CHAPTER 3 – RISK ASSESSMENT

Before any mitigation strategies can be derived, real and potential hazards must be identified and analyzed. This chapter will focus on: identifying natural and technological hazards within Portage County, inventorying the history of previous occurrences, identify vulnerability, and future potential of occurrence.

SECTION A: HAZARD ANALYSIS

During the development of 2007 *Portage County Natural Hazard Mitigation Plan*, each municipality was asked to complete a natural and manmade hazard identification and risk assessment matrix to prioritize hazards in their area, based on their perceived risk (see Appendix D for risk assessment results). For the identification of hazards for this 2012-2017 update, the Work Group reviewed the natural hazards that were previously identified by each local unit of government and included in the 2007 Mitigation Plan. They further discussed: the need to separate out some natural hazards that were combined; other natural hazards to be incorporated into Plan; and technological hazards to be included. Ultimately it was determined that the natural and technological hazards listed below would be a part of this updated plan. Some minor changes from the 2007 Mitigation Plan include: separating tornados and high wind events, and creating dam failure as its own hazard to mitigate.

Tornados	Extreme Temperatures
High Winds	Fires – Wild land
Severe Storms – Winter	Drought – Agriculture
Severe Storms – Summer	Hazardous Materials
Flooding	Dam Failure

History and Probability Assessment

Past experiences of hazards help identify the probability of occurrence. The National Climatic Data Center (NCDC), the world's largest archive of weather data, publishes past weather events with reported total death, injury, property damage and crop damage. Between 1950 and August 31, 2011, the NCDC reported 352 events within Portage County.

Vulnerability Assessment

As much as we try to prepare for catastrophic disasters and reduce the risks to their devastation, disasters still happen.

The Federal Emergency Management Agency (FEMA) provides disaster aid to communities. Three of the major categories for disaster aid include:

1. Individual Assistance
   FEMA provides a variety of assistance for persons living in counties that have been declared a Presidential Disaster and who have been adversely affected by that disaster. Individual Assistance can include low-interest loans, income tax relief, cash grants, unemployment assistance, and crisis counseling.

   Individual Assistance usually falls into the following categories: Disaster Housing, Disaster Grants, Low-Interest Disaster Loans, and Other Disaster Aid Programs.

2. Public Assistance
   Public assistance is aid to state or local governments to pay part of the costs of rebuilding communities damaged infrastructure. Generally, public assistance programs pay for 75% of the approved project costs. Public assistance may include debris removal, emergency protective measure and public services, repairs of damaged public property, loans needed by communities for essential government functions, and grants for public schools.

3. Hazard Mitigation
   Wisconsin Emergency Management (WEM) administers the Hazard Mitigation Grant Program (HMGP) and makes grants available to state and local governments as well as eligible private, non-profit organizations and Indian tribes to implement cost-effective and long-term mitigation measures following a major disaster declaration.

There have been several disasters in Portage County that have received Presidential Disaster Declarations; they include:

Table 17: Presidential Disaster Declarations

Year	Type of Disaster
1971	Flood
1973	Flood
1975	Army Worm Infestation
1976	Drought
1993	Flooding
2001	Severe Storms and Flooding
2002	Severe Storms and Flooding
2002	Tornado, Severe Storms
2004	Flooding, Severe Storms, Tornados
2010	Severe Storms and Flooding

Source: Portage County Emergency Management Department

Table 18: Portage County Disaster Aid Recovery 1993 – 2011

Date of Disaster	Type of Disaster	Type of Grant	Total Grant Payment
July 2, 1993	Flooding	Individual Assistance	$2,452.00
July 2, 1993	Flooding	Public Assistance	$264,378.46
May 11, 2001	Severe Storms, Flooding	Public Assistance	$571,534.93
June 21-25, 2002	Severe Storms, Flooding	Public Assistance	$843.56
June 21-25, 2002	Severe Storm, Flooding	Public Assistance	$1,417,125.06
June 21-25, 2002	Severe Storms, Flooding	Public Assistance	$390,606.66
September 2-6, 2002	Tornado, Severe Storms	Hazard Mitigation	$11,900.00
July 2, 2004	Flooding, Severe Storms, Tornados	Individual Assistance	$32,617.07
September 24 - October 9, 2010	Severe Storms, Flooding	Public Assistance	$416,966.26
Total			**$2,944,228.29**

Source: Wisconsin Emergency Management Department, and Portage County Emergency Management Department,

Table 18 above identifies Disaster Aid between 1993 and 2011, and distinguishes between the three types of aid most available to communities. Throughout those 17 years, Portage County received $2,944,228.26 in disaster aid, averaging just under 174 thousand in aid each year.

The Wisconsin Disaster Fund (WDF) was created by order of 2005 Wisconsin Act 269 enacted April 5, 2006 to provide state disaster assistance to local government units. This assistance is in the form of payments for damages and costs incurred as a result of a major catastrophe when the damages sustained are not of a significant nature to warrant a federal disaster proclamation. Table 19 below lists the WDF aid received by municipalities in Portage County.

Table 19: Wisconsin Disaster Fund

Date of Disaster	Municipality	Type of Disaster	Type of Funding	Total Payment Received
July 19, 2011	Town of Stockton	Heavy Rain/Wind	Wisconsin Disaster Fund	$12, 683.66
July 19, 2011	City of Stevens Point	Heavy Rain/Wind	Wisconsin Disaster Fund	$60,497.35
Total				**$73,181.01**

Source: Wisconsin Emergency Management (WEM), and Portage County Emergency Management

SECTION B: HAZARD ASSESSMENT

This section includes analysis of the eight natural and two technological hazards previously identified in this document. The assessment for each of these hazards includes: a description of the type location and extent of each hazard, information on previous occurrences, probability of future hazard events, description of hazard's impact, and vulnerability. This section also identifies the related hazard risks and vulnerabilities for all participating cities, villages, towns and the County as a whole. With the exception of flooding, wildfire, dam failure, and even hazardous materials, the remaining natural hazard threats facing Portage County do not have defined hazard areas. The majority of these events effect large areas, or are scattered throughout the County, giving almost equal vulnerability to all areas.

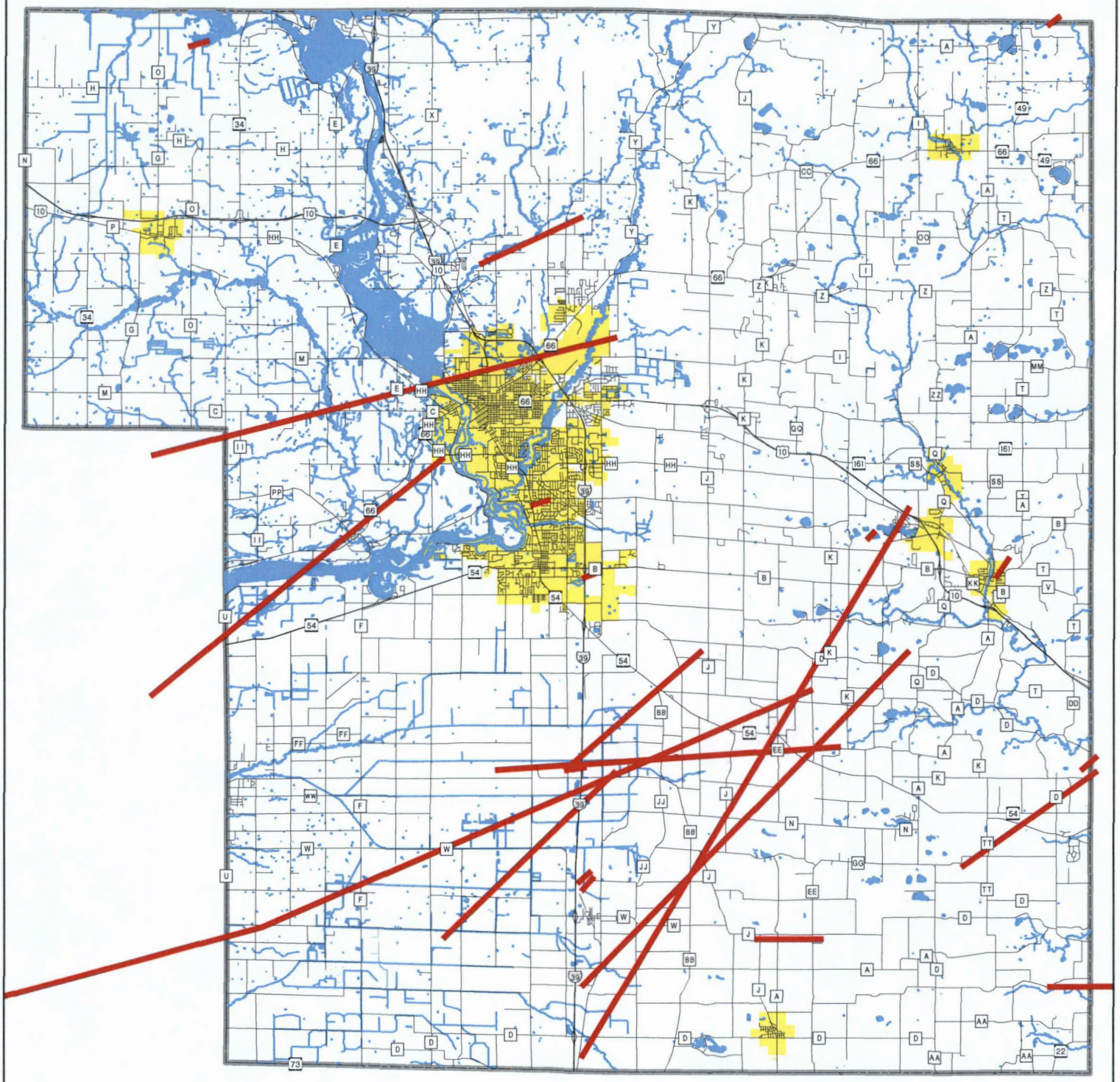
Tornado

A tornado is a funnel shaped violently rotating column of air, with the vortex/column must contact the ground and cloud base. Average winds in the tornado are between 175 and 250 miles per hour and may produce winds exceeding 300 miles per hour. This hazard typically produces damage in an area that does not exceed one-fourth mile in width or sixteen miles in length. Tornados with track lengths greater than 150 miles have been reported, although such tornados are rare.

Tornados are visible because low atmospheric pressure in the vortex leads to cooling of the air by expansion with condensation and formation of water droplets. They are also visible as a result of the airborne debris and dust associated with the vortex. The destructive power of the tornado lies primarily in its high-wind velocities and sudden changes in pressure; wind and pressure differential probably account for ninety (90%) percent of the damage in most cases. Since tornadoes are associated with storm systems, hail, torrential rain, and intense lightning usually accompany them.

There are six different tornado categories based on the Enhanced Fujita Scale or the "EF-Scale". The EF-Scale rates a tornado between F0 and F5 depending on the intensity of damage caused in the area. Please see source information as it pertains to the update to the Enhanced Fujita Scale from the Fujita Scale by the National Weather Service in 2007.

Map 14: Tornadoes



Tornado Paths (1951-2011)

N
W E
S

0 1 2 4 Miles

Source: Portage County Planning & Zoning (2012)
National Climatic Data Center (2011)

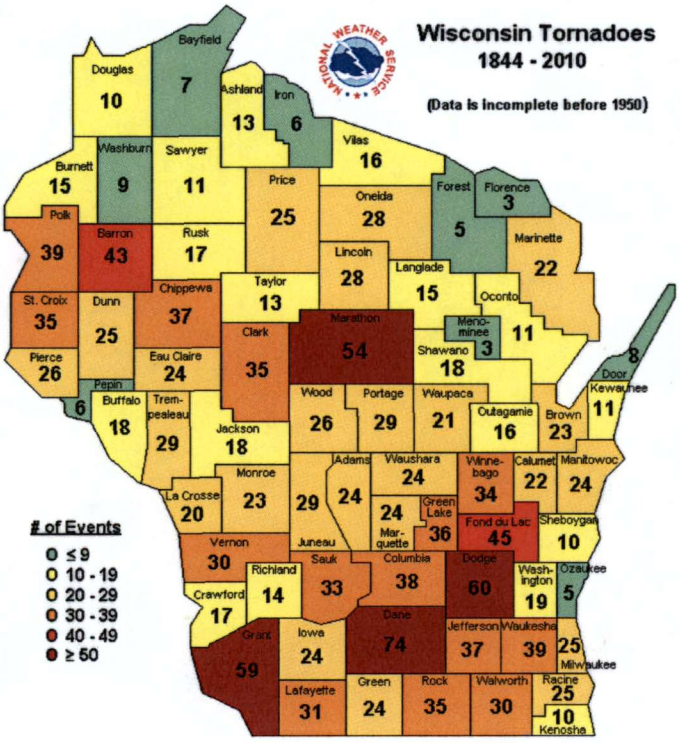
Map Produced: May, 2012

Portage County Planning & Zoning
1462 Strongs Ave
Stevens Point, WI 54481

Table 20: The Enhanced Fujita Tornado Scale

FUJITA SCALE			OPERATIONAL EF-SCALE	
F Number	Fastest 1/4-mile (mph)	3 Second Gust (mph)	**EF Number**	**3 Second Gust (mph)**
0	40-72	45-78	**0**	**65-85**
1	73-112	79-117	**1**	**86-110**
2	113-157	118-161	**2**	**111-135**
3	158-207	162-209	**3**	**136-165**
4	208-260	210-261	**4**	**166-200**
5	261-318	262-317	**5**	**Over 200**

Source: The EF-scale was unveiled by the NWS to the public and the full meteorological community early in 2006. On 1 February 2007, the Enhanced Fujita scale replaced the original Fujita scale in all tornado damage surveys in the United States. It is important to note that, despite the improvements, the EF-scale still remains a set of wind estimates based on 8 levels of damage to 28 different types of structures and vegetation. Above is a table comparing the estimated winds in the original F-scale and the operational EF-scale that is currently in use by the NWS.



Source: State Plan, 2011

Wisconsin lies along the northern edge of the nation's tornado belt, which extends north-eastward from Oklahoma into Iowa. Winter, spring, and fall tornadoes are more likely to occur in southern Wisconsin than in northern counties. Yet, tornadoes have occurred in Wisconsin during every month except February.

Wisconsin's tornado season runs from the beginning of April through September. The most severe tornadoes typically occur during April, May, and June. Many tornadoes strike in late afternoon or early evening. However, tornadoes have occurred at other times. Personal property damage, deaths, and injuries have and will continue to occur in Wisconsin due to tornadoes.

May 2011 tornado photo taken by Beth Neuenfeldt

Map 14 shows the physical location of confirmed tornadoes and their path taken between 1950 and 2011 (7/31/2011), according to the NCDC (National Climatic Data Center).

History and Probability Assessment

Over the past 61 years, Portage County has seen 22 confirmed tornadoes in various locations (Table 21 and Map 14). The most recent tornado activity occurred in 2011 when (according to NCDC http://www4.ncdc.noaa.gov/cgi-win/wwcgi.dll?wwevent~ShowEvent~867452) a tornado entered Portage County from Wood County at 6:20 pm. The tornado entered mainly over farmland and continued to snap trees and overturn agricultural irrigation systems. About six miles south of Plover, a nearly half-mile long row of power poles were bent over. The tornado crossed I-39 at Coddington Road two miles west of Keene, and grew to nearly 700 yards wide as it passed north of Keene and heavily damaged a farmstead. Several outbuildings were also damaged or destroyed, and along this path at least two dozen agricultural irrigation systems were overturned and damaged (resulting in $1 million in losses), along with many hundreds of trees snapped or uprooted. This area experienced high-end EF-1 damage with winds of 100 to 110 mph. The tornado dissipated about nine miles southeast of Plover at 6:46 pm. The average path width was 300 yards.

Photo taken by Portage County Sheriff's Office Deputy, Damage after Tornado in Town of Buena Vista, May 2011

In 2004, the County was struck by three tornadoes; no injuries or deaths were reported from these events. On April 3, 1956, Portage County experienced a tornado which passed through Bancroft and Amherst killing two and injuring two, the only recorded tornado deaths within the past 61 years. Portage County has been fortunate that over the years property damage and loss of life have been minimal.

Table 21: Reported Tornadoes in Portage County 1950-2011

	Date	Time	Location	Length (miles)	Width (yards)	Property Damage (in $1,000)	Deaths	Injures	F-scale
1	9/27/1951	3:45pm	SE T. Lanark	4	100	$250.00	0	0	F4
2	4/3/1956	12:50pm	SE Portage County	18	100	$250.00	2	2	F2
3	4/19/1957	4:00pm	SE Portage County	13	33	$25.00	0	0	F1
4	6/23/1962	7:00pm	Western T. Amherst	0	0	$0	0	0	F0
5	8/22/1964	2:00pm	NW T. Pine Grove/SW T. Buena Vista	6	333	$25.00	0	0	F2
6	6/7/1970	3:00pm	NE T. Pine Grove	2	100	$25.00	0	0	F2
7	12/1/1970	7:00am	Northern T. Hull	3	200	$25.00	0	0	F1
8	6/9/1974	2:45pm	NE T. Pine Grove	3	30	$2.50	0	0	F1
9	6/12/1976	8:30pm	Eastern V. Amherst	0	50	$25.00	0	0	F2
10	6/12/1976	9:00pm	NE T. Alban	0	50	$2.50	0	0	F1
11	6/13/1976	7:00pm	SE V. Plover / Northern T. Plover	0	50	$2.50	0	0	F2
12	6/13/1976	7:20pm	North T. Linwood/North St. Pt.	13	100	$25.00	0	2	F1
13	3/30/1982	2:40pm	SW to NE T. Linwood	10	33	$250.00	0	0	F1
14	4/27/1984	2:15pm	NW T. Buena Vista	6	20	$250.00	0	0	F2
15	5/8/1988	5:12pm	Western T. Buena Vista	1	20	$2.50	0	0	F0
16	5/16/1992	2:30pm	T. Buena Vista	1	400	$250.00	0	0	F1
17	5/16/1992	6:10pm	North T. Eau Pleine	11	400	$250.00	0	0	F2
18	10/8/1992	5:12pm	East T. Lanark	2	100	$250.00	0	0	F1
19	6/23/2004	6:46pm	NE T. Almond	2	25	$0	0	0	F1
20	6/23/2004	6:47pm	V. Plover/V. Whiting boundary	0	10	$0	0	0	F0
21	6/23/2004	6:53pm	Eastern T. Belmont	3	100	$200.00	0	0	F1
22	5/22/2011	5:20 PM	Kellner	19	700	$1.8 M	0	0	F1

Source: NCDC Climate data

Based on NCDC historic data presented above, Portage County can expect a tornado about once every 2.5 years, or a 36% chance per year, each costing on average $34,556 in damage. Table 22 describes the probability of a specific magnitude of tornado, based on past experiences between 1950-2011.

Average $ Damage/Tornado: Total damages ($) divided by the # of tornadoes = average damage/event

$ 2,111,800 / 22 = $95,990.90 Average Damage/Event

Annual Probability: # of Tornadoes divided by the # of years = Annual Probability

22 tornadoes / 60 years = 0.36 % Annual Probability

Estimated Future Annual Loss: Annual probability x average damage/event = estimated future annual loss.

0.36 * $95,990.90 = $34,556.73 Estimated Future Annual Loss

Table 22: Future Probability by specific magnitude of tornado

Tornado Scale	F0	F1	F2	F3	F4	F5
Number of Reported Tornadoes	3	11	7	0	1	0
Probability of Occurrence	13.6%	50.0%	31.8%	0.0%	4.5%	0.0%

Source: National Weather Service and Portage County Planning and Zoning Department

Vulnerability Assessment

Just over 41% of Portage County residents live in rural areas that consist of scattered small concentrations of low density residential development (rural villages and subdivisions), while the other sixty percent lives within the central Urban Area (City of Stevens Point, and Villages of Plover, Park Ridge and Whiting). Due to their concentrated development pattern, the Urban Area, rural villages, and subdivisions are considered vulnerable because they pose a greater threat to property damage, injury, and/or death. All areas of Portage County are vulnerable to tornadoes.

