Oceana County
Community Wildfire Protection Plan

2014

WEST MICHIGAN SHORELINE
REGIONAL DEVELOPMENT COMMISSION

WEST MICHIGAN SHORELINE
REGIONAL DEVELOPMENT COMMISSION
(WMSRDC)

The WMSRDC is a regional council of governments representing 127 local governments in the West Michigan counties of Lake, Mason, Muskegon, Newaygo, Oceana, and northern Ottawa.

The mission of WMSRDC is to promote and foster regional development in West Michigan… through cooperation amongst local governments.

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WEST MICHIGAN SHORELINE
REGIONAL DEVELOPMENT COMMISSION

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This Plan was prepared by WMSRDC in conjunction with Oceana County Emergency Management, Oceana County Fire Departments, Michigan Department of Natural Resources, and United States Forest Service.

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EXECUTIVE SUMMARY

With large areas of State and National Forest, lake and streamside communities, numerous woodlots, and extensive Lake Michigan frontage, Oceana County has many areas that are at significant risk from wildfire. As a first step towards reducing wildfire risk, Oceana County Emergency Management, with the support of all eight county fire departments, secured a grant from the Michigan Department of Natural Resources to develop a Community Wildfire Protection Plan (CWPP). The grant was used to convene local, state and federal stakeholders and develop the Oceana County Community Wildfire Protection Plan which evaluates wildfire risk, areas of concern, and firefighting resources and limitations, and also identifies priority actions.

The information and maps contained within this plan are intended to educate property owners and local officials about wildfire risks in Oceana County and suggest development and property maintenance practices that can reduce the impacts of wildfire. The plan should also be used to help identify the most effective and cost-efficient projects for wildfire mitigation in Oceana County.

This plan was developed with the assistance of the West Michigan Shoreline Regional Development Commission under the guidance of the Healthy Forest Restoration Act of 2003. It represents the efforts and cooperation of a large number of organizations and agencies working together to improve the preparedness for wildfire events in Oceana County while reducing factors of risk.

I. BACKGROUND & PLANNING PROCESS

A. INTRODUCTION

In 2003 President George W. Bush signed the Healthy Forest Restoration Act (HFRA) into law. The act represents a significant federal effort to encourage cities, townships, and counties to develop wildfire plans with federal support. The HFRA encourages communities to develop fire plans in coordination with state and federal fire managers with intense community-level participation. The intention was to create plans that "Prioritize and refine [the communities] priorities for the protection of life, property, and critical infrastructure in the wildland urban interface (WUI)." In order to utilize the HFRA, communities have taken the act and developed a process for plan creation. The process affects who collaborates, how collaboration takes place, and increases the influence homeowners have in the planning process. The final result is a community wildfire protection plan (CWPP).

The purpose of a community wildfire protection plan is to engage communities, gather public input and represent the community's voice when fire management decisions are made at the state and federal level. The coordinated fuels reductions projects include state and federal lands to affect the safety of entire communities down to the neighborhood level. The CWPP is a plan that also allows for cohesive community wide fuel reduction projects with community participation and support.

In February of 2012, a grant to develop a community wildfire protection plan for Oceana County was announced. Oceana County was awarded a grant for $15,895 with a local match of $2,000 (in-kind services) by the county. The money was authorized and awarded by the Michigan Department of Natural Resources. Oceana County Emergency Management coordinated with the West Michigan Shoreline Regional Development Commission (WMSRDC) to lead the planning process, conduct meetings, collect local input, and author the plan.

This plan is organized to function as a handbook to guide the community through the steps taken during the planning process. It is intended to provide a framework for understanding the context of the decisions that were made in the community's wildfire protection plan. Each section builds upon the prior sections and content grows progressively complex. It is intended to follow a logical flow and provide understanding for the decision making process.

B. PURPOSE AND SCOPE

This plan has been designed to meet and exceed the requirements of the Healthy Forest Restoration Act (HFRA) of 2003. The minimum requirements for a CWPP as described in the HFRA are:

1) **Collaboration**: A CWPP must be collaboratively developed by local and state government representatives, in consultation with federal agencies and other interested parties.
2) **Prioritized Fuel Reduction**: A CWPP must identify and prioritize areas for hazardous fuel reduction treatments and recommend the types and methods of treatment that will protect one or more at-risk communities and essential infrastructure.
3) **Treatment of Structural Ignitability**: A CWPP must recommend measures that homeowners and communities can take to reduce the ignitability of structures throughout the area addressed by the plan.

In addition to the content and collaboration requirements, the HFRA requires that the applicable local government, the local fire department, and the state entity responsible for forest management agree to the final contents of the plan. The HFRA also recommends that the United States Forest Service (USFS) and United States Bureau of Land Management (BLM) be invited to participate in the development of the plan.

This plan is intended to influence resource allocation and planning in the context of preparations for fire related emergencies. Analysis of existing conditions and projection of future conditions of the landscape in Oceana County are intended to influence the people of the community to prepare against the threats associated with wildland fire. Where wildland fire constitutes a real and substantial threat, the plan shall discuss mitigation and management activities.

C. PLANNING PROCESS

The planning process implemented in the creation of this plan was sourced and recommended by two handbooks. They were created to aid communities in the creation of CWPP in a way that is collaborative and comprehensive; in a manner that meets the requirements of the HFRA and is unique to the community. The first handbook, the *Community Guide to Preparing and Implementing a Community Wildfire Protection Plan (August 2008),* is a supplement to the second handbook, *Preparing a Community Wildfire Protection Plan "A Handbook for Wildland Urban Interface Communities" (March 2004)*. Both handbooks were produced through multiple partners including the Communities Committee, National Association of State Foresters, Society of American Foresters, and the Western Governors' Association.

These two documents outline an approach to the creation of a CWPP that engages stakeholders and produces a community-involved plan. The planning process is broken down into steps that produce a comprehensive wildfire protection and response plan. These steps follow a logical progression in plan development and provide the framework for meetings and meeting content, thus guiding the community input and public feedback aspects of plan creation.

Step One: Convene Decision Makers

This is the initial step in developing the CWPP and involves the creation of a core team representing local government, local fire authorities, and the state fire management agency. This group forms the decision making responsibility and members must agree to the plan's contents.

Step Two: Involve Federal Agencies

Once the core team is formed they will engage local representatives of the USFS, BLM, and other federal agencies to share perspectives and information that are part of the planning process.

Step Three: Engage Interested Parties

The core team effectively engages all interested stakeholders into the planning process, in a manner leading to substantial input from community that represents and reflects the community's priorities. This step also aides in the implementation of the recommended projects.

Step Four: Establish a Community Base Map

The core team and stakeholders use the best available technology combined with local expertise to develop a base map of the community. The base map provides a baseline to assess and make recommendations regarding protection and risk reduction priorities. The base

map should identify developed areas, critical infrastructure, and provide the basis for the designation of the wildland urban interface.

Step Five: Develop a Community Risk Assessment

The risk assessment helps stakeholders and the core team effectively prioritize areas for treatment and identify the best allocation of resources.

Step Six: Establish Community Hazard Reduction Priorities and Recommendations to Reduce Structural Ignitability

This step provides the basis for essential discussion regarding the results of the fire risk assessment and its impact on local protection and prevention needs. This leads to the prioritization of fuel treatment projects across property boundaries.

Step Seven: Develop Action Plan and Assessment Strategy

This step involves the core team and key community partners in the development of a prioritized actionable list of fire mitigation projects the community wishes to consider.

Step Eight: Finalize the Community Wildfire Protection Plan

Following the collaborative development process of the plan and a brief public comment period, the plan's contents are agreed upon by the core team and supported by the local unit of government. All comments are considered and changes to the draft are proposed and discussed by the steering committee.

E. WILDFIRE ADVISORY GROUP

Step one of the planning process initiates contact between the local, federal, regional, and state levels to create a framework for the planning process. In December of 2013, a core group comprised of representatives from each of the nine fire districts in Oceana County, Oceana County Emergency Management, Oceana County Equalization, USFS, MDNR, Michigan State Parks, and West Michigan Shoreline Regional Development Commission (WMSRDC) was formed to initiate the planning process. This "wildfire advisory group" oversaw the creation, contents, and the eventual adoption of the plan.

Six meetings of the group were held between December of 2013 and June of 2014. These meetings were organized by Oceana County Emergency Management and facilitated by WMSRDC. At the meeting on June 4 elected officials, zoning officials, planning commissioners, neighborhood organizations, and other community stakeholders from throughout Oceana County were invited to join the group to learn about the CWPP. The meeting also featured a presentation about the Firewise program, which is administered in Michigan through the Michigan State University Extension. Attendees were provided with access to a preliminary draft of this plan and invited to provide comments and input

F. PLAN PRIORITIES

The four goals presented below were crafted to meet the minimum requirements of a CWPP, and to ensure the plan meets the wildfire needs of Oceana County. As products of research,

risk assessment, and collaboration that occurred during the planning process, these goals provide a framework for the proposed actions contained within this plan.

OCEANA COUNTY CWPP GOALS

1. **Mitigate Accidental Ignitions**
2. **Reduce Catastrophic Fire Potential**
3. **Fortify Existing Structures and Infrastructure**
4. **Support Fire Suppression and Emergency Response Capabilities**

II. COMMUNITY PROFILE

A. OVERVIEW

Oceana County is located in the west-central part of Michigan's Lower Peninsula. The county borders Mason County to the north, Newaygo County to the east, Muskegon County to the south, and Lake Michigan to the west. The county has a land area of 512.07 squares miles, which notably includes sections of the Manistee National Forest in the eastern half, state-owned lands in the northwest, and coastal sand dunes along Lake Michigan. The county has a total water area of 3,245 acres and about 30 miles of Lake Michigan coastline. The 2007 Census of Agriculture shows 67.6% of the total county land area in farms (this includes both land involved in crop production and areas on the farm property such as woodlots, wetlands, etc.). There are numerous recreational opportunities in the Manistee National Forest, as well as other outdoor recreation opportunities such as canoeing, fishing, sightseeing, and agri-tourism.

The county had a U.S. Census population in 1970 of 17,984 persons. Population significantly grew to 26,873 in 2000, and then slightly decreased to 26,570 as of the 2010 U.S. Census. The population is estimated to nearly double at times during the summer season. Oceana is a mainly rural county; just one-quarter of the population resides within one of the county's seven incorporated communities. Additional concentrations of development are common in communities close to Lake Michigan and surrounding inland lakes.

In terms of ethnicity, the 2010 population consisted of 23,952 White, 119 Afro-American, 285 American Indian or Alaskan Native, 3,629 Hispanic or Latino, 531 "two or more" races, and 1,618 "some other" race. In 2010, there were 15,944 total housing units with 10,174 occupied and 5,770 vacant. A large portion of vacant housing units consisted of seasonal dwellings and temporary migrant worker dwellings. Per capita income in 2010 was $18,065 and median household income was $39,043.

B. HISTORY

The first settlers in Oceana County arrived at the mouth of Whiskey Creek in the late 1840's, in what is now Claybanks Township. They chose the area because it had very fertile clay loam soil and several acres had been cleared by Native Americans. By the 1850's, there were 36 people living in the settlement. The earliest settlers included Reverend William M. Ferry and his son Thomas. Together they bought 1,300 acres of woodland along Stony Creek and opened the area's first sawmill. Another settler was Charles Mears, who founded present-day Pentwater. He built a sawmill in the mid-1850's and improved the channel between Pentwater Lake and Lake Michigan.

Officially organized on May 31, 1855, Oceana County was named after its long shoreline on Lake Michigan. The first county seats were Stony Creek and Whiskey Creek. In 1864, the county seat was moved to Hart in the northwestern part of the County. An influx of new settlers and lumbermen increased the county's population from 7,000 in 1870 to 12,000 in 1880. The best timber had been cut by the 1880's, and the residents by that time found the cut over areas provided excellent locations for farming special crops and orchards. In the early 1860's, apple and peach trees were planted near Little Point Sable. In 1867, peaches, plums, and pears were brought to Pentwater, marketed, and shipped to Chicago.

Today, Oceana County has become one of Michigan's leading horticultural producers. According to the Michigan Department of Agriculture, in 2009 the county ranked first in acres of asparagus and tart cherries, and second in acres of all vegetables and second in revenue from Christmas tree sales. It also ranked third in number of controlled atmosphere storage facilities and fifth in number of food processing plants. In addition, the county ranked #1 in the nation for acreage of tart cherries and #2 for acreage of asparagus according to the 2007 Census of Agriculture.

Historic Sites in Oceana County

Federal Register of Historic Places

- Jared H. Gay House, Rt. 2, 128th Ave., Crystal Valley
- Little Sable Point Light Station, Little Sable Point, Golden Twp
- Green Quarry Site, Address Restricted, Mears
- Charles Mears, Silver Lake Boardinghouse, Corner of Lighthouse and Silver Lake Channel Rds., Mears
- Dumaw Creek Site, Address Restricted, Pentwater
- Navigation Structures at Pentwater Harbor, West End of Lowell St., Pentwater
- US 31-Pentwater River Bridge, US 31 over Pentwater R., Weare Twp

State Register of Historic Places

- Hart Historic Industrial District, 215-216 Lincoln St. & 109 Union St. (Hart)
- US-31 (Old) Pentwater River Bridge, Oceana Dr. over Pentwater River (Hart)
- Benona Township Hall, 5400 W. Woodrow (Benona Twp)
- Little Point Sable Light Station, Little Sable Point (Benona Twp)
- Charles Mears, Silver Lake Boardinghouse, Lighthouse & Silver Lake Channel rds. (Golden Twp)
- Veterans Day Storm-Graveyard of Ships Informational Designation, 421 S. Hancock St. (Pentwater)
- Jared H. Gay House, Route 2, 128th Avenue (Crystal Valley)

C. ECONOMIC SETTING

The main industry in Oceana County is agriculture. Specialty crops are marketed fresh, frozen, or canned. Food processing is an important component of the agriculture industry and of the overall economy of the county. These operations are among the county's largest employers. The other main industries are tourism; the production of lumber for pallets, crates, and baskets;

and machine tooling and casting. Tourism is a vital part of the economy along the county's coastline. Pentwater and the Silver Lake area are major summer attractions.

D. AGRICULTURE

A variety of soils and relief exist throughout Oceana County. These factors, as well as the moderating effects of Lake Michigan on the climate, have resulted in a variety of agricultural products. While over two-thirds of the county land is held in farms, a 2009 Michigan Department of Agriculture report states that 37.7 percent of the total land area (123,384 acres) is actually cropland. Corn, soy and wheat crops were grown on 20,619 acres (16.7% of cropland), while about 13,122 acres were used for vegetables (10.6% of cropland). In northeastern areas of the county, vegetables and corn have recently become the major crops and corn production has increased. Fruit and tree nuts accounted for 16,061 acres (11.4% of cropland). Oceana County leads the State in acreage of asparagus and tart cherries. Asparagus is grown mainly on coarse textured, excessively drained soils. Other vegetables, such as cucumbers and squash, generally are grown on coarse textured to medium textured, well-drained soils. Tart cherries, sweet cherries, apples, peaches, pears, prunes, and plums are the major fruits grown in the county. They are generally grown in the rolling areas where frost damage is minimized. Many of the fruit-producing areas are in the western half of the county, where the proximity of Lake Michigan reduces the effects of frost. The production of fruit tree nursery stock and Christmas tree plantations are important enterprises. Oceana County is second in the State in revenue from Christmas tree sales. Some of the farmland in the county is used for livestock enterprises and hay crops. The livestock are mainly hogs, beef, and dairy cows, while alfalfa is the primary hay crop.

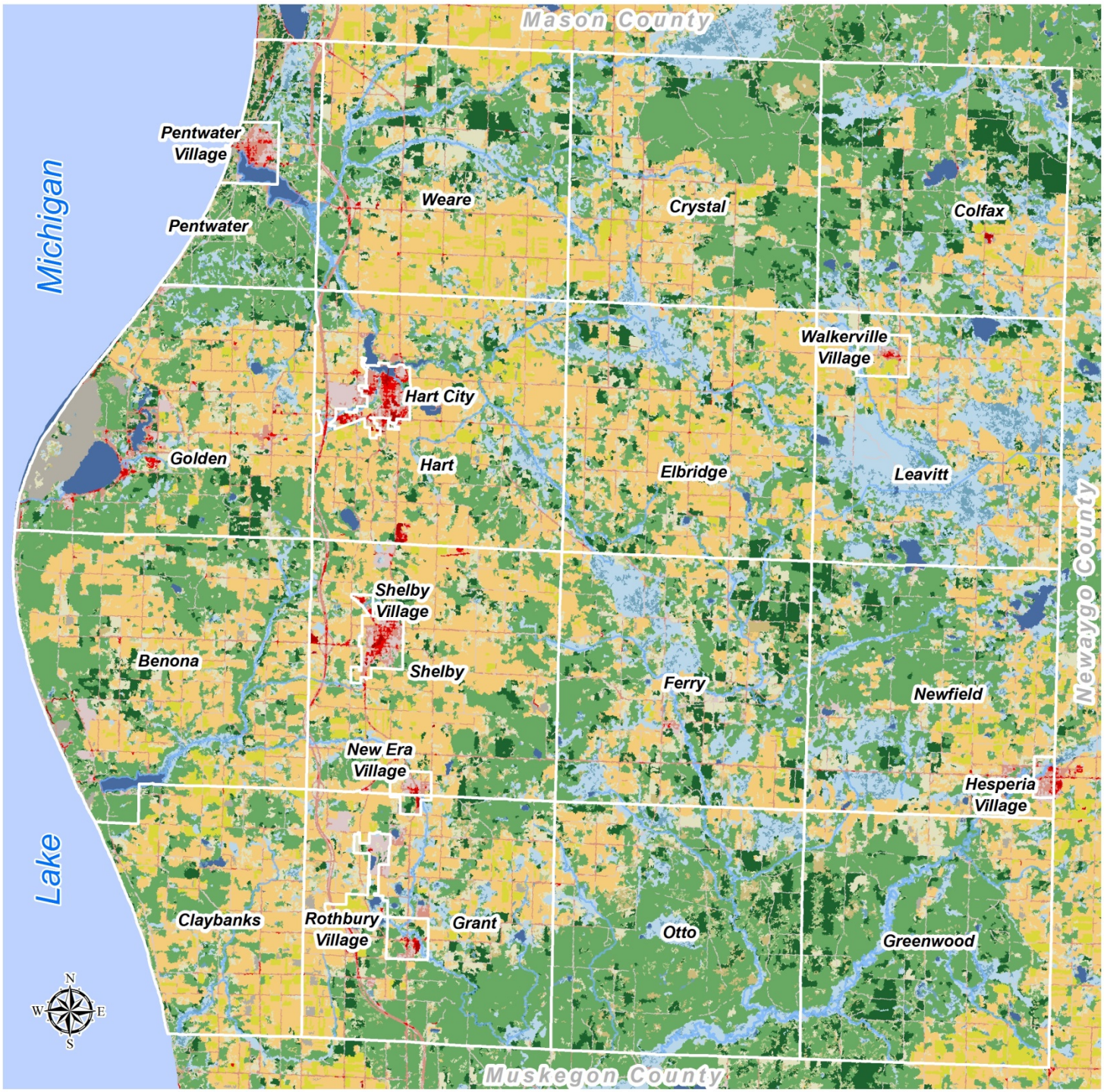
E. LAND COVER & VEGETATION

According to 2011 land cover data created by the Multi-Resolution Land Characteristics Consortium (MRLC), almost 31% of Oceana County is covered by deciduous forest with the largest portions in the southeastern and northeastern areas. Deciduous forest also covers significant portions of the mid- and north-western areas of the county. The second most prevalent land cover type is cultivated crops which make up about 24% of the total. This cover is generally interspersed through the county, and is most prevalent along the US-31 corridor and between Hart and Walkerville. Woody wetlands and herbaceous vegetation are the third and fourth most prevalent land cover types covering about 10% and 9% of the total land area respectively. These land covers exist mostly along rivers and streams. High, medium, and low intensity development only account for about 3.65% of the total land cover, and are most prevalent in the county's city and villages. However, notable densities do exist in the western part of the county and along the shores of Lake Michigan and some major inland lakes.

Land Cover Type	%
Open Water	1.10
Developed, Open Space	3.85
Developed, Low Intensity	3.22
Developed, Med. Intensity	0.35
Developed, High Intensity	0.08
Barren Land	0.97
Deciduous Forest	30.69
Evergreen Forest	6.74
Mixed Forest	1.94
Shrub/Scrub	2.45
Herbaceous	9.01
Hay/Pasture	2.94
Cultivated Crops	24.3
Woody Wetlands	10.10%
Emergent Herbaceous Wetlands	2.23%

Percentages calculated by WMSRDC.
Source: MRLC NLCD Database, 2011

Oceana County
2011 Land Cover



NLCD Classifications

- Barren Land
- Cultivated Crops
- Deciduous Forest
- Developed, High Intensity
- Developed, Low Intensity
- Developed, Medium Intensity
- Developed, Open Space
- Emergent Herbaceuous Wetlands
- Evergreen Forest
- Hay/Pasture
- Herbaceuous
- Mixed Forest
- Open Water
- Shrub/Scrub
- Woody Wetlands

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Map Created May 2014 Source: MRLC NLCD Database 2011 , MI Geographic Framwork V12

F. HOUSING

Oceana County is a rural, agricultural place, augmented by a variety of attractive landscapes and recreational opportunities. It is no surprise that the housing stock is generally dispersed across the landscape. (Only about one-quarter of the population lives within an incorporated community.) A great many of these housing structures are nestled in hard to access areas such as coastal sand dunes and inland forests.

With 36 percent of the housing units "vacant," there is a surplus of housing with respect to the permanent population. However, 75 percent of those units are considered "vacant for seasonal, recreational, or occasional use."

Nearly 20 percent of the housing stock was constructed prior to 1940, and nearly 30 percent was built in 1990 or later.

Oceana County Housing	#	%
Total housing units	15,944	100.0
Occupied housing units	10,174	63.8
Vacant housing units	5,770	36.2
For rent	170	1.1
Rented, not occupied	21	0.1
For sale only	239	1.5
Sold, not occupied	62	0.4
For seasonal, recreational, or occasional use	4,381	27.5
All other vacants	897	5.6

Source: U.S. Census, 2010

Year Structure Built	#	%
Total housing units	15,949	100
Built 2010 or later	51	0.3
Built 2000 to 2009	1,633	10.2
Built 1990 to 1999	2,994	18.8
Built 1980 to 1989	1,823	11.4
Built 1970 to 1979	2,748	17.2
Built 1960 to 1969	1,611	10.1
Built 1950 to 1959	1,096	6.9
Built 1940 to 1949	955	6.0
Built 1939 or earlier	3,038	19.0

Source: ACS 2008-2012 5-Year Estimates

F. WATER FEATURES

Lake Michigan marks Oceana County's western fringe with about 30 miles of coastline. The lone harbor offering recreational access to the "big lake" is located in Pentwater. There are about 65 inland lakes and 3 major river systems. The largest lakes are Silver (690 acres), Pentwater (430 acres), Stony (278 acres), McLaren (271 acres), and Hart (240 acres). Bodies of water that are more than 40 acres in size make up a total of about 3,245 acres in the county. The major rivers are the north and south branches of the Pentwater River, the north and south branches of the White River, and the South Branch Pere Marquette River.

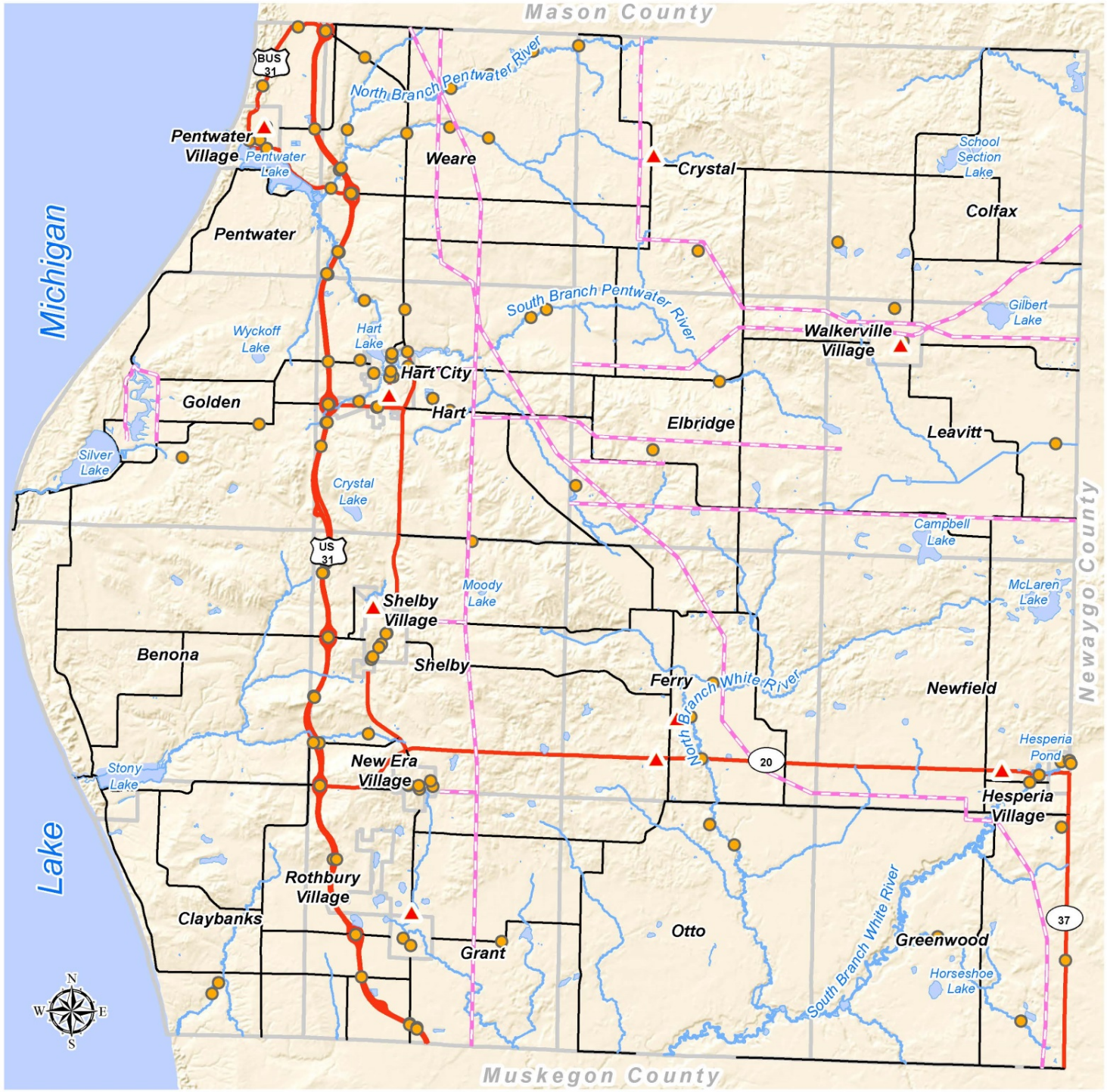
G. CLIMATE

The major climatic variations in the county, even among areas that are near one another, are mainly the result of differences in topography and the proximity to Lake Michigan. Between 1981 and 2010, the average winter (December through February) temperature is 25.1 degrees

Fahrenheit at Hart on the west side of the county and 24.4 degrees at Hesperia on the east side. The average daily minimum temperatures are 18.3 degrees at Hart and 16.3 degrees at Hesperia. The lowest temperature on record is -35 degrees at Hart on February 11, 1899. In summer (June through August), the average temperatures are 67.0 degrees at Hart and 67.1 degrees at Hesperia. The average daily maximum temperatures are 77.7 degrees at Hart and 79.7 degrees at Hesperia. The highest recorded temperatures were 104 degrees at Hart on July 13, 1936 and 100 degrees at Hesperia on August 21, 1955.

