase coverage and use of NOAA All Hazard Weather Radio and EAS broadcasts;
- Promote educational and informational programming. Citizen Corps may be able to provide assistance in these educational efforts;
- Ongoing review and 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 Task Force 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 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 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 provides ample warning for potentially affected areas to take preventative actions. When drought events do occur, they commonly last for extended periods of time (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 94,716 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 Plan Task Force 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

- 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
- Consider 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. 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.unl.edu/dm); 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.

The USDA's Farm Service Agency (FSA) provides information about conservation, commodity programs, crop insurance, and farm loans, along with State and county contacts.

When serious drought conditions occur, an Interagency Drought Task Force, with Federal, State and private sector agencies involved is typically organized. The Task Force brings together the resources and technical expertise of the various agencies, including the University of Wisconsin-Extension, to address all aspects of the drought. Examples of key activities include the operation of a Hay Hotline that matches those in need of hay or feed with potential suppliers from locations throughout the nation and the Farmers Assistance Line operated by the Department of Agriculture. The Assistance Line provides information and referrals for family farmers on a wide variety of legal, financial, employment, and personal health issues. In addition, numerous other organizations provide public safety information, most notably the American Red Cross.

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.

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.

Multi-Jurisdictional Considerations

Droughts 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 Mitigation Task Force (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 multi-agency approaches to 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;
- 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 Task Force 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 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 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 Plan Task Force 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.

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, the NWS will issue a Dense Fog Advisory. 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.

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.

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 Task Force (see Appendix A), the following mitigation activities related to fog events are included as priority mitigation measures in the Kenosha County hazards mitigation plan:

- 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.
- 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 Task Force 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 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

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 1950-2003 there have been no recorded wild or forest fires in the County. Additionally, the Kenosha County Division of Emergency Management reports only seven urban fires to have occurred at Kenosha County businesses during this same time period.

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 Plan Task Force, 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

- Bulldoze downed timber to prevent the spread of wildfire;
- 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.

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 15 in Chapter II). Other 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 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.

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 Mitigation Task Force (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 Task Force 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 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

There are a significant number of injuries, deaths, and property damages primarily associated with roadway transportation systems, compared to railway transportation, as discussed in Chapter III. In addition, motor vehicle-related accidents within Kenosha County are strongly influenced by such factors as road conditions, time of day, weather conditions, traffic conditions, as well as complicated by differences in gender, differences in age, and alcohol usage.

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 Plan Task force 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. All of the measures noted are currently underway through the actions of the Wisconsin Department of Transportation (WisDOT) and County and local law enforcement programs and regulations.

Nonstructural

- Continue to monitor and upgrade the transportation system, when necessary, to reduce accident exposure and provide for increased travel safety and personal security;¹⁵ and
- Continue to promote law enforcement including traffic violations, weight and travel restrictions, and designated truck routes.

¹⁵SEWRPC Planning Report No. 49, A Regional Transportation System Plan for Southeastern Wisconsin: 2035, June 2006.

Structural

- Continue to improve the design, routing, and traffic control at problem roadway areas.

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 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;
- Enforce the law requiring use of seatbelts for adults and children¹⁶ and the use of helmets when riding a motorcycle; and
- Promote awareness of the influence of alcohol usage on driving safety.

Railways

Railway intersections are areas that are significantly more dangerous than other areas among the railway transportation system within Kenosha County. Trains cannot stop quickly. A freight train moving at 55 miles per hour, or an eight-car passenger train moving at 79 miles per hour, can take a mile or more to stop. However, railroad-related accidents have and will continue to occur in a variety of areas such as railroad yards and derailments can happen anywhere within the railroad system. In review by the Kenosha County Hazard Mitigation Plan Task Force 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. Nearly all of these measures are currently being carried out, to some degree, by the State, County, and local units of government and the railroads concerned.

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.

¹⁶Wisconsin Department of Transportation, Wisconsin Strategic Highway Safety Plan: 2006-2008, October 2006; Wisconsin Department of Transportation, Wisconsin Federal Fiscal Year 2009 Highway Safety Performance Plan.

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, 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

The Wisconsin Department of Transportation is currently involved in a variety of long-range transportation planning activities for airport, bicycle, highway, pedestrian, rail, and roadway systems.¹⁷ 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.¹⁸ WisDOT programs and services also include incorporation of a broad range of diverse technologies, known collectively as intelligent transportation 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.

Local Programs

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 and public informational and educational programming systems.

¹⁷For more information about Wisconsin Department of Transportation Programs and Services, see <http://www.dot.wisconsin.gov/> and for specific information on the State Connections 2030 transportation plan see <http://www.dot.wisconsin.gov/projects/state/connections2030.htm>.

¹⁸For general local planning guidance and tools, see <http://www.dot.wisconsin.gov/localgov/>. For projects specific to the southeastern portion of the State of Wisconsin, including Kenosha County, see <http://www.dot.wisconsin.gov/projects/se.htm>.

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 Task Force (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:

- 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 enforce traffic violations, weight and travel restrictions, and designated truck routes;
- Continue to evaluate and refine safety components and consideration of railway and airport 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 Task Force 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 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

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 provides 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 (weeks or months) and likely would impact a specific water source (well, reservoir, utility, etc.). In review by the Kenosha County Hazard Mitigation Plan Task Force 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; and
- Incorporate a groundwater protection element in future land use planning activities.

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; and
- Promote proper location, installation, cleaning, monitoring, and maintenance of septic systems.

Public Informational and Educational Programming

- Encourage residents to develop a Family Emergency Preparedness Plan including the preparation of a Disaster Supply Kit (Appendix G); and
- Train operators and plant personnel in security awareness and reporting protocols.

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.

The Wisconsin Department of Natural Resources oversees three programs relating to groundwater contamination issues:

- The first is overseen by the Department's Bureau for Remediation and Redevelopment (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 881 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.

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.¹⁹

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.

¹⁹*SEWRPC Planning Report No. 52, A Regional Water Supply Plan for Southeastern Wisconsin, in preparation; 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.

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- or contamination-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 Task Force (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. Citizen Corps 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 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; and
- Prepare and implement wellhead protection plans.

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 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 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

- 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 have and utilize hazardous materials and/or are near facilities/transportation routes where hazardous materials are used and/or transported.

Structural

- Promote proper design, construction, maintenance, and inspections of hazardous material storage facilities, pipelines, and other related facilities;
- 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;
- 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.

Current Programs

Federal and State Programs

In accordance with the Emergency Planning and Community Right-to-Know Act (EPCRA) of 1986 and Chapter 166 of the *Wisconsin Statutes*, a Local Emergency Planning Committee (LEPC) has been established in Kenosha County and in other counties in Wisconsin. The Wisconsin Division of Emergency Management 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).

In the State of Wisconsin, there are eight regional emergency response teams that mitigate Level A releases at fixed facilities, as well as transportation incidents. One of these Level A response teams is located in the City of Racine. A Level A release involves the most hazardous types of materials and requires the highest degree of protection for the emergency responder, including both respiratory and skin protection. Level B response capability is a County responsibility. Kenosha County is one of 35 countywide Level B teams designated in Wisconsin. A Level B release requires respiratory protection with minimum skin protection. Wisconsin Division of Emergency Management develops policy and administers the programs that support regional emergency response teams.

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.

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 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.

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.

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 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 Hazardous Materials 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 and enforcement and public informational and educational programming systems. Other potential mitigation actions include expansion of the current household hazardous waste management program.

Multi-Jurisdictional Considerations

Hazardous material incidents could potentially impact all municipalities within the County.

Priority Mitigation Measures

Based upon the foregoing evaluation, consideration of risk (see Appendix H), and review and action by the Kenosha County Hazard Mitigation Task Force (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:

- Promote educational and informational programming related to hazardous material safety, and to individual actions to protect citizens, property, and businesses. Citizen Corps may be able to provide assistance in these educational efforts;
- 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;
- Continue support of training, equipment, planning, and preparedness of first responders; and
- Continue coordination of emergency response plans among governmental units, businesses 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 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 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 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 development of site emergency plans for schools, factories, office buildings, shopping malls, hospitals, government buildings, 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 the Citizen Corps program and encourage citizen involvement in the various components of that program;
- 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.

Structural

- 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;
- Increase coverage and use of NOAA All Hazard Weather Radio, which can provide notification to the community during any period of emergency, including enemy attack;

- 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.

Wisconsin anti-terrorism efforts are coordinated by the Wisconsin Division of Emergency Management 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 the Wisconsin Division of Emergency Management 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, there are a total of 12 fire and rescue departments, 16 hospitals, major clinics, and health departments distributed throughout Kenosha County (see Appendices C and D). Four of the 12 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 fire and rescue 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.

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.

The initial Kenosha County hazard mitigation plan recommended establishing a Citizen Corps program within the County. A Kenosha County Citizen Corps was established. The Kenosha and Racine Citizen Corps officially joined to become one council in March 2006. Members of the Southeast Wisconsin Citizen Corps Council (SEWICC) are equally divided between Kenosha County and Racine County residents and meetings have rotated between the two counties. The mission of the Southeast Wisconsin Citizen Corps Council is to collaborate among community agencies to promote volunteerism and individual preparedness for natural and man-made disasters.

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 Task Force (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:

- 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 the Citizen Corps program and encourage citizen involvement in the various components of that program;
- 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.

Because these measures are intended to be ongoing efforts, the Task Force 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 Task Force in light of the updated hazard conditions and hazard mitigation goals documented in Chapters III and IV, respectively.

Current 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 prepared informational and educational materials related to power outage mitigative measures. Informational and educational material related to power outages and mitigative measures are also available from organizations such as the American Red Cross.²⁰

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, We Energies²¹ offers the following recommendations:
 - Stay away from fallen wires, broken utility poles, or tree limbs on power lines;
 - Don't leave burning candles unattended;

²⁰American Red Cross, *“Be Red Cross Ready: Power Outage Checklist,”* 2009.

²¹We Energies, *“Safety During a Power Outage.”*

- Unplug sensitive electronic equipment;
- Don't use extension cords between homes or across yards or streets;
- Keep outdoor grills, stoves, or ovens outside;
- Stay clear of electric company vehicles and equipment;
- Have a supply of safe water;
- 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 recommends²² 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.

- Encourage development of business resumption plans to be put into place following an outage (see Wisconsin Department of Administration web site: <http://enterprise.state.wi.us>.)

Because these measures are intended to be ongoing efforts, the Task Force 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 59. Table 59 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 20-Year Cost section below).

²²We Energies, "Preparing for a Power Outage."

Table 59

COST-BENEFIT ANALYSIS SUMMARY OF MEASURES INCLUDED IN THE KENOSHA COUNTY HAZARD MITIGATION PLAN

Hazard	Mitigation Measures	Estimated Cost: 20-Year ^a		Costs of Implementation ^b			Direct Benefits				Indirect Benefits ^c	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 ^d	<u>Floodland and Environmentally Sensitive Land Preservation Element</u> • Floodplain and wetland zoning ^e	- .f	- .f	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, ⁹ Paris, Randall, Salem, Somers, and Wheatland
	• Environmentally sensitive area and open space preservation actions ^e	- .h	- .h	--	X	--	X	X	--	--	4	Kenosha County; City of Kenosha; Villages of Bristol, Paddock Lake, Pleasant Prairie, Silver Lake, and Twin Lakes; and Towns of Brighton, Bristol, ⁹ Paris, Randall, Salem, Somers, and Wheatland
	<u>Floodland Management Plan Element</u> Fox River Watershed ⁱ • Removal of 227 structures ^{e,j}	\$28,670.1	--	--	--	X	X	X	X	X	5	Kenosha County; Villages of Silver Lake and Twin Lakes; and Towns of Randall, Salem, and Wheatland
	• Elizabeth Lake spillway modifications	100.0	--	--	X	--	X	--	--	--	4	Village of Twin Lakes
	• Hoosier Creek and tributaries brush clearing	250.0	--	--	X	--	X	X	--	--	3	Town of Brighton
	Root River Watershed ^k • Channel clearing along 2 miles of East Branch Root River Canal	51.4	\$1.6	X	--	--	X	X	--	--	3	Kenosha County and Town of Paris
	Pike River Watershed ^l • Upper Pike River—channel widening/deepening	\$135.3	\$0.6	--	X	--	X	X	--	--	3	Kenosha County and Town of Somers
	• Upper Pike River—bridge replacements	966.5	--	--	X	--	X	X	--	--	3	Kenosha County and Town of Somers
	• Upper Pike River—aquatic habitat restoration	70.9	--	X	--	--	--	X	--	--	3	Kenosha County and Town of Somers
	Watershedwide—removal of eight structures ^{e,j}	\$1,010.4	--	--	--	X	X	X	X	X	5	Kenosha County, City of Kenosha, and Town of Somers

Table 59 (continued)

Hazard	Mitigation Measures	Estimated Cost: 20-Year ^a		Costs of Implementation ^b			Direct Benefits				Indirect Benefits ^c	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 ^d (continued)	Pike River Watershed ^l (continued)											
	• Pike Creek—channel improvements, floodwater detention storage, bridge replacements, and aquatic habitat restoration	\$12,136.5	\$20.3	--	--	X	X	X	--	--	3	Kenosha County, City of Kenosha, and Town of Somers
	• Airport Branch and Tributary to Airport Branch—channel improvements, bridge replacement, aquatic habitat restoration	2,016.8	1.6	--	--	X	X	X	--	--	3	Kenosha County, City of Kenosha, and Town of Somers
	• Somers Branch and tributary – channel cleaning	17.0	--	X	--	--	X	X	--	--	3	Kenosha County and Town of Somers
	• Pike River flood mitigation repair work	25.4	--	X	--	--	X	X	--	--	5	Kenosha County and Town of Somers
	Des Plaines River Watershed ^m											
	• Provision of onsite detention storage facilities for planned new development ^e	\$49,515.8 ⁿ	\$473.9	--	--	X	X	X	--	--	3	Kenosha County, City of Kenosha; Villages of Paddock Lake, Bristol and Pleasant Prairie, and Towns of Brighton, Bristol, ^x Paris, and, Somers
	• Restoration of prairie conditions ^{e,o}	19,560.7	25.2 to 1,778.8 ^p	--	--	X	--	X	--	--	4	Kenosha County, Village of Bristol, and Towns of Bristol, ⁹ Paris, and Somers
	• Restoration of wetland conditions ^{e,o}	8,655.3	13.3 to 916.0 ^p	--	--	X	--	X	--	--	4	Kenosha County, Village of Bristol, and Towns of Brighton, Bristol, ⁹ Paris, Salem, and Somers
	• Land rental cost for restored wetlands and prairies	--	849.6	--	X	--	--	X	--	--	4	Kenosha County, Village of Bristol, and Towns of Bristol, ⁹ Paris, and Somers
	• Floodproofing of 44 residential, commercial, and agricultural structures ^{e,j}	856.2	--	--	X	--	X	X	--	--	3	Kenosha County; Villages of Paddock Lake and Pleasant Prairie; and Towns of Bristol, ⁹ Salem, and Somers
	• Elevation of four residential structures ^{e,j}	385.0	--	--	X	--	X	X	--	--	3	Kenosha County and Villages of Paddock Lake and Pleasant Prairie
	• Removal of 13 residential and agricultural structures ^{e,j,q}	1,807.8	--	--	--	X	X	X	X	X	5	Kenosha County, Village of Pleasant Prairie, and Town of Somers.

Table 59 (continued)

Hazard	Mitigation Measures	Estimated Cost: 20-Year ^a		Costs of Implementation ^b			Direct Benefits				Indirect Benefits ^c	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 ^d (continued)	Des Plaines River Watershed ^m (continued)											
	• Upper Des Plaines River sediment monitoring	73.0	--	X	--	--	X	X	--	--	3	Kenosha County and Towns of Paris and Somers
	• Brighton Creek – replace the 18th Street crossing	87.0	--	X	--	--	X	X	--	--	3	Kenosha County and Town of Brighton
	• Center Creek riprap work	16.0	--	X	--	--	X	X	--	--	3	Kenosha County and Town of Bristol ⁹
	• UT-6 to Brighton Creek – centralized detention storage facility north of CTH K	788.5	8.0	--	X	--	X	X	--	--	3	Kenosha County, Village of Paddock Lake, and Town of Salem
	• UT to Des Plaines River – Chateau Eau Plaines stormwater pond	1,500.0	--	--	--	X	X	X	--	--	3	Village of Pleasant Prairie
	• UT-6 to Brighton Creek - improve storm sewer	463.3	--	--	X	--	X	X	--	--	3	Kenosha County, Village of Paddock Lake, and Town of Salem
	• UT-6 to Brighton Creek - remove seven residential structures ^{e,j}	1,120.0	--	--	X	--	X	X	X	X	5	Kenosha County and Village of Paddock Lake
	• UT-1 to Hooker Lake – replace culvert under 83rd Street	50.0	0.1	X	--	--	X	X	--	--	3	Kenosha County and Village of Paddock Lake
	Lake Michigan Direct Drainage Watershed											
	• Removal of 13 structures ^{e,j}	\$1,641.9	--	--	--	X	X	X	X	X	5	Kenosha County, City of Kenosha, and Town of Somers
	• Continued implementation of land acquisition for the Chiwaukee Prairie-Carol Beach area ^{e,r}	5,962.4	150.2	--	--	X	X	X	--	--	4	Kenosha County and Village of Pleasant Prairie
	• Tobin Creek study	117.0	--	--	X	--	--	X	--	--	3	Kenosha County and Village of Pleasant Prairie
	• Forest Park storm sewer study	125.4	--				X	X	--	--	3	City of Kenosha
	• Shagbark Basin	518.0	--	--	X	--	X	X	--	--	3	City of Kenosha
	• Spring Brook Innovation Center stormwater management project	725.0	--	--	X	--	X	X	--	--	3	Village of Pleasant Prairie
	• Elevation of one residence ^e	69.0	--	X	--	--	--	X	X	--	5	Village of Pleasant Prairie
	• Carol Beach Unit 1 sewer system improvements	790.0	--	--	X	--	X	X	--	--	3	Village of Pleasant Prairie

Table 59 (continued)

Hazard	Mitigation Measures	Estimated Cost: 20-Year ^a		Costs of Implementation ^b			Direct Benefits				Indirect Benefits ^c	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 ^d (continued)	Lake Michigan Direct Drainage Watershed (continued)											
	Lake Michigan Coast											
	• Removal of nine structures ^{e,j}	\$1,136.7	--	--	--	X	X	X	X	X	5	Kenosha County and Village of Pleasant Prairie
	<u>Stormwater Management Plan Element</u>											
	• Stormwater management plans ^e	-- ^s	-- ^s	X	--	--	X	X	--	--	3	Kenosha County; City of Kenosha; Villages of Bristol, Paddock Lake, Pleasant Prairie, Silver Lake, and Twin Lakes; and Towns of Brighton, Bristol, ⁹ Paris, Randall, Salem, Somers, and Wheatland
	• Stormwater-related regulations ^e	-- ^t	-- ^t	--	--	--	X	X	--	--	3	Kenosha County; City of Kenosha; Villages of Bristol, Paddock Lake, Pleasant Prairie, Silver Lake, and Twin Lakes; and Towns of Brighton, Bristol, ⁹ Paris, Randall, Salem, Somers, and Wheatland
	<u>Public Information and Education Element</u>											
	• Public education activities	-- ^u	-- ^u	X	--	--	X	--	--	--	4	Kenosha County; City of Kenosha; Villages of Bristol, Paddock Lake, Pleasant Prairie, Silver Lake, and Twin Lakes; and Towns of Brighton, Bristol, ⁹ Paris, Randall, Salem, Somers, and Wheatland
	• Public participation activities and coordination with other agencies and units of government	-- ^u	-- ^u	X	--	--	X	--	--	--	4	Kenosha County; City of Kenosha; Villages of Bristol, Paddock Lake, Pleasant Prairie, Silver Lake, and Twin Lakes; and Towns of Brighton, Bristol, ⁹ Paris, Randall, Salem, Somers, and Wheatland

Table 59 (continued)

Hazard	Mitigation Measures	Estimated Cost: 20-Year ^a		Costs of Implementation ^b			Direct Benefits				Indirect Benefits ^c	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 ^d (continued)	Lake Michigan Direct Drainage Watershed (continued) <u>Secondary Plan Element</u>											
	<ul style="list-style-type: none"> National Flood Insurance Program and map updating 	-- ^f	-- ^f	X	--	--	X	X	--	--	3	Kenosha County; City of Kenosha; Villages of Bristol, Paddock Lake, Pleasant Prairie, Silver Lake, and Twin Lakes; and Towns of Brighton, Bristol, ⁹ Paris, Randall, Salem, Somers, and Wheatland
	<ul style="list-style-type: none"> Lending institution and real estate agent policies^e 	-- ^f	-- ^f	X	--	--	X	X	--	--	3	Kenosha County; City of Kenosha; Villages of Bristol, Paddock Lake, Pleasant Prairie, Silver Lake, and Twin Lakes; and Towns of Brighton, Bristol, ⁹ Paris, Randall, Salem, Somers, and Wheatland
	<ul style="list-style-type: none"> Channel maintenance 	-- ^f	-- ^f	X	--	--	X	X	--	--	3	Kenosha County; City of Kenosha; Villages of Bristol, Paddock Lake, Pleasant Prairie, Silver Lake, and Twin Lakes; and Towns of Brighton, Bristol, ⁹ Paris, Randall, Salem, Somers, and Wheatland
	<ul style="list-style-type: none"> Stormwater management facilities maintenance 	-- ^f	-- ^f	X	--	--	X	X	--	--	3	Kenosha County; City of Kenosha; Villages of Bristol, Paddock Lake, Pleasant Prairie, Silver Lake, and Twin Lakes; and Towns of Brighton, Bristol, ⁹ Paris, Randall, Salem, Somers, and Wheatland
	<ul style="list-style-type: none"> Survey of buildings near flood hazard areas^g 	\$ 359.0	--	X	--	--	X	X	--	--	3	Kenosha County; City of Kenosha; Villages of Bristol, Paddock Lake, Pleasant Prairie, Silver Lake, and Twin Lakes; and Towns of Brighton, Bristol, ⁹ Paris, Randall, Salem, Somers, and Wheatland

Table 59 (continued)

Hazard	Mitigation Measures	Estimated Cost: 20-Year ^a		Costs of Implementation ^b			Direct Benefits				Indirect Benefits ^c	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	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	-- ^v	-- ^v	--	X	--	X	--	--	--	5	Kenosha County and all local jurisdictions ^w
	Promote educational and informational programming, especially related to the early warning network, and to individual actions to protect citizens, property, and businesses	-- ^u	-- ^u	X	--	--	X	--	--	--	5	Kenosha County and all local jurisdictions ^w
	Review and enforce building code ordinances and requirements	-- ^f	-- ^f	X	--	--	X	X	X	X	5	Kenosha County; the City of Kenosha; and Villages of Bristol, Paddock Lake, Pleasant Prairie, Silver Lake, and Twin Lakes
	Continue coordination of emergency operations and response plans among governmental units and first responders	-- ^f	-- ^f	X	--	--	X	--	--	--	5	Kenosha County and all local jurisdictions ^w
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	-- ^v	-- ^v	--	X	--	X	--	X	X	5	Kenosha County and all local jurisdictions ^w
	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	-- ^x	-- ^x	--	X	--	X	X	X	X	5	Kenosha County and all local jurisdictions ^w
	Promote educational and informational programming, especially related to the early warning network, and to individual actions to protect citizens, property, and businesses	-- ^u	-- ^u	X	--	--	X	--	--	--	5	Kenosha County and all local jurisdictions ^w
	Review and enforce building code ordinance requirements	-- ^f	-- ^f	X	--	--	X	X	X	X	5	Kenosha County; the City of Kenosha; and Villages of Bristol, Paddock Lake, Pleasant Prairie, Silver Lake, and Twin Lakes
	Continue coordination of emergency response and operations plans among governmental units and first responders	-- ^f	-- ^f	X	--	--	X	--	--	--	5	Kenosha County and all local jurisdictions ^w

Table 59 (continued)

Hazard	Mitigation Measures	Estimated Cost: 20-Year ^a		Costs of Implementation ^b			Direct Benefits				Indirect Benefits ^c	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		
Extreme Temperature Events	Organize neighborhood outreach groups who look after vulnerable groups and individuals	-- ^v	-- ^v	X	--	--	X	--	--	--	5	Kenosha County and all local jurisdictions ^w
	Provide special arrangements for payment of heating bills	-- ^v	-- ^v	X	--	--	X	--	--	--	5	Kenosha County and all local jurisdictions ^w
	Identify and advertise a list of available heating and/or cooling shelters in the immediate area	-- ^u	-- ^u	X	--	--	X	--	--	--	5	Kenosha County and all local jurisdictions ^w
	Increase coverage and use of NOAA All Hazard Weather Radio and EAS broadcasts	-- ^v	-- ^v	X	--	--	X	--	--	X	5	Kenosha County and all local jurisdictions ^w
	Promote educational and informational programming	-- ^u	-- ^u	X	--	--	X	--	--	--	5	Kenosha County and all local jurisdictions ^w
Lake Michigan Coastal Hazards	Continue enforcement of the County shoreland zoning ordinance ^e	-- ^f	-- ^f	X	--	--	X	X	X	X	5	Kenosha County, City of Kenosha, Village of Pleasant Prairie, and Town of Somers
	Review of Lake Michigan shoreline municipal shoreland ordinances ^e	-- ^f	-- ^f	X	--	--	X	X	X	X	5	Kenosha County, City of Kenosha, Village of Pleasant Prairie, and Town of Somers
	Develop a cooperative program to assess the effectiveness of Lake Michigan shoreline protection structures in the County	\$ 17.6	--	X	--	--	X	--	--	--	3	Kenosha County, City of Kenosha, Village of Pleasant Prairie, and Town of Somers
	Continue construction and maintenance of shoreline protection structures	-- ^x	-- ^x	--	X	--	X	X	--	--	3	Kenosha County, City of Kenosha, Village of Pleasant Prairie, and Town of Somers
	Continue ongoing programs to update and refine coastal hazard area data using geographic information system technology ^e	14.0	--	X	--	--	X	--	--	--	3	Kenosha County, City of Kenosha, Village of Pleasant Prairie, and Town of Somers
	Provide public informational and educational programming	-- ^u	-- ^u	X	--	--	X	--	--	--	5	Kenosha County and all local jurisdictions ^w

Table 59 (continued)

Hazard	Mitigation Measures	Estimated Cost: 20-Year ^a		Costs of Implementation ^b			Direct Benefits				Indirect Benefits ^c	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		
Winter Storm Events	Organize neighborhood outreach groups who look after vulnerable groups and individuals	-- ^v	-- ^v	X	--	--	X	--	--	--	5	Kenosha County and all local jurisdictions ^w
	Provide special arrangements for payment of heating bills	-- ^v	-- ^v	X	--	--	X	--	--	--	5	Kenosha County and all local jurisdictions ^w
	Identify and advertise a list of available heated shelters in the immediate area	-- ^u	-- ^u	X	--	--	X	--	--	--	5	Kenosha County and all local jurisdictions ^w
	Increase coverage and use of NOAA All Hazard Weather Radio and EAS broadcasts	-- ^v	-- ^v	--	X	--	X	--	X	X	5	Kenosha County and all local jurisdictions ^w
	Promote educational and informational programming	-- ^u	-- ^u	X	--	--	X	--	--	--	5	Kenosha County and all local jurisdictions ^w
	Ongoing review and enforcement of building code ordinance requirements	-- ^f	-- ^f	X	--	--	X	X	X	X	5	Kenosha County; City of Kenosha; and Villages of Bristol, Paddock Lake, Pleasant Prairie, Silver Lake, and Twin Lakes
	Work with agencies to establish a system for short-term sheltering	-- ^v	-- ^v	X	--	--	X	--	--	--	5	Kenosha County and all local jurisdictions ^w
	Continue coordination of emergency response plans among governmental units and first responders	-- ^f	-- ^f	X	--	--	X	--	--	--	5	Kenosha County and all local jurisdictions ^w
	Continue and refine State, County, and local road maintenance programs	-- ^f	-- ^f	X	--	--	X	--	--	--	5	Kenosha County and all local jurisdictions ^w
	Work with utilities to assess and improve electrical service reliability	-- ^f	-- ^f	X	--	--	X	--	--	--	5	Kenosha County and all local jurisdictions ^w
Drought Events	Encourage multi-agency approaches to water conservation, drought prediction, and stream and ground water monitoring	-- ^v	-- ^v	X	--	--	X	--	--	--	4	Kenosha County and all local jurisdictions ^w
	Promote educational and informational programming	-- ^u	-- ^u	X	--	--	X	--	--	--	3	Kenosha County and all local jurisdictions ^w
	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	-- ^f	-- ^f	X	--	--	X	--	--	--	3	Kenosha County and all local jurisdictions ^w

Table 59 (continued)

Hazard	Mitigation Measures	Estimated Cost: 20-Year ^a		Costs of Implementation ^b			Direct Benefits				Indirect Benefits ^c	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)	Evaluate and design water supply systems that are not vulnerable to drought	--X	--X	X	--	--	X	--	--	--	3	Kenosha County and all local jurisdictions ^w
	Encourage farm operators to evaluate the economics of crop insurance programs	--Y	--Y	X	--	--	X	--	--	--	3	Kenosha County and all local jurisdictions ^w
Fog	Organize neighborhood outreach groups who look after vulnerable groups and individuals	--V	--V	X	--	--	X	--	--	--	5	Kenosha County and all local jurisdictions ^w
	Increase coverage and use of NOAA All Hazard Weather Radio and EAS broadcasts	--V	--V	--	X	--	X	--	X	X	5	Kenosha County and all local jurisdictions ^w
	Increase public education and awareness of the potential severity of hazardous fog events	--U	--U	X	--	--	X	--	--	--	5	Kenosha County and all local jurisdictions ^w
	Produce and distribute emergency preparedness information related to fog events	--U	--U	X	--	--	X	--	--	--	5	Kenosha County and all local jurisdictions ^w
Fire	Promote activities that physically stop the spread of fire	--V	--V	X	--	--	X	X	X	X	5	Kenosha County and all local jurisdictions ^w
	Promote emergency restrictions on fire causing activities	--V	--V	X	--	--	X	X	X	X	5	Kenosha County and all local jurisdictions ^w
	Offer training and exercises for local and regional fire fighters and acquire additional fire equipment	--V	--V	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, ⁹ Paris, Randall, Salem, Somers, and Wheatland
	Map hazard areas and vulnerable structures	--V	--V	--	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, ⁹ Paris, Randall, Salem, Somers, and Wheatland
	Support fire prevention, education, and enforcement programs, and enhance fire hazard awareness for landowners and visitors	--U	--U	X	--	--	X	--	--	--	5	Kenosha County and all local jurisdictions ^w

Table 59 (continued)

Hazard	Mitigation Measures	Estimated Cost: 20-Year ^a		Costs of Implementation ^b			Direct Benefits				Indirect Benefits ^c	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		
Transportation Accident-Related Events	Promote educational and informational programming, especially related to driver safety, and to individual actions to protect citizens, property, and businesses	-- ^f	-- ^f	X	--	--	X	--	--	--	5	Kenosha County and all local jurisdictions ^w
	Continue to monitor and improve the transportation system through design, routing, and traffic control at problem areas	-- ^f	-- ^f	X	--	--	X	X	X	X	5	Kenosha County and all local jurisdictions ^w
	Continue to enforce traffic violations, weight and travel restrictions, and designated truck routes	-- ^f	-- ^f	X	--	--	X	X	X	X	5	Kenosha County and all local jurisdictions ^w
	Continue to evaluate and refine safety components of railway facilities	-- ^f	-- ^f	X	--	--	X	X	X	X	5	Kenosha County; City of Kenosha; Villages of Pleasant Prairie and Silver Lake; and Towns of Salem, Somers, and Wheatland
	Continue to evaluate and refine safety components of airport facilities	-- ^f	-- ^f	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	-- ^f	-- ^f	X	--	--	X	--	--	--	5	Kenosha County and all local jurisdictions ^w
	Continue to coordinate emergency response plans among governmental units and first responders	-- ^f	-- ^f	X	--	--	X	--	--	--	5	Kenosha County and all local jurisdictions ^w
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 ^w
	Encourage multi-agency approaches to water conservation, loss and contamination prevention and trend-monitoring	-- ^v	-- ^v	X	--	--	X	--	--	--	4	Kenosha County and all local jurisdictions ^w
	Prepare emergency operation plans for each public water supply system	-- ^v	-- ^v	--	X	--	X	--	--	--	5	Kenosha County, City of Kenosha, and Villages of Bristol, Paddock Lake and Pleasant Prairie
	Continue coordination of emergency response plans among governmental units and first responders	-- ^f	-- ^f	X	--	--	X	--	--	--	5	Kenosha County and all local jurisdictions ^w
	Prepare and implement wellhead protection plans	-- ^v	-- ^v	X	--	--	X	--	--	--	5	Kenosha County, Villages of Bristol and Paddock Lake, and Town of Bristol ⁹

Table 59 (continued)

Hazard	Mitigation Measures	Estimated Cost: 20-Year ^a		Costs of Implementation ^b			Direct Benefits				Indirect Benefits ^c	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	Promote educational and informational programming related to hazardous material safety, and to individual actions to protect citizens, property, and businesses	-- ^u	-- ^u	X	--	--	X	--	--	--	5	Kenosha County and all local jurisdictions ^w
	Promote community and operator compliance with industry safety regulations and standards	-- ^f	-- ^f	X	--	--	X	X	X	X	5	Kenosha County and all local jurisdictions ^w
	Promote ongoing enforcement of Federal, State, and County regulatory standards	-- ^u	-- ^u	X	--	--	X	X	X	X	5	Kenosha County and all local jurisdictions ^w
	Support existing or consider expansion of household waste management control programs, which should include hazardous material disposal sites for public citizens	-- ^v	-- ^v	X	--	--	X	--	--	--	5	Kenosha County and all local jurisdictions ^w
	Continue support of training, equipment, planning, and preparedness of first responders	-- ^v	-- ^v	X	--	--	X	--	--	--	5	Kenosha County and all local jurisdictions ^w
	Continue coordination of emergency response plans among governmental units, businesses, and first responders	-- ^v	-- ^v	X	--	--	X	--	--	--	5	Kenosha County and all local jurisdictions ^w
Terrorism Incidents	Continue and expand educational and informational programming related to public health and safety issues due to terrorist incidents	-- ^u	-- ^u	X	--	--	X	--	--	--	5	Kenosha County and all local jurisdictions ^w
	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	-- ^v	-- ^v	--	X	--	X	--	--	--	5	Kenosha County and all local jurisdictions ^w
	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	-- ^v	-- ^v	--	X	--	X	--	X	X	5	Kenosha County and all local jurisdictions ^w

Table 59 (continued)

Hazard	Mitigation Measures	Estimated Cost: 20-Year ^a		Costs of Implementation ^b			Direct Benefits				Indirect Benefits ^c	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 support of training, equipment, planning, and preparedness for local law enforcement, fire and rescue departments, and other emergency management services	-- ^v	-- ^v	--	X	--	X	--	--	--	5	Kenosha County and all local jurisdictions ^w
	Continue coordination of emergency response plans among Federal, State, and local governmental units, businesses, and emergency management services	-- ^v	-- ^v	X	--	--	X	--	--	--	5	Kenosha County and all local jurisdictions ^w
	Continue Citizens Corps Program and encourage citizen involvement	-- ^z	-- ^z	X	--	--	X	--	--	--	5	Kenosha County and all local jurisdictions ^w
	Establish and train community emergency response team	-- ^z	-- ^z	--	X	--	X	--	--	--	5	Kenosha County and all local jurisdictions ^w
	Expand neighborhood watch program	-- ^v	-- ^v	X	--	--	X	--	--	--	5	Kenosha County and all local jurisdictions ^w
Power Outages	Continue to review and implement programs to improve reliability of power supply facilities	-- ^f	-- ^f	X	--	--	X	--	--	--	3	Kenosha County and all local jurisdictions ^w
	Coordinate activities and communication regarding prevention and response to power outages	-- ^f	-- ^f	X	--	--	X	--	--	--	5	Kenosha County and all local jurisdictions ^w
	Encourage backup power generation facilities	-- ^f	-- ^f	X	--	--	X	--	--	--	5	Kenosha County and all local jurisdictions ^w
	Continue and refine public informational and educational programming	-- ^u	-- ^u	X	--	--	X	--	--	--	3	Kenosha County and all local jurisdictions ^w

^aAll costs expressed in 2008 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.

^cIndirect 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

Footnotes to Table 59 (continued)

^dFor further details on the benefit-cost analysis of floodland mitigation refer to Tables 52 through 58.

^eThis mitigation measure is related but not essential to continued compliance with the requirements of the National Flood Insurance Program.

^fCosts covered under ongoing activity.

^gOn July 4, 2010 the Village of Bristol annexed the Town of Bristol. As of that date, areas affected within the former Town are within the Village.

^hCosts are included under Kenosha County Park and Open Space Plan Implementation.

ⁱThis mitigation measure is the recommended alternative from SEWRPC Planning Report No. 12, A Comprehensive Plan for the Fox River Watershed, Volume Two, February 1970.

^jStructure floodproofing, elevation, or removal to be evaluated on a site-by-site basis and to be carried out at the discretion of property owners.

^kThis mitigation measure is the recommended alternative from SEWRPC Planning Report No. 9, A Comprehensive Plan for the Root River Watershed, July 1966.

^lThese 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.

^mThese mitigation measures are the recommended alternatives from SEWRPC Planning Report No. 44, A Comprehensive Plan for the Des Plaines River Watershed, June 2003.

ⁿCost to control runoff up to the 100-year event.

^oPrairie and wetland restoration to be carried out at discretion of property owners.

^pIncremental cost between control of two-year and 100-year events.

^qNumber of structures as of April 2005.

^rAmount shown is the estimated amount prior to implementation in 2009 dollars.

^sCosts to be determined by each community based upon logical subwatershed area. Estimated cost is from \$1.2 to \$1.5 million countywide.

^tCost of ordinance development is covered under ongoing programs. Cost of implementation is not determined.

^uPortion 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 \$20,000 per year.

^vCosts to be determined. Partially covered under ongoing programs.

^wJurisdictions 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.

^xCosts are site-specific and survey is needed for countywide estimate.

^yPrivate property costs to be expended as needs arise.

^zCosts to be determined.

Source: SEWRPC.

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 59. 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 20-Year Cost

Table 59 includes a summary of the estimated 20-year capital cost, average annual operation and maintenance cost, and benefit-cost ratio, 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 floodland management measures include capital and operation and maintenance costs. Hence, environmental, recreational or other intangible benefits and costs that cannot be readily quantified were not addressed or reflected in the final benefit-cost ratio number as shown in Table 59 (see also Tables 52 to 58). A benefit-cost ratio equal to one indicates that the monetary costs equal the monetary benefits and a ratio greater than one indicates that the benefits exceed the costs.

Where appropriate, the primary mitigation actions as shown in Table 59 were ranked by the benefit-cost ratio, which indicates the priority that will provide the greatest benefit versus the cost. However, it is important to note that there may be other reasons beyond flood damage reduction or enhancement of property values that may significantly affect the priority of implementation of the mitigation measures identified in Table 59. 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 59. 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 59, 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 59 also provides a list of the local units of government affected for each hazard and corresponding priority mitigation measures.

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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 2009 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 may be 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 this 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. (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 this updated 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 comment 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 on April 22, 2011 and to the full County Board on May 3, 2011. 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). 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.

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, Silver Lake, and Twin Lakes; and the Towns of Brighton, Bristol, Paris, Randall, Salem, 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 All Hazards Mitigation Plan Task Force; 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 60 and 61. In addition, corresponding mitigation measures are summarized on Map 38 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.¹

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 2009. 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 are described below.

¹*SEWRPC Community Assistance Planning Report No. 299, A Multi-Jurisdictional Comprehensive Plan for Kenosha County: 2035, April 2010.*

Table 60

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 P)
		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>				
	• Floodplain and wetland zoning	-- ^b	-- ^b	Plan implementation is in place; some review and refinement needed in local community ordinances	1,2,4,10,14,18,20,22,23,24,27,31,37,38,39,40,41,43,51
	• Environmentally sensitive area and open space preservation actions	-- ^c	-- ^c	Plan implementation is in place or ongoing; additional actions needed in some areas	1,2,3,4,7,8,9,11,12,13,14,15,16,17,18,19,20,21,22,23,25,29,33,37,38,39,40,41,43
	<u>Floodland Management Plan Element</u>				
	Fox River Watershed ^d				
	• Removal of 227 structures ^e	\$28,670.1	--	Ongoing in the Village of Silver Lake and the Towns of Salem and Wheatland	1,2,3,4,5,6,7,8,11,12,15,16,17,18,21,33,38,39,40,43,45,48
	• Elizabeth Lake spillway modifications	100.0	--	Design work 2010	
	• Hoosier Creek and tributaries brush clearing	250.0	--	First assessment December 2009	
	Root River Watershed ^f				
	• Channel clearing along two miles of the East Branch Root River Canal	\$51.4	\$1.6	To be determined	1,2,3,4,7,8,9,11,12,13,14,15,18,21,25,33,43,53
	Pike River Watershed ^g				
	• Upper Pike River: channel widening/deepening	\$135.3	\$0.6	To be determined	1,2,3,4,5,6,7,8,11,12,15,18,21,28,32,33,43,45,53,58,59,60,61,62
	• Upper Pike River: bridge replacements	966.5	--	To be determined	
	• Upper Pike River: aquatic habitat restoration	70.9	--	To be determined	
	• Watershedwide: removal of eight structures ^e	1,010.4	--	To be determined	
	• Pike Creek: channel improvements, floodwater detention storage, bridge replacements, and aquatic habitat restoration	12,136.5	20.3	To be determined	
	• Airport Branch and Tributary to Airport Branch: channel improvements, bridge replacement, and aquatic habitat restoration	2,016.8	1.6	To be determined	
	• Somers Branch and tributary: channel cleaning	17.0	--	Implemented	
	• Pike River Town of Somers flood mitigation repair work	25.4	--	FEMA grant received 2009	
	Des Plaines River Watershed ^h				
	• Provision of onsite detention storage facilities for planned new development	\$49,515.8 ⁱ	\$473.9	Ongoing	1,2,3,4,5,6,11,18,22,25,28,31,32,36,38,43,45,58,59,60,61
	• Restoration of prairie conditions ^j	19,560.7	25.2 to 1,778.8 ^k	2nd level planning in progress	
	• Restoration of wetland conditions ^j	8,655.3	13.3 to 916.0 ^k	2nd level planning in progress	
	• Land rental cost for restored wetlands and prairies	--	849.6	2nd level planning in progress	
	• Floodproofing of 44 residential, commercial, and agricultural structures ^e	856.2	--	To be determined	

Table 60 (continued)

Hazard	Mitigation Measures	Estimated Cost: 20-Year ^a		Plan Implementation Schedule	Potential Funding Programs (see Appendix P)
		Capital (thousands of dollars)	Average Annual Operation and Maintenance (thousands of dollars)		
Flooding and Related Stormwater Drainage Problems (continued)	Des Plaines River Watershed ^h (continued)				
	• Elevation of four residential structures ^e	385.0	--	To be determined	1,2,3,4,5,6,11,18,22,25,28,31,32,36,38,43, 45,58,59,60,61
	• Removal of 13 residential and agricultural structures ^e	1,807.8	--	2nd level planning in progress	
	• Upper Des Plaines River sediment monitoring	73.0	--	To be determined	
	• Brighton Creek – replace the 18th Street crossing	87.0	--	Implemented	
	• Center Creek riprap work	16.0	--	Implemented	
	• Chateau Eau Plaines stormwater pond	1,500.0	--	To be determined	
	• UT-6 to Brighton Creek – centralized detention facility	788.5	8.0	To be determined	
	• UT-6 to Brighton Creek – improve storm sewer	463.3	--	To be determined	
	• UT-6 to Brighton Creek – remove seven residential structures ^e	1,120.0	--	Federal grants applied for 2009	
	• UT-1 to Hooker Lake – replace culvert under 83rd Street	50.0	0.1	Implemented	
	Lake Michigan Direct Drainage Watershed				1,2,3,4,5,6,7,8,11,12,15,16,17,18,21,33,38, 39,43,45,58,59,60,61,62
	• Removal of 13 structures ^e	\$1,641.9	--	To be determined	
	• Continued implementation of land acquisition for the Chiwaukee Prairie-Carol Beach area ^e	5,962.4	150.2	Essentially complete 2009	
	• Tobin Creek study	117.0	--	To be determined. Unsuccessful GLRI proposal submitted 2009	
	• Forest Park storm sewer study	125.4	--	Scope development started 2009	
	• Shagbark basin	518.0	--	Completed in 2009	
	• Spring Brook Innovation Center stormwater management project	725.0	--	CDBG received 2010	
	• Elevation of one residence	69.0	--	CDBG received 2010	
	• Carol Beach Unit 1 sewer system improvements	790.0	--	To be determined	
	Lake Michigan Coast				--
	• Removal of nine structures ^e	\$1,136.7	--	To be determined	
	<u>Stormwater Management Plan Element</u>				4,7,12,13,17,18,25,34,37,43
	• Stormwater management plans	-- ^l	-- ^l	2010	
	• Stormwater-related regulations	-- ^m	-- ^m	2010	4,21,25,27,34,42,43,44
	<u>Public Information and Education Element</u>				
	• Public education activities	-- ⁿ	-- ⁿ	Ongoing	
	• Public participation activities and coordination with other agencies and units of government	-- ⁿ	-- ⁿ	Ongoing	

Table 60 (continued)

Hazard	Mitigation Measures	Estimated Cost: 20-Year ^a		Plan Implementation Schedule	Potential Funding Programs (see Appendix P)
		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	9,10,11,12,15,18,25,37,41,43,50
	• 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	\$359.0	--	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	-.o	-.o	Ongoing	16,17,42,43,44,46
	Promote educational and informational programming, especially related to the early warning network, and to individual actions to protect citizens, property, and businesses	-.n	-.n	Ongoing	
	Review and enforce building code ordinances and requirements	-.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	-.o	-.o	Ongoing	16,17,42,43,44,50
	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	-.p	-.p	To be determined	
	Promote educational and informational programming, especially related to the early warning network, and to individual actions to protect citizens, property, and businesses	-.n	-.n	Ongoing	See previous page
	Review and enforce building code ordinance requirements	-.b	-.b	Ongoing	
	Continue coordination of emergency response and operations plans among governmental units and first responders	-.b	-.b	Ongoing	
Extreme Temperature Events	Organize neighborhood outreach groups who look after vulnerable groups and individuals	-.o	-.o	Ongoing	16,17,42,43,44,47,50
	Provide special arrangements for payment of heating bills	-.o	-.o	Ongoing	
	Identify and advertise a list of available heating and or cooling shelters in the immediate area	-.o	-.o	Ongoing	
	Increase coverage and use of NOAA All Hazard Weather Radio and EAS broadcasts	-.h	-.h	Ongoing	
	Promote educational and informational programming	-.o	-.o	Ongoing	

Table 60 (continued)

Hazard	Mitigation Measures	Estimated Cost: 20-Year ^a		Plan Implementation Schedule	Potential Funding Programs (see Appendix P)
		Capital (thousands of dollars)	Average Annual Operation and Maintenance (thousands of dollars)		
Lake Michigan Coastal Hazards	Continue enforcement of the County shoreland zoning ordinance	- .b	- .b	Ongoing	10,19,21,24,52,54,55
	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	\$17.6	- -	To be determined	
	Continue construction and maintenance of shoreline protection structures	- .p	- .p	Ongoing	41,44
	Continue ongoing programs to update and refine coastal hazard area data using geographic information system technology	14.0	- -	To be determined	
	Review water and wastewater treatment plant capacity and level of protection under range of Lake Michigan water levels	- .q	- .q	To be determined	26,52,54,55
	Provide public informational and educational programming	- .n	- .n	Ongoing	25,42,43,44,52,54,55
Winter Storm Events	Organize neighborhood outreach groups who look after vulnerable groups and individuals	- .o	- .o	Ongoing	16,42,43,44,49,50
	Provide special arrangements for payment of heating bills	- .o	- .o	Ongoing	
	Identify and advertise a list of available heated shelters in the immediate area	- .n	- .n	Ongoing	
	Increase coverage and use of NOAA All Hazard Weather Radio and EAS broadcasts	- .o	- .o	Ongoing	
	Promote educational and informational programming	- .n	- .n	Ongoing	
	Ongoing review and enforcement of building code ordinance requirements	- .b	- .b	Ongoing	
	Work with agencies to establish a system for short-term sheltering	- .o	- .o	Ongoing	
	Continue coordination of emergency response plans among governmental units and first responders	- .b	- .b	Ongoing	See previous page
	Continue and refine State, County, and local road maintenance programs	- .b	- .b	Ongoing	
	Work with utilities to assess and improve electrical service reliability	- .b	- .b	Ongoing	
Drought Events	Encourage multi-agency approaches to water conservation, drought prediction, and stream and ground water monitoring	- .o	- .o	Ongoing	15,42,43,44,47,49,50
	Promote educational and informational programming	- .n	- .n	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	- .p	- .p	Ongoing	
	Encourage farm operators to evaluate the economics of crop insurance programs	- .r	- .r	Ongoing	

Table 60 (continued)

Hazard	Mitigation Measures	Estimated Cost: 20-Year ^a		Plan Implementation Schedule	Potential Funding Programs (see Appendix P)
		Capital (thousands of dollars)	Average Annual Operation and Maintenance (thousands of dollars)		
Fog	Organize neighborhood outreach groups who look after vulnerable groups and individuals	- . ⁰	- . ⁰	Ongoing	16,17,43,44,46
	Increase coverage and use of NOAA All Hazard Weather Radio and EAS broadcasts	- . ⁰	- . ⁰	Ongoing	
	Increase public education and awareness of the potential severity of hazardous fog events	- . ⁿ	- . ⁿ	Ongoing	
	Produce and distribute emergency preparedness information related to fog events	- . ⁿ	- . ⁿ	Ongoing	
Fire	Promote activities that physically stop the spread of fire	- . ⁰	- . ⁰	Ongoing	16,17,43,44,46
	Promote emergency restrictions on fire causing activities	- . ⁰	- . ⁰	Ongoing	
	Offer training and exercises for local and regional fire fighters and acquire additional fire equipment	- . ⁰	- . ⁰	Ongoing	
	Map hazard areas and vulnerable structures	- . ⁰	- . ⁰	Ongoing	
	Support fire prevention, education, and enforcement programs, and enhance fire hazard awareness for landowners and visitors	- . ⁿ	- . ⁿ	Ongoing	
Transportation Accident-Related Events	Promote educational and informational programming, especially related to driver safety, and to individual actions to protect citizens, property, and businesses	- . ^b	- . ^b	Ongoing	37,44,45,55,57 See previous page
	Continue to monitor and improve the transportation system through design, routing, and traffic control at problem areas	- . ^b	- . ^b	Ongoing	
	Continue to enforce traffic violations, weight and travel restrictions, and designated truck routes	- . ^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	- . ⁿ	- . ⁿ	Ongoing	19,26,29,34,36,42,43,44,46
	Encourage multi-agency approaches to water conservation, loss and contamination prevention and trend-monitoring	- . ⁰	- . ⁰	Ongoing	
	Prepare emergency operation plans for each public water supply system	- . ⁰	- . ⁰	To be determined	
	Continue coordination of emergency response plans among governmental units and first responders	- . ^b	- . ^b	Ongoing	
	Prepare and implement wellhead protection plans	- . ⁰	- . ⁰	To be determined	

Table 60 (continued)

Hazard	Mitigation Measures	Estimated Cost: 20-Year ^a		Plan Implementation Schedule	Potential Funding Programs (see Appendix P)
		Capital (thousands of dollars)	Average Annual Operation and Maintenance (thousands of dollars)		
Hazardous Material Events	Promote educational and informational programming related to hazardous material safety, and to individual actions to protect citizens, property, and businesses	- . ⁿ	- . ⁿ	Ongoing	42,43,44,46,47,48
	Promote community and operator compliance with industry safety regulations and standards	- . ^b	- . ^b	Ongoing	
	Promote ongoing enforcement of Federal, State, and County regulatory standards	- . ⁿ	- . ⁿ	Ongoing	
	Support existing or consider expansion of household waste management control programs, which should include hazardous material disposal sites for public citizens	- . ^o	- . ^o	Ongoing	
	Continue support of training, equipment, planning, and preparedness of first responders	- . ^o	- . ^o	Ongoing	
	Continue coordination of emergency response plans among governmental units, businesses, and first responders	- . ^o	- . ^o	Ongoing	
Terrorism Incidents	Continue and expand educational and informational programming related to public health and safety issues due to terrorist incidents	- . ⁿ	- . ⁿ	Ongoing	16,43,44,45,46,47,48,49,57
	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	- . ^o	- . ^o	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	- . ^o	- . ^o	Ongoing	See previous page
	Continue support of training, equipment, planning, and preparedness for local law enforcement, fire and rescue departments, and other emergency management services	- . ^o	- . ^o	Ongoing	
	Continue coordination of emergency response plans among Federal, State, and local governmental units, businesses, and emergency management services	- . ^o	- . ^o	Ongoing	
	Continue Citizens Corps Program and encourage citizen involvement	- . ^s	- . ^s	Ongoing	
	Establish and train community emergency response team	- . ^s	- . ^s	Ongoing	
	Expand neighborhood watch program	- . ^o	- . ^o	Ongoing	
Power Outages	Continue to review and implement programs to improve reliability of power supply facilities	- . ^b	- . ^b	Ongoing	43,44,46
	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	- . ⁿ	- . ⁿ	Ongoing	

Footnotes to Table 60

^aAll cost expressed in 2008 dollars.