Source: State Plan, NOAA's National Weather Service Milwaukee/Sullivan, 2008

Table 23: Manufactured Homes per Municipality

Municipality	#
T. Alban	48
T. Almond	8
T. Amherst	15
T. Belmont	93
T. Buena Vista	31
T. Carson	13
T. Dewey	18
T. Eau Pleine	32
T. Grant	68
T. Hull	286
T. Lanark	98
T. Linwood	13
T. New Hope	22
T. Pine Grove	148
T. Plover	55
T. Sharon	28
T. Stockton	158
V. Almond	6
V. Amherst	8
V. Amherst Jct.	7
V. Junction City	50
V. Nelsonville	6
V. Park Ridge	0
V. Plover	255
V. Rosholt	0
V. Whiting	2
C. Stevens Point	280
Portage County	**1,748**

Source: American Community Survey Data, 2005-2009 DP04 5-yr Estimate

Manufactured homes have greater vulnerability to damage from tornadoes. According to the 2005-2009 American Community Survey, Portage County had 1,748 manufactured homes located throughout the County, some of which are concentrated into manufactured home parks. Table 23 breaks down the number of manufactured homes per municipality and Map 15 shows the locations of manufactured home parks.

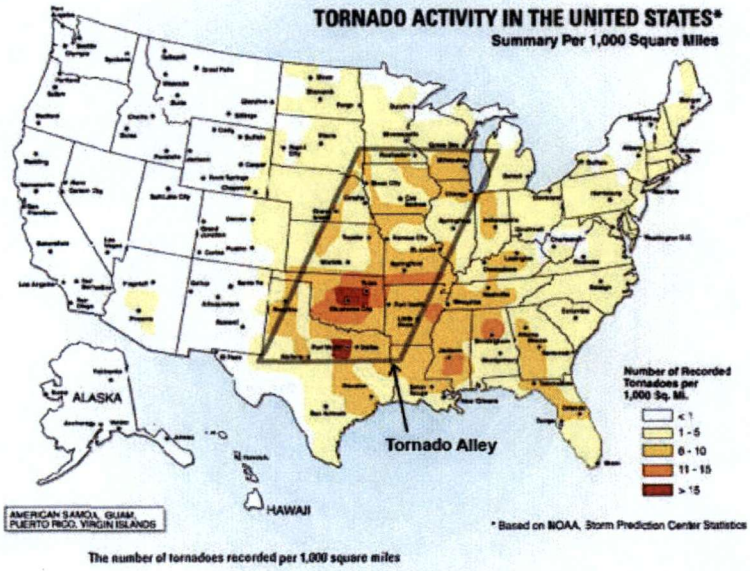
Campgrounds are also vulnerable during tornadoes, again, due to their concentration of people, vehicles, and structures. These can be found on Map 15.

Based on past occurrences within Portage County over the past 54 years, there are some areas that have seen more tornadoes than others, but the likelihood of an occurrence within any area of Portage County still exists. Tornadoes are a county-wide concern.

Table 24: Number of Portage County Tornado Watches and Warnings

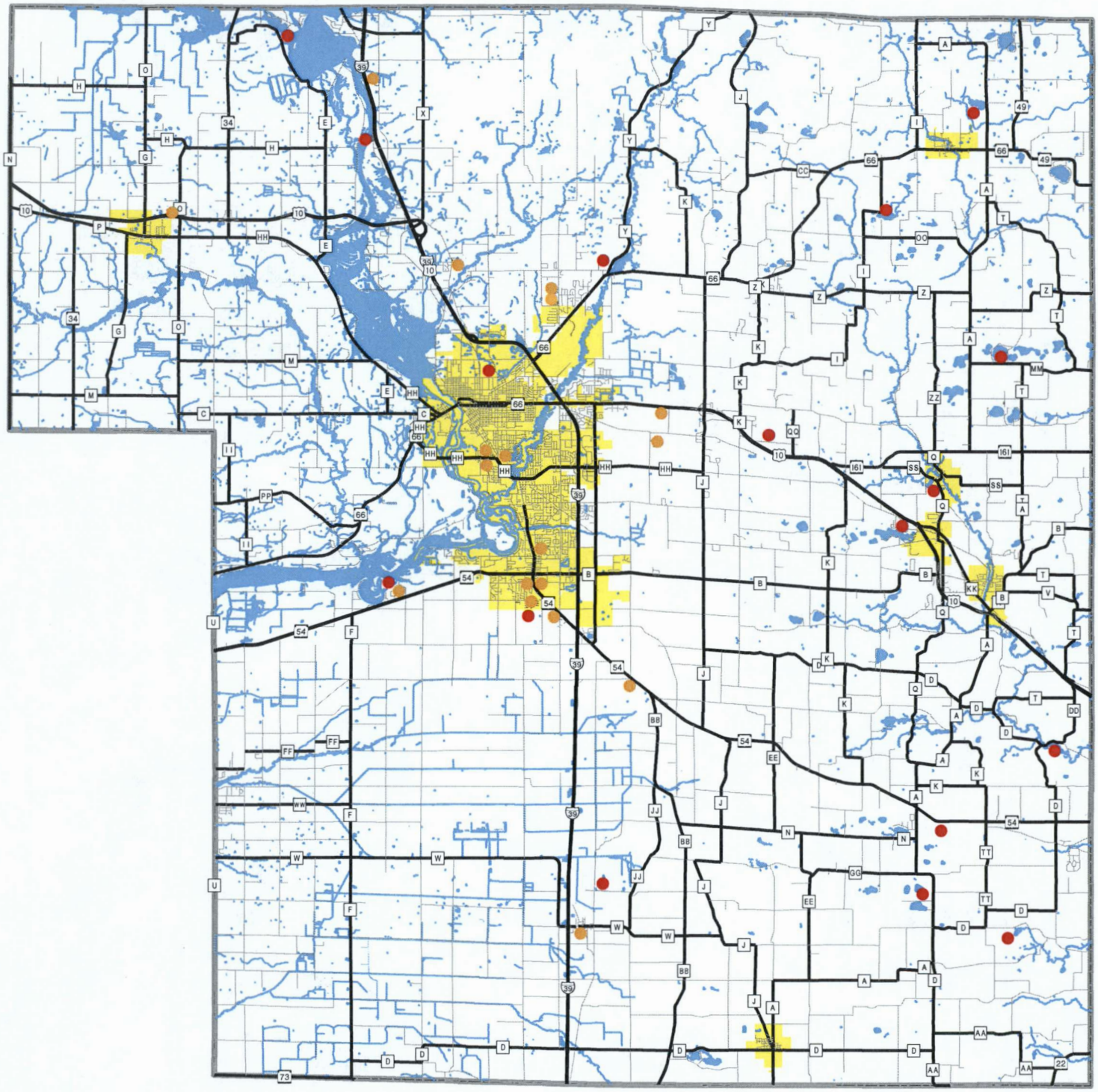
Year	# of Watches	# of Warnings
1990	6	0
1991	2	0
1992	3	1
1993	3	2
1994	6	1
1995	2	0
1996	7	2
1997	3	2
1998	9	0
1999	2	0
2000	1	1
2001	3	1
2002	1	0
2003	1	0
2004	3	2
2005	5	1
2006	0	0
2007	3	1
2008	3	0
2009	0	0
2010	2	2
2011	4	2

Source: National Weather Service



Source: NWS Storm Prediction Center, Norman, OK

Map 15: Mobile Home Parks & Campgrounds



● Mobile Home Park
● Campground

N
W E
S

0 1 2 4 Miles

Source: Portage County Planning & Zoning (2012)

Map Produced: May, 2012

Portage County Planning & Zoning
1462 Strongs Ave
Stevens Point, WI 54481

Severe Storms – Summer Events

Hazard Analysis

Thunderstorms - There are three distinct stages of development for thunderstorms: birth, growth, and maturity. In the first stage of development, an up-draft drives warm air up beyond condensation levels where clouds form. The second stage of development occurs as water vapors in the expanding cloud is raised to saturation levels, the air is cooled sufficiently to form solid and liquid particles of water, and rain begins to fall within the cloud.

A thunderstorm's mature stage is marked by a transition of wind direction within the storm cells. The prevailing up-draft, which initiated the cloud's growth, is joined by a down-draft generated by precipitation. Lighting may occur soon after precipitation begins. Hail, high winds and tornadoes may also develop during this stage.

A thunderstorm often is born, grows, reaches maturity, and dies within a thirty-minute period. The individual thunderstorm cell frequently travels between thirty and fifty miles per hour. Strong frontal systems may create one squall line after another composed of many individual thunderstorm cells. These fronts can often be tracked across the state from west to east with a constant cycle of birth, growth, maturity, and death of individual thunderstorm cells.

Hail - Studies of thunderstorms indicate that two conditions are required to develop a hailstorm: sufficient strong and persistent up-draft velocities; and liquid water accumulated in a super cool state in the upper parts of the storm. Injury and loss of life are rarely associated with hailstorms. However, extensive property damage is possible, especially to crops.

Hail from May 2011 tornado storm taken by Diana Pitcher (PC Maintenance)

Hail ranges in size from barely visible particles to grapefruit-sized dimensions. Hail may be spherical, conical, or irregular in shape and fall in swaths, which may be from twenty to one hundred miles long and five to thirty miles wide. A hail swath is not a large continuous path of hail, but generally consists of a series of hail cells, which are produced by individual thunderstorm clouds traveling in the same general area.

Lightning – Lightning is a phenomenon associated with thunderstorms. Lightning may extend from cloud to cloud, cloud to ground, or if there are high structures involved, from ground to cloud. The temperatures in a lightning strike rise to 50,000 degrees Fahrenheit. A sudden and violent discharge that occurs in the form of a lightning strike is over in a millionth of a second.

Lightning damage includes electrocution of humans and animals, fires or sudden power surges which cause damage to electrical or electronic equipment. Lightning kills more persons each year than hurricanes or tornadoes nationwide.

History and Probability Assessment

Table 25: Number of Portage County Severe Thunderstorm Watches and Warnings

Year	# of Watches	# of Warnings
1988	6	4
1989	5	4
1990	11	2
1991	7	4
1992	6	9
1993	6	3
1994	9	5
1995	16	9
1996	5	8
1997	4	7
1998	9	13
1999	10	5
2000	10	5
2001	3	7
2002	11	8
2003	8	2
2004	6	10
2005	8	7
2006	9	9
2007	8	8
2008	5	10
2009	2	3
2010	8	10
2011	11	17

Source: National Weather Service

Thunderstorm frequency is measured in terms of incidents observed per day. Wisconsin averages between thirty and forty-five thunderstorms per year. In Portage County, there are typically seven (7) severe thunderstorms per year.

Thunderstorms can occur throughout the year, with the highest frequency during the months of May through September. The majority of the storms occur between the hours of noon and midnight.

Wisconsin averages two to three hail days per year. Hailstorms usually occur from May through August. Most of the hail damage is in the rural area as these four months also correspond to the growing and harvesting seasons for most crops. The NCDC has identified 64 hail events in Portage County between 1950 and 2011, with hail ranging in sizes of 0.75 inches to 3 inches.

Nationwide, forty-five percent of the persons killed by lightning have been outdoors, about sixteen percent occur under trees, six percent on heavy road equipment, and thirty-three percent at various unknown locations. Less than ten percent of the deaths involved individuals inside buildings. These are primarily due to lightning-caused fires.

Wisconsin has a high frequency of property losses because of lightning. Insurance records show that annually one out of every fifty farms have been struck by lightning or have had a fire which may have been caused by lighting. Generally, rural fires are more destructive than urban fires because of limited protection devices, isolation, longer fire fighting response times, and inadequate water supplies. Specific data on dates,

locations, property damage, injuries or deaths in Portage County from lightning are not available.

Vulnerability Assessment

The NCDC reported 98 confirmed thunderstorms in Portage County since 1950 with $4.766 million of property damage and $502,000 of crop damage. The most recent severe thunderstorm event occurred in the Stevens Point Urban Area on July 19, 2011. Hundreds of trees were blown down or had broken branches and limbs. The City of Stevens Point lost $108,000 worth of city-owned trees in the storm. One home was destroyed, 8 were heavily damaged and 72 sustained minor damage from the storm. The storm left 17,000 customers without electrical power.

Another thunderstorm (June 3, 2004) produced severe weather in central and east central parts of Wisconsin. The storms damaged several buildings 4 miles west of Stevens Point, dropped quarter-sized hail in Plover, and as the storms moved through Portage County, three tornadoes touched down. One of the tornadoes caused minor tree damage in an industrial park in Stevens Point. Eyewitnesses observed water being sucked out of a pond at the same time as doors to an office were sucked open. Another tornado downed several trees, knocked down a fence, damaged the roof of a house and damaged some outbuildings as it passed north of Almond. The third tornado was the strongest and was on the ground intermittently for 10 miles from southeast Portage County into southwest Waupaca County. It downed trees and overturned an irrigation system in Portage County.

Hail and associated summer storms can cause severe damage to structures, personal property and down power lines, leaving isolated areas without electrical service. All areas of Portage County are vulnerable to hail and the damage it may cause. Residents should be aware of National Weather Service Warnings and Watches, which predict lines of severe weather. "A watch means severe weather is possible during the next few hours, while a warning means that severe weather has been observed, or is expected soon" (Source: http://www.spc.noaa.gov/faq/#2.4).

Between 1997 and 2011 the NCDC reported numerous lightning strikes across Portage County. There are no specific areas of Portage County that have a higher risk of lightning strikes; all areas need to be aware of the possibility.

Severe Storms – Winter Events

Hazard Analysis

Winter storms include a variety of weather phenomena. Wisconsin residents are most familiar with heavy snow storms, blizzards, sleet, and ice storms. The winter storm season generally runs from November to April in Wisconsin.

A snowfall with accumulation of four or more inches in a twelve-hour period is considered a heavy snowfall. The majority of Wisconsin snowfalls are between one and

three inches per occurrence. However, heavy snowfalls that produce at least ten inches may occur four or five time per season.

A storm with sustained wind speeds in excess of thirty miles per hour accompanied by heavy snow or large amounts of blowing or drifting snow is classified as a blizzard. Areas of northwestern Wisconsin encounter more blizzards than southeastern portions of the state.

An ice storm occurs when rain, falling out of the warm and moist upper layers of the atmosphere, comes into contact with a cold and dry layer near the ground. The rain freezes on contact with the ground and accumulates on exposed surfaces. Damage can occur if a half inch of rain freezes on trees and utility wires, especially if accompanied by high winds. In contrast, a sleet storm involves frozen rain drops or pellets which do not cling to surfaces. An accumulation of these pellets can make driving hazardous.

History and Probability Assessment

Snowfall in Wisconsin varies between thirty inches in the southern counties to one hundred inches in the north. Portage County averages 44 ½ inches each year. Storm tracks which originate in the southern Rockies or plain states, and move north-eastward produce the heaviest precipitation (typically six to twelve inches). Meanwhile low-pressure systems originating in the northwest (Alberta) tend to produce only light snowfalls (generally two to four inches). Those snowfalls associated with the Alberta lows occur more frequently with colder weather.

Table 26: Average Snow Fall

Element	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANN
Snow(in)	11.6	7.8	7.1	1.9	0.0	0.0	0.0	0.0	0.0	0.1	4.6	11.4	44.5

Source: WI State Climatology Office 1971-2000 averages - Station: 478171 Stevens Point WI

Although massive blizzards are rare in Wisconsin, blizzard-like conditions often exist during heavy snowstorms when gusty winds cause blowing and drifting of snow.

Both ice and sleet storms can occur at any time throughout the winter seasons from November to April. Ice storms of disastrous proportions occurred in central Wisconsin in February 1922 and in southern Wisconsin in March 1976. A Presidential Disaster Declaration was obtained as a result of the 1976 storm. Utility crews from surrounding states were called in to restore power, which was off up to ten days in some areas. Other storms of lesser magnitude have caused power outages and treacherous highways.

On February 20, 2011 an all time two-day February snowfall record was broken for Stevens Point with a total accumulation of 15.8 inches. In January of 2000, a band of heavy snow developed across central and west-central Wisconsin leaving some of the highest snowfalls in Plover (12 inches).

According to NCDC; 60 snow and ice storms were reported in Portage County between January 13, 1993 through April 19, 2011. These storms included heavy snow, ice, freezing rain, and/or glaze. In the 18 years between 1993 and 2011, Portage County averaged just over 3 major storms each year. The future probability of storms can be based on these events.

Vulnerability Assessment

Winter storms in Wisconsin are inevitable, and residents should be reminded that such storms can cause severe damage to property, power outages, etc. All areas of Portage County are prone to the effects of winter weather events and all communities should be prepared for such events.

High Wind Events

Hazard Analysis

High wind events can be associated with a number of other natural hazards, from severe thunderstorms, blizzards and winter storm events to tornado events. Specific analysis only directed to high wind events is not readily available. High wind events were previously included with Tornado events, but during this 2012 update, it was determined to begin to separate it out, due to the fact that high wind events can happen throughout the year, and have wide-spread damage associated with them.

The National Climatic Data Center (NCDC) identifies **High Winds** as: Sustained non-convective winds of 35 knots (40 mph) or greater lasting for 1 hour or longer or winds (sustained or gusts) of 50 knots (58 mph) for any duration (or otherwise locally/regionally defined), on a widespread or localized basis. In some mountainous areas, the above numerical values are 43 knots (50 mph) and 65 knots (75 mph), respectively. The High Wind event name will not be used for severe local storms, tropical cyclones, or winter storm events. Inland offices which experience high winds/damage associated with tropical cyclones will document such winds under the Tropical Storm or Hurricane/ Typhoon category, as appropriate, not under the High Wind category. Events with winds less than the High Wind event threshold numbers, resulting in fatalities, injuries, or significant property damage, will be encoded as a **Strong Wind** event.

Strong Wind: Non-convective winds gusting less than 50 knots (58 mph), or sustained winds less than 35 knots (40 mph), resulting in a fatality, injury, or damage. Consistent with regional guidelines, mountain states may have higher criteria. A peak wind gust (estimated or measured) or maximum sustained wind will be entered. Inland counties/parishes which experience strong winds/damage associated with tropical cyclones will be documented under the Tropical Depression or Tropical Storm category, as appropriate, not as a Strong Wind event. Events over large inland lakes (with no specific, assigned Marine Forecast Zone number) that meet Strong Wind criteria will be entered as a Strong Wind event, rather than a Marine Strong Wind event.

History and Probability Assessment

The NCDC has reported 15 'strong wind' events from September 29, 1997 through October 31, 2011. In addition, 5 'high wind' events have also been reported from November 18, 1994 through October 31, 2011.

On April 9, 2001, high winds downed numerous trees, tree limbs and power poles across central, east central and northeast Wisconsin. The wind removed part of the roof of a building in Rosholt and knocked over billboards in Outagamie County. The winds with this storm developed grass fires in counties surrounding Portage County.

On April 6, 1997 a strong cold front ushered in wind gusts over 50 mph across much of northeast Wisconsin. Many trees were reported down, signs were blown over and power was lost. A fishing boat was overcome by the high winds and waves on the Wisconsin River two miles south of the Du Bay dam in Portage County. A 67 year old male drowned, two others in the boat survived.

Over the past 17 years, Portage County has seen combined total of 20 High Wind and Strong wind events, Over one event a year. The probability of future events will more than likely be consistent with past events, more than one event a year.

Vulnerability Assessment

High wind events are inevitable and can be associated with a number of other Natural Hazards, residents should be reminded that such storms can cause severe damage to property, power outages, etc. All areas of Portage County are prone to the effects of high wind events and all communities should be prepared for such events.