The total average annual precipitation is 36.75 inches at Hart and 35.02 inches at Hesperia. On average, over half of the total precipitation falls in April through September. The growing season for most crops falls within this period. The heaviest 1-day rainfalls during the period of record were 5.43 inches at Hart and 6.56 inches at Hesperia, all on September 11, 1986. Thunderstorms occur between 30 and 34 days each year, mostly in June, July, or August. The average annual snowfall between 1981 and 2010 was 81.6 inches at Hart and 71.1 inches at Hesperia. Maximum snow depths generally occur in the month of January. On the average, 98 days of the year at Hart and 97 days of the year at Hesperia have at least 1 inch of snow on the ground. The number of such days can vary greatly from year to year. The heaviest 1-day snowfalls between 1981 and 2010 were 15.0 inches at Hart and 12.3 inches at Hesperia. The greatest monthly snowfalls were 88.7 inches at Hart in December 2008 and 78.9 inches at Hesperia in December 2008. The greatest annual snowfalls were 201.4 inches at Hart in 2008 and 144.4 inches at Hesperia in 2008. The least annual snowfalls were 27.6 inches at Hart in 1998 and 30.0 inches at Hesperia in 1993. The average relative humidity in mid-afternoon is about 64 percent. Humidity is higher at night, and the average at dawn is about 81 percent. The prevailing wind is from the south-southwest. Average wind-speed is highest, at 12.5 miles per hour, in January.

Oceana County
Community Base Map



Interstate/Trunkline
County Primary
Utility
Fire Station
Critical Facility
River/Stream
Lakes

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Map Created March 2014 Source: USGS TNM, MRLC NLCD Database 2011, MI Geographic Framework V12

III. WILDFIRE RISK ASSESSMENT

A. WILDFIRE DESCRIPTION

Most Michigan wildfires occur close to where people live and recreate, which puts people, property, and the environment at risk. Development within and around forested areas often increases the potential for loss of life and property from wildfires, since most fires are caused by human activities, such as outdoor burning.

Wildfires are a normal ecological phenomenon and serve long-term functions for vegetation and the natural environment. Wildfires can burn excessive brush, maintain large savannah-like openings, and restore wetlands by forcing out unwanted brush and vegetation. The natural function of fires within the environment can be considered a renewal or "cleansing process" as long as the fire is not too severe.

The negative impacts and immediate danger from wildfires are destruction of timber, property, wildlife, and injury or loss of life to persons who live in the affected area or who are using recreational facilities in the area. Other long-term and corollary effects of wildfire may include:

- Increased erosion and flooding, due to the disappearance of vegetation that would otherwise protect soils and slow surface runoff of water;
- Smoke (poor visibilities and air quality), closed roadways, and infrastructure impacts that may interfere with ordinary life, the economy, and planned tourism-based events; and
- Structural fires, particularly near outdoor recreation areas and wildland-urban interfaces.

The threat of wildfire may be elevated in times of drought, high heat, high wind, and/or low humidity. Unfortunately these conditions often coincide with attractive conditions for outdoor activity and recreation. This only compounds the fact that most wildfires are induced by human activity, rather than as a part of natural processes. Other factors that may increase the risk or severity of wildfire include: mild winters with abnormally low precipitation, allowing brush and other wildfire fuels to dry out; wind storms and frost/freeze damage, increasing the availability of dead fuels; and slow/late green-up in the spring. Conversely, a harsh winter with a heavy deep snowpack can mitigate wildfire risk in the spring. Such conditions compact dead fuels, reducing their surface-to-mass ratio and allowing them to retain moisture longer.

B. WILDFIRE HISTORY

Contrary to popular belief, lightning strikes are not the primary cause of wildfires in Michigan. Between 2001 and 2010, only about 7% of all wildfires in Michigan were caused by lightning strikes, while most other causes were attributed to human activity. Outdoor debris burning is the leading cause of wildfires in Michigan in recent years, comprising nearly one-third of the total. Most Michigan wildfires occur close to where people live and recreate, placing both people and property at risk.

Wildfires occur annually in Oceana County, and have had significant effects on the area. The first recorded catastrophic fire in Michigan occurred in October of 1871 after a prolonged drought over much of the Great Lakes region in the preceding summer months. Logging waste and debris, dried from the drought, greatly contributed to the spread of the fire. A similar series of wildfires burned in the spring and summer months of 1891. These fires played a role in dismantling Michigan's logging industry, and subsequently weakening Oceana's economy.

Wildfire incidents have continued to occur in Oceana County and nearby areas of the state since the late 1800's despite advances in firefighting technology and methodology. These advances have reduced the number of acres burned per year and have helped prevent major wildfires such as those of 1871 and 1891.

While Oceana County has not experienced a catastrophic wildfire in recent memory, smaller wildfires happen numerous times each year. The more damaging wildfires tend to occur along the Lake Michigan shoreline. In 2005, a notable wildfire in Benona Township scorched 17 acres, destroyed 2 houses and 16 walkways, and damaged 5 other homes. Two examples of human-caused wildfires happened in Golden Township in 2012. In June, a gust of wind caused a campfire to spread to nearby dune grass along the Lake Michigan shoreline. The fire scorched 2.4 acres of land, damaged a number of residential decks, and required special equipment to maneuver around the dunes and beach sand to quell the flames. The other instance happened in July, when a fire resulted from fireworks being ignited in the area. This fire also occurred along the Lake Michigan shoreline and burned one acre of dune grass.

A significant task of this CWPP was to collect and compile wildfire records from each fire district and the MDNR. Each department provided wildfire records going back anywhere from 10 to 27 years. These have been compiled and placed on a map which can be found in Appendix C. Unfortunately no two departments in Oceana County record and maintain records of wildfire the same way. As such, it was not possible to conduct countywide statistical analyses of wildfire histories based on the information provided. However, the information provided can help identify general observations, such as:

- Fire department calls for wildfire are most common where people live and recreate.
- Nearly all wildfires in Oceana County have been the result of human activity.
- The most common cause of wildfire from 1986-2013 was garbage and/debris burning.
- Only 3 out of 544 documented fires were attributed to lightning.

It may be beneficial to establish a countywide standard for reporting and recording wildfires. This would enable a more useful analysis of county wildfire patterns, which could be used to inform the selection of appropriate wildfire mitigation measures.

C. WILDFIRE SETTING

Forests cover approximately half of Oceana County's land area. The forest cover is a boon for the economy and quality of life. However, it also makes many areas of the county potentially vulnerable to wildfires. Throughout the county, private developed lands, critical facilities, infrastructure, and agriculture can be found adjacent to or scattered within forested lands. This section provides a summary of wildfire concerns in Oceana County that were identified during meetings of the Wildfire Advisory Group.

Perhaps the greatest wildfire concern in Oceana County is along the Lake Michigan shore. Development there is often characterized by dwellings tucked away on wooded lots. Adding to this concern is the prevalence of poor or inadequate access for first responders, such as narrow drives, extreme topography, and abundant fuels. This environment hinders fire suppression efforts and puts emergency responders at risk. The potential for significant loss is compounded by the presence of large homes and higher property values in these areas.

State and federally-owned forestlands are another variable of the wildfire equation in Oceana County. Inadequate or non-existent motorized vehicle access to densely forested areas owned by state and federal agencies is commonly cited as an issue of public safety. At least a small portion of the Manistee National Forest can be found in the townships of Colfax, Crystal, Elbridge, Ferry, Grant, Greenwood, Leavitt, Newfield, Otto, Shelby, and Weare. Colfax, Crystal, Greenwood, and Otto townships have the greatest acreage of national forest. State-owned lands in the county are highlighted by larger tracts in Golden and Pentwater townships; the Pentwater River State Game Area in Pentwater and Weare townships; and state parks in the Village of Pentwater and Golden Township.

Additional wildfire concerns in Oceana County include potential economic impacts of wildfire on agriculture, tourism, and recreation. Even a small fire could disrupt local commerce given the right circumstance. Other factors that contribute to wildfire risk in Oceana County include blight (associated with trash burning), pine stands and plantations, and oil / gas wells (specifically those with known detectable levels of hydrogen sulfide).

D. WILDLAND-URBAN INTERFACE (WUI)

A crucial step in local level wildfire management is the designation of the wildland urban interface or "WUI." The wildland urban interface is defined by the National Wildfire Coordinating Group as:

"The line, area, or zone where structures and other human development meet or intermingle with undeveloped wildland or vegetative fuels."

In general, the WUI is an area that is subject to the natural conditions of the wildland. When conditions are right for fire in the wildland, there is a corresponding threat to structures, life, and property. The presence of human inhabitants also poses a special risk in these areas by way of non-natural ignition sources. In general, the threat of fire increases in the area designated as the WUI due to this human activity.

Designation of the WUI

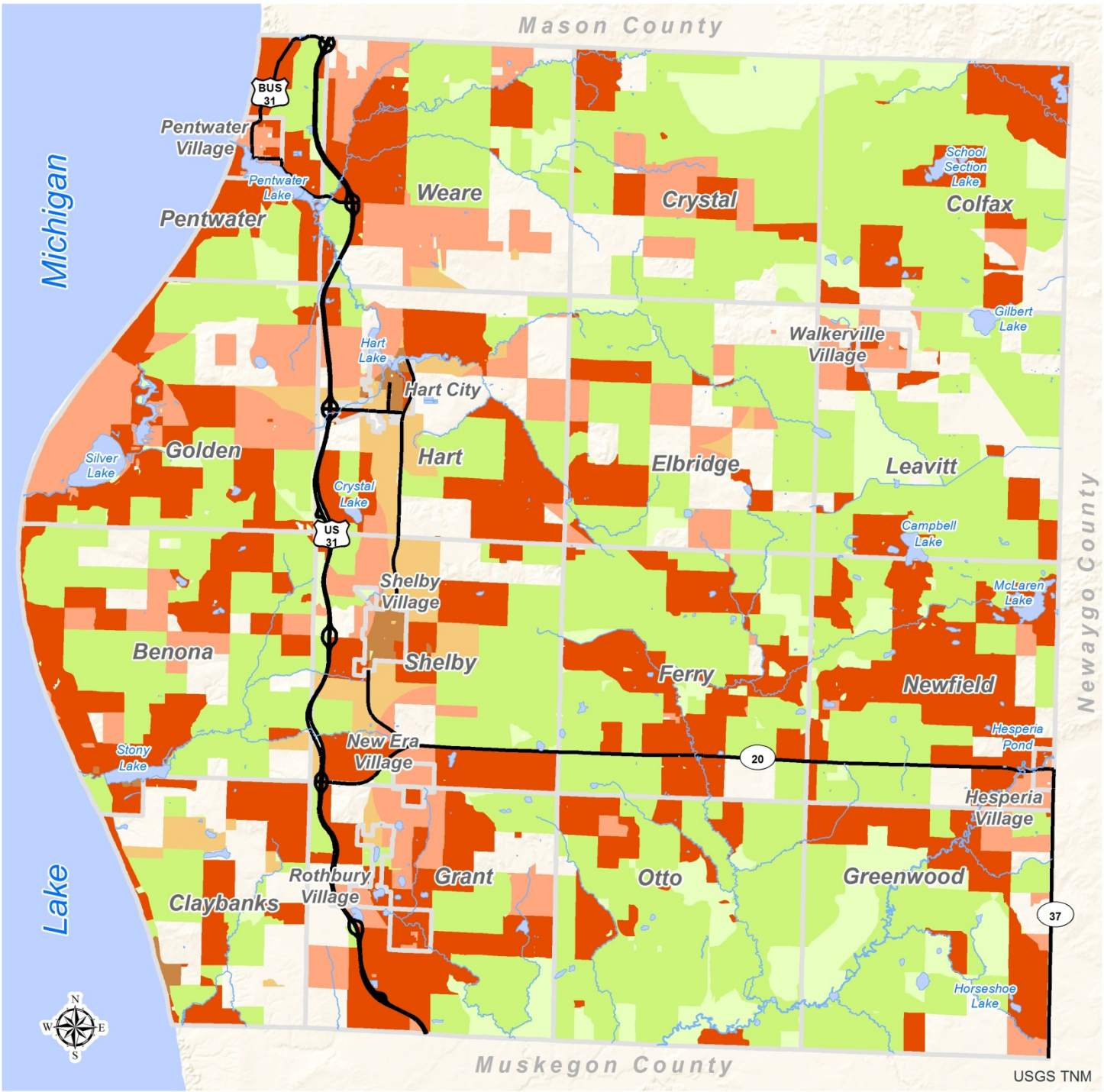
WUI is a fundamental issue in community wildfire protection plans. It is the local level where human development may be threatened by wildfire. This defined area must be reviewed, verified, and accepted by the local authority having jurisdiction and state fire management to meet the objectives of HFRA 2003.

Oceana County contains a variety of landscapes and a variety of contexts in which development exists. Therefore it is difficult to concisely define the WUI. The WUI was discussed at several meetings of the Wildfire Advisory Group. It was ultimately decided that this plan should not adopt a strict WUI definition; as doing so may cause some WUI areas to be overlooked. The advisory group agreed on the following broad definition for WUI in Oceana County:

"Any area where structures and other human developments meet hazardous vegetative fuels."

The generally defined Oceana County WUI is shown on the Wildland-Urban Interface Map on the following page. Data for this map was provided by the U.S. Forest Service, and identifies where structures are scattered throughout wildland areas (intermix areas), and where structures directly abut wildland fuels (interface areas).

Oceana County
Wildland-Urban Interface Map



WUI
- Intermix
- Interface

Non-WUI Vegetated
- Low Density Vegetated
- Uninhabited Vegetated

Non-Vegetated Housing Density
- High and Medium Density
- Low Density

Inermix- area where structures are scattered throughout a wildland area with no clear line of demarcation.
Interface- area where structures directly abut wildland fuels with a clear line of demarcation between residental, business, public structures, and wildland fuels.

WMSRDC WEST MICHIGAN SHORELINE REGIONAL DEVELOPMENT COMMISSION

Map Created March 2014Source: USFS, USDA Forest Service
North Central Research Station, Universtiy of Wisconsin-MadisonMI Geographic Framwork V12

E. RISK ASSESSMENT

In order to make informed planning decisions, the identified wildfire concerns and defined WUI must be paired with an analysis of conditions on the ground. It is known that areas of development located within or adjacent to wildland fuels have an inherently greater risk of damage from wildfire. Therefore, the Oceana County WUI Wildfire Risk Map on the following page shows an analysis of the aforementioned WUI and "Average Year Fire Hazard Risk" data obtained from the U.S. Forest Service (USFS). In order to determine WUI risk using these datasets, a weighted overlay analysis was performed using ESRI's ArcGIS computer mapping software. The weighted overlay tool allows for the comparison of variables by creating "common denominators" between different datasets. The tool also allows the ability to assign a measure of influence, or weight, to each dataset. This function is useful when trying to solve multi-criteria problems such as selecting the best site for development of a new facility, or in this case, assigning a scale of wildfire risk in WUI areas of Oceana County.

For this assessment, the Average Year Fire Hazard Risk was considered a more influential factor and predictor of risk than the WUI dataset itself. The wildfire risk dataset estimates fire hazard according to anticipated fire behavior for a community in an average year, while the WUI dataset highlights areas where development abutted (interface) or was dispersed throughout (intermix) wildland areas. The WUI dataset therefore provides no direct assessment of wildfire risk, potential fire behavior or intensity, but does provides the geographic area and context for evaluation. Areas within the WUI boundaries that intermixed with wildland vegetation were considered to be at a higher risk in the context of this assessment than were areas that abutted or were not directly adjacent to wildland areas.

With those assumptions established, the following criteria were applied in order to conduct the analysis. The Average Year Fire Hazard Risk dataset was assigned a 65% level of influence and the WUI dataset was assigned 35% influence on the outcome of the analysis. To establish common denominators, risk factors within each dataset were assigned values on a scale of 1 to 9; 9 being the highest risk and 1 being the lowest. For example, crown fire was considered to be the most hazardous and intense type of wildfire within the Average Year Fire Hazard Risk dataset and was assigned a 9. Areas within the WUI dataset that were high density and intermixed with wildland vegetation were also assigned a risk factor ranking of 9.

The weighted overlay analysis produced a dataset of wildfire risk values within the Oceana County WUI on a scale of 0 to 9, where larger values indicate higher risk. On the map, these values are geographically displayed at a 30-meter resolution. Values of 0 were omitted from the map, and the remaining values were grouped into three categories: "low risk," "moderate risk," and "high risk." This helped to paint a clearer, more organized picture of wildfire risk.

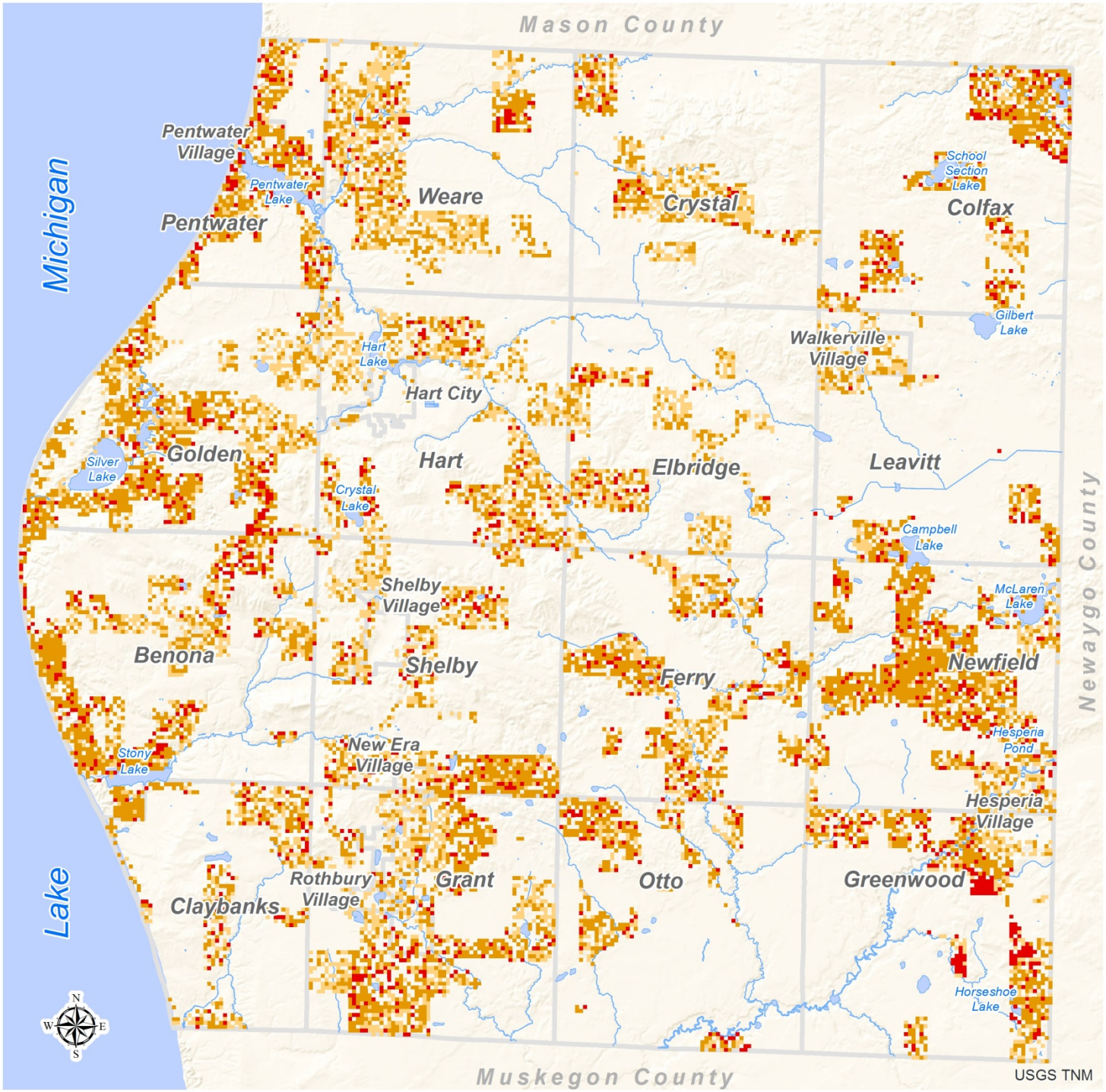
The purpose of the analysis is to highlight areas of development that may be subjected to a greater risk of impacts from wildfire. The levels of risk indicate where there may exist an **increased potential** for loss of life or property, should a wildfire occur. The analysis does not intend to indicate wildfire risk in terms of likelihood of occurrence. The map should be used as a

tool to help identify areas where mitigation measures will be the most effective in lessening the impacts of wildfire in Oceana County.

The Wildfire Advisory Group reviewed the Oceana County WUI Wildfire Risk Map at its April 1, 2014 meeting. It was agreed that the map reasonably depicts areas of higher wildfire risk, and that it aligns with wildfire concerns identified in group discussions.

Lastly, it should be noted that this risk assessment is limited to WUI areas identified by USFS data. Maps showing countywide wildfire risk in terms of potential severity due to the type of vegetation are included in Appendix C. Other maps that were created to help analyze wildfire conditions in Oceana County during the development of this plan are found there as well. Sources of digital geographic information utilized to create the maps in this plan include: U.S. Forest Service, U.S. Geological Survey, Multi-Resolution Land Characteristics Consortium, LANDFIRE, Michigan Geographic Data Library, Oceana County GIS, and WMSRDC.

Oceana County
WUI Wildfire Risk Map



Wildfire Risk

- Low Risk
- Moderate Risk
- High Risk

Map Created March 2014 Source: USFS, USDA Forest Service North Central Research Station, Universtiy of Wisconsin-MadisonMI Geographic Framwork V12

IV. WILDFIRE MITIGATION

The information presented thus far is intended to aid the identification of mitigation projects, and to help ensure the efficient and effective implementation of those projects. The previous section discussed areas of the county where fires tend to occur, and areas where wildfire poses the greatest risk to life and property. The fire risk assessment map, combined with input from local fire departments regarding wildfire risk, provide the baseline for wildfire planning decisions to be made. Now that it is known where threats exist and where risks are generally the greatest, the discussion shifts to identification of potential mitigation measures.

A. FUEL MANAGEMENT

Fuel management is the primary line of defense against the threat of an approaching wildfire. Proactive fuels management projects are an excellent way to protect property and prevent losses associated with wildfire. The National Wildfire Coordinating Group defines fuel management as the following:

(The) "Act or practice of controlling flammability and reducing resistance to control of wildland fuels through mechanical, chemical, biological, or manual means, or by fire, in support of land management objectives."

The first step is to outline fuel types and fuel arrangements that contribute to fire behavior in wildland areas.

Fuel Types

An understanding of the fuel types and fuels arrangement in the wildland is the first step to understanding how to manage fuels.

Fine Fuels- easy to ignite fuels with a diameter of less than one-quarter inch that are rapidly consumed and produce large flames. Examples include pine needles, dried grasses, dead leaves and twigs.

Coarse Fuels- thicker diameter fuels are slower to ignite, but when ignited burn for an extended time, producing small flames or smoldering. Examples of this fuel include tree trunks, limbs, and duff (the topmost layer of soil that is partially decayed).

Fuel Arrangements

The arrangement of fuel in the wildland affects how fire spreads in wildfire scenarios.

Fuel Loading- refers to the quantity of fuels in a given area that are available for combustion. Firefighters should be aware of both composition and moisture content.

Horizontal Continuity- a description of the arrangement of fuels horizontally across the landscape. The arrangement may be continuous or patchy. Patchy areas include places that have little or no vegetation including bare ground and other non-fuel areas. Continuous areas are places with uninterrupted vegetative fuels.

Vertical Arrangement- a description of the vertical arrangement of fuels, including: ground fuels (found beneath the surface); surface fuels (resting on the ground's surface or immediately above the surface); and aerial fuels (all vegetation in a forest's understory and canopy).

The Fuel Ladder- describes how fuels allow surface fires to move into the forest canopy. It is composed of three areas; the ground level, the understory, and forest canopy.

The following strategies may be utilized to manage fuels.

Vegetative Treatments

In order to stop or slow the progression of a wildfire, an interruption of the *horizontal continuity* and/or a break in the *fuel ladder* may be enough to prevent or inhibit catastrophic fire. Breaking the continuity of fuels in the wildland is referred to as 'vegetative treatment.' This can be achieved through the application of any number of different fuels treatments, or by prescribing a combination of treatments.

Fuel Ladder- treatment of the fuel ladder can be an excellent means of preventing catastrophic fire. By removing the aerial fuels in the understory of the forest from the ground to approximately 6 feet above the ground, it is possible to prevent fire from moving from the ground into the understory and the canopy. Treating the fuel ladder around structures and areas prone to crown fires may mitigate the potential for catastrophic fire.

Vegetative Thinning- treatment of the horizontal continuity of fuels can slow the spread and intensity of fires in the wildland. In general, the spacing of trees or tree groups 10 – 15 feet apart can prevent torching. Thinning of shrubs and separation of shrubs by at least 15 feet can also lessen the intensity of fires.