^bCosts covered under ongoing activity.

^cCosts are included under Kenosha County Park and Open Space Plan Implementation.

^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.

^fThis mitigation measure is the recommended alternative from SEWRPC Planning Report No. 9, A Comprehensive Plan for the Root River Watershed, July 1966.

^gThese 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.

^hThese mitigation measures are the recommended alternatives from SEWRPC Planning Report No. 44, A Comprehensive Plan for the Des Plaines River Watershed, June 2003.

ⁱCost to control runoff up to the one-percent-annual-probability (100-year recurrence interval) event.

^jPrairie and wetland restoration to be carried out at discretion of property owners.

^kIncremental cost between control of the 50-percent-annual-probability and one-percent-probability events.

^lCosts to be determined by each community based upon logical subwatershed area. Estimated cost is from \$1.2 to \$1.5 million countywide.

^mCost of ordinance development is covered under ongoing programs. Cost of implementation is not determined.

ⁿPortion 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.

^oCosts to be determined. Partially covered under ongoing programs.

^pCosts are site-specific and survey is needed for countywide estimate.

^qTo be conducted as part of next needed facility planning program.

^rPrivate property costs to be expended as needs arise.

^sCosts to be determined.

Source: SEWRPC.

Table 61

**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	Village of Twin Lakes	Town of Brighton	Town of Bristol ^a	Town of Paris	Town of Randall	Town of Salem	Town of Somers	Town of Wheatland
<u>Floodland and Environmentally Sensitive Land Preservation Element</u>														
• Floodplain and wetland zoning	KCPD, KCB	CKDCD, CKCC	VBPC, BVB	PLPC, PLVB	PPPC, PPVB	SLPC, SLVB	TLPC, TLVB	KCPD, KCB	VBPC, BVB	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	TLPC, TLPK	TBPC	VBPC, VBPK	TPPC	RPB, RPK	TSPLU, TSPK	SOPC, SOPK	WPLZ
<u>Floodland Management Plan Element</u> <u>Fox River Watershed^b</u>														
• Removal of 227 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	KCPD	Kenosha County Department of Planning and Development	PPPC	Village of Pleasant Prairie Planning Commission	SLVB	Silver Lake Village Board	TLVB	Twin Lakes Village Board
CKCC	City of Kenosha Common Council	KCPW	Kenosha County Department of Public Works	PPVB	Pleasant Prairie Village Board	SOPC	Town of Somers Planning Commission	TPPC	Town of Paris Planning Commission
CKDCD	City of Kenosha Department of City Development	MPSU	Village of Mount Pleasant Stormwater Utility	RCBDC	Racine County Board of Drain Commissioners	SOPK	Town of Somers Parks Commission	TSPK	Town of Salem Parks Commission
KCB	Kenosha County Board	PLPC	Village of Paddock Lake Planning Commission	RPB	Town of Randall Planning Board	TBPC	Town of Brighton Planning Commission	TSPLU	Town of Salem Planning and Land Use
KCDH	Kenosha County Division of Health	PLPK	Village of Paddock Lake Parks Department	RPK	Town of Randall Park Board	TLPC	Village of Twin Lakes Planning Commission	VBPC	Village of Bristol Planning Commission
KCEM	Kenosha County Emergency Management	PLVB	Paddock Lake Village Board	SLPC	Village of Silver Lake Planning Commission	TLPK	Village of Twin Lakes Board of Park Commissioners	VBPK	Village of Bristol Parks Department
KCHA	Kenosha County Housing Authority	PPPAC	Village of Pleasant Prairie Parks Commission	SLPW	Village of Silver Lake Sanitary Sewer and Public Works Department	TLPRD	Twin Lakes Lake Protection and Rehabilitation District	WPLZ	Town of Wheatland Planning and Zoning Commission

Table 61 (continued)

Mitigation Measures	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 Bristol ^a	Town of Paris	Town of Randall	Town of Salem	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

Table 61 (continued)

Mitigation Measures	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 Bristol ^a	Town of Paris	Town of Randall	Town of Salem	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	--	--	--	VBPC	TPPC	--	--	--	--
• Restoration of prairie conditions ^e	KCPD, WDNR	--	--	--	--	--	--	--	--	--	--	--	--	--
• Restoration of wetland conditions ^f	KCPD, WDNR	--	--	--	--	--	--	--	--	--	--	--	--	--
• Floodproofing of 44 residential, commercial, and agricultural structures	KCHA	--	BVB	PLPB	PPCD	--	--	--	BVB	--	--	TSPLU	SOPC	--
• Elevation of four residential structures	KCHA	--	BVB	--	PPCD	--	--	--	BVB	--	--	--	--	--
• Removal of 13 residential and agricultural structures	KCHA	--	BVB	--	PPCD	--	--	--	BVB	--	--	--	SOPC	--
• Upper Des Plaines River sediment monitoring	WDNR	--	--	--	--	--	--	--	--	--	--	--	--	--
• Brighton Creek replacement of 18th Street crossing	KCPW	--	--	--	--	--	--	--	--	--	--	--	--	--
• Center Creek riprap work	KCPD	--	VBPC	--	--	--	--	--	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

Table 61 (continued)

Mitigation Measures	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 Bristol ^a	Town of Paris	Town of Randall	Town of Salem	Town of Somers	Town of Wheatland
<u>Lake Michigan Direct Drainage Watershed</u>														
• Removal of 13 structures	KCHA	CKDCD	--	--	--	--	--	--	--	--	--	--	SOPC	--
• Continued implementation of land acquisition for the Chiwaukee Prairie-Carol Beach area	KCPW	--	--	--	PPAC	--	--	--	--	--	--	--	--	--
• 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 nine structures	KCHA	--	--	--	--	--	--	--	--	--	--	--	--	--
<u>Stormwater Management Plan Element</u>														
• Stormwater management plans	KCPD	CKSWU	VBPC	PLPB	PPPC	SLZA	TLPRD	--	VBPC	--	--	TSSU	--	--
• Stormwater-related regulations	KCPD	CKSWU	VBPC	PLPB	PPPC	SLZA	TLPRD	--	VBPC	--	--	TSSU	--	--
<u>Public Information and Education Element</u>														
• Public education activities	RPWIN	RPWIN	RPWIN	PLPW	RPWIN	RPWIN	TLPW	--	RPWIN	--	--	RPWIN	RPWIN	--
• Public participation activities and coordination with other agencies and units of government	KCPD	CKDCD, CKSWU	VBPC	PLPB	PPCD	SLPC	TLPC, TLPRD	--	VBPC	--	--	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	PPAC	Village of Pleasant Prairie Parks Commission	SLZA	Village of Silver Lake Zoning Administrator	TLPW	Village of Twin Lakes Public Works Department
CKSWU	City of Kenosha Stormwater Utility	PLPB	Village of Paddock Lake Planning and Building	PPPC	Village of Pleasant Prairie Planning Commission	SOPC	Town of Somers Planning Commission	TSSU	Town of Salem Stormwater Utility
KCHA	Kenosha County Housing Authority	PLPW	Village of Paddock Lake Public Works Department	RPWIN	Root-Pike Watershed Initiative Network	TLPC	Village of Twin Lakes Planning Commission	VBPC	Village of Bristol 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	TLPRD	Twin Lakes Lake Protection and Rehabilitation District		

Table 61 (continued)

Mitigation Measures	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 Bristol ^a	Town of Paris	Town of Randall	Town of Salem	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	TLPW, TLPD	BFDD	VBPW	--	--	TSPW, TSSU	--	--
• Stormwater management facilities maintenance	KCPW	CKSWU, CKPW	VBPW	PLPW	PPPW	SLPW	TLPW	--	VBPW, BFDD	--	--	TSSU, TSHD	--	--
• Survey of buildings near flood hazard areas	KCPW	CKPW	VBPW	PLPW	PPPW	SLPW	TLPW	--	VBPW	--	--	--	--	--
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	--	--	--	--	--	--	--	--	--	--	--	--	--
Promote educational and informational programming, especially related to the early warning network, and to individual actions to protect citizens, property, and businesses	KCEM	--	--	--	--	--	--	--	--	--	--	--	--	--
Review and enforce building code ordinances and requirements	KCPD	CKDCD	VBBI, VBPC	PLPB, PLPC	PPBI, PPPC	SLPC, SLVB	TLBZ, TLPC	--	--	--	--	--	--	--
Continue coordination of emergency operations and response plans among governmental units and first responders	KCEM, KCSD	CKPD, CKFD	VBFD	TSFR	PPPD, PPFD	SLPD, SLFD	TLPD, TLFD	TSFR, KVR	VBFD	PFR	RFD	TSFR	SOFR	WFD

NOTE: Agency abbreviations in the table are as follows:

BFDD	Bristol Farm Drainage District	KCPW	Kenosha County Department of Public Works	PPFD	Village of Pleasant Prairie Fire Department	SLPW	Village of Silver Lake Sanitary Sewer and Public Works Department	TSFR	Town of Salem Fire and Rescue
CKDCD	City of Kenosha Department of City Development	KCSD	Kenosha County Sheriff's Department	PPPC	Village of Pleasant Prairie Planning Commission	SLVB	Silver Lake Village Board	TSHD	Town of Salem Highway Department
CKFD	City of Kenosha Fire Department	KVR	Kansasville Volunteer Fire and Rescue	PPPD	Village of Pleasant Prairie Police Department	SOFR	Somers Fire and Rescue Department	TSSU	Town of Salem Stormwater Utility
CKPD	City of Kenosha Police Department	LI	Lending Institutions	PPPW	Village of Pleasant Prairie Public Works	TLBZ	Village of Twin Lakes Building and Zoning Department	VBBI	Village of Bristol Building Inspector
CKPW	City of Kenosha Public Works Department	PFR	Town of Paris Fire and Rescue	RB	Real Estate Brokers	TLFD	Village of Twin Lakes Fire and Rescue Department	VBFD	Village of Bristol Fire Department
CKSWU	City of Kenosha Stormwater Utility	PLPB	Village of Paddock Lake Planning and Building	RFD	Town of Randall Fire Department	TLPC	Village of Twin Lakes Planning Commission	VBPC	Village of Bristol Planning Commission
FEMA	Federal Emergency Management Agency	PLPC	Village of Paddock Lake Planning Commission	SLFD	Silver Lake Fire Department	TLPD	Village of Twin Lakes Police Department	VBPW	Village of Bristol Public Works Department
KCEM	Kenosha County Emergency Management	PLPW	Village of Paddock Lake Public Works Department	SLPC	Village of Silver Lake Planning Commission	TLPD	Twin Lakes Lake Protection and Rehabilitation District	WFD	Wheatland Fire Department
KCPD	Kenosha County Department of Planning and Development	PPBI	Village of Pleasant Prairie Building Inspector	SLPD	Village of Silver Lake Police Department	TLPW	Village of Twin Lakes Public Works Department		

Table 61 (continued)

Mitigation Measures	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 Bristol ^a	Town of Paris	Town of Randall	Town of Salem	Town of Somers	Town of Wheatland
<u>Tornadoes</u> 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
Promote educational and informational programming, especially related to the early warning network, and to individual actions to protect citizens, property, and businesses	KCEM	--	--	--	--	--	--	--	--	--	--	--	--	--
Review and enforce building code ordinance requirements	KCPD	CKDCD	VBBI, VBPC,	PLPB, PLPC	PPBI, PPPC	SLPC, SLVB	TLBZ, TLPC	--	--	--	--	--	--	--
Continue coordination of emergency response and operations plans among governmental units and first responders	KCEM, KCSD	CKPD, CKFD	VBFD	TSFR	PPPD, PPFD	SLPD, SLFD	TLPD, TLFD	TSFR, KVR	VBFD	PFR	RFD	TSFR	SOFR	WFD

NOTE: Agency abbreviations in the table are as follows:

CKDCD	City of Kenosha Department of City Development	PLPB	Village of Paddock Lake Planning and Building	SLFD	Silver Lake Fire Department	TLPD	Village of Twin Lakes Police Department
CKFD	City of Kenosha Fire Department	PLPC	Village of Paddock Lake Planning Commission	SLPC	Village of Silver Lake Planning Commission	TSFR	Town of Salem Fire and Rescue
CKPD	City of Kenosha Police Department	PO	Property Owners	SLPD	Village of Silver Lake Police Department	VBBI	Village of Bristol Building Inspector
KCEM	Kenosha County Emergency Management	PPBI	Village of Pleasant Prairie Building Inspector	SLVB	Silver Lake Village Board	VBFD	Village of Bristol Fire Department
KCPD	Kenosha County Department of Planning and Development	PPFD	Village of Pleasant Prairie Fire Department	SOFR	Somers Fire and Rescue Department	VBPC	Village of Bristol Planning Commission
KCSD	Kenosha County Sheriff's Department	PPPC	Village of Pleasant Prairie Planning Commission	TLBZ	Village of Twin Lakes Building and Zoning Department	WFD	Wheatland Fire Department
KVR	Kansasville Volunteer Fire and Rescue	PPPD	Village of Pleasant Prairie Police Department	TLFD	Village of Twin Lakes Fire and Rescue Department		
PFR	Town of Paris Fire and Rescue	RFD	Town of Randall Fire Department	TLPC	Village of Twin Lakes Planning Commission		

Table 61 (continued)

Mitigation Measures	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 Bristol ^a	Town of Paris	Town of Randall	Town of Salem	Town of Somers	Town of Wheatland
<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	--	--	--	--	--	--	--	--	--	--	--	--	--
Increase coverage and use of NOAA All Hazard Weather Radio and EAS broadcasts	KCEM	--	--	--	--	--	--	--	--	--	--	--	--	--
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	--	--	PLPC	--	--	--	--	--	--	--	SOPC	--
Develop a cooperative program to assess the effectiveness of Lake Michigan shoreline protection structures in the County	KCPD	CKDCD	--	--	PLPC	--	--	--	--	--	--	--	SOPC	--
Continue construction and maintenance of shoreline protection structures	KCPW	CKPW	--	--	PPPW	--	--	--	--	--	--	--	SOPW	--
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	--	--	--	--	--	--	--	--	--	--	--	--	--

NOTE: Agency abbreviations in the table are as follows:

CKDCD City of Kenosha Department of City Development
 CKPW City of Kenosha Public Works Department
 KCEM Kenosha County Emergency Management
 KCPD Kenosha County Department of Planning and Development

KCPW Kenosha County Department of Public Works
 KCWD Kenosha County Division of Workforce Development
 KWU Kenosha Water Utility
 PLPC Village of Paddock Lake Planning Commission

PPPW Village of Pleasant Prairie Public Works
 SOPC Town of Somers Planning Commission
 SOPW Town of Somers Public Works

Table 61 (continued)

Mitigation Measures	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 Bristol ^a	Town of Paris	Town of Randall	Town of Salem	Town of Somers	Town of Wheatland
<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	--	--	--	--	--	--	--	--	--	--	--	--	--
Increase coverage and use of NOAA All Hazard Weather Radio and EAS broadcasts	KCEM	--	--	--	--	--	--	--	--	--	--	--	--	--
Promote educational and informational programming	KCEM	--	--	--	--	--	--	--	--	--	--	--	--	--
Ongoing review and enforcement of building code ordinance requirements	KCPD	CKDCD	VBBI, VBPC	PLPB, PLPC	PPBI, PPPC	SLPC, SLVB, SLBI	TLBZ, TLPC	--	--	--	--	--	--	--
Work with agencies to establish a system for short-term sheltering	KCEM	--	--	--	--	--	--	--	--	--	--	--	--	--
Continue coordination of emergency response plans among governmental units and first responders	KCEM, KCSD	CKPD, CKFD	VBFD	TSFR	PPPD, PPF	SLPD, SLFD	TLPD, TLFD	TSFR, KVR	VBFD	PFR	RFD	TSFR	SOFR	WFD
Continue and refine State, County, and local road maintenance programs	KCPW	CKPW	VBPW	PLPW	PPPW	SLPW	TLPW	--	VBPW	--	--	TSHD	SOPW	--
Work with utilities to assess and improve electrical service reliability	KCEM, WE	--	--	--	--	--	--	--	--	--	--	--	--	--

NOTE: Agency abbreviations in the table are as follows:

CKDCD	City of Kenosha Department of City Development	KVR	Kansasville Volunteer Fire and Rescue	PPPD	Village of Pleasant Prairie Police Department	SLVB	Silver Lake Village Board	TSFR	Town of Salem Fire and Rescue
CKFD	City of Kenosha Fire Department	PFR	Town of Paris Fire and Rescue	PPPW	Village of Pleasant Prairie Public Works	SOFR	Somers Fire and Rescue Department	TSHD	Town of Salem Highway Department
CKPD	City of Kenosha Police Department	PLPB	Village of Paddock Lake Planning and Building	RFD	Town of Randall Fire Department	SOPW	Town of Somers Public Works	VBBI	Village of Bristol Building Inspector
CKPW	City of Kenosha Public Works Department	PLPC	Village of Paddock Lake Planning Commission	SLBI	Village of Silver Lake Building Inspector	TLBZ	Village of Twin Lakes Building and Zoning Department	VBFD	Village of Bristol Fire Department
KCEM	Kenosha County Emergency Management	PLPW	Village of Paddock Lake Public Works Department	SLFD	Silver Lake Fire Department	TLFD	Village of Twin Lakes Fire and Rescue Department	VBPC	Village of Bristol Planning Commission
KCPD	Kenosha County Department of Planning and Development	PPBI	Village of Pleasant Prairie Building Inspector	SLPC	Village of Silver Lake Planning Commission	TLPC	Village of Twin Lakes Planning Commission	VBPW	Village of Bristol Public Works Department
KCPW	Kenosha County Department of Public Works	PPFD	Village of Pleasant Prairie Fire Department	SLPD	Village of Silver Lake Police Department	TLPD	Village of Twin Lakes Police Department	WE	We Energies
KCSD	Kenosha County Sheriff's Department	PPPC	Village of Pleasant Prairie Planning Commission	SLPW	Village of Silver Lake Sanitary Sewer and Public Works Department	TLPW	Village of Twin Lakes Public Works Department	WFD	Wheatland Fire Department
KCWD	Kenosha County Division of Workforce Development								

Table 61 (continued)

Mitigation Measures	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 Bristol ^a	Town of Paris	Town of Randall	Town of Salem	Town of Somers	Town of Wheatland
<u>Drought Events</u>														
Encourage multi-agency approaches to water conservation, drought prediction, and stream and ground water monitoring	FSA, WDNR, USGS	--	--	--	--	--	--	--	--	--	--	--	--	--
Promote educational and informational programming	KCEM	--	--	--	--	--	--	--	--	--	--	--	--	--
Support agricultural programs that promote soil health, preserve soil moisture, and help to minimize loss of crops and topsoil in 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	--	--	--	BUD1, BUD3	--	--	--	SOWU	--
Encourage farm operators to evaluate the economics of crop insurance programs	FSA	--	--	--	--	--	--	--	--	--	--	--	--	--
<u>Fog</u>														
Organize neighborhood outreach groups who look after vulnerable groups and individuals	KCEM	--	--	--	--	--	--	--	--	--	--	--	--	--
Increase coverage and use of NOAA All Hazard Weather Radio and EAS broadcasts	KCEM	--	--	--	--	--	--	--	--	--	--	--	--	--
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	--	--	--	--	--	--	--	--	--	--	--	--	--

NOTE: Agency abbreviations in the table are as follows:

BUD1	Bristol Utility District No. 1	NRCS	Natural Resources Conservation Service
BUD3	Bristol Utility District No. 3	PLWU	Paddock Lake Water Utility
FSA	U.S. Department of Agriculture Farm Services Agency	PPWU	Village of Pleasant Prairie Water Utility
KCEM	Kenosha County Emergency Management	SOWU	Town of Somers Water Utility
KCPD	Kenosha County Department of Planning and Development	USGS	U.S. Geological Survey
KWU	Kenosha Water Utility	WDNR	Wisconsin Department of Natural Resources

Table 61 (continued)

Mitigation Measures	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 Bristol ^a	Town of Paris	Town of Randall	Town of Salem	Town of Somers	Town of Wheatland
<u>Fire</u>														
Promote activities that physically stop the spread of fire	--	CKFD	VBFD	TSFR	PPFD	SLFD	TLFD	TSFR, KVR	VBFD	PFR	RFD	TSFR	SOFR	WFD
Promote emergency restrictions on fire causing activities	--	CKFD	VBFD	TSFR	PPFD	SLFD	TLFD	TSFR, KVR	VBFD	PFR	RFD	TSFR	SOFR	WFD
Offer training and exercises for local and regional fire fighters and acquire additional fire equipment	KCEM	CKFD	VBFD	TSFR	PPFD	SLFD	TLFD	TSFR, KVR	VBFD	PFR	RFD	TSFR	SOFR	WFD
Map hazard areas and vulnerable structures		CKFD	VBFD	TSFR	PPFD	SLFD	TLFD	TSFR, KVR	VBFD	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	SLFD	TLFD	TSFR, KVR	VBFD	PFR	RFD	TSFR	SOFR	WFD
<u>Transportation Accident-Related Events</u>														
Promote educational and informational programming, especially related to driver safety, and to individual actions to protect citizens, property, and businesses	KCEM	--	--	--	--	--	--	--	--	--	--	--	--	--
Continue to monitor and improve the transportation system through design, routing, and traffic control at problem areas	KCPW	CKPW	VBPW	PLPW	PPPW	SLPW	TLPW	BTB	VBPW	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	TLFD	Village of Twin Lakes Fire and Rescue Department
CKFD	City of Kenosha Fire Department	PTB	Paris Town Board	TLPW	Village of Twin Lakes Public Works Department
CKPW	City of Kenosha Public Works Department	RFD	Town of Randall Fire Department	TSFR	Town of Salem Fire and Rescue
KCEM	Kenosha County Emergency Management	RTB	Randall Town Board	TSHD	Town of Salem Highway Department
KCPW	Kenosha County Department of Public Works	SLFD	Silver Lake Fire Department	VBFD	Village of Bristol Fire Department
KVR	Kansasville Volunteer Fire and Rescue	SLPW	Village of Silver Lake Sanitary Sewer and Public Works Department	VBPW	Village of Bristol Public Works Department
PFR	Town of Paris Fire and Rescue	SOFR	Somers Fire and Rescue Department	WFD	Wheatland Fire Department
PLPW	Village of Paddock Lake Public Works Department	SOPW	Town of Somers Public Works	WTB	Wheatland Town Board
PPFD	Village of Pleasant Prairie Fire Department				

Table 61 (continued)

Mitigation Measures	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 Bristol ^a	Town of Paris	Town of Randall	Town of Salem	Town of Somers	Town of Wheatland
<u>Transportation Accident-Related Events</u> (continued)														
Continue to enforce traffic violations, weight and travel restrictions, and designated truck routes	KCSD, WSP	CKPD	KCSD	KCSD	PPPD	SLPD	TLPD	KCSD	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, SLFD	TLPD, TLFD	TSFR, KVR	VBFD	PFR	RFD	TSFR	SOFR	WFD
Continue to coordinate emergency response plans among governmental units and first responders	KCEM, KCSD	CKPD, CKFD	VBFD	TSFR	PPPD, PPFD	SLPD, SLFD	TLPD, TLFD	TSFR, KVR	VBFD	PFR	RFD	TSFR	SOFR	WFD
<u>Contamination or Loss of Water Supply</u>														
Promote educational and informational programming related to water safety issues	KCEM	KWU	BUD1, BUD3	PLWU	PPWU	--	--	--	BUD1, BUD3	--	--	--	SOWU	--
Encourage multi-agency approaches to water conservation, loss and contamination prevention and trend-monitoring	--	KWU	BUD1, BUD3	PLWU	PPWU	--	--	--	BUD1, BUD3	--	--	--	SOWU	--

NOTE: Agency abbreviations in the table are as follows:

BUD1 Bristol Utility District No. 1
 BUD3 Bristol Utility District No. 3
 CKFD City of Kenosha Fire Department
 CKPD City of Kenosha Police Department
 FAA Federal Aviation Administration
 FRA Federal Railroad Administration
 KCEM Kenosha County Emergency Management
 KCSD Kenosha County Sheriff's Department
 KVR Kansasville Volunteer Fire and Rescue

KWU Kenosha Water Utility
 NTSB National Transportation Safety Board
 PFR Town of Paris Fire and Rescue
 PLWU Paddock Lake Water Utility
 PPFD Village of Pleasant Prairie Fire Department
 PPPD Village of Pleasant Prairie Police Department
 PPWU Village of Pleasant Prairie Water Utility
 RFD Town of Randall Fire Department
 SLFD Silver Lake Fire Department

SLPD Village of Silver Lake Police Department
 SOFR Somers Fire and Rescue Department
 SOWU Town of Somers Water Utility
 TLFD Village of Twin Lakes Fire and Rescue Department
 TLPD Village of Twin Lakes Police Department
 TSFR Town of Salem Fire and Rescue
 VBFD Village of Bristol Fire Department
 WFD Wheatland Fire Department
 WSP Wisconsin State Patrol

Table 61 (continued)

Mitigation Measures	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 Bristol ^a	Town of Paris	Town of Randall	Town of Salem	Town of Somers	Town of Wheatland
<u>Contamination or Loss of Water Supply</u> (continued)														
Prepare emergency operation plans for each public water supply system	--	KWU	BUD1, BUD3	PLWU	PPWU	--	--	--	BUD1, BUD3	--	--	--	SOWU	--
Continue coordination of emergency response plans among governmental units and first responders	KCEM, KCSD	CKPD, CKFD, KWU	VBFD, BUD1, BUD3	TSFR, PLWU	PPPD, PPFD, PPWU	SLPD, SLFD	TLPD, TLFD	TSFR, KVR	VBFD	PFR	RFD	TSFR	SOFR, SOWU	WFD
Prepare and implement wellhead protection plans	--	--	BUD1, BUD3	PLWU	--	--	--	--	BUD1, BUD3	--	--	--	--	--
<u>Hazardous Material Events</u>														
Promote educational and informational programming related to hazardous material safety, and to individual actions to protect citizens, property, and businesses	KCEM	--	--	--	--	--	--	--	--	--	--	--	--	--
Promote community and operator compliance with industry safety regulations and standards	KCLEPC	--	--	--	--	--	--	--	--	--	--	--	--	--
Promote ongoing enforcement of Federal, State, and County regulatory standards	KCLEPC	--	--	--	--	--	--	--	--	--	--	--	--	--
Support existing or consider expansion of household waste management control programs, which should include hazardous material disposal sites for public citizens	KCDH, KCEM, KCB	CKCC	BVB	PLVB	PPVB	SLVB	TLVB	BTB	BVB	PTB	RTB	SATB	SOTB	WTB

NOTE: Agency abbreviations in the table are as follows:

BTB	Brighton Town Board	KCLEPC	Kenosha County Local Emergency Planning Committee	PPWU	Village of Pleasant Prairie Water Utility	SOWU	Town of Somers Water Utility
BUD1	Bristol Utility District No. 1	KCSD	Kenosha County Sheriff's Department	PTB	Paris Town Board	TLFD	Village of Twin Lakes Fire and Rescue Department
BUD3	Bristol Utility District No. 3	KVR	Kansasville Volunteer Fire and Rescue	RFD	Town of Randall Fire Department	TLPD	Village of Twin Lakes Police Department
BVB	Bristol Village Board	KWU	Kenosha Water Utility	RTB	Randall Town Board	TLVB	Twin Lakes Village Board
CKCC	City of Kenosha Common Council	PFR	Town of Paris Fire and Rescue	SATB	Salem Town Board	TSFR	Town of Salem Fire and Rescue
CKFD	City of Kenosha Fire Department	PLVB	Paddock Lake Village Board	SLFD	Silver Lake Fire Department	VBFD	Village of Bristol Fire Department
CKPD	City of Kenosha Police Department	PLWU	Paddock Lake Water Utility	SLPD	Village of Silver Lake Police Department	WFD	Wheatland Fire Department
KCB	Kenosha County Board	PPFD	Village of Pleasant Prairie Fire Department	SLVB	Silver Lake Village Board	WTB	Wheatland Town Board
KCDH	Kenosha County Division of Health	PPPD	Village of Pleasant Prairie Police Department	SOFR	Somers Fire and Rescue Department		
KCEM	Kenosha County Emergency Management	PPVB	Pleasant Prairie Village Board	SOTB	Somers Town Board		

Table 61 (continued)

Mitigation Measures	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 Bristol ^a	Town of Paris	Town of Randall	Town of Salem	Town of Somers	Town of Wheatland
<u>Hazardous Material Events</u> (continued)														
Continue support of training, equipment, planning, and preparedness of first responders	KCEM, KCSD	CKPD, CKFD	VBFD	TSFR	PPPD, PPFD	SLPD, SLFD	TLPD, TLFD	TSFR, KVR	VBFD	PFR	RFD	TSFR	SOFR	WFD
Continue coordination of emergency response plans among governmental units, businesses, and first responders	KCEM, KCSD	CKPD, CKFD	VBFD	TSFR	PPPD, PPFD	SLPD, SLFD	TLPD, TLFD	TSFR, KVR	VBFD	PFR	RFD	TSFR	SOFR	WFD
<u>Terrorism Incidents</u>														
Continue and expand educational and informational programming related to public health and safety issues due to terrorist incidents	KCEM, KCDH	--	--	--	--	--	--	--	--	--	--	--	--	--
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	KCDH	--	--	--	--	--	--	--	--	--	--	--	--	--
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	--	--	--	--	BUD1, BUD3	--	--	--	--	--
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, PPFD	SLPD, SLFD	TLPD, TLFD	TSFR, KVR	VBFD	PFR	RFD	TSFR, TSPS	SOFR	WFD

NOTE: Agency abbreviations in the table are as follows:

BUD1	Bristol Utility District No. 1	KCSD	Kenosha County Sheriff's Department	PPPD	Village of Pleasant Prairie Police Department	TLFD	Village of Twin Lakes Fire and Rescue Department
BUD3	Bristol Utility District No. 3	KVR	Kansasville Volunteer Fire and Rescue	RFD	Town of Randall Fire Department	TSFR	Town of Salem Fire and Rescue
CKFD	City of Kenosha Fire Department	KWU	Kenosha Water Utility	SLFD	Silver Lake Fire Department	TSPS	Town of Salem Department of Public Safety
CKPD	City of Kenosha Police Department	PFR	Town of Paris Fire and Rescue	SLPD	Village of Silver Lake Police Department	VBFD	Village of Bristol Fire Department
KCDH	Kenosha County Division of Health	PLWU	Paddock Lake Water Utility	SOFR	Somers Fire and Rescue Department	WFD	Wheatland Fire Department
KCEM	Kenosha County Emergency Management	PPFD	Village of Pleasant Prairie Fire Department	TLPD	Village of Twin Lakes Police Department		

Table 61 (continued)

Mitigation Measures	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 Bristol ^a	Town of Paris	Town of Randall	Town of Salem	Town of Somers	Town of Wheatland
<u>Terrorism Incidents</u> (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, PPFD	SLPD, SLFD	TLPD, TLFD	TSFR, KVR	VBFD	PFR	RFD	TSFR, TSPS	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, PPFD	SLPD, SLFD	TLPD, TLFD	TSFR, KVR	VBFD	PFR	RFD	TSFR	SOFR	WFD
Continue Citizens Corps Program and encourage citizen involvement	KCEM, SEWCC	--	--	--	--	--	--	--	--	--	--	--	--	--
Establish and train community emergency response team	KCSD	CKFD	VBFD	TSFR	PPFD	SLFD	TLFD	TSFR, KVR	VBFD	PFR	RFD	TSFR	SOFR	WFD
Expand neighborhood watch program	KCSD	CKPD	KCSD	KCSD	PPPD	SLPD	TLPD	KCSD	KCSD	KCSD	KCSD	KCSD	KCSD	KCSD
<u>Power Outages</u>														
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	--	--	--	--	--	--	--	--	--	--	--	--	--

NOTE: Agency abbreviations in the table are as follows:

CKFD	City of Kenosha Fire Department	PFR	Town of Paris Fire and Rescue	SLFD	Silver Lake Fire Department	TSFR	Town of Salem Fire and Rescue
CKPD	City of Kenosha Police Department	PPFD	Village of Pleasant Prairie Fire Department	SLPD	Village of Silver Lake Police Department	TSPS	Town of Salem Department of Public Safety
KCEM	Kenosha County Emergency Management	PPPD	Village of Pleasant Prairie Police Department	SOFR	Somers Fire and Rescue Department	VBFD	Village of Bristol Fire Department
KCSD	Kenosha County Sheriff's Department	RFD	Town of Randall Fire Department	TLFD	Village of Twin Lakes Fire and Rescue Department	WE	We Energies
KVR	Kansasville Volunteer Fire and Rescue	SEWCC	Southeastern Wisconsin Citizen Corps Council	TLPD	Village of Twin Lakes Police Department	WFD	Wheatland Fire Department

Footnotes to Table 61

^aOn July 4, 2010, the Village of Bristol annexed the Town of Bristol. As of that date, the plan implementation responsibilities of the former Town are assigned to the Village.

^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.

^cThis mitigation measure is the recommended alternative from SEWRPC Planning Report No. 9, A Comprehensive Plan for the Root River Watershed, July 1966.

^dThese 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.

^eThese mitigation measures are the recommended alternatives from SEWRPC Planning Report No. 44, A Comprehensive Plan for the Des Plaines River Watershed, June 2003.

^fPrairie and wetland restoration to be carried out at discretion of property owners.

Source: SEWRPC.

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 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. 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.

Public Assistance Program

FEMA's Public Assistance Program 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. The Public Assistance Program may pay for mitigation measures under Section 406 of the Stafford Act.

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.

Repetitive Flood Claims Program

FEMA's Repetitive Flood Claims Program (RFC) provides funds on an annual basis to reduce the risk of flood damage to individual properties insured under the NFIP that have had one or more claim payments for flood damages. RFC provides up to 100 percent Federal funding for projects in communities that meet the reduced capacity requirements. Examples of eligible projects include property acquisition, structure removal or relocations, dry floodproofing of nonresidential structures and historic residential structures and minor localized flood reduction projects.

Severe Repetitive Loss Program

FEMA's Severe Repetitive Loss Program (SRI) provides funds on an annual basis to reduce the risk of flood damage to residential structures insured under the NFIP that are qualified as severe repetitive loss structures. SRL provides up to 90 percent Federal funding for eligible projects. Examples of eligible projects include property acquisition, structure removal or relocations, structure elevation, dry floodproofing of residential structures, mitigation reconstruction, and minor localized flood reduction projects.

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 Commerce.

The Community Development Block Grant Emergency Assistance Program is a special program that the Wisconsin Department of Commerce, Division of Housing and Community Development 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.² 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 municipal telecommunications. Grant funds are available on a continual basis. The maximum grant for any single applicant is \$750,000, 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.

²*HUD 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.*

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 205—Small flood control projects. Maximum of \$7.0 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 July 15 of each calendar year.

Urban Green Space Program

The WDNR’s Urban Green Space (UGS) program provides 50 percent matching grants to cities, villages, towns, counties, public inland lake protection and rehabilitation districts, and qualified nonprofit conservation organizations for the acquisition of land. The intent of the program is to provide natural open space within or near urban areas and protect scenic or ecological features.

Urban Rivers Grants Program

The WDNR’s Urban Rivers Grants Program (URGP) provides 50 percent matching grants to municipalities to acquire land or rights to land on or adjacent to rivers that flow through urban areas, in order to preserve or restore urban rivers or riverfronts for the purposes of economic revitalization and the encouragement of outdoor recreational activities.

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 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. The maximum possible grant is \$200,000 (\$150,000 for construction activities and \$50,000 for land acquisition or easements). 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 All Hazards Mitigation Plan Task Force 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 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 in the form of 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 Task Force, in its review process, will periodically examine 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 Task Force, 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 Task Force or the County Board.

The meetings of the Task Force 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 Task Force are considered public meetings under Wisconsin Law and are open to all interested parties.

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 Task Force 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 aforementioned annual meeting of the Task Force.

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 at a minimum of five-year intervals. The Director of the Kenosha County Division of Emergency Management will be responsible for scheduling the meetings of the Local Emergency Planning Committee (LEPC) and the County Board to reevaluate and update the plan. The meetings will be open to the public and advertised in the local newspaper to solicit public input. The LEPC and the County Board 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. The LEPC and the County Board, soliciting input from the public, will review the vulnerability assessment portions of the plan to determine if this information should be updated or modified, including 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. The status report will be published in the local newspaper to update local citizens.

The Director of the Kenosha County Division of Emergency Management will be responsible for the five-year update of the plan. Reevaluation, updating, and revision of this updated plan should be initiated approximately 24 months prior to expiration of this updated plan. The Director will make appropriate changes to the plan before submitting it to the LEPC, the County Board, and the public for review and approval. Before the end of the five-year period, the updated plan will be submitted to the State Hazard Mitigation Office and FEMA for acceptance.

The Director of the Kenosha County Division of Emergency Management will notify all holders of the plan when changes have been made.

Incorporating Existing Planning Mechanisms

The Hazard Mitigation Plan Task Force 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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APPENDICES

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Appendix A

KENOSHA COUNTY HAZARD MITIGATION TASK FORCE MEETING 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 ALL HAZARDS MITIGATION PLAN TASK FORCE

Michael Boozer Chief Executive Officer, ChemReport, Inc.
Joseph E. Boxhorn..... Senior Planner, Southeastern Wisconsin Regional Planning Commission
John Burg Village Administrator, Village of Paddock Lake
Steven Carlson..... Risk Management Officer, University of Wisconsin-Parkside
David Cox..... Village Administrator, Village of Twin Lakes
Michelle Eisenhauer Central Services Manager, Kenosha County Human Services
Patrick Finnemore Director of Facilities, Kenosha Unified School District No. 1
William Glembocki Chairman, Town of Wheatland
Roxanne K. Gray State Hazard Mitigation Officer, Wisconsin Division of Emergency Management
Paul Guilbert, Jr. Fire Chief, Pleasant Prairie Fire and Rescue
Michael G. Hahn Chief Environmental Engineer, Southeastern Wisconsin Regional Planning Commission
William Hoare Associate Vice President, Carthage College
Don Howland Captain, City of Kenosha Fire Department
Jim Huff..... Supervisor, Kenosha County
Mark Krueger Lieutenant, Kenosha County Sheriff's Department
Eric Kuhart Security Director, Carthage College
Lewis Lindquist..... Captain, Kenosha Police Department
John Meland Chief Economic Development Planner, Southeastern WI Regional Planning Commission
George Melcher Director, Kenosha County Department of Planning and Development
Mark Melotik..... Kenosha County Health Department
Edwin L. Morris Senior Engineer, We Energies
Bill Morris Administrator, Town of Somers
Aaron Owens Research Analyst, Southeastern Wisconsin Regional Planning Commission
Peter Parker Fire Chief, Town of Bristol Fire Department
Katie Pedicone..... Community Office Director, American Red Cross of Southeastern Wisconsin
Michael Pollocoff Village Administrator, Village of Pleasant Prairie
Tim Popanda..... Building Inspector, Village of Pleasant Prairie
Ben Schliesman Director, Kenosha County Division of Emergency Management
Rick Schroeder Assistant City Planner, City of Kenosha
James M. Smith Chairman, Town of Somers
Michael Spence Village Engineer, Village of Pleasant Prairie
Mark Starzyk Chairperson, Kenosha County Housing Authority
Bob Stoll..... Chairperson, Town of Randall
Mike Slover Chief, Town of Salem Fire/Rescue
Linda Valentine Chairperson, Town of Salem
Brian Wagner Chief of Police, Village of Pleasant Prairie
Tedi Winnett..... Director, Kenosha County UW-Extension

Figure A-2

ACTIVITIES OF THE KENOSHA COUNTY ALL HAZARDS MITIGATION PLAN TASK FORCE

Kenosha County Division of Emergency Management
Southeastern Wisconsin Regional Planning Commission

Notice of Meeting and Agenda

KENOSHA COUNTY HAZARD MITIGATION TASK FORCE

DATE: September 28, 2009

TIME: 1:30 to 3:30 p.m.