Flooding

Hazard Analysis

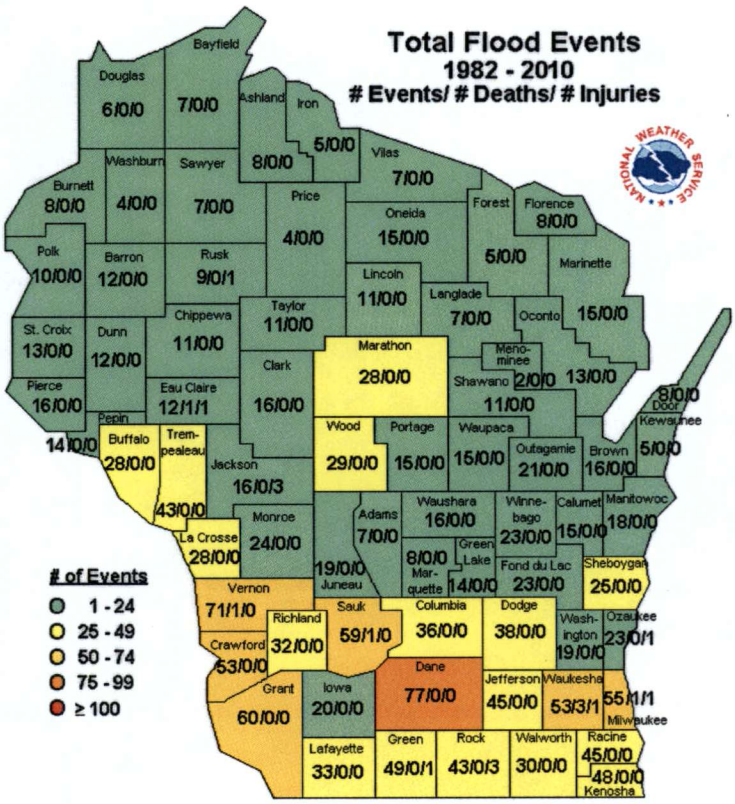
Flooding is defined as a general condition of partial or complete inundation of normally dry land from the overflow of inland waters, or the unusual and rapid accumulation or run-off of surface waters from any source.

Terms commonly used when referring to flooding are "100-year flood" and "flood plain". A "100-year flood" is defined as the flood water level which can be expected to occur or be exceeded in a given location once every 100 years. There is a one percent chance of a flood of such magnitude or greater occurring in a given year. The Wisconsin Department of Natural Resources (WiDNR), working with local zoning offices, has designated flood plain areas as those places where there is the greatest potential for flooding. Delineation of these areas is based on land elevation. Portage County flood plan maps were updated in 2009 as part of the State Map Modernization Plan, in which FEMA re-issued more detailed maps. (See State Plan for more information).

Major floods in Wisconsin have, for the most part, been confined either to specific streams or to locations which receive intense rainfall in a short period of time. Flooding which occurs in the spring due to snow melt and/or prolonged period of heavy rain is characterized by a slow buildup of flow and velocity in rivers and streams over a period of days. This buildup continues until the river or stream overflows its banks, for as long as a week or two, then slowly recedes. Generally, the timing and location of this type of flooding is fairly predictable and allows ample time for evacuation of people and property.

The type of flooding which occurs solely from surface run-off as a result of intense rainfall is referred to as flash flooding. Flash flooding occurs less frequently in Wisconsin than flooding associated with spring snow melt. However, spring snow melt flooding is unpredictable. For prediction and warning purposes, floods are classified by the National Weather Service into two types: those that develop and crest over a period of approximately six hours or more, and those that crest more quickly. The former are referred to as "floods" and the latter as "flash floods". Generally, the amount of damage from flooding is a direct consequence of land use. If the ground is already saturated, stripped of vegetation, or paved, the amount of run-off increases, adding to the flooding.

Another factor to consider is the potential of dam failure. For this update dam failure has been separated out from flooding. A complete analysis and information on dam failure in Portage County can be seen on page 73.



Source: NOAA NWS Milwaukee/Sullivan WFO, State of Wisconsin Hazard Mitigation Plan shows the county-by-county distribution of flood events across Wisconsin for the period of 1982-2007. Within each county are three numbers: the first number is the number of flood events, followed by the number of directly-related fatalities, and the number of directly-related injuries.

September 2010 Flood photo, Little Chicago Road, Town of Linwood

History and Probability Assessment

Wisconsin has experienced several major floods during the last two decades. The 1973, 1986 and 1993 floods revealed that few floodplains or urban areas in Wisconsin can be considered safe from flood damages.

Portage County historically has not had a serious flooding problem as there are no structures reported in the Repetitive Loss Report. Flooding from rivers, streams, and creeks has been minimal for the past 10 year period. However, there has been some localized flooding primarily caused by heavy rainfall and run-off. The most recent example of flooding in Portage County is the September 2010 event that affected the City of Stevens Point, Towns of Carson, Eau Pleine, Hull, Plover, and Linwood. Portage County incurred additional costs due to damaged roads and protective measures. The Federal Emergency Management Agency (FEMA) reimbursed Portage County's affected municipalities in total $416,966.26. Additional information on this event can be found at http://www.fema.gov/news/eventcounties.fema?id=13452.

Some areas of Portage County, outside mapped floodplains, are subject to flooding in seasons when excessive precipitation or rapid snowmelt overwhelms the ability of the soil to accept the water. This phenomenon is compounded by the fact that the level of the groundwater fluctuates on approximately a 10-11 year cycle.

When the groundwater is at its multiyear peak and the ground cannot accept all of the excessive precipitation or rapid snowmelt, the excess water on the surface moves into lower lying places on the normally dry landscape. Basements, wells, and septic systems can be flooded, and lower lying areas accumulate significant quantities of water.

Areas in the Towns of Grant, Pine Grove, Linwood, and Carson have been regularly affected in the spring, and in 1993, most of the County's municipalities west of the moraine were affected to some degree throughout the summer and fall. In August and September of 2010 and 2011, record rainfalls caused similar flooding during the fall. Once the surface water has saturated the ground to its maximum capacity, and has dissipated to lower areas of the landscape, it takes weeks to months for the groundwater levels to drop back to normal and flooded basements to be usable again. Water on the surface can move hundreds of feet per day, while groundwater can flow laterally only a few feet per day.

Map 6, identifies Shallow Groundwater. It can help identify those areas in Portage County that are outside of the floodplain that still experience flooding and issues associated with flooding due to groundwater

Table 27: Recent Floods Reported in Portage County

Date	Location and Description
1983	Town of Linwood, Section 6 County II and Bear Creek
1983	Town of Linwood, Section 3 & 4 Bear Creek
1986	Town of Carson, Section 3, River Road
1986	Town of Linwood, Section 34, along Mill Creek
1993	Towns of Hull, Grant, Stockton, Village of Plover, and other areas experienced high groundwater due to heavy spring rains
1993	Areas along the Wisconsin River were affected by higher than normal river flow. Towns of Eau Pleine, Linwood, Carson, and Plover etc.
1997	Heavy winter snow along with above normal soil moisture and lack of frost created a spring flood potential for moderate to high river flow. Portage County experienced high river flows in early April, which resulted in one drowning.
2002	Severe storms and heavy rains totaling 5-10 inches over a two day period in June caused flash flooding in Linwood, Carson, Eau Pleine, Junction City, Plover and other locations throughout Portage County.
2004	May 19th through June, Severe storms with heavy rainfall amounts caused flooding in several municipalities throughout Portage County. Specifically: Towns of Hull, Carson, Plover, Grant, Stockton, Buena Vista, Pine Grove, Village of Whiting, and City of Stevens Point. Individual Assistance was granted by a Presidential Declaration. However, Public Assistance was denied to the municipalities.
2010	Unusually high amounts of precipitation during the summer of 2010 saturated soils. A heavy rainfall in late September resulted in high river flows and substantial flooding in the towns of Eau Pleine, Linwood, Carson, Plover and the City of Stevens Point. A presidential Disaster Declaration was awarded to assist in recovery efforts
2011	April of 2011 heavy rain and spring melt caused flooding for the following municipalities; Towns of Plover, Pine Grove, Hull Linwood, and Grant. Significant road damage occurred for some of these towns.

Source: Portage County Emergency Management Department

On September 23, 2010 heavy rain fell across Portage County, causing rivers and streams to overflow their banks, washing out roads and damaging homes and businesses. Much of the county had in excess of 4 inches of rain, after a summer of unusually high amounts of precipitation that saturated soils. The highest recorded total was 5.65 inches at Stevens Point. County crews sandbagged several roads in the northwest part of the County. The flooding caused minor damage to 36 homes and 2 businesses and major damage to 1 home.

National Flood Insurance Program Claims

In 1968, Congress adopted the National Flood Insurances Act, which among other things created the National Flood Insurance Program (NFIP). This federal program allows property owners to purchase flood insurance if their community participates in the program. Those homeowners with mortgages backed by a federal program must purchase flood insurance when their property is located in the regulatory floodplain. In Portage County those residents that reside in Village of Amherst, Village of Nelsonville, Village of Plover, Village of Rosholt, Village of Whiting, City of Stevens Point, and Portage County, are eligible to purchase flood insurance because their municipality participates in the program. The Village of Park Ridge (as identified in the NFIP Loss Statistics information) does not participate in the National Flood Program and its residents are not eligible to purchase flood insurance. Other municipalities of Portage County are not specifically listed as participating or not participating.

Table 28: NFIP Loss Statistics as of 09/30/2011

Community	Total Losses	Closed Losses	Open Losses	CWOP	Total Payments
Village of Amherst	1	1	0	0	$579.88
Village of Rosholt	1	0	0	1	$0
City of Stevens Point	7	3	0	4	$14,165.76
Portage County	9	7	0	2	$131,192.43
Total	**18**	**11**	**0**	**7**	**$145,938.07**

Source:bas.nfipstat.com/reports/1040.htm, Wisconsin Emergency Management Department

The number of paid claims for flood damage under the NFIP is a good indicator of the extent of flooding in a community/County and the number of affected properties. Through September 30, 2011, 11 insurance claims were paid in Portage County totaling $145,938.04. The majority of payments have been made to residents in rural Portage County.

Table 29: NFIP Policy Statistics as of 09/30/2011

Community	Policies In-Force	Ins In-Force Whole $	Written Premium In-Force
Village of Amherst	4	$327,000	2,628
Village of Rosholt	5	471,400	2,538
Village of Plover	4	$980,000	1,421
City of Stevens Point	164	$21,318,500	148,689
Portage County	56	$9,024,900	37,461

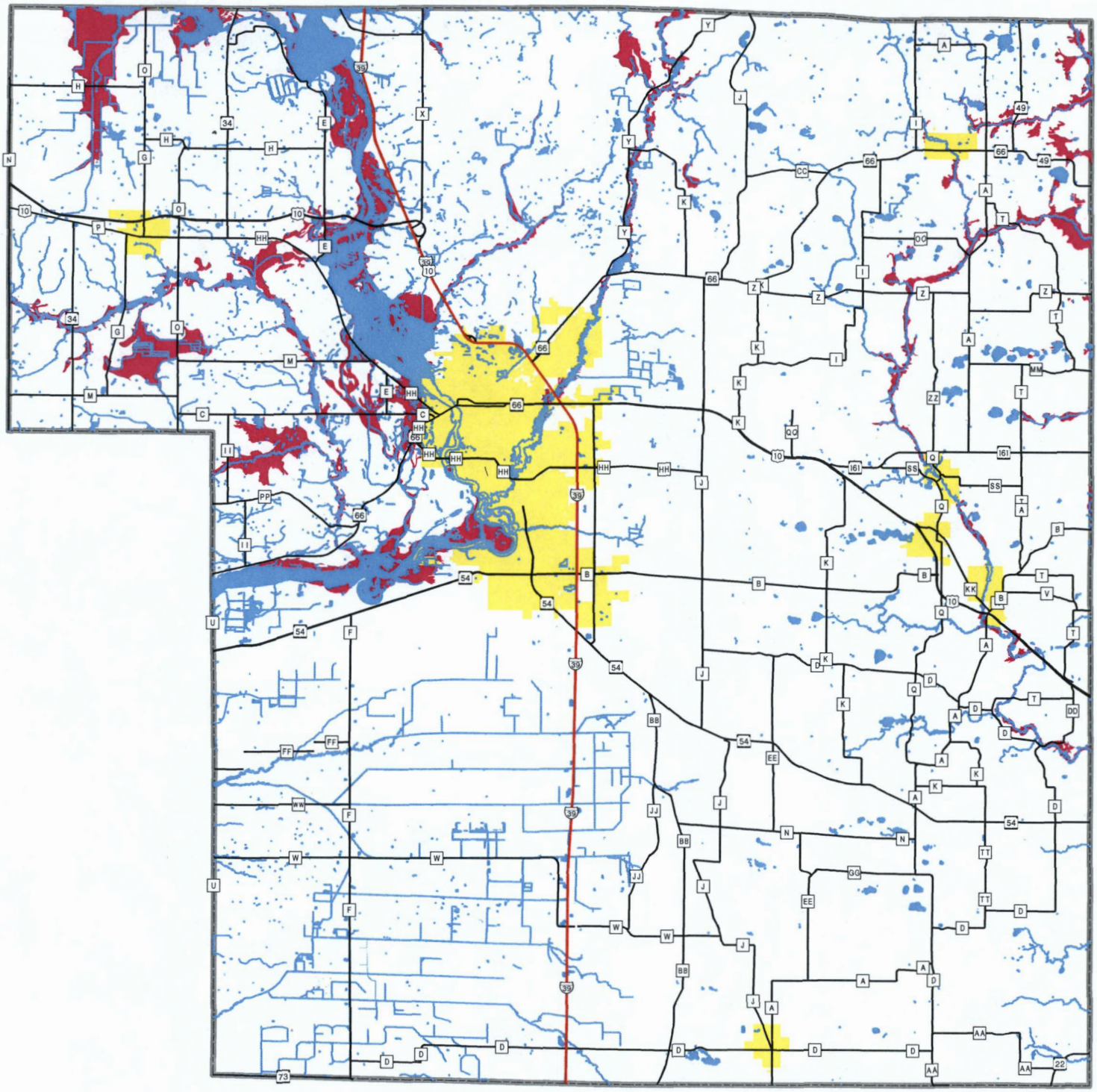
Source: http://bas.nfipstat.com/reports/1011.ht , Wisconsin Emergency Management Department

Review of Vulnerable Structures in Portage County

To determine the number of structures in Table 30 below, Portage County Planning and Zoning Department incorporated the 2009 FEMA floodplain maps into a GIS coverage for the County. Structure locations were overlaid with the FEMA floodplain boundaries to determine the number of structures, by municipality, which may be impacted by flooding. Current assessment data were used to determine structure values by code. While this has a low probability of occurring, it is a worst case scenario for which to plan. Structures that have been removed from the floodplain by a FEMA Letter of Map Amendment (LOMA) were not included in this analysis.

Field surveys would be required to determine a structure's precise relationship to the floodplain. Some structures may be found to be outside the flood hazard areas, and some others may be inside a floodplain based upon detailed field survey data. At the time this information becomes available, a more thorough analysis of structures within the floodplains of Portage County will be conducted and will be incorporated into this plan.

Map 16: Floodplain



100 Year Floodplain

N
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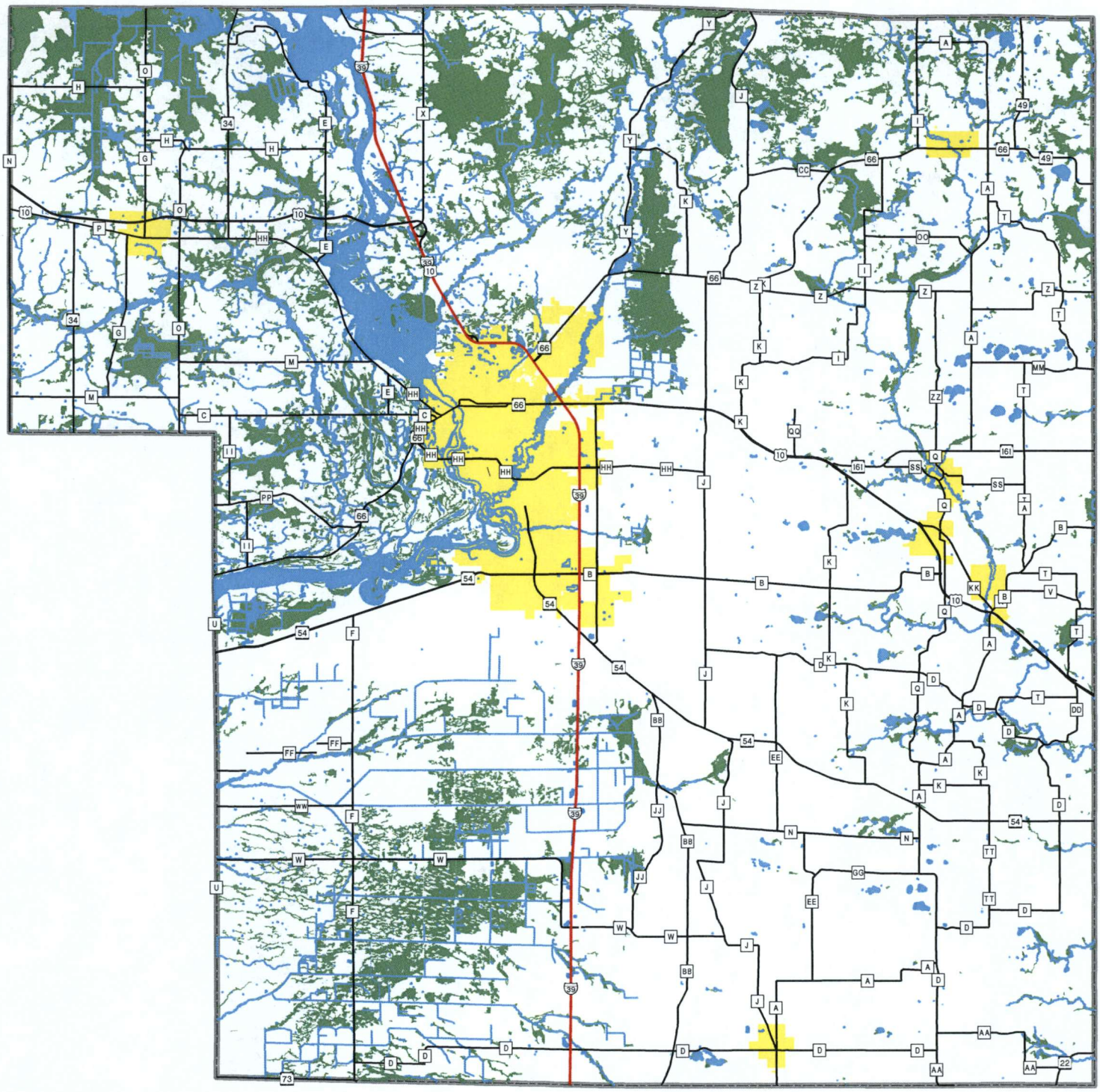
0 1 2 4 Miles

Source: Portage County Planning & Zoning (2012)
Federal Emergency Mgmt. Agency (2009)

Map Produced: May, 2012

Portage County Planning & Zoning
1462 Strongs Ave
Stevens Point, WI 54481

Map 17: Wetlands



Wetlands

N
W E
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0 1 2 4 Miles

Source: Portage County Planning & Zoning (2012)
DNR - Wisconsin Wetland Inventory (1986)

Map Produced: May, 2012

Portage County Planning & Zoning
1462 Strongs Ave
Stevens Point, WI 54481

Table 30: Number of Structures in Floodplain and Potential Loss Estimate

Municipalities	Structures in the Floodplain	Residential	Commercial	Industrial	Other	Estimated Improvement Value
Floodplain*						
C. of Stevens Point	263	$19,945,000	$15,398,700	$0	$0	$35,343,700
V. of Almond	0	$0	$0	$0	$0	$0
V. of Amherst	0	$145,400	$279,000	$0	$0	$424,400
V. of Junction City	0	$0	$0	$0	$0	$0
V. of Nelsonville	2	$141,000	$59,600	$0	$0	$200,600
V. of Park Ridge	0	$0	$0	$0	$0	$0
V. of Plover	1	$0	$0	$0	$0	$0
V. of Rosholt	29	$1,421,600	$588,800	$0	$0	$2,010,400
V. of Whiting	1	$0	$0	$6,288,100	$0	$6,288,100
T. of Alban	11	$505,200	$0	$0	$0	$505,200
T. of Almond	0	$0	$0	$0	$0	$0
T. of Amherst	6	$724,600	$25,000	$0	$0	$749,600
T. of Belmont	0	$0	$0	$0	$0	$0
T. of Buena Vista	0	$0	$0	$0	$0	$0
T. of Carson	48	$5,974,000	$1,002,000	$0	$0	$6,976,000
T. of Dewey	4	$601,500	$0	$0	$0	$601,500
T. of Eau Pleine	31	$7,486,800	$0	$0	$84,900	$7,571,700
T. of Grant	0	$0	$0	$0	$0	$0
T. of Hull	1	$0	$0	$0	$178,500	$178,500
T. of Lanark	6	$359,500	$0	$0	$0	$359,500
T. of Linwood	46	$3,878,800	$230,600		$12,000	$4,121,400
T. of New Hope	3	$393,100	$0	$0	$0	$393,100
T. of Pine Grove	0	$0	$0	$0	$0	$0
T. of Plover	15	$1,043,000	$0	$0	$0	$1,043,000
T. of Sharon	2	$188,000	$0	$0	$0	$188,000
T. of Stockton	0	$0	$0	$0	$0	$0
Total	**469**	**$42,807,500**	**$17,583,700**	**$6,288,100**	**$275,400**	**$66,954,700**

*Source: Portage County Planning and Zoning Department. * Note some structures were not included due to not having an improvement value*

Vulnerability Assessment

The NCDC reported 12 flood events in Portage County between 1996 and 2011. Over that 15 year period, less than one storm event a year occurred. These reported cases totaled $1.7 million in damage to property and $56 million in crop damage. Areas in Portage County that have a higher vulnerability to flooding include those municipalities

in close proximity to the Wisconsin, Plover and Little Plover Rivers, along with areas that have shallow depth groundwater (Map 6).