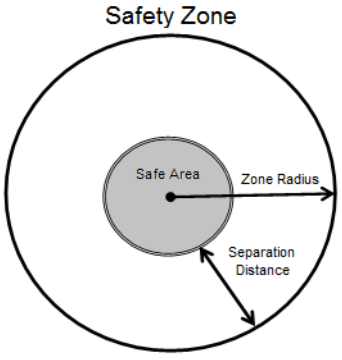
Crown Thinning- a form of vegetative thinning that applies to the forest canopy. This method slows the movement and intensity of fire through the canopy. By spacing tree crowns or groups of tree crowns 10 feet or more apart, torching can be stopped under most conditions.

Fuel Breaks- literally a break in the fuels complex of the forest. Fuel breaks can be effective in mitigating surface fires, understory fires, and if wide enough can stop the spread of a canopy fire. If the intention of the fuel break is to stop the spread of a canopy fire, its width should be at least 1½ the length of the flames of a high intensity fire.

Fuel Break System- a series of modified strips, fire resistance areas, or blocks of cleared land tied together to form a continuous strategically located fuel break.

Safety Zones

A safety zone is similar to a fuel break but intended to protect fire-fighters and vehicles from a wildfire. It should be easily accessible and large enough to keep fire fighters at least four times the distance of the height of the tallest flames of the adjacent burning fuels. For example, a safety zone with fuels that burn at 20 feet should have an 80 foot buffer zone between the fire and personnel and be at the least ½ an acre in size.



Flame Height	Separation Distance	Area in Acres
10 feet	40 feet	1/10 acre
20 feet	80 feet	½ acre
50 feet	200 feet	3 acres
75 feet	300 feet	7 acres
100 feet	400 feet	12 acres
(1 acre = 208 feet x 208 feet, or the approximate size of a football field)		

Shelter-in-Place

Similar to the 'safety zone' concept, a shelter in place is an area that can be protected from a wildfire. It is a way to protect the public from an advancing wildfire by instructing people to remain inside a safe structure until the danger passes. This method of incident response can be implemented where time, hazards, and logistics make an evacuation impossible. The success of this tactic depends on detailed preplanning that takes into account the construction type, building materials, topography, and the surrounding fuel loading.

Defensible Space

The area around every home and structure should be examined and considered to become "defensible space." With implementation of proper fuels management, this area can be defendable by a fire department in fire scenarios. Fire departments should keep track of homes that have implemented defensible space. In the event of a wildfire, a fire department may not be able to protect structures or homes without defensible space and may divert resources to areas that may be more easily protected. As one of the most effective means of mitigating community wildfire risk, landowners should be urged to adopt the practice.

Stewardship Contracting

A by-product of hazardous fuel reductions can be a large quantity of woody biomass. This by-product can be utilized by local "sustainable" industries. Becoming familiar with industries interested in utilization of biomass and inviting them to participate in the mitigation process could be mutually beneficial to local governments and local business. These beneficial relationships can develop into partnerships and can increase the effectiveness of fuels reductions by offsetting costs.

The US Forest Service provides an excellent resource that explains how it has used Stewardship Contracting in their land management activities. Oceana County and/or individual fire departments may be interested in developing a contracting program for fuels reduction. Additional information about the USFS Stewardship Contracting program is available at http://www.fs.fed.us/restoration/Stewardship_Contracting/index.shtml.

B. REDUCING STRUCTURAL IGNITABILITY

One of the requirements for community wildfire protection plans by the Healthy Forest Restoration Act is to address structural ignitability and provide strategies to reduce structural ignitability. When homeowners take the initiative to establish and identify their home ignition zone and take steps to modify the conditions in this area, their home will have a much higher likelihood of surviving a wildfire.

Ignition Types

Homes and structures can ignite from direct flame contact, convection, radiation from nearby burning materials, and from flying embers (firebrands). Firebrand ignition happens when a burning ember lands on the home or on fuels adjacent to the home. Flame ignitions typically require direct contact with the structure. Most structures will not succumb to ignition by radiation, especially if flames are 30 or more feet from the house.

Protecting Structures from Ignitions

There are a number of steps homeowners can take to protect their investments. Here is a brief list of ignition prevention strategies that can increase home safety.

Firewise Landscaping- a method of reducing structural ignitability. This involves removing all

flammable vegetation within 5 feet of a structure, removing trees and tree limbs within 10 feet, and keeping a tidy green lawn. The "home ignition zone" is the space 30 feet around a structure. Trees and vegetation in this area should be sparse and spaced at least 15 feet apart. All ladder fuels should be removed within 100 feet of the structure, with thinning of trees and vegetation in this area also recommended. Other considerations include non-flammable walkways and decks, removal of woodchips around structure, and the use of rocks in landscaping.

Seasonal Maintenance- clear eaves, gutters, and roof of debris early every spring and fall. Sweep decks and wooden walkways of flammable debris and remove combustible materials from under these structures. Rake around structures to remove combustible debris. These actions prevent ignition from firebrands and prevent torching by convection if a surface fire advances on the structure.

NFPA Recommendations

The following actions are recommended by the National Fire Protection Association to reduce structural ignitions.

Roofing- use of class A roofing materials. Any covering that is non-combustible and does not self-sustain or spread fire is considered to be an appropriate roofing choice.

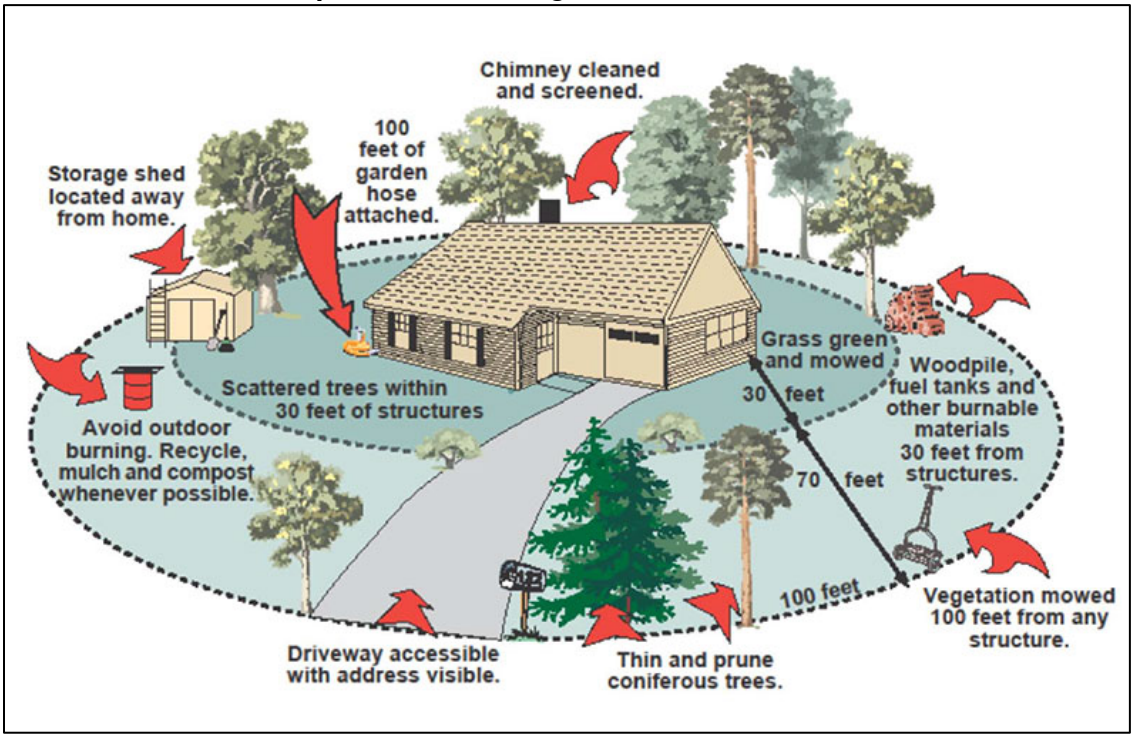
Screening- use of at least a 1/4 inch screen over all opening of structure, especially ground and attic vent openings.

Siding- use non-combustible siding materials.

Windows- installation of double paned windows. Close windows tightly prior to emergency fire evacuation.

Chimney and flue- spark arrestors made of at least 12 gauge steel with openings no greater than ½ inch. Vegetation shall be no closer than 10 feet from chimney outlet.

Defensible Space and Home Ignition Zone Recommendations



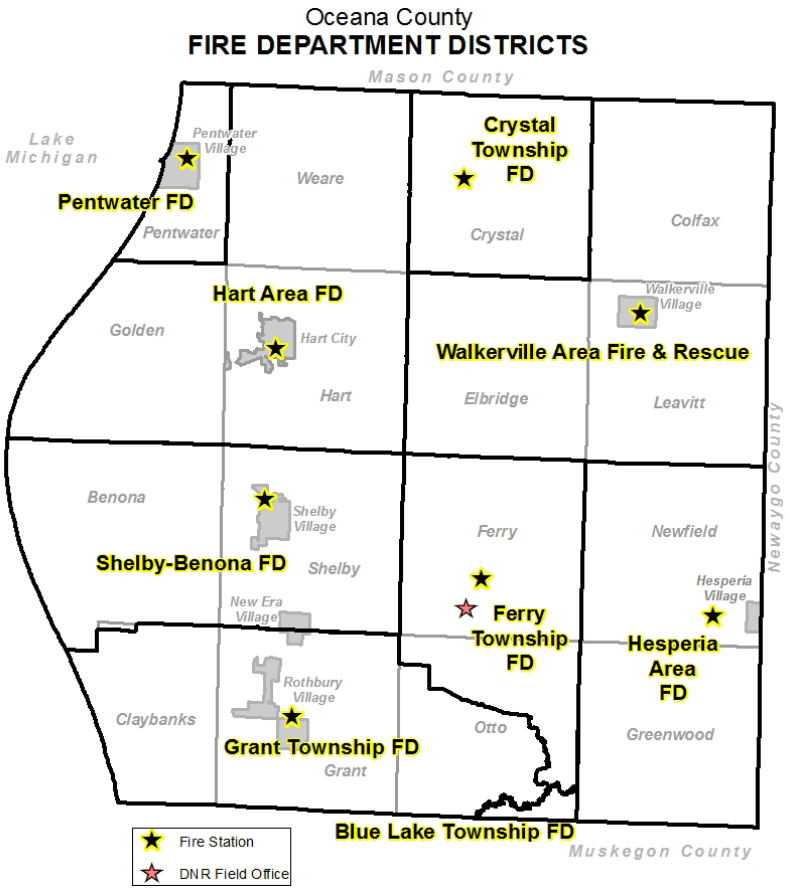
Source: Lincoln County FireSafe Council, http://www.lcfiresafe.org/homeowner-info.html

V. FIRE MANAGEMENT

This section explores fire management within the context of wildfire response and prevention in Oceana County. It contains a description of the county's fire departments, federal and state land management, and issues pertaining to fire response in Oceana County.

A. LOCAL FIREFIGHTING SETTING

Fire protection in Oceana County is provided by nine fire districts and the Michigan Department of Natural Resources (MDNR). The U.S. Forest Service does not respond to calls in Oceana County unless in Mutual Aid to the MDNR.



One strategy of this CWPP was to rely on each fire district to provide information needed to identify local wildfire histories, risks, special vulnerabilities, and response capabilities. A questionnaire was distributed to the designated representatives of each fire department. Information received through this process has been compiled into fire department profiles which can be found in Appendix A of this plan. Each profile also includes a 2013 aerial image, a map showing notable assets of the area, and a WUI Wildfire Risk map.

To avoid unnecessary expenditure of manpower and resources, local fire departments in Oceana County appreciate advance notice of prescribed burns on state and federal lands in the area.

B. REGIONAL FIREFIGHTING SETTING

U.S. Forest Service

Oceana County contains a portion of the Huron-Manistee National Forests, which covers almost a million acres of public land across a transitional zone between forested lands to the north and agricultural lands to the south. Oceana County lies within the Baldwin/White Cloud District, however the USFS does not typically respond to wildfires within Oceana County.

Formed by glaciers thousands of years ago, these lands are characterized by relatively low relief, abundant sand, clear water and diverse forests. In the late 1800s logging was at its peak and these forests were clear-cut, burned and poorly farmed. In 1909, the Huron National Forest was established and the Manistee National Forests was formed in 1938. In 1945, these two National Forests were administratively combined. The diverse, maturing forest ecosystems that exist today are the result of nearly a century of forest management by the Forest Service and its conservation partners.

The Huron-Manistee National Forests Land and Resource Management Plan guides all natural resource management activities for the Huron-Manistee National Forests. It describes desired resource conditions, resource management practices, levels of resource production and management, and the availability of suitable land and resource management. The purpose of the plan is to provide management direction to ensure that ecosystems are capable of providing a sustainable flow of beneficial goods and services to the public. The plan may be freely accessed at http://www.fs.usda.gov/main/hmnf/landmanagement/planning.

Michigan Department of Natural Resources

The MDNR's Cadillac Unit manages over 235 thousand acres of state forest lands in Missaukee, Osceola, Lake, and Wexford counties, and provides wildfire protection for over a million acres of state and private land in those counties, as well as portions of Mason, Oceana, Newaygo and Mecosta. The Cadillac Unit Headquarters is at the Cadillac Operations Service Center and is open to the public. Oceana County is primarily serviced by the Oceana MDNR Field Office located on M-20 in Ferry Township. The Baldwin Field Office services Mason and Lake counties; the Evart Field Office services Mecosta and Osceola counties; and the Manton Field Office services Wexford and Missaukee counties. Additional detail regarding the Cadillac Unit's resources and capabilities is available in Appendix B of this plan.

Beyond the provision of resources and expertise in wildland fire suppression, the MDNR also carries the legal responsibility, according to state law, over wildland fires. During a major fire emergency the MDNR has the ability to mobilize resources across the state to support a large fire operation. It also has Incident Management Teams that can be deployed to orchestrate large fire operations. In the event that a situation exceeds the capacity of those resources, the MDNR has mutual aid agreements in place with the USFS and through the Great Lakes Forest Fire Compact (WI, MN, MI, Manitoba & Ontario). These other entities can offer helpful resources such as trucks, dozer, manpower, and supervision; as well as specialized equipment such as tanker planes and helicopters.

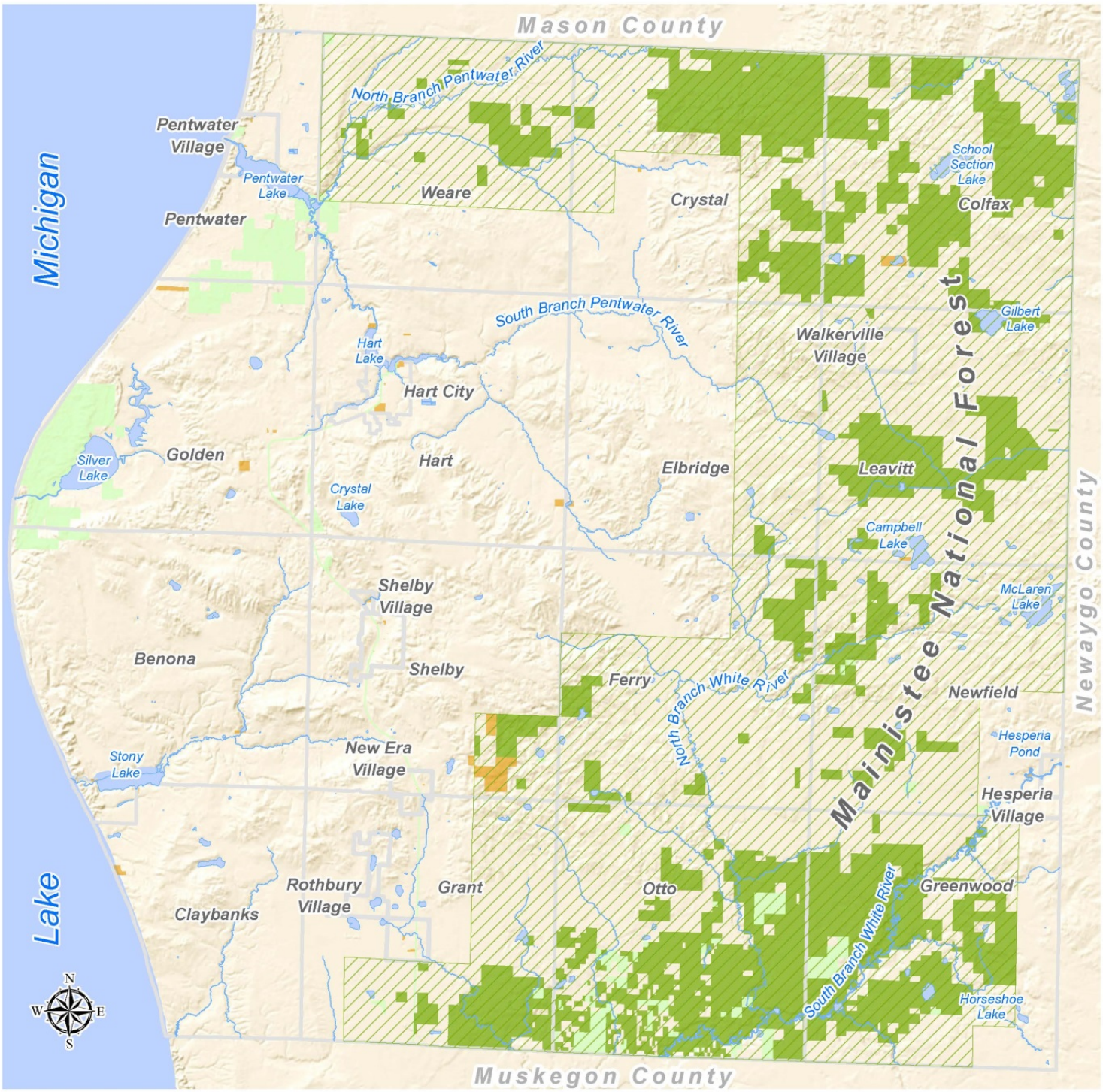
The MDNR also operates two state parks and manages a state game area in Oceana County. The largest of these is Silver Lake State Park, which occupies nearly 3,000 acres in Golden and Benona townships. The Pentwater River State Game Area encompasses approximately 2,415 acres in Pentwater Township and has been dedicated for wildlife conservation and management by the DNR Wildlife Division. The Charles Mears State Park occupies about 50 acres in the

Village of Pentwater.

Mutual Aid Agreements

Mutual aid is an agreement between fire departments that allows for emergency assistance across jurisdictional boundaries. Mutual Aid agreements operate under a cooperative basis during incidents that exceed local resources. All local fire departments within in Oceana County share a Mutual Aid Agreement effective March, 2001. Any additional agreements held by fire departments with federal or state agencies, or fire departments outside of Oceana County are included in the fire department profiles in Appendix A.

Oceana County
Land Ownership Map



USFS Land
Municipal Parks/ Land
DNR Parks/ Land
USFS Management Boundary

WMSRDC WEST MICHIGAN SHORELINE REGIONAL DEVELOPMENT COMMISSION

Map Created 2014 Source: USGS TNM, USFS, MIDNR, MI Geographic Framework V12

C. TRANSPORTATION NETWORK AND EMERGENCY ACCESS

Oceana County contains a wide variety of roads which may be used for responding to wildfire. Unfortunately, some of the most pressing wildfire concerns occur in areas that have roads and drives that are unsuitable or unsafe for firefighting apparatus. A detailed analysis of the transportation network and access for fire suppression would aid in operations preplanning, identify areas where improvements are needed, and may also help determine the need for response strategies and new apparatus. However, a countywide study of that magnitude is currently beyond the scope of this CWPP. The following considerations may be components of transportation network and access study in the future.

Road Classification- surface type, road width, apparatus accessibility, bridge load limits, and other factors that affect emergency vehicle accessibility. Not all apparatus can respond to fire incidents in every area of the county. Knowing what equipment can respond to certain areas will aid in suppressions response and mobilization of resources.

Promote Street Signage and Addressing- nonflammable reflective street signage should be placed at every intersection on a non-flammable post. Not every responder in a catastrophic fire event will be familiar with local roads. Especially within the WUI, fires can be very chaotic and even the most experienced responder may become disoriented by the smoke, fire, and other incident stresses.

Inventory Turnarounds- every dead end road should have a turnaround that meets the NFPA fire code guidelines for apparatus turning radius. This can be accomplished by working with the road commission, subdivisions, property associations, and larger organizations such as camps to plan for needed turnarounds within the right of way.

Escape Routes- places with one ingress/egress route may become easily blocked and impassable due to fire, smoke, or broken down vehicles. These routes may be inventoried and prescribed with emergency pull-off sites and fuels reduction treatments.

D. WATER SUPPLY

Access to a reliable water supply is a tactical necessity for wildfire suppression. The source, delivery, and use of water in wildland fire suppressions may vary depending on location within Oceana County. The various types of water supply utilized in Oceana County include: pivot hydrant, drafting site, dry hydrant, municipal hydrant, water well, and irrigation well. More detail regarding water sources for fire suppression can be found within the individual fire department profiles in Appendix A. Additional types of water supply may include cistern (underground storage tank), and pump house. State and federal funding may be available to improve access to water where it is needed.

E. WILDFIRE EDUCATION

Education is an ongoing activity in the world of fire-fighting and wildfire awareness. There are a number of educational resources that fire departments can exploit, free of charge, to increase public knowledge associated with wildfire and enrich each department's base of knowledge.

The National Fire Protection Association provides educational materials free of charge on their website at www.nfpa.org under "catalog." Once in the NFPA Catalog type "Wildland Urban

Interface" into the search box and review materials. Also search "Firewise" for educational materials related to the Firewise communities program.

The Ready, Set, Go! (RSG) Program, managed by the International Association of Fire Chiefs (IAFC), seeks to develop and improve the dialogue between fire departments and the residents they serve. Launched nationally in March 2011 at the Wildland-Urban Interface (WUI 2011) Conference, the program helps fire departments to teach individuals who live in high risk wildfire areas – and the wildland-urban interface – how to best prepare themselves and their properties against fire threats. RSG tenets help residents be *Ready* with preparedness understanding, be *Set* with situational awareness when fire threatens, and to *Go*, acting early when a fire starts. Go to http://www.wildlandfirersg.org/ for more information.

Michigan State University Extension Educator and Firewise Project Manager Elaine Bush is also available to assist with the Firewise process. She is an excellent asset to the region and is available to provide public educational sessions and training workshops to local agencies and communities. Go to http://firewise.msu.edu/ for more information about the MSUE Firewise program.

VI. ACTION PLAN

The following table reveals a summary of action items selected to address wildfire in Oceana County. These were discussed during the April 1, 2014 and May 6, 2014 Wildfire Advisory Group meetings. All identified action items are considered priorities within the CWPP. In order to help structure implementation of the CWPP, a general priority level of high, medium or low was assigned to each measure. Some items may have been given a lower priority due to circumstances beyond the control of the CWPP without legislation/ordinance change and/or stakeholder buy-in. The list should be reviewed and revised annually, and progress should be discussed, tracked, and documented.