PLACE: Kenosha County Center
Public Hearing Room
19600 - 75th Street
Bristol, Wisconsin

AGENDA:

1. Welcome: County Executive Jim Kreuser
2. Introductions
3. Overview of hazard mitigation plan updating process: Roxanne K. Gray, State Hazard Mitigation Officer, Wisconsin Division of Emergency Management
4. Overview of ongoing buyouts of flood prone buildings along the Fox River in Kenosha County: John Meland, SEWRPC Chief Economic Development Planner and Executive Director, Kenosha County Housing Authority
5. Background on the update to the Kenosha County Hazard Mitigation Plan: Michael G. Hahn, SEWRPC Chief Environmental Engineer
 - a. Initial 2004/2005 plan
 - b. Main plan components to be reviewed and revised
 - c. Schedule for the plan update (Attachment 1)
6. Review of preliminary draft Chapter I, "Introduction and Background," of SEWRPC Community Assistance Planning Report No. 278 (CAPR No. 278), 2nd Edition, *Kenosha County Hazard Mitigation Plan Update: 2011-2015* (SEWRPC staff) [**NOTE: Preliminary draft chapters can be viewed at sewrpc.org, click on "Environmental Planning" in the left margin, then "Kenosha County Hazard Mitigation Plan Update", then select the chapter that you want to review. Chapter I will be posted on the web page on or before September 14. Meeting summary notes and meeting agendas can also be accessed from that web page.**]
7. Connection between the ongoing County comprehensive plan and the hazard mitigation plan update (maps and tables will be distributed at the meeting): Ben Schliesman, Director, Kenosha County Emergency Management/Homeland Security and Joseph E. Boxhorn, SEWRPC Senior Planner
8. Review of hazard mitigation goals established for the 2004/2005 plan (Attachment 2): Mike Hahn
9. Hazard and vulnerability assessment exercise (Attachment 3): Ben Schliesman

10. Other business
11. Next meeting
12. Adjourn

Michael G. Hahn
Secretary

Enclosures

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Attachment 1

**WORK SCHEDULE FOR UPDATING THE
KENOSHA COUNTY HAZARD MITIGATION PLAN**

Task	Estimated Completion Date
Update Planning Team Membership	August 2009
Kickoff Meeting	September 2009
Survey Designated Management Agencies Regarding Status of Implementation of Original Plan	September 2009 through November 2009
Public Participation	September 2009 through July 2010
Review of Established Goals and Objectives	September through December 2009
Submit Second Quarterly Report to Wisconsin Division of Emergency Management	September 10, 2009
Develop Updated Community Profiles Consistent with the Ongoing County Comprehensive Plan	October 2009
Identify and Describe Hazards	October through December 2009
Update Risk and Vulnerability Assessments	November 2009 through January 2010
Submit Third Quarterly Report to Wisconsin Division of Emergency Management	December 10, 2010
Submit Fourth Quarterly Report to Wisconsin Division of Emergency Management	March 10, 2010
Develop Updated Mitigation Actions	April 2010
Develop Plan Maintenance Process	June 2010
Submit Draft Plan Update	July 31, 2010
Revise Plan Based on State Review	October 2010 through December 2010
Formal Adoption	January 2011 through February 2011
Submit Final Plan Update for Approval	March 10, 2011

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08/07/09

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 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 and that minimizes hazards and dangers to health, welfare, and safety, as well as further enhancing the economic base of the County.
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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¹SEWRPC Community Assistance Planning Report No. 278, Kenosha County Hazard Mitigation Plan, November 2004, April 2005 revisions.

Attachment 3

HAZARD AND VULNERABILITY ASSESSMENT TOOL KENOSHA COUNTY HAZARD MITIGATION PLAN UPDATE						
EVENT	PROBABILITY	SEVERITY = (MAGNITUDE - MITIGATION)				RISK
		HUMAN IMPACT	PROPERTY IMPACT	BUSINESS IMPACT	PREPARED-NESS	
SCORE	Likelihood this will occur 0 = N/A 1 = Low 2 = Moderate 3 = High	Possibility of death or injury 0 = N/A 1 = Low 2 = Moderate 3 = High	Physical losses and damages 0 = N/A 1 = Low 2 = Moderate 3 = High	Interruption of services 0 = N/A 1 = Low 2 = Moderate 3 = High	Preplanning 0 = N/A 1 = High 2 = Moderate 3 = Low or none	Relative threat* 0 - 100%
A1. Riverine flooding						0%
A2. Stormwater flooding						0%
A3. Lake flooding						0%
A2. Tornado or high straight-line wind event						0%
A3. Earthquake						0%
A4. Lake Michigan coastal erosion (long-term lake level changes)						0%
A5b. Snow storm						0%
A5f. Blizzard or extreme snowfall						0%
A5h. Ice storm						0%
A5c. Extreme heat						0%
A5d. Extreme cold						0%
A5a. Lightning						0%
A5k. Thunderstorm						0%
Hail						0%
A5e. Fog						0%
A5i. Drought						0%
A5j. Dust storm						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%
C5. Aircraft (flight path)						0%
Roadway transportation accidents						0%
Railway transportation accidents						0%
D1. Correctional center incident						0%
D2. Civil unrest						0%
D3. Terrorism incident (bomb threat, hostage situation, biological incident)						0%
E3. Biological contaminants (anthrax, smallpox, etc.)						0%
Contamination or loss of water supply system						0%
D4. Workplace violence						0%
D5. School violence						0%
E1. Radon gas						0%
E2. Communicable disease outbreak or epidemic						0%
F1. Major fire (structure(s) or rural area wild fire or grain field fire)						0%
F2. Explosion						0%
F3. Mass casualty incident						0%
F4. Building collapse or cave-in						0%
G1. Quarries						0%
G2. Landfills						0%
G3. Wild animals						0%
G4. Insects						0%
G5. Recreational vehicles (snowmobiles)						0%
AVERAGE SCORE	0.00	0.00	0.00	0.00	0.00	0%

*Threat increases with percentage.

RISK = PROBABILITY * SEVERITY		
0.00	0.00	0.00

Source: Kaiser Permanente and SEWRPC.

DOCS #146344					
MGH/pk					
8/7/2009					

SUMMARY NOTES OF THE SEPTEMBER 28, 2009, MEETING OF THE KENOSHA COUNTY HAZARD MITIGATION TASK FORCE

INTRODUCTION

The first meeting of the Kenosha County Hazard Mitigation Task Force was convened at the Kenosha County Center Public Hearing Room at 1:35 p.m. The meeting was called to order by Kenosha County Division of Emergency Management Director, Ben Schliesman. Attendance was taken by circulating a sign-in sheet and a quorum was declared present.

In attendance at the meeting were the following individuals:

Ben Schliesman, Chairman	Director, Kenosha County Division of Emergency Management
Michael G. Hahn, Secretary	Chief Environmental Engineer, Southeastern Wisconsin Regional Planning Commission
Michael Boozer	Chief Executive Officer, Chemreport
Joseph E. Boxhorn	Senior Planner, Southeastern Wisconsin Regional Planning Commission
John Burg	Village Administrator, Village of Paddock Lake
Steven Carlson	Risk Management Officer, University of Wisconsin-Parkside
Michelle Eisenhauer	Central Services Manager, Kenosha County Department of Human Services
Patrick Finnemore	Director of Facilities, Kenosha Unified School District No. 1
William Glembocki	Chairperson, Town of Wheatland
Roxanne K. Gray	State Hazard Mitigation Officer, Wisconsin Division of Emergency Management
Paul Guilbert, Jr.	Chief, Pleasant Prairie Fire and Rescue
William Hoare	Associate Vice President, Carthage College
Don Howland	Captain, City of Kenosha Fire Department
Jim Huff	Supervisor, Kenosha County
Mark Krueger	Lieutenant, Kenosha County Sheriff's Department
George E. Melcher	Director, Kenosha County Department of Planning and Development
Mark Melotik	Kenosha County Health Department
Bill Morris	Town Administrator, Town of Somers
Edwin Morris	WE Energies
Aaron Owens	Research Analyst, Southeastern Wisconsin Regional Planning Commission
Peter Parker	Chief, Town of Bristol Fire Department
Katie Pedicone	Community Office Director, American Red Cross of Southeastern Wisconsin
Michael Pollocoff	Village Administrator, Village of Pleasant Prairie
Tim Popanda	Building Inspector, Village of Paddock Lake
Rick Schroeder	Assistant City Planner, City of Kenosha
James M. Smith	Chairperson, Town of Somers
Michael Spence	Village Engineer, Village of Pleasant Prairie
Mark Starzyk	Chairman, Kenosha County Housing Authority
Bob Stoll	Chairperson, Town of Randall
Mike Stover	Chief, Town of Salem Fire/Rescue
Linda Valentine	Chairperson, Town of Salem
Brian Wagner	Chief of Police, Village of Pleasant Prairie Police Department
Tedi Winnett	Director, Kenosha County UW Extension

Mr. Schliesman welcomed all those in attendance and thanked them for their interest and participation in this important program. He noted that the Federal Emergency Management Agency (FEMA) requires an updated hazard mitigation plan every five years and that this plan ensures eligibility for FEMA mitigation grants for communities within the County. Mr. Schliesman explained that at the end of the planning process, the County will send a resolution to all communities to adopt the updated plan. He noted the importance for every community to participate in the planning process and to adopt the final plan in order to maintain eligibility for FEMA mitigation grants. Mr. Schliesman noted that attendance would be taken via a sign in sheet. He then asked each of those in attendance to introduce themselves.

OVERVIEW OF HAZARD MITIGATION PLAN UPDATING PROCESS

Mr. Schliesman introduced Roxanne Gray of the Wisconsin Division of Emergency Management. At Mr. Schliesman's request, Ms. Gray presented an overview of hazard mitigation plan updating process.

[Secretary's Note: Ms. Gray's presentation is attached hereto as Exhibit A.]

Mr. Schliesman commented on one of the mitigation examples Ms. Gray cited, stating that non-weather related hazards, such as chemical spills, are now broadcast on NOAA weather radios in addition to weather related hazards.

OVERVIEW OF ONGOING BUYOUTS OF FLOODPRONE BUILDINGS ALONG THE FOX RIVER IN KENOSHA COUNTY

Mr. Schliesman informed the Task Force that John Meland, SEWRPC Chief Economic Development Planner and Executive Director of the Kenosha County Housing Authority, who was scheduled to present an overview of the buyout program for floodprone buildings in Kenosha County was unable to attend the meeting. Mr. Meland will present this overview at a subsequent meeting.

BACKGROUND ON THE UPDATE TO THE KENOSHA COUNTY HAZARD MITIGATION PLAN

Mr. Schliesman introduced Michael G. Hahn of the SEWRPC staff. At Mr. Schliesman's request, Mr. Hahn presented background information on the initial hazard mitigation plan, the main plan components to be reviewed, and a schedule for the plan update.

[Secretary's Note: Mr. Hahn's presentation is attached hereto as Exhibit B.]

Mr. Hahn stated that as the update of the plan proceeds SEWRPC staff will present updated text to the Task Force and look for comments and updated information from the Task Force. Mr. Hahn noted that he anticipated that the plan update process will require two or three more meetings. He indicated that it is important that each local unit of government participate in the plan updating process and adopt the updated plan in order to maintain eligibility for hazard mitigation grants from FEMA. Mr. Hahn noted that he was encouraged to see many local partners represented on the Task Force.

REVIEW OF PRELIMINARY DRAFT CHAPTER I, "INTRODUCTION AND BACKGROUND", OF SEWRPC COMMUNITY ASSISTANCE PLANNING REPORT NO. 278 (CAPR NO. 278), 2ND EDITION, KENOSHA COUNTY HAZARD MITIGATION PLAN UPDATE: 2011-2015

Mr. Schliesman introduced Joseph E. Boxhorn of the SEWRPC staff. At Mr. Schliesman's request, Mr. Boxhorn reviewed the preliminary draft of Chapter I, "Introduction and Background."

[Secretary's Note: Mr. Boxhorn's presentation is attached hereto as Exhibit C.]

Mr. Boxhorn noted that the Commission staff used Chapter I from the initial report as a template for this draft of the updated chapter. He indicated that significant changes and additions to the text are highlighted. He reiterated that FEMA regulations require that all jurisdictions covered by a multi-jurisdictional plan participate in the planning process. He stated that Table I-1 will summarize participation.

Mr. Boxhorn stated that the draft chapter also documents plan maintenance activities for the time period 2005 to 2009. Tables I-2 and I-3 list local government outreach and hazard mitigation activities, respectively. He noted that these tables are currently blank, and stated that County staff and Commission staff will require information from the municipalities on their activities in order to complete these tables.

Mr. Boxhorn explained to the Task Force they may submit feedback and comments on the plan via the comments page on the SEWRPC website. Mr. Hahn informed the Task Force that a copy of the webpage was included in the handouts.

[Secretary's Note: A copy of the comments page is attached hereto as Exhibit D.]

CONNECTION BETWEEN COUNTY COMPREHENSIVE PLAN AND HAZARD MITIGATION PLAN UPDATE

Mr. Boxhorn called the Task Force's attention to the sets of maps and tables from the ongoing Kenosha County Comprehensive Plan that were distributed to each Task Force member. He explained that County and Commission staff will adapt this material for use in the updated Hazard Mitigation Plan. Mr. Boxhorn asked the Task Force to review the maps and inform him on any updates or changes. Mr. Boxhorn reminded the Task Force that any updates, changes, or comments can be submitted through the comments page on the SEWRPC website or through email.

REVIEW OF HAZARD MITIGATION GOALS ESTABLISHED FOR THE 2004/2005 PLAN

Mr. Hahn asked the Task Force to review the set of eight hazard mitigation goals established for the 2004/2005 plan. He requested any need for changes or additions be brought to his attention.

REVIEW OF HAZARD AND VULNERABILITY ASSESSMENT EXERCISE

Mr. Schliesman asked the Task Force to review the Hazard and Vulnerability Assessment Tool attached to the meeting agenda. Mr. Hahn indicated that this form contained the list of hazards considered in the development of the initial plan in addition to several other hazards that were subsequently added. Mr. Schliesman explained to the Task Force how to complete the Hazard and Vulnerability Assessment Tool, and he asked them to complete the tool. Mr. Schliesman noted that the exercise could be completed at the meeting and returned or completed at a later time and submitted via email. Completed forms could also be mailed to the SEWRPC or County office. He indicated that the results from the assessment tool would be distributed with the meeting minutes.

[Secretary's Note: A summary of the results from the Hazard and Vulnerability Assessment Tool is attached hereto as Exhibit E.]

Mr. Howland asked if the assessments should be made in terms of personal experience through his job or viewed as an overall assessment of the County. Mr. Hahn explained that the tool is subjective, and that his answers could be based on both local and countywide perceptions.

CONCLUDING DISCUSSION

Mr. Melcher noted the Hazard Mitigation Plan is very important to the work of John Meland and Mark Starzyk of the Kenosha County Housing Authority in their efforts to purchase and remove floodprone buildings from the floodplain of the Fox River. Mr. Schliesman noted that Paddock Lake also received funds for buyouts.

Ms. Gray noted that a loss avoidance study for Kenosha County that examines how much money was saved by the floodprone structure buyout program should be completed soon. She also noted that the focus of the Task Force should not be limited to flood mitigation, but should include the entire range of hazards that impact the County.

TIME AND DATE OF NEXT MEETING

Mr. Hahn stated that the Task Force would be notified by electronic mail regarding the date and time of the next meeting. He noted he anticipates that the next meeting will take place in early 2010. He indicated that a notice, agenda, materials to review, and minutes would be sent out about a week ahead of the meeting.

ADJOURNMENT

There being no further business, the meeting was adjourned by unanimous consent at 2:34 p.m.

Respectfully Submitted,

Michael G. Hahn
Secretary

Attachments

#147601 V1 - CAPR-278-2ED SUMMARY NOTES 09/28/09
330-3022
MGH/AWO/JEB/pk
02/01/10, 02/08/10

Exhibit A

HAZARD MITIGATION

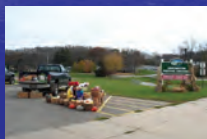
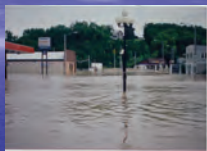
Roxanne Gray
Wisconsin Emergency Management
608-242-3211
Roxanne.gray@wisconsin.gov

What is Mitigation?

- Mitigation is any action taken to eliminate or reduce the long-term risk to human life and property from natural and technological hazards

Break the Cycle

- Mitigation is one of the phases of emergency management (preparedness, response and recovery)
- Can occur in any phase
- Only phase that breaks the cycle
 - Damage, repair, damage



Mitigation Examples



- Structural (dams, retention ponds, levees)
- Land-use planning
- Stronger building codes
- Removing persons out of harms way

More Examples

- Raise appliances and utilities
- Install back-flow valves
- Proper landscaping
- Retrofit for wind resistance
- Construct a safe room
- Mobile Home Tie-Downs
- NOAA Weather Radios
- Education and Public Awareness
- INSURANCE (flood and sewer)

Why Mitigation

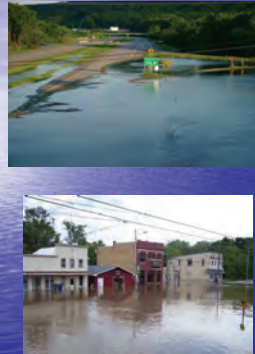
- \$3 billion in Disaster-related damages last 3 decades
- 12 Federal Disaster Declarations in the 90's compared to 6 in the 80's
- 2000, 2001, two in 2002, 2004, 2007, 2008 plus 2 snow emergencies

2008 Floods

- 31 counties (30 for IA and 30 for PA)
- \$763,618,860 + in damages
- Incident period June 5 to July 25
- "Incident of National Significance"



- Interstates and hundreds of state and local roads closed
- DNR monitored over 200 dams
- WEM provided over 700,000 sandbags
- 35 shelters – 2,623 people
- 7 Fixed Feeding Sites and 36 Mobile Feeding Sites for 77,065 meals
- 2,500 wells tested; 28% contaminated
- 161 WWTP diverted raw sewage – 90 million gallons
- 3 confirmed deaths
- Set records on 38 river gauges
- 810 square miles of land flooded



FEMA INDIVIDUAL ASSISTANCE

- 40,814 registrations for Individual Assistance; \$55,504,924 disbursed
 - Home Repair
 - Rental Assistance
 - Other Needs Assistance
- 1,965 SBA low-interest loans approved for \$48,728,400
- 9,844 visited 16 DRCs & 3 mobile DRCs



KENOSHA COUNTY

- 57 households eligible for Individual assistance totaling \$223,665.84
- 4 SBA low-interest disaster loans for \$83,200

PUBLIC ASSISTANCE



- Estimated \$76 million in eligible damages to public infrastructure and emergency response costs
- 858 applicants (local and state governments and PNPs) for assistance

For every dollar spent on mitigation, \$4 is saved in future damages.

(Per the National Institute of Building Sciences -2005)



Reasons to Plan

- Disasters cost too much
- State/Federal aid insufficient
- Can prevent damages
- Less impact and speed response and recovery process
- Mitigation happens at the local level



DMA2K

- Disaster Mitigation Act of 2000
- PL 106-390 signed into law 10/30/00
- Establish a national disaster hazard mitigation program
 - Section 203 – Pre-Disaster Mitigation Program
 - Section 322 – Mitigation Planning Requirement

Vision

- To reduce disaster losses thru pre-disaster mitigation planning by pre-identifying, cost-effective mitigation.
- Mitigation planning would then streamline and speed up the recovery process

State Hazard Mitigation Plan Goals

- Minimize human, economic and environmental disruption from natural hazards;
- Enhance public education about disaster preparedness and resistance, and expand public awareness of natural hazards;
- Encourage hazard mitigation planning;

- Support intergovernmental coordination and cooperation among federal, state and local authorities regarding hazard mitigation activities; and
- Improve the disaster resistance of buildings, structures, and infrastructure whether new construction, expansion or renovation.

Planning Criteria Criteria (Section 201.6)

- Planning Process
- Risk Assessment
- Mitigation Strategy
- Plan Maintenance Process
- Plan Adoption
- Plan Review

PLANNING DEADLINES

- Must have an approved All Hazards Mitigation Plan to receive PDM, HMGP, FMA, SRL (exception RFC)
- Local Plans have to be reviewed, updated, and re-approved every 5 years
- Kenosha County's Plan expires 1/6/11

5-Year Plan Update Requirements

- Review recommended revisions from the review of the approved plan
- Follow Plan Maintenance Section of the approved plan; if different document the new process
- Evaluate, review, analyze and update each section of the plan

- Follow federal and state guidance
- Address any data deficiencies identified in the first plan
- Formally adopted by participating jurisdictions
- Approved by the State and FEMA
- FEMA Local Plan Update Guidance (7-1-08)

Things to Consider

- Goals and objectives still current
- Update data in the risk assessment
- Include data on disasters that may have occurred since the initial plan
- Have hazards change? Any new hazards
- Have conditions changed
- Have priorities changed

- Have data deficiencies been addressed or do they still exist
- Do mitigation recommendations need to be revised or new ones added based on changed conditions
- Document progress on mitigation actions taken since last update
- Are there changes in levels of funding
- Implementation problems


HAZARD MITIGATION ASSISTANCE

- Hazard Mitigation Grant Program (HMGP)
 - 1998: \$1,094,835 (18 structures)
 - 2000: \$643,997 (9 structures)
 - 2001: \$414,500 (5 structures)
 - 2004: \$798,470 (26 structures)
 - 2007: \$1,392,414 (23 structures)
 - 2008: \$242,450 (2 structures); \$2,335,265 (16 structures – pending approval)
 - 2008: \$40,000 (update mitigation plan)



- Flood Mitigation Assistance Program (FMA)
 - 1996: \$6,000 (flood mitigation plan)
 - 1999: \$166,800 (2 structures)
 - 2001: \$53,448 (1 structure)
 - 2007: \$180,441 (1 structure)
- Pre-Disaster Mitigation Program (PDM)
 - 2002: \$24,000 (all hazard mitigation plan)
 - 2003: \$390,073 (3 structures)

- Total Planning Grants: \$70,000
- Total Project Grants: \$7,712,693
- 106 structures

Exhibit B

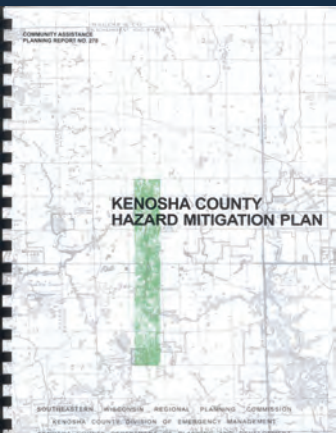


**KENOSHA COUNTY
HAZARD MITIGATION PLAN UPDATE TASK FORCE
MEETING 1: SEPTEMBER 28, 2009**

#147173

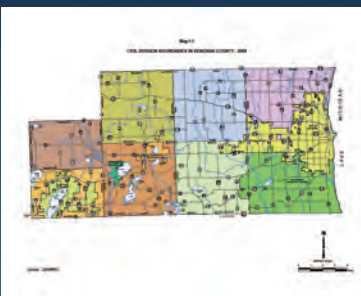
Report was Published
in 2005



2

**BACKGROUND ON THE COUNTY HAZARD
MITIGATION PLAN**

- 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




3



**BACKGROUND ON THE COUNTY
HAZARD MITIGATION PLAN**

- 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.

4



**2005 Plan Components to be
Reviewed and Revised**

- Survey communities regarding status of implementation of original plan
- Update community profiles consistent with the ongoing County comprehensive plan
- Review established plan goals and objectives
- Identify and describe hazards
- Update risk and vulnerability assessments
- Develop updated mitigation activities
- Plan maintenance process


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**WORK SCHEDULE FOR UPDATING THE
RACINE COUNTY HAZARD MITIGATION PLAN (Agenda Attachment 1)**

Task	Estimated Completion Date
Update Planning Team Membership	August 2009
Kickoff Meeting	September 2009
Survey Designated Management Agencies Regarding Status of Implementation of Original Plan	September 2009 through November 2009
Public Participation	September 2009 through July 2010
Review of Established Goals and Objectives	September through December 2009
Submit Second Quarterly Report to Wisconsin Division of Emergency Management	September 10, 2009
Develop Updated Community Profiles Consistent with the Ongoing Plan	October 2009
Identify and Describe Hazards	October through December 2009
Update Risk and Vulnerability Assessments	November 2009 through January 2010
Submit Third Quarterly Report to Wisconsin Division of Emergency Management	December 10, 2009
Submit Fourth Quarterly Report to Division of Emergency Management	March 10, 2010
Develop Updated Mitigation Actions	April 2010
Develop Plan Maintenance Process	June 2010
Submit Draft Plan Update	July 31, 2010
Revise Plan Based on State Review	October 2010 through December 2010
Formal Adoption	January 2011 through February 2011
Submit Final Plan Update for Approval	March 10, 2011


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Review Hazard Mitigation Goals for 2005 Plan (Agenda Attachment 2)

- Land Use:** A spatial distribution of the various land uses that minimizes hazards and dangers to health, welfare, and safety 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 and that minimizes hazards and dangers to health, welfare, and safety, as well as further enhancing the economic base of the County.
- 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.


7



Review Hazard Mitigation Goals for 2005 Plan (Agenda Attachment 2)

- 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.
- 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.
- 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.

8



Review Hazard Mitigation Goals for 2005 Plan (Agenda Attachment 2)

- 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.
- 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.

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.

9

Review Hazards and Vulnerability Assessment Tool (Agenda Attachment 3)

Hazard	Exposure				Vulnerability	Risk
	Population	Property	Infrastructure	Environment		
Earthquake	100,000	50,000	10,000	5,000	High	Very High
Flood	200,000	100,000	20,000	10,000	Medium	High
Wildfire	50,000	25,000	5,000	2,500	Low	Medium
Aviation	10,000	5,000	1,000	500	Very Low	Low
Biological	5,000	2,500	500	250	Very Low	Very Low
Chemical	2,500	1,250	250	125	Very Low	Very Low
Climate Change	1,000	500	100	50	Very Low	Very Low
Other	500	250	50	25	Very Low	Very Low

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Exhibit C

KENOSHA COUNTY HAZARD MITIGATION PLAN UPDATE



CHAPTER 1: INTRODUCTION AND BACKGROUND

Table I-1
PARTICIPATION IN THE KENOSHA COUNTY ALL HAZARDS MITIGATION PLAN UPDATE PLANNING PROCESS

		Attendance at Task Force Planning Meetings			
	Civil Division	September 28, 2009			<div>Provision of Data</div> <div>Review of Report</div>
Cities					
	Kericho				
Villages					
	Paddock Lake				
	Pleasant Plains				
	Silver Lake				
	Twin Lakes				
Towns					
	Brighton				
	Brink				
	Paris				
	Randall				
	Salem				
	Somers				
	Whiteland				
County					
	Kericho County				

Table I-2

**OUTREACH ACTIVITIES BY LOCAL COMMUNITIES IN
KENOSHA COUNTY RELATED TO HAZARD MITIGATION: 2005-2009**

[illegible]

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

Table I-3
HAZARD MITIGATION ACTIVITIES IN KENOSHA COUNTY: 2005-2009

[illegible]

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

**SUBMIT FEEDBACK
ON THE STUDY ONLINE:**

<http://www.sewrpc.org/environmental/kenosha-hazard-mitigation/feedback.asp>

Southwestern National Regional Planning Commission



Southwestern National
Regional Planning
Commission
4000 North Central Expressway
Suite 100
Dallas, Texas 75245-3000
Phone: 214/343-1212
Fax: 214/343-1213
E-Mail: info@sw-nrpc.com

**Keweenaw County Hazard Mitigation Plan
Update**

Consent on the Plan

I, the Sign below, hereby consent to the Keweenaw County Hazard Mitigation Plan Update, a report of the Keweenaw County Hazard Mitigation Committee, as authorized by the Keweenaw County Board of Commissioners, and I agree to provide to the County Board and to the Commission for dissemination in preparing the Final Plan.

 Title: _____
 Name: _____
 Address: _____
 City: _____
 State: _____
 Zip: _____

☐ *Indicates a required field.

Please the "Signature" button when finished.

Signature

You may also submit a consent via the following:

E-Mail: 2143431212@sw-nrpc.com
 Fax: (214) 343-1213
 U.S. Mail: Southwestern National Regional Planning
 Commission
 4000 N. Central
 Suite 100
 Richardson, TX 75082-1407

If you have any questions please contact:

Richard C. Smith
 Director
 4000 North Central Expressway
 Suite 100
 Dallas, Texas 75245-3000
 Phone: 214/343-1212
 Fax: 214/343-1213
 E-Mail: info@sw-nrpc.com

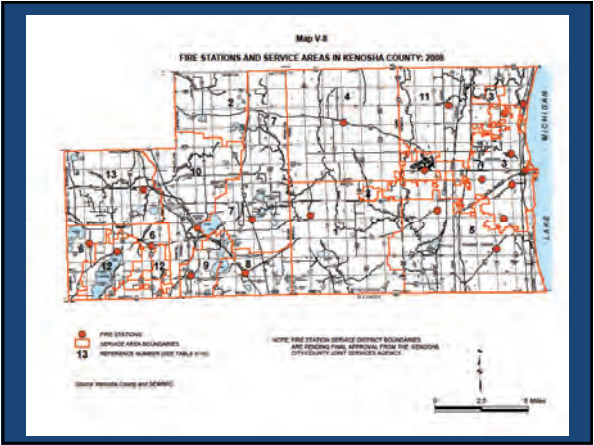
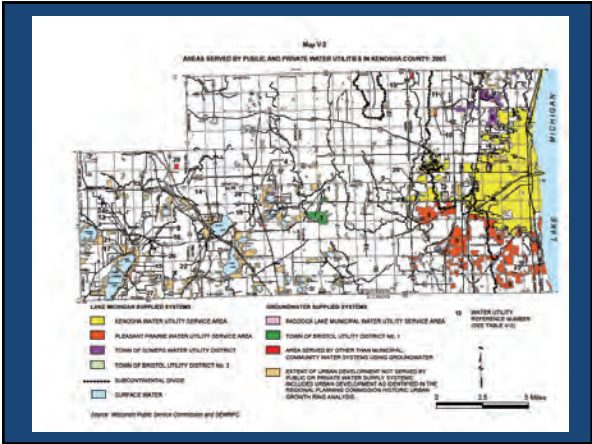
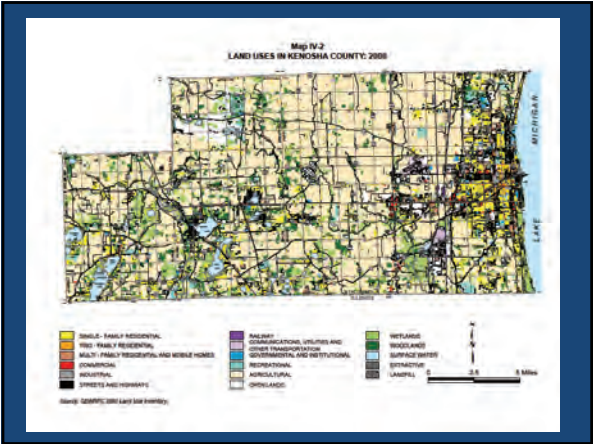


Exhibit D

Southeastern Wisconsin Regional Planning Commission



[Draft Chapters and Meeting Materials](#)

[Submit a Comment on the Study](#)

Kenosha County Hazard Mitigation Plan Update

Comment on the Plan

Use the box below to submit any comments you may have about the Kenosha County Hazard Mitigation Plan Update. A record of public comments will be assembled and provided to the Plan Task Force and to the Commission for deliberations in preparing the final plan.

First Name: *

Last Name: *

E-mail address: *

Organization:

PO Box/Street address:

City: *

State: *

Zip:

* Denotes a required field

Press the "Submit" button when finished.

You may also submit a comment via the following:

E-Mail: jboxhorn@sewrpc.org

Fax: (262) 547-1103

U.S. Mail: Southeastern Wisconsin Regional Planning Commission
P.O. Box 1607
Waukesha, WI 53187-1607

If you have any questions please contact:

Michael Hahn
SEWRPC Chief Environmental Engineer
(262) 547-6722, extension 243

Exhibit E

Summary of Hazard and Vulnerability Assessment Tool Results

Methods

The assessment tools were completed at the September 28, 2009 meeting of the Kenosha County Hazard Mitigation Task Force, with 15 surveys being returned and analyzed. For each hazard 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 47 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.

The results from the assessment tool were analyzed for 47 hazards.

Results

The results from the assessment tool are summarized in Table 1. The average level of risk for hazards ranged from 11.5 percent for the lowest ranked hazard (correctional center incident) to 61.5 percent for the highest ranked hazard (riverine flooding). Eight of the 10 highest average risks belonged to natural hazards related to meteorological causes, mostly causes associated with either winter weather or severe storms. The remaining two of the 10 highest average risks belong to technological or human-induced hazards. The interquartile ranges for the 10 hazards with the highest average risks tended to be relatively large, indicating a diversity of opinion among Task Force members as to the level of risk posed by each of these hazards. In some instances, such as the hazards

posed by riverine flooding, there was general agreement among Task Force members that the risk was relatively high, but disagreement as to just how high. The exception to this pattern was for thunderstorms. The interquartile range associated with this hazard was quite low, indicating a high degree of agreement among Task Force members as to the 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, natural hazards related to biological organisms, and hazards related to human behavior. The interquartile ranges for the 10 hazards with the lowest average risks were low, indicating strong agreement among Task Force members as to the level of risk posed by each of these hazards.

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Table 1

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	44	19
Lake Michigan Coastal Erosion	0.0	58.3	17.5	38	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	45	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	29	14
Loss of Telecommunication	2.8	50.0	24.2	28	19
Electrical System Outage	8.3	75.0	38.1	12	17
Computer System Incident/Cyber Attack	0.0	50.0	23.6	30	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	36	8
Hazardous Materials Fixed Facilities	8.3	75.0	29.8	20	22
Aircraft (flight path)	8.3	44.4	20.6	33.5	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	46	17
Civil Unrest	0.0	44.4	16.7	39	11
Terrorism Incident	0.0	50.0	22.0	31	10
Biological Contaminants (anthrax, small pox, etc.)	0.0	50.0	21.7	32	8

Event	Minimum (percent) ^a	Maximum (percent) ^a	Average (percent) ^a	Rank	Interquartile Range (percent) ^b
Workplace Violence	0.0	66.7	20.1	35	8
School Violence	11.1	66.7	28.2	21	25
Radon Gas	2.8	50.0	20.6	33.5	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	42	13
Landfills	0.0	50.0	13.9	43	19
Wild animals	0.0	58.3	14.1	41	11
Insects	0.0	50.0	14.9	40	17
Recreational Vehicles (snowmobiles)	0.0	58.3	18.8	37	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.

Kenosha County Division of Emergency Management
Southeastern Wisconsin Regional Planning Commission

Notice of Meeting and Agenda

KENOSHA COUNTY HAZARD MITIGATION TASK FORCE

DATE: February 24, 2010

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 of September 28, 2009 Task Force meeting.
3. Overview of ongoing buyouts of floodprone buildings along the Fox River in Kenosha County: John Meland, SEWRPC Chief Economic Development Planner and Executive Director, Kenosha County Housing Authority
4. Review of preliminary draft Chapter II, "Basic Study Area Inventory and Analysis," of SEWRPC Community Assistance Planning Report No. 278 (CAPR No. 278), 2nd Edition, *Kenosha County Hazard Mitigation Plan Update: 2011-2015* (SEWRPC staff)
5. Review of partial preliminary draft Chapter III, "Analysis of Hazard Conditions," of SEWRPC CAPR No. 278, 2nd Edition (SEWRPC staff)
6. Review of preliminary draft Chapter IV, "Hazard Mitigation Goals" (SEWRPC staff)
7. Other business
8. Next meeting
9. Adjourn

Michael G. Hahn
Secretary

Enclosures

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SUMMARY NOTES OF THE FEBRUARY 24, 2010, MEETING OF THE KENOSHA COUNTY HAZARD MITIGATION TASK FORCE

INTRODUCTION

The second meeting of the Kenosha County Hazard Mitigation Task Force was convened at the Kenosha County Center Public Hearing Room at 1:35 p.m. on February 24, 2010. The meeting was called to order by Kenosha County Division of Emergency Management Director, Ben Schliesman. Attendance was taken by circulating a sign-in sheet.

In attendance at the meeting were the following individuals:

Bennett J. Schliesman, Chairman	Director, Kenosha County Division of Emergency Management
Michael G. Hahn, Secretary	Chief Environmental Engineer, Southeastern Wisconsin Regional Planning Commission
Michael Boozer	Chief Executive Officer, ChemReport, Inc.
Joseph E. Boxhorn	Senior Planner, Southeastern Wisconsin Regional Planning Commission
John Burg	Village Administrator, Village of Paddock Lake
David Cox	Village Administrator, Village of Twin Lakes
Steven Carlson	Risk Management Officer, University of Wisconsin-Parkside
Michelle Eisenhauer	Central Services Manager, Kenosha County Department of Human Services
Patrick Finnemore	Director of Facilities, Kenosha Unified School District No. 1
William Glembocki	Chairperson, Town of Wheatland
Paul Guilbert, Jr.	Chief, Pleasant Prairie Fire and Rescue
Mark Krueger	Lieutenant, Kenosha County Sheriff's Department
John Meland	Executive Director, Kenosha County Housing Authority; Chief Economic Development Planner, Southeastern Wisconsin Regional Planning Commission
George E. Melcher	Director, Kenosha County Department of Planning and Development
Mark Melotik	Kenosha County Health Department
William Morris	Administrator, Town of Somers
Edwin L. Morris	Senior Engineer, WE Energies
Aaron Owens	Research Analyst, Southeastern Wisconsin Regional Planning Commission
Peter Parker	Chief, Town of Bristol Fire Department
Michael Slover	Chief, Town of Salem Fire/Rescue
James M. Smith	Chairperson, Town of Somers
Mark Starzyk	Chairman, Kenosha County Housing Authority
Linda Valentine	Chairperson, Town of Salem

Mr. Schliesman welcomed all those in attendance and thanked them for their interest and participation in this important program. He noted that the Federal Emergency Management Agency (FEMA) requires an updated hazard mitigation plan every five years and that this plan ensures eligibility for FEMA mitigation grants for communities within the County. He explained that at the end of the planning process, the County will send a resolution to all of the communities to assist them in adopting the updated plan. He noted the importance for every community to participate in the planning process and to adopt the final plan in order to maintain eligibility for FEMA Mitigation grants. Mr. Schliesman noted that attendance would be taken via a sign in sheet. He then asked each of those in attendance to introduce themselves.

REVIEW OF SUMMARY NOTES OF THE SEPTEMBER 28, 2009 TASK FORCE MEETING

Mr. Schliesman introduced Michael G. Hahn of the Southeastern Wisconsin Regional Planning Commission (SEWRPC) staff. At Mr. Schliesman's request, Mr. Hahn reviewed the summary notes of the September 28, 2009 Task Force meeting. No additions or corrections to the summary notes were offered.

OVERVIEW OF ONGOING BUYOUTS OF FLOODPRONE BUILDINGS ALONG THE FOX RIVER IN KENOSHA COUNTY

Mr. Schliesman introduced John Meland, SEWRPC Chief Economic Development Planner and Executive Director of the Kenosha County Housing Authority. At Mr. Schliesman's request, Mr. Meland presented an overview of Kenosha County's ongoing buyout program of floodprone buildings along the Fox River.

Mr. Meland stated that the Kenosha County Housing Authority has been purchasing and demolishing homes in the floodplain of the Fox River for the past 16 years. The project area is along the floodplain of the Fox River between STH 50 and CTH F in the Village of Silver Lake and the Towns of Salem and Wheatland. Mr. Meland explained that acquiring and demolishing properties in the floodplain was a key strategy recognized in the initial hazard mitigation plan for ensuring the safety residents and emergency responders.

Mr. Meland noted that in 1969 the SEWRPC comprehensive plan for the Fox River watershed identified this reach of the Fox River as a problem area; however, no funding to pursue buyouts was available at that time. Following the Great Midwest Flood of 1993, Kenosha County was able to obtain funding from FEMA to begin the project. Additional funding was obtained after subsequent disaster declarations.

Mr. Meland said that, to date, 86 properties have been purchased in the project area. In addition, 88 properties remain in the floodplain. He explained that participation by property owners is strictly voluntary; however, he noted that as properties continue to be periodically flooded, interest increases among property owners. He indicated that following acquisition, deed restrictions are placed upon the acquired properties requiring that they remain as open space. He noted that the ultimate goal is to remove roads and utilities from the project area.

Mr. Meland stated that funding sources for the program include FEMA's Hazard Mitigation Grant Program. In addition, funds have been provided by the Wisconsin Division of Emergency Management, the Wisconsin Department of Natural Resources, and the Wisconsin Department of Commerce's Community Development Block Grant Program. In some instances, he noted, the funds from these latter three have been used to meet the local matching funds requirement of the FEMA program.

Mr. Meland stated that in 2008, representatives from FEMA visited Kenosha County. Following this, FEMA published an article on the Kenosha County buyout program.

[Secretary's Note: The FEMA article on the Kenosha County buyout program is attached hereto as Exhibit A.]

REVIEW OF PRELIMINARY DRAFT CHAPTER II, "BASIC STUDY AREA INVENTORY AND ANALYSIS", OF SEWRPC COMMUNITY ASSISTANCE PLANNING REPORT NO. 278 (CAPR NO. 278), 2ND EDITION, KENOSHA COUNTY HAZARD MITIGATION PLAN UPDATE: 2011-2015

Mr. Schliesman introduced Joseph E. Boxhorn of the SEWRPC staff. At Mr. Schliesman's request, Mr. Boxhorn reviewed the preliminary draft of Chapter II, "Basic Study Area Inventory and Analysis." Mr. Boxhorn told the Task Force that Commission staff recently received review comments from the Wisconsin Division of Emergency Management (WEM) on Racine County's updated hazard mitigation plan. He noted that the Racine County plan is similar to the Kenosha County plan, and he indicated that the additions and changes that WEM requested

to the updated Racine County plan will be incorporated into the updated Kenosha County plan. For the chapters reviewed at this meeting and at the September 28, 2009 Task Force meeting, these changes will be documented in the summary notes.

Mr. Boxhorn indicated that the Commission staff used the initial report as a template for the updated drafts of the chapters, and that significant changes and additions to the text are highlighted.

Mr. Boxhorn noted that Chapter II drew heavily on the Kenosha County comprehensive plan that was recently completed by the County and SEWRPC.

In reference to the inventory of airports, Mr. Melcher asked that the Flight for Life Helipad located at the Kenosha County Center be added to Map II-10. Mr. Cox added that the Camp Lake, Vincent, and Westosha Airports are not shown on Map II-10. He also noted that the Westosha Airport is no longer in the Town of Randall. It has recently been added to the Village of Twin Lakes. Mr. Boxhorn responded that the map and text would be corrected.

[Secretary's Note: The airports in question were added to Map II-10. In an e-mail subsequent to the meeting, Mr. Parker requested that the Winfield Ultralight Airport (a private airport not serving the public) in the Town of Bristol be added to Map II-10. This airport was added. The third sentence of the second paragraph was revised to read (The revised text and added text in this and all subsequent revisions indicated in these summary notes is indicated in bold letters for clarification only. The report text will not be bold):

“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**).”]

Mr. Schliesman noted that a portion of the Town of Bristol has incorporated as a Village and asked whether the names of the two utility districts in the Town and Village had changed. Mr. Parker stated that he will provide the correct designations.

[Secretary's Note: In an e-mail subsequent to the meeting, Mr. Parker indicated that the name of the Town of Bristol Utility District No. 1 has been changed to the Village of Bristol Utility District No. 1. Map II-11 was revised to reflect the change.]

Mr. Starzyk commented that the Nippersink Golf Course subdivision and the Knolls subdivision in the Town of Randall are not included on Map II-11 as other than municipal community water systems.

[Secretary's Note: Map II-11 was corrected to show these systems.]

Mr. Boxhorn stated that he had received an e-mail from Mr. Carlson indicating that there is a cell phone tower at the University of Wisconsin-Parkside. He asked Mr. Carlson how many antennas are on the tower. Mr. Carlson responded that the tower has one antenna.

[Secretary's Note: Subsequent to the meeting, Mr. Carlson indicated that this tower and the antenna were installed during the summer of 2004. The tower was added to Map II-14.]

Mr. William Morris commented that the We Energies landfill referred to on page 12 of the chapter is not a sanitary landfill. Rather it is licensed for industrial waste only. He stated that he would provide language describing it for the report

[Secretary's Note: The second sentence of the third paragraph on page 12 was revised to read:

"As of 2009, 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 within the Village of Pleasant Prairie."]

Mr. Starzyk commented that there is only one wireless telecommunication site near Powers Lake in the Town of Randall while Map II-14 shows two. Mr. Melcher added that the map shows the site as being south of CTH F while the actual site is north of CTH F.

[Secretary's Note: The suggested corrections were made to the map.]

In reference to the designations on Map II-15 and Appendix B, Mr. Melcher commented that the designation "transitional landfill" needs to be defined.

[Secretary's Note: Based upon discussions with Wisconsin Department of Natural Resources staff, the designations of these landfills on Map II-15 and Appendix B have been change to inactive.]

Mr. Schliesman noted that Map II-19 does not show the locations of satellite sites operated by colleges and universities in the County. Mr. Melcher stated that because such sites tend to come and go, it is unnecessary to map them.

Mr. Boxhorn asked the Task Force to provide the status of the emergency operation plans listed in Table II-13.

Mr. William Morris noted that there have been additions to the water service area in the Town of Somers since 2005. Mr. Hahn replied that, since the maps are prepared to represent conditions in 2005, changes in water service areas after that date would not be shown on the maps.

Mr. Schliesman noted that on page 14 the discussion of facilities using and storing extremely hazardous substances appears to overestimate the total number of facilities because most of the planning facilities are also considered reporting facilities.

[Secretary's Note: Based on data provided by Mr. Schliesman, Table II-11 was revised. The revised table is attached herein as Exhibit B. The third sentence of the second paragraph on page 14 was revised to read:

"In 2010, there were 128 identified users of extremely hazardous substances in Kenosha County. Of these facilities, nine were classified as planning facilities, 69 were classified as reporting facilities, and 50 were classified as both planning facilities and reporting facilities."]

The first sentence of the third paragraph on page 14 was revised to read:

"The 128 facilities which are noted above as storing or producing hazardous materials are located throughout Kenosha County, as summarized in Table II-11."]

Ms. Valentine asked that an evaluation of dam conditions and the ability of public officials to access dam sites and operations be included in the plan.

[Secretary's Note: The Wisconsin Department of Natural Resources (WDNR) is the primary agency responsible for dam safety in the State of Wisconsin. Information related to the condition and operation of specific dams is available from WDNR files of from the owners of the dams.]

After the meeting, Mr. Glembocki asked whether group homes, such as facilities for troubled adults, should be inventoried. He noted that some of these facilities were located in the Town of Wheatland.

[Secretary's Note: The rationale for inventorying adult care facilities such as nursing homes among the critical community facilities is that the mobility issues associated with advanced age and with disabilities should be considered when designating which facilities are considered critical community facilities. Because these issues are not associated with the sort of facilities described, it was decided not to add them to the inventories of critical community facilities.]

**REVIEW OF PARTIAL PRELIMINARY DRAFT CHAPTER III,
“ANALYSIS OF HAZARD CONDITIONS”, OF SEWRPC
CAPR NO. 278), 2ND EDITION, *KENOSHA COUNTY HAZARD
MITIGATION PLAN UPDATE: 2011-2015***

At Mr. Schliesman's request, Mr. Boxhorn reviewed the partial preliminary draft of Chapter III, “Analysis of Hazard Conditions.”