HAZUS_MH Information

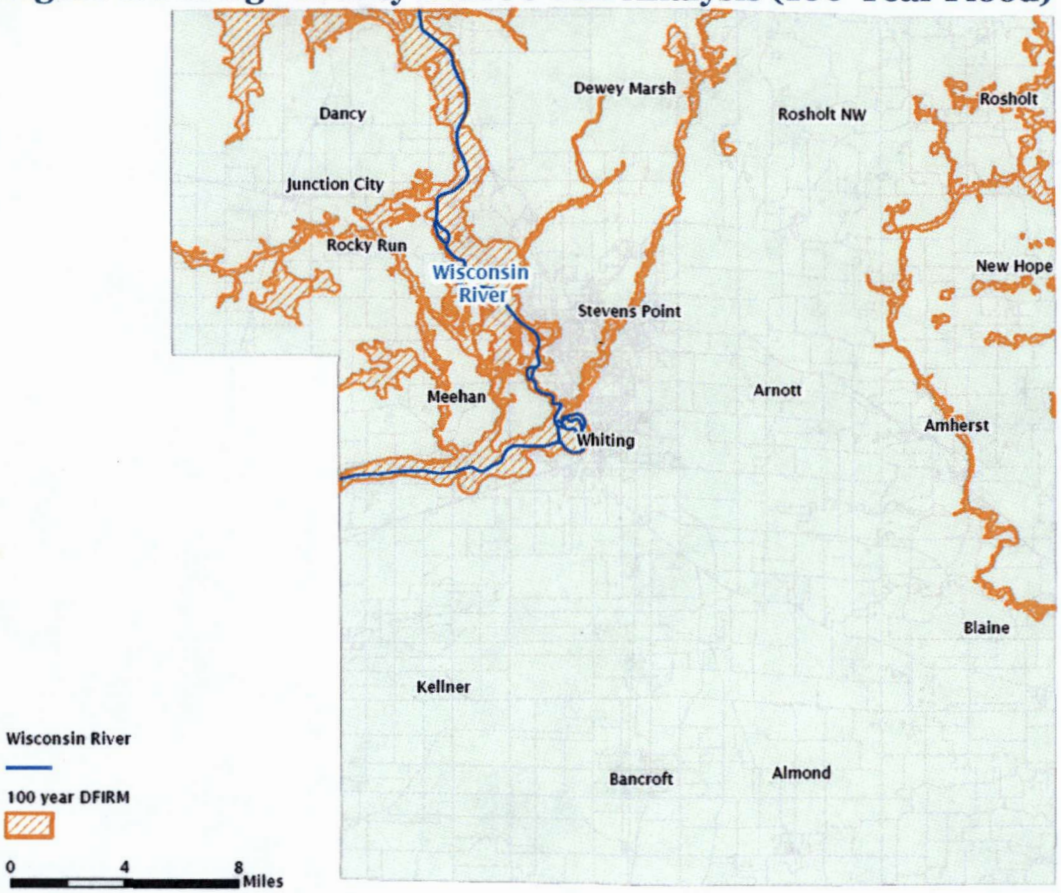
The Wisconsin Emergency Management Department staff conducted flood analysis for Portage County using HAZUS-MH MR3 released in July 2007. The bundled aggregate general building stock was updated to Dun & Bradstreet 2006. Building valuations were updated to R.S. Means 2006. Building counts based on census housing unit counts are available for RES1 (single-family dwellings) and RES2 (manufactured housing) instead of calculated building counts.

The site specific inventory (specifically Schools, Hospitals, Emergency Operation Centers, Fire Stations and Police Stations) were updated using the best available statewide information.

HAZUS-MH was used to generate the flood depth grid for a 100-year return period calculated by clipping the USGS 30, DEM to the DFIRM boundary (at the time of this analysis the Portage County DFIRM was not yet officially finalized).

Figure 1 depicts the flood boundary from the HAZUS-MH analysis. The majority of damages due to flooding occur along the Wisconsin River. Seventy-five percent of the reported total losses occur in census blocks located within the Wisconsin River floodplain boundary.

Figure 1: Portage County HAZUS-MH Analysis (100-Year Flood)



HAZUS-MH Aggregate Loss Analysis

HAZUS-MH was used to estimate the damages for a 100-year flood event in Portage County. An estimated 59 buildings will be damaged totaling $27 million in building losses. The total estimated number of damaged buildings, total building losses, and estimated total economic losses are shown in Table 31.

HAZUS-MH estimates 308 census blocks with losses exceeding $1 million. The distribution of losses is shown in Figure 1.

HAZUS-MH aggregate loss analysis is evenly distributed across a census block. Census blocks of concern should be reviewed in more detail to determine the actual percentage of facilities that fall within the flood hazard areas. The aggregate losses reported in this study may be overstated. Examples are provided in Figure 1.

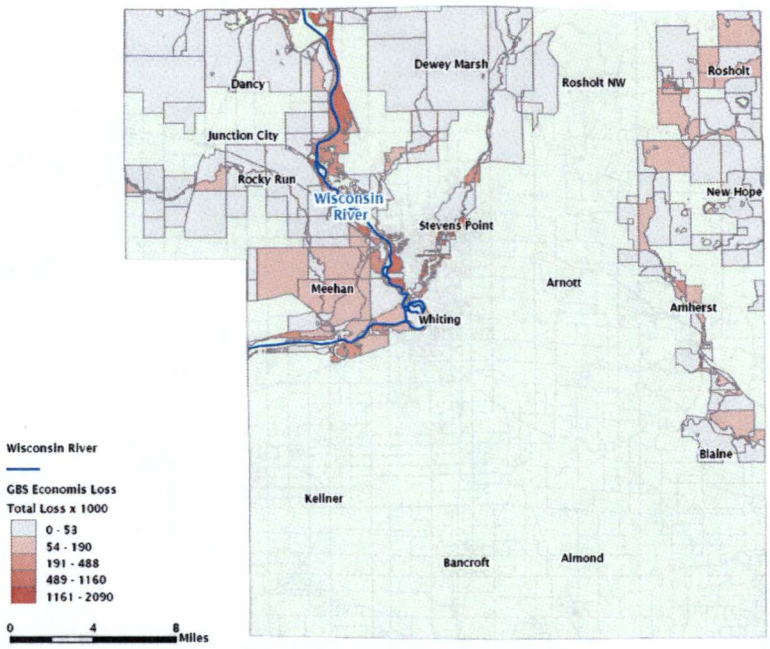
Table 31: Portage County Total Economic Loss – 100-Year Flood

General Occupancy	Estimated Total Buildings	Total Damaged Buildings	Total Building Exposure X 1000	Total Economic Loss X 1000	Building Loss X 1000
Agricultural	3	0	$68,583	$1,910	$501
Commercial	182	0	$731,250	$12,006	$3,278
Education	1	0	$62,274	$1,714	$253
Government	2	0	$17,232	$474	$40
Industrial	11	3	$180,047	$16,692	$3,804
Religious/Non-Profit	4	0	$79,153	$2,561	$351
Residential	22,010	56	$3,663,733	$32,041	$19,390
Total	**22,213**	**59**	**$4,802,272**	**$67,398**	**$27,617**

Source: 2008 Wisconsin Emergency Management Department HAZUS-MH

The reported building counts should be interpreted as degrees of loss rather than as exact numbers of buildings exposed to flooding.

Figure 2: Portage County Total Economic Loss – 100-Year Flood



Source: 2008 Wisconsin Emergency Management Department HAZUS-MH

These numbers were derived from aggregate building inventories which are assumed to be dispersed evenly across census blocks. HAZUS-MH requires that a predetermined amount of square footage of a typical building sustain damage in order to produce a

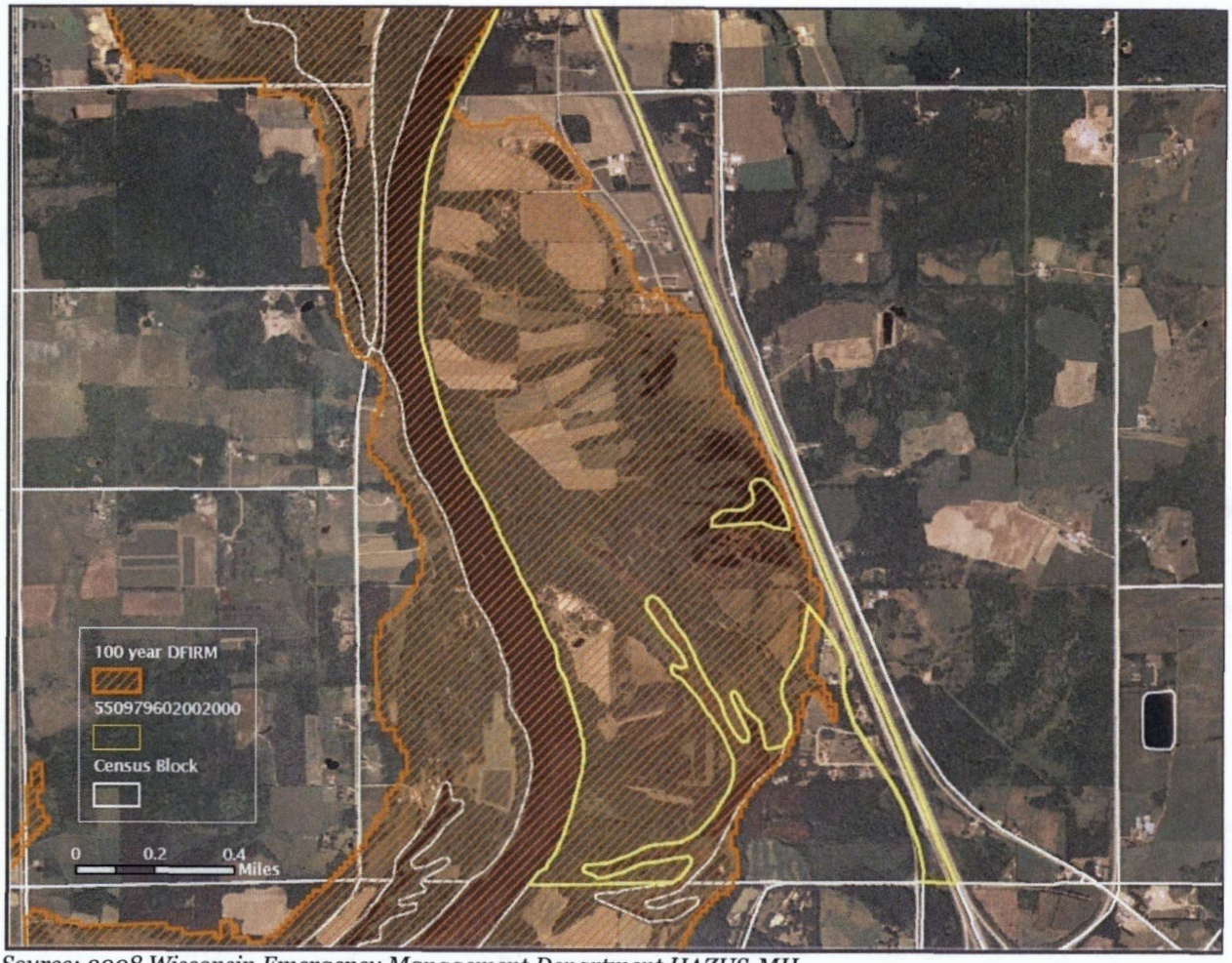
damaged building count. If only a minimal amount of damage to buildings is predicted, it is possible to see zero damaged building counts while also seeing economic losses.

Figure 3: Flood Damage Exposure in Stevens Point

Source: 2008 Wisconsin Emergency Management Department HAZUS-MH

Figure 3 shows census blocks and flood boundary displayed over an orthophoto of Stevens Point. Census Block 5550979605004096 has an estimated building loss of $295 thousand with a combined replacement cost of $645 thousand. However, the orthophoto shows no buildings located in the floodplain boundary.

Figure 4: Flood Damage Exposure in Dewey



Source: 2008 Wisconsin Emergency Management Department HAZUS-MH

Figure 4, shows census blocks and flood boundary displayed over an orthophoto of Dewey. Census block 550979602002000 has an estimated building loss of $573 thousand with a combined replacement cost of $890 thousand. HAZUS-MH estimates that 18 buildings are within the calculated flood boundary for this block. However, the orthophoto shows this area to be mainly forest and agricultural lands.

HAZUS-MH Essential Facility Loss Analysis

An essential facility would encounter many of the same impacts as any other building within the flood boundary. These impacts include: structural failure, extensive water damage to the facility and loss of facility functionally (i.e. damaged police station will no longer be able to serve the community).

The HAZUS-MH analysis identified no essential facilities subject to flooding.

Table 32: Portage Essential Facility Loss – 100-Year Flood

Class	Building Count	At Least Moderate Damage	At Least Substantial Damage	Loss of Use
Care Facilities	3	0	0	0
EOC	1	0	0	0
Fire Stations	15	0	0	0
Police Stations	8	0	0	0
Schools	43	0	0	0
Total	**70**	**0**	**0**	**0**

Source: 2008 Wisconsin Emergency Management Department HAZUS-MH

HAZUS-MH Shelter Requirement Analysis

HAZUS-MH estimates the number of households that are expected to be displaced from their homes due to the flood and the associated potential evacuation. HAZUS-MH also estimates those displaced people that will require accommodations in temporary public shelters. The model estimates 1,346 households will be displaced due to the flood. Displacement includes households evacuated from within or very near to the inundated area. Of these 2,615 people (out of a total 2008 population of 67,182) will seek temporary shelter in public shelters.

HAZUS-MH State Property Loss Analysis

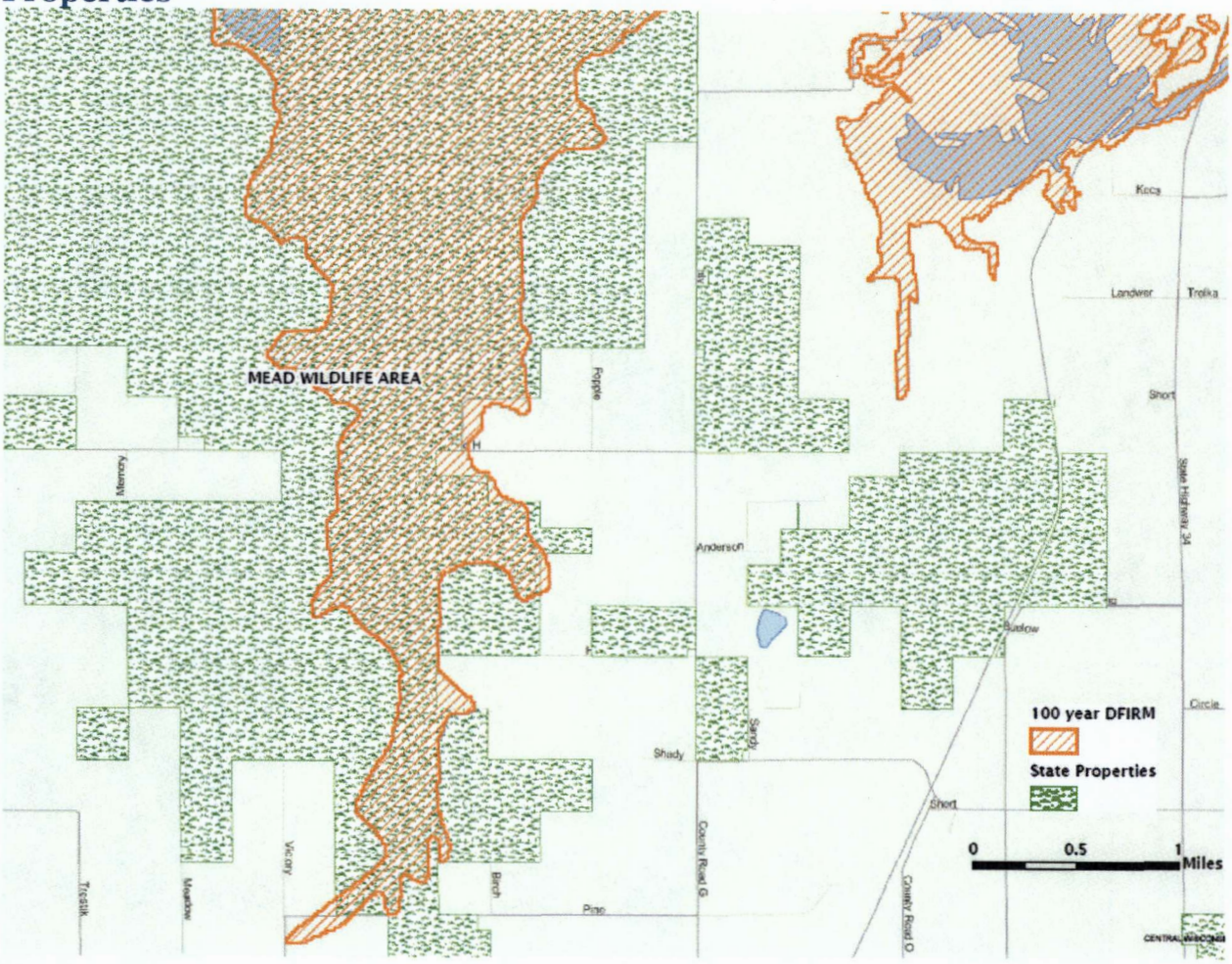
Table 33: State Property in Portage County Flood Inundation

State Property	Percent Inundated	Acres Inundated
Mead Wildlife Area	8%	2,489
Little Wolf River Fishery Area	23%	645
Paul Olson Wildlife Area	29%	590
Richard A Hemp Fishery Area	36%	492
Dewey Marsh Wildlife Area	1%	88
Gift Lands	2%	72
Rem-Peterson And Sannes Creek	5%	25
Stream Bank Protection Fee Program	0%	14
Statewide Public Access	0%	2
Tomorrow River State Trail	0%	1