	High	Medium	Low
Goal 1: Mitigate Accidental Ignitions			
1a. Conduct fire safety programs	x		
1b. Wildfire prevention activities for the public furnished by MDNR, USFS, and local fire departments	x		
1c. Enforce burning ordinances	x		
1d. Promote "Firewise on the Farm"		x	
1e. Promote public opportunities for trash disposal			x
Goal 2: Reduce Catastrophic Fire Potential ***(fuel reduction treatments)***			
2a. Encourage landowner / facility operator participation through the Firewise program	x		
2b. Identify key roads / evacuation routes	x		
2c. Offer home risk assessments	x		
2d. Identify locations for vegetative treatments		x	
2e. Sponsor neighborhood cleanup days			x
2f. Organize chipping / disposal opportunities			x
2g. Identify locations for strategic firebreaks		x	
2h. Identify demonstration houses			x
Goal 3: Fortify Existing Structures and Infrastructure ***(reduce structural ignitability)***			
3a. Create a "wildfire overlay district" to include provisions such as larger lots, reduced densities, and fire resistant building components	x		
3b. Encourage homeowner / facility operator participation through the Firewise program	x		
3c. Identify potential "ignition resistant" standards that go beyond minimum requirements of current building codes.			x
3d. Require subdivision standards to include provisions such as ample road widths, appropriate slopes and clearances, etc.		x	
Goal 4: Support Fire Suppression and Emergency Response Capabilities			
4a. Maintain mutual aid agreements	x		
4b. Ensure adequate access to water sources, especially within WUI areas	x		
4c. Improve access to private properties in Lake Michigan coastal areas	x		
4d. Improve access to private properties scattered within publicly-owned lands	x		
4e. Maintain equipment, and acquire additional equipment as necessary	x		
4f. Firewise training	x		
4g. Annual wildfire suppression training for local fire departments provided by MDNR and USFS	x		

GOAL 1: Mitigate Accidental Ignitions *Measures to reduce the number of human-induced wildfire starts.*		
Action Items	**Possible Responsible Parties**	**Timeframe**
1a. Conduct fire safety programs. *Priority Level:* HIGH *Description:* All fire departments in Oceana County engage in fire safety education, typically geared toward youth, on some level. This action item is included to encourage the continuation and / or expansion of these activities.	Local Fire Departments	Annually
1b. Wildfire prevention activities for the public furnished by MDNR, USFS, and local fire departments. *Priority Level:* HIGH *Description:* The public will be informed about ways to prevent human-induced wildfire starts, such as: installation of spark arresters, proper installation of fire rings, observation of burn bans, etc.	Local Fire Departments USFS MDNR	Ongoing
1c. Enforce burning ordinances. *Priority Level:* HIGH *Description:* This action item is intended to increase compliance of burning ordinances through higher prioritization of enforcement actions.	Local Fire Departments MDNR Law Enforcement	Ongoing
1d. Promote "Firewise on the Farm." *Priority Level:* MEDIUM *Description:* This would include a campaign to educate farmers and farm workers on the importance of following safe fire practices associated with brush burning, operation of farm equipment, and other fire-related activities. This action item should be embraced by agencies that frequently interact with agricultural producers.	Local Fire Departments MSUE Oceana Cons. Dist.	Ongoing
1e. Public opportunities for trash disposal. *Priority Level:* LOW *Description:* This is intended to provide residents with a viable alternative to trash / vegetative waste burning. This may include "community trash days" or the establishment of low / no-cost waste receiving stations or transfer sites. Implementation of this action item should be assessed by each individual community and will require local government support.	Local Governments	Annual / Seasonal, or Ongoing

GOAL 2: Reduce Catastrophic Fire Potential *Fuels reduction activities and other measures intended to mitigate the damage potential of wildfires.*		
Action Items	**Possible Responsible Parties**	**Timeframe**
2a. Encourage landowner / facility operator participation through the Firewise program. *Priority Level:* HIGH *Description:* Firewise principles are a critical component of fuels reduction on private property. Local fire departments and Oceana County Emergency Management will distribute Firewise handouts. Some materials can be obtained free of charge from the catalogue at Firewise.org. Local governments will be encouraged to invite representatives from the MSU Extension Firewise program to give presentations and hand out materials at public meetings.	Local Fire Departments Local Governments OC Em. Mgmt.	Following completion of Action Item 4f
2b. Identify key roads / evacuation routes. *Priority Level:* HIGH *Description:* This activity should be incorporated into a comprehensive study of emergency response issues in Oceana County. Once identified, key roads and evacuation routes will be treated to reduce vegetative fuels and increase accessibility for emergency responders.	OC Wildfire Advisory Group OC Em. Mgmt. Mason-Oceana 911	As time and funding permit
2c. Offer home risk assessments. *Priority Level:* HIGH *Description:* Upon appropriate Firewise training, local departments will offer to conduct home ignition-zone hazard assessments.	Local Fire Departments	Following completion of Action Item 4f
2d. Identify locations for vegetative treatments. *Priority Level:* MEDIUM *Description:* Locations for vegetative treatments will include access roads / evacuation routes and areas within the WUI / high wildfire risk areas identified within this plan. Subsequent actions may include enlisting landowner participation, acquisition of equipment, and eventually performing vegetative treatments on the ground.	Local Fire Departments MDNR USFS	As time and funding permit
2e. Sponsor neighborhood cleanup days. *Priority Level:* LOW *Description:* These activities are intended to help neighborhoods reduce the amount of trash and vegetative fuels that might be intentionally burned, thereby reducing wildfire risk.	Local Fire Departments Local Governments	Annually
2f. Organize chipping / disposal opportunities. *Priority Level:* LOW *Description:* Aspects of this action item may include acquisition of a wood-chipping device for use in neighborhoods throughout the county to reduce fuels loads. Temporary storage locations for downed vegetation will also help reduce neighborhood fuel loads.	Local Fire Departments Local Governments OC Em. Mgmt.	Annually, or During storm recovery
2g. Identify locations for strategic firebreaks. *Priority Level:* MEDIUM *Description:* Utilize the latest aerial imagery and GIS technology in concert with existing maps and ground information to identify and map potential locations for firebreaks. Work with state and federal forestry agencies to implement an effective firebreak program.	Local Fire Departments MDNR USFS	As time and funding permit
2h. Identify demonstration houses. *Priority Level:* LOW *Description:* This action item may be most effective following implementation of action item 4f, which is intended to bring Firewise training to local fire departments and enhance their ability to communicate Firewise tactics to landowners and facility operators. This action item could be used to make Action Item 2a more effective.	Local Fire Departments	Following completion of Action Item 4f

Goal 3: Fortify Existing Structures and Infrastructure *Measures intended to increase the community's resistance to wildfire by reducing structural ignitability.*		
Action Items	**Possible Responsible Parties**	**Timeframe**
3a. Create a "wildfire overlay district" to include provisions such as larger lots, reduced densities, and fire resistant building components. *Priority Level:* HIGH *Description:* A sample "wildfire overlay" based upon the wildfire analyses contained within this plan will be discussed at the county planning level. Local governments and fire departments will be responsible to implement and enforce the recommendations.	OC Planning Commission Local Fire Departments Local Governments	Following adoption of this plan
3b. Encourage homeowner / facility operator participation through the Firewise program. *Priority Level:* HIGH *Description:* The Firewise program offers a number of proven methods for reducing structural ignitability. Participation in the program will be encouraged through distribution of Firewise materials by local fire departments and Oceana County Emergency Management. Local governments may also invite representatives from the MSU Extension Firewise program to give presentations and hand out materials at public meetings. This action item may be most effective following implementation of action item 4f, which is intended to bring Firewise training to local fire departments, thereby enhancing their ability to communicate Firewise tactics to landowners and facility operators.	Local Fire Departments Local Governments OC Em. Mgmt.	Following completion of Action Item 4f
3c. Identify potential "ignition resistant" standards that go beyond minimum requirements of current building codes. *Priority Level:* LOW *Description:* Local and county building officials are encouraged to identify and incorporate special standards to help new structures be more resistant to wildfires. These standards would be most beneficial in WUI / high wildfire risk areas. They could also be applied to the "wildfire overlay district" proposed in action item 3a.	OC Bldg. Official Local Governments	Upon revision of building codes; or Upon the creation of a "wildfire overlay district"
3d. Require subdivision standards to include provisions such as ample road widths, appropriate slopes and clearances, etc. *Priority Level:* MEDIUM *Description:* This action item is intended to ensure that new developments will contain infrastructure that can accommodate emergency response vehicles.	OC Bldg. Official Local Governments	Upon revision of zoning ordinances

Goal 4: Support Fire Suppression and Emergency Response Capabilities *Enhance the safety of emergency responders and enhance response capabilities during an emergency.*		
Action Items	**Possible Responsible Parties**	**Timeframe**
4a. Maintain mutual aid agreements. *Priority Level:* HIGH *Description:* Regularly review mutual aid agreements to ensure proper support during an emergency, as well as ensure a thorough understanding of reimbursement expectations for aid and support during emergencies.	Local Fire Departments	Revisit annually
4b. Ensure adequate access to water sources, especially within WUI areas. *Priority Level:* HIGH *Description:* Assess the availability of water sources within WUI areas identified in this plan. Note areas with insufficient access to water sources for fire suppression.	Local Fire Departments	Following adoption of this plan
4c. Improve access to private properties in Lake Michigan coastal areas. *Priority Level:* HIGH *Description:* Serious access issues exist with many residential developments in coastal dune areas. These issues inhibit or prevent emergency response operations. Addressing the problem begins with private landowner participation. Property owners should be made aware of the problem; be educated on ways to address the problem; and be encouraged to take action.	Local Fire Departments Mason-Oceana 911 Law Enforcement OC EMS OC Road Commission	Following adoption of this plan
4d. Improve access to private properties scattered within publicly-owned lands. *Priority Level:* HIGH *Description:* Residential developments tucked away within publicly-owned lands are often inaccessible. Private landowner participation is critical to addressing this issue. Another factor is communication and coordination with state and federal agencies regarding access roads maintained by those agencies. Property owners should be made aware of the problem; be educated on ways to address the problem; and be encouraged to take action.	Local Fire Departments Mason-Oceana 911 Law Enforcement OC EMS OC Road Commission USFS MDNR	Following adoption of this plan
4e. Maintain equipment, and acquire additional equipment as necessary. *Priority Level:* HIGH *Description:* Equipment maintenance will continue with added emphasis upon wildland fire considerations. Departments will evaluate their equipment and response capabilities to identify needs with respect to wildfire suppression. Departments will also annually maintain the inventory of equipment found in Appendix A of this document. This will inform agencies of each other's equipment and capabilities, and facilitate assessment of equipment needs on the county level.	Local Fire Departments Law Enforcement USFS MDNR	Ongoing
4f. Firewise training. *Priority Level:* HIGH *Description:* Work with MSUE to access training materials and courses appropriate for fire fighters.	Local Fire Departments OC Em. Mgmt. MSUE	**Immediately** following adoption of this plan
4g. Annual wildfire suppression training for local fire departments provided by MDNR and USFS. *Priority Level:* HIGH *Description:* Local fire departments should continue to receive wildfire suppression and training from MDNR and USFS personnel.	Local Fire Departments USFS MDNR	Annual

VII. PLAN MAINTENANCE

Over time, Oceana County will have the opportunity to consider how this plan has helped reduce wildfire risk, while also meeting state and national goals for wildfire risk reduction. This chapter is intended to encourage and present strategies for long-term maintenance of this plan.

A. MONITORING & EVALUATION

The risks from fires are continual. Therefore the CWPP process should not end when the plan is adopted. Monitoring wildfire threats and mitigation progress are part of a process that revolves around the community's needs and desired amount of protection. A thorough process should involve a continuous cycle of collaborative planning, implementation, monitoring, and adapting strategies based on lessons learned.

CWPP Monitoring and Evaluation Guidelines:

- Only monitor what matters. Since resources are scarce, do not attempt to engage in complex monitoring process. Identify key goals and objectives, and make decisions to monitor what is most important to long-term sustainability of the CWPP.
- Track accomplishments and identify the extent to which CWPP goals have been met.
- Monitor how collaborative efforts have contributed to CWPP implementation, and when possible identify new partners or better arrangements.
- Identify actions and priority fuels reduction projects that have not been implemented, and why.

CWPP Evaluation Guide

Perhaps the most critical aspect of a monitoring and evaluation process is to identify the impact the CWPP has had on the community. A 2008 publication from the University of Oregon, CWPP Evaluation Guide, provides a step-by-step process to evaluate how well a community has addressed the goals and objectives of its CWPP, and modify actions for the future accordingly. This evaluation may be a helpful tool to celebrate successes, identify gaps, and update this CWPP.

Framework for Monitoring and Evaluating a CWPP

The table on the following page may also be used to help monitor and evaluate this CWPP. The table lists six broad CWPP goals and a series of questions to help monitor and evaluate accomplishments, challenges, and how well goals have been met.

Framework for Monitoring and Evaluating a CWPP

1. Partnerships and Collaboration	- Who has been involved with CWPP development and implementation? How have relationships grown or changed through implementation? What resources did they bring to the table?
	- How did the fire planning process influence CWPP implementation?
	- How has the collaborative process assisted in implementing the CWPP and building capacity for the community to reduce wildfire risk?
	- Have social service agencies (or groups that might assist low-income and vulnerable populations) partnered on CWPP efforts? If so, how?
	- Have CWPP partners remained engaged in implementation? Have new partners become involved? How have the relationships established through the CWPP enhanced opportunities to address plan goals?
	- Has collaboration made a difference or a positive impact on local organizations, neighborhoods and/or actions?
2. Risk Assessment	- How has population growth/change and development in your community affected wildfire risk?
	- If this is a multi-jurisdictional plan, what is the number and percent of communities at risk with a CWPP in the area? Are all communities at risk identified in the CWPP, and are there priority fuels projects identified in the area?
	- Are there new or updated data sources that may change the risk assessment and influence fuels priorities?
	- How is the risk assessment being used to make decisions about fuels priorities or the designation of the WUI boundary?
	- Has the community enacted a wildfire-related ordinance? If so, county, state, or local?
	- What percent of communities at risk are also low income or have special needs? Have these communities been engaged in reducing wildfire risk?
3. Reducing Hazardous Fuels	- How many acres have been treated for hazardous fuels reduction on public and private land that were identified as high-priority projects in the CWPP? What percentage of total acres treated does this constitute?
	- How many fuels reduction projects have spanned ownership boundaries to include public and private land?
	- What is the number and percent of residents that have participated in projects and completed defensible space on their land?
	- Economic development resulting from fuels reduction?
	- How many local jobs have resulted because of fuels reduction or restoration activities?
	- How many hazardous fuels reduction projects have been implemented in connection with a forest restoration project?
4. Reducing Structural Ignitability	- What kind of resource losses (e.g. homes, property, infrastructure) occurred from wildfires in the previous year?
	- Are the current codes and regulations for wildfire hazard adequate? If not, are there efforts to change or update them? Are there action items in the CWPP to develop codes and recommendations?
	- Has the public knowledge and understanding about structural ignitability been increased by strategies adopted in the CWPP? Have homeowners been educated on how to reduce home ignitability, and are they replacing flammable building components with non-flammable materials?
	- How many Firewise Communities have been recognized? How many citizens, neighborhoods, or communities have taken action to increase the resilience of their structure to fire?
	- How has the availability and capacity of local fire agencies to respond to wildland and structural fires improved or changed since the CWPP was developed?
5. Education and Outreach	- What kind of public involvement has the CWPP fostered? Examples include public education, household visits, demonstration projects, etc.
	- Has a change in public awareness about wildfire resulted from the plan?
	- What kinds of activities have citizens taken to reduce wildfire risk?
6. Emergency Management	- Is the CWPP integrated within the county or municipal Emergency Operations Plan?
	- Does the CWPP include an evacuation plan? If yes, has it been tested or implemented since the CWPP adoption?
	- Is the CWPP aligned with other hazard mitigation plans or efforts?

B. HAZARD MITIGATION PLANNING COORDINATION

In 2006 Oceana County Emergency Management produced a hazard mitigation plan through contract and coordination with West Michigan Shoreline Regional Development Commission (WMSRDC). In order for the county to obtain federal emergency funding from FEMA, the county plan must be reviewed and updated every five years. The update process began in 2012 and was expected to be complete in 2014, sometime after the completion of this CWPP.

The continual maintenance of this CWPP and coordination with the WMSRDC will ensure cohesive planning strategies into the future. Please notify WMSRDC of any changes to the Oceana County CWPP so changes can be actively coordinated with the updating of other regional planning efforts and legislative actions.

The development of this CWPP aligns with many of the Goals and Objectives of the Oceana County Hazard Mitigation Plan:

Oceana County Hazard Mitigation Plan Goals & Objectives

GOAL 1. Promote growth in a sustainable, hazard-free manner.

Objective 1.1. Incorporate hazard provisions in building code standards, ordinances, and procedures.
Objective 1.2. Incorporate hazard mitigation into land use and capital improvement planning and development activities.
Objective 1.3. Incorporate hazard mitigation into existing land use regulation mechanisms to ensure that development will not put people in danger or increase threats to existing properties.
Objective 1.4. Research, recommend, adopt and enforce other plans and ordinances that protect natural resources so that they can, in turn, provide hazard protection.

GOAL 2. Protect existing and new properties.

Objective 2.1. Use the most cost-effective approaches to keep hazards away from existing buildings and facilities.
Objective 2.2. Use the most cost-effective approaches to protect existing buildings and sites from hazards.
Objective 2.3. Maximize insurance coverage to provide financial protection against hazard events.
Objective 2.4. Maximize the resources for investment in hazard mitigation, including the use of outside sources of funding.

GOAL 3. Protect public health and safety.

Objective 3.1. Assure that threat recognition (watches) and warning systems are adequate and appropriate and that they utilize the latest technology.
Objective 3.2. Protect infrastructure and services.
Objective 3.3. Build and support local capacity, commitment and partnerships to continuously become less vulnerable to hazards.
Objective 3.4. Enlist support of committed volunteers to safeguard the community before, during, and after a disaster.

GOAL 4. Increase public understanding, support, and participation in hazard mitigation.

Objective 4.1. Heighten public awareness of the full range of existing natural and man-made hazards and actions they can take to prevent or reduce the risk to life or property from them.
Objective 4.2. Encourage local communities, agencies, organizations and businesses to participate in the hazard mitigation process.
Objective 4.3. Encourage cooperation and communication between planning and emergency management officials.

C. ECOLOGICAL MONITORING

A critical outcome related to CWPPs is related to the change in fire behavior, as affected by the number and type of fuels treatments that occur as a result of priorities identified within the CWPP. The HFRA (Section 102(g)(5)) instructs the USFS and DOI to establish a collaborative multiparty monitoring, evaluation, and accountability process when significant interest is expressed in such an approach.

Multiparty monitoring gives communities an opportunity to assess environmental, social, and economic outcomes related to fuels reduction projects. Multiparty monitoring also builds trust and provides an opportunity for residents to learn about fire-adapted ecology. The USFS Collaborative Forest Restoration Program (CFRP) in the Southwest offers a set of guidelines for monitoring community-based forest restoration. Communities engaged in ecological monitoring of hazardous fuels reduction projects can use these guidelines. They provide an overview of the multiparty monitoring process, ecological and socioeconomic goals and indicators, and examples of measures, data sources, and tools that can be used in conducting this kind of monitoring. The CFRP also developed a series of handbooks to help communities conduct this monitoring, which can be accessed at http://www.fs.fed.us/r3/spf/cfrp/monitoring/index.shtml.

There are also tools used by state and federal agencies to conduct ecological monitoring and monitor maintenance of treated areas. One such program is the Fire Effects Monitoring and Inventory Protocol (FIREMON). FIREMON is an agency-independent plot-level sampling system designed to characterize changes in ecosystem attributes over time https://www.frames.gov/partner-sites/firemon/firemon-home/.

Other methods for conducting ecological monitoring for fuels reduction projects may include using photo points, modeling changes in fire behavior, and measuring change in fire regime and condition class. There are a wide range of approaches to ecological monitoring; FIREMON and other modeling systems are mostly within federal purview, but community organizations and citizens have many monitoring options available and simple methods like comparing photo points and conducting vegetation surveys that are valuable and important.

Appendix A

LOCAL FIRE DEPARTMENT PROFILES

A. Blue Lake Township Fire Department

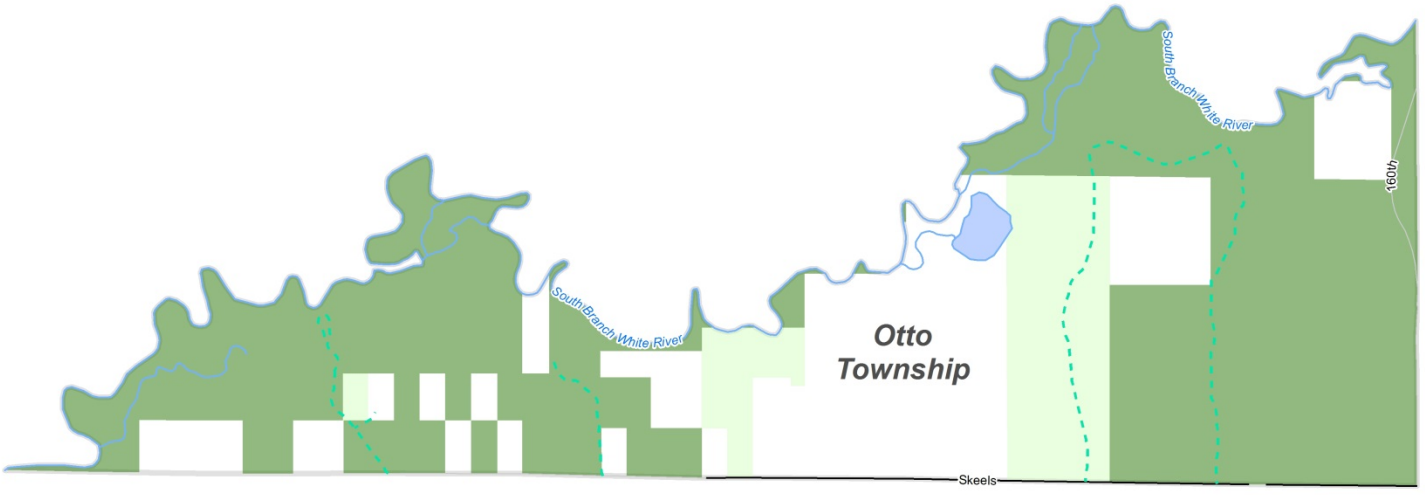
Chief: Larry Radtke
Number of paid firefighters: 0
Number of volunteer firefighters: 11
Inventory of major equipment:

#	Age (years)	Condition	Type
1420	18	Very Good	Engine
1422	9	Very Good	Engine / Tender
1461	5	Excellent	Tender

Mutual Aid Agreements:
- Muskegon Area Fire Services Mutual Aid agreement (2014)
- Otto Township (Apr 1, 2014 – Mar 31, 2017)
- MDNR Forest Resources Division (2013)

The Blue Lake Township Fire Department provides fire protection to a small portion of Oceana County in Otto Township, south of the White River. This area of Otto Township is generally wooded with scattered residential homes. Much of the land is either federally or state owned. Water sources for fire suppression include dry hydrants on Nichols Road, Pond Road, and Fruitvale Road. An area where access for first responders is needed is off of Skeels Road. The department also hosts an annual Fire Prevention Open House, to which all residents within its service area are welcome to attend.

Blue Lake Township Fire Department
(Oceana County Service Area)
District Assets



County Primary Rd
Local Rd
USFS Roads
Federal Land
State Land

WMSRDC WEST MICHIGAN SHORELINE REGIONAL DEVELOPMENT COMMISSION
Map Created May 2014
Source: USFS, MI DNR

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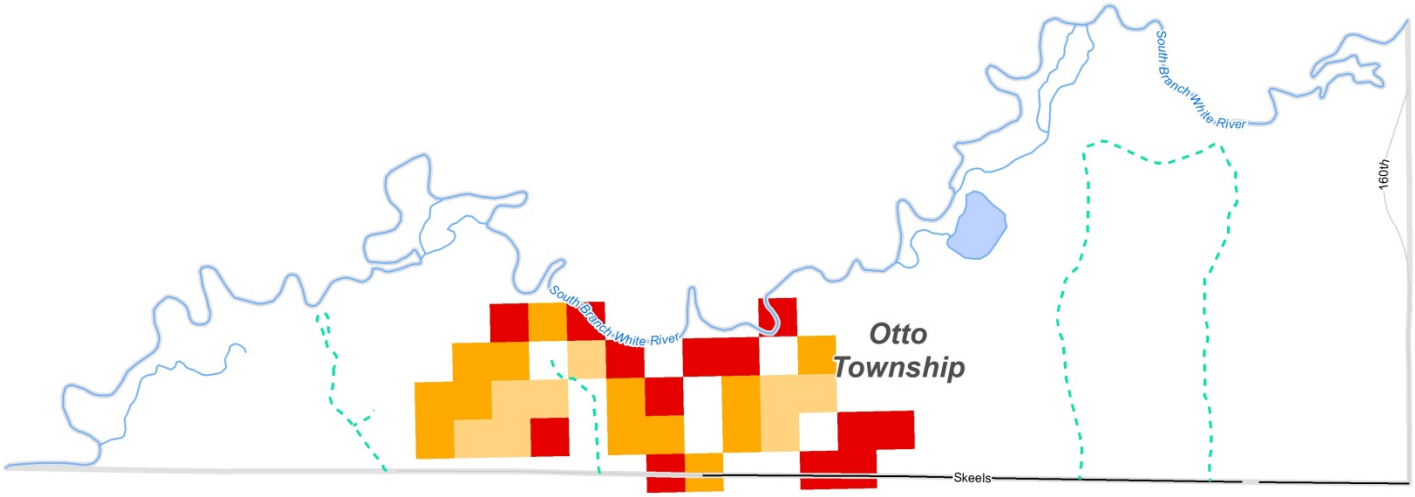
Blue Lake Township Fire Department
(Oceana County Service Area)
District WUI Wildfire Risk



County Primary Rd
Local Rd
USFS Roads
Low Risk
Moderate Risk
High Risk

This map is for general planning purposes only.

WMSRDC
WEST MICHIGAN SHORELINE REGIONAL DEVELOPMENT COMMISSION

Map Created May 2014
Source: USFS, MI Geographic Data Library

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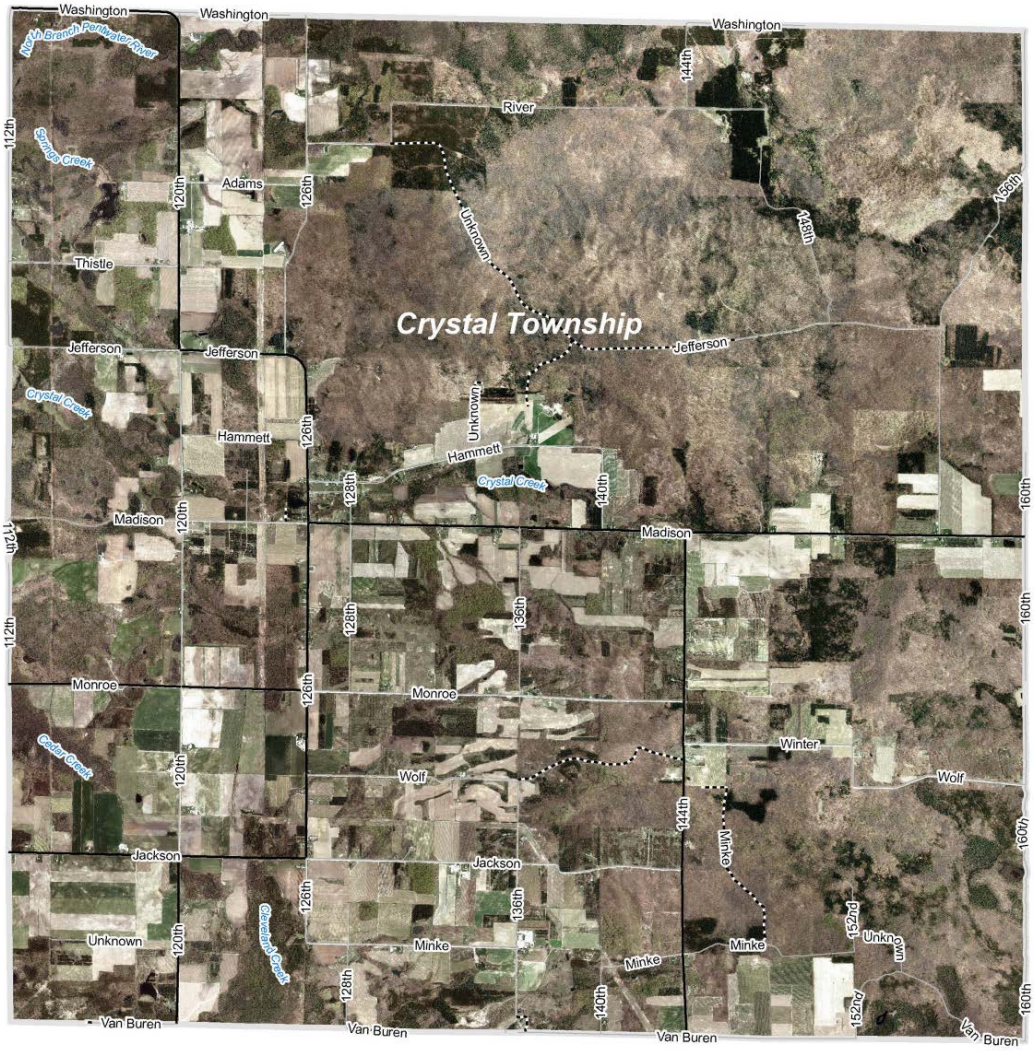
B. Crystal Township Fire Department

The Crystal Township Fire Department provides fire protection to the six square miles of Crystal Township. This area contains a large expanse of Manistee National Forest, as well as some farmland. The unincorporated community of Crystal Valley lies near the center of the township, and includes a fire station, a county park, and a small neighborhood that abuts forestland. Water sources for fire suppression include dry hydrants on Washington Road in the northwest, and in 126th Avenue in Crystal Valley. A pivot hydrant is located along 126th Avenue just south of Crystal Valley.