Mr. Schliesman commented that the inventory of tornadoes in Table III-15 and Map III-7 appears to be missing a tornado. Mr. Boxhorn replied that he would investigate this and correct the table and map, if necessary.

[Secretary's Note: The records of the National Climatic Data Center and the National Weather Service were reexamined. No additional tornadoes were found that were recorded as having occurred in Kenosha County.]

Mr. Glembocki commented that the location of tornado number 9 in Table III-15 should be the Town of Wheatland rather than Powers Lake. Mr. Melcher added that the point for this tornado on Map III-7 should be moved north into the Town.

[Secretary's Note: The table and the map were corrected.]

In reference to the discussion of airway transportation hazards on page 12, Mr. Schliesman stated that his understanding was that the Kenosha County Airport was the second busiest in the State. Mr. Boxhorn responded that according to data on takeoffs and landings from the Wisconsin Department of Transportation, it is the third busiest. Mr. Schliesman stated that according to the National Transportation Safety Board, there were 45 crashes of small airplanes and helicopters in Kenosha County between 1982 and 2008. Mr. Boxhorn indicated that this hazard could be profiled and added to the risk assessment, and that mitigation strategies could be developed for it, if the Task Force wished. There was no action on this by the Task Force.

In reference to Map III-10, Mr. Schliesman stated that the text should explain the factors used for assessing groundwater contamination potential. Mr. Boozer noted that Table III-30 indicates factors that contribute to groundwater contamination potential.

[Secretary's Note: The following note was added to Map III-10:

“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-30.”]

In reference to groundwater contamination potential, Ms. Valentine noted that there is a Superfund site near Antioch, Illinois. She asked that the contamination plume from this site be mapped.

[Secretary’s Note: According to the U.S. Environmental Protection Agency, remediation activities were completed at the H.O.D. Landfill site in 2001. In the groundwater monitoring conducted as a part of remediation activities, no evidence of a contaminant plume was detected. As part of the remediation, leachate from the landfill continues to be collected for offsite treatment and disposal. This minimizes the risk of leachate leaking out of the landfill. The general direction of groundwater flow in the Antioch, Illinois area is from west to east, making it unlikely that any contaminants from this site would be transported to locations in Kenosha County. Given that no contaminant plume has been detected, no map was added to the report.]

**REVIEW OF PRELIMINARY DRAFT CHAPTER IV,
“HAZARD MITIGATION GOALS”, OF SEWRPC
CAPR NO. 278, 2ND EDITION, KENOSHA COUNTY HAZARD
MITIGATION PLAN UPDATE: 2011-2015**

At Mr. Schliesman’s request, Mr. Boxhorn reviewed the preliminary draft of Chapter IV, “Hazard Mitigation Goals.” He indicated that there are only two changes in the draft chapter. The first goal has been reworded to make it read more clearly. He indicated that text has been added to the Chapter discussing the relationship of the goals to the County’s comprehensive plan. He added that this set of goals can be amended or added to; however, it would be helpful if any changes were suggested soon. Mr. Schliesman asked the Task Force to review the goals and to suggest any changes or additions at the next Task Force meeting.

Mr. Boozer asked whether the goals were listed in order of priority. Mr. Boxhorn replied that they are not listed in any order of priority.

OTHER BUSINESS

Mr. Boxhorn stated that the SEWRPC website has been redesigned. Because of this, the web address for materials related to the Kenosha County hazard mitigation plan update has changed. He distributed a handout showing the new web page and noted that the address for the page was on the bottom of the handout. He explained to the Task Force that they may continue to submit feedback and comments on the plan via the comments screen on the page on the SEWRPC website. In addition, he noted that they may also e-mail him directly with comments.

[Secretary’s Note: A copy of the comments page is attached hereto as Exhibit C.]

TIME AND DATE OF NEXT MEETING

After discussion, it was agreed that the next Task Force meeting would be scheduled for Tuesday, June 22, 2010, at 1:30 p.m. at the Kenosha County Center. Mr. Schliesman indicated that a notice, agenda, materials to review, and minutes would be sent out about a week ahead of the meeting.

ADJOURNMENT

There being no further business, the meeting was adjourned by unanimous consent at 2:57 p.m.

Respectfully Submitted,

Michael G. Hahn
Secretary

REVISIONS TO CHAPTER I OF SEWRPC CAPR NO. 278, 2ND EDITION, KENOSHA COUNTY HAZARD MITIGATION PLAN UPDATE: 2011-2015

Following the Task Force Meeting, the Commission Staff made the following revisions to Chapter I of the report in order to make the chapter consistent with the revisions that the Wisconsin Division of Emergency Management (WEM) requested be made to Racine County's hazard mitigation plan update.

[Secretary's Note: The sentence was to the end of the initial note on page 1:

“Essential and important information that is unchanged remains unhighlighted.”]

[Secretary's Note: Table I-0 was added as the initial table to the chapter. This table is shown in Exhibit D. The following sentences were added after the second sentence in the first full paragraph on page 2:

“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, Bristol, Paris, Randall, Salem, Somers, and Wheatland. The participating jurisdictions are listed in Table I-0.”]

[Secretary's Note: The following footnote was added to the heading of the Provision of Data column in Table I-2:

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

REVISION TO CHAPTER II OF SEWRPC CAPR NO. 278, 2ND EDITION, KENOSHA COUNTY HAZARD MITIGATION PLAN UPDATE: 2011-2015

Following the Task Force Meeting, the Commission Staff made the following revision to Chapter II of the report in order to make the chapter consistent with the revisions that the Wisconsin Division of Emergency Management (WEM) requested be made to Racine County's hazard mitigation plan update.

[Secretary's Note: The sentence was to the end of the initial note on page 1:

“Essential and important information that is unchanged remains unhighlighted.”]

Following the Task Force Meeting, Commission Staff made the following revision to Chapter II of the report in order to incorporate data on hazardous material spills received from Wisconsin Emergency Management.

[Secretary's Note: The first full paragraph on page 71 was revised to read:

“Between 2007 and 2009, Kenosha County averaged 23 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.”]

REVISION TO CHAPTER III OF SEWRPC CAPR NO. 278, 2ND EDITION, KENOSHA COUNTY HAZARD MITIGATION PLAN UPDATE: 2011-2015

Following the Task Force Meeting, the Commission Staff made the following revision to Chapter III of the report in order to make the chapter consistent with the revisions that the Wisconsin Division of Emergency Management (WEM) requested be made to Racine County's hazard mitigation plan update.

[Secretary's Note: The sentence was added to the end of the initial note on page 1:

“Essential and important information that is unchanged remains unhighlighted.”]

Following the Task Force Meeting, Commission Staff made the following revision to Chapter II of the report in order to incorporate data on hazardous material spills received from Wisconsin Emergency Management.

[Secretary's Note: The fourth paragraph on page 14 was revised to read:

“Between 2007 and 2009, Kenosha County averaged 23 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.”]

REVISION TO CHAPTER IV OF SEWRPC CAPR NO. 278, 2ND EDITION, KENOSHA COUNTY HAZARD MITIGATION PLAN UPDATE: 2011-2015

Following the Task Force Meeting, the Commission Staff made the following revision to Chapter IV of the report in order to make the chapter consistent with the revisions that the Wisconsin Division of Emergency Management (WEM) requested be made to Racine County's hazard mitigation plan update.

[Secretary's Note: The sentence was to the end of the initial note on page 1:

“Essential and important information that is unchanged remains unhighlighted.”]

RESPONSES TO COMMENTS FROM TIM POPANDA, BUILDING AND ZONING ADMINISTRATOR, VILLAGE OF PADDOCK LAKE

Subsequent to the meeting, Mr. Popanda provided some helpful written comments on Chapters II and III. Mr. Popanda's comments are attached herein as Exhibit E. A summary of these comments and the responses by Commission staff are provided below.

[Secretary's Note: While the Commission staff recognizes that several of the suggested inventories would be of value to emergency responders in the context of an emergency response plan, they are beyond the scope of an all hazard mitigation plan and would be of limited usefulness in developing hazard mitigation strategies.

Comment: The Village of Paddock Lake has adopted a stormwater management plan and associated ordinances.

Response: Table II-13 has been revised to reflect this.

Comment: Map II-11 shows the Pathway's Glen Subdivision as being served by a community water supply system. The homes in this subdivision are served by individual private wells.

Response: Map II-11 has been corrected.

Comment: Remote fire suppression systems in the County should be inventoried and identified on a map

Response: While we recognize that this inventory would be of value to emergency responders in the context of an emergency response plan, it is beyond the scope of an all hazards mitigation plan. The following paragraph was added after the last paragraph on page 12 of Chapter II.

"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."

Comment: Schools, public buildings, and medical clinics with basements should be identified. A 1950 civil defense document prepared by the U.S. Army identified all basements as shelters and places to search.

Response: Facilities available for use as shelters will be briefly described in Chapter V of the report. A more detailed list may be available from the Kenosha County Division of Emergency Management. An inventory of schools, public buildings, and medical clinics with basements is beyond the scope of an all hazards mitigation plan.

Comment: The Westosha Airport, the Camp Lake Airport, and the Flight for Life Heliport at the Kenosha County Center are not shown on Map II-10.

Response: Map II-10 has been corrected to show these facilities.

Comment: Map II-12 should identify the privately owned and operated wastewater treatment plants and the areas they serve. In addition, consideration should be given to mapping large agricultural nutrient management ponds and slurry stores.

Response: The privately owned wastewater treatment plants in the County have been added to Map II-12. In general, the Task Force has concluded that the hazard mitigation plan is not focusing on dam failures due to the low risk compared to other hazards considered. In view of this, we concluded that mapping agricultural nutrient management ponds is beyond the scope of this study.

Comment: Day camps, overnight camps, and campgrounds within the County should be added to Map II-22 and Table D-4. Faith-based adult and youth camps should also be included.

Response: Those camps that are licensed as child day care facilities by the Wisconsin Department of Children and Families are included in the inventories shown on Table D-4 and on Map II-22. Inventorying campgrounds is beyond the scope of this study.

Comment: Kenosha County's building addressing system should be explained in the text. The addressing systems used by the Villages of Silver Lake and Twin Lakes should also be explained so as not to confuse agencies responding for mutual aid.

Comment: Large public venues in the County should be identified.

Comment: Public and private social services should be identified.

Response: We recognize that these inventories and descriptions would be of value to emergency responders in the context of an emergency response plan; however, they are beyond the scope of an all hazards mitigation plan.

Comment: The hazard mitigation plan does not adequately address earthquake loads or seismic zones.

Response: Based upon input from the Task Force, earthquakes are not being profiled as a hazard under the Kenosha County hazard mitigation plan. The following sentences were added following the fifth sentence in the first full paragraph on page 8 of Chapter III:

"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 .¹ These are low values. While these levels of shaking can be noticeable, they are rarely associated with damages to structures."]

* * *

#150246 V1 - CAPR-278-2ED SUMMARY NOTES 02/24/10
330-3022
MGH/JEB/pk
04/28/10

Attachments

¹U.S. Geological Survey, "2008 United States National Seismic Hazard Maps," USGS Fact Sheet 2008-3018, April 2008.



FEMA

Moving People Out of Harm's Way

Kenosha County, Wisconsin –
“Residents are strongly urged to evacuate until river levels subside...Rapidly-rising swift currents will provide an extreme danger to residents and responders.” - This excerpt from a May 2000 emergency bulletin is a common occurrence for residents of Kenosha County, Wisconsin living along the Fox River between Highway 50 and Highway F to the south. Low-lying land in this region is plagued by frequent, dangerous floods that threaten the safety of the residents and cause severe damage to homes.

The Illinois Fox River rises near Menomonee Falls, Wisconsin, and flows through Waukesha, Racine and Kenosha Counties in Southeast Wisconsin for a total of 70 miles before entering Illinois. There are two rivers in Wisconsin called the Fox River. This one is designated as the



When the Illinois Fox River floods in Kenosha County, Wisconsin, roads close and houses flood. Sand bags are not always effective in keeping out damaging waters. Photo taken 6/16/08: Kenosha County Planning and Development



This small house, formerly a vacation cottage next to the Fox River, is one that's been purchased as part of the Fox River Flood Mitigation Project. It will be demolished and the land returned to nature. Photo taken 8/7/08: Barbara Ellis, FEMA

Illinois Fox River by local residents since it flows out of Wisconsin and into Illinois. Flooding is common on the Kenosha County, Wisconsin section of the river, especially near the towns of Wheatland and Salem and the Village of Silver Lake.

During the middle of the 20th Century, the riverside was valued as a vacation or weekend get-away spot and many people from nearby cities built rustic cabins on the banks of the river. Later, as the area population grew, some families built year-round residences and even more constructed weekend cabins. The waterfront properties were occasionally flooded, but the owners kept coming back to clean up and rebuild. The river area provided the scenic beauty and outdoor recreation they treasured.

The private property in this floodplain has created an “urban interface” problem similar to those in the forested lands of America’s western states. Having



Flood waters surround one house and a vacant lot in the foreground. Owners of the house that once stood on the vacant lot opted to sell and move to drier land. The "fountain" of water next to the house is the well head. Hydrologic pressure is pushing the groundwater out the top.

Photo taken 4/14/08: Kenosha County Planning and Development

a population adjacent to or in an area that frequently experiences natural disasters puts stress on local emergency management and law enforcement as well as public works.

When extensive, heavy rains pummel the watershed for the Illinois Fox River, Kenosha County emergency management personnel and law enforcement officers keep in steady contact with the National Weather Service to receive constant updates about rainfall and river level predictions. When the river rises to hazardous flood stage levels, the county executive issues an emergency declaration to set in motion safety procedures to protect citizens in the path of floodwaters. During emergency declarations, county law enforcement officers personally warn residents of the imminent danger of fast-moving floodwaters and are prepared to provide help to evacuate them to safety if the need arises. The officers may patrol the flooding areas in four-wheel drive vehicles carrying personal flotation devices in case people need assistance. During rescue efforts in the 1994 flooding, a rescue boat flipped over in a fast-running current. Luckily, no one was killed in the incident.

Since 1994 there have been many damaging floods in the Fox River floodplain in Kenosha County and more people to suffer loss from them. From 1994 to the summer of 2008 there have been eight federally declared disasters for the region. Monetary damages accrued by flood victims included hotel bills, lost wages, costs associated with cutting down trees and using power generators, repair of damaged foundations and siding, and mold and flood debris cleanup. In addition to the personal property damage endured by the residents, recovery efforts have cost the county hundreds of thousands of dollars.

In April 1969, the Southeastern Wisconsin Regional Planning Commission (SEWRPC) issued its "Fox River Watershed Study,"

the culmination of a three-year study of the Fox River watershed in southeastern Wisconsin. The purpose of the study was to prepare a comprehensive plan for the physical development of the watershed designed not only to solve the problems of flooding, water pollution and changing land use existing within the watershed, but to most advantageously develop the total land and water resources of the watershed. Its goal was "to provide an environment for human life within the watershed which is attractive, as well as safe and healthful."

At the time of the original study, land use and housing development ideas and regulations were drastically different from those of today. Wetlands are more highly valued and protected now than in the past. However, new zoning ordinances adopted in the early 1970s prohibit new building within the 100-year floodplain. The original study presents a summary of the factual findings of the many required inventories completed as a part of that study, as well as forecasts of future growth and development within the watershed. The inventories within the study provided a benchmark of historic data upon which future studies of the watershed can be built.



Water from the Fox River sheets over Riverside Drive and into houses along the river.

Photo taken 4/14/08: Kenosha County Planning and Development

In 1994 Kenosha County officials initiated a plan to help people move out of the flood-prone area that was mapped as the 100-year floodplain of the Illinois Fox River. By May 2004, when yet another major flood instigated another disaster declaration, many fewer homes and residents were at risk because over that ten-year period 56 property owners had participated in the Fox River Flood Mitigation Program. The Kenosha County Housing Authority administers the program, with staff support provided by SEWRPC. Through this program homes are bought and demolished and the land cleared and seeded to be left as undeveloped open space.

The 2007 Wisconsin floods hit Kenosha County hard again. While the disaster of 2004 had water four feet above flood stage, the 2007 deluge topped out at 14.98 feet, 4.9 feet over

In addition to structural damage from floods, mold and mildew are part of flooding's aftermath that needs to be addressed. Mold is a serious health threat that must be removed and treated before residents move back into the house. Photos taken 10/3/07: Kenosha County Planning and Development



flood stage. Even though the water was higher than before, fewer homes and residents were in danger because more property owners had opted for the buyout program and had moved to higher ground. Those who hadn't been bought out suffered more than they had in the 2004 flood. One home, still occupied, on 71st Street just a few yards from the river, caught fire during the height of the flood and burned to the water line because fire fighters could not reach the house. Some homes were damaged when water came into the crawl spaces beneath them; although the water didn't reach the living areas, it was wicked up through the wooden framing. With the summer warmth, mold and mildew quickly developed inside. Additionally, some homes were constructed with utilities in the basements or crawl spaces.

The flooding that may not have reached the interior of the homes ruined furnaces, well pumps and water heaters.

While the 2007 floods made some people think they had seen the worst of it, June 2008 brought even greater devastation. Flood gauges measured the maximum heights at 15, 16 and 18 feet – five to eight feet above flood stage. By the time the 2008 floods hit, 72 property owners had already participated in the Fox River Flood Mitigation Program, sold their homes for the estimated fair market value and moved to safer quarters.

John Meland, Chief Economic Development Planner for SEWRPC, has watched with compassion as hometown-





The house was removed and the ground seeded with grass on this newly acquired property. Floods will not be an issue here in the future. Photo: Barbara Ellis, FEMA

Natural Resources, and Community Development Block Grant's Emergency Assistance Program (CDBG-EAP) from the Wisconsin Department of Commerce.

The Fox River Flood Mitigation Program has provided multiple benefits, from saving the county money that it would have spent on road repairs and overtime for first responders to the residents' piece of mind for their safety and the security of not worrying about living in a house that could be repeatedly flooded.

ers struggle with the idea of selling their flood-prone properties. He also has seen the positive results of the buyout program as floodwater sweeps harmlessly over vacant land where houses used to sit soaking in the stinking mire. Meland looks at a recent acquisition, house demolished and hauled away, the newly seeded ground covered with mulch, and exclaims, "72 down, 104 to go," referring to the properties still in the 100-year floodplain. "Homeowners are not being pushed out or forced to sell their properties," Meland said, "It's a voluntary program." The only forceful urging is coming from the river itself, taking back more and more of the land next to it with each flood.

Although Kenosha County and many other upper Midwest communities have a long history of flood damage, the catastrophic Mississippi River flood of 1993 freed up money to begin major mitigation projects. As of August 2008, this program has totaled approximately \$7.4 million from combined sources including the Federal Emergency Management Agency's (FEMA's) Hazard Mitigation Grant Program (HMGP), Wisconsin Emergency Management, the Wisconsin Department of

Fox River Flood Mitigation Program Acquisition Statistics			
year of acquisition	# of properties acquired	cost of properties acquired	actions/costs avoided
1995	6	\$507,387	emergency evacuations
1996	5	\$309,726	
1997	1	\$91,712	
1998	3	\$257,068	road repairs
1999	7	\$588,731	sand bagging
2000	12	\$1,062,253	
2001	9	\$606,667	private property repairs
2002	11	\$912,956	debris clearing
2003	5	\$425,705	
2004	1	\$93,890	hotel bills - while evacuated
2005	4	\$388,922	
2006	6	\$576,727	lost wages
2007	3	\$401,435	
2008 (thru July)	2	\$271,545	
14 years	75 properties	\$6,494,723	TOTALS

Exhibit B

#150977 V1 - CAPR-278-2 REVISED TABLE II-11
330-3022
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04/24/10

Table II-11

**CIVIL DIVISION LOCATION OF FACILITIES
THAT STORE HAZARDOUS MATERIALS: 2010**

Municipality	Number of Facilities		
	Reporting Only	Planning Only	Reporting and Planning
Cities			
Kenosha	31	3	14
Subtotal	31	3	14
Villages			
Bristol ^a	2	0	2
Paddock Lake	1	0	0
Pleasant Prairie	15	2	26
Silver Lake	0	0	0
Twin Lakes	3	0	0
Subtotal	21	2	28
Towns			
Brighton	0	1	0
Bristol ^a	4	1	0
Paris	4	0	1
Randall	0	0	1
Salem	3	0	4
Somers	5	2	2
Wheatland	1	0	0
Subtotal	17	4	8
Total	69	9	50

^aOn December 1, 2009, a portion of the Town of Bristol was incorporated as the Village of Bristol.

Source: Kenosha County Division of Emergency Management.


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Community Assistance

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[Advisory Services](#)
[Review Services](#)
[Project Planning Services](#)
[Project Management Services](#)
[County Surveyor Services](#)

Project Planning Services

SEWRPC community assistance efforts extend to the preparation, upon request, of county and local comprehensive plan elements as well as plan implementation ordinances addressing zoning, land division, and official mapping. This work also extends to hazard mitigation planning and local park and open space planning. This work seeks to integrate regional and local planning and helps implement regional plans.

Multi-Jurisdictional Comprehensive Planning Programs in Southeastern Wisconsin

With the enactment into law in 1999 of new State comprehensive planning legislation, popularly called "Smart Growth", SEWRPC offered to work with each of the seven counties in the Region to produce county comprehensive plan documents. Six of the counties conducted or are conducting multi-jurisdictional planning programs that will produce a county comprehensive plan and companion local plans for participating cities, towns, and villages. Information on county comprehensive planning programs is provided below. The comprehensive plan status in the region is summarized on this [map](#).

• Kenosha County

Kenosha County and nine cities, towns, and villages were awarded a grant from the Wisconsin Department of Administration in March 2006 to prepare a multi-jurisdictional comprehensive plan. SEWRPC is assisting in developing the plan. A draft multi-jurisdictional plan was approved by the multi-jurisdictional advisory committee on December 22, 2009. The plan will be considered for adoption in early 2010 by the County Board. The Village of Silver Lake and Towns of Brighton, Bristol, Paris, and Somers also anticipate adopting the multi-jurisdictional plan document as their local comprehensive plan in early 2010. The new Village of Bristol (Incorporated in late 2009 from a portion of the Town of Bristol) is also planning to adopt the multi-jurisdictional plan as the Village comprehensive plan. The City of Kenosha and Towns of Salem and Wheatland anticipate adopting a separate local plan document based on the multi-jurisdictional plan in early 2010. The Village of Pleasant Prairie adopted a Village comprehensive plan, based on the multi-jurisdictional plan, in December 2009. More information is available on the [Kenosha County website](#). For more information on this project, please contact:

Nancy M. Anderson, AICP
Chief Community Assistance Planner
262-547-6722 Ext. 212
nanderson@sewrpc.org

• Ozaukee County

Ozaukee County was awarded a State comprehensive planning grant in 2004. With the exception of the City of Cedarburg, all cities, towns, and villages in the County, including the Village of Newburg which straddles the Ozaukee County-Washington County line, participated in a multi-jurisdictional planning program to develop a comprehensive plan for the County and each of the participating local governments. SEWRPC assisted in preparing the plans. The multi-jurisdictional comprehensive plan was adopted by the Ozaukee County Board of Supervisors on April 2, 2008. All local plans were adopted by April 14, 2009. An amendment to the multi-jurisdictional plan to incorporate the local plans was approved by the Ozaukee County Board on May 6, 2009. The adopted County plan as amended in May 2009, is available [here](#). Additional information about the plan is available on the [Ozaukee County website](#). For more information on this project, please contact:

Topics Found Here

[Smart Growth Comprehensive Planning](#)
[Hazard Mitigation Planning](#)
[Kenosha County](#)
[Racine County](#)
[Plan Implementation Ordinances and Maps](#)
[Local Park and Open Space Planning](#)


Benjamin R. McKay
Principal Planner
262-547-6722 Ext. 229
bmckay@sewrpc.org

• **Racine County**

Racine County and all 17 cities, towns, and villages were awarded a grant from the Wisconsin Department of Administration in March 2006 to prepare a multi-jurisdictional comprehensive plan. The multi-jurisdictional plan was adopted by the Racine County Board on October 13, 2009. The multi-jurisdictional plan document has been adopted as the local comprehensive plan by 16 of the 17 participating communities. The seventeenth community, the City of Racine, endorsed the multi-jurisdictional comprehensive plan and adopted a city comprehensive plan based upon the multi-jurisdictional plan. More information is available on the [Racine County website](#). For more information on this project, please contact:

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Principal Planner
262-547-6722 Ext. 277
dschilling@sewrpc.org

• **Walworth County**

Walworth County and 13 towns worked together on a multi-jurisdictional comprehensive plan with assistance from SEWRPC. The plan was adopted by the Walworth County Board on November 10, 2009. Each participating town adopted the multi-jurisdictional plan document as the town plan prior to County Board adoption. More information is available [here](#). For more information on this project, please contact:

William J. Stauber
Chief Land Use Planner
262-547-6722 Ext. 279
wstauber@sewrpc.org

• **Washington County**

Washington County, 10 towns, and one village were awarded a comprehensive planning grant on March 4, 2005. SEWRPC and UW-Extension are also part of the planning process. The multi-jurisdictional comprehensive plan was adopted by the Washington County Board of Supervisors on April 15, 2008. The adopted County plan is available [here](#). Local comprehensive plans have been adopted by the Town of Farmington, [Town of Addison](#), [Town of Barton](#), [Town of Erin](#), [Town of Hartford](#), [Town of Kewaskum](#), [Village of Kewaskum](#), [Town of Polk](#), [Town of Trenton](#), and [Town of Wayne](#). The Town of Germantown has adopted the multi-jurisdictional plan document as the Town comprehensive plan. More information is available on the [Washington County website](#). For more information on this project, please contact:

Nancy M. Anderson, AICP
Chief Community Assistance Planner
262-547-6722 Ext. 212
nanderson@sewrpc.org

• **Waukesha County**

The County comprehensive plan was adopted by the Waukesha County Board of Supervisors on February 24, 2009. More information is available on the Waukesha County website. For more information on this project, please contact:

Richard R. Kania, AICP, RLA
Principal Planner
262-547-6722 Ext 226
rkania@sewrpc.org

Hazard Mitigation Planning

SEWRPC provides assistance to counties and local governments in the preparation and updating of hazard mitigation plans. These plans fulfill requirements set forth by the Wisconsin Department of Military Affairs, Division of Emergency Management, and the Federal Emergency Management Agency (FEMA). Through such planning, appropriate consideration is given to such hazards as flooding; lakeshore bluff and dam 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 material situations. SEWRPC is presently working with two counties—Kenosha and Racine—on updates to their hazard mitigation plans. Report materials,

meeting materials, and comment submittal opportunities relative to these two work efforts may be accessed on the links provided below:

• Kenosha County Hazard Mitigation Plan Update

Preliminary Draft Chapters:

[Chapter I, Introduction and Background](#)

[Chapter II, Basic Study Area Inventory and Analysis](#)

[Chapter III, Analysis of Hazard Conditions](#)

[Chapter IV, Hazard Mitigation Goals](#)

[Appendix B, Solid Waste Disposal Sites in Kenosha County: 2009](#)

[Appendix C, Police Stations, County Sheriff Offices, and Fire Stations in Kenosha County: 2009](#)

[Appendix D, Critical Community Facilities in Kenosha County](#)

Meeting Materials:

[February 24, 2010 Agenda](#)

[September 28, 2009 Agenda](#)

[September 28, 2009 Minutes](#) (not yet approved)

Comment Opportunity

Use the box below to submit any comments you may have about the Kenosha County Hazard Mitigation Plan Update. A record of public comments will be assembled and provided to the Plan Task Force and to the Commission for deliberations in preparing the final plan.

Your Contact Information:

First Name:*	<input type="text"/>
Last Name:*	<input type="text"/>
Email Address:*	<input type="text"/>
Organization	<input type="text"/>
Mailing Address:	<input type="text"/>
City:*	<input type="text"/>
State:*	<input type="text"/>
Zip:	<input type="text"/>

* Denotes a required field

You may also submit a comment via the following:

Email: jboxhorn@sewrpc.org

Fax: 262-547-1103

Project Planning Services

Page 4 of 5

U.S. Mail: Southeastern Wisconsin Regional Planning Commission
P.O. Box 1607
Waukesha, WI 53187-1607

If you have any questions, please contact: Michael Hahn
SEWRPC Chief Environmental Engineer
262-547-6722, Ext 243

Press the "Submit" button when finished.

Submit

• Racine County Hazard Mitigation Plan Update

Draft Final Report:

[Community Assistance Planning Report No. 266 – 2nd Edition](#)

Meeting Materials:

[November 4, 2009 Agenda](#)

[November 4, 2009 Meeting Summary Notes](#) (not yet approved)

Comment Opportunity

Use the box below to submit any comments you may have about the Racine County Hazard Mitigation Plan Update. A record of public comments will be assembled and provided to the Plan Task Force and to the Commission for deliberations in preparing the final plan.

Your Contact Information:

First Name:*
Last Name:*
Email Address:*
Organization
Mailing Address:
City:*
State:*
Zip:

* Denotes a required field

You may also submit a comment via the following:

Email: jboxhorn@sewrpc.org
Fax: 262-547-1103

Project Planning Services

Page 5 of 5

U.S. Mail: Southeastern Wisconsin Regional Planning Commission
P.O. Box 1607
Waukesha, WI 53187-1607

If you have any questions, please
contact:

Michael Hahn
SEWRPC Chief Environmental
Engineer
mhahn@sewrpc.org
262-547-6722, Ext 243

Press the "Submit" button when finished.

Submit

Plan Implementation Ordinances and Maps

SEWRPC helps county and local governments to produce zoning, land division, and official mapping ordinances and related map materials. This work is conducted on an as requested basis and is intended to help local governments implement regional plan recommendations. For more information on this project, please contact:

Nancy M. Anderson, AICP
Chief Community Assistance Planner
262-547-6722 Ext. 212
nanderson@sewrpc.org

Local Park and Open Space Planning

SEWRPC provides assistance to local governments in the preparation and updating of local park and open space plans. This work is conducted on an as requested basis and in part is intended to help local governments meet Federal and State requirements for securing grants to help preserve park and open space land and develop recreational facilities. For more information on these activities, please contact:

Nancy M. Anderson, AICP
Chief Community Assistance Planner
262-547-6722 Ext. 212
nanderson@sewrpc.org

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Southeastern Wisconsin Regional
Planning Commission

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Fax: (262) 547-1103
E-mail: sewrpc@sewrpc.org

Exhibit D

#150375 V1 - CAPR-278-2 NEW CHAPTER 1 TABLE
JEB
03/03/10

Table I-1

JURISDICTIONS PARTICIPATING IN THE KENOSHA COUNTY ALL HAZARDS MITIGATION PLAN UPDATE: 2009-2010

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

^aDuring December 2009, a portion of the Town of Bristol incorporated as The Village of Bristol. The former Town had participated in the initial Racine County hazard mitigation plan.

Source: SEWRPC.

Exhibit E

THE Village of **PADDOCK LAKE**

PHONES – 262-843-2713 or 262-843-2400 FAX 262-843-3409
March 1, 2010

Michael Hahn
P.O. Box 1607
Waukesha, WI. 53187-1607

6969 236th AVENUE
SALEM, WISCONSIN 53168



RE: Kenosha County Hazard Mitigation Plan

I have been requested by Village Administrator, John Burg to review the materials of the Kenosha County Hazard Mitigation Plan and provide you with comment. I am hesitant to making any comments due to my late arrival or involvement in the planning process and hope that my comments do not offend any of the persons that have put countless hours into preparing the plan. The following are my observation and recommendations:

- Chapter II table II-13, regulations and programs; The Village of Paddock Lake has in fact adopted a storm water management plan and DNR required ordinances.
- Chapter II map II-19 Areas Served by Public and Private Water Supply; The map depicts the subdivision known as Pathway Glenn located in the northeast corner of the Village of Paddock Lake as being served by a water system when in fact this is not served by a water supply system. These single family homes are served by their own individual SFH wells
- Chapter II, map II-16, Fire Department and Fire Stations; An additional map should be added that includes the fire department remote fire suppression systems. Through out Kenosha County fire departments, schools and municipalities have fire suppression cisterns and dry hydrants. These should be inventoried and identified on a map in this plan.
- Chapter II, map II-19, II-20 and II-21, Schools, Public buildings and Medical Clinics with basements should be identified. In the event of search and recovery by mutual aid agencies those locations should be identified. In a 1950 civil defenses document prepared by the US Army all basements were identified as shelters and places to search.
- Chapter II, map II-22 and appendix D, table D-4; The map and appendix should include the day and overnight camps through out the County. Examples would be Camp Oh Dakota, Boy Scout Camp in Wheatland, The Boy Scout Camp in Wilmot, The Boys and Girls Club in Paddock Lake, Salvation Army Camp, Seno Woodland Center, Wheatland, and any other camps or camp grounds.
- Chapter II, map II-10; Airports in Kenosha County; the airport known as Wetosha Airport on CTH C is not shown. Also the heliport located at the Kenosha County Center at STH 50 and 45 north is not shown. The private airport located outside of Camp Lake on CTH AH is not shown.
- Chapter II, map II-12 Sewer Mapping; The plans and maps should identify privately owned and operated package plants and areas they serve such as Wheatland Trailer Park

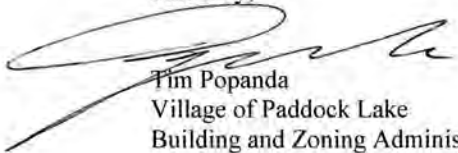
and Rainbow Manor. Also in the spirit of identifying hazards to the environment you may consider identifying large agricultural nutrient management ponds and slurry stores. Some of these ponds and structures have the potential to store hundreds of thousands of gallons of animal waste.

- Chapter II, map II-22 and appendix; Faith Based Adult and Youth Camps should be included.
- Building Address Systems: Kenosha County has a superior building addressing system that is easily understood by new comers to the County. This system should be explained in the Plan. The Village of Sliver Lake and Twin Lakes have their own addressing system. These unique systems should also be explained and depicted so as not to confuse agencies responding for mutual aid.
- Large Public venues in the County should be identified. Such as, Country Thunder, Wilmot Ski Hills, Bristol Renaissance Faire, Kenosha County Fair, Sport Complexes, Sliver Lake Beach and the two Speedways. All of these sites have potential to have well over 1,000 people in attendance at various time through out the year.
- Public and Private Social Services should be indentified, examples would be Sharing Center, Twin Lakes food pantry, Woman's Horizon and Shalom Center.
- The Hazard Mitigation plan does not adequately address the earth quake loads or seismic zones. Enclosed for your consideration and review is a copy of the State adopted international building codes seismic zone map. Only a small portion of Kenosha County is affected by the seismic zone but in the spirit of identifying all hazards regardless of size, this should be included in the plan.

These above listed recommendations may seem insignificant and unnecessary information to Kenosha County Agencies for which this plan seems targeted to. However; these suggested amendments may prove very helpful to mutual aid agencies as well as State and Federal Departments.

If you have any further questions, please feel free to contact me in my office at the Village Hall at 262-843-3617.

Sincerely,



Tim Popanda
Village of Paddock Lake
Building and Zoning Administrator

CC: Marlene Goodson, Village President
Paddock Lake Village Board
John Burg, Village Administrator
Mike Slover, Salem (Paddock Lake) Fire Chief

ity to resist the increased forces determined in accordance with Sections 1613 through 1622.

1614.2 Change of occupancy. When a change of occupancy results in a structure being reclassified to a higher Seismic Use Group, the structure shall conform to the seismic requirements for a new structure.

Exception: Specific detailing provisions required for a new structure are not required to be met where it can be shown an equivalent level of performance and seismic safety contemplated for a new structure is obtained. Such analysis shall consider the regularity, overstrength, redundancy and ductility of the structure within the context of the specific detailing provided.

1614.3 Alterations. Existing structures being altered need not comply with Sections 1613 through 1622 provided that the following conditions are met:

1. The alterations do not create a structural irregularity as defined in Section 1616.5 or make an existing structural irregularity more severe.
2. The alteration does not increase the seismic forces in any structural element of the existing structure by more than 5 percent, unless the capacity of the element subject to the increased forces is still in compliance with Sections 1613 through 1622.
3. The alteration does not decrease the seismic resistance of any structural element of the existing structure to less than that required for a new structure.
4. The alterations do not result in the creation of an unsafe condition.

1614.4 Quality assurance. A Quality Assurance Plan shall be provided where required by Chapter 17.

1614.5 Seismic and wind. When the code-prescribed wind design produces greater effects, the wind design shall govern, but detailing requirements and limitations prescribed in this and referenced sections shall be followed.

SECTION 1615 EARTHQUAKE LOADS—SITE GROUND MOTION

1615.1 General procedure for determining maximum considered earthquake and design spectral response accelerations. Ground motion accelerations, represented by response spectra and coefficients derived from these spectra, shall be determined in accordance with the general procedure of Section 1615.1 or the site-specific procedure of Section 1615.2. The site-specific procedure of Section 1615.2 shall be used for structures on sites classified as Site Class F, in accordance with Section 1615.1.1.

The mapped maximum considered earthquake spectral response acceleration at short periods, S_S , and at 1-second period, S_1 , shall be determined from Figures 1615(1) through (10). Where a site is between contours, straight line interpolation or the value of the higher contour shall be used.

Comm 62.1615 Alternatives to contour lines in IBC Figures 1615(1) and 1615(2).

- (1) The contour line in IBC Figure 1615(1) that extends through southern Rock, Walworth, and Kenosha Counties in Wisconsin may be ignored.
- (2) The 4% g contour line in IBC Figure 1615(2) may be applied as occurring in the location shown in Figure 62.16-2.



Figure 62.16-2
Alternate 4% g Contour Location

The Site Class shall be determined in accordance with Section 1615.1.1. The maximum considered earthquake spectral response accelerations at short period and 1-second period adjusted for site class effects, S_{MS} and S_{M1} , shall be determined in accordance with Section 1615.1.2. The design spectral response accelerations at short period, S_{DS} , and at 1-second period, S_{D1} , shall be determined in accordance with Section 1615.1.3. The general response spectrum shall be determined in accordance with Section 1615.1.4.

Exception: For structures located on sites with mapped spectral response acceleration at short period, S_S , less than or equal to 0.15g and mapped spectral response acceleration at 1-second period, S_1 , less than or equal to 0.04g, the Site Class, maximum considered earthquake spectral response accelerations at short period and at 1-second period adjusted for site class effects (S_{MS} and S_{M1}), and the design spectral response accelerations at short period and at 1-second period (S_{DS} and S_{D1}) need not be determined. Such structures shall be categorized as Seismic Design Category A and need only comply with the requirements of Section 1616.4.

FIGURE 1615(1)

STRUCTURAL DESIGN

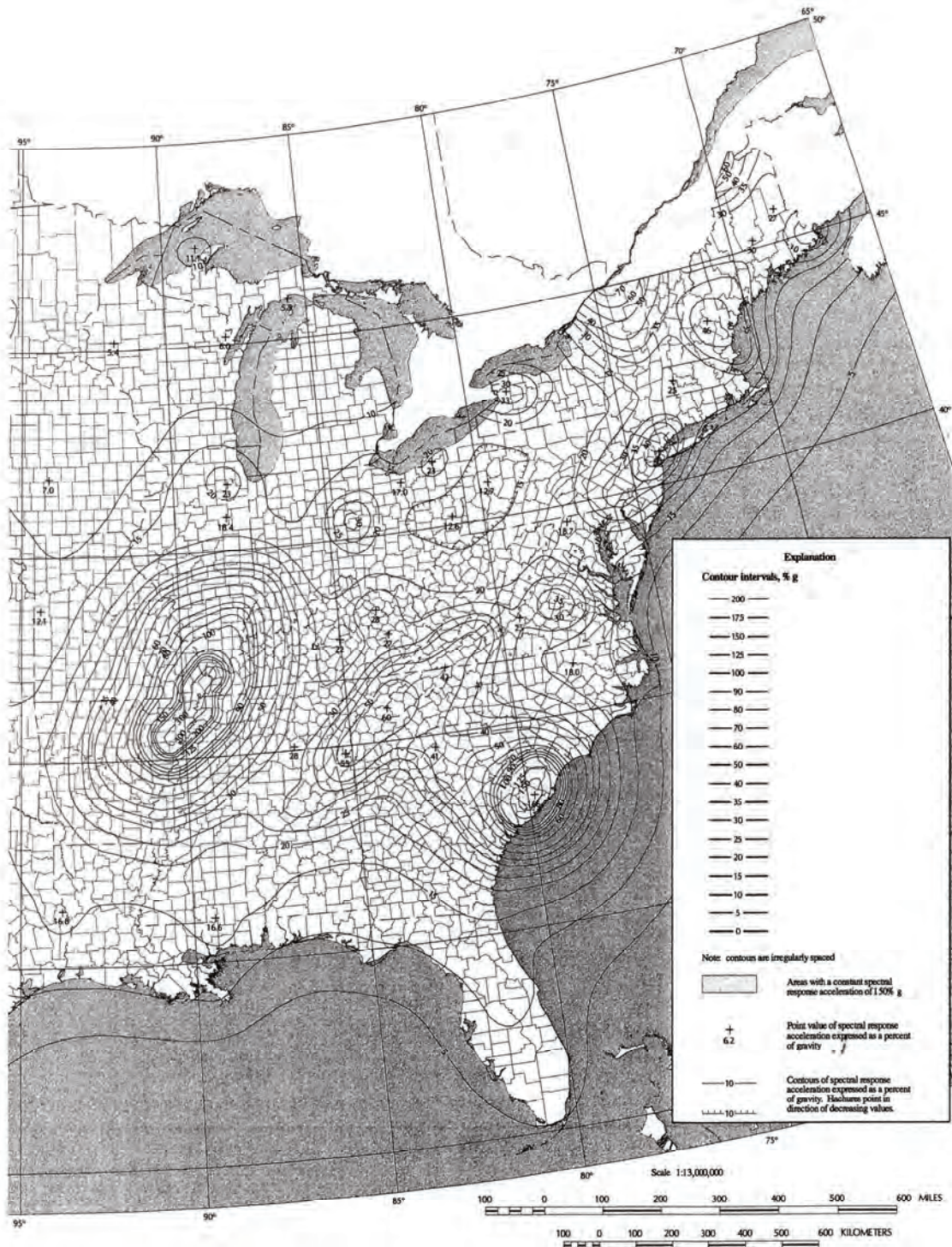


FIGURE 1615(1)
MAXIMUM CONSIDERED EARTHQUAKE GROUND MOTION FOR THE CONTIGUOUS UNITED STATES
OF 0.2 SEC SPECTRAL RESPONSE ACCELERATION (5 PERCENT OF CRITICAL DAMPING), SITE CLASS B

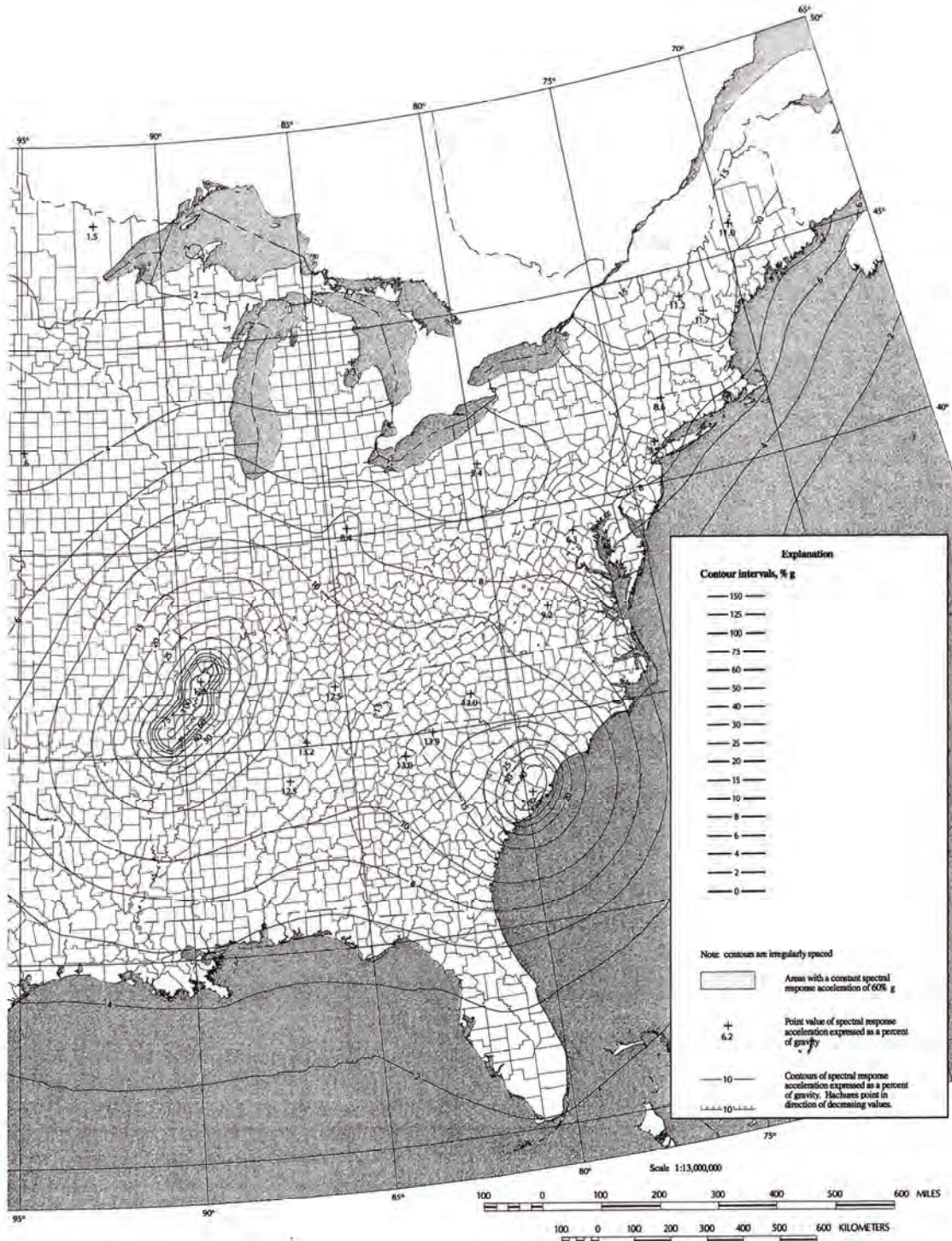


FIGURE 1615(2)
MAXIMUM CONSIDERED EARTHQUAKE GROUND MOTION FOR THE CONTERMINOUS UNITED STATES
OF 1.0 SEC SPECTRAL RESPONSE ACCELERATION (5 PERCENT OF CRITICAL DAMPING), SITE CLASS B

1615.1.1 Site class definitions. The site shall be classified as one of the site classes defined in Table 1615.1.1. Where the soil shear wave velocity, \bar{v}_s , is not known, site class shall be determined, as permitted in Table 1615.1.1, from standard penetration resistance, \bar{N} , or from soil undrained shear strength, \bar{s}_u , calculated per Section 1615.1.5. Where site-specific data are not available to a depth of 100 feet (30 480 mm), appropriate soil properties are permitted to be estimated by the registered design professional preparing the soils report based on known geologic conditions.

When the soil properties are not known in sufficient detail to determine the site class, Site Class D shall be used unless the building official determines that Site Class E or F soil is likely to be present at the site.