Source: 2008 Wisconsin Emergency Management Department HAZUS-MH

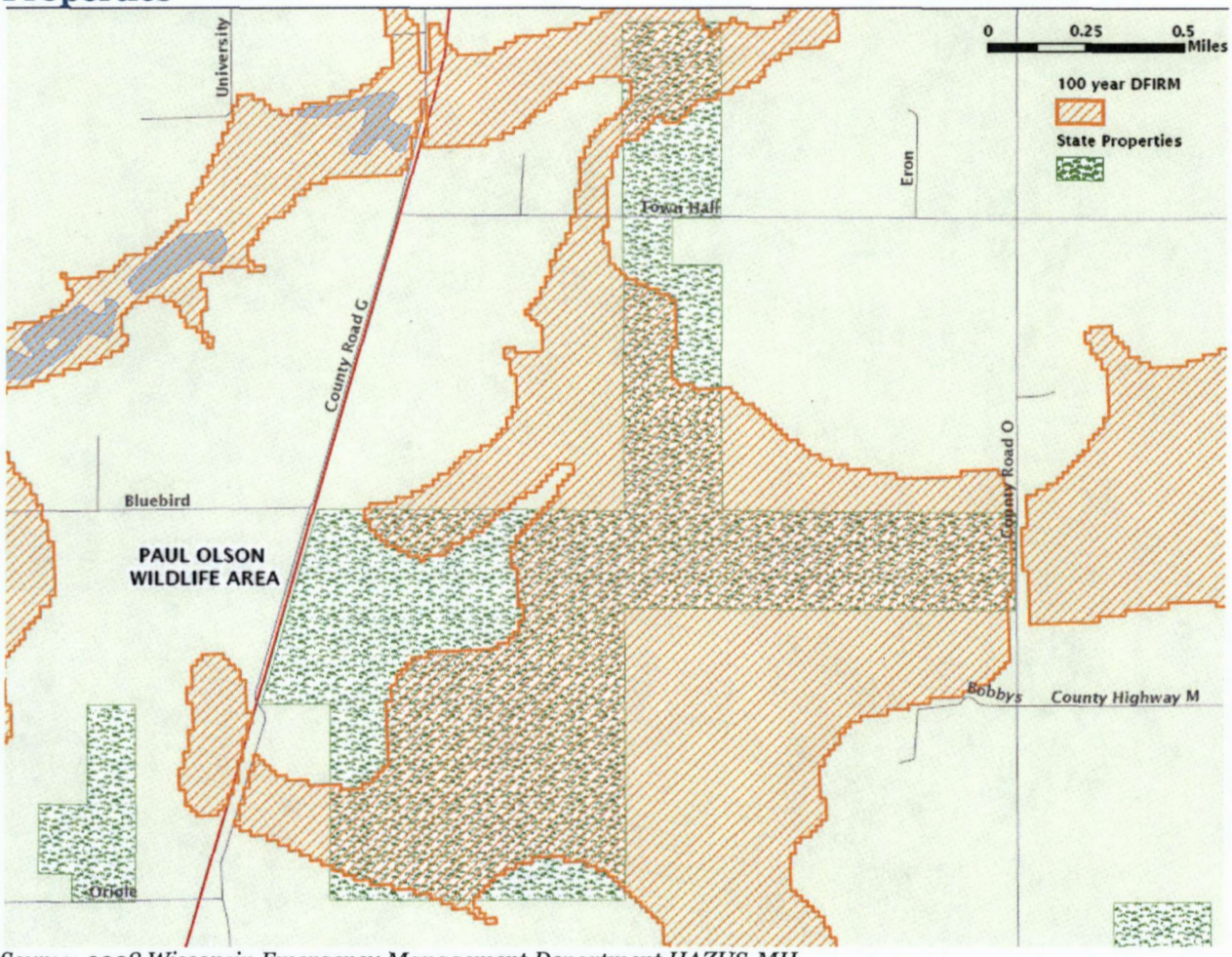
The flood boundaries were overlaid with the State of Wisconsin Property boundaries as provided by the WiDNR. Table 33, provides a list of state properties impacted by the flood boundary. Figure 5 and 6 show examples of the inundated areas.

Figure 5: Boundary of 100-Year Flood Overlaid with State of Wisconsin Properties



Source: 2008 Wisconsin Emergency Management Department HAZUS-MH

Figure 6: Boundary of 100-Year Flood Overlaid with State of Wisconsin Properties



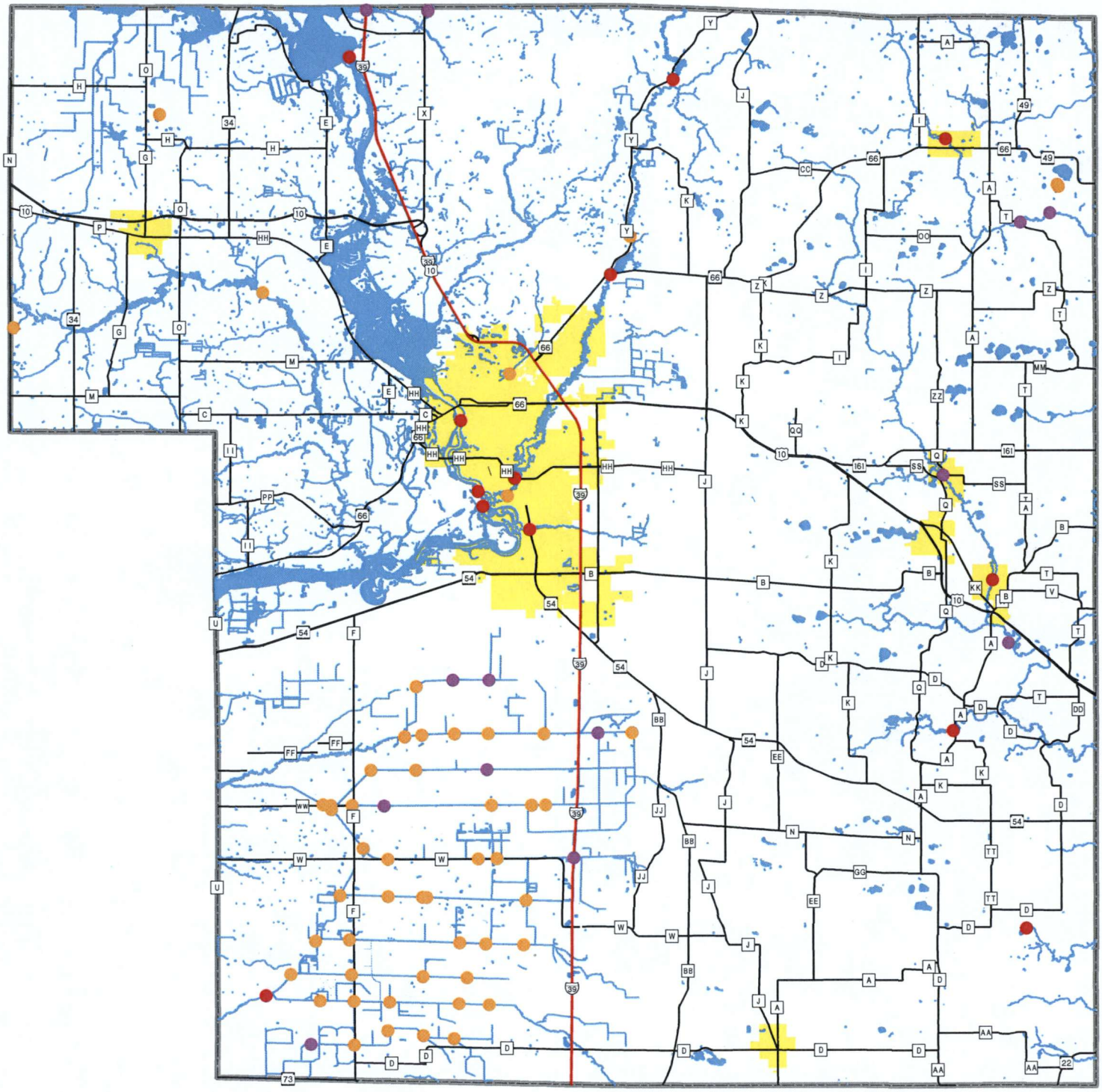
Source: 2008 Wisconsin Emergency Management Department HAZUS-MH

Dam Failure

Another possible disaster is the potential of a dam failure. Portage County has 64 dams, of which 14 are classified as large dams and 50 are classified as small dams. Table 35 below shows those dams which are classified as **large.** A dam with a structural height of over 6 feet and impounding 50 acre-feet or more, or having a structural height of 25 feet or more and impounding more than 15 acre-feet is classified as a **large dam**. The WiDNR also assigns dams into a hazard rating. Dams are classified as Low, Significant or High Hazard. A dam is assigned a rating of High Hazard when its failure would put lives at risk. The "hazard" is not based on the physical attributes, quality or strength of the dam itself, but rather the potential for loss of life or property damage should the dam fail.

Wisconsin State Statures Chapter 31, created in 1917 under the Water Power Law, was developed to ensure that dams are safely constructed, operated and maintained. NR 333 provides design and construction standards for a large dam, and NR 335 covers the

Map 18: Dams



- Large
- Small
- Abandoned Dams

N
W E
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0 1 2 4 Miles

Source: Portage County Planning & Zoning (2012)
Wisconsin Dept. of Natural Resources (2011)

Map Produced: May, 2012

Portage County Planning & Zoning
1462 Strongs Ave
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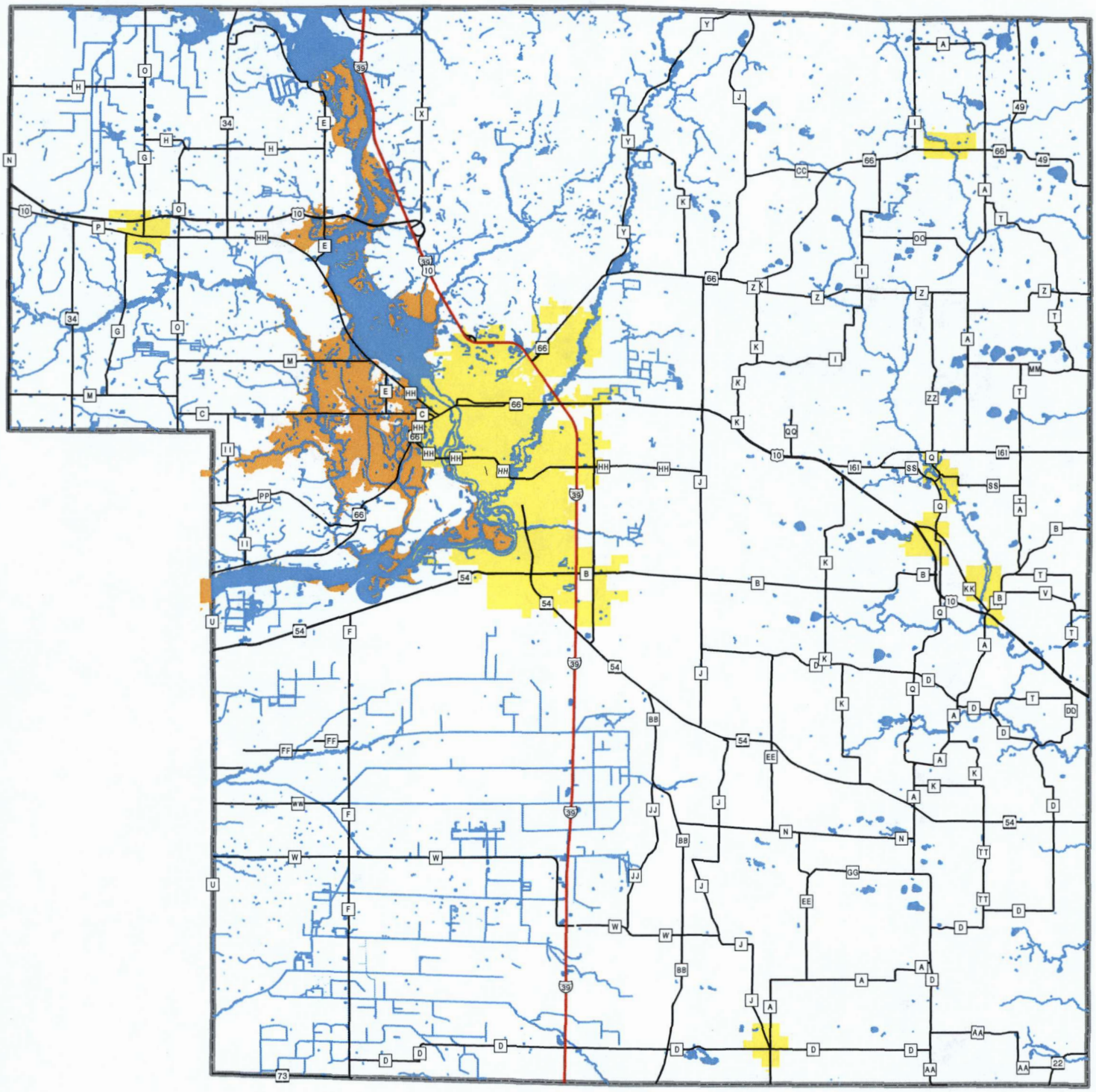
Map 19: Dam Failure Inundation Zone For Lake DuBay



Lake DuBay Inundation Zone

See Appendix E for Detailed Information

N
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0 1 2 4 Miles

Source: Portage County Planning & Zoning (2012)
DuBay Dam EAP Document, and Mead & Hunt Engineering Study (December 31, 2010)

Map Produced: May, 2012

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1462 Strongs Ave
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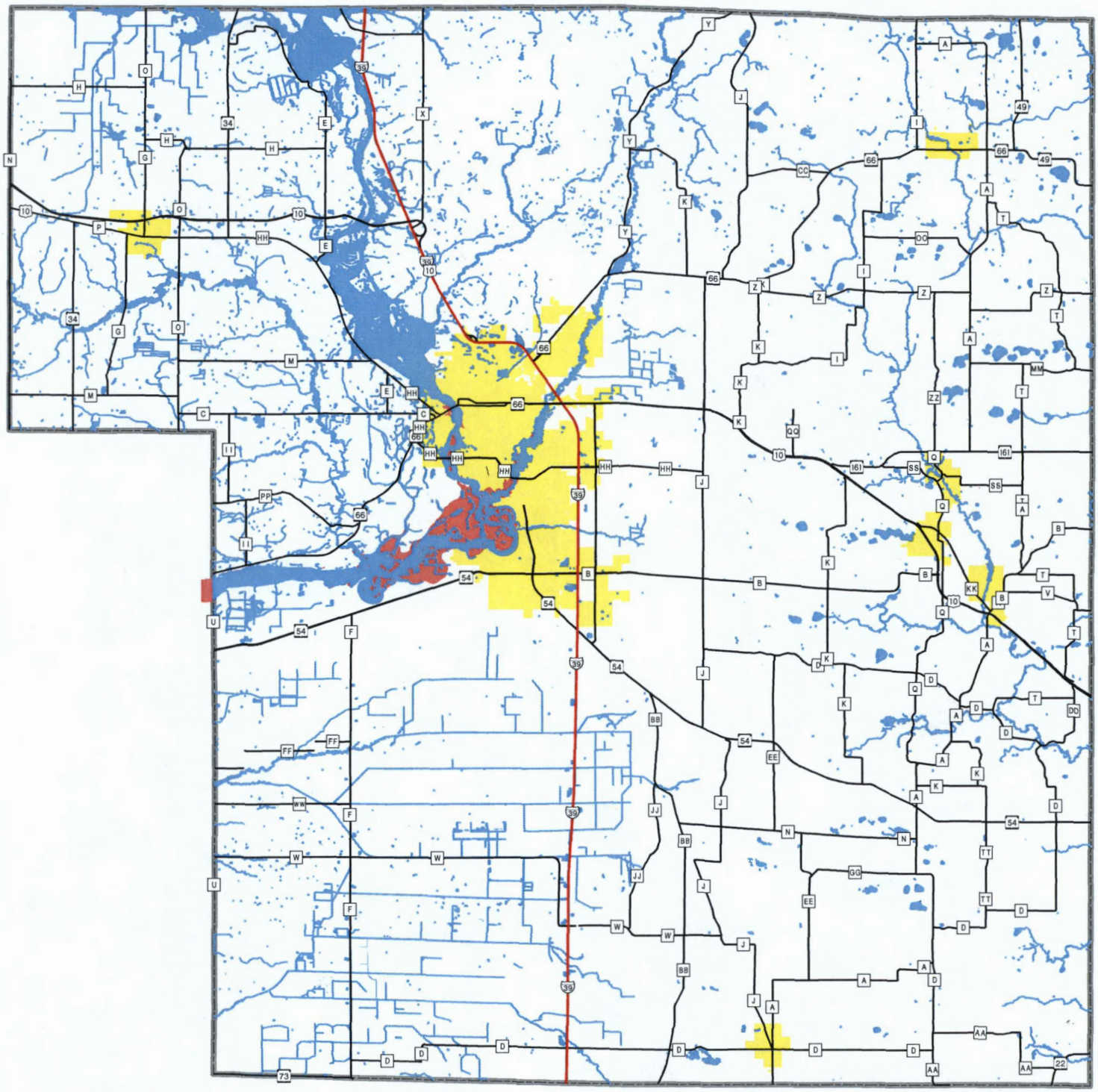
Map 20: Dam Failure Inundation Zone For Stevens Point Flowage



Stevens Point Flowage Inundation Zone

N
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0 1 2 4 Miles

Source: Portage County Planning & Zoning (2012)
DuBay Dam EAP Document, and Mead & Hunt Engineering Study (December 31, 2010)

Map Produced: May, 2012

Portage County Planning & Zoning
1462 Strongs Ave
Stevens Point, WI 54481

administration of the Municipal Dam Repair and Removal Grant Program. WIDNR is responsible for administration of these regulations. Chapter 31 covers: dam permitting, dam construction, dam safety, operation and maintenance, alteration or repair of dams, dam transfer and dam removal, water level and flow control. In regards to dam safety inspections, Chapter 31.19 requires the WIDNR to inspect High and Significant hazard dams on navigable waterways once every 10 years.

Table 34: Structures and Estimated Improvement in Inundation Areas

Municipalities	Structures in the Inundation Area	Res.	Com.	Ind.	Other	Est. Improv. Value
Stevens Point Hydroelectric Dam						
C. of Stevens Point	74	$6,547,700	$624,700	$0	$0	$7,172,400
V. of Plover	1*					$0
V. of Whiting	5	$153,700	$219,700	$6,600,900	$0	$6,974,300
T. of Carson	0	$0	$0	$0	$0	$0
T. of Dewey	0	$0	$0	$0	$0	$0
T.of Eau Pleine	0	$0	$0	$0	$0	$0
T. of Hull	0	$0	$0	$0	$0	$0
T. of Linwood	36	$3,878,900	$277,700	$0	$0	$4,156,600
T. of Plover	18	$1,132,100	$0	$0	$0	$1,132,100
Total	**134**	**$11,712,400**	**$1,122,100**	**$6,600,900**	**$0**	**$19,435,400**
DuBay Hydroelectric Dam						
C.of Stevens Point	1,163	$78,603,200	$26,149,400	$649,200	$0	$105,401,800
V. of Plover	0	$0	$0	$0	$0	$0
V.of Whiting	1	$166,500	$0	$0	$0	$166,500
T. of Carson	117	$19,310,800	$696,200	$0	$403,900	$20,410,900
T.of Dewey	8	$1,636,500	$0	$0	$0	$1,636,500
T.of Eau Pleine	16	$1,783,000	$0	$0	$84,900	$1,867,900
T. of Hull	37	$3,249,400	$196,400	$0	$178,500	$3,624,300
T.of Linwood	155	$17,168,100	$543,900	$0	$273,600	$17,985,600
T.of Plover	23	$1,305,800	$0	$0	$0	$1,305,800
Total	**1,520**	**$123,223,300**	**$27,585,900**	**$649,200**	**$940,900**	**$152,399,300**

Source: Stevens Point Dam and DuBay Dam EPA Documents, including MEAD and Hunt Engineering Study December 31, 2010

A dam can fail for a number of reasons, such as, excessive rainfall or melting snow. It can also be the result of poor construction or maintenance, flood damage, earthquake activity, weakening caused by burrowing animals or vegetation, surface erosion,

vandalism or a combination of these factors. Dam failures can happen with little warning, resulting in the loss of life and significant property damage in an extensive area downstream of the dam. For emergency planning purposes, dam failures are categorized as either rainy day or sunny day failures. Rainy day failures involve periods of excessive precipitation leading to an unusually high runoff. Sunny day failures occur due to poor dam maintenance, damage/obstruction of outlet systems, or vandalism. This is the worst type of failure and can be catastrophic because the breach is unexpected and there may be insufficient time to properly warn downstream residents and property owners.