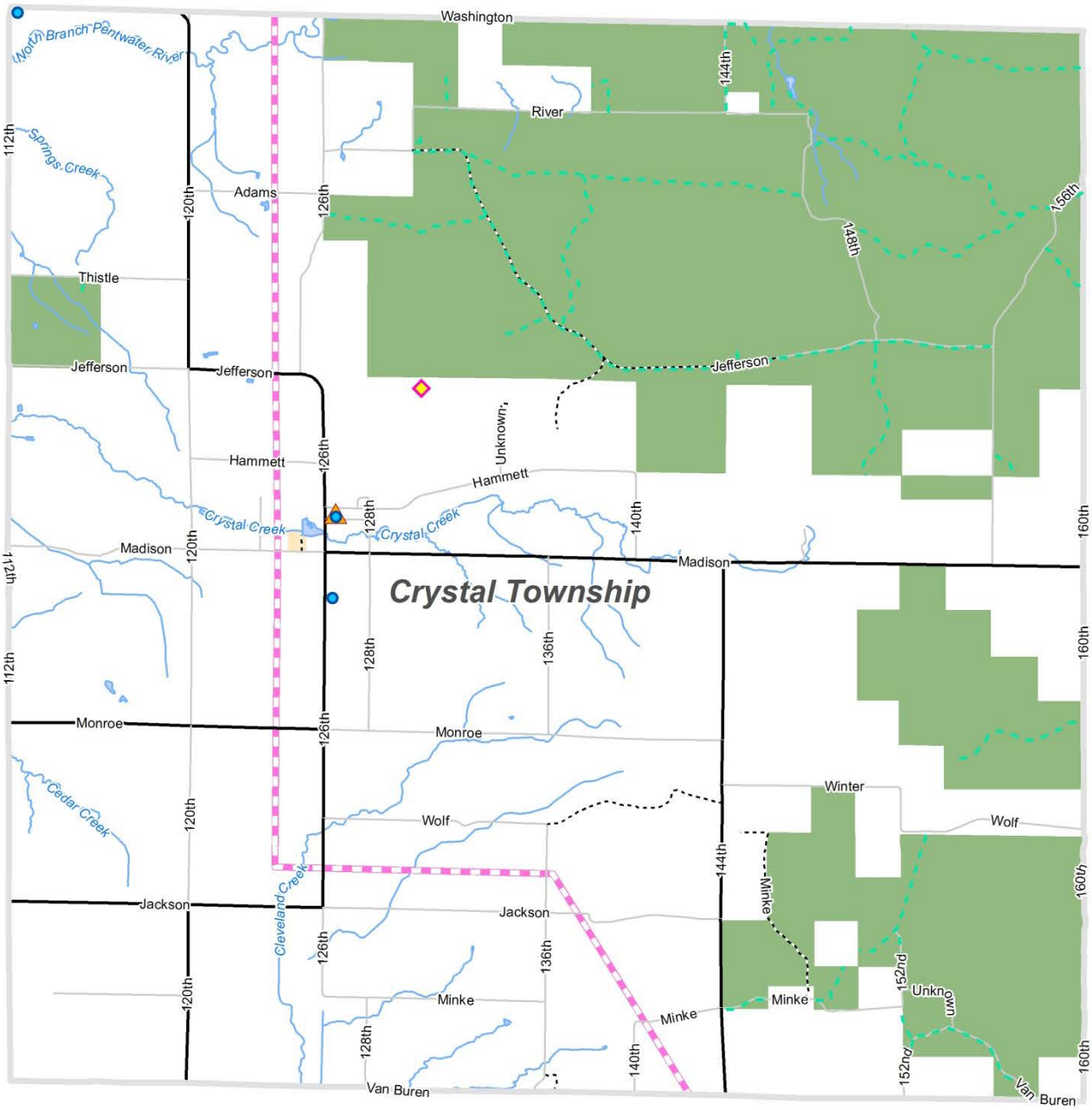
Chief: Al Purdy
Number of paid firefighters: 0
Number of volunteer firefighters: 13
Inventory of major equipment:

#	Age (years)	Condition
541	20+	Fair
561	4	Good
571	25+	Fair

Mutual Aid Agreements:
- Oceana Co. Fire Departments (2001)
- Mason Co. Rural Fire Authority (July 1996)
- MDNR Forest Mgmt. Division (1993)



Crystal Township Fire Department
District Assets



County Primary Rd
Local Rd
Undefined/Unpaved Rd
USFS Roads
Power Line
Fire Station
H2S Well*
Water Supply
Federal Land
Municipal Land

*Oil or gas well known to have detectable levels of hydrogen sulfide

WMSRDC West Michigan Shoreline Regional Development Commission

Map Created May 2014 Source: USGS National Map, MI DEQ Environmental Mapper, USFS, MI DNR

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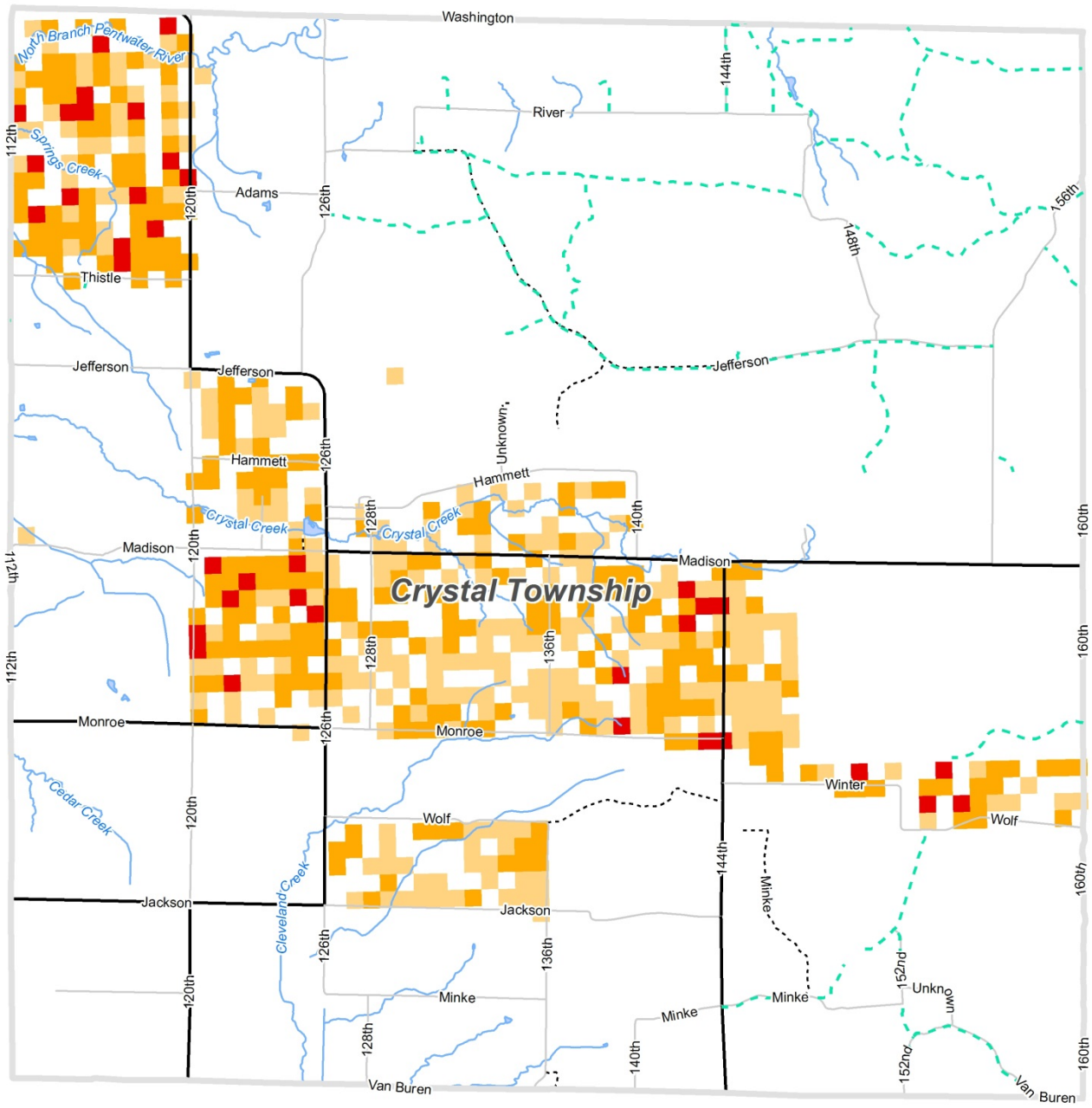
Crystal Township Fire Department
District WUI Wildfire Risk



County Primary Rd
Local Rd
Undefined/Unpaved Rd
USFS Roads

Low Risk
Moderate Risk
High Risk

This map is for general planning purposes only.

WMSRDC WEST MICHIGAN SHORELINE REGIONAL DEVELOPMENT COMMISSION

Map Created May 2014
Source: USFS, MI Geographic Data Library

0 0.5 1 Miles

C. Ferry Township Fire Department

Chief: Brad Fritcher
Number of paid firefighters: 13 (on call)
Number of volunteer firefighters: 0
Inventory of major equipment:

Year	Type	Condition
1997	Pierce 1500 gpm 700 gal Engine	Good
2000	E-One Pumper-Tanker 1,200 gpm 1500 gal	Good
2003	Freightliner Tanker 3,000 gal	Good
1986 (x2)	Chevy Brush Trucks 230 gal	Good

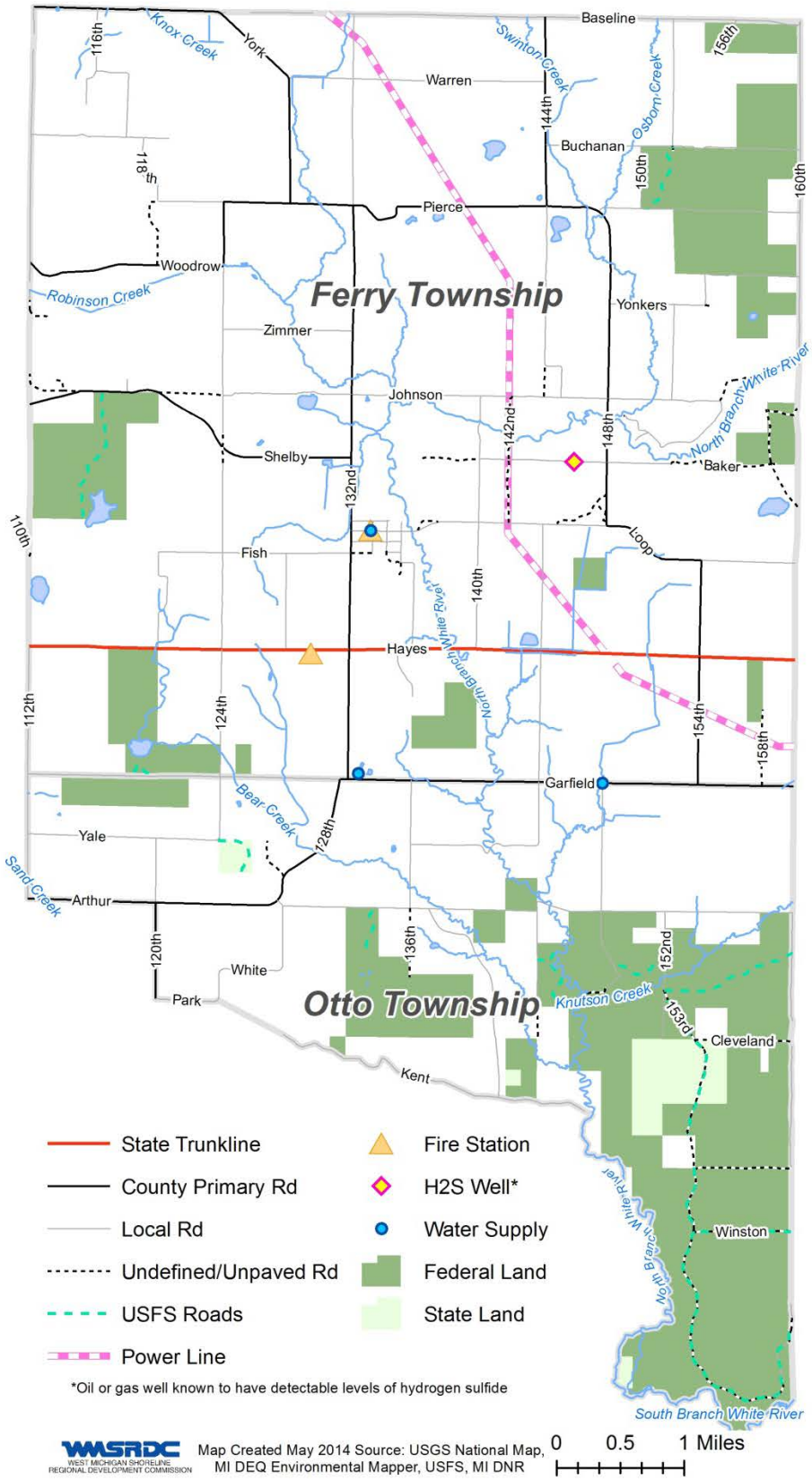
Mutual Aid Agreements:

- Oceana County Fire Departments (March 2001)
- Newaygo County (September, 2010)
- MDNR Forest, Mineral and Fire Management (May, 2013)

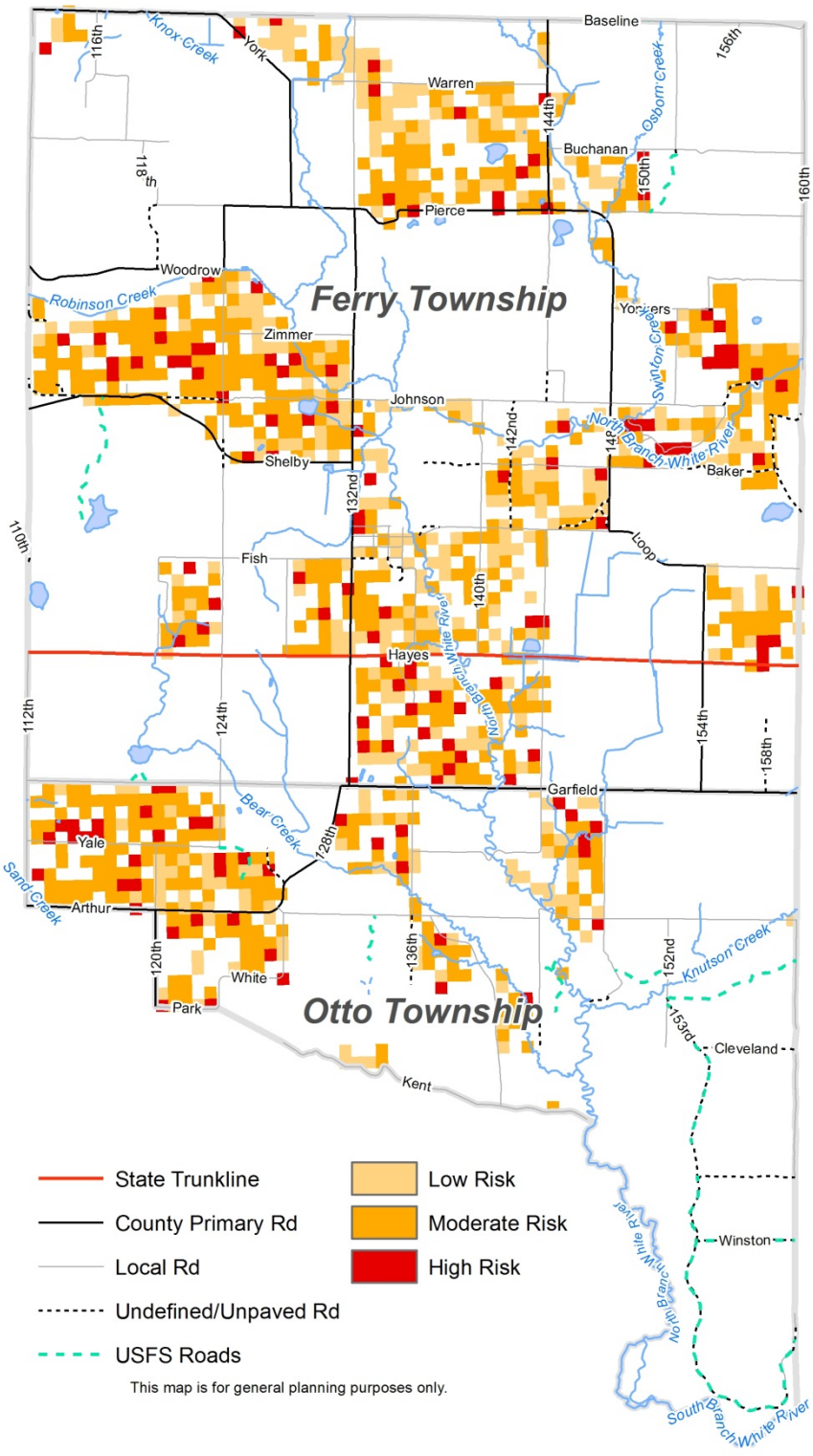
The Ferry Township Fire Department provides fire suppression, first aid, and jaws extraction to all of Ferry Township, as well as northern and eastern portions of Otto Township. The department also has an annual Fire Prevention program. The landscape is varied, with scattered forests, agriculture, and residential housing. Pine plantations and federal lands (Manistee National Forest) are found throughout the district. The unincorporated community of Ferry lies near the center of the district, and includes a fire station, a county park, and a small platted neighborhood that is surrounded by forests on all sides. There is also a hydrogen sulfide gas well within two miles east of the neighborhood. Water sources for fire suppression include fill sites at the fire station and at a pond near the intersection of Garfield Road and 132nd Avenue. Four additional drafting fill sites are scattered about Ferry Township. Access for first responders is needed on federal lands.


Baseline
116th
Knox Creek
York
Warren
144th
Sumner Ct
Osborn Creek
156th
Sparks Lake
Buchanan
150th
160th
118th
Pierce
Woodrow
Ferry Township
Robinson Creek
Yonkers
Zimmer
Landin Lake
Johnson
142nd
148th
White River
North Branch White River
Shelby
Baker
132nd
Gillon Lake
110th
Loop
Fish
Bragg Lake
North Branch White River
140th
Hayes
112th
124th
154th
158th
Bear Lake
Garfield
Yale
128th
Bear Creek
Sand Creek
Arthur
120th
136th
152nd
White
Park
Knutson Creek
153rd
Cleveland
Kent
North Branch White River
Otto Township
Winston
South Branch White River

Ferry Township Fire Department
District Assets



Ferry Township Fire Department
District WUI Wildfire Risk



WMSRDC WEST MICHIGAN SHORELINE REGIONAL DEVELOPMENT COMMISSION

Map Created May 2014
Source: USFS, MI Geographic Data Library

0 0.5 1 Miles

D. Grant Township Fire Department

Chief: Roland Brooks
Number of paid firefighters: 0
Number of volunteer firefighters: 16
Inventory of major equipment:

#	Year	Type
776	2002	Engine, Class A, 1,500 gpm, 1,000 gal
770	1989	Engine, Class A, 1,500 gpm, 1,000 gal
771	1994	Tender, 2,000 gal
775	1984	Tender, 2,000 gal
774	2003	Grass Truck, 50 gpm, 200 gal
772	2015	Grass Truck, 50 gpm, 200 gal

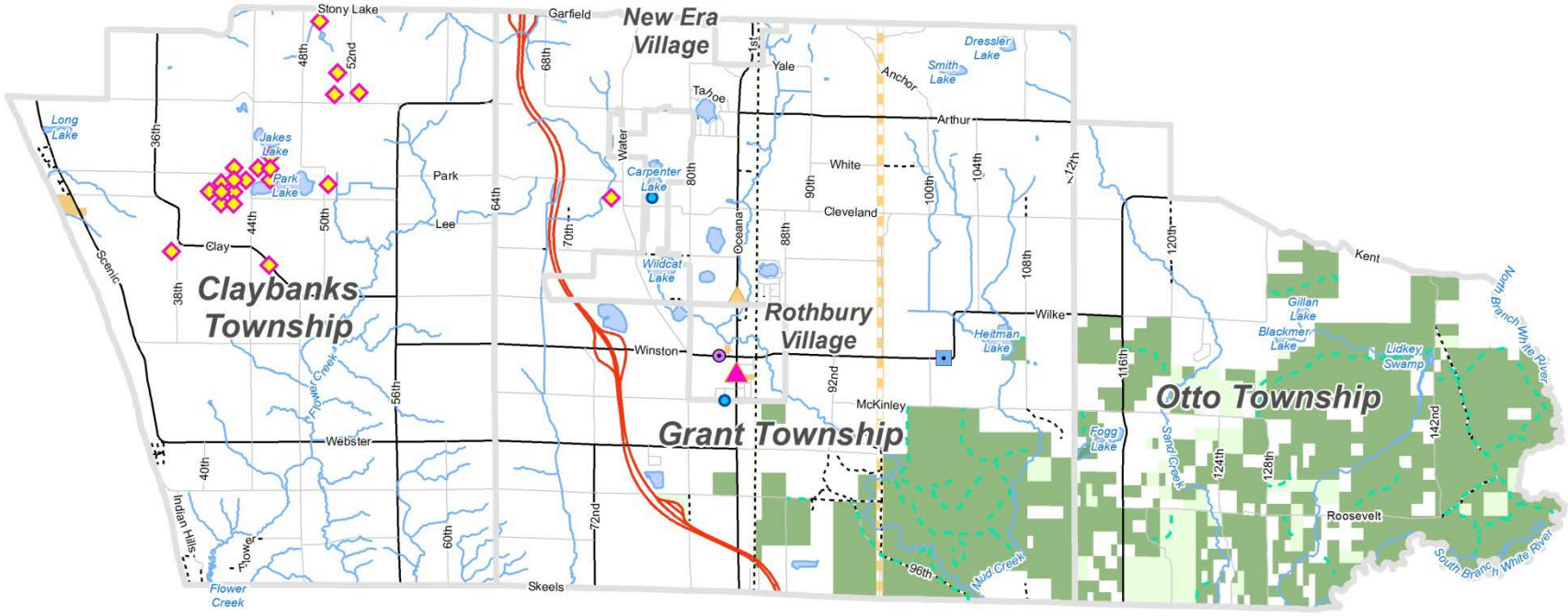
Mutual Aid Agreements:

- Oceana County Fire Departments (March 2001)
- MDNR – Forest Resources Division (2013)
- Blue Lake Fire Department (verbal)
- Montague Fire Department (verbal)
- Whitehall Fire Department (verbal)

The Grant Township Fire Department provides full response capabilities to New Era and Rothbury villages, Claybanks Township, Grant Township, and a portion of Otto Township. The department also participates in Fire Prevention Week every October. In general, the landscape is characterized by Lake Michigan shoreline in the west, agriculture in the central, and portions of the Manistee National Forest and state-owned lands in the east. Significant WUI areas are found along the shoreline and between the villages of New Era and Rothbury. Water sources for fire suppression include a large well on Cleveland Road and a large well on McKinley Road, both of which are in Grant Township. Improved access for first responders is needed along the Lake Michigan shoreline, and access improvements are needed on state and federal lands east and south of Rothbury.


North Branch White River
Unknown
142nd
Lickey Swamp
Kent
Gillan Lake
Blackmar Lake
Otto Township
South Branch White River
Roosevelt
128th
124th
120th
Sand Creek
116th
Fogg Lake
112th
108th
Wilke
Helman Lake
Mud Creek
Dressler Lake
Smith Lake
104th
Arthur
100th
Anchor
96th
McKinley
White
Cleveland
92nd
90th
Winston
88th
Yale
1st
Oceana
Lake Sixteen
Wildcat Lake
New Era Village
Rothbury Village
Grant Township
80th
Water
Garfield
70th
72nd
Skeels
68th
64th
Park
Lee
60th
56th
Webster
52nd
Tower Creek
48th
Jakes Lake
Park Lake
50th
44th
Clay
Claybanks Township
Tower
40th
Indian Hills
Flower Creek
38th
Stony Lake
36th
Scenic
Long Lake

Grant Township Fire Department
District Assets



State Trunkline
Primary/Major Rd
Local/Minor Rd
Undefined/Unpaved Rd
Natural Gas Pipeline

USFS Roads
Fire Station
Police Station
School
Shelter

H2S Well*
Water Supply
Federal Land
State Land
Municipal Land

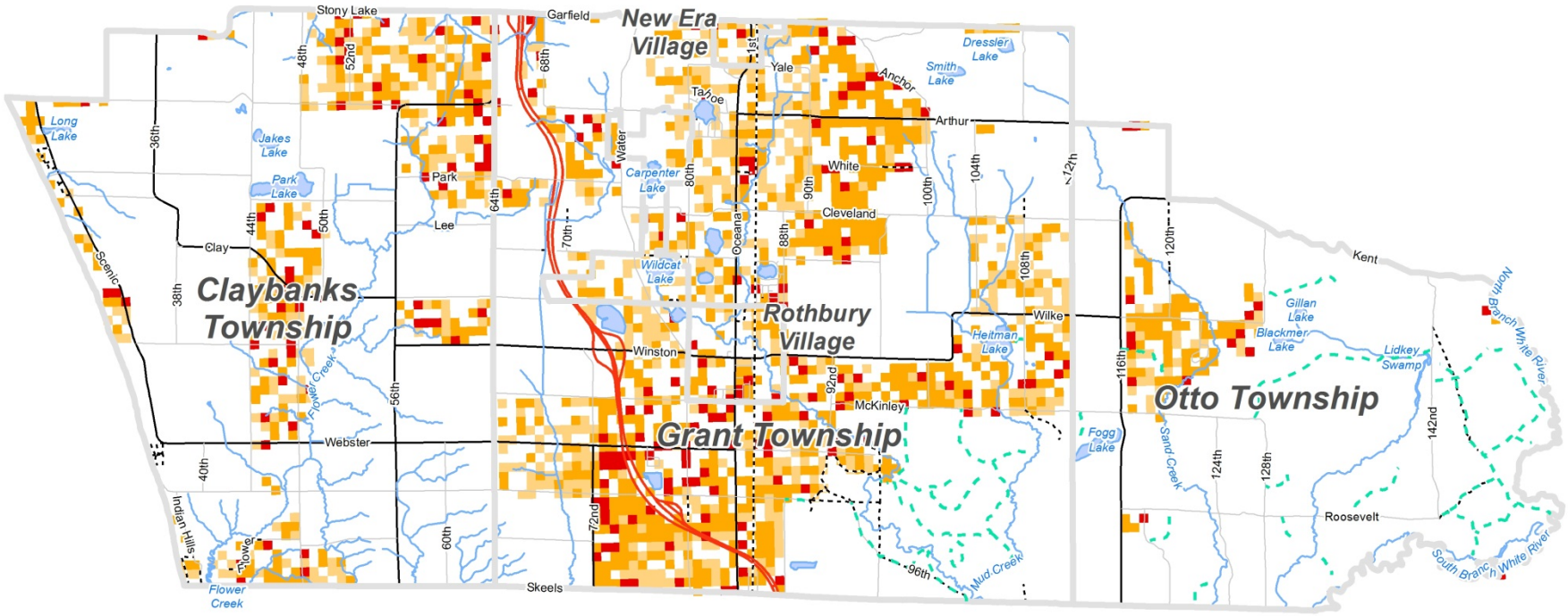
*Oil or gas well known to have detectable levels of hydrogen sulfide

WMSRDC WEST MICHIGAN SHORELINE REGIONAL DEVELOPMENT COMMISSION

Map Created May 2014 Source: USGS National Map, MI DEQ Environmental Mapper, USFS, MI DNR

0 0.5 1 Miles

Grant Township Fire Department
District WUI Wildfire Risk



State Trunkline
Primary/Major Rd
Local/Minor Rd
Undefined/Unpaved Rd
USFS Roads
Low Risk
Moderate Risk
High Risk

This map is for general planning purposes only.