1615.1.2 Site coefficients and adjusted maximum considered earthquake spectral response acceleration parameters. The maximum considered earthquake spectral response acceleration for short periods, S_{MS} , and at 1-second period, S_{MI} , adjusted for site class effects, shall be determined by Equations 16-16 and 16-17, respectively:

$$S_{MS} = F_a S_s \quad (\text{Equation 16-16})$$

$$S_{MI} = F_v S_I \quad (\text{Equation 16-17})$$

where:

F_a = Site coefficient defined in Table 1615.1.2(1).

F_v = Site coefficient defined in Table 1615.1.2(2).

S_s = The mapped spectral accelerations for short periods as determined in Section 1615.1.

S_I = The mapped spectral accelerations for a 1-second period as determined in Section 1615.1.

1615.1.3 Design spectral response acceleration parameters. Five-percent damped design spectral response acceleration at short periods, S_{DS} , and at 1 second period, S_{DI} , shall be determined from Equations 16-18 and 16-19, respectively:

$$S_{DS} = \frac{2}{3} S_{MS} \quad (\text{Equation 16-18})$$

$$S_{DI} = \frac{2}{3} S_{MI} \quad (\text{Equation 16-19})$$

where:

S_{MS} = The maximum considered earthquake spectral response accelerations for short period as determined in Section 1615.1.2.

S_{MI} = The maximum considered earthquake spectral response accelerations for 1 second period as determined in Section 1615.1.2.

1615.1.4 General procedure response spectrum. The general design response spectrum curve shall be developed as indicated in Figure 1615.1.4 and as follows:

1. For periods less than or equal to T_o , the design spectral response acceleration, S_a , shall be given by Equation 16-20,

2. For periods greater than or equal to T_o and less than or equal to the T_s , the design spectral response acceleration, S_a , shall be taken equal to S_{DS} .

3. For periods greater than T_s , the design spectral response acceleration, S_a , shall be given by Equation 16-21.

$$S_a = 0.6 \frac{S_{DS}}{T_o} T + 0.4 S_{DS} \quad (\text{Equation 16-20})$$

$$S_a = \frac{S_{DI}}{T} \quad (\text{Equation 16-21})$$

where:

S_{DS} = The design spectral response acceleration at short periods as determined in Section 1615.1.3.

S_{DI} = The design spectral response acceleration at 1 second period as determined in Section 1615.1.3.

T = Fundamental period (in seconds) of the structure (Section 1617.4.2).

T_o = $0.2 S_{DI}/S_{DS}$

T_s = S_{DI}/S_{DS}

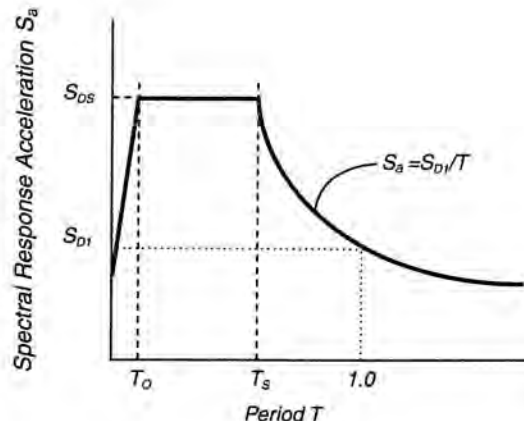


FIGURE 1615.1.4
DESIGN RESPONSE SPECTRUM

1615.1.5 Site classification for seismic design. The notations presented below apply to the upper 100 feet (30 480 mm) of the site profile. Profiles containing distinctly different soil layers shall be subdivided into those layers designated by a number that ranges from 1 to n at the bottom where there are a total of n distinct layers in the upper 100 feet (30 480 mm). The symbol, i , then refers to any one of the layers between 1 and n .

where:

v_{si} = The shear wave velocity in feet per second (m/s).

Kenosha County Division of Emergency Management
Southeastern Wisconsin Regional Planning Commission

Notice of Meeting and Agenda

KENOSHA COUNTY HAZARD MITIGATION TASK FORCE

DATE: June 22, 2010
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 of February 24, 2010 Task Force meeting.
3. Review of remainder preliminary draft Chapter III, "Analysis of Hazard Conditions," of SEWRPC Community Assistance Planning Report No. 278 (CAPR No. 278), 2nd Edition, *Kenosha County Hazard Mitigation Plan Update: 2011-2015* (SEWRPC staff). (Part of this chapter was reviewed at the February 2010 meeting.)
4. Review of preliminary draft Chapter V, "Hazard Mitigation Strategies" (SEWRPC staff)
5. Review of preliminary draft Chapter VI, "Plan Adoption, Implementation, Maintenance, and Revision" (SEWRPC staff)
6. Appendix N, "Hazard Risk Analysis And Prioritization: 2010" (SEWRPC staff)
7. Other business
8. Adjourn

Michael G. Hahn
Secretary

Enclosures

#151751 V1 - CAPR-278 2ND ED NOTICE JUNE 2010 MTG
MGH/pk
05/27/10

SUMMARY NOTES OF THE JUNE 22, 2010 MEETING OF THE KENOSHA COUNTY HAZARD MITIGATION TASK FORCE

INTRODUCTION

The third meeting of the Kenosha County Hazard Mitigation Task Force was convened at the Kenosha County Center Public Hearing Room at 1:30 p.m. on June 22, 2010. The meeting was called to order by Kenosha County Division of Emergency Management Director Ben Schliesman. Attendance was taken by circulating a sign-in sheet.

In attendance at the meeting were the following individuals:

Ben Schliesman, Chairman	Director, Kenosha County Division of Emergency Management
Michael G. Hahn, Secretary	Chief Environmental Engineer, Southeastern Wisconsin Regional Planning Commission
Michael Boozer	Chief Executive Officer, ChemReport, Inc.
Joseph E. Boxhorn	Senior Planner, Southeastern Wisconsin Regional Planning Commission
John Burg	Village Administrator, Village of Paddock Lake
Michelle Eisenhauer	Central Services Manager, Kenosha County Department of Human Services
Patrick Finnemore	Director of Facilities, Kenosha Unified School District No. 1
William Glembocki	Chairperson, Town of Wheatland
Paul Guilbert, Jr.	Chief, Pleasant Prairie Fire and Rescue
Don Howland	Captain, City of Kenosha Fire Department
Mark Krueger	Lieutenant, Kenosha County Sheriff's Department
Eric Kuhart	Security Director, Carthage College
Lewis Lindquist	Captain, Kenosha Police Department
John Meland	Executive Director, Kenosha County Housing Authority; Chief Economic Development Planner, Southeastern Wisconsin Regional Planning Commission
George E. Melcher	Director, Kenosha County Department of Planning and Development
Mark Melotik	Kenosha County Health Department
Edwin Morris	WE Energies
Aaron Owens	Research Analyst, Southeastern Wisconsin Regional Planning Commission
Peter Parker	Chief, Town of Bristol Fire Department
Mike Slover	Chief, Town of Salem Fire/Rescue
Linda Valentine	Chairperson, Town of Salem

Mr. Schliesman welcomed all those in attendance and thanked them for their interest and participation in this important program. Mr. Schliesman noted that attendance would be taken via a sign in sheet. He then asked each of those in attendance to introduce themselves and state the organization which they are representing. He also asked those in attendance to note that item number six on the agenda would be moved ahead of item number five.

REVIEW OF SUMMARY NOTES OF THE FEBRUARY 24, 2010 TASK FORCE MEETING

Mr. Schliesman introduced Joseph Boxhorn of the Southeastern Wisconsin Regional Planning Commission (SEWRPC) staff. At Mr. Schliesman's request, Mr. Boxhorn reviewed the summary notes of the February 24, 2010 Task Force meeting. Mr. Boxhorn reminded representatives of the municipalities in attendance that updates on the status of their Emergency Operation Plans are needed. He requested that any information regarding the adoption of plans, the date of adoption and any revisions be emailed to him. Any updates will then be added to Table II-13 of the Kenosha County Hazard Mitigation Plan Update report. He also pointed out that pages 7 and 8

of the summary notes describe revision that were made to Chapters I, II, and III in order to be consistent with revisions that the Wisconsin Division of Emergency Management (WEM) requested be made to the Racine County hazard mitigation plan update, which SEWRPC prepared prior to the Kenosha County plan update.

Mr. Boxhorn also noted that the summary notes included responses to written comments submitted by Timothy Popanda, Village of Paddock Lake Building and Zoning Administrator, in a March 1, 2010 letter to Michael Hahn of the SEWRPC staff.

No additions or corrections to the summary notes were offered. Ms. Valentine moved to approve the summary notes. Mr. Guilbert seconded the motion and the summary notes were approved.

At the request of Mr. Schliesman, Mr. Hahn discussed where the planning process is and what the next steps of the process will be. Mr. Hahn explained that July 31, 2010 is the deadline to send the plan to WEM. Any changes and revisions requested by WEM will be made by SEWRPC staff. The revised draft plan will then be made available on the SEWRPC website and Task Force comments will be solicited. Following this, a Public Hearing will be scheduled and notices sent out. Mr. Hahn noted that after a public hearing takes place, the plan will be revised to incorporate pertinent comments, Task Force comments will again be solicited, the plan will be submitted to WEM, and WEM will send the plan to the Federal Emergency Management Agency (FEMA) for review and approval. Mr. Schliesman added that each municipality will be asked to adopt the plan, and noted that adoption is required to be eligible for aid.

**REVIEW OF THE REMAINDER OF PRELIMINARY DRAFT CHAPTER III,
“ANALYSIS OF HAZARD CONDITIONS”, OF SEWRPC COMMUNITY
ASSISTANCE PLANNING REPORT NO. 278 (CAPR NO. 278), 2ND EDITION,
*KENOSHA COUNTY HAZARD MITIGATION PLAN UPDATE: 2011-2015***

At Mr. Schliesman’s request, Mr. Boxhorn reviewed pages 16-28 of the preliminary draft of Chapter III, “Analysis of Hazard Conditions.” He noted that the rest of Chapter III had been reviewed at the February 24, 2010 Task Force meeting.

Mr. Boxhorn explained that the terminology for describing the 100-year floodplain had been changed throughout the plan from “100-year recurrence interval” flood hazard area to “one-percent-annual-probability” flood hazard area. Mr. Boxhorn noted that this more accurately reflects what is being described.

Mr. Boxhorn noted that although some critical community facilities appear to be within the one-percent-annual-probability flood hazard area at the scale shown on Map III-4, closer examination showed that none are actually in the floodplain.

Ms. Valentine commented that the Town of Salem contains three lake management districts, and that each lake has unique scenarios related to flooding. She suggested that lake districts be discussed in the plan update. Mr. Hahn noted that lake management plans do not generally deal specifically with stormwater drainage issues but are more focused on water quality. Mr. Hahn suggested adding a table listing lake management districts in the County.

[Secretary’s Note: A table listing the lake management districts was added to Chapter II. That table is attached herein as Exhibit A. The following sentences were added to the end of the first partial paragraph on page 6 of Chapter II:

“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-6a.”]

There were no further comments or suggestions on Chapter III. Mr. Boxhorn noted that the comments page is still accessible on the SEWRPC website and any comments or suggestions can be submitted through the website or sent directly to him by e-mail.

REVIEW OF PRELIMINARY DRAFT CHAPTER V, “HAZARD MITIGATION STRATEGIES”, OF SEWRPC COMMUNITY ASSISTANCE PLANNING REPORT NO. 278 (CAPR NO. 278), 2ND EDITION, KENOSHA COUNTY HAZARD MITIGATION PLAN UPDATE: 2011-2015

At Mr. Schliesman’s request, Mr. Boxhorn reviewed Chapter V, “Hazard Mitigation Strategies.”

In reference to the subsection on stormwater drainage, Ms. Valentine expressed concerns regarding high water levels in lakes in the Town of Salem. She noted that Camp Lake was under a slow-no-wake rule through June 17th. She suggested that the cause of high lake levels could be due to obstructions to flow through wetlands south of CTH C. She also noted that there are no provisions in the plan for wetland maintenance. In response to a question from Mr. Hahn, she noted there is no structure flooding at this time.

Ms. Valentine also expressed concern regarding dam maintenance. She noted that the Town of Salem received letters from the Wisconsin Department of Natural Resources (WDNR) regarding two dams in the Town. She indicated that, in some cases, it is difficult to determine and locate dam owners. Ms. Valentine also noted that Center Lake Dam, Rock Lake Dam, and Cross Lake Dam may be candidates for removal. Mr. Hahn asked if it would be possible for Ms. Valentine to forward any correspondence with the WDNR regarding these dams. Ms. Valentine agreed to forward correspondence. Mr. Hahn asked the Task Force whether any other municipality has had similar correspondence with WDNR regarding dams. No other Task Force member noted any such correspondence.

[Secretary’s Note: On July 8, 2010, Ms. Valentine forwarded a June 22, 2009 electronic mail message that she sent to Tanya L. Meyer, WDNR Water Management Engineer, and an e-mail response from Ms. Meyer. Those messages referred to factors affecting the hydraulic capacity of the Center Lake outlet to Camp Lake and to issues related to ownership and abandonment of the Center Lake dam. On July 9, 2010, Ms. Valentine provided the SEWRPC staff with an April 8, 2010 letter from Ms. Meyer to Ms. Valentine and Raymond Arbet, Director of the Kenosha County Division of Public Works. That letter requested their assistance in identifying the owner of the Rock Lake dam, and mentioned the possibility of the Town, the County, or another party assuming ownership. While issues related to dam ownership and abandonment of dams are important considerations in managing dams and their associated impoundments, the effects of a potential dam failure are the most pertinent for consideration under a hazard mitigation plan such as this one.

At its February 24 and June 22, 2010 meetings, the Task Force reviewed Chapter III, “Analysis of Hazard Conditions,” including the “Dam Failure Flooding” subsection (page 7) of the “Hazard Identification” section and the “Vulnerability Assessment for Flooding and Associated Stormwater Drainage Problems” section. Dam failure flooding was not considered a significant enough hazard to be addressed in depth, but the “Vulnerability” sections does include a recommendation that consideration be given to “future evaluation of floodplain areas related to dam failure.”

In response to Ms. Valentine’s comments, Table III-7a, which is attached to these summary notes as Exhibit B, was added. That table summarizes information on existing dams for which hazard potentials have been established by WDNR. The information in the table is taken directly from the WDNR dam inventory. Also, the third sentence on page 17 of Chapter III was replaced with the following sentences:

“As indicated in Table III-7a, there are 13 existing dams in Kenosha County for which hazard ratings have been assigned 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.¹ Because of the presence of two high hazard and three significant hazard dams in the County, future evaluation of floodplain areas related to dam failure should be considered.”]

There were no other comments or suggestions on Chapter V. Mr. Boxhorn acknowledged the large amount of material reviewed and reiterated that Task Force members may submit questions or suggestions on the chapters via the comments page on the SEWRPC website or by e-mailing him directly.

REVIEW OF PRELIMINARY DRAFT APPENDIX N, “HAZARD RISK ANALYSIS AND PRIORITIZATION: 2010”, OF SEWRPC COMMUNITY ASSISTANCE PLANNING REPORT NO. 278 (CAPR NO. 278), 2ND EDITION, KENOSHA COUNTY HAZARD MITIGATION PLAN UPDATE: 2011-2015

At Mr. Schliesman’s request, Mr. Boxhorn reviewed the preliminary draft of Appendix N, “Hazard Risk Analysis and Prioritization: 2010.

In regards to Table N-1 and Table N-2, Mr. Boxhorn noted that the numbers are based on the best available data. Mr. Boxhorn acknowledged that most of the numbers in the tables are likely to represent underestimates due to underreporting of incidents.

There were no questions or comments on Appendix N.

REVIEW OF PRELIMINARY DRAFT CHAPTER VI, “PLAN ADOPTION, IMPLEMENTATION, MAINTENANCE, AND REVISION”, OF SEWRPC COMMUNITY ASSISTANCE PLANNING REPORT NO. 278 (CAPR NO. 278), 2ND EDITION, KENOSHA COUNTY HAZARD MITIGATION PLAN UPDATE: 2011-2015

At Mr. Schliesman’s request, Mr. Boxhorn reviewed the preliminary draft Chapter VI, “Plan Adoption Implementation, Maintenance, and Revision.”

Mr. Hahn suggested that the updating process for the Kenosha County Hazard Mitigation Plan begin at least two years prior to the plan’s expiration date. Regarding the expiration of the updated plan, Mr. Guilbert asked whether the plan would be valid through 2015. Mr. Hahn indicated that would be the case.

TIME AND DATE OF NEXT MEETING

Mr. Schliesman stated that SEWRPC staff would incorporate comments from this meeting and revise the draft plan. He presented two options to the task force moving forward. One option was to hold a final meeting on

¹Chapter 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.”

Friday July 16, 2010 to review any revisions to chapters reviewed in this meeting. The other option presented by Mr. Schliesman was to post revisions on the SEWRPC website, and allow a period of time for the Task Force to submit comments online or by e-mail. After discussion, it was agreed that the Task Force would review the chapters online.

ADJOURNMENT

There being no further business, the meeting was adjourned by unanimous consent at 2:30 p.m.

COMMENTS FROM LINDA VALENTINE, SALEM TOWN CHAIR, FOLLOWING THE MEETING

Following the meeting, Ms. Valentine spoke with Mr. Boxhorn regarding issues in the Town related to dams and stormwater management. On July 8, 2010 she followed up with e-mail messages elaborating on those issues. Ms. Valentine's comments relate to localized stormwater drainage issues, the stormwater drainage effects of new development on narrow lake-frontage lots, stormwater management planning for existing development, and shoreland/wetland zoning issues.

The subsection on "Multi-Jurisdictional Flooding and Stormwater Management Risk Assessment," on page 28 of Chapter III of SEWRPC CAPR No. 278, 2nd Edition, alludes to stormwater problems that require special consideration, with the special considerations being listed in Table III-11.

[Secretary's Note: Ms. Valentine's comments regarding localized stormwater drainage issues, the stormwater drainage effects of new development on narrow lake-frontage lots, and stormwater management planning for existing development have been addressed by revising the portion of Table III-11 that relates to the Town of Salem (see Exhibit C).]

The "Stormwater Management Element" subsection (pages 16 through 18) of the "Hazard Mitigation Plan Component for Flooding and Related Stormwater Drainage Problems" section in Chapter V cites a recommendation from the 2003 SEWRPC Des Plaines River watershed study which calls for preparation of stormwater management plans for several subwatersheds, including the Salem Branch of Brighton Creek subwatershed in the Villages of Bristol and Paddock Lake and the Town of Salem. That recommendation addresses the identified need for stormwater management planning in a portion of the Town of Salem.

[Secretary's Note: In addition, the Town of Salem recently adopted a stormwater management plan which should provide the framework for addressing issues of the type raised by Ms. Valentine. The following paragraph was inserted after the third paragraph on page 17 of Chapter V:

"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 (2-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 \$6.2 million dollars for 2010-2020."]

As noted on page 18 of Chapter V, both Kenosha County and the Town of Salem have adopted stormwater management ordinances.

[Secretary's Note: The following sentence was inserted at the end of the "Stormwater-Related Regulations" subsection on page 18 of Chapter V:

"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."]

The shoreland/wetland zoning issues identified by Ms. Valentine, while important considerations, are not directly related to the hazard mitigation plan update, and, therefore, they will not be specifically addressed in the plan.

Respectfully Submitted,

Michael G. Hahn
Secretary

* * *

#152188 V1 - CAPR-278-2ED SUMMARY NOTES 06/22/10
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07/20/10

Exhibit A

Table II-6a

LAKE MANAGEMENT DISTRICTS IN KENOSHA COUNTY: 2010

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
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

^aLocated in Walworth County.

Source: University of Wisconsin-Extension, and SEWRPC.

Exhibit B

Table III-7a

WISCONSIN DEPARTMENT OF NATURAL RESOURCES DAM INVENTORY INFORMATION: 2010

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
6	1269	Hooker Lake	Carl Bryzek	Carl Bryzek Farm, LLC	Salem	30.02	Small	1.0	3.0	87.0	180.0	Low
7	1270	Camp Lake	Camp Lake	Kenosha County DPW	Salem	30.03	Large	0.3	7.2	461.0	1,500.0	Low
8	1271	Paddock Lake 3	--	Vince Paddock	Salem	30.04	Small	2.0	3.0	130.0	300.0	Low
9	1272	Silver Lake	Jack Erb	Brian Sullivan	Salem	30.05	Small	1.0	2.0	464.0	920.0	Low
10	1273	Cross Lake	B.J. Corbin	Harbhajan Singh Samra	Salem	30.07	Small	3.0	4.0	87.0	270.0	Significant
11	1274	Lake George	John Haterlein	George Wronowski	Bristol	30.09	Small	4.0	6.0	59.0	290.0	Low
12	1275	Voltz Lake	--	Unknown	Salem	30.11	Small	3.0	5.0	52.0	200.0	Significant
13	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
14	1277	Dyer Lake	--	Kenosha Boy Scouts of America	Wheatland	30.13	Small	3.0	6.0	52.0	200.0	Significant

Source: Wisconsin Department of Natural Resources and SEWRPC.

Exhibit C

Table III-11

COMMUNITIES IN KENOSHA COUNTY WITH SPECIAL FLOOD AND RELATED STORMWATER DRAINAGE CONSIDERATIONS

Community	Reason for Special Consideration
City of Kenosha	15 structures estimated to be in flood hazard area
Village of Bristol	Nine 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	30 structures estimated to be in flood hazard area
Village of Silver Lake	47 structures estimated to be in flood hazard area
Village of Twin Lakes	Two structures estimated to be in flood hazard area
Town of Bristol ^a	Three structures estimated to be in flood hazard area. Substantial agricultural flood damages
Town of Paris	Substantial agricultural flood damages
Town of Randall	Six structures estimated to be in flood hazard area
Town of Salem	136 structures estimated to be in flood hazard area, 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	38 structures estimated to be in flood hazard area
Town of Wheatland	46 structures estimated to be in flood hazard area

NOTE: See Maps III-2 and III-3.

^aOn July 4, 2010, the Village of Bristol annexed the Town of Bristol.

Source: SEWRPC.

Figure A-3

RELEVANT REGIONAL AND LOCAL ADVISORY COMMITTEES: 2009

KENOSHA COUNTY MULTI-JURISDICTIONAL ADVISORY COMMITTEE

Fred Ekornaas, Chair	Kenosha County Land Use Committee, Supervisor, Kenosha County
Bill Morris, Vice-Chair	Administrator, Town of Somers
Dennis Faber.....	Supervisor, Town of Salem
William Glembocki, Jr.	Chairman, Town of Wheatland
Rich Gossling	Chairman, Town of Bristol
Jerry Helmert.....	Supervisor, Town of Brighton
John Holloway.....	Chairman, Town of Paris Planning Commission
Jeff Labahn	Director, Department of City Development, City of Kenosha
Joanne Maggio	Village of Silver Lake
Jean Werbie	Director, Department of Community Development, Village of Pleasant Prairie

TECHNICAL COORDINATING AND ADVISORY COMMITTEE ON REGIONAL AIRPORT SYSTEM PLANNING

Duane H. Bluemke, Chair	Former Commissioner, Southeastern Wisconsin Regional Planning Commission
Kenneth R. Yunker, Secretary	Executive Director, Southeastern Wisconsin Regional Planning Commission
C. Barry Bateman	Airport Director, General Mitchell International Airport
Wayde B. Buck.....	Airport Director, Kenosha Regional Airport
John B. Capelle.....	Director of Community Development, City of West Bend
Justin Drew	City Planner, City of Hartford
Thomas J. Gorlinski.....	Former Supervisor, Kenosha County Board
David M. Green	Director, Bureau of Aeronautics, Wisconsin Department of Transportation
N. David Mann	Vice-President and Airport Manager, Batten Airport, Racine
Keith Markano.....	Airport Manager, Waukesha County-Crites Field
George E. Melcher.....	Director, Department of Planning and, Development, Kenosha County
Daniel J. Millenacker.....	Community Planner, U.S. Department of Transportation, Federal Aviation Administration
Paul M. Roback	Community Resource Development Educator, University of Wisconsin-Extension, Ozaukee County
Douglas Seymour	Director of Community Development, City of Oak Creek
Albert Stanek	Chief of Intercity Planning, Bureau of Planning & Economic Development, Division of Transportation Investment Management, Wisconsin Department of Transportation
George A. Torres	Director, Milwaukee County Department of Transportation and Public Works
Earl E. Vorpagel, Jr.	Former Chairman, Airport Commission, City of Burlington
Judy Weter.....	Administrator, Village of East Troy

TECHNICAL COORDINATING AND ADVISORY COMMITTEE ON REGIONAL TRANSPORTATION SYSTEM PLANNING

Ray Arbet, Chair.....	Director of Public Works, Kenosha County
Sandra K. Beaupre.....	Director, Bureau of Planning, Division of Transportation Investment Management, Wisconsin Department of Transportation
John M. Bennett	City Engineer-Director of Public Works, City of Franklin
Allison Bussler	Chief of Staff, Waukesha County Executive's Office
Shane Crawford.....	Deputy County Administrator—Central Services, Walworth County Public Works Department
Paul G. Day	Interim Director of Public Works, City of Waukesha
Robert R. Dennik.....	Director, Division of Economic and Community Development, Milwaukee County Department of Administrative Services
Robert R. Dreblow.....	Highway Commissioner, Ozaukee County Highway Department
Thomas M. Grisa	Director of Public Works, City of Brookfield
Anita Gullota-Connelly	Managing Director, Milwaukee County Transit System
Richard M. Jones	Commissioner of Public Works/City Engineer, City of Racine
William A. Kappel.....	Director of Public Works, City of Wauwatosa
Michael M. Lemens.....	Director, Engineering Division, Public Works Department, City of Kenosha
Jeffrey J. Mantes.....	Commissioner of Public Works, Department of Public Works, City of Milwaukee
Bahrut Mathur	Deputy Regional Administrator, Region 5, U.S. Environmental Protection Agency
Dwight E. McComb.....	Planning and Program Development Engineer, Federal Highway, Administration, U.S. Department of Transportation
Gloria L. McCutcheon.....	Regional Director, Southeast Region, Wisconsin Department of Natural Resources
John H. Melby, Jr.	Director, Bureau of Air Management Wisconsin Department of Natural Resources
Larry Moore	Community Partnership Coordinator, City of Milwaukee Housing Authority
Kenneth M. Pesch.....	Highway Commissioner, Washington County
Jeffrey S. Polenske	City Engineer, City of Milwaukee
David Prott	Director of Public Works, Racine County
Sandra Rusch Walton	Marketing and Public Relations Officer, Milwaukee Public Library
Sheri Schmit	Systems Planning Group Manager, Southeast Region, Wisconsin Department of Transportation
Marisol Simón	Regional Administrator, Region V, Federal Transit Administration, U.S. Department of Transportation
Wallace Thiel	Village Administration, Village of Hartland
George A. Torres	Director, Milwaukee County Department of Transportation and Public Works

TECHNICAL AND CITIZEN ADVISORY COMMITTEE ON REGIONAL BICYCLE AND PEDESTRIAN FACILITIES SYSTEM PLANNING

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Kenneth R. Yunker, Secretary	Executive Director, Southeastern Wisconsin Regional Planning Commission
Robert Dreblow	Highway Commissioner, Ozaukee County Highway Department
Paul A. Feller.....	Director of Public Works, City of Waukesha
Thomas P. Huber	State Bicycle and Pedestrian Program Coordinator, Wisconsin Department of Transportation
Richard A. Jones.....	Director of Public Works, City of Racine
James W. Kavemeier	Parks System Manager, Waukesha County Department of Parks and Land Use
Vivian M. Keller.....	Public Policy Consultant
Jaclyn D. Lawton.....	Environmental Coordinator, Federal Highway Administration
Randal LeClaire.....	Traffic Engineer, City of Kenosha
Jeffrey J. Mantes.....	Commissioner, Department of Public Works, City of Milwaukee
Raymond G. Meyer	Public Member, Ozaukee County
Steve Mokrohisky.....	Deputy Chief of Staff, Milwaukee County
Kenneth Neitzke	Governmental Relations Committee Chairman, Waukesha County Chapter, Ice Age Trail Committee
Robert F. Pfeiffer.....	Project Development Chief, District 2, Wisconsin Department of Transportation
Mark A. Piotrowicz	Assistant Director of Community Development, City of West Bend
Jeffrey S. Polenske	City Engineer, City of Milwaukee
Linda Roessl	President, Bay View Bicycle Club
Ronald J. Rutkowski.....	Director, Transportation Planning and Development, Milwaukee Department of Public Works
Paul S. Sandgren.....	Superintendent, Kettle Moraine State Forest, Southern Unit
Karen Springob.....	Project Engineer, City of Brookfield
Robert Wagler	Safety Specialist Senior, City of Milwaukee Police Department
William R. Waldron	Planning Analyst, Milwaukee County Department of Parks, Recreation and Culture

**KENOSHA COUNTY JURISDICTIONAL
HIGHWAY PLANNING COMMITTEE**

Ray Arbet, ChaiDirector of Public Works, Kenosha County
Kenneth R. Yunker, Secretary Executive Director, Southeastern Wisconsin
Regional Planning Commission
David C. Buehn President, Village of Paddock Lake
David E. Cox Administrator, Village of Twin Lakes
David DeVito Chairman, Town of Brighton
Virgil Gentz Chairman, Town of Paris
William Glembocki Chairman, Town of Wheatland
Barry S. GoadPresident, Village of Genoa City
Richard J. Gossling.....Chairman, Town of Bristol
Dewayne J. Johnson Director, Southeast Region, Wisconsin Department of Transportation
Roger Johnson President, Village of Silver Lake
Michael M. Lemens.....Director, Engineering Division, Public Works Department, City of Kenosha
Dwight E. McComb.....Planning and Program Development Engineer, Federal Highway
Administration, U.S. Department of Transportation
George E. Melcher..... Director of Planning and Development, Kenosha County
James M. Smith Chairman, Town of Somers
Michael Spence Village Engineer, Village of Pleasant Prairie
Robert Stoll.....Chairman, Town of Randall
Linda ValentineChairperson, Town of Salem

**ADVISORY COMMITTEE ON TRANSPORTATION SYSTEM PLANNING AND
PROGRAMMING FOR THE ROUND LAKE BEACH-MCHENRY-GRAYSLAKE,
ILLINOIS-WISCONSIN URBANIZED AREA (WISCONSIN PORTION)**

Kenneth R. Yunker, Secretary	Executive Director, Southeastern Wisconsin Regional Planning Commission
Sandra K. Beaupre	Director, Bureau of Planning, Division of Transportation Investment, Wisconsin Department of Transportation
David C. Buehn	President, Village of Paddock Lake
David DeVito	Chairman, Town of Brighton
William Glembocki	Chairman, Town of Wheatland
Richard J. Gossling.....	Chairman, Town of Bristol
Dewayne J. Johnson	Director, Southeast Region, Wisconsin Department of Transportation
Roger Johnson	President, Village of Silver Lake
Peter T. McMullen	Program and Planning Analyst, Wisconsin Department of Natural Resources
Cheryl L. Newton	Environmental Protection Specialist, Region V U.S. Environmental Protection Agency
Allen Radliff	Wisconsin Division Administrator, Federal Highway Administration, U.S. Department of Transportation
Marisol Simón	Regional Administrator, Region V, Federal Transit Administration, U.S. Department of Transportation
Gary A. Sipsma	Director, Division of Highway, and Highway Commissioner Department of Public Works, Kenosha County
Howard K. Skinner	Chairman, Village of Twin Lakes
Robert Stoll.....	Chairman, Town of Randall
Linda Valentine	Chairperson, Town of Salem

**ADVISORY COMMITTEE ON TRANSPORTATION SYSTEM PLANNING
AND PROGRAMMING FOR THE KENOSHA URBANIZED AREA**

Kenneth R. Yunker, Secretary	Executive Director, Southeastern Wisconsin Regional Planning Commission
Sandra K. Beaupre	Director, Bureau of Planning, Division of Transportation Investment, Wisconsin Department of Transportation
Leonard Brandup	Director, Department of Transportation, City of Kenosha
Ronald L. Bursek	Director, Public Works Department, City of Kenosha
Dewayne J. Johnson	Director, Southeast Region, Wisconsin Department of Transportation
Jeffrey B. Labahn	Director, Department of City Development, City of Kenosha
Michael M. Lemens	Director, Engineering Division, Public Works Department City of Kenosha
Peter T. McMullen	Program and Planning Analyst, Wisconsin Department of Natural Resources
Cheryl L. Newton	Environmental Protection Specialist, Region V U.S. Environmental Protection Agency
Michael Pjevack	President, Wisconsin Coach Lines
Michael R. Pollocoff	Administrator, Village of Pleasant Prairie
Allen Radliff	Wisconsin Division Administrator, Federal Highway Administration, U.S. Department of Transportation
Marisol Simón	Regional Administrator, Region V, Federal Transit Administration, U.S. Department of Transportation
Gary A. Sipsma	Director, Division of Highway, and Highway Commissioner Department of Public Works, Kenosha County

TECHNICAL AND CITIZEN ADVISORY COMMITTEE ON COASTAL MANAGEMENT IN SOUTHEASTERN WISCONSIN

Dr. Norman P. Lasca, Chairman Professor, Department of Geological Sciences,
University of Wisconsin Milwaukee

Susan Black, Vice-Chairman.....Director of Parks, Recreation and Culture, Milwaukee County

Donald M. Reed, SecretaryChief Biologist, Southeastern Wisconsin
Regional Planning Commission

Hubert J. Albert Representative, Port Washington Yacht Club

E. Craig Faucett Director of Engineering, City of Cudahy

Scott A. Huebner Mayor, City of Port Washington

Steve Keith Acting Director of Environmental Services, Milwaukee County

Jeffrey J. Mantes.....Commissioner, Department of Public Works,
City of Milwaukee

Tamara Mayzik..... Administrative Coordinator, City of South Milwaukee

Gloria L. McCutcheon..... District Director, Southeast Region,
Wisconsin Department of Natural Resources

C. William Nelson Member, Great Lakes Sports Fisherman's Club

Eric ReineltMunicipal Port Director, Port of Milwaukee

Susan E. Robertson.....Manager, Village of Fox Point

Chad Sampson County Conservationist, Racine County

Kevin L. Shafer Executive Director, Milwaukee Metropolitan Sewerage District

REGIONAL WATER SUPPLY PLANNING ADVISORY COMMITTEE

Kurt W. Bauer, Chairman.....	Executive Director Emeritus, SEWRPC
Robert P. Biebel, Secretary	Special Projects Environmental Engineer, SEWRPC
Julie A. Anderson	Director of Planning and Development, Racine County
Kenneth R. Bradbury	Hydrogeologist/Professor, Wisconsin Geological and Natural History Survey
Thomas J. Bunker.....	Representative, Water and Wastewater Utility, City of Racine
Douglas S. Cherkauer	Professor of Hydrogeology, University of Wisconsin-Milwaukee
Lisa Conley.....	Representative, Town and County Resource Conservation and Development, Inc.
Michael P. Cotter.....	Director, Walworth County Land User and Resource Management Department
Charles A. Czarkowski	Drinking Water Expert, Wisconsin Department of Natural Resources, Southeastern Wisconsin District Office
Daniel S. Duchniak.....	General Manager, Waukesha Water Utility, City of Waukesha
Charles P. Dunning.....	Hydrologist, U.S. Geological Survey
Frank Ericson	Manager, Environmental Operations, S. C. Johnson & Son, Inc.
David Ewig.....	Water Superintendent, City of Port Washington
Thomas M. Grisa.....	Director of Public Works, City of Brookfield
Jeffrey A. Helmuth	Hydrogeologist Program Coordinator, Wisconsin Department of Natural Resources
Andrew A. Holschbach	Land Conservation Director, Ozaukee County
Eric J. Kiefer.....	Manager, North Shore Water Commission
Terrence H. Kiekhaefer	Director of Public Works, City of West Bend
Thomas J. Krueger.....	Water and Wastewater Utility Director, Village of Grafton
Carrie M. Lewis.....	Superintendent, Milwaukee Water Works, City of Milwaukee
Mark Lurvey	Agricultural Business Operator, Lurvey Turf Nursery
J. Scott Mathie	Vice President, of Governmental Affairs, Metropolitan Builders Association of Greater Milwaukee
George E. Melcher.....	Director of Planning and Development, Kenosha County
Paul E. Mueller.....	Administrator, Washington County Land Use and Parks Department
Jeffrey Musche	Administrator/Clerk, Town of Lisbon
Michael P. Rau	General Manager, We Energies-Water Services
Dale Shaver	Director, Waukesha County Departments of Parks and Land Use
Edward St. Peter.....	General Manager, Water Utility, City of Kenosha
James Surfus.....	Senior Environmental Engineer, MillerCoors, LLC
George A. Torres	Director, Milwaukee County Department of Transportation and Public Works
Daniel S. Winkler	Director of Public Works and Utilities, City of Lake Geneva
Steve Yttri.....	General Manager, Water and Sewer Utility, City of Oak Creek

ADVISORY COMMITTEE ON REGIONAL LAND USE PLANNING

George E. Melcher, Chair..... Director of Planning and Development, Kenosha County
Julie A. Anderson Director of Planning and Development, Racine County
Susan Black Director of Parks, Recreation and Culture, Milwaukee County
Martha L. Brown Deputy Commissioner, Department of
City Development, City of Milwaukee
John B. Capelle..... Director of Community Development, City of West Bend
Krista Chapdelaine Water Resources Planner, Milwaukee Metropolitan Sewerage District
Harlan E. Clinkenbeard Administrator/Planner, City of Pewaukee; Planner Town of Somers
Michael P. Cotter..... Director, Walworth County Land Use and Resource Management Department
Steve Crandell Director of Community Development, City of Waukesha
Henry Elling Town Manager/Planner, Town of Summit
Charles Erickson..... Director of Planning and Economic Development, City of Greenfield
Daniel F. Ertl Director of Community Development, City of Brookfield
Robert Greenstreet..... Planning Director, Department of City Development, City of Milwaukee
Gregory I. Igl..... District Conservationist, U.S. Natural Resources
Conservation Service, Walworth County
Jeffrey B. Labahn Director, Department of City Development, City of Kenosha
Peter T. McMullen Program and Planning Analyst, Wisconsin
Department of Natural Resources
Paul E. Mueller..... Administrator, Washington County Land Use and Park Department
Brian O'Connell Director of City Development, City of Racine
Sheri Schmit Systems Planning Group Manager, Southeast Region,
Wisconsin Department of Transportation
Douglas Seymour Director of Community Development, City of Oak Creek
Dale R. Shaver..... Director, Waukesha County Department of Parks and Land Use
John F. Stibal..... Director of Community Development, City of West Allis
Andrew T. Struck Director of Planning and Parks, Ozaukee
County Planning and Parks Department
Randy L. Tetzlaff..... Director of Planning and Development,
City of Port Washington; Supervisor, Town of Summit
Nancy L. Welch..... Director of Community Development, City of Wauwatosa

DES PLAINES RIVER WATERSHED COMMITTEE

George E. Melcher, Chair.....Director, Office of Planning and Development, Kenosha County
Kenneth R. Yunker, Secretary Executive Director, Southeastern Wisconsin
Regional Planning Commission
Julie A. Anderson Director of Planning and Development, Racine County
David C. Buehn President, Village of Paddock Lake
John F. BurkeManager, Halter Wildlife Area
James D’Antuono Illinois Fox Basin Team Leader, Wisconsin Department of Natural Resources
Virgil Gentz Chairman, Town of Paris
Richard J. Gossling.....Chairman, Town of Bristol
Ronald L. Johnson Chairman, Kenosha County Land Conservation Committee;
Supervisor, Kenosha County Board
Wayne E. KoesslRepresentative, WISPARK Corporation
Jeffrey B. LabahnDirector, Department of City Development, City of Kenosha
Douglas J. Noble Supervisor, Kenosha County Board
Michael R. Pollocoff Administrator, Village of Pleasant Prairie
Steve Richter Director of Conservation and Land Management, The Nature Conservancy
James M. Smith Chairman, Town of Somers
Edward St. PeterGeneral Manager, City of Kenosha Water Utility
Ronald Thomas.....Deputy Director of Planning, Chicago Metropolitan Agency for Planning
Michael D. Warner Executive Director, Lake County Stormwater Management Commission

Figure A-4

PUBLIC INFORMATION MEETING ON THE KENOSHA COUNTY HAZARD MITIGATION PLAN UPDATE

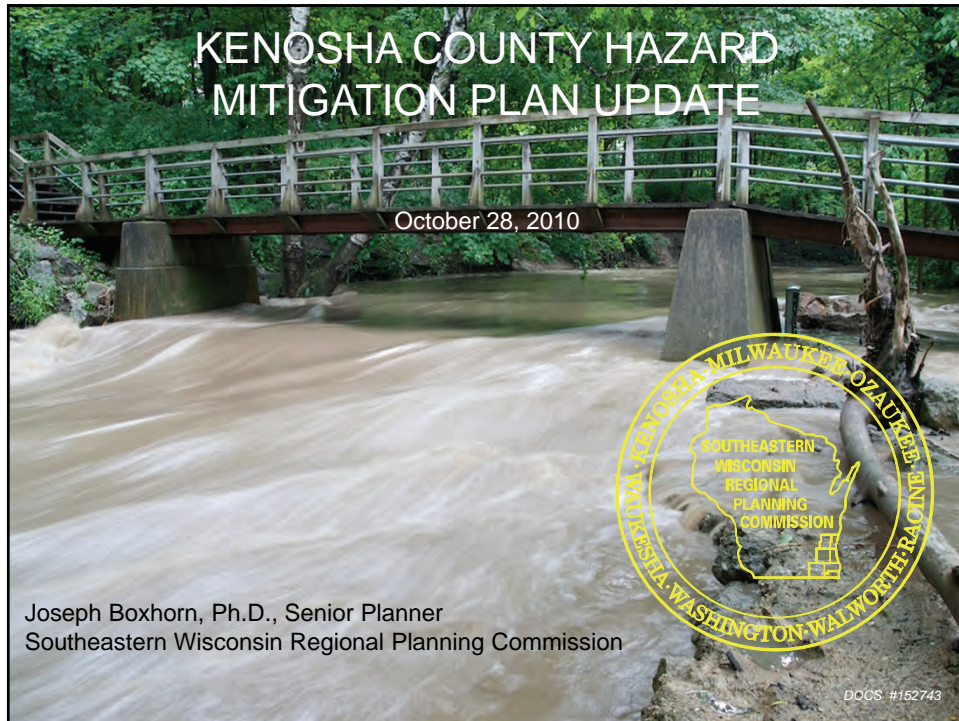
On Thursday, October 28, 2010 staff from the Kenosha County Office of Emergency Management and the Southeastern Wisconsin Regional Planning Commission (SEWRPC) conducted a public informational meeting on the update of the Kenosha County Hazard Mitigation Plan. The session provided the public an opportunity to learn about and comment on the findings and recommendations documented in the preliminary draft of SEWRPC Community Assistance Planning Report No. 278, 2nd Edition, *Kenosha County Hazard Mitigation Plan Update: 2011-2015*. This meeting was held from 4:00-6:00 p.m. at the Kenosha County Center, 19600 75th Street, Bristol, Wisconsin.

The session began with a meeting in “open house” format, which provided an opportunity for the public to meet with the County and Commission staffs to receive information, ask questions, and provide written comments. A copy of a Commission staff presentation is attached herein as Exhibit A.

Announcements of the meeting were sent for posting to all municipalities in the County, and through paid advertisements in the Kenosha News Newspaper on October 24, 2010. A copy of the announcement is attached herein as Exhibit B.

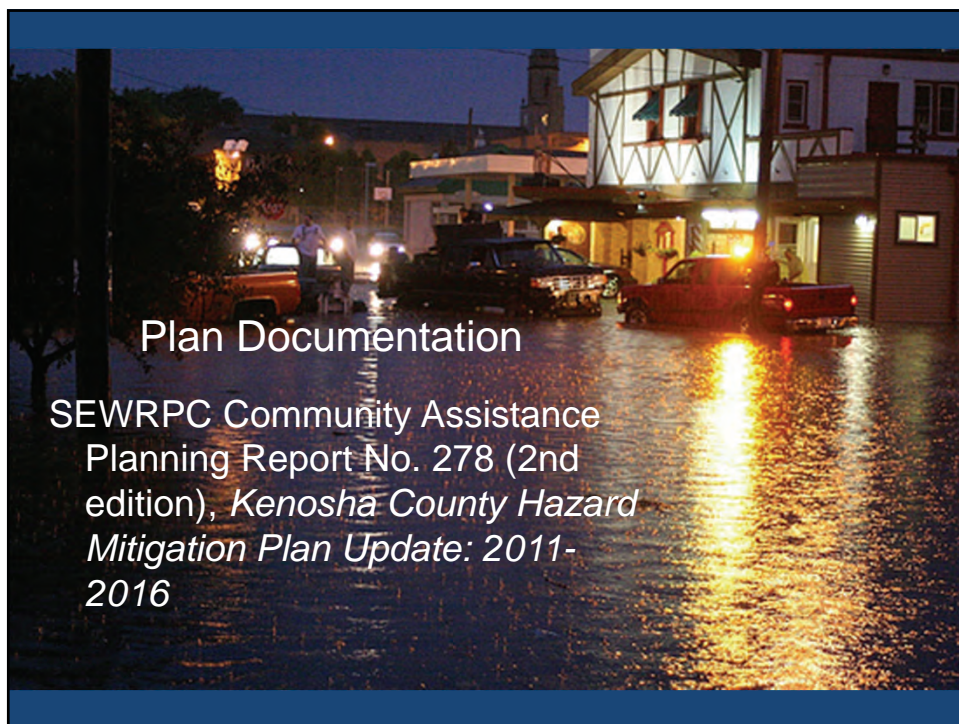
In addition to accepting comments on the preliminary draft of the plan update at this meeting, County and Commission staffs accepted written comments until November 12, 2010 through U.S. Mail and through a comment screen on the Commission’s website. No comments were received.