Eight (8) dams in Portage County have a hazard rating of Significant (4) or High Hazard (4). Emergency Action Plans (EAPs) are required by the Department of Natural Resources for dams that meet the large dam criteria and/or pose a threat to life or property. Six dams in Portage County currently have EAP's in place, see Table 35 below.

Table 35: Portage County Dams with Large Classifications

Dam Name	Dam Size	Hazard Rating	EAP Date	Ownership Type
Dubay	Large	High	2009	Utility
Stevens Point	Large	High	2009	Utility
Rosholt	Large	High	2010	Village
Van Order (Christensen Pond)**	Large	High		Private
Amherst	Large	Significant		Village
Fountain Lake	Large	Significant		Drainage District
McDill	Large	Significant	2009	Village
Springville	Large	Significant	1997	Village
Jordan	Large	Low	2010	Portage County
Bently Sawmill	Large	Low		Private
Spring Creek	Large	Low		Private
Portage County No. 35	Large	Low		Drainage District
Whiting Plover (Lower Paper Mill)	Large	Low		Private
Upper Paper Mill	Large	Low		Utility

*Source: Wisconsin Department of Natural Resources, ** there is no impoundment, DNR will be removing from high hazard rating*

Probability of Occurrence and Vulnerability Assessment

While Portage County has not had any dam failures that have threatened life, health or property, dam failures can occur at any time. A problem would more than likely occur during a flood event.

Based on data from the Emergency Action Plans (EAPs), and studies of the Stevens Point Hydroelectric Dam and the Dubay Hydroelectric Dam we can better understand

vulnerable areas. As indicated on the inundation maps for failure of each dam, See Maps 19 and 20 and the table below to indicate the number of structures in the inundation area for each of these dams.

Table 28: Number of Structures in Inundation Area of Dubay and Stevens Point Dams and Potential Loss Estimate

Hazardous Materials

For mitigation planning, hazardous materials are defined simply as any materials or combination of materials that may have negative impact on human health, animal health, or the environment. The impacts of hazardous materials exposure may be short-term with negative effects immediately or within a few seconds, minutes, or hours, or long-term with negative effects within days, weeks, or in some cases years after exposure.

The Emergency Planning and Community Right-To-Know Act (EPCRA), created by the Superfund Amendments and Reauthorization Act (SARA) of 1986, also known as SARA Title III, a statute designed to improve community access to information about chemical hazards and to facilitate the development of chemical emergency response plans by state/tribe and local governments. EPCRA required the establishments of state/tribe emergency response commissions (SERCs/TERCs), responsible for coordinating certain emergency response activities and for appointing local emergency planning committees (LEPCs).

The objective of the Emergency Planning and Community Right-To-Know Act (EPCRA) is to: 1 Allow state and local planning for chemical emergencies, 2 Provide for notification of emergency release of chemicals, and 3 Address communities' right-to-know about toxic and hazardous chemicals.

Portage County has in place our Local Emergency Planning Committee (LEPC), comprised of elected officials, response agencies, medical, emergency management, health, media, community groups, and facility representation. This All Hazard Mitigation Plan is in addition to the planning activities of that committee. The County HazMat Plan is intended to develop policies and procedures for responding to hazardous materials incident and/or accidents in compliance with Federal regulations, in order to protect the community from the harmful and possible life threatening effects of a hazardous materials release. That plan also defines the roles, responsibilities, and inter/intra-organizational relations of government and private organizations in response to a hazardous materials incident.

Portage County also provides a local (county) Hazardous Materials Response Team, through contract with the Whiting Fire Department, at the Operations level, to respond to chemical incidents. Portage County also contracts with Waupaca County Hazardous Materials Response Team, which operates at the Technician level. The State Emergency Management Department contracts with eight Regional Hazardous Materials Response Teams across the state to be activated for an incident involving a hazardous materials spill, leak, explosion, injury or the potential of immediate threat to life, the environment, or property. Wausau is currently our Regional Team, which is required to operate at the Technician level.

This County All Hazard Mitigation Plan intends to identify ways to mitigate hazardous materials incidents. Hazardous chemicals are widely used in heavy industry, manufacturing, agriculture, mining, the oil and gas industry, high tech industries, forestry, medical facilities, and commercial, public and residential buildings, all of which can include the transportation of materials to and from these sites. There are thousands of chemicals that may be hazardous to human health to some extent. This Mitigation Plan will be focusing on an Extremely Hazardous Substance (EHS) as defined as one of the 356 substances on the United States Environmental Protection Agency list of EHS, identified at 40 CFR Part 355.

Hazardous Materials: is any substance or combination of substances which may cause or significantly contribute to an increase in mortality or an increase in serious illness to human health.

History of Hazardous Materials Incidents in Portage County and Probability Assessment

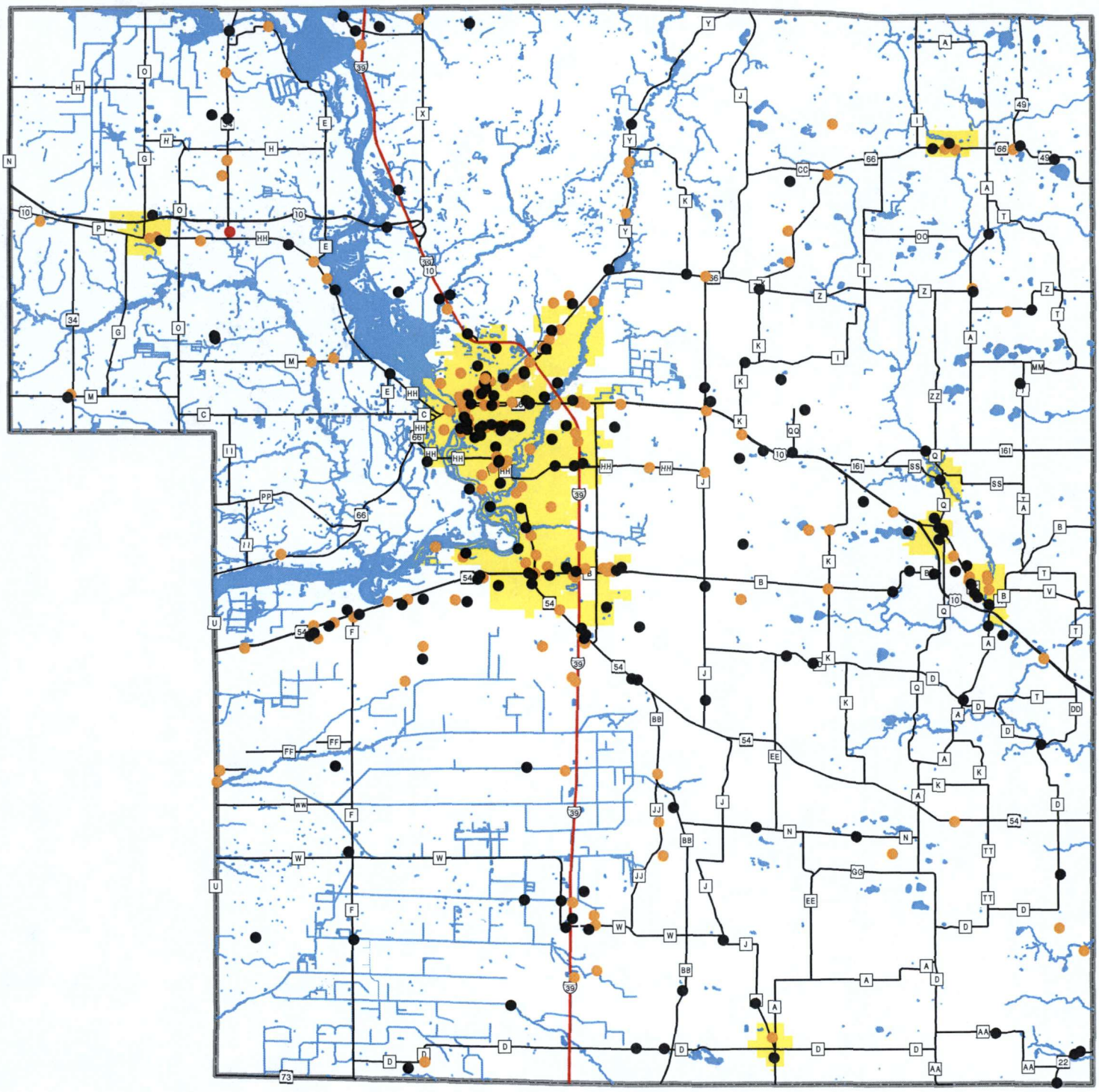
Portage County does not have any significant reported hazardous material response, spill or problems from any of our fixed facilities, spill, or transportation related incidents. Portage County has a number of smaller scale activities: abandoned containers, leaking underground storage tanks, environmental repairs, and spills listed on the State of Wisconsin Department of Natural Resources Bureau for Remediation and Redevelopment Tracking System (BRRTS). BRRTS is the WIDNR's online database that provides information about contaminated properties and other activities related to the investigation and cleanup of contaminated soil or groundwater in Wisconsin.

Table 36: Portage County Remediation Sites

	Open	Closed	Historical	Conditional
Abandoned Container	2	1	0	0
Leaking Underground Storage Tank	13	212	0	1
Environmental Repair	18	107	0	1
Spills	1	248	251	0
Total	**34**	**568**	**251**	**2**

Source: Wisconsin Department of Natural Resources, BERRTS data, date

Map 21: Spill Sites



- Open
- Closed
- Historic

NOTE:
Only 90% of the Spill data is displayed on this map. The remaining Spill data is incomplete and cannot be mapped.

N
W E
S

0 1 2 4 Miles

Source: Portage County Planning & Zoning (2012)
Wisconsin Hazmat Online Planning & Reporting System - WHOPRS (2011)

Map Produced: May, 2012

Portage County Planning & Zoning
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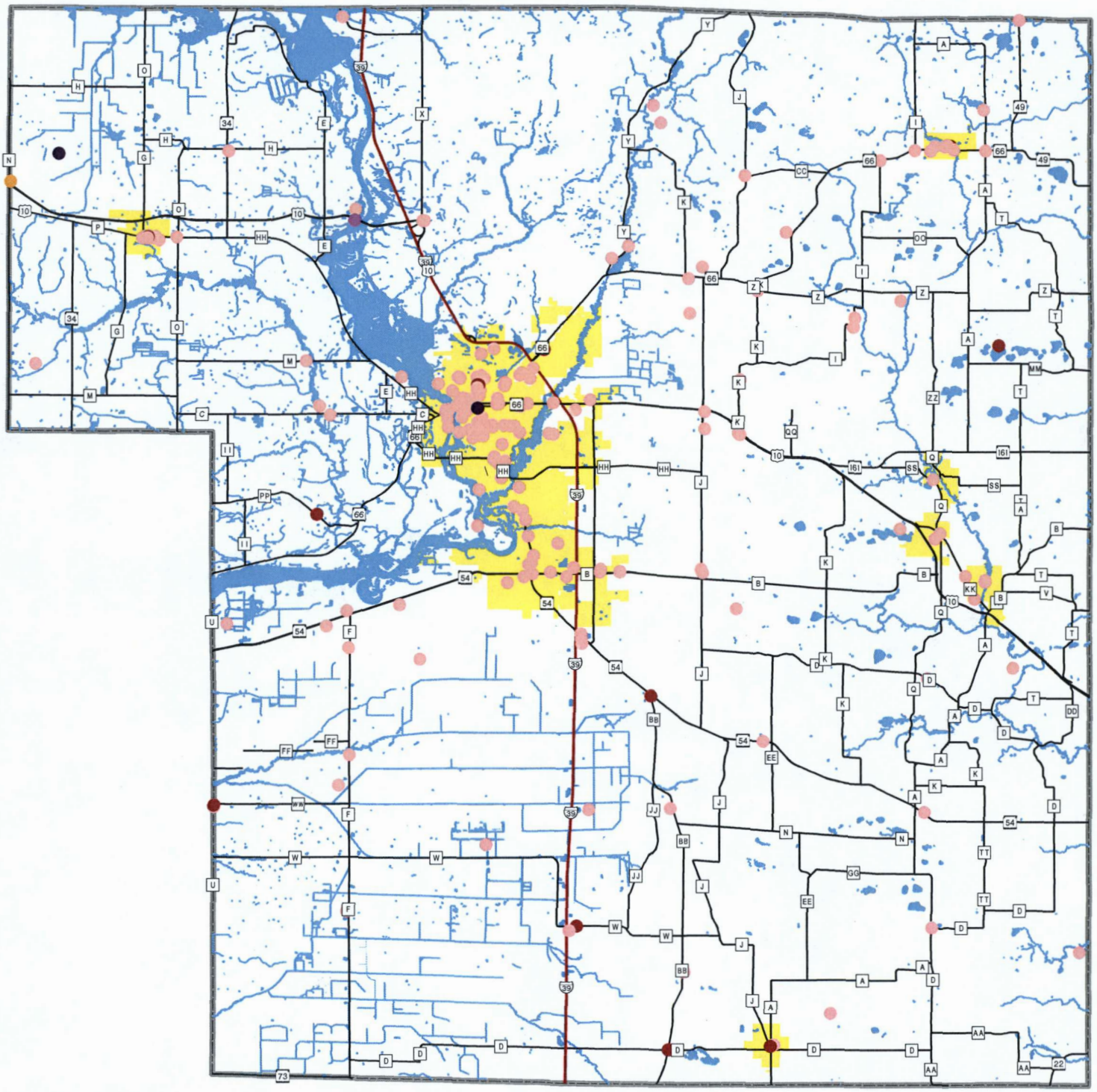
Map 22: Abandoned Storage Containers & Leaking Underground Storage Tanks



Abandoned Containers
- Closed
- Open

Leaking Underground Storage Tanks (LUST)
- Closed
- Conditionally Closed
- Open

N
W E
S

0 1 2 4 Miles

Source: Portage County Planning & Zoning (2012)
WI-DNR Bureau for Remediation & Redevelopment Tracking System (BRRTS -2011)

Map Produced: May, 2012

Portage County Planning & Zoning
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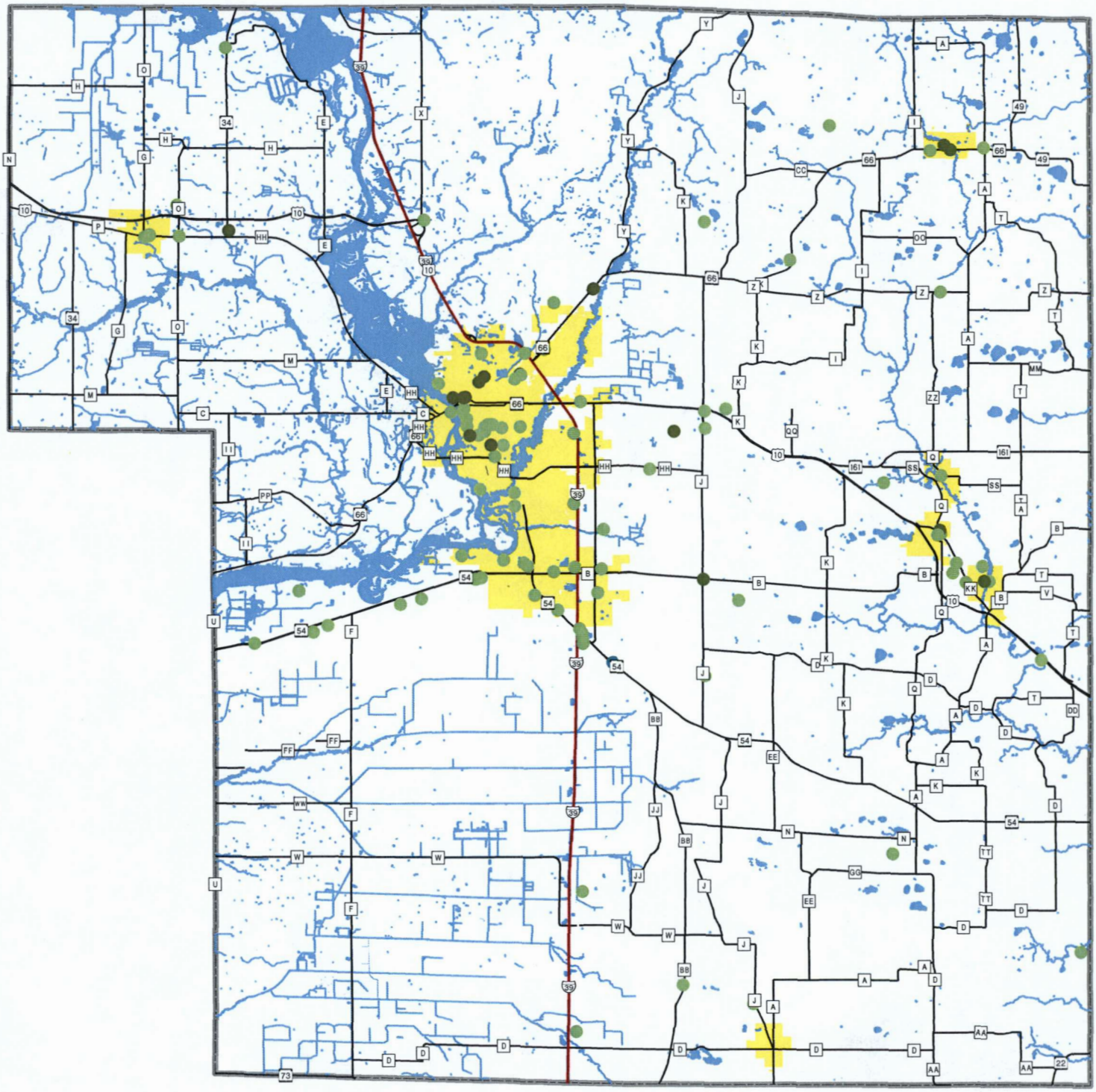
Map 23: Environmental Repair Sites



- Closed
- Conditionally Closed
- Open

N
W E
S

0 1 2 4 Miles

Source: Portage County Planning & Zoning (2012)
WI-DNR Bureau for Remediation & Redevelopment Tracking System (BRRTS -2011)

Map Produced: May, 2012

Portage County Planning & Zoning
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The BRRTS database has identified 995 activities from February 1977 through May 2011, of which 34 are listed as Open Status. Maps 21-23 indicates each activity type separately and includes, open, closed, historical, and conditional categories.

At this time we do not have sufficient information to give a probability assessment for Hazardous Materials.

Vulnerability Assessment

While it is difficult to come up with a specific vulnerability assessment for hazardous material incidents for Portage County due to the low volume of significant incidents, the following information can help us better understand where we are most vulnerable. While we have no specific data to base a probability and vulnerability assessment for Portage County, major disasters do happen and could take place as part of any of the areas further described below.