WMSRDC
WEST MICHIGAN SHORELINE REGIONAL DEVELOPMENT COMMISSION

Map Created May 2014
Source: USFS, MI Geographic Data Library

0 0.5 1 Miles

E. Hart Area Fire Department

Chief: Ken Klotz
Number of paid firefighters: 24 (on call)
Number of volunteer firefighters: 0
Inventory of major equipment:

#	Year	Type
		Triple Combinations
143	2008	500 gpm, 4x4, 300 gal, A foam
142	2003	1,250 gpm, 1,000 gal, Afoam
142	1991	1,000 gpm, 1,000 gal
		Tender
161	1983	2,000 gal
		Brush Trucks
171	1978	1 ton, 4x4, 250 gpm, 250 gal
172	1983	1 ton, 4x4, 250 gpm, 250 gal
181	1992	1 ton, 4x4, 250 gpm, 250 gal
		Squad
151	1991	Grumman van, cascade system (4,500 psi), rehab a/c, rescue, RIT

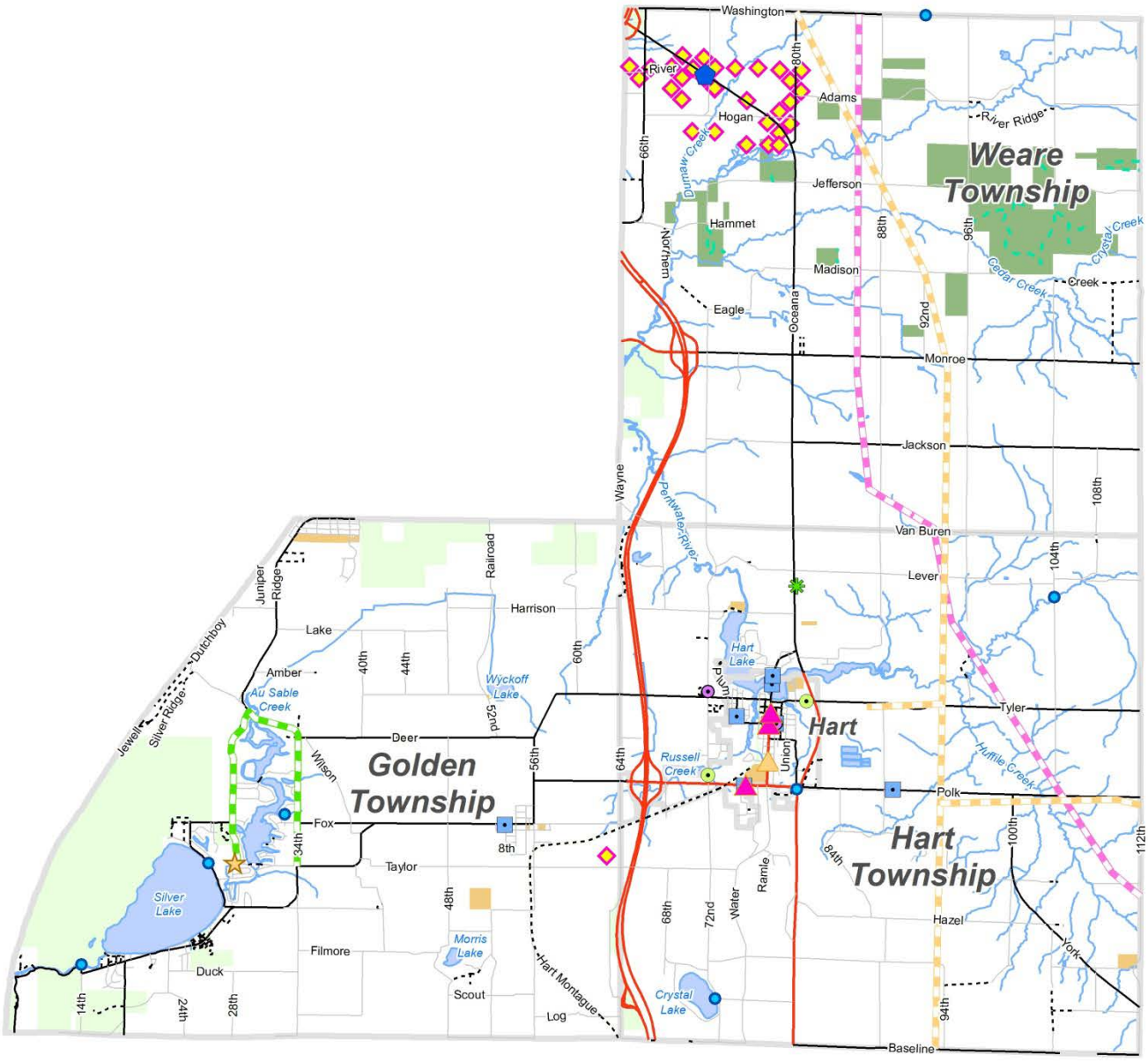
Mutual Aid Agreements:

- Oceana County Fire Departments (March 2001)

The Hart Area Fire Department provides fire suppression, vehicle extraction, wildland fire/WUI response, and operations level HazMat response to Hart City and the townships of Golden, Hart, and Weare. The department also has a fire prevention program for elementary grades K-3. Agriculture is the most common land use in this area. Wildfire concerns include: Silver Lake State Park, Grace Youth Camp, the Lake Michigan Shore, and heavy growth load (state forest) along the northern border in Golden Township; high elevations with steep/wooded terrain in Hart Township; and federal lands (Manistee National Forest) and pine stands in Weare Township. Water sources for fire suppression include a hydrant system in Hart City; three sources in the Silver Lake area; 3 sources in Hart Township; and one well in Weare Township. Improved access for first responders is needed along the Lake Michigan shoreline. There are also a number of escape routes in the shoreline area.


Washington
River
Adams
Hogan
River Ridge
66th
Unknown
Jefferson
Weare Township
88th
96th
Crystal Creek
Madison
Cedar Creek
Creek
Eagle
92nd
Monroe
Jackson
Wayne
Pentwater River
106th
Van Buren
Lever
104th
Harrison
Railroad
Juniper Ridge
Dutchboy
Lake
Amber
Au Sable Creek
40th
44th
60th
Wyckoff Lake
Golden Township
Deer
56th
64th
Jewell
Silver Ridge
Wilson
Hart
Hart Lake
Tyler
Huffins Creek
Fox
Polk
Hart Township
34th
8th
100th
112th
Taylor
Hunter Creek
Silver Lake
48th
Ramie
94th
Water
72nd
66th
Hazel
Silver Creek
Filmore
Morris Lake
Duck
Hart Montague
York
Scout
Crystal Lake
14th
24th
28th
52nd
Log
94th
Baseline

Hart Area Fire Department
District Assets



State Trunkline
Primary/ Major Rd
Local/ Minor Rd
Undefined/Unpaved Rd
USFS Roads
Gas Pipeline
Power Line
Propane Distribution Line
Propane Storage
Medical Facility
Shelter
911
EMS
Fire
Police
School
H2S Well*
Water Supply
Federal Land
Municipal Land
State Land

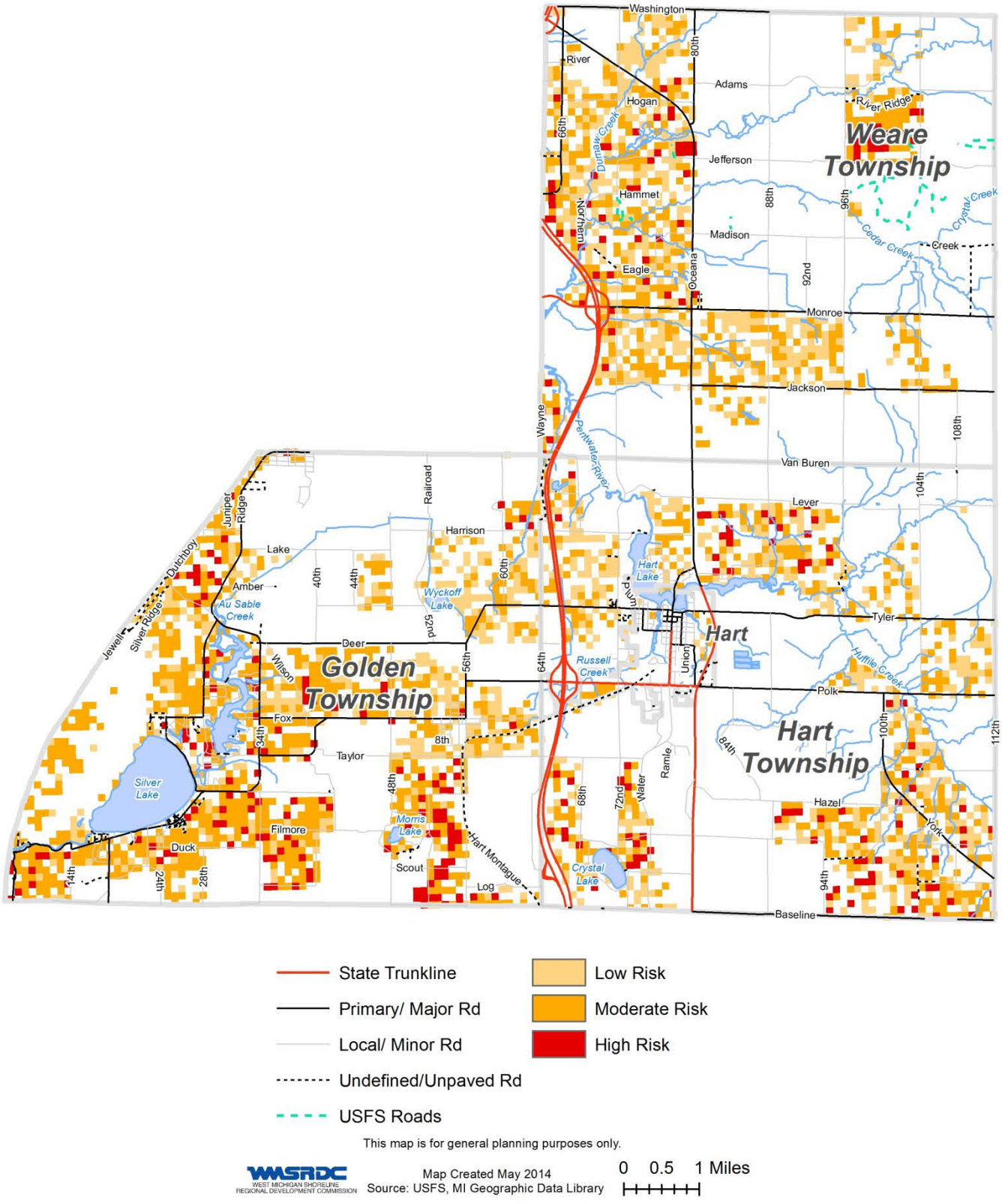
*Oil or gas well know to have detectable levels of hydrogen sulfide

WMSRDC WEST MICHIGAN SHORELINE REGIONAL DEVELOPMENT COMMISSION

Map Created May 2014 Source: MI DEQ Environmental Mapper, USFS, MI DNR

0 0.5 1 Miles

Hart Area Fire Department
District WUI Wildfire Risk



State Trunkline
Primary/ Major Rd
Local/ Minor Rd
Undefined/Unpaved Rd
USFS Roads

Low Risk
Moderate Risk
High Risk

This map is for general planning purposes only.

WMSRDC WEST MICHIGAN SHORELINE REGIONAL DEVELOPMENT COMMISSION

Map Created May 2014
Source: USFS, MI Geographic Data Library

0 0.5 1 Miles

F. Hesperia Area Fire Department

Chief: Dwayne Tinkham
Number of paid firefighters: 0
Number of volunteer firefighters: 19
Inventory of major equipment:

#	Type	Age (years)
1910	Primary Engine 1,250 gpm / 1,000 gal	13
1920	Pumper / Tanker 1,250 gpm / 2,000 gal	10
1921	Pumper / Tanker 500 gpm / 2,000 gal	2
1930	Wildland Engine Type VII	24
1931	Wildland Engine Type VI	29
1950	Water Source 1,000 gpm	29
1960	Equipment / Air Supply	18

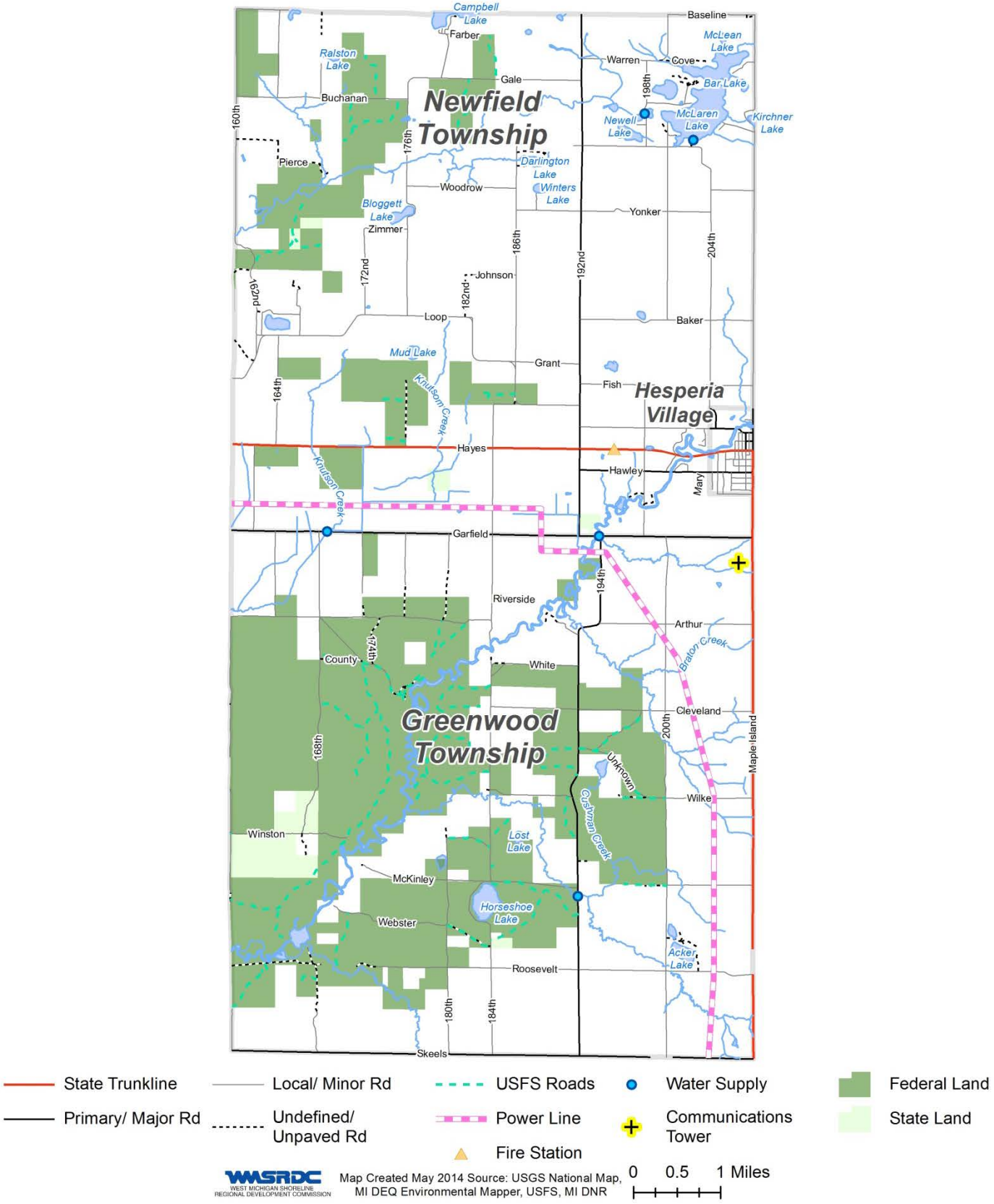
Mutual Aid Agreements:

- Oceana County Fire Departments (March 2001)

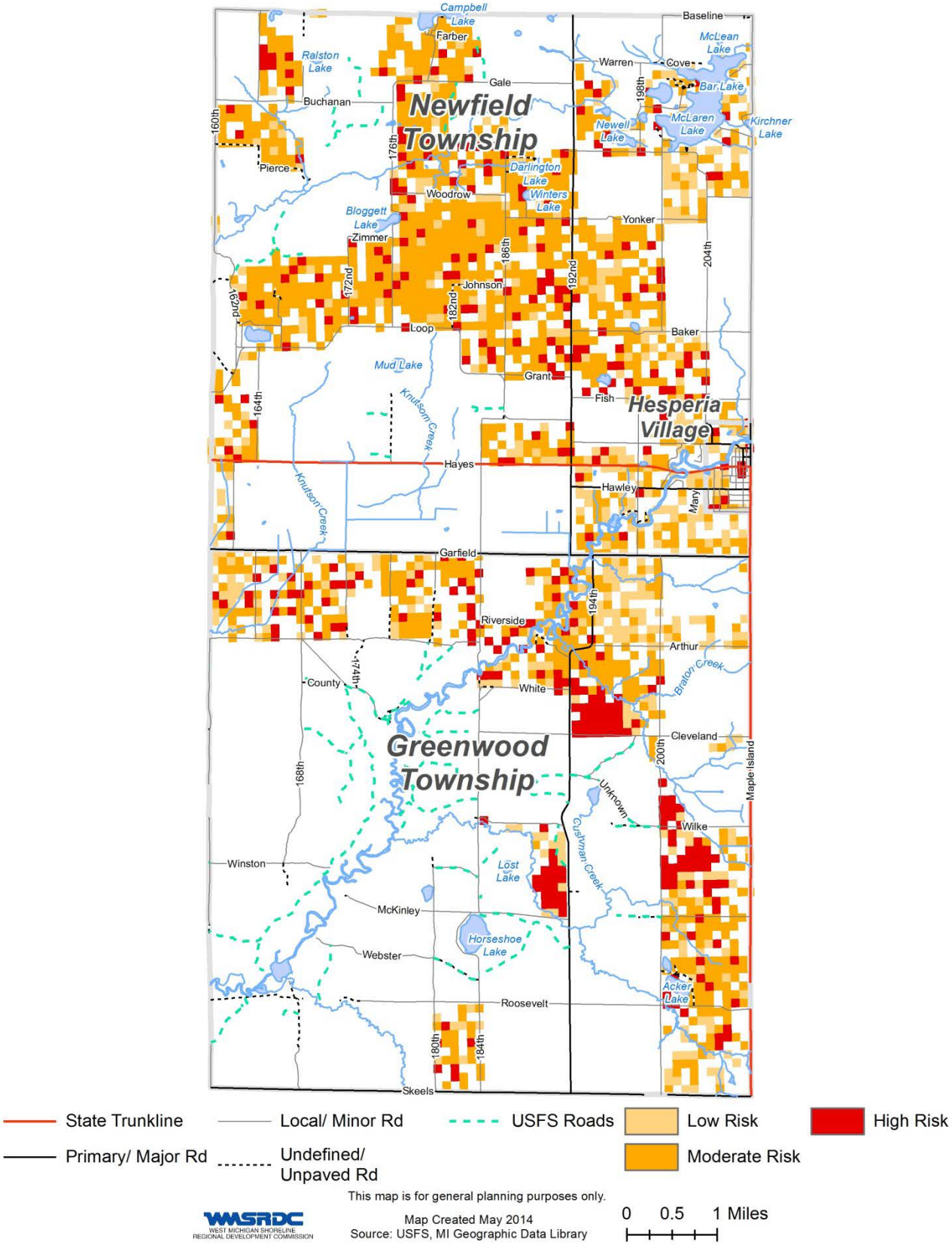
The Hesperia Area Fire Department covers the Village of Hesperia, Greenwood Township and Newfield Township in Oceana County. HAFD responds to various types of fires (including structural vehicle, and wildland), responds to vehicle accidents, and assists EMS and various other types of emergencies. The department also performs fire prevention education services in the form of school visits, open house and station tours. The landscape is mainly natural vegetation and forests. There are some pine plantations, farms, and scattered rural housing with higher housing concentrations located around lakes. Housing at Campbell and Darlington lakes have only one route to and from the developments. The Village of Hesperia is mostly surrounded by farmland. Water sources for fire suppression include a hydrant system in the village; dry hydrants on Garfield Road and at McLaren Lake; and drafting sites at McLaren Lake, Garfield Road at the White River, and 192nd Avenue near Cushman Creek. Much of Greenwood and Newfield townships are located within the Manistee National Forest, where access improvements are needed for first responders.


Baseline
Farber
Warren
Cove
Lure
Gale
198th
Buchanan
Newfield Township
160th
Gressley
176th
Pierce
Birch
North Branch White River
Woodrow
Yonker
Zimmer
186th
204th
192nd
172nd
Johnson
182nd
Loop
Baker
Grant
Hesperia Village
164th
Fish
Knutson Creek
Hayes
Hawley
Mary
Knutson Creek
Garfield
194th
Riverside
Arthur
South Branch White River
Braton Creek
174th
County
White
Cleveland
200th
168th
Greenwood Township
Maple Island
Unknown
Wilke
Cushman Creek
Winston
McKinley
Webster
Roosevelt
180th
184th
Skeels

Hesperia Area Fire Department
District Assets



Hesperia Area Fire Department
District WUI Wildfire Risk



State Trunkline — Local/ Minor Rd — USFS Roads — Low Risk — High Risk

Primary/ Major Rd — Undefined/ Unpaved Rd — Moderate Risk

This map is for general planning purposes only.