Exhibit A



Plan Preparation Staff

- Kenosha County Division of Emergency Management
- Southeastern Wisconsin Regional Planning Commission

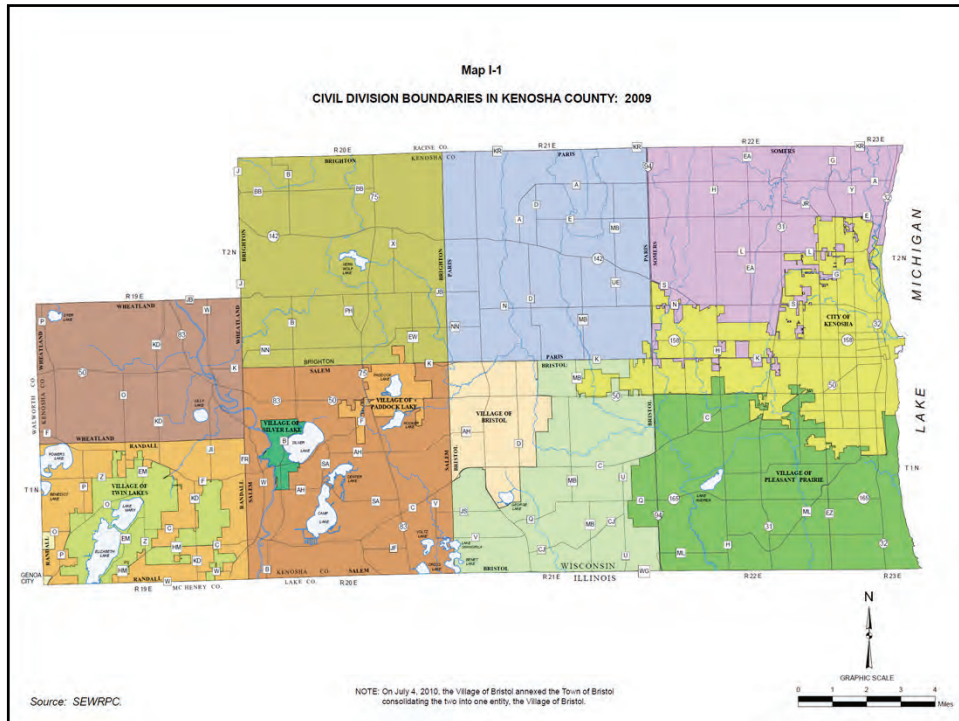


Plan Documentation

SEWRPC Community Assistance
Planning Report No. 278 (2nd
edition), *Kenosha County Hazard
Mitigation Plan Update: 2011-
2016*

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



Scope and Purpose (Chapter I)

Set forth the most appropriate, feasible, and effective hazard mitigation strategy for Kenosha County and local units of government

Maintain eligibility for hazard mitigation funding streams through the Federal Emergency Management Agency (FEMA)



Kenosha County Hazard Mitigation Plan Task Force

Oversaw plan updating activities

Comprised of

Elected officials, appointed officials, agency representatives,
business representatives, knowledgeable citizens

Law enforcement agencies, fire and EMS departments, public health
departments, public works departments, engineering
departments, private sector firms, nonprofit organizations,
colleges and universities

Plan Update Activities

(Described in Chapter I)

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

Inventory Data (Chapter II)

Demographic characteristics

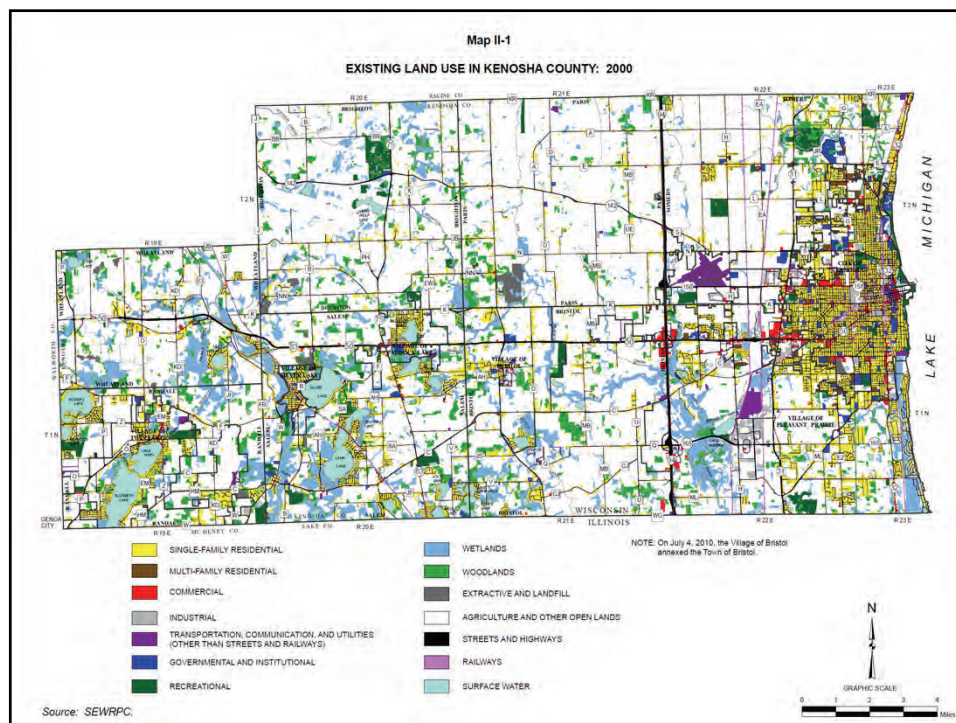
Existing and planned land use

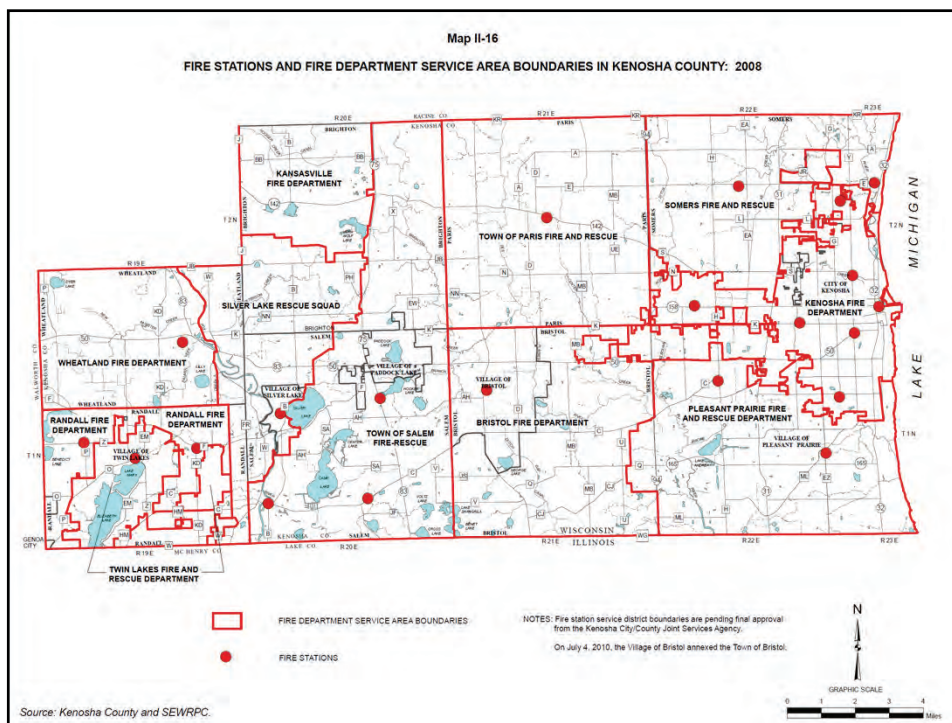
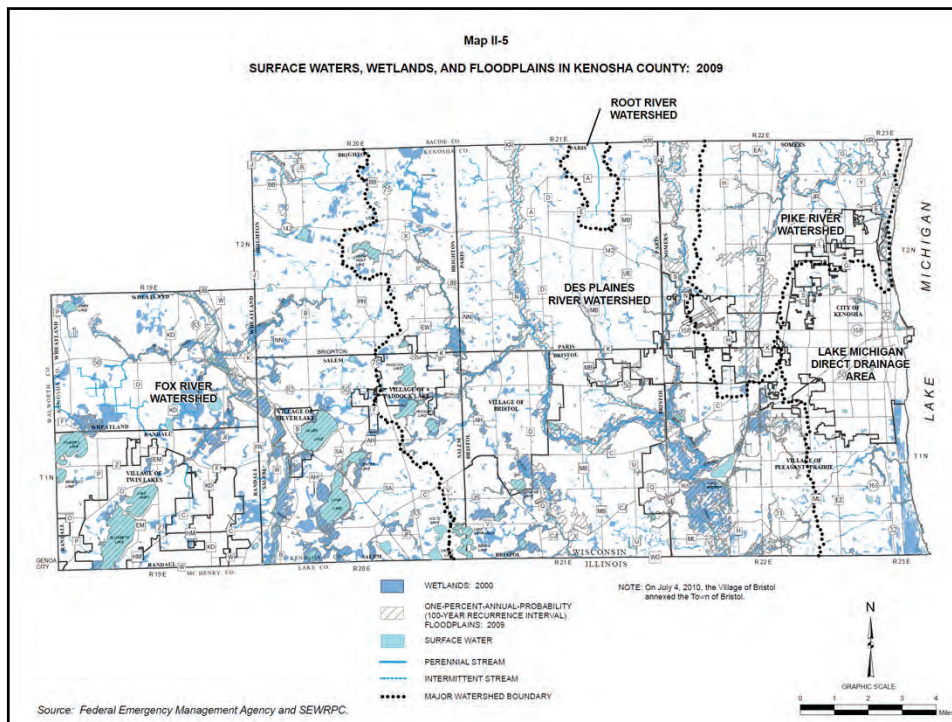
Surface water and Lake Michigan shoreline

Transportation and utility systems

Critical community facilities

Existing regulations and programs





Hazard Identification (Chapter III)

Task Force Input

Hazard and Vulnerability
Assessment Tool

Past Hazard Experience

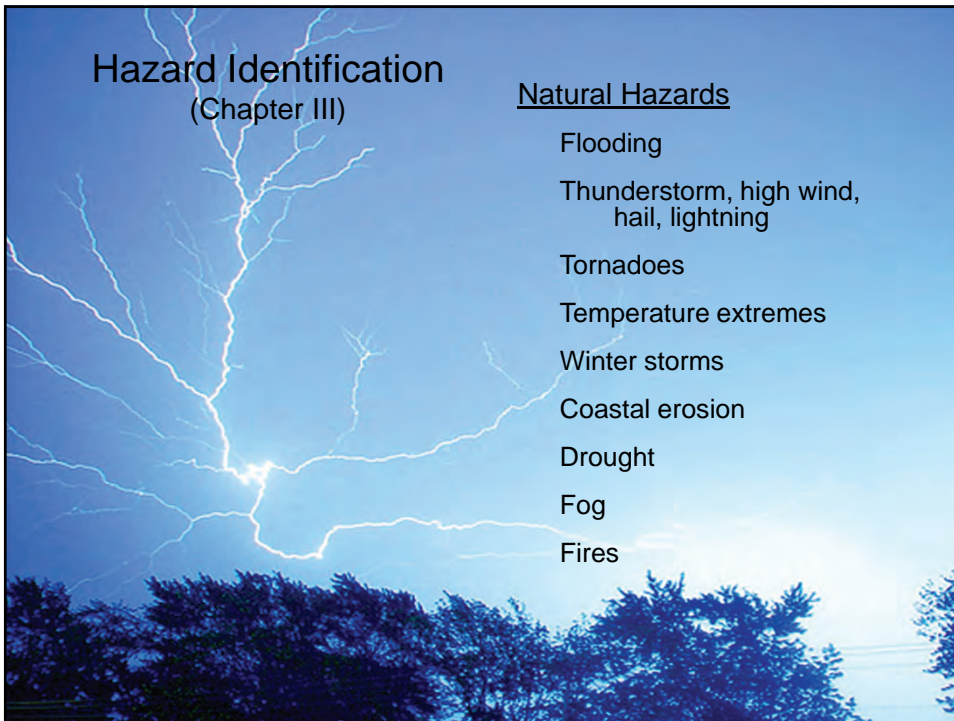
Frequency of occurrence
Property and crop damages
Fatalities and injuries



Hazard Identification (Chapter III)

Natural Hazards

Flooding
Thunderstorm, high wind,
hail, lightning
Tornadoes
Temperature extremes
Winter storms
Coastal erosion
Drought
Fog
Fires



Hazard Identification (Chapter III)

Other Hazards

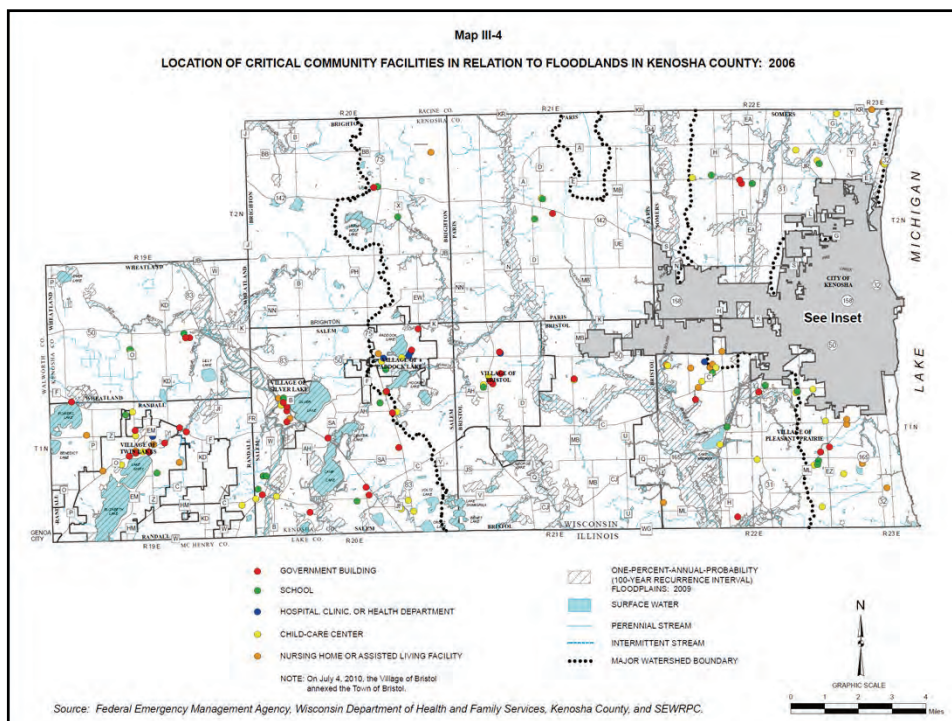
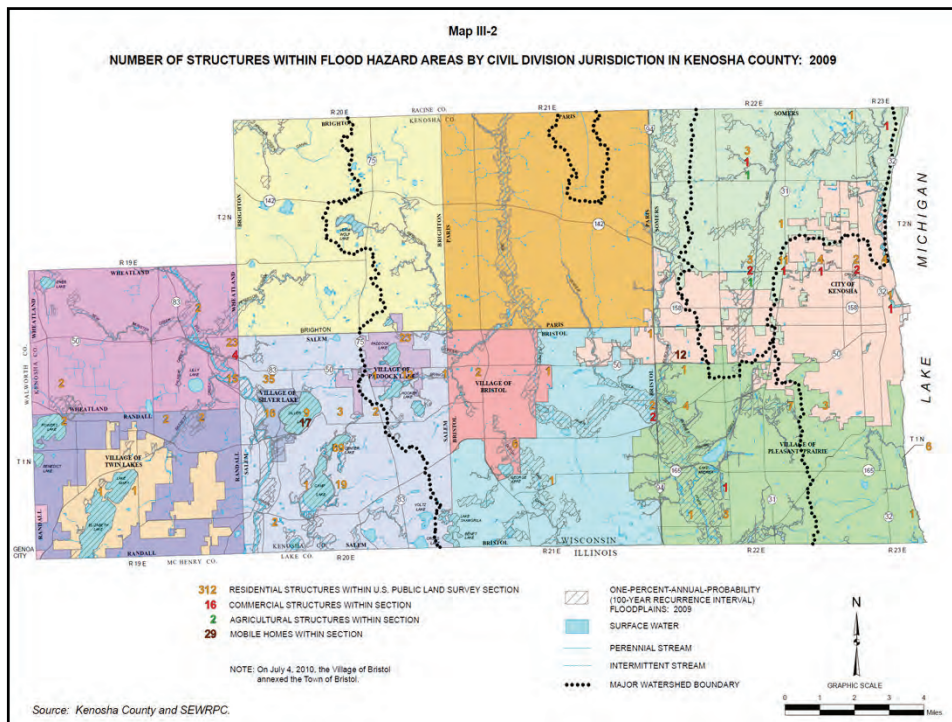
- * Transportation accidents
 - Street and roadway, railroad
- * Contamination or loss of water supply
- * Hazardous material incidents
 - Fixed facility, transportation
- * Terrorism
- * Power outage

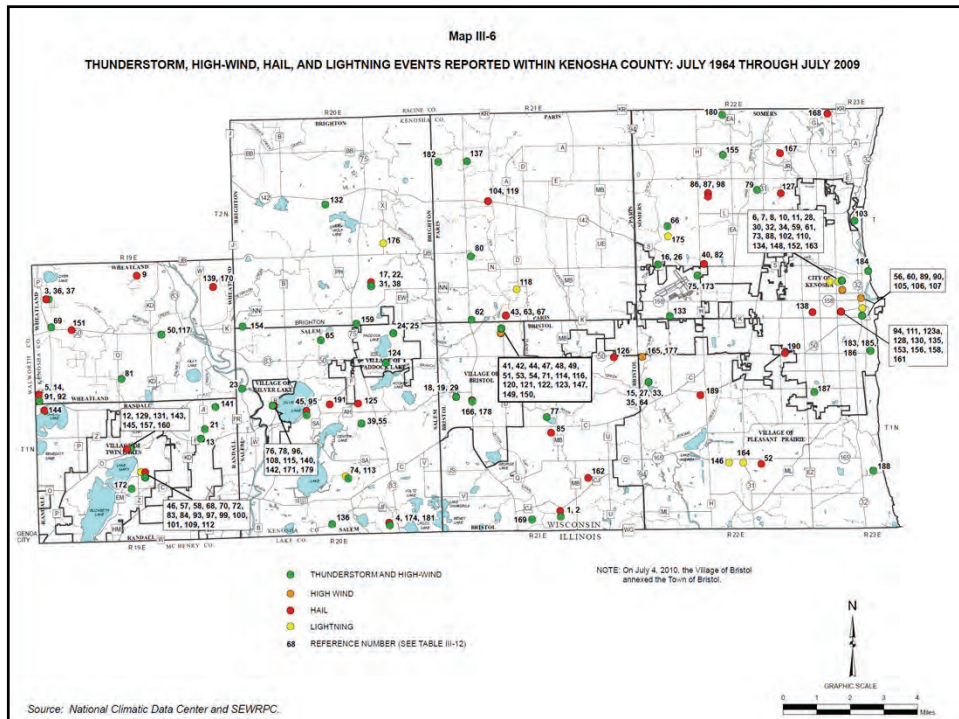
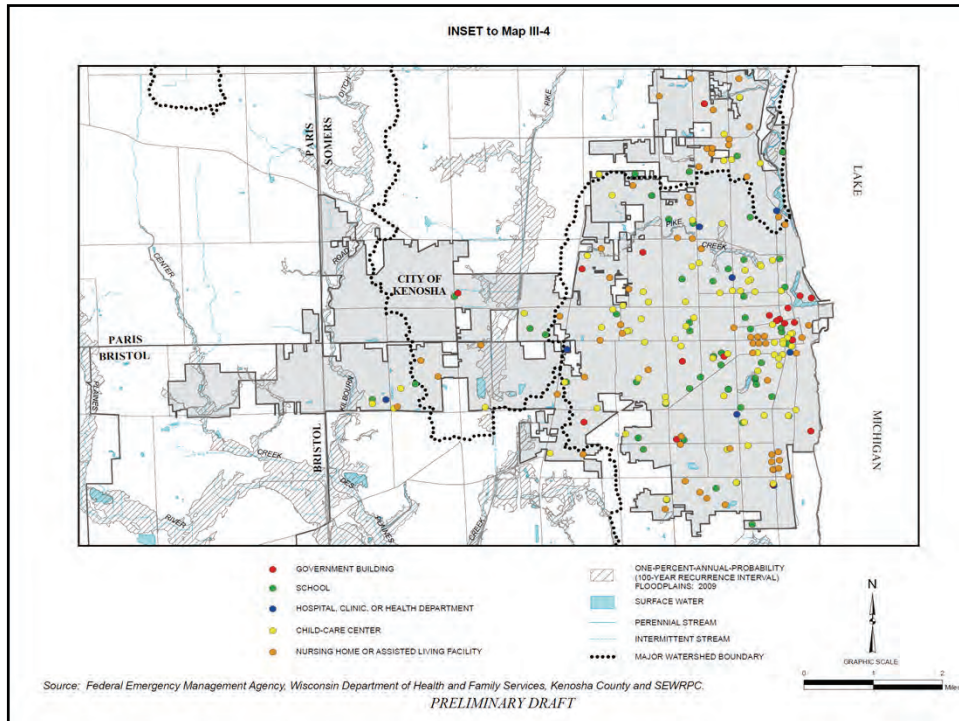


Vulnerability Assessment Format (Chapter III)

- Description of Hazard
- Historical Experience with the Hazard
- Recent Hazard Events
- Vulnerability and Community Impacts Assessment
- Potential Future Changes
- Multi-Jurisdictional Risk Assessment







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 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

(Chapter IV)

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

(Chapter IV)

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

(Chapter IV)

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.

Development of Hazard Mitigation Strategies (Chapter V)

Identified alternative strategies

Nonstructural, structural, public information and education

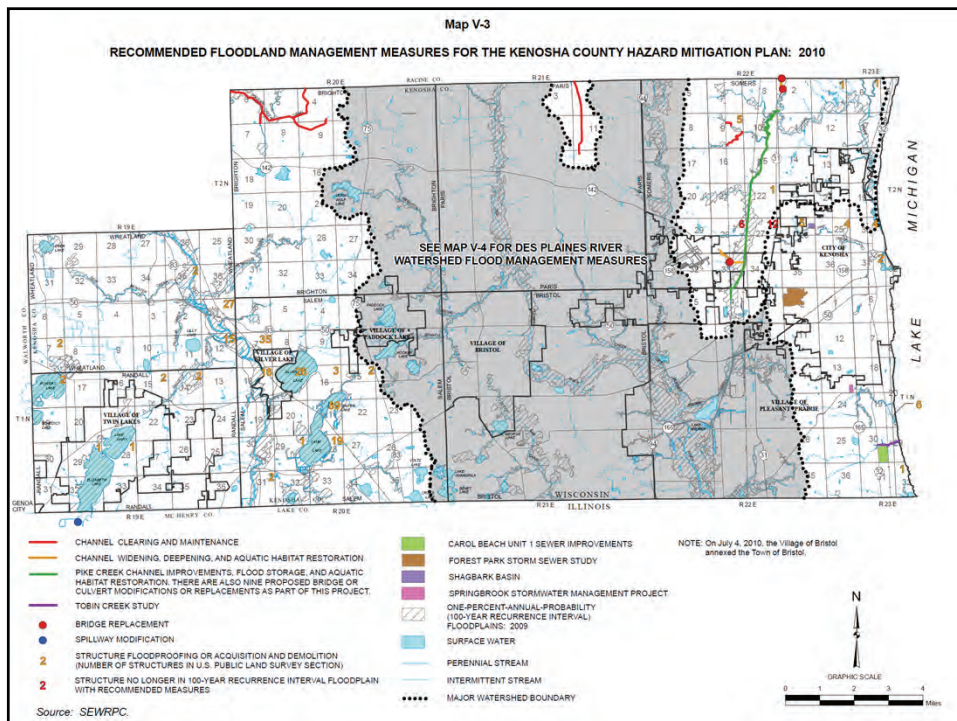
Reviewed current programs

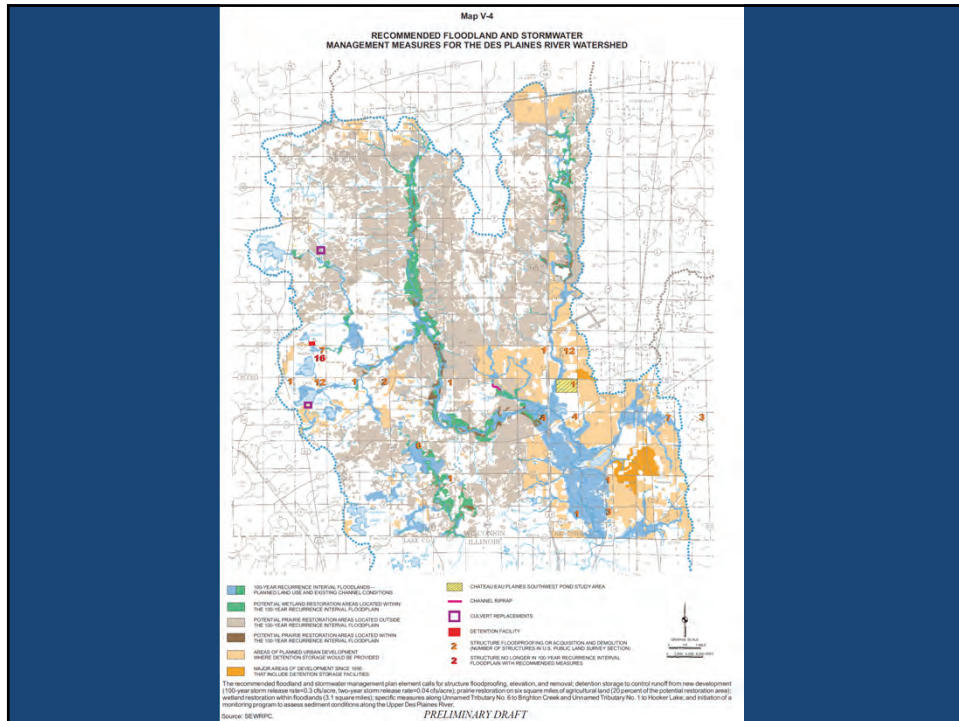
Federal and State, local

Evaluation of alternatives and identification of mitigation actions

Identified multi-jurisdictional considerations

Selected and set forth priority mitigation measures





Priority Flood Mitigation Strategies

(Chapter V)

Floodland and wetland zoning and zoning review

Preservation of open and sensitive areas

Purchase, demolition, and removal or flood proofing of 318 structures

Channel cleaning, maintenance, or rehabilitation

Stormwater management planning and regulation

Stormwater management facility maintenance

NFIP map updating

Survey of buildings near flood hazard areas



Restoration of prairies and wetlands

Priority Mitigation Strategies for Weather-related Hazards

(Chapter V)

Maintain early warning systems

NOAA Weather Radio, EAS broadcasting, HAZCollect

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

Priority Mitigation Strategies for Human-induced Hazards

(Chapter V)



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

Priority Ranking of Hazards

Mortality and Injury

Transportation Accidents
Temperature Extremes
Thunderstorm and associated
Tornadoes
Hazardous Material Incidents
Fog
Flooding
Winter Storms
Terrorism Incidents
Fires

Property and Crop Damage

Transportation Accidents
Flooding
Thunderstorm and associated
Tornadoes
Drought
Hazardous Material Incidents
Temperature Extremes
Winter Storms
Lake Michigan Coastal Erosion
Terrorism Incidents

Plan Implementation (Chapter VI)

For each priority
mitigation strategy

Estimated costs

Designated management
agencies

Noted current
implementation
status

Identified potential
funding sources



Plan Adoption (Chapter VI)

The plan will need be
approved by FEMA

The plan will need to be
adopted by:

Kenosha County Board

Governing bodies of
cities and villages



The plan has been reviewed by the Wisconsin Division of
Emergency Management and their comments incorporated.

Submit Feedback on the Study: (Up to November 12, 2010)

Comment Sheets

SEWRPC website:

<http://www.sewrpc.org/SEWRPC/communityassistance/ProjectPlanningServices.htm>

Email: jboxhorn@sewrpc.org

Exhibit B

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 findings and recommendations documented in the preliminary draft of Southeastern Wisconsin Regional Planning Commission (SEWRPC) Community Assistance Planning Report No. 278, 2nd Edition, *Kenosha County Hazard Mitigation Plan Update: 2011-2015*. The plan includes recommendations related to the mitigation of impacts 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 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 report chapters, including the recommended plan chapter, are now available for review on the SEWRPC web site at

<http://www.sewrpc.org/SEWRPCFiles/CommunityAssistance/KenoshaHazardMitigation/capr-278-kenosha-county-hazard-mitigation-plan.pdf>

The plan was 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 Task Force 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 4:00-6:00 p.m. on Thursday, October 28, 2010 at the Kenosha County Center, 19600 - 75th Street, Bristol, Conference Room A.

The session will begin with a meeting in "open house" format from 4:00-5:30 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. A presentation will be made by the Commission staff at 5:30 p.m.

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/ProjectPlanningServices.htm>

Written comments should be received no later than November 12, 2010. To obtain a paper copy of the preliminary draft plan, 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**

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Appendix B

SOLID WASTE DISPOSAL SITES IN KENOSHA COUNTY: 2009

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			
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	Kenosha Recyclery
6	Village of Pleasant Prairie	NW NW S15 T1N, R22E	Village of Pleasant Prairie Compost Transfer Site
7	Town of Brighton	NE NE S15 T2N, R20E	Town of Brighton Recycling and Dropoff Center
8	Town of Wheatland	NW NW S2 T1N, R19E	Town of Wheatland Recycling and Dropoff Center
Compost Sites			
9	City of Kenosha	NE SE S29 T2N, R29E	City of Kenosha Compost Site
10	Village of Pleasant Prairie	SW SE S33 T1N, R22E	Village of Pleasant Prairie Compost Site
Inactive Landfills			
11	Village of Pleasant Prairie	SE SW S18 T1N, R23E	Rogers Tree Service
12	Town of Somers	SE NE S18 T2N, R23E	James Burns/Ted Radtke
13	City of Kenosha	NE NW S24 T2N, R22E	Kenosha County Trucking
14	City of Kenosha	SE SW S24 T2N, R22E	Ron's Rubbish
15	City of Kenosha	NE NW S31 T2N, R23E	N. S. Koos and Sons
16	City of Kenosha	SW NE S19 T2N, R23E	St. George's Cemetery
17	Village of Pleasant Prairie	SE NE S33 T1N, R22E	City of Kenosha and Village of Pleasant Prairie Landfill
18	Village of Pleasant Prairie	SE SW S29 T1N, R23E	Daniel Dorece
19	Village of Pleasant Prairie	SW NW S10 T1N, R22E	Gerald Kramer
20	Village of Pleasant Prairie	NE SW S8 T1N, R22E	Harry Crow and Son, Inc.
21	Village of Pleasant Prairie	E NW S15 T1N, R22E	Harry Crow and Son, Inc.
22	Village of Pleasant Prairie	SE SW S18 T1N, R23E	Kenosha Drive-In

Appendix B (continued)

Identification Number ^a	Municipality	Location by U.S. Public Land Survey	Operator
Inactive Landfills (continued)			
23	Village of Pleasant Prairie	SW NE S18 T1N, R23E	Luckason
24	Village of Silver Lake	SE SW S8 T1N, R20E	Silver Lake Landfill
25	Village of Twin Lakes	SW SE S16 T1N, R19E	Village of Twin Lakes Landfill
26	Town of Brighton	NW SW S31 T2N, R20E	Town of Brighton Landfill
27	Town of Bristol	NE NW S17 T1N, R21E	Town of Bristol Landfill
28	Town of Bristol	NE SE S10 T1N, R21E	Kenosha Bowman, Inc.
29	Town of Paris	SW NE S18 T2N, R21E	Thomas Hancock
30	Town of Randall	NW SW S14 T1N, R19E	New Munster Deep Pit (WDNR)
31	Town of Randall	NW NE S30 T1N, R19E	Nippersink Manor Resort
32	Town of Randall	NW NW S23 T1N, R19E	Town of Randall Landfill
33	Town of Salem	SW NE S11 T1N, R20E	C. Bryzek (Fish Dump)
34	Town of Salem	SE NW S8 T1N, R20E	Kenosha County Highway Department
35	Town of Salem	NW SW S16 T1N, R20E	Salvation Army
36	Town of Salem	SE SW S5 T1N, R20E	Town of Salem Landfill
37	Town of Somers	SW NE S18 T2N, R23E, 13th Court	No Name Dump (Private)
38	Town of Somers	NE SW S31 T2N, 22E	Town of Somers
39	Town of Somers	SE SW S15 T2N, R22E	Town of Somers Landfill
40	Town of Somers	NW SE S1 T2N, R22E	Warren Hansche
41	Town of Wheatland	NE NW S04 T1N, R19E	Dan Peterson Property
42	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 16 in Chapter II of this report.

Source: Wisconsin Department of Natural Resources and SEWRPC.

Appendix C

POLICE STATIONS, COUNTY SHERIFF OFFICES, AND FIRE STATIONS IN KENOSHA COUNTY: 2009

Table C-1

POLICE STATIONS, COUNTY SHERIFF OFFICES OR SUBSTATIONS, AND CORRECTIONAL FACILITIES

Identification Number ^a	Facility Name	Municipality	Address
1	Auxiliary Police	City of Kenosha	3707 – 19th Avenue, 53140
2	City of Kenosha Police	City of Kenosha	1000 – 55th Street, 53140
3	Kenosha Correctional Center	City of Kenosha	6353 – 14th Avenue, 53143
4	Kenosha Sheriff's Department	City of Kenosha	1000 – 55th Street, 53140
5	Kenosha Sheriff's Department Detention Center	City of Kenosha	4777 – 88th Avenue, 53140
6	Kenosha Sheriff's Department Pretrial Facility	City of Kenosha	927 – 54th Street, 53140
7	Pleasant Prairie Police	Village of Pleasant Prairie	8600 Green Bay Road, 53158
8	Silver Lake Police	Village of Silver Lake	113 S. First Street, 53170
9	Twin Lakes Police	Village of Twin Lakes	920 Lance Drive, P.O. Box 549, 53181
10	UW-Parkside Police and Public Safety	Town 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 19 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	Town of Bristol	8301 – 198th Avenue, 53104
Kansasville Fire Department	Kansasville/ Union Grove	23730 Durand Avenue, 53182
Kenosha Fire Department – Station 1 (Rescue (BLS) Unit)	City of Kenosha	625 – 52nd Street, 53140
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)	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	9915 39th Avenue, 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	Town of Salem	8339 Antioch Road, P.O. Box 142, 53168
Town of Salem Fire/ Rescue	Town of Salem	25700 Wilmot Road, P.O. Box 166, 53179
Town of Salem Fire/ Rescue	Town of Salem	30400 Wilmot Road, P.O. Box 306, 53192
Silver Lake Fire Department	Village of Silver Lake	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	Town of Somers	7511 – 12th Street, P.O. Box 126, 53171
Somers Fire and Rescue Department – Station 2	Town 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.

Appendix D

CRITICAL COMMUNITY FACILITIES IN KENOSHA COUNTY

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
12	Brass Community School	City of Kenosha	6400 – 15th Avenue, 53143
7	The Brompton School	City of Kenosha	7951 – 36th Avenue, 53142
8	Bullen Middle School	City of Kenosha	2804 – 39th Street, 53144
9	Cesar Chavez Learning Station (Head Start)	City of Kenosha	6300 – 27th Avenue, 53143
10	Columbus Elementary School	City of Kenosha	6410 – 25th Avenue, 53143
11	Dimensions of Learning (Charter School K-8)	City of Kenosha	6218 – 25th Avenue, 53140
13	Forest Park Elementary School	City of Kenosha	6810 – 45th Avenue, 53142
14	Frank Elementary School	City of Kenosha	1816 – 57th Street, 53140
15	Grant Elementary School	City of Kenosha	1716 – 35th Street, 53140
16	Grewenow Elementary School	City of Kenosha	7714 – 20th Avenue, 53143
17	Harvey Elementary School	City of Kenosha	2012 – 19th Avenue, 53140
18	HillCrest High School	City of Kenosha	4616 – 24th Street, 53144
24	Head Start Child Development Center	City of Kenosha	6300 – 27th Avenue, 53143
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)			
48	Harborside Academy	City of Kenosha	714 – 49th Street, 53140
76	Kenosha eSchool	City of Kenosha	6729 – 18th Avenue, 53143
77	Kenosha School of Enhance Technology Curriculum	City of Kenosha	6811 – 18th Avenue, 53143
22	Lakeview Technology Academy	Village of Pleasant Prairie	9449 – 88th Avenue, 53158
23	Lance Middle School	City of Kenosha	4515 – 80th Street, 53142
25	Lincoln Middle School	City of Kenosha	6729 – 18th Avenue, 53143
26	Mahone Middle School	City of Kenosha	6900 – 60th Street, 53144
27	McKinley Elementary School	City of Kenosha	5520 – 32nd Avenue, 53144
28	McKinley Middle School	City of Kenosha	5710 – 32nd Avenue, 53144
29	Nash Elementary School	City of Kenosha	6801 – 99th Avenue, 53142
30	Paideia Academy (Charter School 6-8)	City of Kenosha	5821 – 10th Avenue, 53140
31	Pleasant Prairie Elementary School	Village of Pleasant Prairie	9208 Wilmot Road, 53158
32	Prairie Lane Elementary School	Village of Pleasant Prairie	10717 – 47th Avenue, 53158
33	Reuther Central High School	City of Kenosha	913 – 57th Street, 53140
34	Roosevelt Elementary School	City of Kenosha	3322 Roosevelt Road, 53142
35	Somers Elementary School	City of Kenosha	1245 – 72nd Avenue, 53144
36	Southport Elementary School	City of Kenosha	723 – 76th Street, 53143
37	Stocker Elementary School	City of Kenosha	6315 – 67th Street, 53142
38	Strange Elementary School	City of Kenosha	5414 – 49th Avenue, 53144
39	Tremper High School	City of Kenosha	8560 – 26th Avenue, 53143
40	Vernon Elementary School	City of Kenosha	8518 – 22nd Avenue, 53143
41	Washington Middle School	City of Kenosha	811 Washington Road, 53140
42	Whittier Elementary School	Village of Pleasant Prairie	8542 Cooper Road, 53158
43	Wilson Elementary School	City of Kenosha	4520 – 33rd Avenue, 53144
Paris J1 School District			
44	Paris Consolidated Elementary School	Town of Paris	1901 – 176th Avenue, Kenosha, 53144
Randall J1 School District			
45	Randall Consolidated School	Town of Randall	37101 – 87th Street, P.O. Box 38, Bassett, 53101
Salem School District			
46	Salem Consolidated Elementary School	Town of Salem	8828 Antioch Road, P.O. Box 160, 53168
Silver Lake J1 School District			
47	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
50	Wilmot Bright Horizons Charter School	Town of Salem	10720 Fox River Road, Highway W, P.O. Box 68, Wilmot, 53192
51	Wilmot Grade School	Town of Salem	10720 Fox River Road, Highway W, P.O. Box 68, Wilmot, 53192
Twin Lakes School District No. 4			
52	Lakewood Elementary School	Village of Twin Lakes	1218 Wilmot Avenue, 53181
Wheatland J1 School District			
53	Wheatland Center School	Town of Wheatland	6606 – 368th Avenue, Burlington, 53105
Wilmot UHS School District			
54	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			
55	Providence Catholic School – West Campus	Town of Brighton	1714 – 240th Avenue, Kansasville, 53139
56	Armitage Academy	City of Kenosha	6032 – 8th Avenue, 53143
57	Bethany Lutheran	City of Kenosha	2100 – 75th Street, 53143
58	Christ Lutheran Academy	Village of Pleasant Prairie	8411 Old Green Bay Road, 53158
59	Christian Life School	City of Kenosha	10700 – 75th Street, 53142
60	Diderrich Academy	City of Kenosha	7918 – 47th Avenue, 53142
61	Friedens Lutheran	City of Kenosha	5043 – 20th Avenue, 53140
62	Good Shepard Lutheran	Village of Pleasant Prairie	4311 – 104th Street, 53158
63	Holy Rosary	City of Kenosha	4400 – 22nd Avenue, 53140
64	Kenosha Montessori	City of Kenosha	2401 – 69th Street, 53143
65	Our Lady of Mt. Carmel	City of Kenosha	5400 – 19th Avenue, 53140
66	St. Joseph High School	City of Kenosha	2401 – 69th Street, 53143
67	St. Joseph Junior High School	City of Kenosha	2401 – 69th Street, 53143
68	St. Luke's Evangelical Lutheran School	City of Kenosha	6700 – 30th Avenue, 53142
69	St. Mark's Grade School	City of Kenosha	7207 – 14th Avenue, 53143
70	St. Mary Catholic Grade School	City of Kenosha	7400 – 39th Avenue, 53142
71	St. Peter Grade School	City of Kenosha	2224 – 30th Avenue, 53144
72	St. Therese School	City of Kenosha	2020 – 91st Street, (9005 – 22nd Avenue, Mail), 53143
73	Shoreland Lutheran High School	Town of Somers	9026 – 12th Street, 53171
74	Providence Catholic School	Town of Paris	1481 – 172nd Avenue, 53182
75	St. Alphonsus School	Town of Wheatland	6211 – 344th Avenue, P.O. Box 922, New Munster, 53152
Colleges and Universities			
78	Carthage College	City of Kenosha	2001 Alford Park Drive, 53140-1994
79	Gateway Technical College – Kenosha Campus	City of Kenosha	3520 – 30th Avenue, 53144
80	Gateway Technical College – Aviation Center	City of Kenosha	4940 – 88th Avenue, 53144
81	University of Wisconsin – Parkside	Town of Somers	900 Wood Road, P.O. Box 2000, Kenosha, 53141-2000

Source: 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 Town Office	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	Town 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	Village of Paddock Lake Wastewater Treatment Plant	Village of Paddock Lake	23201 – 62nd Street, Paddock Lake, 53168
19	Roger Prange Municipal Building	Village of Pleasant Prairie	8600 Green Bay Road, 53158
20	Pleasant Prairie Sanitary District 73-1 Wastewater Treatment Plant	Village of Pleasant Prairie	8000 – 128th Street, Pleasant Prairie
21	Pleasant Prairie Sewer Utility District D Wastewater Treatment Plant	Village of Pleasant Prairie	10201 Wilmot Road, Pleasant Prairie
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	1120 – 80th Street, 53143
34	Wisconsin Vehicle Emissions Inspections	City of Kenosha	5910 – 77th Street, 53142

Table D-2 (continued)

Number on Map 21	Facility Name	Municipality	Address
U.S. Post Offices			
35	Bassett	Town of Randall	34341 Bassett Road, Bassett, 53101
36	Bristol	Village of Bristol	8223 – 199th Avenue, 53104
37	Camp Lake	Town of Salem	9540 Camp Lake Road, Hwy. AH, Camp Lake, 53109
38	Kenosha	City of Kenosha	5605 Sheridan Road, 53140
39	New Munster	Town of Wheatland	34315 Geneva Road, New Munster, 53152
40	Pleasant Prairie	Village of Pleasant Prairie	4225 – 101st Street, 53158
41	Powers Lake	Town of Randall	39705 Bloomfield Road, Powers Lake, 53159
42	Salem	Town of Salem	24913 – 83rd Place, Salem 53168
43	Silver Lake	Village of Silver Lake	739 S. Cogswell Drive, Silver Lake 53170
44	Somers	Town of Somers	7621 – 12th Street, Somers 53171
45	Trevor	Town of Salem	25930 Wilmot Road, Trevor, 53179
46	Twin Lakes	Village of Twin Lakes	170 Lance Drive, Twin Lakes, 53181
47	Wilmot	Town of Salem	30725 – 113th Street, Wilmot, 53192
48	Woodworth	Town of Bristol	8105 – 160th Avenue, Woodworth
Other Federal Facilities			
49	Social Security Administration	City of Kenosha	5624 – 6th Avenue, 53140
50	US Coast Guard	City of Kenosha	5036 – 4th Avenue, 53140
Public Libraries			
51	Northside Kenosha Public Library	City of Kenosha	1500 – 27th Avenue, Kenosha
52	Salem Community Library	Town of Salem	24615 – 89th Street, Salem
52	Silver Lake Community Library	Village of Silver Lake	319 E. Lake Street, Silver Lake
54	Simmons Kenosha Public Library	City of Kenosha	711 – 59th Place, Kenosha
55	Southwest Kenosha Public Library	City of Kenosha	7979 – 38th Avenue, Kenosha
56	Twin Lakes Community Library	Village of Twin Lakes	110 S. Lake Avenue, Twin Lakes
57	Uptown Kenosha Public Library	City of Kenosha	2419 – 63rd Street, Kenosha

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 ^b	City of Kenosha	6308 – 8th Avenue, 53143-5082
Clinics ^c			
4	Aurora Health Center—Kenosha	City of Kenosha	7540 – 22nd Avenue, 53143
5	Aurora Health Center—Paddock Lake	Village of Paddock Lake	25320 – 75th Street, 53168
6	Aurora Health Center—Twin Lakes	Village of Twin Lakes	150 Lance Drive, 53181
7	Family Medical Center North	City of Kenosha	3200 Sheridan Road
8	Family Practice Associates	City of Kenosha	3535 – 30th Avenue, 53144
9	Kenosha Community Health Center	City of Kenosha	4536 – 22nd Avenue, 53140
10	Kenosha Pediatrics	City of Kenosha	6125 Green Bay Road
11	Kenosha Pediatrics at Paddock Lake	Village of Paddock Lake	24906 – 75th Street, Salem, 53168
12	Sheridan Medical Complex	City of Kenosha	8400 Sheridan Road
13	Twin Lakes Clinic	Village of Twin Lakes	118 S. Lake Avenue
14	United Health System Physician Clinic—Paddock Lake	Village of Paddock Lake	7322 – 236th Avenue, 53168
Health Departments			
15	Kenosha County Public Health	City of Kenosha	8600 Sheridan Road, 53143
16	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

^bThe Kenosha Medical Center Campus also contains Children's Hospital of Wisconsin-Kenosha within the same structure. Children's Hospital of Wisconsin-Kenosha is contained within the pediatric unit of the Hospital.