Hazardous Materials Transportation

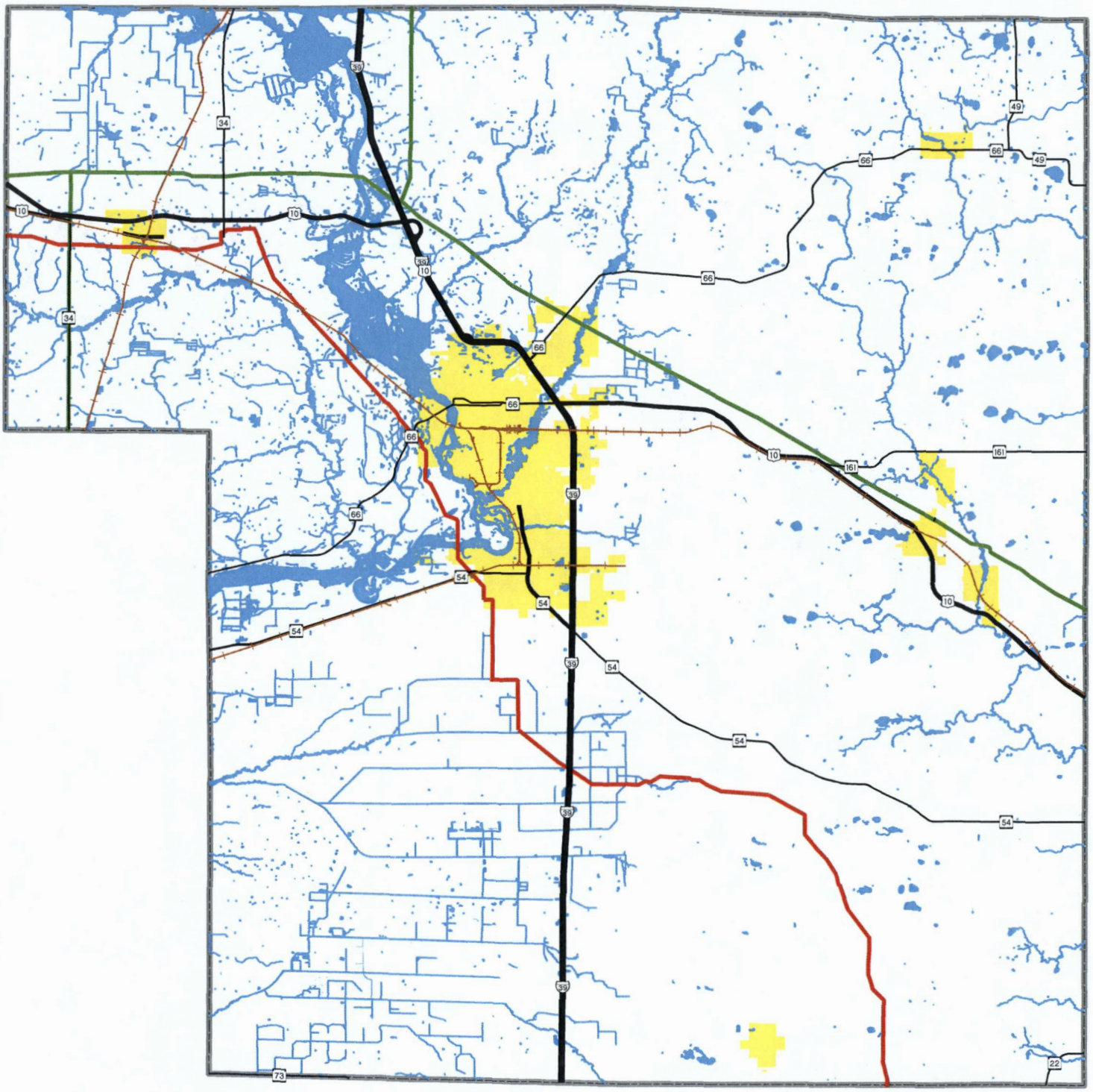
There are at a minimum approximately 13 different EHS transported annually throughout Portage County because of their storage at fixed facilities, but the potential exists for the transport of any EHS listed on the United States Environmental Protection Agency's List of Lists or the Department of Labor's Occupational Safety and Health Administration's Toxic and Hazardous Substances List. These substances are transported in containers that range from 10-ounce agricultural packages to 225,000 pound rail car quantities. For Portage County, transportation accidents and fixed facilities present the highest risk for a hazardous materials incident. See Subsection A of Section III-Hazard Analysis of the Countywide Hazmat Plan for more information.

The major transportation systems include Interstate and other highways, railroad and pipeline. The County contains approximately 36 miles of Interstate, 155 miles of State Highways, 438 miles of County Roads and 1,242 miles of local roads. The Canadian National LTD Railroad operates two main lines; 35 miles of line east/west from Junction City through the City of Stevens Point to Amherst, and 12.5 miles of line that run north/south along Highway 34 corridor from the Wood County line to the Marathon County line. They also operate 9 miles of line from Wood County line to the Village of Plover along the Highway 54 corridor, and 4.4 miles connecting from the Village of Plover to the main line and railroad yard in the City of Stevens Point.

Major transportation routes and the airport are highlighted on Map 24.

The Koch Pipeline (operated by Flint Hills Resources, Junction City, Wisconsin) delivers refined products including gasoline, diesel fuels and propane throughout Wisconsin. The Wisconsin Pipeline system delivers products to bulk terminals located in Junction City. It runs 42.5 miles through Portage County. The TransCanada Pipeline/ANR Natural Gas Pipeline runs 47 miles through Portage County. Between 1990 and 1997, Portage County experienced three pipeline leaks.

Map 24: Major Transportation Routes



Interstate
US Highway
State Highway
Rail Road
Natural Gas Pipeline
Petroleum Pipeline

N
W E
S

0 1 2 4 Miles

Source: Portage County Planning & Zoning (2012)

Map Produced: May, 2012

Portage County Planning & Zoning
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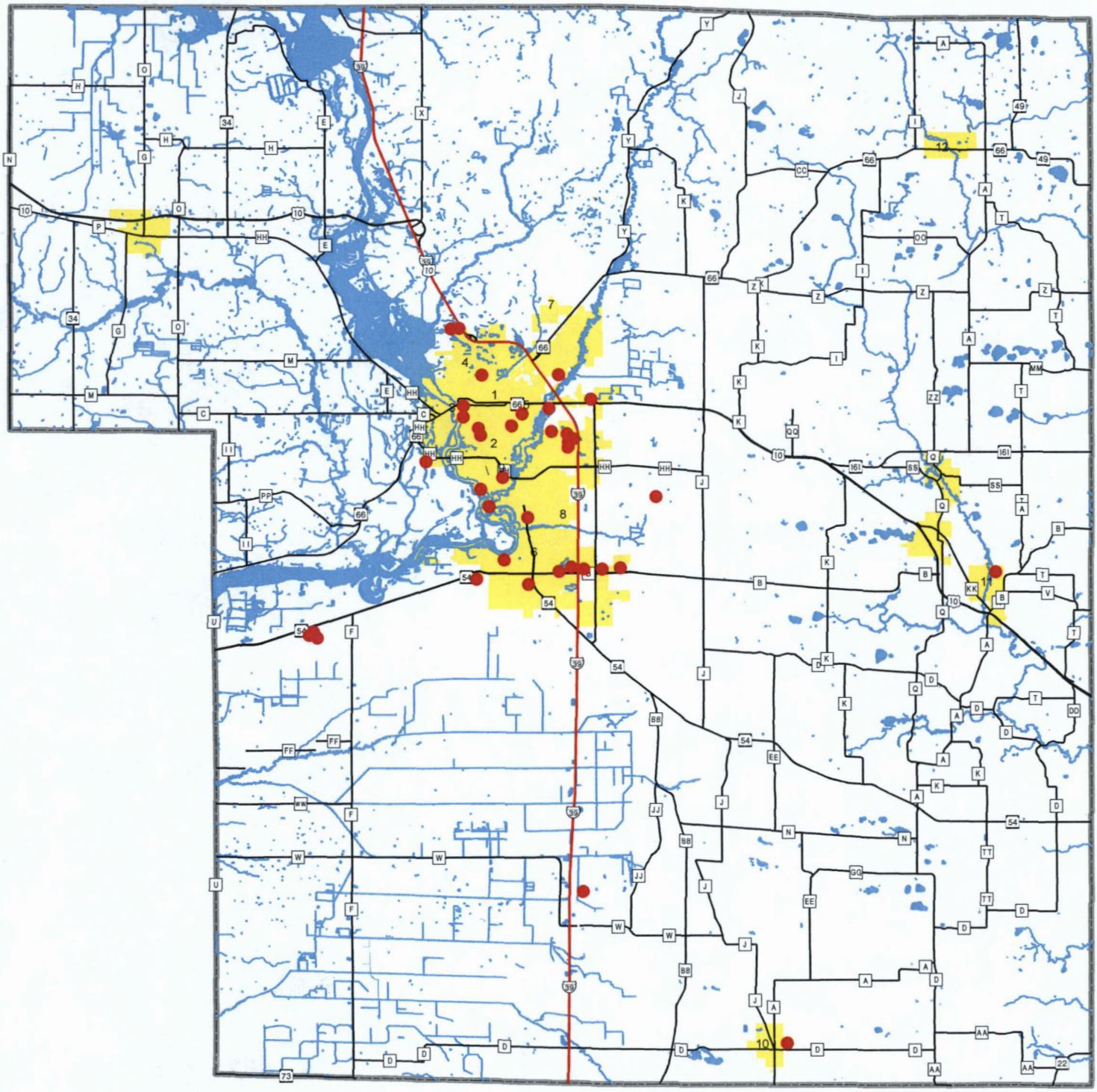
Map 25: Extremely Hazardous Substances



● Facilities with Extremely Hazardous Substances

N
W E
S

0 1 2 4 Miles

Source: Portage County Planning & Zoning (2012)
Wisconsin Hazmat Online Planning & Reporting System - WHOPRS (2011)

Map Produced: May, 2012

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Fixed Facilities

The presence of Extremely Hazardous Substances (EHS) in quantities at or above the Threshold Planning Quantity (TPQ) requires certain emergency planning activities to be conducted. Local Emergency Planning Committees (LEPCs) must develop emergency response plans and facilities must notify the State Emergency Response Commission (SERC) and LEPC if they use/store or manufacture the substance on site at or above the TPQ.

As of 2011, forty-one (41) facilities in Portage County reported being subject to the planning requirements of the Emergency Planning and Community Right-to-Know Act (EPCRA). These facilities use/store or manufacture EHS that meet or exceed the federal threshold planning quantity. To date, all 41 off-site facility plans have been developed, (see Map 25). Portage County also has an additional forty-four (44) reporting facilities that annually submit a Tier II emergency and hazardous chemical inventory report. This report must be filed: 1) for each hazardous chemical present the preceding calendar year at the facility at or above 10,000 pounds at any one time, or 2) for each EHS present the preceding calendar year at the facility at or above 500 pounds or the TPQ, whichever is less, at any one time (Source: An Information Guide Emergency Planning and Community Right-to-Know Act Wisconsin Statute 323.60).

Hazardous Materials Response Incidents

While the Wisconsin Department of Natural Resources has the BRRTs database of spills, the data is not complete. Local agencies also maintain their own data on spills responded to within the county.

Extreme Temperatures

The Wisconsin climate is known for its extreme temperatures. Summer heat waves bring unusually high temperatures and high humidity that may last for days or weeks. Wisconsin winters bring winter storms with large amounts of snow, ice, and wind chill temperatures that can fall well below zero. Being prepared and observing safety precautions during these extreme temperatures can reduce the risk of weather related problems.

Extreme Heat Hazard Analysis

A heat wave is any prolonged period of excessive heat and humidity

Heat Index (HI) is the temperature that the body feels when heat and humidity are combined. The chart below shows the HI that corresponds to the actual air temperature and relative humidity. The National Weather Service extreme heat terminology and conditions definitions include: **Heat Index** – an arbitrary number that reflects the combined effects of temperature and humidity on the human body. **Excessive Heat Outlook** - This "Heads-Up" message is issued 2 to 4 days prior to the first day that Heat

Advisory or Excessive Heat Warning weather conditions are anticipated. **Excessive Heat Watch** – This "Heads-Up" message is issued when the following situation is likely: for a 24-hour period, the Heat Index is forecast to equal or exceed 105° for 3 hours or more during the day, and remain above 80° at night. Meteorologists will attempt to issue an Excessive Heat Watch 24 to 36 hours in advance of the first expected day of excessive heat. **Heat Advisory** – this weather alert is issued when forecasters have a high level of confidence that: for a 24-hour period, the Heat Index is forecast to equal or exceed 105° for 3 hours or more during the day, and remain above 80° at night.

Table 37: Heat Index Chart

Temp (F°)	Relative Humidity (%)								
	90	80	70	60	50	40	30	20	10
65	65.6	64.7	63.8	62.8	61.9	60.9	60.0	59.1	58.1
70	71.6	70.7	69.8	68.8	67.9	66.9	66.0	65.1	64.1
75	79.7	76.7	75.8	74.8	73.9	72.9	72.0	71.1	70.1
80	88.2	85.9	84.2	82.8	81.6	80.4	79.0	77.4	76.1
85	101.4	97.0	93.3	90.3	87.7	85.5	83.5	81.6	79.6
90	119.3	112.0	105.8	100.5	96.1	92.3	89.2	86.5	84.2
95	141.8	131.1	121.7	113.6	106.7	100.9	96.1	92.2	89.2
100	168.7	154.0	140.9	129.5	119.6	111.2	104.2	98.7	94.4
105	200.0	180.7	163.4	148.1	134.7	123.2	113.6	105.8	100.0
110	235.6	211.2	189.1	169.4	151.9	136.8	124.1	113.7	105.8
115	275.3	245.4	218.0	193.3	171.3	152.1	135.8	122.3	111.9
120	319.1	283.1	250.0	219.9	192.9	169.1	148.7	131.6	118.2

Source: National Weather Service - Any value less than 80° is considered comfortable. Any value greater than 90° is considered extreme. Any value greater than 100° is considered hazardous. Any value greater than 110° is considered dangerous.

Meteorologists will attempt to issue a Heat Advisory within 24 hours of the first expected day of excessive heat. **Excessive Heat Warning** - this weather alert is issued when forecasters have a high level of confidence that the following weather situation will occur: For any 24-hour period, the Heat Index is forecast to equal or exceed 115° for 3 hours or more during the day, and remain above 80° at night. Meteorologists will attempt to issue an Excessive Heat Warning within 24 hours of the first expected day of heat.

Heat Wave Safety Tips from the American Red Cross:

- **Slow Down** – Strenuous activities should be reduced, eliminated, or rescheduled to the coolest time of the day. Individuals at risk should stay in the coolest available place, not necessarily indoors.
- **Dress for Summer** – Lightweight light-colored clothing reflects heat and sunlight, and helps your body maintain normal temperatures.

- **Put less fuel on your inner fires -** Foods (like proteins) that increase metabolic heat production also increase water loss.
- **Drink plenty of water or other non-alcohol fluids** – Your body needs water to keep cool. Drink plenty of fluids even if you don't feel thirsty.
- **Do not drink alcoholic beverages.**
- **Do not take salt tablets unless specified by a physician** – Persons on salt restrictive diets should consult a physician before increasing their salt intake.
- **Spend more time in air-conditioned places** – Air conditioning in homes and other buildings markedly reduces danger from heat. If you cannot afford an air conditioner, spending some time each day (during hot weather) in an air conditioned environment affords some protection.
- **Don't get too much sun -** Sunburn makes the job of heat dissipation that much more difficult.

Extreme Cold Hazard Analysis

Wind chill is based on the rate of heat loss from exposed skin caused by the combined effects of wind and cold. As the wind speed increases, heat is carried away from the body at an accelerated rate, driving down the body temperature. The wind chill temperature, an "apparent" temperature, gives us a better estimate of how cold it really feels outside. The measure of the rate of heat loss based on air temperatures and wind speed is not a temperature, but it allows us to understand how quickly heat is lost to the wind.

Cold Related Health Concerns

Hypothermia occurs when your body's control mechanisms fail to maintain a normal body temperature of 98.6° F. A body temperature of 95°F or lower signals hypothermia. Hypothermia is usually caused by an extended exposure to cold temperatures or a cool, damp environment. Signs and signals of hypothermia include: shivering, slurred speech, slow rate of breathing, cold, pale skin, fatigue and loss of mental and physical abilities. Some prevention measures include: wear a hat and protective clothing in layers, avoid overexertion, and stay dry.

Frostbite occurs when skin and underlying tissues are exposed to very cold temperatures. Areas most likely to be affected are hands, nose, feet and ears. You can identify frostbite by the hard, pale and cold nature of the skin. As the areas thaw, the flesh becomes red and painful. If frostbite occurs, get out of the cold, warm the area (do not rub the affected area) and call for medical help.

Table 38: Wind Chill Index Chart

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

Source: National Weather Service

History and Probability Assessment (Heat and Cold)

The National Weather Service (Milwaukee/Sullivan Weather Forecast Office) reported death and injury directly related to Natural Hazards Between 1982 and 2011.

Table 39: 1982-2011 Wisconsin Weather Related Deaths and Injuries

Event	Deaths	Injuries
Tornadoes	28	691
Hail	0	42
Winds	26	275
Floods	9	13
Lighting	25	208
Heat Waves	121/95*	-
Winter Storms	6	51
Cold Waves	38	54
Total	**253/227**	**1,334**

*Source: National Weather Service Milwaukee/Sullivan Weather Forecast Office * Note: deaths listed above are "direct: deaths, in which the weather hazard is the major cause of death. However, for heat waves, the heat and*

*humidity are sometimes labeled as "secondary" or "contributing" causes of death. These "Indirect" deaths, are the second number shown in the heat wave column. ** Likewise, nearly all deaths attributed to vehicle deaths on highways in winter storms are "indirect" deaths, since the driver was driving too fast for the conditions. In other words, the snow or ice did not kill the individual; the death was the result of a vehicle accident.*

The National Weather Service reported that heat waves do not injure people the way other weather events injure people. The medical community documents illnesses due to the effects of heat, but does not consider them injuries. In addition to the 121 directly related heat deaths in the above table, there were another 95 Wisconsin resident's death where heat was a secondary cause or contributing factor. This translates into a total of 216 directly and indirectly heat-related deaths in Wisconsin over a 30 year period. Heat waves, by a large margin, remain the number one weather-related killer in Wisconsin.

Vulnerability Assessment (Heat and Cold)

According to the NCDC, since 2006, there have been one occurrence of extreme cold temperatures and no extreme heat conditions recorded in Portage County. While these extreme events are vary hazardous, less extreme events can also cause health problems. Residents need to be fully aware of the negative effects associated with extreme temperatures. All areas of Portage County are vulnerable. Extreme temperatures are more likely to affect the poor, elderly, and the very young, as they are very susceptible to such temperatures. Extreme temperatures usually do not affect structures, but extreme cold can cause damage with freezing pipes and water mains. Local municipalities should be aware of these affects and the costs associated with them.