WMSRDC
WEST MICHIGAN SHORELINE REGIONAL DEVELOPMENT COMMISSION

Map Created May 2014
Source: USFS, MI Geographic Data Library

0 0.5 1 Miles

G. Pentwater Fire Department

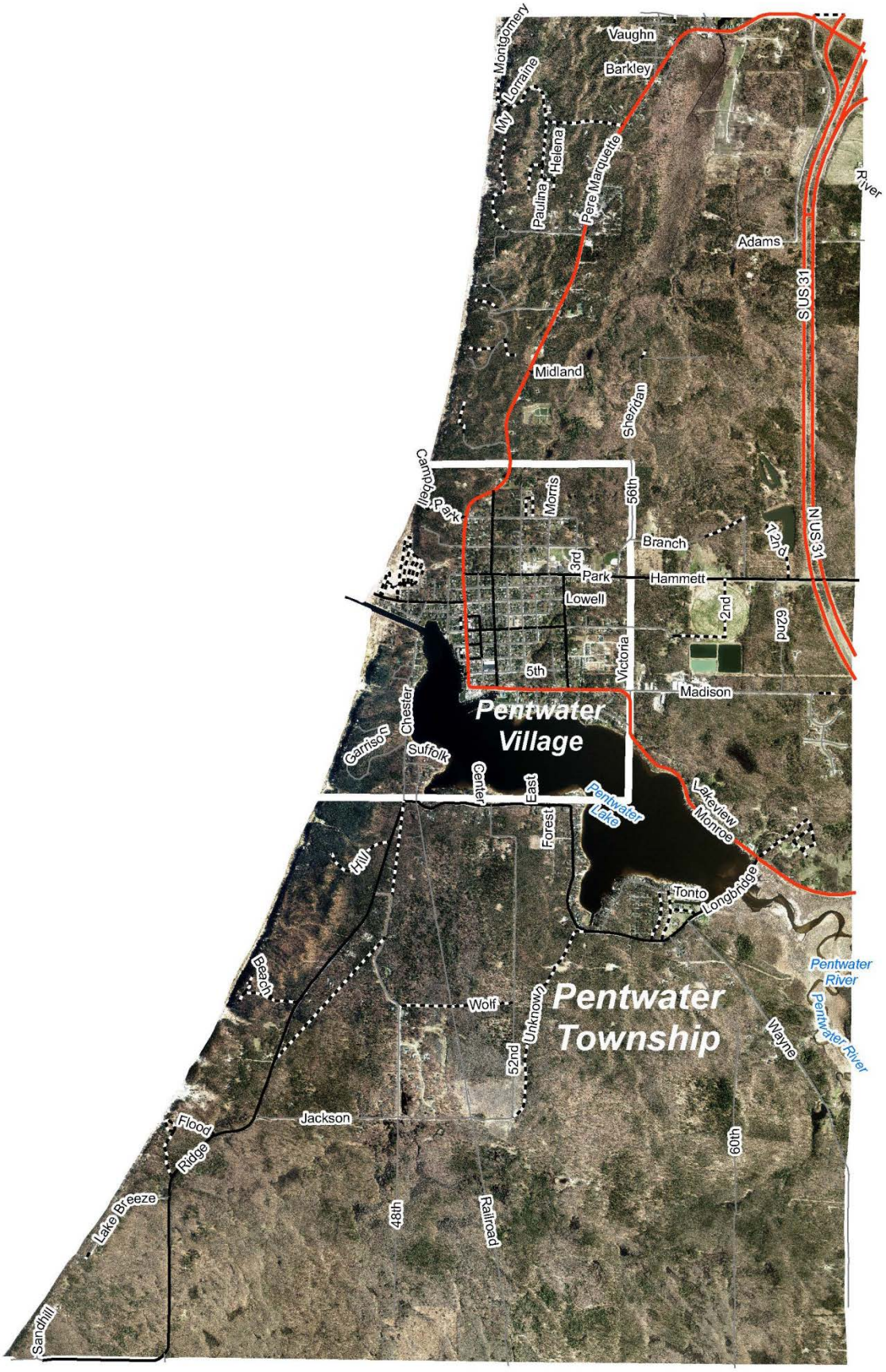
Chief: Terry Cluchey
Number of paid firefighters: 0
Number of volunteer firefighters: 17
Inventory of major equipment: (all are in very good or excellent working condition)

Year	Type
2002	Class A Darley / Spartan 1,500 gpm engine, 1,000 gal, CAFS
2013	Class A Darley / Ford F-550, 1,500 gpm engine, 200 gal, CAFS
2008	Ford Expedition EL medical rescue
2009	International DuraStar 4400, 2,300 gal water tender
2006	Ford F-350 brush / rescue, 150 gpm, 200 gal, CAFS
1982	DNR Co-Op 6x6, 50 gpm, 1,000 gal
1999	Ford F-150, 150 gpm, 200 gal, CAFS
1989	25' Bayliner 2556 Command Bridge
2011	Polaris Ranger XP EPS 4x4, KIMTEK Medlite rescue skid, Mattracks tracks

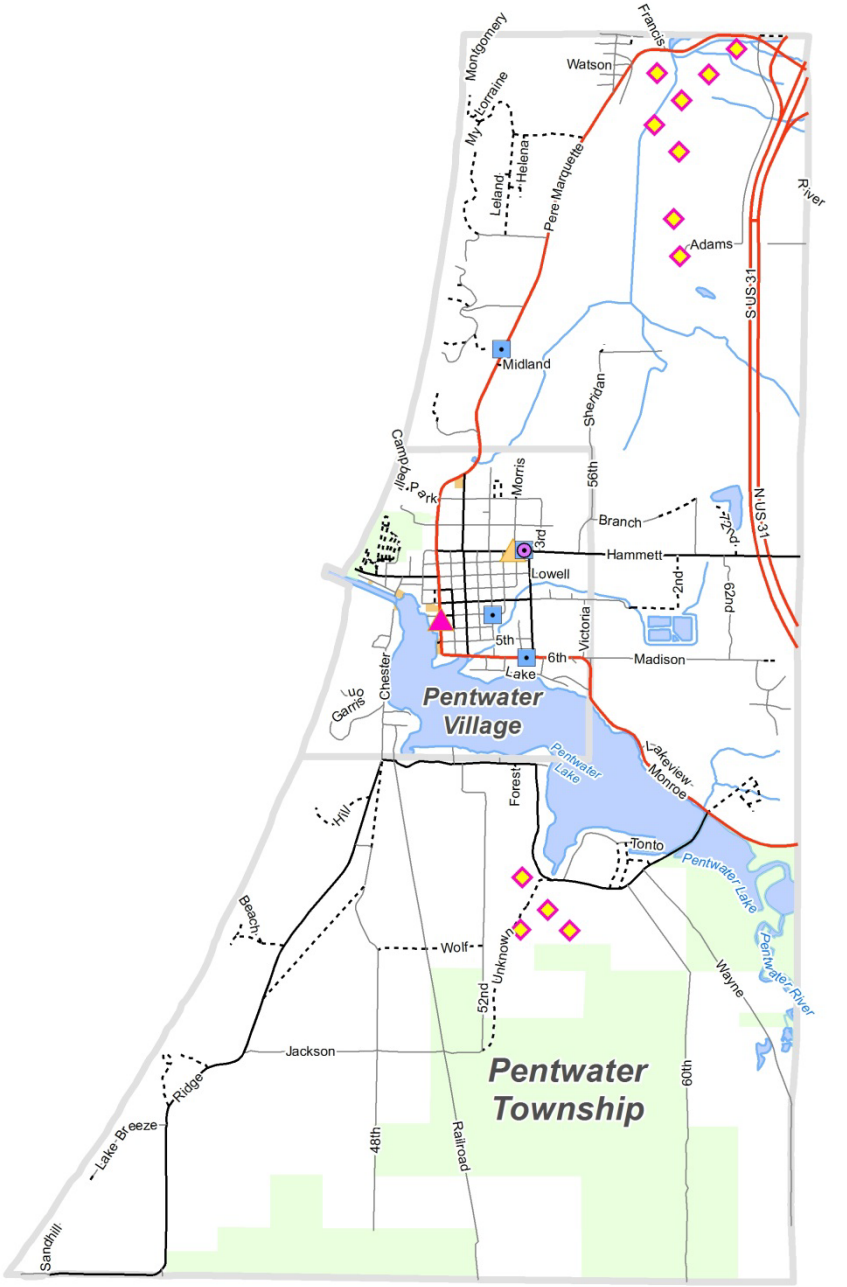
Mutual Aid Agreements:

- Oceana County Fire Departments (March 2001)

The Pentwater Fire Department serves the Village of Pentwater and Pentwater Township with response capabilities including, but not limited to, all types of fire suppression. The area is characterized by significant terrain and wildland-urban interface areas. Dune communities along Lake Michigan typically have the following attributes: one way in and out; major access issues; structures vulnerable to wildfire; dune grass near Lake Michigan; and heavy pine load inland. The department maintains four apparatus designed for suppression in those areas. The department is also licensed to respond at the Medical First Responder level and maintains two apparatus licensed to respond to medical emergencies. All firefighters are trained in ice rescue, and several are also trained in water rescue, including special equipment for both. A boat is maintained for calls on Pentwater Lake and Lake Michigan. In addition, PFD distributes Emergency Preparedness Guides at Mears State Park, and administers smoke education to elementary (K-6) students every October. Water sources for fire suppression in the area include a hydrant system in the village; a dry hydrant near the US-31 exit at Oceana Drive; and a fill site at the boat launch on the south side of Pentwater Lake.


Vaughn
Barkley
Montgomery
Lorraine
Helena
Paulina
Pere Marquette
River
Adams
S US 31
Midland
Sheridan
Campbell Park
Morris
56th
Branch
N US 31
3rd
Park
Hammett
Lowell
2nd
62nd
Victoria
5th
Madison
Pentwater Village
Chester
Garnsey
Suffolk
Center
East
Pentwater Lake
Lakeview
Monroe
Forest
Hill
Tonto
Longbridge
Pentwater River
Beach
Wolf
Unknown
Pentwater Township
Wayne
52nd
Jackson
Flood
Ridge
60th
Lake Breeze
48th
Railroad
Sandhill

Pentwater Fire Department
District Assets



State Trunkline
Primary/ Major Rd
Local/ Minor Rd
Undefined/Unpaved Rd

Fire Station
Police Station
H2S Well*
Hart

School
Shelter
Municipal Land
State Land

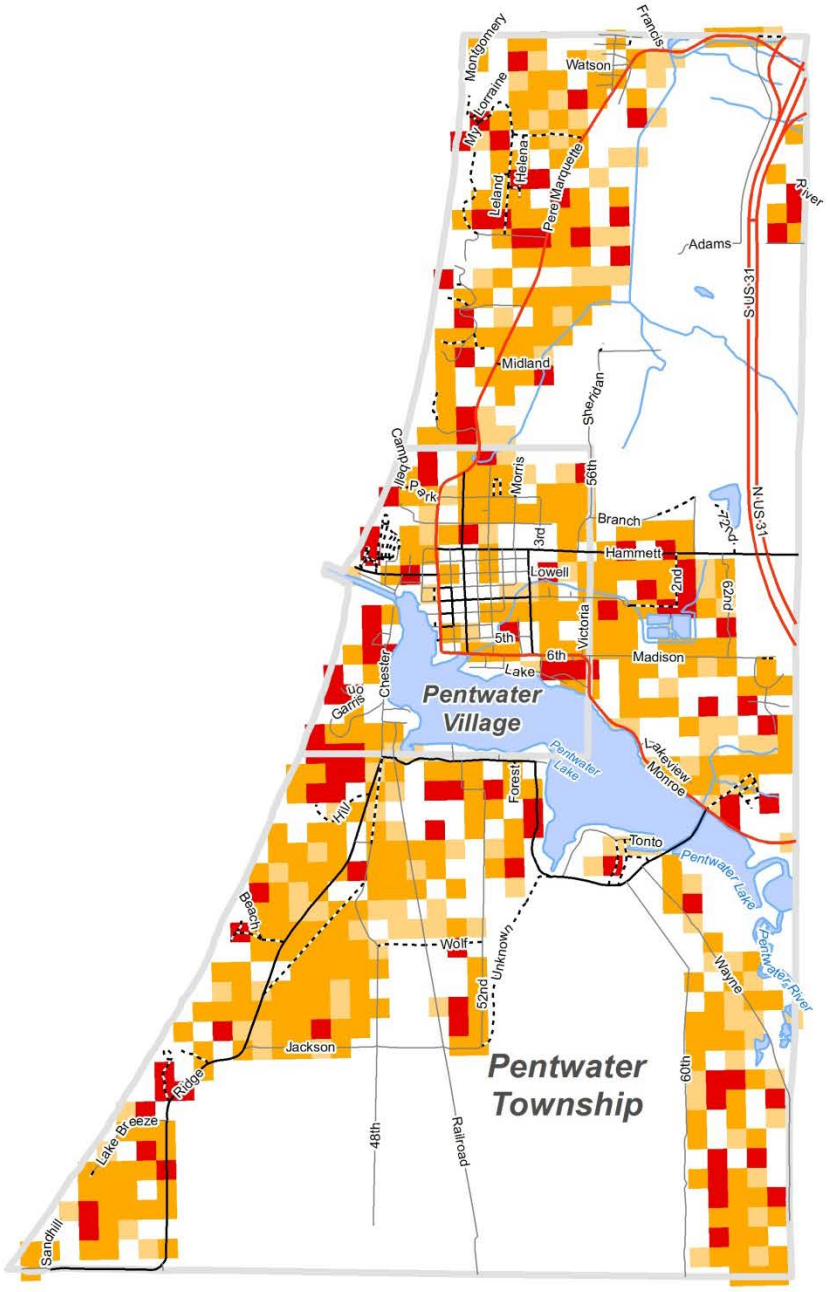
*Oil or gas well known to have detectable levels of hydrogen sulfide

WMSRDC WEST MICHIGAN SHORELINE REGIONAL DEVELOPMENT COMMISSION

Map Created May 2014 Source: MI DEQ Environmental Mapper, USFS, MI DNR

0 0.5 1 Miles

Pentwater Fire Department
District WUI Wildfire Risk



State Trunkline
Primary/ Major Rd
Local/ Minor Rd
Undefined/Unpaved Rd

Low Risk
Moderate Risk
High Risk

This map is for general planning purposes only.

WMSRDC WEST MICHIGAN SHORELINE REGIONAL DEVELOPMENT COMMISSION

Map Created May 2014
Source: USFS, MI Geographic Data Library

0 0.5 1 Miles

H. Shelby-Benona Fire Department

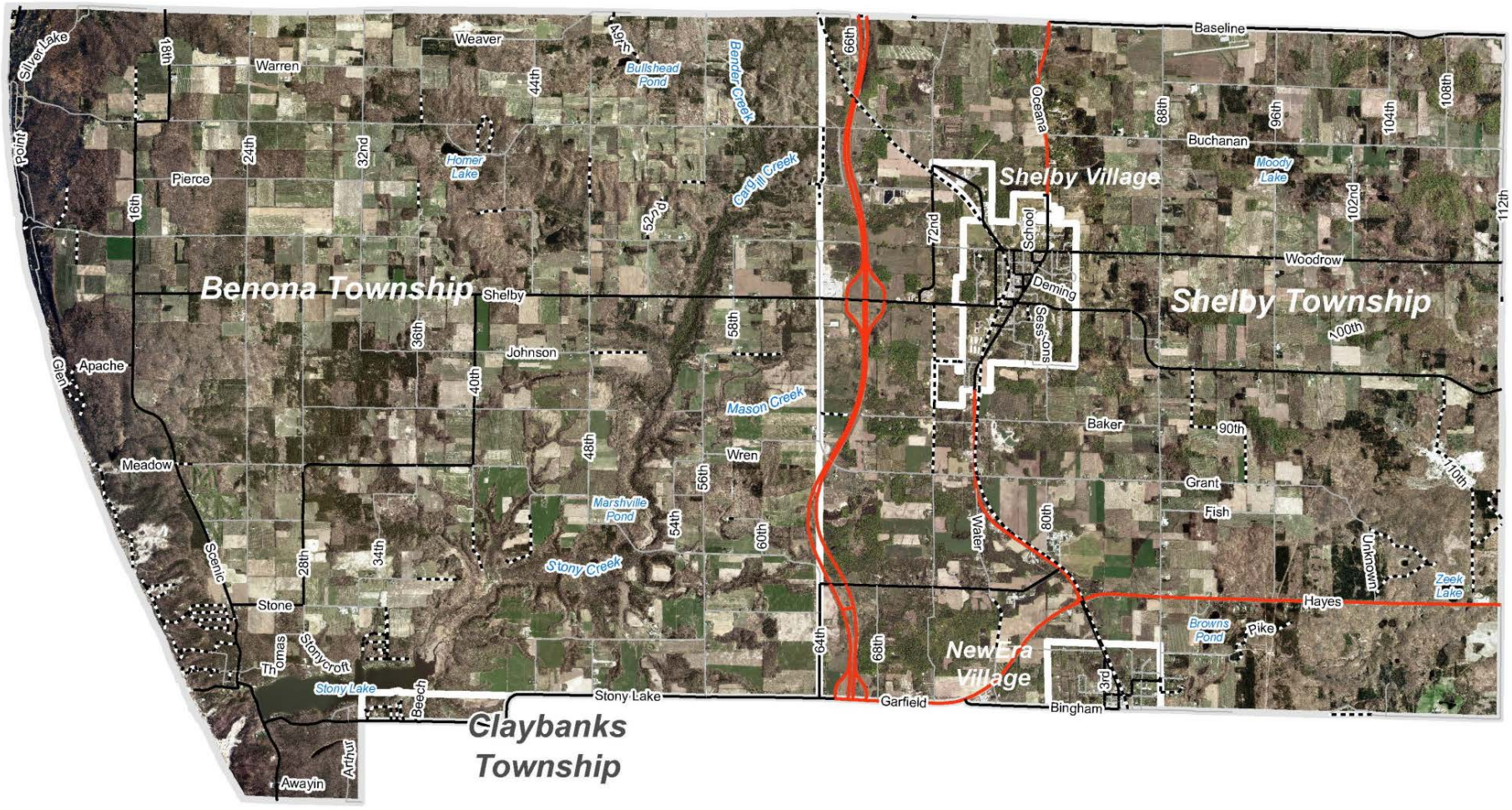
Chief: Jack White
Number of paid firefighters: 0
Number of volunteer firefighters: 21 (on call / part paid)
Inventory of major equipment:

#	Year	Type	Condition
243	2008	Class A, Pumper / Extraction Tools	Excellent
242	1997	Class A, Pumper	Good
261	2003	Class A, Pumper / Tender	Excellent
280	2005	RAT, Wildland-Urban Interface	Excellent
271	1987	Brush & Grass, Government Surplus	Fair
254	1996	Squad, 4,000 psi air / lighting / personnel transport	Good

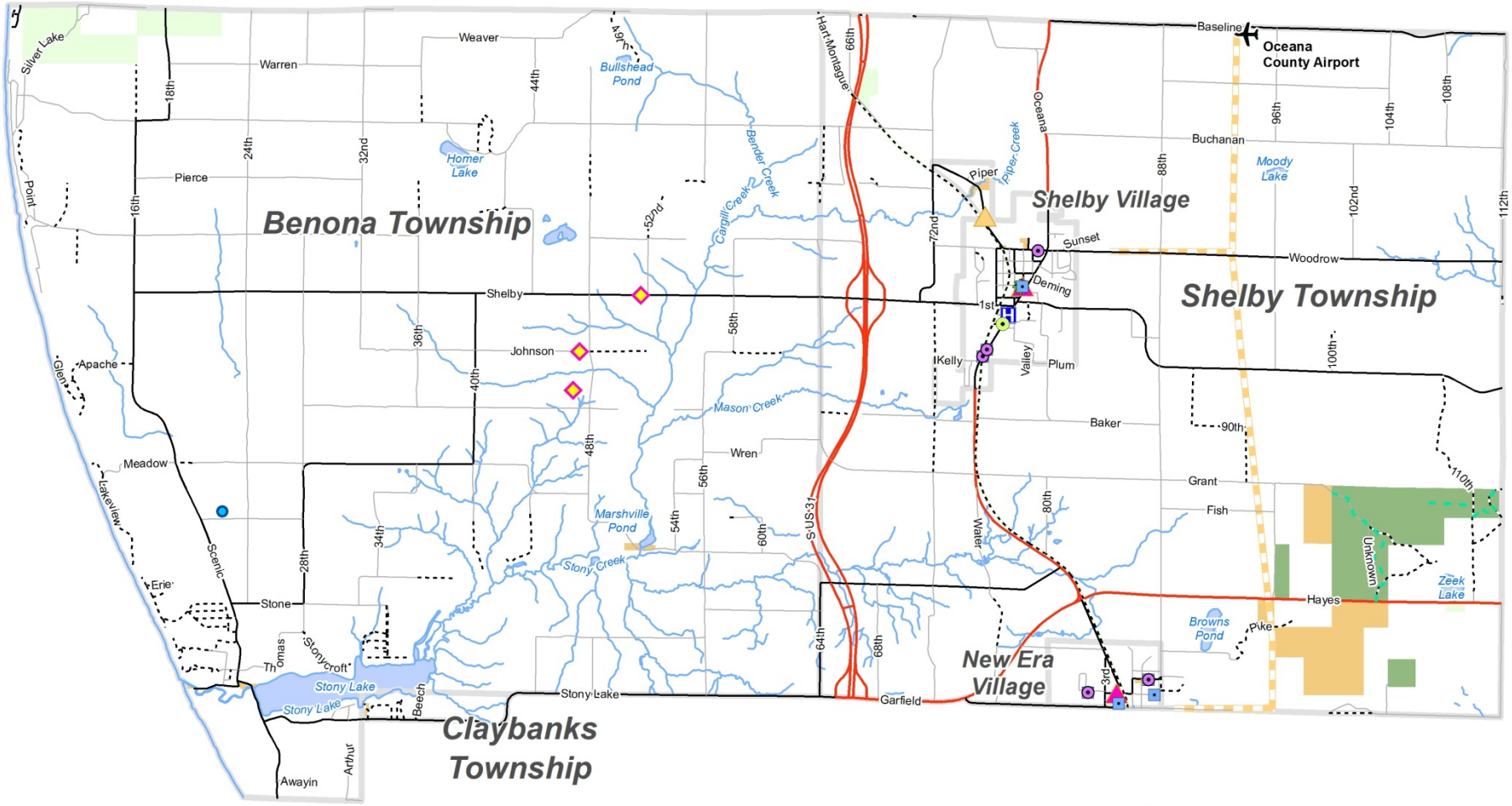
Mutual Aid Agreements:

- Oceana County Fire Departments (March 2001)
- MDNR Forest, Mineral and Fire Management (August, 2007)

The Shelby-Benona Fire Department covers Shelby Village, the north half of New Era Village, and the townships of Benona and Shelby. The landscape is a mix of natural vegetation, farmland, and forests. Wildfire concerns include limited access and the wildland urban interface along Lake Michigan; pockets of forest that abut Shelby and New Era villages; and a section of the Manistee National Forest which lies in the southeast portion of the area. There are also two youth camps, Miniwanca and Ao-Wa-Kiya, nestled in undeveloped areas near Stony Lake. The department responds to structural and wildland fires, and provides extraction, rescue and HAZMAT capabilities. The department also performs fire prevention education in elementary schools each year. Water sources for fire suppression include a fire hydrant system in Shelby Village, and dry hydrants in the Stony Lake area.


Benona Township
Shelby Township
Claybanks Township
Shelby Village
New Era Village
Silver Lake
Point
Pierce
Warren
Weaver
Homer Lake
Bullshead Pond
Bender Creek
Cargill Creek
Shelby
Johnson
Apache
Glen
Meadow
Mason Creek
Wren
Marshville Pond
Stony Creek
Scenic
Stone
Thomas
Stonycroft
Stony Lake
Beech
Arthur
Awayin
Oceana
School
Deming
Sessions
Baseline
Buchanan
Moody Lake
Woodrow
Baker
Grant
Fish
Water
Unknown
Zeek Lake
Hayes
Browns Pond
Pike
Garfield
Bingham
3rd
18th
16th
24th
32nd
44th
52nd
36th
40th
48th
56th
28th
34th
54th
60th
64th
66th
68th
72nd
88th
96th
100th
102nd
104th
108th
110th
112th
90th

Shelby - Benona Fire Department
District Assets



State Trunkline
Primary/ Major Rd
Local/ Minor Rd
Undefined/Unpaved Rd
USFS Roads
Gas Pipeline
Airport
Hospital
Medical Facility
School
Shelter
EMS
Fire Station
Police Station
H2S Well*
Water Supply
Federal Land
State Land
Municipal Land

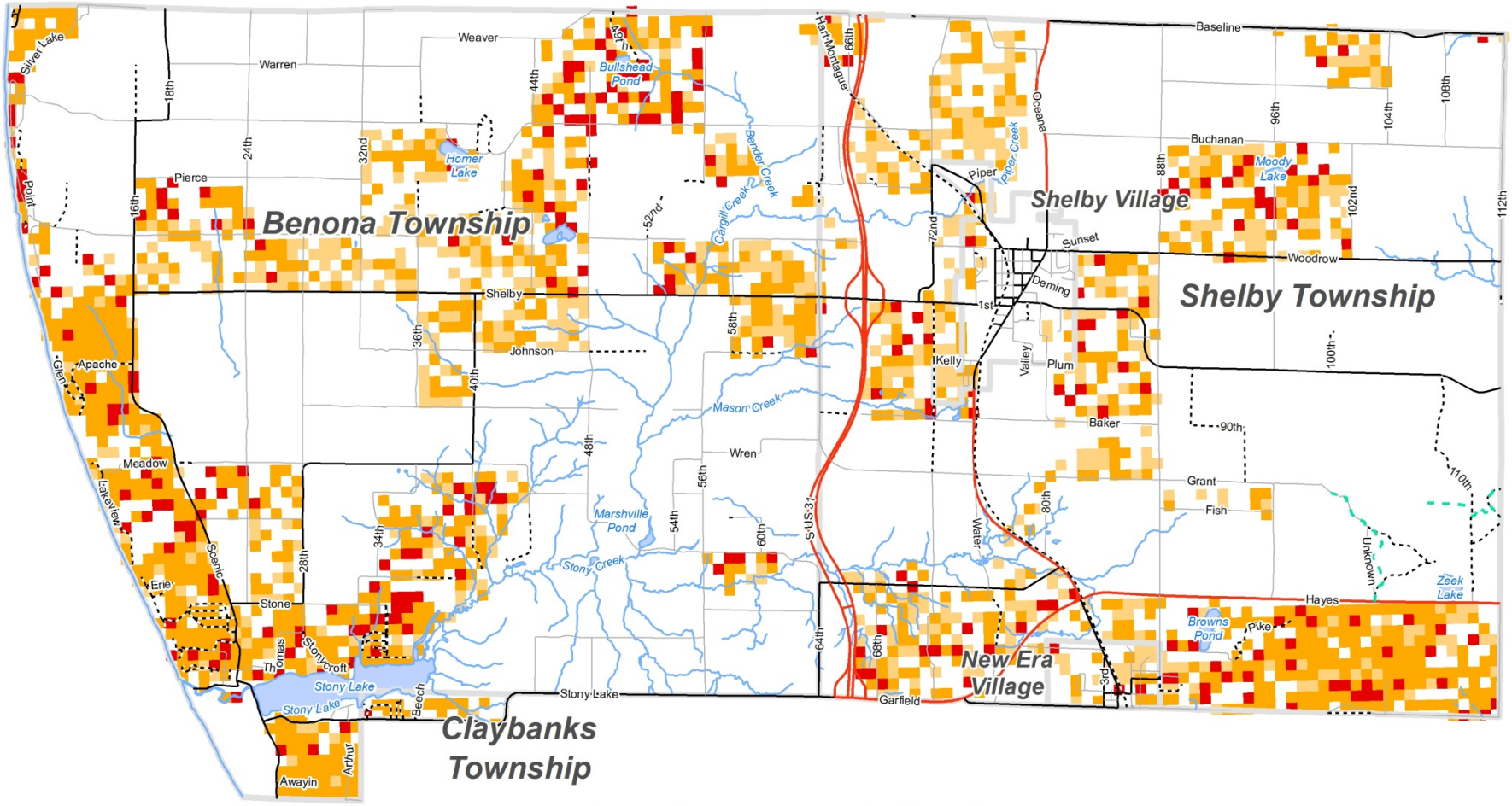
*Oil or gas well known to have detectable levels of hydrogen sulfide

WMSRDC WEST MICHIGAN SHORELINE REGIONAL DEVELOPMENT COMMISSION

Map Created May 2014 Source: MI DEQ Environmental Mapper, USFS, MI DNR

0 0.5 1 Miles

Shelby - Benona Fire Department
District WUI Wildfire Risk



State Trunkline
Primary/ Major Rd
Local/ Minor Rd
Undefined/Unpaved Rd
USFS Roads
Low Risk
Moderate Risk
High Risk

This map is for general planning purposes only.