^cA 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: 2006

Number on Map 23	Facility Name	Municipality	Address	Class ^a	Capacity
1	A Child's Place Child Care Center	City of Kenosha	8600 Sheridan Road	Group	88
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	40
4	Almost Home Academy	City of Kenosha	1760 – 22nd Avenue	Group	100
5	Angel Academy	City of Kenosha	7816 – 113th Avenue	Family	8
6	April's Child Care	Town of Salem	14403 – 89th Street	Family	8
7	Auntie Ginny's Daycare	City of Kenosha	4908 – 22nd Avenue	Family	8
8	Baby Bear's Family Daycare	City of Kenosha	974 Sheridan Road	Family	8
9	Beautiful & Loving Children Daycare	Village of Twin Lakes	422 Elm Court	Family	8
10	Books and Blocks Learning Center	City of Kenosha	2506 – 50th Street	Group	25
11	Bright Beginnings Child Care	City of Kenosha	4319 – 60th Street	Family	8
12	Building Blocks Day Care	City of Kenosha	7688 – 49th Avenue	Family	8
13	Burton's Child Care	City of Kenosha	6337 – 11th Avenue Upper	Family	8
14	Busy Bee's Child Care Center, LLC	City of Kenosha	9918 – 12st Street, 53144	Group	70
15	Cathy's Care	City of Kenosha	4505 – 85th Street Lance Drive, 53181	Family	8
16	Children R Us	City of Kenosha	10025 – 69th Street	Family	8
17	Christian Life Day Care	City of Kenosha	10700 – 75th Street, 53142	Group	110
18	Circle of Friends Family Day Care	City of Kenosha	8131 – 68th Avenue	Family	8
19	Color My World Family Day Care	City of Kenosha	4411 – 19th Avenue	Family	8
20	Connie's Day Care, LLC	City of Kenosha	812 – 50th Street	Group	115
21	Dad-Dee Day Care	Village of Twin Lakes	11665 – 318th Avenue	Family	8
22	Dede's Child Care	City of Kenosha	2816 – 22nd Street	Family	8
23	Dream Maker's Child Care Center	City of Kenosha	1003 – 42nd Street	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	Extensive Fun and Learning	Town of Salem	1207 Antioch Road, Trevor	Group	57
27	First United Day Care Center	City of Kenosha	919 – 60th Street, 53140	Group	104
28	Glenda's Helping Hands Child Care	City of Kenosha	5112 – 33rd Avenue	Family	8
29	Gloria's Gift Child Care Center	City of Kenosha	2324 – 63rd Street	Family	8
30	Grace Lutheran Child Development Center	Village of Twin Lakes	248 E. Main Street, 53181	Group	84
31	Imagination Station Christian Family Day Care	City of Kenosha	10901 – 32nd Avenue	Family	8
32	Jeanna's Child Care	City of Kenosha	5416 – 31st Avenue	Family	8
33	Jenny's House	City of Kenosha	2406 – 55th Avenue	Family	8
34	Joyce's Preschool and Day Care	Village of Bristol	8014 – 199th Avenue, 53104	Group	32
35	Just Kid Inn Day Care Center, Inc.	City of Kenosha	1409 – 43rd Street, 53140	Group	57
36	Just Kid Inn Day Care Center, Inc.	City of Kenosha	2037 – 22nd Avenue, 53140	Group	93
37	Kaleck Family Child Care Center	City of Kenosha	4816 – 52nd Street	Family	8
38	Kelly's Home Day Care	City of Kenosha	4712 – 58th Street	Family	8
39	Kenosha YMCA—Cesar Chavez	City of Kenosha	2703 – 63rd Street	Group	14
40	Kenosha YMCA Camp Go	Village of Paddock Lake	24100 – 75th Street	Group/Camp	12
41	Kenosha YMCA CFB	City of Kenosha	7101 – 53rd Street, 53144	Group	93
42	Kenosha YMCA Downtown	City of Kenosha	720 – 59th Place, 53140	Group	97
43	Kenosha YMCA Forrest Park	City of Kenosha	6810 – 45th Avenue, 53142	Group	55
44	Kenosha YMCA Grewenow	City of Kenosha	7714 – 20th Avenue, 53143	Group	36

Table D-4 (continued)

Number on Map 23	Facility Name	Municipality	Address	Class ^a	Capacity
45	Kenosha YMCA Jeffery	City of Kenosha	4011 – 87th Street, 53140	Group	60
46	Kenosha YMCA Petrifying Springs	City of Kenosha	4700 Petrifying Springs Road, 53144	Group/Camp	20
47	Kenosha YMCA Pleasant Prairie	Village of Pleasant Prairie	9208 Wilmot Road, 53158	Group	50
48	Kenosha YMCA Prairie Lane	Village of Pleasant Prairie	10717 – 47th Avenue, 53158	Group	35
49	Kenosha YMCA Riverview	Village of Silver Lake	300 Prosser Street, 53170	Group	30
50	Kenosha YMCA Southport	City of Kenosha	723 – 76th Street, 53143	Group	50
51	Kenosha YMCA Stocker	City of Kenosha	6315 – 67th Street, 53142	Group	50
52	Kenosha YMCA Whittier	Village of Pleasant Prairie	8542 – 51st Avenue, 53158	Group	65
53	Kiddie Kare Akadaemie, Ltd.	Village of Pleasant Prairie	9244 – 39th Avenue, 53158	Group	92
54	Kiddie Karousel	City of Kenosha	4700 – 18th Avenue	Family	8
55	Kid's Club – Bristol Grade School	Village of Bristol	20121 – 83rd Street, 53104	Group	47
56	Kids Express Child Care	City of Kenosha	5702 – 54th Avenue	Family	8
57	Kid's Stuff	Village of Twin Lakes	700 Burlington Avenue, 53181	Group	45
58	Kid's World	City of Kenosha	4217 – 30th Avenue	Family	8
59	La Petite Academy—Kenosha	City of Kenosha	10320 – 74th Avenue	Group	174
60	Lakeview Recplex Preschool	Village of Pleasant Prairie	9900 Terwall Terrace	Group	43
61	The Learning Company	Town of Somers	160 – 28th Avenue	Family	8
62	Library Square School Child Day Care	City of Kenosha	807 – 61st Street, 53143	Group	48
63	Lil' Dreamers, LLC	City of Kenosha	8220 – 75th Street, 53142	Group	125
64	Lil' Rugrats	City of Kenosha	2509 – 71st Street	Family	8
65	Lite & Brite Day Care	Town of Salem	23917 – 116th Place, Trevor	Family	8
66	Little Explorers Family Daycare	City of Kenosha	7546 – 15th Avenue	Family	8
67	Little Lambs Learning Center	City of Kenosha	2026 – 22nd Avenue, 53140	Group	50
68	Little People University Day Care	City of Kenosha	6025 – 12th Avenue	Family	8
69	Lov N Care Children's Academy	City of Kenosha	1115 – 56th Street, 53140	Group	91
70	Lov N Care Children's Academy II	City of Kenosha	1634 – 50th Street	Group	73
71	Lov N Care Children's Academy III	City of Kenosha	5109 – 52nd Street	Group	102
72	Loving Hearts Family Childcare	City of Kenosha	5548 – 22rd Avenue	Family	8
73	Marcoe Day Care	City of Kenosha	2515 – 80th Place	Family	8
74	Messiah Christian Preschool	Village of Twin Lakes	8720 – 368th Avenue, 53181	Group	24
75	Montessori Children's House Kenosha	City of Kenosha	920 – 61st Street, 53143	Group	25
76	Morning Glory's Family Day Care	City of Kenosha	4605 – 18th Avenue	Family	8
77	Mt. Zion Preschool	City of Kenosha	5927 – 37th Avenue, 53144	Group	33
78	My Little School House Brighton LOC	Town of Brighton	1200 – 248th Avenue, Kansasville	Group	22
79	My Little School House ECC	Town of Paris	1491 – 172nd Avenue, Union Grove	Group	40
80	Nancy's House Family Day Care	City of Kenosha	4730 – 58th Street, 53140	Family	8
81	Noah's Ark Christian Child Care Center	City of Kenosha	5934 – 8th Avenue, 53140	Group	120
82	One World Many Faces	City of Kenosha	2405 – 35th Street	Family	8
83	Patty's Safe Haven	City of Kenosha	6611 – 17th Avenue	Family	8
84	Peggy's Place	Village of Pleasant Prairie	12115 – 44th Avenue	Family	8
85	Play, Grow & Learn Child Development Center	City of Kenosha	1015 – 65th Place	Group	47
86	Pleasant Prairie Renaissance School	Village of Pleasant Prairie	10450 – 72nd Avenue, 53158	Group	175
87	Polliwogs and Caterpillars	Village of Silver Lake	209 N. 2nd Street, 53170	Group	48
88	Precious Few Child Care	Town of Salem	31105 Highway C, Wilmot, 53192	Family	8
89	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
90	Quality Child Care, Inc.	Town of Salem	24401 – 119th Street, Trevor	Family	8
91	Rachael's Playhouse	City of Kenosha	4314 – 31st Avenue	Family	8
92	Regina's Funland	City of Kenosha	1404 – 44th Street	Family	8
93	Rise and Shine Christian Child Care Center	City of Kenosha	4914 – 43rd Avenue	Family	8
94	Roots and Wings Child Care Center	Town of Salem	8333 Antioch Road, 53168-0386	Group	38
95	Shay's Care	City of Kenosha	4910 – 20th Avenue	Family	8
96	Small Steps Family Day Care	City of Kenosha	1505 – 21st Street	Family	8
97	St. Mary's Catholic Day Care & Preschool	City of Kenosha	7401 – 40th Avenue, 53142	Group	62
98	St. Mary's Lutheran Nursery School	City of Kenosha	2001 – 80th Street, 53143	Group	37
99	Sweet Dreams Child Care	City of Kenosha	6311 – 10th Avenue	Family	8
100	Teresa's Treasures	City of Kenosha	5115 – 29th Place	Family	8
101	The Imagination Station	Village of Silver Lake	104 W. Lake Street	Family	8
102	The Kidzone Child Care Center	City of Kenosha	1612 – 63rd Street	Group	25
103	The Red Balloon Nursery School	Town of Salem	24929 – 75th Street, 53168	Group	24
104	Tiny Tots Family Child Care	City of Kenosha	6037 – 35th Avenue	Family	8
105	Trinity Cooperative Nursery School	City of Kenosha	7104 – 39th Avenue, 53142	Group	24
106	Tuesday's Child Family Child Care	Village of Pleasant Prairie	8545 – 54th Avenue	Family	8
107	UW – Parkside Child Care Center	City of Kenosha	900 Wood Road, P.O. Box 2000, 53141	Group	90
108	Wee Care Child Development Center	City of Kenosha	5602 – 75th Street, 53142	Group	112
109	Westosha Head Start	Town of Salem	30100 Wilmot Road, P.O. Box 57, Wilmot, 53192	Group	34
110	Wheatland Head Start	Town of Wheatland	6606 – 368th Avenue, Burlington, 53105	Group	20
111	Wheatland Kids Club	Town of Wheatland	6606 – 368th Avenue, Burlington, 53105	Group	24
112	Wonderful World of Kids Castle	City of Kenosha	1900 – 15th Street	Group	30
113	Wonderful World of Kids Castle	City of Kenosha	8518 – 22nd Avenue	Group	30
114	Wonderful World of Kids Castle	City of Kenosha	1245 – 72nd Avenue	Group	30
115	Wonderful World of Kids Castle	City of Kenosha	4211 Green Bay Road	Group	50
116	X-Cite Kenosha	City of Kenosha	4212 – 52nd Street	Group	44

^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: 2007

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	Forest Towers Metro	City of Kenosha	8218 – 14th Avenue
3	Joanne Apartments	City of Kenosha	8827 – 41st Avenue
4	Kenosha Garden Apartments	City of Kenosha	5430 – 64th Avenue
5	Lakeside Towers	City of Kenosha	5800 – 3rd Avenue
6	Meadowview Village Apartments	Village of Twin Lakes	450 Lincoln Drive
7	Northpoint Crossings	City of Kenosha	1724 Birch Road
8	Saxony Manor	City of Kenosha	1876 – 22nd Avenue
9	Silver Crest Apartments	Village of Silver Lake	630 S. Cogswell Drive
10	Tanglewood Apartments	City of Kenosha	3020 – 87th Place
11	Tuscan Villa Apartments	City of Kenosha	8051 – 25th Avenue
12	Villa Nova Apartments	City of Kenosha	2401 – 18th Street
13	Village Plaza Apartments	Village of Paddock Lake	25166 – 72nd Street
Affordable Housing for Older Adults			
14	Glenwood Apartments	City of Kenosha	1920 – 27th Avenue
15	Kenosha Commons	City of Kenosha	5500 – 60th Street
16	Lincoln Crest Apartments	Village of Twin Lakes	410 Lincoln Drive
17	Prairie Ridge Senior Campus	Village of Pleasant Prairie	7900 – 94th Avenue
18	Prairie Village Senior Apartments	Village of Pleasant Prairie	9500 – 81st Street
19	St. Catherine Commons	City of Kenosha	3619 – 8th Avenue
20	Villa Ciera	City of Kenosha	1940 – 27th Avenue
Senior Apartments			
21	Beech Pointe	City of Kenosha	910 – 85th Street
22	Petretti Apartments	City of Kenosha	1830 – 22nd Avenue
Nursing Homes			
23	Beverly Healthcare - Kenosha	City of Kenosha	1703 – 60th Street, 53140
24	Brookside Care Center	City of Kenosha	3506 Washington Road, 53144
25	Claridge House	City of Kenosha	1519 – 60th Street, 53140
26	Grande Prairie Health and Rehabilitation Center	Village of Pleasant Prairie	10330 Prairie Ridge Boulevard, 53158
27	Heartland Health Care Center – Washington Manor	City of Kenosha	3100 Washington Road, 53144
28	Hospitality Nursing/ Rehabilitation Center	City of Kenosha	8633 – 32nd Avenue, 53142
29	Sheridan Medical Complex	City of Kenosha	8400 Sheridan Road, 53143
30	St. Joseph's Home	City of Kenosha	9244 – 29th Avenue, 53143
31	Woodstock Health and Rehabilitation	City of Kenosha	3415 N. Sheridan Road, 53140
Community Based Residential Facilities			
32	Alterra Clare Bridge of Kenosha	City of Kenosha	10108 – 74th Street, 53142
33	Alterra Sterling House of Kenosha	City of Kenosha	3109 – 12th Street, 53144
34	Alterra Wynwood of Kenosha	City of Kenosha	7377 – 88th Avenue, 53142
56	Bella Alternative Homes	City of Kenosha	6555 Pershing Boulevard
35	Bethel Hill Assisted Living	Village of Twin Lakes	100 E. School Street
57	Brotoloc Briarwood	Town of Salem	25420 – 89th Street, 53168
58	Brotoloc Cottonwood Community Base Residential Facility (CBRF)	City of Kenosha	5415 Adams Road, 53144
36	Brotoloc Harbour Village East	City of Kenosha	1130 – 82nd Street, 53143

Table D-5 (continued)

Number on Map 24	Facility Name	Municipality	Address
Community Based Residential Facilities (continued)			
37	Brotoloc Harbour Village West	City of Kenosha	1150 – 82nd Street, 53143
59	Brotoloc Ravenswood	City of Kenosha	2615 – 45th Avenue, 53144
38	Canterbury Home of Kenosha	City of Kenosha	7924 – 36th Avenue, 53142-2118
60	Caralott	City of Kenosha	4901 – 56th Street
39	Carey Manor	Village of Pleasant Prairie	10628 – 22nd Avenue, 53158
61	Cholaks Home Care Center	City of Kenosha	1607 – 59th Street, 53140
40	Christopher House	City of Kenosha	8332 – 14th Avenue, 53143
62	Dayton Residential Care	City of Kenosha	521 – 59th Street, 53140
41	Edwards House	City of Kenosha	4831 – 47th Avenue, 53144
63	Genesis Options Residential Program	City of Kenosha	6755 – 14th Avenue, 53140
42	Harbor House	City of Kenosha	4600 – 52nd Avenue, 53140
43	Harbor House	City of Kenosha	7135 Green Bay Road, 53142-1450
44	Harmony of Kenosha	City of Kenosha	3109 – 30th Avenue
64	Kare Center	City of Kenosha	510 – 60th Street
45	Living Hope	Village of Twin Lakes	1213 W. Main Street
65	Open Arms	City of Kenosha	2217 – 56th Street
46	South Winds	City of Kenosha	6305 – 7th Avenue
47	St. James Manor	City of Kenosha	910 – 59th Street
66	Transition House I	City of Kenosha	6024 – 18th Avenue
67	Transition House II	City of Kenosha	5905 – 19th Avenue, 53140
68	Transitional Living Services	City of Kenosha	1834 – 60th Street, 53140
69	Windy Oaks	City of Kenosha	11831 – 120th Avenue, 53158
Residential Care Apartment Complexes			
48	Meadowmere Southport Assisted Living	City of Kenosha	8351 Sheridan Road, 53143
49	Regent Manor	City of Kenosha	7905 – 36th Avenue
Adult Day Care Facilities			
55	St. Joseph's Adult Day Care	City of Kenosha	9244 – 29th Avenue, 53143
Adult Family Homes			
70	Alder Home	City of Kenosha	8212 – 61st Street
71	Alpha Homes of Wisconsin IX	City of Kenosha	5603 – 49th Avenue, 53144
72	Alpha Homes of Wisconsin VIII	Town of Somers	101 – 11th Avenue, 53171
73	Alpha Homes of Wisconsin X	City of Kenosha	1822 – 12th Place, 53140
74	Alpha Homes of Wisconsin XI	City of Kenosha	2922 – 22nd Avenue, 53144
75	Alpha Homes of Wisconsin XII	City of Kenosha	8114 – 60th Avenue, 53140
76	Alpha Homes of Wisconsin XIII	City of Kenosha	1481 – 39th Avenue, 53140
77	Alpha Homes of Wisconsin XIV	City of Kenosha	3506 – 85th Place, 53142
78	Birch Home	City of Kenosha	1549 – 25th Avenue
79	CLA Twin Lakes	Village of Twin Lakes	1222 Winged Foot Drive, 53181
80	Crabtree Adult Family Home	City of Kenosha	5915 – 67th Street, 53142
50	Eternal Hope	Town of Randall	9255 – 392nd Avenue, Powers Lake, 53159
81	Gunderson Family Home	Town of Brighton	707 – 224th Avenue, Kansasville, 53139
51	Hawthorne Home	City of Kenosha	6244 – 95th Avenue
82	Independent Living Adult Family Home	City of Kenosha	4004 – 29th Avenue, 53140

Table D-5 (continued)

Number on Map 24	Facility Name	Municipality	Address
Adult Family Homes (continued)			
52	Linden Home	City of Kenosha	3216 – 29th Street
53	Rasmussen Adult Family Home	City of Kenosha	9516 – 70th Street, 53142
54	Reindl Home	Village of Pleasant Prairie	7851 – 115th Avenue
83	Shannon Martin	Village of Pleasant Prairie	10010 Wilmot Road
84	Sycamore Home	City of Kenosha	8211 – 66th Street
85	Victorian Manor Adult Family Home	City of Kenosha	409 – 75th Street, 53143

Source: Wisconsin Department of Health and Family Services, Kenosha County Department of Human Services, and SEWRPC.

Appendix E

PLANS WITH OPEN SPACE ELEMENTS CONSISTENT WITH REGIONAL PLAN RECOMMENDATIONS: KENOSHA COUNTY

Land Use Plans		
Community	Plans Prepared by	Date
City of Kenosha	SEWRPC	July 1999
Village of Paddock Lake	Vandewalle & Associates, Inc.	April 2005
Village of Pleasant Prairie	SEWRPC	December 1995 ^a
Town of Bristol ^b	Meehan and Company, Inc.	September 2006
Town of Paris	Camiros, Ltd.	April 1995
Town of Salem	Meehan and Company, Inc.	March 1999 ^c
Town of Somers	SEWRPC	December 1995

Park and Open Space Plans		
Community	Plans Prepared by	Date
City of Kenosha	Landscape Architects, Inc.	April 2001
Village of Paddock Lake	Vandewalle & Associates, Inc.	September 2006
Village of Pleasant Prairie	Vandewalle & Associates, Inc.	March 2006
Village of Silver Lake	Vandewalle & Associates, Inc.	September 2003
Village of Twin Lakes	Ruekert & Mielke, Inc.	November 2005
Town of Bristol ^b	Meehan and Company, Inc.	January 2009
Town of Randall	Ruekert & Mielke, Inc.	April 2008
Town of Salem	SEWRPC	March 2005

^aThe Village of Pleasant Prairie is preparing neighborhood plans to detail the land use element of the Kenosha Urban Planning District Plan.

^bDuring December 2009, a portion of the Town of Bristol incorporated as The Village of Bristol. The former Town had participated in the initial Kenosha County hazard mitigation plan. On July 4, 2010, the Village of Bristol annexed the Town of Bristol, consolidating the Village and Town into one entity, the Village of Bristol.

^cThe 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.

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Appendix F

EXAMPLE OF MATERIAL PUBLISHED AS PART OF CITY OF BROOKFIELD INFORMATIONAL AND EDUCATIONAL EFFORTS DIRECTED TOWARD SOLVING LOCAL HOMEOWNERS' FLOODING AND SANITARY SEWER BACKUP PROBLEMS



IMPORTANT NOTICE OF DISCLAIMER

The material contained in this brochure is offered for informational purposes only. The City does not warrant or guarantee the effectiveness of any of the alternatives discussed. Individual properties must be assessed on a case by case basis by the property owner and appropriate professionals in the area of flood proofing.

STORMWATER FLOODING & SANITARY SEWER BACKUPS

CAUSES, PREVENTIONS AND CLEAN-UP TIPS

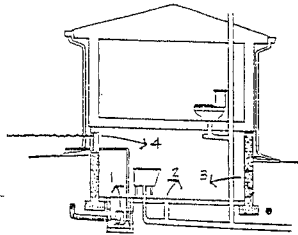
JUNE 1999

Reference: *Protecting Your Home from Flood Damage, Revised 1996, 2nd Edition.*
Federal Emergency Management Agency

CAUSES

There are four ways water can get into your basement:

1. Through the drainage tile system's sump.
2. Backing up through the sanitary sewer lines under the house.
3. Seeping through cracks in the walls and floors.
4. Over the surface of the ground through windows and doorways.

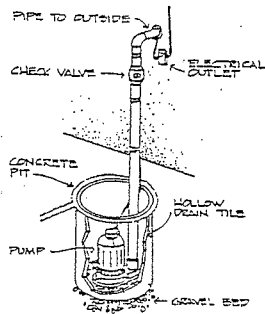


1. SUMP BACKUP

The sump in your drainage system is directly connected to the drain tiles, and therefore to the water in the ground outside your basement walls. A sump will back up when the pump fails, when the power fails, or when the pump is overloaded.

The first condition can be prevented by proper pump maintenance and operation according to the manufacturer's owner's manual. This includes periodic cleaning of the debris screen, even during high water. A clogged intake is as bad as having no pump.

One of the most common causes of basement flooding is not pump failure, but electrical failure. Power losses often accompany severe storms. Backup systems with batteries or generators are available commercially and experienced flood victims will tell you they are well worth the cost.



3

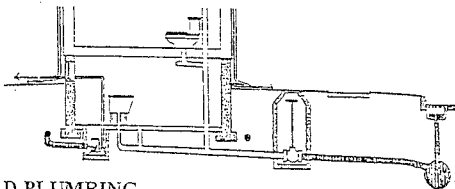
PLUG

Since the basement floor drain is the lowest point in your house, it is the first place of entry for backed up sewage. The drain can be closed with a rubber or wooden plug during heavy rains. Some drains are threaded for a screw-in plug. Plugs can usually be brought at a hardware or plumbing supply store. This is the simplest and cheapest way to stop sewer backup. However, the sewer could backup into the next higher opening, probably a sink drain or toilet.

VALVE

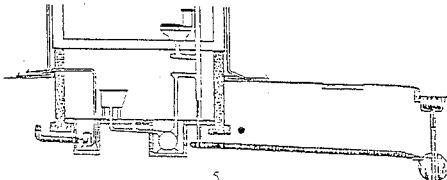
A backwater valve installed in the sewer line is more expensive than a plug or a standpipe. However, there are several advantages. Valves operate automatically, are a permanent part of your system and prevent the sewer from backing up into the basement.

A backwater valve may require periodic maintenance, and therefore must have an access point so it can be cleaned or repaired.



OVERHEAD PLUMBING

Your plumbing can be rebuilt so that the basement sewage drains to a sump. Sewage is then pumped up to the height of the sewer system's manhole. From this height, it flows by gravity into the system. The sewer system will back up onto the street before it could get high enough to back up into your house. Just as with a sump pump, pumps for overhead plumbing require a backup system in case of power failure.



5

*****SAFETY NOTE*****

Be sure your backup generator exhausts to the outdoors. Just like your car engine, a gasoline powered generator creates deadly carbon monoxide gas.

Pump overload occurs when there is more groundwater coming into the drain tiles than the pump can handle. There are two methods to prevent this. One method is to have a second or even a third pump on hand. Each pump should have its own outflow pipe. The second method is to make sure the outflow pipes drain on top of the ground, well away from the house. The City of Brookfield does not allow sump pumps to drain into the municipal sanitary sewer system because it overloads the system pumps or treatment facilities.

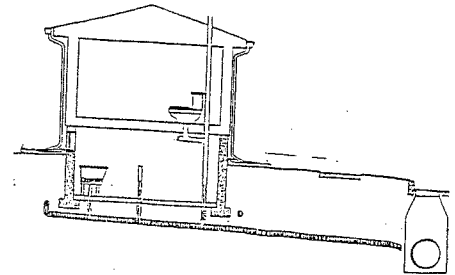
2. SEWER BACKUP

A sanitary sewer backup occurs when the municipal system is overloaded with clear water from inflow and infiltration. There are four ways to protect against this type of backup: install a standpipe, a plug, a back water valve, or an overhead/hung sewer. High volumes of clear water overload the system and backups occur in basements.

STANDPIPE

A pipe inserted or screwed into the floor drain will allow the sewer backup to seek its own level without flowing into your basement. The pipe need only be tall enough to be higher than street level. As water rises, it will flow out of the sanitary sewer manholes into the street, rather than out of the floor drain.

A standpipe may be more dependable than a plug that could pop out. However, one shortcoming of a standpipe is that one must be home to install it.



4

3. SEEPAGE

Whether from heavy local rains and water standing in your yard, broken or plugged drain tiles or surface flooding, the ground around your house can become saturated with water. If there are cracks in your walls or floors, saturated ground will allow seepage of water into your basement.

The best ways to deal with seepage are to ensure that walls are waterproof and to relieve the groundwater through subsurface drain tiles. Cracks can be repaired and the walls can be waterproofed from inside or outside. Waterproofing on the outside of the wall is more effective because groundwater pressure forces the sealer into the foundation. The best technique is to dig a ditch around the basement wall and apply a commercial sealant. Drain tile systems have proven very effective in dealing with high groundwater. Water is kept away from the walls by draining down to the drain tiles. Water flows to the sump and is pumped out. Therefore, one of the best protections against seepage is to ensure you have a drain system and sump pump that work properly.

4. SURFACE STORMWATER FLOODING

One of the most serious types of damage to your basement will come from flood waters on top of the ground. This is caused from overflow of a nearby stream, or if your building is located in a low spot, from the collection of runoff from heavy rains.

One of the first responses to this sort of flooding is to seal the openings, such as the windows. This can be done by replacing windows with glass blocks or raising window wells above the water level. A low wall can be built around the stairwells.

The biggest problem with closing the direct openings to your basement is that water will still stand on the ground next to your house and will likely seep down along the walls. However, unlike other seepage problems, surface flooding will deliver more water than your sump pumps can handle. Split levels, bi-levels and houses with the basement floor no more than three or four feet below ground level are probably strong enough to deal with this, especially if the walls are built of concrete. However, if the difference in flood heights and the floor of the basement is greater than three feet and the wall is made of block or masonry, the most effective method of preventing water from reaching the walls is through proper grading or creating swales to divert water away from the home.

Remember to be a considerate neighbor and make sure your actions do not interfere with drainage on adjacent properties.

6

PREVENTIONS

Once the source of water has been determined, the following information may be used to remedy the problems. Consult a professional in your area for assistance.

Sump Pumps

Sump: A hole designed to collect water.

Sump Pump: Used to remove water from basements and other low areas.

A sump consists of a perforated liner set in a hole lined with coarse stone. The stone helps collect water and filter out fine particles. A filter cloth may extend the life of the sump by preventing it from silting up. Perforated water-collection pipes draining to the sump make it more effective.

A sump pump is usually either the submersible type with a motor and impeller under water, or the pedestal type with the impeller under water and motor on top. Both types have an automatic switch. Both types will work until the electricity is shorted by the water. With the submersible type, this happens at the end of the electrical supply wire. With the pedestal type, it happens when the water reaches the motor on top of the pedestal. Both types should have a one-way valve that will not allow the water to flow back into the discharge hose or pipe.

Caution:

Electricity and water are a hazardous combination. The sump pump must be wired into a grounded receptacle that only allows one plug. A second nearby outlet should be equipped with a ground fault circuit interrupter (GFCI). This second outlet should be handy so that people working near the sump pump will not be tempted to unplug it to use the outlet, thereby placing themselves in danger.

Installing a Floor Drain Plug

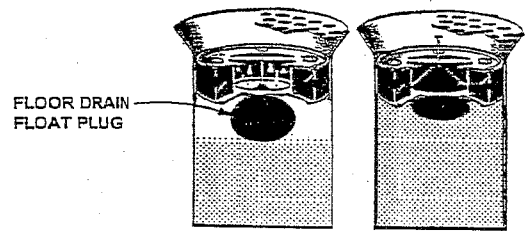
The easiest way to stop sewer backup is to plug the opening where the backup can first enter the house. The sanitary system's lowest opening in the house is the floor drain. Commercial plugs are available that can be placed in the floor drain below the grate. Bolts on metal end pieces are tightened, causing a rubber gasket to expand and seal the plug in the pipe.

A plug not only stops water from entering the house but it prevents it from leaving the house as well. Because of this, it may be best to put the plug in place only during heavy rains.

You may install a plug with a float. The float allows water to drain out of the basement. When the sewer backs up, the float rises and plugs the drain. A float plug permanently installed will not interfere with the floor drain's normal operation.

Caution:

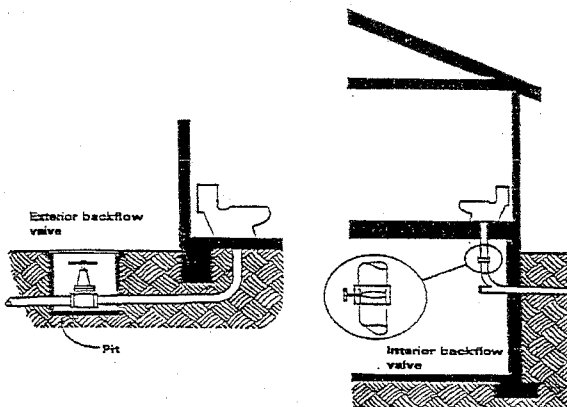
- Float plugs may be blocked open by even small amounts of debris.
- Floor drain plugs do not stop backup from coming out of the next lowest opening, for example a laundry tub or basement toilet.
- In older houses the sewer lines under the basement floor may be clay tile. A build up of water pressure can damage the sewer lines.



Certain repairs are not permitted for substantially damaged buildings. Check with your local building official or floodplain administrator before beginning repairs.

Installing a Backflow Valve

The sewage/septic system is designed to remove sewage from a house. If flood water enters the system, the sewage can backup and enter your home. To help prevent this, install a backflow valve in the sewer line. The backflow valve is opened by the flow of sewage exiting your home, but closes when the flow reverses preventing sewage from backing up into your home. Check with your local building official for permitting and code requirements. It is recommended that this work be done by a qualified, licensed plumbing contractor.

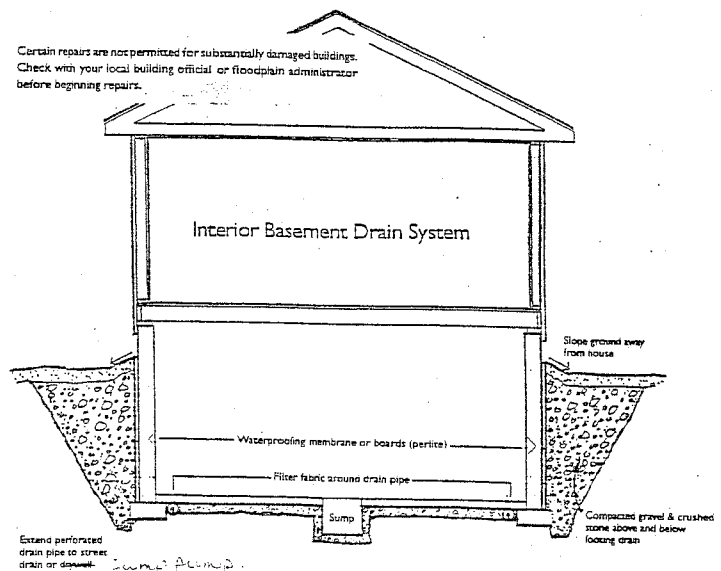


Certain repairs are not permitted for substantially damaged buildings. Check with your local building official or floodplain administrator before beginning repairs.

Installing an Interior Foundation Drainage System

Some homes need a basement foundation drain system to collect and carry away groundwater. This may involve cutting the floor slab, excavating a trench and installing drains along the inside perimeter of all footings. These drains should slope to a low point from which a single line can carry the water away from the house, or to a sump pump.

The basement drainage retrofit depicted below is a simple, generic system utilizing perforated drain pipe, wrapped in filter fabric, and imbedded in crushed stone. Other, more sophisticated systems, some of which are patented, are available to correct serious basement drainage problems. Consult an architect, engineer or licensed specialty contractor for specific information and recommendations regarding system alternatives.



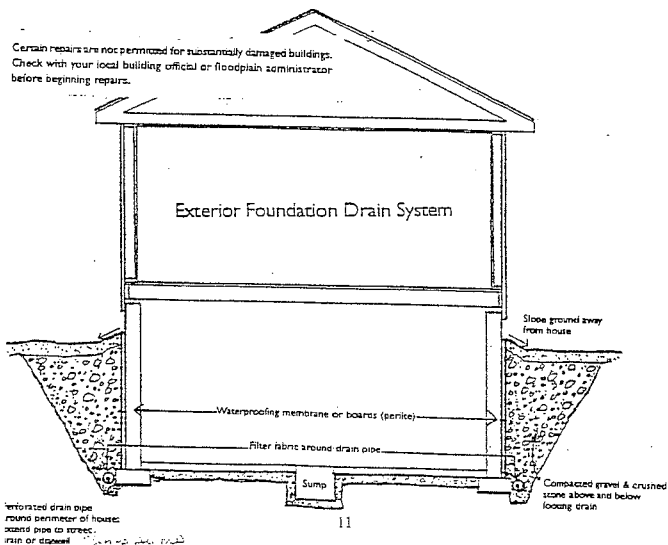
Certain repairs are not permitted for substantially damaged buildings. Check with your local building official or floodplain administrator before beginning repairs.

Installing an Exterior Foundation Drainage System

All houses need a well-developed drain system to collect and carry away groundwaters. This means establishing drains around all footings with perforated pipe surrounded by crushed stone backfill to drain water that seeps through the ground. These drains should slope to a low point from which a single line should carry the water away from the house, to a sump pump which discharges to a storm sewer, or to the ground surface away from the house.

A 4" deep bed of gravel under the slab should allow water to run to a central collection point where there is a sump pump with a continuous power source. If you have a lot of water under the slab, you may need to install perforated pipe drain lines to carry the water to the sump pump.

As with other retrofitting systems, a sealed house will usually need a sewer backflow protection device.



Sealing Openings In Walls

If your house is being flooded by flowing waters entering through windows or doors, you can temporarily close up those openings during a flood and keep that water out.

Metal or wooden shields can be made to fit the openings. These can then be secured to the openings with bolts or slid into special positioning channels to stop the flow of water. On the inside, the shields need to have a special rubber gasket or they should be installed with a bead of caulking to make them water tight. Sandbags can also be stacked in doorways or window wells and vents to make the openings water resistant.

NOTE: Houses should be shielded from floodwater entry, but generally shielded not more than 1 1/2 feet. Exterior water deeper than this could push the walls in if there is no water inside to push back with equal force.

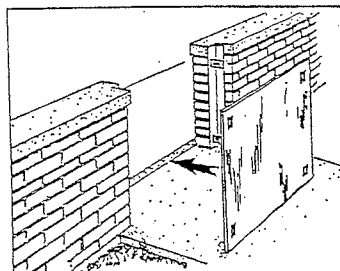


Figure 1: In-house flood shield

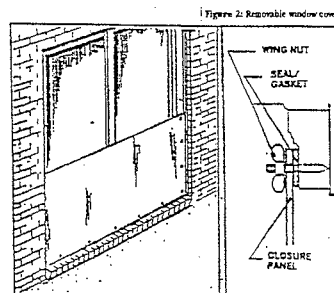
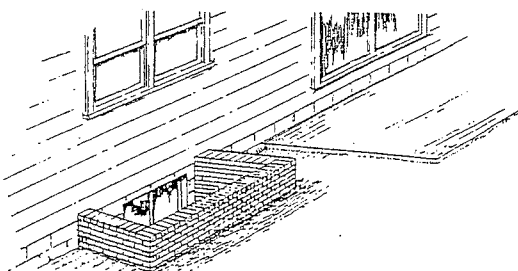


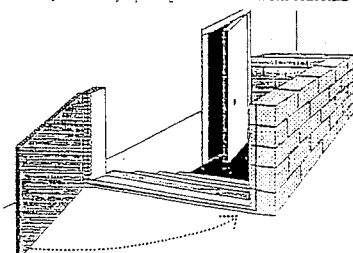
Figure 2: Removable window cover

Installing an Exterior Floodwall

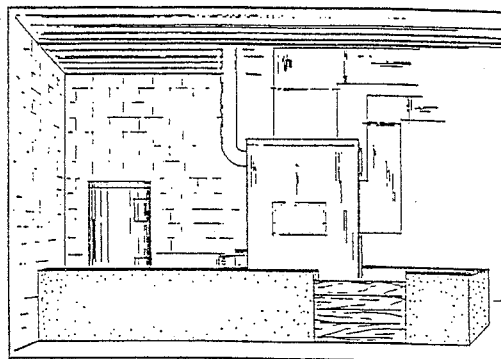
An exterior floodwall can protect a window well or stair against low level flash flooding. Walls should be supported by and securely tied into a footing so that they will not be undercut by scouring. Flood walls can be constructed of masonry or concrete. It is important to understand the flood situation you are working with and your soil conditions in order to properly evaluate if a flood wall is the right solution for you. Flood walls are not effective when the ground becomes saturated.



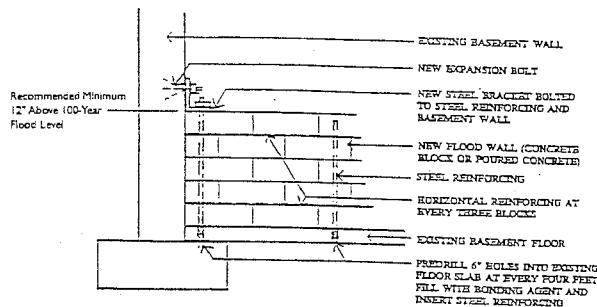
Construct a watertight masonry flood wall around the perimeter of the opening. The wall should not exceed three feet in height and must be constructed of properly reinforced poured concrete or sufficient concrete masonry units to prevent failure under flood conditions. Install proper footing and anchor to existing walls. Install a watertight, spring-loaded steel access door and watertight gaskets on sides and bottom of frame at any necessary opening. Be sure all work conforms to State and local building codes.



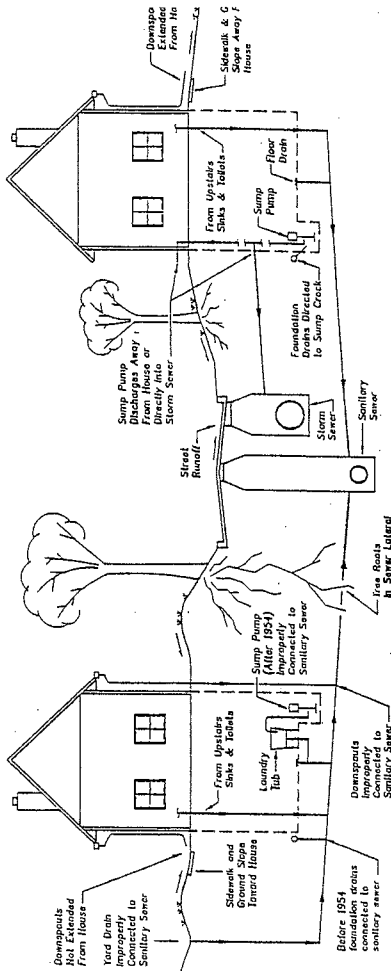
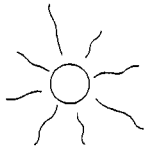
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An interior flood wall can be built to accommodate low levels of flooding. The wall must enclose the utilities and be built 1 foot above the 100 year flood elevation. The wall must be constructed of either concrete blocks or poured concrete and reinforced with steel rods in order to be able to resist the pressure of the floodwaters. It is important to anchor the new wall into the existing basement wall and floor so that it is not pushed around by the floodwaters. For best protection, do not install gates which open into the enclosure.



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RESIDENCE WITH A GOOD DRAINAGE SYSTEM

RESIDENCE WITH DRAINAGE / SEWER PROBLEMS

CLEAN-UP TIPS

The most important thing to remember is to give your house plenty of time to dry! Rushing to rebuild before everything dries can cause many problems. The rule of thumb is, if it takes a week for visible moisture to disappear, it will take at least another week for unseen parts to dry. Here are some inexpensive measures you can take to make your recovery easier after the next flood.

UTILITIES

Electrical: Move the main breaker or fuse box and utility meters above the flood level for your house. Label each circuit. If the electrical code allows, raise the electrical outlets and switches above the flood level.

Equipment: If you plan to replace a flooded furnace, water heater, or air conditioner, install the new one on a higher floor. If your new air conditioner or heat pump will be outside, install it on a platform above your flood level. A water heater can be put anywhere near a hot water pipe. An updraft furnace in a basement can be replaced with a downdraft furnace on a floor above the flood protection level. Heavy appliances may be placed on raised platforms inside the house where the flood protection level is not too high. Make sure washers/dryers will not vibrate off the blocks or platform during use. A one or two foot waterproof floodwall around appliances will protect them from shallow flooding.

WALLS

Wash and disinfect the studs and sills if the wallboard and insulation were removed. If rebuilding, consider metal studs and sills as they are less damaged by water than wooden ones. Pressure-treated wood resists mildew and wood-eating insects but may swell when soaked. Warning: Some pressure-treated wood should not be used inside the house. It depends on the chemicals used to treat them. Ask your lumber company for consumer information that gives specific precautions.

WALLBOARD

If you install the wall board horizontally (four feet high), you'll only have to replace half the wall if the next flood is less than 4 feet deep.

Leave the wall open 1 inch above the sill. The baseboards will hide the gap, but all you have to do next floodtime is remove the baseboard and the wall cavity will drain freely and air will circulate better. (Not applicable if local code requires a fire wall).

Greenboard or other moisture-resistant wallboard may be more sturdy than regular wallboard, but replacement is required as it presents the same health hazards when soaked with floodwaters.

FLOORS

Particle board or plywood fall apart when wet for lengthy periods. Floor joists and some wood floors regain their shape when naturally dried. Use screws or screw nails on floors and stairs to minimize warping. Completely dry subflooring before laying new flooring or carpeting. Rent, then sand or place a new underlayment for a new floor.

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PAINTS

Completely dry the surface before painting. This may take several weeks, but paint will peel if applied over a damp surface. Coat concrete surfaces with penetrating sealer for easier future cleanup. Coat water-stained areas with shellac or commercial stain killer first or the stains will bleed through the paint. Dryproofing requires thick plastic or rubberized sheeting. Waterproofing paints do not keep out floodwaters.

Windows

The best protection from high wind damage is boarding up all windows or installing hurricane shutters. Taping windows will not prevent storm breakage. To board up windows, cut plywood to fit all doors and windows. Label for quick pairing of coverings and openings. Store with the nails/fasteners for attachment.

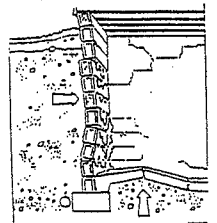
Water Resistant Products

- Concrete, concrete block, or glazed brick
- Clay, concrete, or ceramic tile
- Indoor-outdoor carpeting, synthetic backing (not fastened down)
- Vinyl, terrazzo, or rubber floor covering, with waterproof adhesives
- Metal doors and window frames
- Polyester-epoxy paints (Warning: do not use mildew-resistant paint indoors as it contains a toxic ingredient).
- Stone, slate, cast stone with waterproof mortar
- Mastic, silicone, polyurethane formed-in place flooring
- Polystyrene plastic foam insulation
- Water-resistant glue

Pumping Out a Flooded Basement

If your basement is flooded, don't rush to pump it out.

Water in the ground outside your house will still be pushing hard against the outside of your basement walls, and the water inside your basement faster than the water outside drains out of the ground, the outside pressure will be greater than the inside pressure, causing walls and floor to crack and possible collapse.



How to Safely Pump Water Out of your Basement

- Never go into a flooded basement unless you are sure the electricity is off.
- Start pumping the water out of the basement when floodwaters no longer cover the ground.
- Don't use gasoline-powered pumps or generators indoors. Gasoline engines create deadly carbon monoxide exhaust fumes.
- Pump the water level down 2 or 3 feet. Mark the level, and wait overnight.
- Check the water level the next day. If the water level went back up over your mark, it is still too early to drain your basement. Wait 24 hours, then pump the water down 2 or 3 feet again. Mark the level and check it the next day.
- When the water stops rising, pump down another 2 or 3 feet and wait overnight. Repeat steps 4 and 5 until all water is pumped out of the basement.

What to Do After Draining Your Basement

- Disinfect the floors and walls to remove bacteria left from the floodwaters.
- Before turning the power back on, check any electrical service that may have been damaged. Replace any wiring, switches, outlets that were wet during the flood.
- Remove heating and air conditioning vents or registers as soon as possible and hose out the ductwork. Those ducts that were flooded will have mud and bacteria in them.
- Check your water system for leaks in pipes that may have been moved.
- Check your water supply to be certain it is not contaminated.
- Check all other utilities and drains for damage from the floodwaters.



Community Development Department
2000 North Calhoun Road, Brookfield, WI 53005-5095

796-6646
6/99

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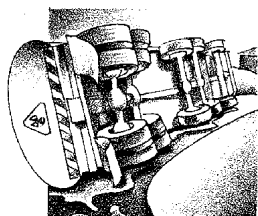
Appendix G

HOMEOWNER DISASTER PREPARATION INFORMATION

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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.

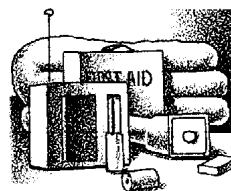


A highway spill of hazardous material could mean instant evacuation.

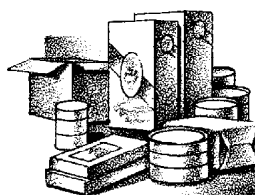


A winter storm could confine your family at home. An earthquake, flood, tornado or any other disaster could cut off basic services—gas, water, electricity and telephones—for days.

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.

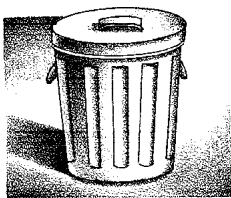


To prepare your kit

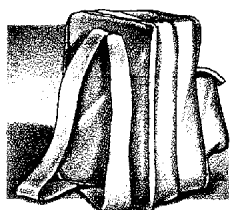
- Review the checklist in this brochure.
- Gather the supplies that are listed. You may need them if your family is confined at home.
- Place the supplies you'd most likely need for an evacuation in an easy-to-carry container. These supplies are listed with an asterisk (*).



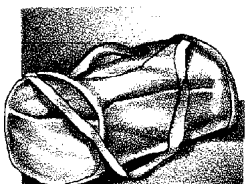
T here are six basics you should stock in your home: water, food, first aid supplies, clothing and bedding, tools and emergency supplies and special items. Keep the items that you would most likely need during an evacuation in an easy-to-carry container—suggested items are marked with an asterisk (*). 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

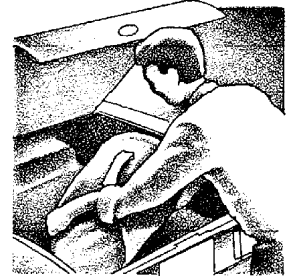
☐ Important Family Documents

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)

SUGGESTIONS AND REMINDERS

- 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.