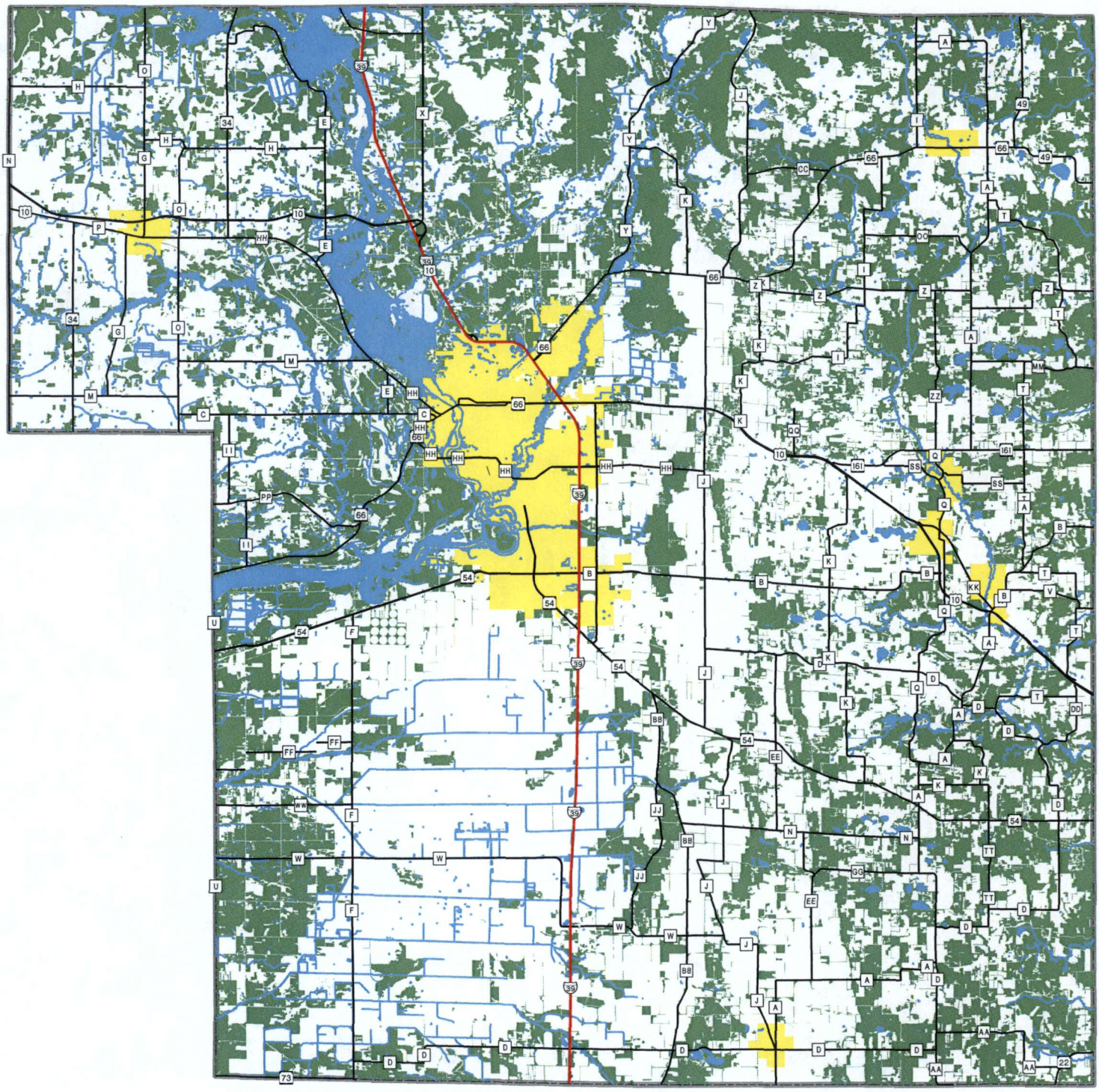
Fires – Wild Land

Hazard Analysis

The forest fire season in Portage County begins in March and continues through November. Wild land fires can occur at any time of day during any month of the year. Generally, wild land fires are more likely to occur whenever vegetation is dry as a result of a winter with little snow or a summer with sparse rainfall.

The Wisconsin DNR (WIDNR) is responsible for wildfire protection on approximately 18 million acres of forest and wild land in Wisconsin. The U.S. Forest Service maintains forest fire protection on two million acres of this land, while local fire departments retain responsibility for the remaining wooded acreage. According to the WIDNR Wisconsin Communities-at-Risk report (WIDNR CAR) from 2011, every year, an average 1,500 wildfires burn more than 4,000 acres on lands where the WIDNR is responsible for wildfire suppression (roughly half the state). Those numbers can be more than doubled when considering wildfires on lands where fire departments and other agencies (i.e. USFS, FWS, NPS, BIA) are responsible for fire suppression. Most fires occur between March and June, with April having the highest incident. Over 90% of wildfires are human caused, with a majority of these related to debris burning. Each year, dozens of structures are destroyed by wildfires and hundreds more threatened.

Map 26: Forested Land



Forested Land

N
W E
S

0 1 2 4 Miles

Source: Portage County Planning & Zoning (2012)
Portage County Aerial Photography (2000)

Map Produced: May, 2012

Portage County Planning & Zoning
1462 Strongs Ave
Stevens Point, WI 54481

Table 40: Portage County Wild Land Fire Summary

Year	Total # of Fires	Acres Burned	Year	Total # of Fires	Acres Burned
1954	41	1,050	1983	60	78
1955	62	677	1984	54	327
1956	102	601	1985	48	62
1957	57	931	1986	26	33
1958	88	1,156	1987	53	262
1959	49	358	1988	130	150
1960	41	279	1989	91	187
1961	60	311	1990	85	237
1962	21	57	1991	26	19
1963	68	425	1992	44	130
1964	102	1,021	1996	27	23
1965	64	335	1994	88	109
1966	116	272	1995	87	79
1967	68	136	1996	69	65
1968	70	368	1997	73	382
1969	70	208	1998	64	85
1970	77	334	1999	57	70
1971	36	51	2000	71	197
1972	77	141	2001	39	40
1973	58	163	2002	36	45
1974	132	311	2003	98	212
1975	91	191	2004	38	141
1976	138	5,215	2005	68	227
1977	65	3,185	2006	46	37
1978	45	39	2007	57	31
1979	77	43	2008	25	40
1980	67	703	2009	48	103
1981	80	203	2010	32	46
1982	40	132	2011	16	8
Ave/per/yr	**76**	**456**	**TOTAL**	**3,718**	**22,321**

Source: Whiting Ranger Station

The WIDNR CAR report also discusses Wild Land-Urban Interface. Throughout much of the 20th century, housing was mainly concentrated in urban areas. By the latter part of the century, people began moving to the outer fringe of cities and villages. In increasing fashion, housing development continues to move deeper into formerly rural areas, sometimes in clustered subdivisions, and sometimes as scattered individual homes. Along with the increase in rural development for primarily homes, the affluence of recent generations affords people the ability to vacation and purchase seasonal "recreational" homes. All of this development in formerly agriculture, grassland, marshland, and forested areas is a natural resource management nightmare. For those involved in fire control, the addition of homes in these areas drastically changes the dynamic of suppression efforts. The bottom line is that fire is inevitable. It is not a matter of if a fire will occur, but when. With that knowledge, the task becomes teaching residents and visitors of wild land issues and identify ways to live and recreate without starting a wildfire, and how to keep people and property safe when a wildfire does occur.

History and Probability Assessment

While the number of forest fires involving multiple agency response has decreased over the years, the potential for catastrophic fires has increased. Due to the rapid spread of permanent and seasonal homes and subdivisions into rural wooded areas of the County, the possibility of disastrous fires is rapidly climbing.

According to the Whiting Ranger Station, over the last 57 years in Portage County, 22,321 acres have burned in 3,718 fires. Portage County can expect an average of 65 fires a year with an average of 392 acres burned per event.

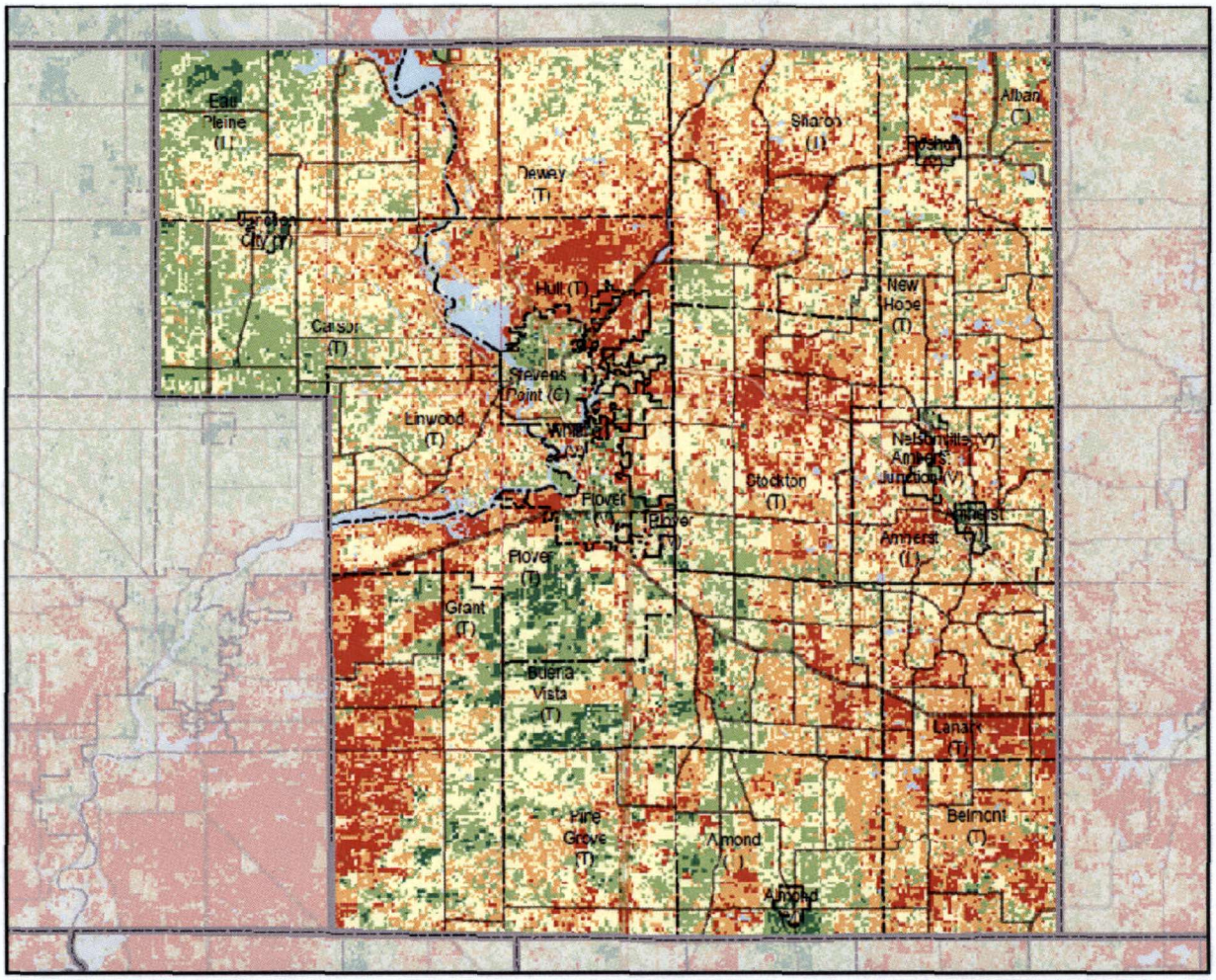
Closer review of the data from this time period shows spikes in acreage burned corresponding with years of drought. The greatest loss from fire occurred during the drought years of 1976 and 1977, when a total of 8,400 acres burned. In 2003, we had the Portage County Fire Complex occur where on April 4th, 73 acres burned in 5 separate fires in one day. These fires corresponded with the highly reported Crystal Lake Fire in Waushara County.

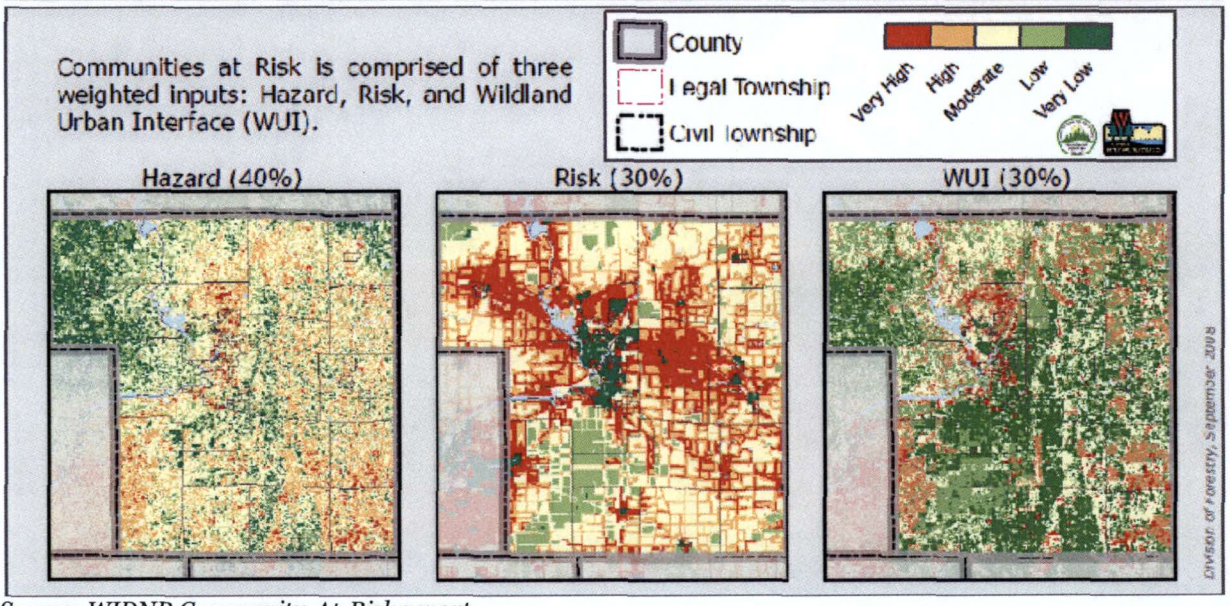
Vulnerability Assessment

Portage County has 184,000 acres of forested land, 35% of the total land area, scattered across the County. While the acreage burned per fire has decreased over the years, the number of structures and single-family homes has increased in these wooded areas, leaving a greater potential for structural damage due to forest fires.

The WIDNR's Community-at-Risk project identified areas of the State that are relatively high risk to multiple structure loss due to wild fire. Communities at risk (CAR) were determined at the municipal civil division. For Portage County, 15 communities were identified as CAR – High, and two (Towns of Hull and Lanark) were identified as CAR – Very High. See maps below, and look to the WIDNR Community-at-Risk methodology for more detail information on how these maps were created.

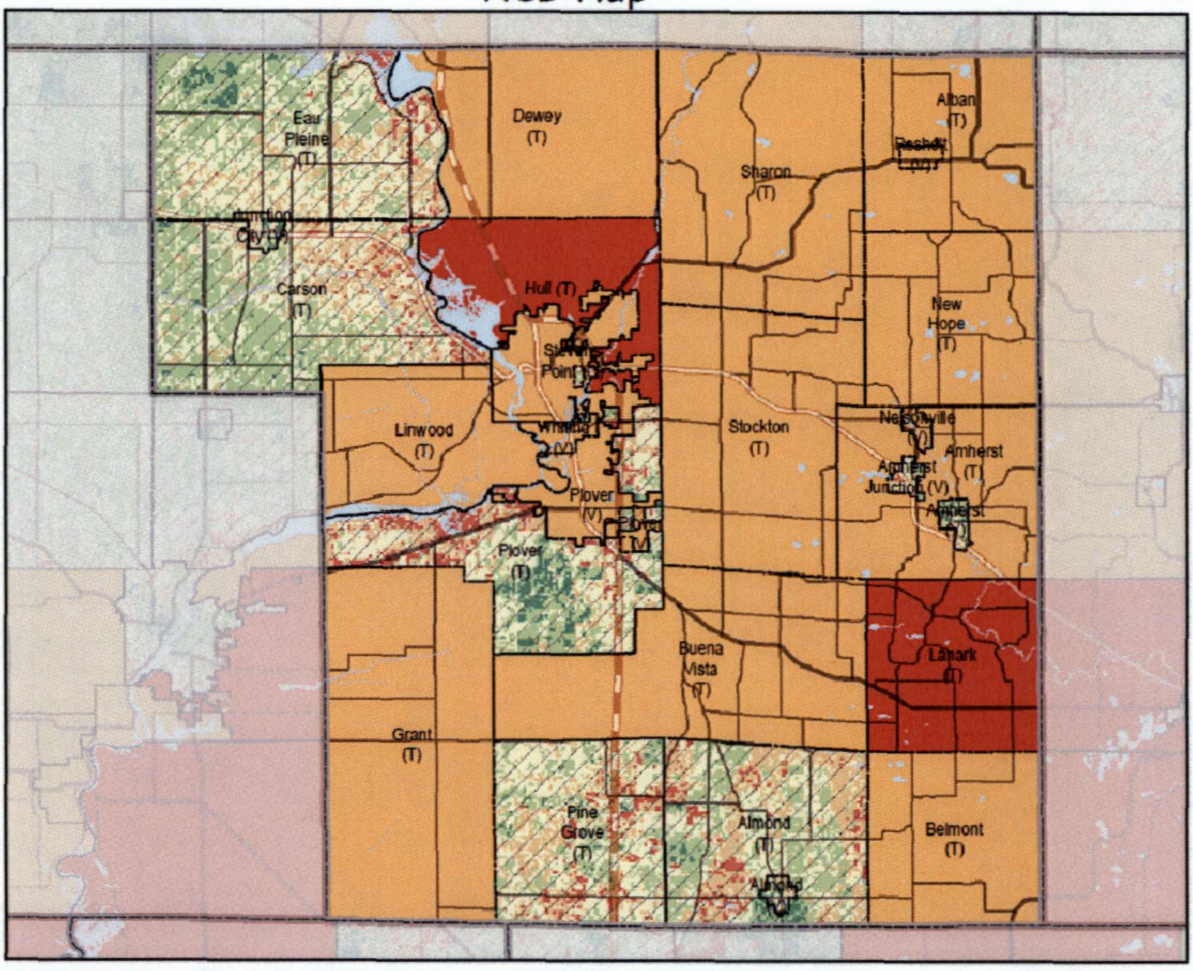
Portage County
Communities-at-Risk Composite Map





Source: WIDNR Community-At-Risk report

Portage County
MCD Map



Communities-at-Risk

MCD Name	Hazard (40%)	Risk (30%)	WUI (30%)
Hull (T)	VH	VH	VH
Lanark (T)	H	VH	H
Alban (T)	M	VH	H
Amherst (T)	H	VH	M
Belmont (T)	VH	H	H
Buena Vista (T)	H	H	M
Dewey (T)	H	H	H
Grant (T)	VH	H	H
Linwood (T)	M	VH	H
Nelsonville (V)	H	M	H
New Hope (T)	H	H	H

MCD Name	Hazard (40%)	Risk (30%)	WUI (30%)
Plover (V)	H	L	H
Rosholt (V)	H	M	M
Sharon (T)	H	VH	H
Stevens Point (C)	H	L	H
Stockton (T)	H	VH	M
Whiting (V)	VH	L	VH

1:345,799

Communities-of-Concern

Almond (T)
Carson (T)
Eau Pleine (T)
Pine Grove (T)
Plover (T)

Community-of-Concern
Communities-at-Risk, Very High
Communities-at-Risk, High

Division of Forestry, September 2008

Source: WIDNR Community-At-Risk report

Agricultural/Hydrologic Drought

Hazard Analysis

Two types of drought occur in Wisconsin – agricultural and hydrologic. **Agricultural** drought is a dry period which reduces crop yield. **Hydrologic** drought, on the other hand, 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 together.

Drought conditions may vary from below normal precipitation for a few weeks to severe lack of normal precipitation for a couple of months. Agricultural areas are primarily affected by drought since the amount and timing of rainfall has a significant impact on crop production. Therefore, the severity of a drought cannot be completely measured in terms of precipitation alone, but must also include crop yields.

History and Probability Assessment

Drought is a relatively common phenomenon in Wisconsin and occurs statewide. Portage County suffered severe crop yield decline and many wells dried up in the 1976 drought. The average annual rainfall for Portage County is 32.06 inches.

Wisconsin is very susceptible to drought. As of 2007, Portage County had 281,545 acres of farmland on 1,066 farms, and had a market value of agriculture products sold of $196,052,000 ($133,682,000 crop sales, $62,370,000 livestock sales). A small drought of limited duration can significantly affect crop growth and yields.

Small droughts of shortened duration have occurred at intervals of about one every 10 years. Widespread droughts have been infrequent in Wisconsin. The five most significant are: 2007, 2003, 1987-1988, 1976-1977, 1955-1959, 1948-1950, and 1929-1934.

Vulnerability Assessment

Due to its complex nature, understanding vulnerability to drought is a challenging task. Droughts can also have impact on other natural hazards. For example, during severe drought conditions, the threat of wild land fires greatly increases, and loss of vegetation due to droughts and/or fires also affects the potential for runoff and flooding. All areas of Portage County are at risk to drought, but farmlands and agricultural production have the potential for greater loss.