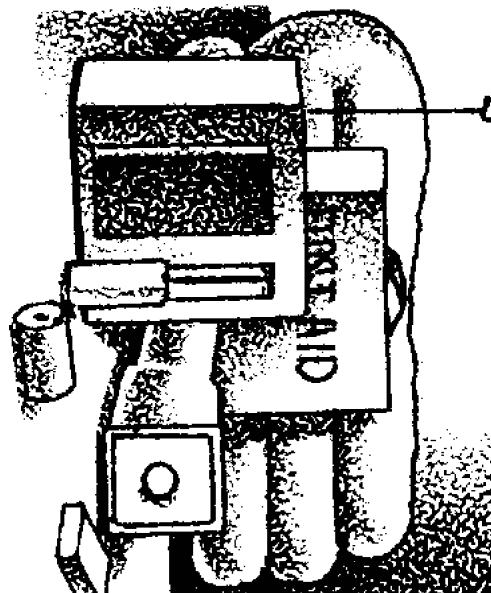
The Federal Emergency Management Agency's Community and Family Preparedness Program and the American Red Cross Community Disaster Education Program are nationwide efforts to help people prepare for disasters of all types. For more information, please contact your local emergency management office and 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



Your
Family Disaster Supplies Kit

HURRICANE • FLASH FLOOD • HAZARDOUS MATERIALS SPILL

Federal Emergency
Management Agency



EARTHQUAKE • TORNADO • WINTER STORM • FIRE

Appendix H

HAZARD RISK ANALYSIS AND PRIORITIZATION: 2010

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 59 in Chapter V of this report, and Tables 60 and 61 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 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 man-made hazards identified in Table 24 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.

Table H-1

PRIORITY RANKING OF NATURAL AND OTHER HAZARDS AFFECTING KENOSHA COUNTY BASED UPON MORTALITY AND INJURY

Order Based on Public 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
4	Transportation Accidents	1997-2008	3,648.0	23.1	2,142.1	2,165.2	1
7	Extreme Temperatures	1995-2008	2.7	0.3	0.7	1.0	2
5	Thunderstorms, High Wind, Hail, and Lightning.....	1964-2008	4.2	0.1	0.7	0.8	3
3	Tornadoes	1963-2009	0.2	0.0	0.3	0.3	4
10	Hazardous Material Incidents.....	2000-2008 ^b	35.0 ^c	0.0 ^b	0.0 ^b	0.0 ^b	5
9	Fog	1999-2008	3.9	0.0	0.0	0.0	6
1	Flooding	1993-2009	2.9	0.0	0.0	0.0	7
2	Winter Storms	1994-2008	2.2	0.0	0.0	0.0	8
13	Terrorism Incidents	2000-2004	0.8	0.0	0.0	0.0	9
6	Fires	1986-1995	- ^d	- ^d	- ^d	- ^d	10
14	Lake Michigan Coastal Erosion.....	1975-1995	1.1 (feet of erosion per year)	0.0 ^d	0.0 ^d	0.0 ^d	11
11	Drought	2002-2008	0.4	0.0	0.0	0.0	12
8	Power Outages	- -	- ^d	- ^d	- ^d	- ^d	13
12	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 All Hazards Mitigation Task Force. For more details see Hazard Identification section and Table 20 in Chapter III in this report.

^bBased upon transportation-related incidents reported to the U.S. Department of Transportation.

^cAll incidents are classified as minor spills.

^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 Public 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
4	Transportation Accidents	1997-2008	3,648.0	18,742,500 ^c	0	18,742,500 ^c	1
1	Flooding	1993-2009	2.9	605,082	626,869	1,231,951	2
5	Thunderstorms, High Wind, Hail, and Lightning.....	1964-2008	4.2	821,569	53,008	874,577	3
3	Tornadoes	1963-2009	0.2	499,772	0	499,772	4
11	Drought	2002-2008	0.4	0	37,617	37,617	5
10	Hazardous Material Incidents.....	2000-2008 ^d	35.0 ^e	956 ^d	0 ^d	956 ^d	6
7	Extreme Temperatures	1995-2008	2.7	834	0	834	7
2	Winter Storms	1994-2008	2.2	0	0	0	8
9	Fog	1999-2008	3.9	0	0	0	9
14	Lake Michigan Coastal Erosion.....	1975-1995	1.1 (feet of erosion per year)	- - ^e	- - ^e	- - ^e	10
13	Terrorism Incidents	2000-2004	0.8	0	0	0	11
6	Fires	1986-1995	- - ^f	- - ^f	- - ^f	- - ^f	12
8	Power Outages	- -	- - ^f	- - ^f	- - ^f	- - ^f	13
12	Contamination or Loss of Water Supply.....	- -	- - ^g	- - ^g	- - ^g	- - ^g	14

^aThese numbers indicate the ranked order of the hazards assigned by the Kenosha County All Hazards Mitigation Task Force. For more details see Hazard Identification section and Table 20 in Chapter III in this report.

^bDollar values were adjusted to year 2008 by using the average annual Consumer Price Index (CPI) values from the U.S. Department of Labor, Bureau of Labor Statistics.

^cEstimated from the number of property damage crashes reported and the National Safety Council estimates of per accident damage.

^dBased upon transportation-related incidents reported to the U.S. Department of Transportation.

^eAll incidents are classified as minor spills.

^fIncidents have been reported, but no data are available to calculate averages.

^gNo data 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.

Four 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; temperature extremes; thunderstorms, hail, and lightning events; and tornadoes. 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 70.6 crashes per 100 million vehicle-miles as shown on Map 34. These are primarily located at on and off ramp locations.

Temperature extremes are ranked as the second highest risk 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 the sick persons within the community.

Thunderstorms, high wind, hail, and lightning, as a group, and tornadoes represent the third and fourth most costly hazards, respectively, 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 Maps 31, 32, and 33 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.

The remaining 10 hazards have not been recorded as causing mortality and injury in Kenosha County based upon known data. These include hazardous material incidents, fog, flooding, winter storms, 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, drought, and hazardous material incidents, have not been recorded to cause mortality and injury, these hazards rank among the top seven recorded to be associated with significant property damage costs to Kenosha County (see Table H-2), which illustrates significant differences in ranking hazards between human life and injury versus property damage comparisons (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 Plan Task Force (see Appendix A of this report).

The priority rankings based upon death and injury in this update are similar to those presented in the initial 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 three hazards are within two positions of their ranking in the initial 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 initial hazard mitigation plan. In terms of ranking based upon mortality and injuries, there were three major changes in rankings between the initial plan and this update. The priority ranking of tornadoes based on mortality and injuries has moved from tenth most costly to fourth most costly. This reflects the injuries associated with the January 7, 2008 events. The priority ranking of fires has moved from fourteenth to tenth. This reflects the fact that, while data are unavailable to utilize for calculating the average annual number of fire-related deaths and injuries, such deaths and injuries are known to have occurred in Kenosha County. Finally, the change in the ranking of Lake Michigan erosion based upon mortality and injuries from eighth to eleventh is a consequence of the other changes in ranking.

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 seven of the 14 priority hazards. These hazards in order of appearance based upon total annual property damages, include: transportation accidents; flooding; thunderstorms, hail, and lightning; tornadoes; drought; hazardous material incidents; and extreme temperatures. Among these hazards, transportation-related accidents were identified as the greatest risk to property 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 conditions. Hazardous materials incidents, which has a transportation-related component, ranked sixth among the top 10 hazards responsible for property damage, mostly based upon property damages associated with transportation-related incidents.¹ In any case, the entire County is at risk from these hazards.

Natural hazards associated with flooding, severe weather, and drought comprised the remaining five of the seven 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; and extreme temperatures. Among these hazards, flooding was identified as the second greatest risk to property and crops compared to any other hazard within Kenosha County. As shown on Maps 27 through 30, 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 2 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 31 through 33 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.

¹*No data were available on property damages associated with hazardous material incidents occurring at fixed facilities.*

Based upon known data, the remaining seven hazards as shown in Table H-2 have not been recorded to be associated with property damages within Kenosha County. These hazards include winter storms, fog, Lake Michigan coastal erosion, terrorism incidents, fires, power outages, and contamination or loss of water supply.

The priority rankings based upon property and crop damage in this update are similar to those presented in the original Kenosha County hazard mitigation plan. While the rank order of most of the hazards in terms of property and crop damage has changed, the ranks of all but one hazard are within two positions of their rankings in the initial plan. In addition, the top seven most costly hazards in terms of property and crop damage in this update include six of the seven hazards that were found to be among the most costly in the initial hazard mitigation plan.

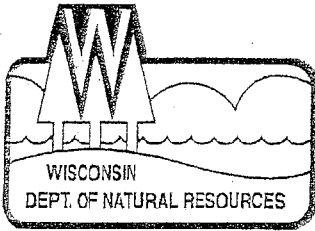
RANKING SUMMARY

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 All Hazards Mitigation Plan Task Force into the updated hazard mitigation plan and implementation strategies, as summarized in Chapter V of this report.

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

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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

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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	<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 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 ^c	- -
3	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
4	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;	- -

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	Repetitive Flood Claims Program	State agencies and participating NFIP communities	1. Elevation, relocation, or demolition of insured structures 2. Floodproofing 3. Minor localized flood reduction projects	100 percent Federal cost share assistance, if the proposed activity cannot be funded under the Flood Mitigation Assistance Program	- -
6	FEMA	Severe Repetitive Loss Program	State agencies and participating NFIP communities	1. Elevation, relocation, or demolition of insured structures 2. Floodproofing 3. Minor localized flood reduction projects 4. Mitigation reconstruction	75 percent Federal cost-share assistance, 25 percent State or local match is required	- -
7	U.S. Army Corps of Engineers (USCOE)	Small Flood Damage Reduction Program	State and local units of government	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 \$7,000,000; 35 to 50 percent local match is required	None
8	USCOE	Clearing and Snagging for Flood Control Program	State and local units of government	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
9	USCOE	Emergency Bank Protection Program	Local communities	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	- -
10	USCOE	Small Hurricane and Storm Damage Reduction Program	State agencies and local units of government	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	- -
11	USCOE	Water Resources Development and Flood Control Acts	Local governments	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

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
12	USCOE	Flood Hazard Mitigation and Riverine 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
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 	\$85.0 million available nationally ^b ; technical assistance and cost-sharing are provided; 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	U.S. Department of Agriculture, Natural Resources Conservation Service (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
15	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
16	U.S. Department of Housing and Urban Development and Wisconsin Department of Commerce, Division of Housing and Community 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

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
17	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
18	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
19	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
20	DATCP	Farmland Preservation Program	Individual landowners for a period of 10 years	<ol style="list-style-type: none"> 1. Best management practices that will lower the soil erosion rate to the tolerable soil loss rate or below 	Tax incentives on an annual basis	None
21	WDNR	Lake Planning Grant Program, Chapter NR 190 of the <i>Wisconsin Administrative Code</i>	Local units of government, lake districts, and nonprofit conservation organizations	<ol style="list-style-type: none"> 1. Gathering and analyzing water quality information 2. Land use planning within lake watersheds 3. Gathering and compiling demographic information pertinent to individual lakes 4. Developing lake management plans 	Up to 75 percent State cost-share assistance, not to exceed \$10,000; 25 percent local match is required; lakes are eligible for more than one grant, however, the total amount of State dollars cannot exceed \$100,000	February 1 and August 1
22	WDNR	Lake Protection Grant Program, Chapter NR 191 of the <i>Wisconsin Administrative Code</i>	Local units of government, lake districts, and nonprofit conservation organizations	<ol style="list-style-type: none"> 1. Land acquisition for easement establishment 2. Wetland restoration 3. Lake restoration projects 4. Other projects involving lake improvement 	75 percent State cost-share which cannot exceed \$200,000; 25 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
23	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
24	WDNR	Urban Rivers Grant Program	Local units of government	<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
25	WDNR	Urban Nonpoint Source and Stormwater Grants Program. Funding is through Chapter NR 155 of the <i>Wisconsin Administrative Code</i>	Local units of government	<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	May 1
26	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>	Local units of government	<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. Rural projects cannot exceed \$30,000 in funding and urban projects cannot exceed \$150,000	May 1
27	WDNR	River Protection Grant Program, Chapter NR 195 of the <i>Wisconsin Administrative Code</i>	Local units of government and nonprofit conservation organizations	<ol style="list-style-type: none"> 1. Activities designed to develop partnerships that protect river ecosystems 2. Educational projects 3. Activities associated with river management plan development 4. Land acquisition 5. Ordinance development 6. Installation of practices to control nonpoint source pollution 	75 percent State cost-share assistance; 25 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
28	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
29	USDA	Water and Waste Disposal Systems for Rural Communities	Local units of government, nonprofit organizations, associations, and districts	<ol style="list-style-type: none"> 1. Installation, repair, improvement or expansion of a rural water facility 2. Installation, repair, improvement or expansion of a rural waste disposal facility 3. Collection and treatment of sanitary waste, stormwater and solid wastes 	\$1,368 million in loans, \$857 million in grants, \$75 million in guaranteed loans, \$49 million disaster loan program, \$2,700 million Reinvestment Recovery Act Direct Loans ^b	Determined by State USDA office
30	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 ^f
31	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
32	NRCS	Conservation Stewardship Program	Individual landowners in a five-year contract	<ol style="list-style-type: none"> 1. Filter strips 2. Riparian buffers 3. Wildlife corridors 4. Stream habitat improvement 	Payments for maintain and/or enhancing natural resources not to exceed \$40,000 per year or \$200,000 over a five-year period	Annually
33	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 ^g

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
34	USEPA	Targeted Watershed Grants	Watershed organizations nominated by State Governors or Tribal leaders	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
35	USEPA	Pesticide Environmental Stewardship Grants	State government including State agencies	1. Implementation of pollution control measures 2. Plan development which includes strategies to reduce pesticide risk	\$500,000 available nationally ^b ; locally grants are provided up to a maximum of \$50,000	Ongoing
36	U.S. Geological Survey (USGS)	Upper Mississippi River System Long Term Resource Monitoring Program	State and local units of government, nonprofit organizations, and inter and intrastate agencies	1. Monitoring resources 2. Developing alternative management measures 3. Managing information with respect to those resources	Federal cost-share program with no local match required; average financial assistance has been \$250,000 per project	None
37	U.S. Department of Transportation (USDOT)	Transportation Enhancement Program	State and local units of government	1. Wetland preservation and restoration 2. Stormwater treatment systems to address runoff from roads and highways 3. Reduce vehicle-caused wildlife mortality while maintaining habitat connectivity	80 percent Federal cost-share assistance; 20 percent local match is required	- -
38	Kenosha/Racine Land Trust	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	- -
39	WDNR	Stewardship Grant Program, Urban Green Space Program	Local units of government, lake protection and rehabilitation districts, and nonprofit conservation organizations	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	- -
40	USDOT	Transportation Enhancement Program	State and local units of government	1. Land acquisition for: scenic easements, pedestrian and bike trails, and abandoned railway corridors	50 percent Federal cost-share assistance; 50 percent local match is required	- -

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
41	Eastman Kodak	American Greenway Grants	Land trusts, local units of government, and nonprofit organizations	<ol style="list-style-type: none"> 1. Ecological assessments 2. Mapping and surveying 3. Planning activities 4. Creative projects that work to establish greenways in communities 5. Must have matching funds from other sources 6. Must show that the project will be completed 	Grants with a maximum amount of \$2,500	March 1 to June 1
42	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
43	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	- -
44	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	- -
45	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	- -
46	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	- -
47	Wisconsin Department of Health Services	Special Needs Technical Assistance	Local communities	Technical assistance to determine if an actual or potential human service and/or population threat is present	Provide technical assistance and support	- -

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
48	Wisconsin Department of Health Services	Chemical Contamination Technical Assistance	Local communities	Technical assistance to determine if an actual or potential public health threat is present and if hazard mitigation is warranted or desirable	Provide technical assistance and support	- -
49	Wisconsin Department of Health Services	Communicable or Infectious Diseases Technical Assistance	Local communities	Technical assistance to determine if an actual or potential human threat is present	Provide technical assistance and support	- -
50	Wisconsin Department of Commerce Division of Housing and Community Development	Home Investment Partnerships Program	Local communities and nonprofit organizations	Supports rental rehabilitation, weatherization related repairs, accessibility improvements and rental housing development	75 percent Federal cost-share assistance; 25 percent homeowner match	- -
51	Wisconsin Department of Administration Division of Intergovernmental Relations	Comprehensive Planning Grant	Cities, villages, towns and counties	Helps communities adopt land use plans that address issues of urban sprawl and transportation infrastructure	Finance the cost of developing a comprehensive plan for eligible applicants, local match may be required	November
52	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 \$1,500,000 is available to all counties adjacent to Lakes Superior and Michigan	November 2
53	Root-Pike Watershed Initiative Network	Root-Pike Watershed Initiative Network Grant Program	State and local units of government, nonprofit organizations	Awards grants and offers advisement to organizations for projects that preserve, promote, and protect land and water resources in the Root River and Pike River Watersheds	\$30,000 in grants are awarded twice a year, in April and November	August and January
54	Great Lakes Protection Fund	Great Lakes Protection Fund	State and local units of government, nonprofit organizations and individuals	<ol style="list-style-type: none"> 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

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
55	Joyce Foundation	Joyce Foundation Grant program	State and local units of government, nonprofit organizations and individuals	<ol style="list-style-type: none"> 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
56	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
57	U.S. Fire Administration FEMA	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. Fire fighting 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
58	National Fish and Wildlife Foundation (NFWF)	Wal-Mart Stores, Inc. Acres for America	State and local units of government, nonprofit conservation organizations	<ol style="list-style-type: none"> 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 April 1 and September 1 Full proposals due June 1 and November 1
59	NFWF	Five-Star Restoration Program	Public or private organizations that engage in community-based restoration projects	<ol style="list-style-type: none"> 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 	\$225,000 available nationally annually; project awards range from \$10,000 to \$40,000, average award \$20,000; minimum 50 percent local match required, higher local match preferred	February
60	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	Variable

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
61	FWS	Partners for Fish and Wildlife Habitat Restoration Program	Private landowners for a 10-year contract	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
62	NFWF	Sustain Our Great Lakes Community Grant Program	State and local units of government, nonprofit organization	1. Wetland restoration, enhancement, and protection projects 2. Tributary restoration, enhancement, and protection projects 3. Shoreline restoration, enhancement, and protection projects 4. Projects must be in Great Lakes watershed	Grant awards range from \$25,000 to \$150,000. No match is required; however, the ratio of matching funds offered is considered during review.	October 15

NOTE: Table was updated in 2010 as a part of the plan update process.

^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.

^bAvailable on an annual basis.

^cMunicipalities must have a flood mitigation plan to be eligible for a project grant.

^dIn kind services are allowed as a part of the local cost-share assistance.

^eApplicants must have a Forest Stewardship Plan prepared by a forester in place on their land or be applying to have one prepared.

^fTwo 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.

^gEQIP in southeastern Wisconsin provides minimal funding.

Source: SEWRPC.

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Appendix K

FUNDING PROGRAMS CONTACT INFORMATION^a

Administrator 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 Region V 536 South Clark Street, 6th Floor Chicago, IL 60605	(312) 408-5500	www.fema.gov/government/grant/hmgrp/index
	Public Assistance Program			www.fema.gov/government/grant/pa/index
FEMA	Flood Mitigation Assistance Program	Headquarters: Federal Emergency Management Agency Mitigation Directorate 500 C Street, SW Washington, DC 20472	(202) 646-2500	www.fema.gov/government/grant/fma/index
	Predisaster Mitigation Program			www.fema.gov/government/grant/pdm/index
	Repetitive Flood Claims Grant Program			www.fema.gov/government/grant/rfc/index
	Severe Repetitive Loss Program			www.fema.gov/government/grant/srl/index
FEMA	Firefighters Grant Program	Assistance to Firefighters Grant Program Federal Emergency Management Agency Region V 536 South Clark Street, 6th Floor Chicago, IL 60605	(217) 726-9550	www.firegrantsupport.com/afg/
National Fish and Wildlife Foundation (NFWF)	Five Star Restoration Program	National Fish and Wildlife Foundation 1133 15th Street, NW, Suite 1100 Washington, DC 20005	(202) 857-0166	www.nfwf.org/FiveStar
NFWF	Wal-Mart Stores, Inc. Acres for America Program	National Fish and Wildlife Foundation Central Partnership Office 1 Federal Drive St. Paul, MN 55111	(612) 713-5173	www.nfwf.org
	Sustain Our Great Lakes Program		(612) 713-5185	
U.S. Army Corps of Engineers (USCOE)	Small Flood Damage Reduction Program	U.S. Army Corps of Engineers 111 N. Canal Street, Suite 600 Chicago, IL 60606	(312) 353-6400	www.usace.army.mil
	Snagging and Clearing for Flood Control Emergency Bank Protection Program Water Resources Development and Flood Control Act Small Hurricane and Storm Damage Reduction Program	U.S. Army Corps of Engineers 477 Michigan Avenue, Room 617 Detroit, MI 48226	(313) 226-6760	

Appendix K (continued)

Administrator of Grant Program	Name of Grant Program	Address	Phone Number	Internet Web Address
USCOE	Flood Hazard Mitigation and Riverine Ecosystem Restoration Program	U.S. Army Corps of Engineers Planning Division 20 Massachusetts Avenue, NW Washington, DC 20314	(202) 761-0115	www.usace.army.mil
U.S. Department of Agriculture (USDA)	Watershed Protection and Flood Prevention Program	Headquarters: Department of Agriculture Natural Resources Conservation Service P.O. Box 2890 Washington, DC 20013	(202) 720-3534	www.ftw.nrcs.usda.gov/programs.html
USDA	Water and Waste Disposal Systems for Rural Communities	U.S. Department of Agriculture Rural Utilities Service Water and Environmental Programs Room 4050-S, Stop 1548 1400 Independence Avenue, SW Washington, DC 20250	(202) 690-2670	www.usda.gov/rus/water/programs.htm
USDA	Watershed Protection and Flood Prevention Program	Headquarters: Department of Agriculture Natural Resources Conservation Service 1400 Independence Avenue, SW Washington, DC 20250	(202) 720-3534	www.nrcs.usda.gov/programs/watershed
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
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) 878-1234	www.fsa.usda.gov
U. S. Environmental Protection Agency (USEPA)	Targeted Watershed Grants	Erin Collard Environmental Protection Agency Office of Wetlands, Oceans, & Watersheds 1200 Pennsylvania Avenue NW Washington, DC 20460	- -	www.epa.gov/twg
USEPA	Environmental Education Grants Program	U.S. Environmental Protection Agency Office of Environmental Education (1704) Ariel Rios Building 1200 Pennsylvania Avenue, NW Washington, DC 20460	(202) 260-8619	www.epa.gov/enviroed/grants.html

Appendix K (continued)

Administrator of Grant Program	Name of Grant Program	Address	Phone Number	Internet Web Address
USEPA	Pesticide Environmental Stewardship Grants	U.S. Environmental Protection Agency Office of Prevention, Pesticides, and Toxic Substances Office of Pesticides Ariel Rios Building 1200 Pennsylvania Avenue, NW Washington, DC 20460	(703) 308-7035	www.epa.gov/oppbppd1/PESP
U.S. Fish and Wildlife Service (FWS)	North American Wetlands Conservation Fund	U. S. Fish and Wildlife Service Division of Bird Habitat Conservation 4401 North Fairfax Drive Arlington, VA 22203	(703)-358-1784	www.fws.gov/birdhabitat/Grants/NAWCA/index.shtm
FWS	Partners for Fish and Wildlife Habitat Restoration Program	U. S. Fish and Wildlife Service Branch of Habitat Restoration 4401 North Fairfax Drive Arlington, VA 22203	(703)-358-2201	www.fws.gov/partners/
U.S. Geological Survey (USGS)	Upper Mississippi River System Long Term Resource Monitoring Program	Upper Midwest Environmental Sciences Center 2630 Fanta Reed Road LaCrosse, WI 54603	(608) 781-6221	www.emewc.usgs.gov/ltrmp.html
U.S. Department of Housing and Urban Development	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) 708-1322	www.hud.gov/offices/cpd/communitydevelopment/programs/drsl/index.cfm
U.S. Department of Transportation (DOT)	Transportation Enhancement Program	U.S. Department of Transportation 400 Seventh Street, SW Washington, DC 20590	(202) 366-4000	www.dot.gov
U.S. Small Business Administration	Disaster Loan Program	U.S. Small Business Administration Disaster Loan Program 101 Marietta Street NW Atlanta, GA 30303-2725	(404) 331-0333	www.sba.gov/services/disasterassistance/index.html
Wisconsin Department of Administration (WDOA)	Comprehensive Planning Grant	Department of Administration Division of Intergovernmental Relations P.O. Box 8944 Madison, WI 53708	(608) 267-3369	www.doa.state.wi.us/complanning
WDOA	Wisconsin Coastal Management	Department of Administration 101 East Wilson Street Madison, WI 53702	(608) 267-6917	www.doa.state.wi.us/section.asp?linkid=65&locid=9

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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 Farmland Preservation 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
Wisconsin Department of Commerce	Home Investment Partnerships Program (HIPP) Community Development Block Grants (CDBG)	Wisconsin Department of Commerce 201 W. Washington Avenue P.O. Box 7970 Madison, WI 53707-7970	HIPP: (608) 266-9185 CDBG: (608) 267-3682	commerce.wi.gov
Wisconsin Department of Health Services (WDHS)	Chemical Contamination	Wisconsin Division of Public Health Bureau of Environmental and Occupational Health 1 W. Wilson Street, Room 150 Madison, WI 53701	(608) 264-9880	www.dhs.state.wi.us/
WDHS	Communicable and Infectious Diseases	Wisconsin Division of Public Health Bureau of Communicable Diseases 1 W. Wilson Street, Room 318 Madison, WI 53701	(608) 267-9363	www.dhs.state.wi.us/
Wisconsin Department of Natural Resources (WDNR)	Municipal Flood Control Grants	Wisconsin Department of Natural Resources Grant Program Manager-CF/2 P.O. Box 7921 Madison, WI 53707-7921	(608) 267-7152	www.dnr.state.wi.us/org/caer/cfa/Ef/flood/grants.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 UWEX-Lakes Partnership UW-Stevens Point 1900 Franklin Street Stevens Point, WI 54481	(262) 574-2130 (715) 346-2116	dnr.wi.gov/org/caer/cfa/Grants/Lakes/Largelake.html dnr.wi.gov/org/caer/cfa/Grants/Lakes/smalllake.html www.uwsp.edu/cnr/uwexlakes/grants
WDNR	Stewardship Grant Program Urban Rivers Grant Program River Protection Grant Program	Wisconsin Department of Natural Resources 2300 N. Dr. Martin Luther King Jr. Drive P.O. Box 12436 Milwaukee, WI 53212	(414) 263-8610	www.dnr.state.wi.us
WDNR	Targeted Runoff Management Grants Urban Nonpoint Source and Storm Water Grants Program	Wisconsin Department of Natural Resources Bureau of Watershed Management P.O. Box 7921 Madison, WI 53707-7921	(608) 267-7568	www.dnr.state.wi.us

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Administrator of Grant Program	Name of Grant Program	Address	Phone Number	Internet Web Address
WDNR	Wisconsin Forest Landowner Grant Program	Wisconsin Department of Natural Resources 9531 Rayne Road, Suite IV Sturtevant, WI 53177	(262) 884-2390	www.dnr.state.wi.us
WDNR	Remediation and Redevelopment Program	Wisconsin Department of Natural Resources 2300 N. Dr. Martin Luther King Jr. Drive P.O. Box 12436 Milwaukee, WI 53212	(414) 263-8688	ua.dnr.state.wi.us/org/aw/rr
WDNR (Utilizing U.S. Department of Interior Funding)	Land and Water Conservation Fund Grants Stewardship Grant Program	Wisconsin Department of Natural Resources 2300 N. Dr. Martin Luther King Jr. Drive P.O. Box 12436 Milwaukee, WI 53212 or U.S. Department of the Interior National Park Service, Recreation Programs 1849 C Street NW Washington, DC 20240	(414) 263-8704 (202) 565-1200	www.dnr.state.wi.us www.ncrc.nps.gov/lwcf
WisDOT	Transportation Enhancement Program	U.S. Department of Transportation 400 Seventh Street, SW Washington, DC 20590	(202) 366-4000	www.dot.gov
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 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/
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
Eastman Kodak	American Greenway Grants	American Greenways The Conservation Fund 1655 N. Fort Meyer Drive, Suite 1300, Arlington, Virginia 22209-3199	(703) 525-6300	www.conservationfund.org
Great Lakes Protection Fund	Great Lakes Protection Fund Grants Program	Great Lakes Protection Fund 1560 Sherman Avenue, Suite 880 Evanston, IL 60201	(847) 425-8150	www.glpf.org/index.html
Joyce Foundation	Joyce Foundation Grant Program	The Joyce Foundation 70 West Madison Street Suite 2750 Chicago, Illinois 60602	(312) 782-2464	www.joycefdn.org

Appendix K (continued)

Administrator of Grant Program	Name of Grant Program	Address	Phone Number	Internet Web Address
Kenosha/Racine Land Trust	Urban Green Space Program Stewardship Grant Program	Kenosha/Racine Land Trust, Inc. P.O. Box 085153 Racine, WI 53408-5153	262-552-0448	www.krlt.org/
Root-Pike Watershed Initiative Network	Root-Pike Watershed Initiative Grants program	Root-Pike WIN P.O. Box 044164 Racine, WI 53404	(262) 898-2055	www.rootpikewin.org/index.asp

NOTE: Table was updated in 2010 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.

Appendix L

GLOSSARY

Asset – Any man-made or natural feature that has value, including, but not limited to people; buildings; infrastructure like bridges, roads, and sewer and water systems; lifelines like electricity and communication resources; or environmental, cultural, or recreational features like parks, dunes, wetlands, or landmarks.

Base Flood – Flood that has a 1 percent probability of being equaled or exceeded in any given year. The base flood is also known as the 1 percent annual probability flood event.

Base Flood Elevation (BFE) – Elevation of the base flood in relation to a specified datum, such as the National Geodetic Vertical Datum of 1929. The Base Flood Elevation is used as the standard for the National Flood Insurance Program.

Bedrock – The solid rock that underlies loose material, such as soil, sand, clay, or gravel.

Building – A structure that is walled and roofed, principally above ground and permanently affixed to a site. The term includes a manufactured home on a permanent foundation on which the wheels and axles carry no weight.

Coastal High Hazard Area – Area, usually along an open coast, bay, or inlet, that is subject to inundation by storm surge and, in some instances, wave action caused by storms or seismic sources.

Coastal Zones – The area along the shore where Lake Michigan meets the land as the surface of the land rises above the Lake. This land/water interface includes beaches, bluffs, and land areas having direct drainage to the Lake.

Community Rating System (CRS) – An NFIP program that provides incentives for NFIP communities to complete activities that reduce flood hazard risk. When the community completes specified activities, the insurance premiums of policyholders in these communities are reduced.

Contour – A line of equal ground elevation on a topographic (contour) map.

Critical Facility – Facilities that are critical to the health and welfare of the population and that are especially important following hazard events. Critical facilities include, but are not limited to, shelters, police and fire stations, and hospitals.

Displacement Time – The average time (in days) which the building's occupants typically must operate from a temporary location while repairs are made to the original building due to damages resulting from a hazard event.

Duration – How long a hazard event lasts.

Earthquake – A sudden motion or trembling that is caused by a release of strain accumulated within or along the edge of earth's tectonic plates.

Erosion – Wearing away of the land surface by detachment and movement of soil and rock fragments, during a flood or storm or over a period of years, through the action of wind, water, or other geologic processes.

Erosion Hazard Area – Area anticipated to be lost to shoreline retreat over a given period of time. The projected inland extent of the area is measured by multiplying the average annual long-term recession rate by the number of years desired.

Essential Facility – Elements that are important to ensure a full recovery of a community or state following a hazard event. These would include: government functions, major employers, banks, schools, and certain commercial establishments, such as grocery stores, hardware stores, and gas stations.

Extent – The size of an area affected by a hazard or hazard event.

Fault – A fracture in the continuity of a rock formation caused by a shifting or dislodging of the earth's crust, in which adjacent surfaces are differentially displaced parallel to the plane of fracture.

Federal Emergency Management Agency (FEMA) – Independent agency created in 1978 to provide a single point of accountability for all Federal activities related to disaster mitigation and emergency preparedness, response and recovery.

Fire Potential Index (FPI) – An index developed by USGS and USFS to assess and map fire hazard potential over broad areas. Based on such geographic information, national policy makers and on-the-ground fire managers established priorities for prevention activities in the defined area to reduce the risk of managed and wildfire ignition and spread. Prediction of fire hazard shortens the time between fire ignition and initial attack by enabling fire managers to pre-allocate and stage suppression forces to high fire risk areas.

Flash Flood – A flood event occurring with little or no warning where water levels rise at an extremely fast rate.

Flood – A general and temporary condition of partial or complete inundation of normally dry land areas from: 1) the overflow of inland or tidal waters, 2) the unusual and rapid accumulation or runoff of surface waters from any source, or 3) mudflows or the sudden collapse of shoreline land.

Flood Depth – Height of the flood water surface above the ground surface.

Flood Elevation – Elevation of the water surface above an established datum, such as the National Geodetic Vertical Datum of 1929, North American Vertical Datum of 1988, or Mean Sea Level.

Flood Hazard Area – The area shown to be inundated by a flood of a given magnitude on a map.

Flood Insurance Rate Map (FIRM) – Map of a community, prepared by the Federal Emergency Management Agency, that shows both the special flood hazard areas and the risk premium zones applicable to the community.

Flood Insurance Study (FIS) – A study that provides an examination, evaluation, and determination of flood hazards and, if appropriate, corresponding water surface elevations in a community or communities.

Floodplain – Any land area, including watercourse, susceptible to partial or complete inundation by water from any source.

Floodway – The stream channel and that portion of the adjacent floodplain that must remain open to permit passage of the base flood without raising the water surface elevation.

Frequency – A measure of how often events of a particular magnitude are expected to occur. Frequency describes how often a hazard of a specific magnitude, duration, and/or extent typically occurs, on average. Statistically, a hazard with a 100-year recurrence interval is expected to occur once every 100 years on average, and would have a 1 percent chance—its probability—of happening in any given year. The reliability of this information varies depending on the kind of hazard being considered and the amount and quality of the available data.

Functional Downtime – The average time (in days) during which a function (business or service) is unable to provide its services due to a hazard event.

Geographic Area Impacted – The physical area in which the effects of the hazard are experienced.

Geographic Information Systems (GIS) – A computer software application that relates physical features on the earth to a database to be used for mapping and analysis.

Ground Motion – The vibration or shaking of the ground during an earthquake. When a fault ruptures, seismic waves radiate, causing the ground to vibrate. The severity of the vibration increases with the amount of energy released and decreases with distance from the causative fault or epicenter, but soft soils can further amplify ground motions.

Hazard – A source of potential danger or adverse condition. Hazards include naturally occurring events such as floods, earthquakes, tornadoes, coastal storms, landslides, and wildfires that strike populated areas and man-made events such as hazard material spills and transportation accidents. An event is a hazard when it has the potential to harm people or property.

Hazard Event – A specific occurrence of a particular type of hazard.

Hazard Identification – The process of identifying hazards that threaten an area.

Hazard Mitigation – Sustained actions taken to reduce or eliminate long-term risk from hazards and their effects.

Hazard Profile – A description of the physical characteristics of hazards and a determination of various descriptors including magnitude, duration, frequency, probability, and extent. In most cases, a community can most easily use these descriptors when they are recorded and displayed as maps.

HAZUS (Hazards U.S.) – A GIS-based nationally standardized earthquake loss estimation tool developed by FEMA.

Hydrology – The science of dealing with the waters of the earth. A flood discharge is developed by a hydrologic study.

Infrastructure – Refers to the public services of a community that have a direct impact on the quality of life. Infrastructure includes communication technology, such as phone lines or Internet access; vital services, such as public water supplies and sewer treatment facilities; and includes an area's transportation system, such as airports, heliports; highways, bridges, tunnels, roadbeds, overpasses, railways, bridges, rail yards, depots; and waterways, canals, locks, seaports, ferries, harbors, dry-docks, piers and regional dams.

Intensity – A measure of the effects of a hazard event as a particular place.

Loss of Bearing Strength – Results when the soil supporting structures liquefies. This can cause structures to tip and topple.

Lowest Floor – Under the NFIP, the lowest floor of the lowest enclosed area (including basement) of a structure.

Magnitude – A measure of the strength of a hazard event. The magnitude (also referred to as severity) of a given hazard event is usually determined using technical measures specific to the hazard.

Mitigation Plan – A systematic evaluation of the nature and extent of vulnerability to the effects of natural hazards typically present in the State and includes a description of actions to minimize future vulnerability to hazards.

National Flood Insurance Program (NFIP) – Federal program created by Congress in 1968 that makes flood insurance available in communities that enact minimum floodplain management regulations in 44 CFR §60.3.

National Geodetic Vertical Datum of 1929 (NGVD) – Datum established in 1929 and used in the NFIP as a basis for measuring flood, ground, and structural elevations, previously referred to as Sea Level Datum or Mean Sea Level. The Base Flood Elevations shown on most of the Flood Insurance Rate Maps issued by the Federal Emergency Management Agency are referenced to NGVD.

National Weather Service (NWS) – Prepares and issues flood, severe weather, and coastal storm warnings and can provide technical assistance to Federal and State entities in preparing weather and flood warning plans.

Planimetric – Describes maps that indicate only man-made features like buildings.

Planning – The act or process of making or carrying out plans; the establishment of goals, policies and procedures for a social or economic unit.

Probability – A statistical measure of the likelihood that a hazard event will occur.

Recurrence Interval – The time between hazard events of similar size in a given location. It is based on the probability that the given event will be equaled or exceeded in any given year.

Repetitive Loss Property – A property that is currently insured for which two or more National Flood Insurance Program losses (occurring more than 10 days apart) of at least \$1,000 each have been paid within any 10-year period since 1978.

Replacement Value – The cost of rebuilding a structure. This is usually expressed in terms of cost per square foot, and reflects the present-day cost of labor and materials to construct a building of a particular size, type, and quality.

Richter Scale – A numerical scale of earthquake magnitude devised by seismologist C.F. Richter in 1935.

Risk – The estimated impact that a hazard would have on people, services, facilities, and structures in a community; the likelihood of a hazard event resulting in an adverse condition that causes injury or damage. Risk is often expressed in relative terms, such as a high, moderate, or low likelihood of sustaining damage above a particular threshold due to a specific type of hazard event. It also can be expressed in terms of potential monetary losses associated with the intensity of the hazard.

Riverine – Of or produced by a river.

Scale – A proportion used in determining a dimensional relationship; the ratio of the distance between two points on a map and the actual distance between the two points on the earth's surface.

Scarp – A steep slope.

Scour – Removal of soil or fill material by the flow of flood waters. The term is frequently used to describe storm-induced, localized conical erosion around pilings and other foundation supports where the obstruction of flow increases turbulence.

Seismicity – Describes the likelihood of an area being subject to earthquakes.

Special Flood Hazard Area (SFHA) – An area within a floodplain having a 1 percent or greater chance of flood occurrence in any given year (100-year floodplain); represented on Flood Insurance Rate Maps by darkly shaded areas with zone designations that include the letter A or V.

Stafford Act – The Robert T. Stafford Disaster Relief and Emergency Assistance Act, PL 100-107 was signed into law November 23, 1988, and amended the Disaster Relief Act of 1974, PL 93-288. The Stafford Act is the statutory authority for most Federal disaster response activities, especially as they pertain to FEMA and its programs.

State Hazard Mitigation Officer (SHMO) – The representative of state government who is the primary point of contact with FEMA, other State and Federal agencies, and local units of government in the planning and implementation of pre- and post-disaster mitigation activities.

Storm Surge – Rise in the water surface above normal water level on the open coast due to the action of wind stress and atmospheric pressure on the water surface.

Structure – Something constructed. (See also Building).

Substantial Damage – Damage of any origin sustained by a structure in a Special Flood Hazard Area whereby the cost of restoring the structure to its before-damaged condition would equal or exceed 50 percent of the market value of the structure before the damage.

Surface Faulting – The differential movement of two sides of a fracture—in other words, the location where the ground breaks apart. The length, width, and displacement of the ground characterize surface faults.

Topographic – Characterizes maps that show natural features and indicate the physical shape of the land using contour lines. These maps may also include manmade features.

Tornado – A violently rotating column of air extending from a thunderstorm to the ground.

Vulnerability – Describes how exposed or susceptible to damage an asset is. Vulnerability depends on an asset's construction, contents, and the economic value of its functions. Like indirect damages, the vulnerability of one element of the community is often related to the vulnerability of another. For example, many businesses depend on uninterrupted electrical power—if an electric substation is flooded, it will affect not only the substation itself, but a number of businesses as well. Often, indirect effects can be much more widespread and damaging than direct ones.

Vulnerability Assessment – The extent of injury and damage that may result from a hazard event of a given intensity in a given area. The vulnerability assessment should address impacts of hazard events on the existing and future built environment.

Wave Runup – The height that the wave extends up to on steep shorelines, measured above a reference level (the normal height of the sea, corrected to the state of the tide at the time of wave arrival).

Wildfire – An uncontrolled fire spreading through vegetative fuels, exposing, and possibly consuming structures.

Zone – A geographical area shown on a Flood Insurance Rate Map (FIRM) that reflects the severity or type of flooding in the area.

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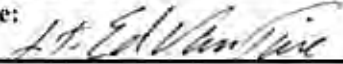
Appendix M

ADOPTING RESOLUTIONS

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KENOSHA COUNTY
BOARD OF SUPERVISORS

RESOLUTION NO. 144

Subject: Hazard Mitigation Grant 2011			
Original <input type="checkbox"/>	Corrected <input type="checkbox"/>	2nd Correction <input type="checkbox"/>	Resubmitted <input type="checkbox"/>
Date Submitted: April 19, 2011		Date Resubmitted:	
Submitted By: Judiciary & Law and Finance Committees			
Fiscal Note Attached <input type="checkbox"/>		Legal Note Attached <input type="checkbox"/>	
Prepared By: Ed VanTine, Director of Emergency Management		Signature: 	

WHEREAS, Kenosha County Sheriff's Department Division of Emergency Management executed an agreement with the Southeastern Wisconsin Regional Planning Commission in mid 2009 to update the countywide all-hazard mitigation plan leading to the recommendations for reducing natural hazards and selected manmade and technical hazards potentially impacting Kenosha County, and

WHEREAS, such plan has been completed under a cooperative effort of the Kenosha County Sheriff's Department Division of Emergency Management and the Southeastern Wisconsin Regional Planning Commission under the guidance of the Kenosha County Hazard Mitigation Plan Task Force, and

WHEREAS, Kenosha County believes that the plan is a valuable guide to the means for reducing the impact of natural and technological hazards that could potentially impact Kenosha County, and that the adoption of such plan by the Kenosha County Board of Supervisors and municipal local Boards, will assure a common understanding by the local governments, and

WHEREAS, the preparation and adoption of the hazard mitigation plan is a requirement for maintaining eligibility for certain hazard mitigation and disaster grant programs funded by the Federal Emergency Management Agency and administered by the State of Wisconsin Department of Military Affairs, Division of Emergency Management, and

WHEREAS, this resolution required no budget modification,

NOW THEREFORE BE IT RESOLVED, that the Kenosha County Board of Supervisors hereby adopts the Kenosha County All-Hazard Mitigation Plan as set forth in SEWRPC Community Assistance Planning Report No. 278, 2nd edition Kenosha County Hazard Mitigation Plan Update 2011-2016, and

BE IT FURTHER RESOLVED, that the Kenosha County Board of Supervisors directs the Kenosha County Sheriff's Department Division of Emergency Management to take the necessary steps to provide copies of the Kenosha county Hazard Mitigation Plan to all of the general-purpose local units of government in the County for consideration and adoption, and

BE IT FURTHER RESOLVED, that the Kenosha County Board of Supervisors directs the County Clerk to transmit a certified copy of the resolution to the Southeastern Wisconsin Regional Planning Commission.

Respectfully submitted,

Judiciary & Law Committee

William M. H. Thompson
William M. H. Thompson

<u>Aye</u>	<u>No</u>	<u>Abstain</u>	<u>Excused</u>
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Bob Haas
Bob Haas, Vice Chairperson

<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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Ronald Johnson
Ronald Johnson, Secretary

<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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David C. Singer
David C. Singer

<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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Ronald Frederick
Ronald Frederick

<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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Finance Committee

Joseph D. Clark, Chairperson

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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John O'Day, Vice Chairperson

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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Jeffrey Gentz, Secretary

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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David C. Singer,

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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Fred Ekornaas

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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KENOSHA COUNTY HAZARD MITIGATION TASK FORCE

Bennett J. Schliesman, Chairman	Former Director, Kenosha County Division of Emergency Management
Michael Boozer.....	Chief Executive Officer, ChemReport, Inc.
Joseph E. Boxhorn	Senior Planner, Southeastern Wisconsin Regional Planning Commission
John Burg.....	Former Administrator, Village of Paddock Lake
Steven Carlson.....	Risk Management Officer, University of Wisconsin-Parkside
David E. Cox	Administrator, Village of Twin Lakes
Michelle Eisenhauer	Central Services Manager, Kenosha County Human Services
Patrick Finnemore	Director of Facilities, Kenosha Unified School District No. 1
William Glembocki.....	Chairman, Town of Wheatland
Roxanne K. Gray.....	State Hazard Mitigation Officer, Wisconsin Division of Emergency Management
Paul G. Guilbert, Jr.	Fire Chief, Pleasant Prairie Fire and Rescue
Michael G. Hahn.....	Chief Environmental Engineer, Southeastern Wisconsin Regional Planning Commission
William D. Hoare	Associate Vice President, Carthage College
Don Howland.....	Captain, City of Kenosha Fire Department
Jim Huff.....	Former Supervisor, Kenosha County
Mark Krueger	Lieutenant, Kenosha County Sheriff's Department
Eric Kuhart	Security Director, Carthage College
Lewis Lindquist.....	Captain, Kenosha Police Department
John R. Meland.....	Chief Economic Development Planner, Southeastern Wisconsin Regional Planning Commission
George E. Melcher	Director, Kenosha County Department of Planning and Development
Mark Melotik.....	Kenosha County Health Department
Edwin L. Morris.....	Senior Engineer, We Energies
William A. Morris	Administrator, Town of Somers
Aaron W. Owens	Research Analyst, Southeastern Wisconsin Regional Planning Commission
Peter Parker	Fire Chief, Town of Bristol Fire Department
Katie Pedicone	Community Office Director, American Red Cross of Southeastern Wisconsin
Michael R. Pollocoff.....	Administrator, Village of Pleasant Prairie
Tim Popanda.....	Building Inspector and Interim Administrator, Village of Pleasant Prairie
Richard Schroeder	Assistant City Planner, City of Kenosha
James M. Smith.....	Former Chairman, Town of Somers
Michael R. Spence	Village Engineer, Village of Pleasant Prairie
Mark Starzyk	Chairperson, Kenosha County Housing Authority
Robert Stoll	Chairperson, Town of Randall
Mike Slover	Chief, Town of Salem Fire/Rescue
Linda Valentine.....	Former Chairperson, Town of Salem
Brian J. Wagner.....	Chief of Police, Village of Pleasant Prairie
Tedi Winnett	Director, Kenosha County UW-Extension