WMSRDC
WEST MICHIGAN SHORELINE REGIONAL DEVELOPMENT COMMISSION

Map Created May 2014
Source: USFS, MI Geographic Data Library

0 0.5 1 Miles

I. Walkerville Area Fire and Rescue

Chief: Jerry Frick
Number of paid firefighters: 0
Number of volunteer firefighters: 15
Inventory of major equipment:

#	Year	Type	Condition
441	2002	Class A Pumper, 1,000 gpm, 2,000 gal	Good
442	1990	Class A Pumper, 1,000 gpm, 1,000 gal	Should be replaced w/WUI engine
461	2006	Pumper/Tanker, 1,250 gpm, 2,500 gal	Good
470	2005	Polaris Ranger 6x6 ATV, wildfire/rescue unit	Fair
471	2012	Wildfire/Quick Attack 4x4, 350 gpm pump, 300 gal	Very Good
472	1990	Wildfire 4x4, 350 gpm, 250 gal	Needs to be replaced
451	2009	Rescue/Air Supply / Medical Response 4x4	Good

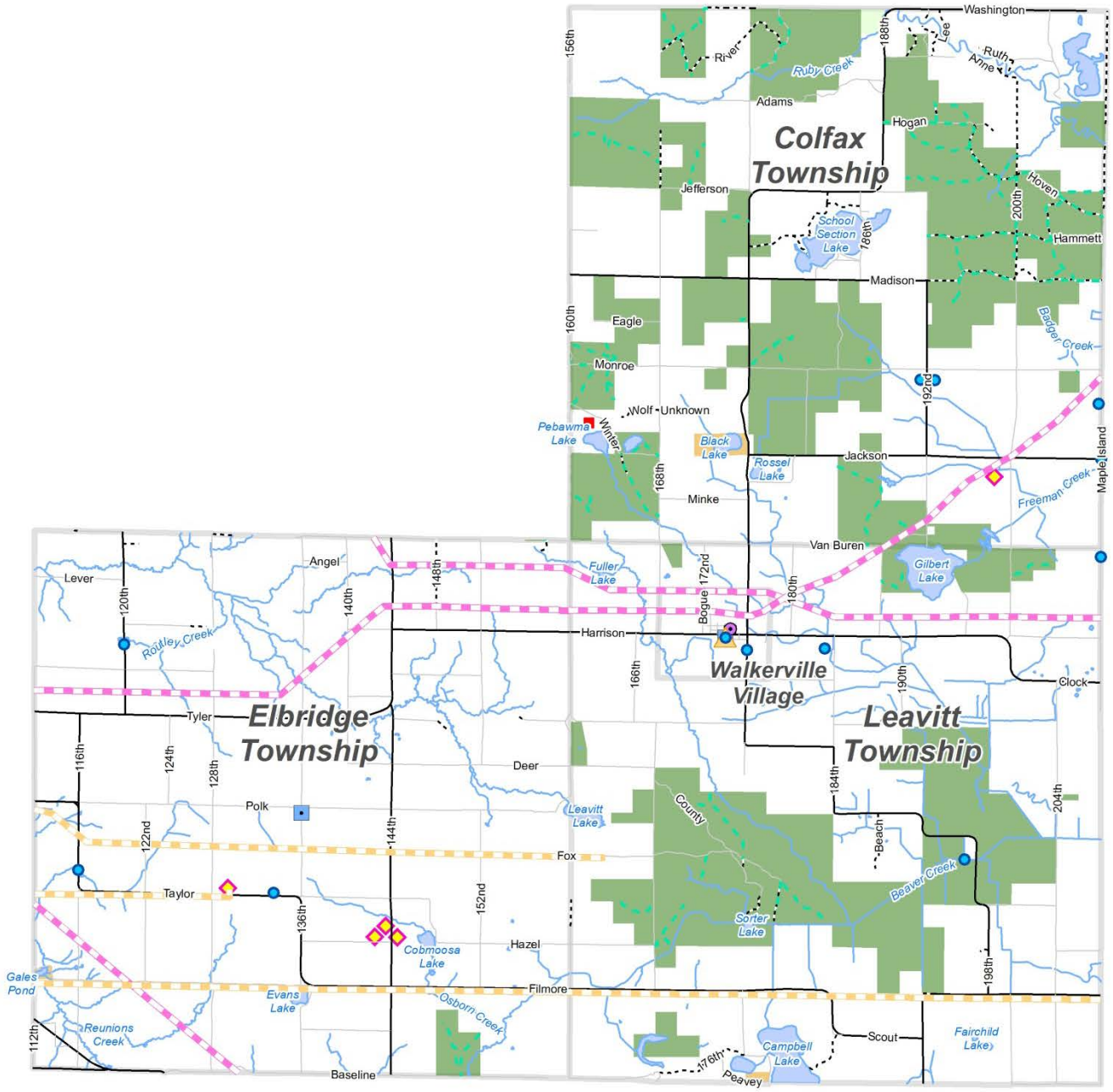
Mutual Aid Agreements:

- Oceana County Fire Departments (March 2001)
- Huron-Manistee National Forest (2008)
- MDNR – Forest Resources Division (2013)
- Newaygo County

The Walkerville Area Fire and Rescue covers Walkerville Village and the townships of Colfax, Elbridge, and Leavitt. The department offers structural and wildland fire suppression, auto extraction, basic HAZMAT response, and basic special rescue. Outreach and education activities of the department include the use of its Fire Prevention / Life Safety Public Training Trailer; fire protection programs; community events; and a newsletter. The landscape is a mix of natural vegetation, farmland, and forests. Elbridge contains the most farmland; Leavitt has a fair mix of farmland and forests; and Colfax is mostly forested with some agriculture. There are pine plantations scattered throughout the area, with the largest concentrations in Colfax. Wildland-urban interface areas include the Ruby Creek area, School Section Lake area, Walkerville Village, Campbell Lake area, and large agricultural operations in Colfax Township. High priority access / escape route areas include the Ruby Creek, School Section Lake, and Campbell Lake areas, as well as federal lands of the Manistee National Forest where motorized vehicle access is often limited. A number of gas and electric transmission lines bisect the area as well. Access to water for fire suppression is available at over a dozen sites in the area. Sources include the fire station well, dry hydrants, irrigation wells, and private wells at Arbre Farms. Additional water sources are recommended for the following locations: Washington Road at the S. Branch Pere Marquette River; School Section Lake; Campbell Lake; and an irrigation well in Colfax Township, Section 19.


Washington
156th
River
Ruby Creek
Ruth Anne
Adams
Hogan
188th
Jefferson
Hoven
200th
School Section Lake
Hammett
Madison
Colfax Township
160th
Eagle
Badger Creek
Monroe
192nd
Wolf
Pebawma Lake
Winter Unknown
Black Lake
Rossel Lake
Jackson
168th
Minke
Freeman Creek
Van Buren
Lever
Angel
148th
120th
140th
Fuller Lake
172nd
Gilbert Lake
Bogue
180th
Routley Creek
Harrison
166th
Walkerville Village
190th
Clock
Amber
Tyler
Elbridge Township
116th
124th
128th
Deer
Leavitt Township
184th
204th
112th
Polk
Leavitt Lake
County
122nd
144th
Fox
Beach
Beaver Creek
Taylor
152nd
Sorter Lake
South Beaver Creek
Hazel
136th
Cobmoosa Lake
198th
Gales Pond
Evans Lake
Filmore
Reunions Creek
Reunions Creek
Osborn Creek
Scout
Campbell Lake
Fairchild Lake
176th
Peavey
Baseline

Walkerville Area Fire and Rescue
District Assets



Primary/ Major Rd
Local/ Minor Rd
Undefined/Unpaved Rd
USFS Roads
Natural Gas Pipeline
Power Line
Correctional Facility
Fire Station
Police Station
School
Shelter
H2S Well*
Water Supply
Federal Land
State Land
Municipal Land

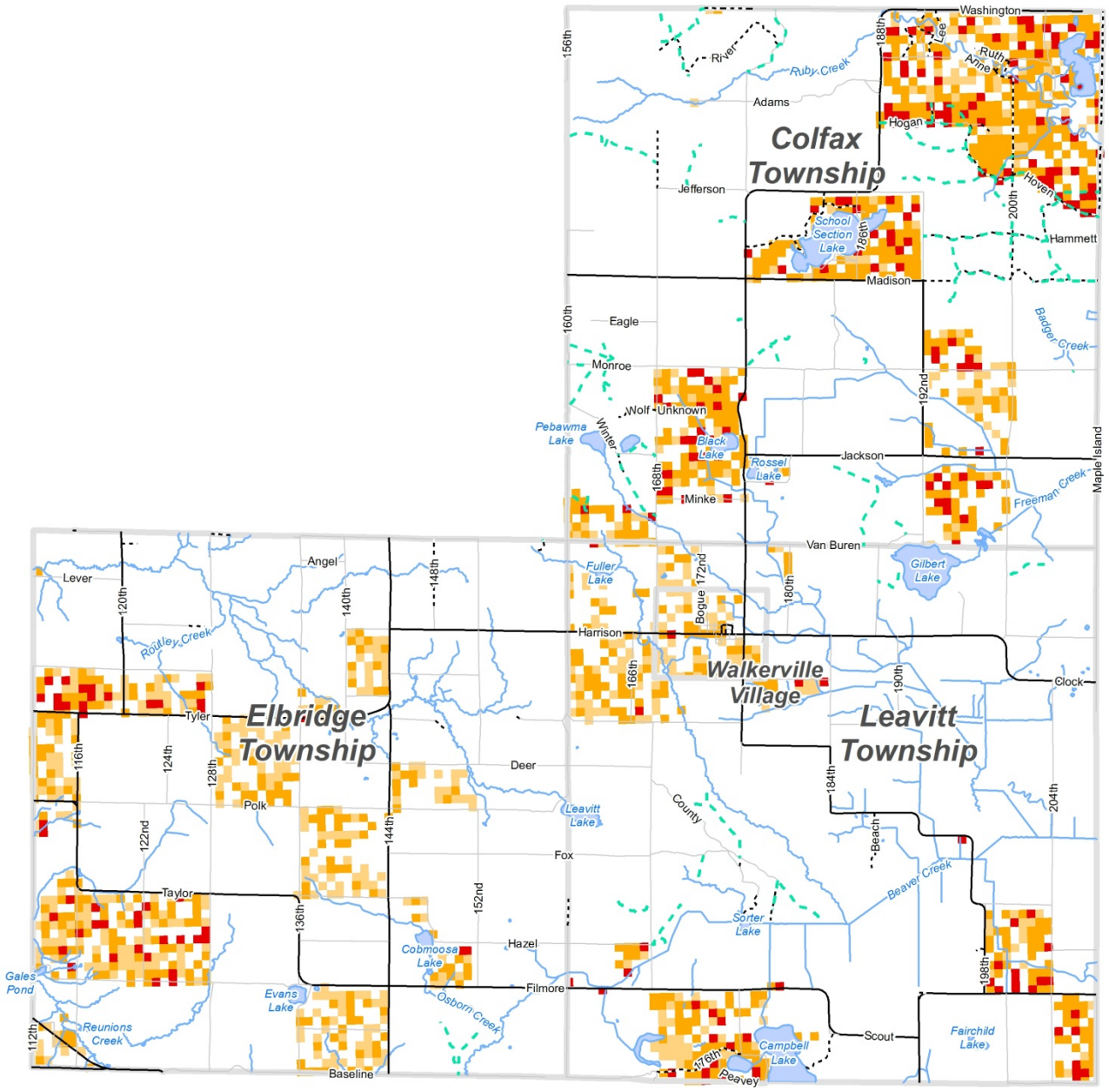
*Oil or gas well known to have detectable levels of hydrogen sulfide

WMSRDC West Michigan Shoreline Regional Development Commission

Map Created May 2014 Source: MI DEQ Environmental Mapper, USFS, MI DNR

0 0.5 1 Miles

Walkerville Area Fire and Rescue
District WUI Wildfire Risk



Primary/ Major Rd
Local/ Minor Rd
Undefined/Unpaved Rd
USFS Roads

Low Risk
Moderate Risk
High Risk

*Oil or gas well known to have detectable levels of hydrogen sulfide

WMSRDC WEST MICHIGAN SHORELINE REGIONAL DEVELOPMENT COMMISSION

Map Created May 2014
Source: USFS, MI Geographic Data Library

0 0.5 1 Miles

J. Other Local Information

OCEANA COUNTY BRIDGE LIST

Township	Road Name	Primary/ Local	Waterway	Load Limit
Pentwater	Longbridge Rd. (S. of Bus 31)	Primary	Pentwater River	none
Weare	Hogan Rd. (near 72nd Ave.)	Local	Quinn Creek	none
	Hammett Rd. (E of 66th Ave.)	Local	N B Pentwater	none
	Oceana Dr. (N of Jefferson)	Primary	Cedar Creek	none
	Oceana Dr. (N of Madison)	Primary	Pentwater River	none
	88th Ave. (N of Jefferson)	Local	N B Pentwater	3 tons
	88th Ave. (S of Jefferson)	Local	Cedar Creek	none
	96th Ave.(N of Jefferson)	Local	N B Pentwater	none
	96th Ave.(S of Jefferson)	Local	Cedar Creek	none
	104th Ave. (N of Adams Rd.)	Local	N B Pentwater	none
	112th Ave. (N of Adams Rd.)	Primary	N B Pentwater	20T, 60T, 80T
Crystal	120th Ave. (S of Washington)	Primary	N B Pentwater River	none
Colfax	Washington (near 188th Ave.)	Primary	Pere Marquette Rv	none
Leavitt	196th Ave. (S of Fox Rd.)	Primary	Beaver Drain	none
	204th Ave. (N of Taylor Rd.)	Local	Beaver Creek	none
Benona	Shelby Rd. (W of 58th Ave.)	Primary	Stony Creek	none
	Garfield Rd. (W of Scenic Dr.)	Primary	Stony Creek	none
	Scenic Dr. (N of Stony Lk Rd.)	Primary	Stony Creek	none
	Marshville Dam Rd. (W of 54th)	Local	Stony Creek	none
Elbridge	140th Ave. (N of Tyler)	Local	S B Pentwater	none
	Tyler Rd. (E of 140th)	Primary	S B Pentwater	none
	144th Ave. (N of Tyler)	Primary	S B Pentwater	none
	120th Ave. (N of Lever)	Primary	S B Pentwater	none
	136th Ave. (N of Tyler)	Local	S B Pentwater	none
	Fillmore Rd. /Gales Pond	Local	Hufftile Creek	none
Hart	72nd Ave. (near Lever Rd.)	Local	Pentwater River	none
	104th Ave. (S of Lever Rd.)	Local	S B Pentwater	none
	Lever Rd. (near 108th Ave.)	Local	S B Pentwater	none
	Polk Rd. (W of 104th Ave.)	Primary	Hufftile Creek	none
	Tyler Rd. (W of 96th Ave)	Primary	Hufftile Creek	none
	York Rd. (E of 108th Ave.)	Primary	Huftile Tributary	none
Golden	Taylor Rd. (W of 34th Ave.)	Local	Ausable Creek	none
Shelby	Water Rd. (N of Hayes)	Local	Dorrance Creek	51T, 62T
Ferry	Johnson Rd. (E of 132nd)	Local	Robinson Creek	none
	Johnson Rd. (E of 148th)	Local	Osborn Creek	none
	140th Ave. (S of Johnson)	Local	N B White River	none
	148th Ave. (S of Johnson)	Primary	N B White River	none
	148th Ave. (N of Yonkers)	Primary	Osborn Creek	none
	148th Ave. (S of Pierce)	Primary	Cobmoosa Creek	none
	Pierce E of 148th Ave.	Local	Cobmoosa Creek	none
	Buchanan Rd (E of 144th)	Local	Cobmoosa Creek	none
	Loop Rd. (E of 136th)	Primary	N B White River	none
	Garfield Rd. (W of 144th)	Primary	N B White River	none
Newfield	Stone Rd. (E of 198th)	Local	White River	none
	Garfield Rd. (W of 194th)	Primary	White River	none
Greenwood	194th Ave. (near Arthur)	Primary	Brayton Creek	none
	192nd Ave. (S of McKinley)	Primary	Cushman Creek	none
	McKinley Rd. (W of 192nd)	Local	Cushman Creek	none
	184th Ave. (S of Wilke Rd.)	Local	Cushman Creek	none
	164th Ave. (N of Arthur Rd.)	Local	Knutson Creek	none
	200th Ave. (N of Roosevelt)	Local	Cushman Creek	none
	200th Ave. (S of Cleveland)	Local	Brayton Creek	5T
Otto	Yale Rd. (S of Garfield Rd.)	Local	N B White River	5T
	Arthur Rd. (E of 144th Ave.)	Local	N B White River	none
Grant	92nd Ave. (N of Webster Rd.)	Local	Carlton Creek	none
	Skeels Rd. (W of 72nd Ave.)	Local	Flower Creek	none
Claybanks	Roosevelt Rd. (W of 48th Ave.)	Local	Flower Creek	none
	48th Ave. (N of Roosevelt)	Local	Flower Creek	none
	Roosevelt Rd. (E of 48th Ave.)	Local	Flower Creek	3T

Total 60 Bridges

Appendix B

MDNR CADILLAC MANAGEMENT UNIT PROFILE

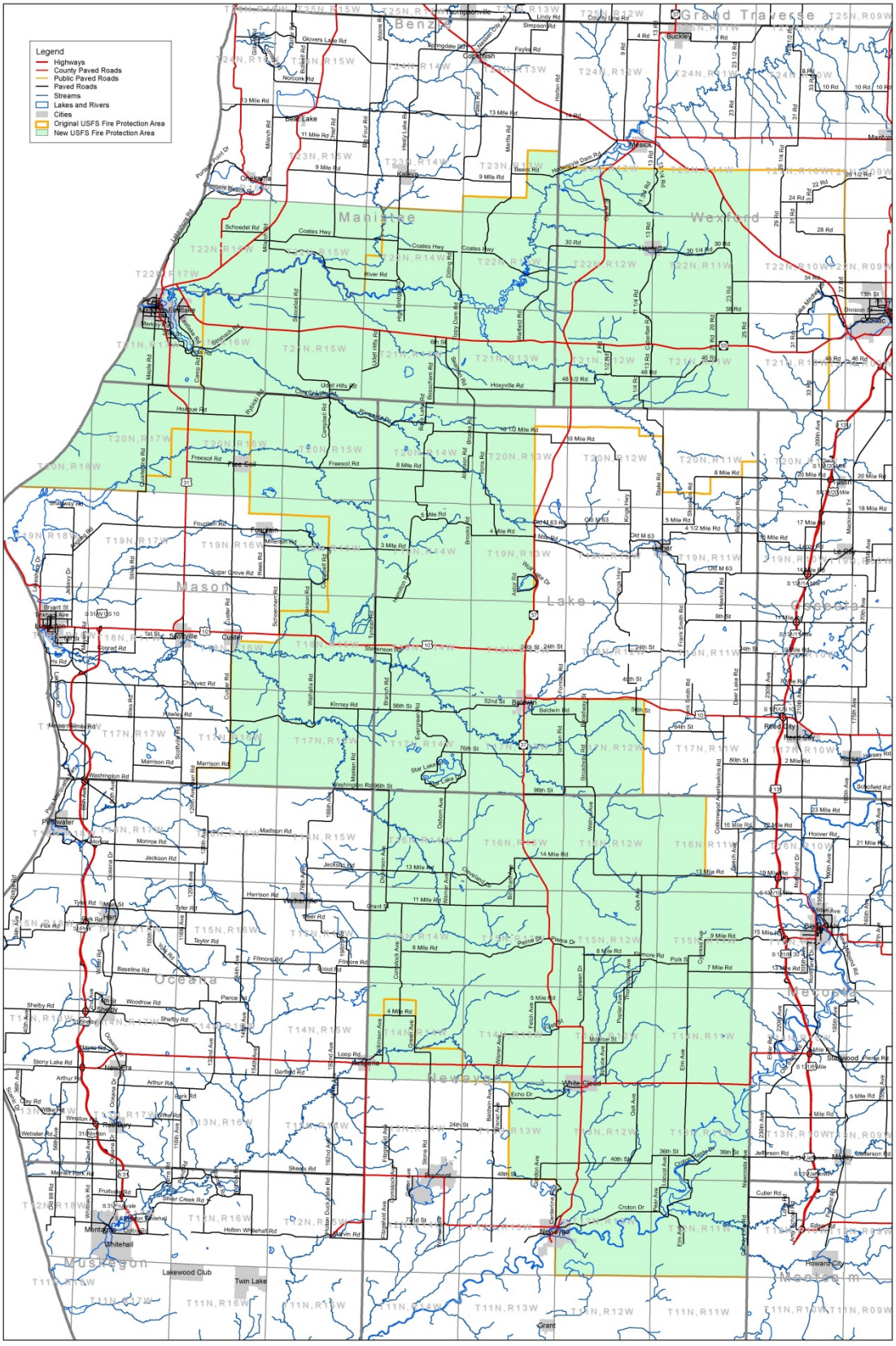
MICHIGAN DNR CADILLAC MANAGEMENT UNIT

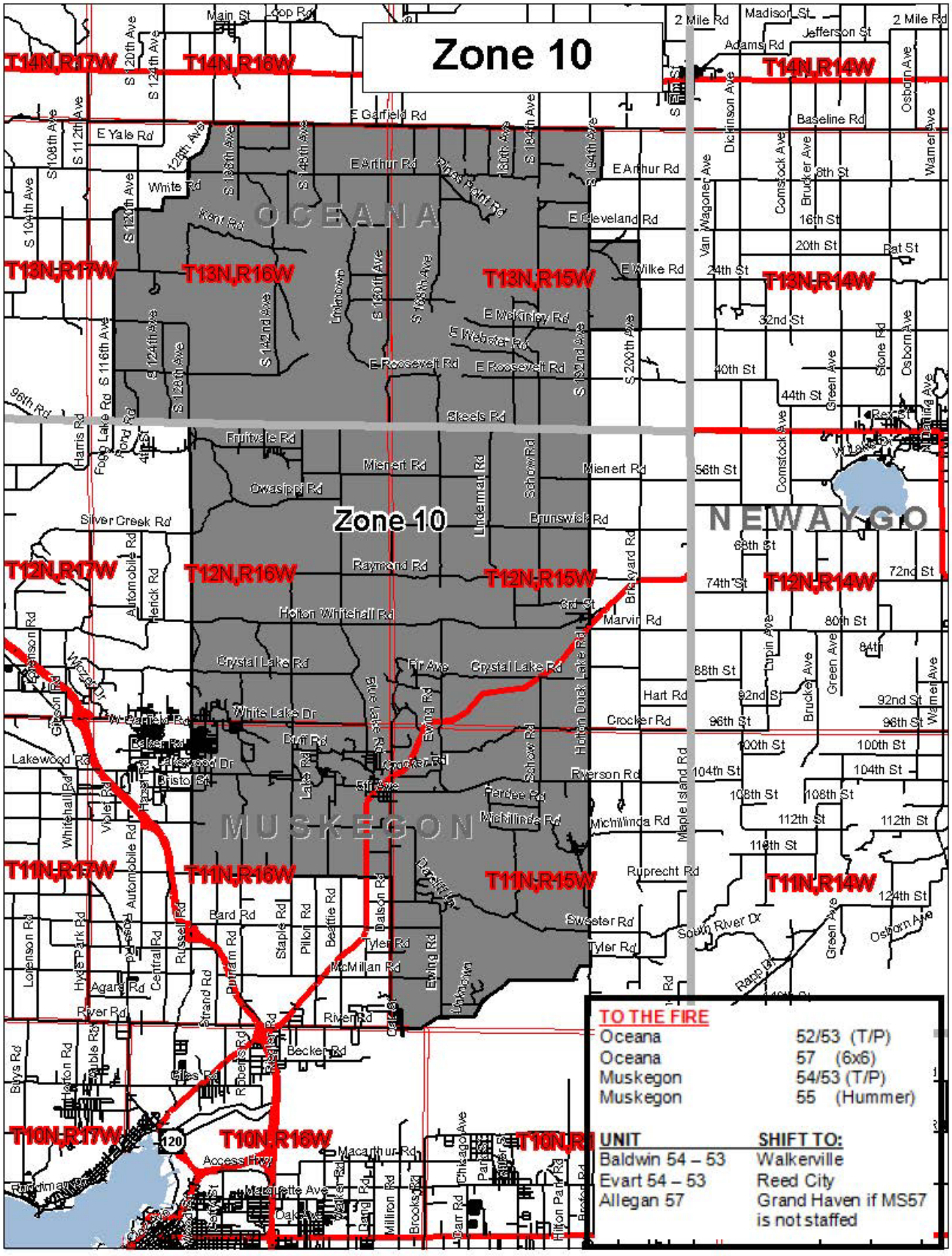
The Michigan DNR (DNR) Cadillac Management Unit includes fire response stations at Baldwin, Evart, Manton and Oceana. These stations are responsible for Initial Attack (IA) wildland fire suppression in the counties of Lake, Mason, Mecosta, Missaukee, Newaygo, Oceana, Osceola, and Wexford. Each station is staffed with a Forest Fire Officer, and additional staff, as needed, to meet fire danger conditions. The management unit is supervised by the Unit Manager for day to day operations and a Fire Officer Supervisor for fire suppression and prevention activities. Fire suppression resources in these stations may be dispatched to other areas as needed, and similarly may be assisted by resources from other areas as needed, including other management units. In addition, these resources may assist or be assisted by the US Forest Service (USFS).

Exact Initial Attack response boundaries within the Cadillac Management Unit have been established by mutual aid agreement between the USFS and DNR, which are illustrated on page B3. Although this boundary lies outside Oceana County, it does exist across the border in portions of Mason and Newaygo counties.

A Zone Dispatch area (Zone 10) has been established within the Unit, which identifies an area with a combination of higher fire risk due to fuels, access and values at risk. This Zone covers portions of Greenwood and Otto townships in Oceana County, and extends southward into Muskegon County. A fire occurring on a day of High and above fire danger may result in the automatic dispatch or pre-positioning of additional DNR resources from surrounding stations. A map of Zone 10 is on page B4.

Fire Protection Boundaries




Zone 10
Zone 10
OCEANA
MUSKEGON
NEWAYGO
T14N,R17W
T14N,R16W
T14N,R14W
T13N,R17W
T13N,R16W
T13N,R15W
T13N,R14W
T12N,R17W
T12N,R16W
T12N,R15W
T12N,R14W
T11N,R17W
T11N,R16W
T11N,R15W
T11N,R14W
T10N,R17W
T10N,R16W
T10N,R15W
TO THE FIRE
Oceana 52/53 (T/P)
Oceana 57 (6x6)
Muskegon 54/53 (T/P)
Muskegon 55 (Hummer)
UNIT
Baldwin 54 – 53
Evart 54 – 53
Allegan 57
SHIFT TO:
Walkerville
Reed City
Grand Haven if MS57 is not staffed

BALDWIN FIELD OFFICE

Voice:(231)745-4651x6950 Fax:(231)745-8743

Staff Name	Call Sign/800 ID	Office Phone
Dave Fisher UNIT MANAGER	CS: Baldwin 40	(231)745-4651x6946
Bruce Tower FIRE OFFICER SUP	CS: Baldwin 50	(231)745-4651x6950
Gary Meese FIRE OFFICER	CS: Baldwin 51	(231)745-4651x6952

Equipment Type	Description	Call Sign/800 ID	Stand by Location
ENGINE, ATV	Polaris 6 wheeler w/tank		
PUMPS, PORTABLE	Mark III Portable Pump		
PUMPS, PORTABLE	Honda portable pump		
OTHER	Foam		
OTHER	Honda 400 4x4		
OTHER	Polaris Sportsman 400 4x4 ATV		
CREW TRANSPORTATION	1/2 Ton Dodge 4x4 Pickup	No Radio	
CREW TRANSPORTATION	1/2 ton pickup 4x4 w/ topper	No Radio	
TILTBED, TANDEM AXLE	Peterbilt tandem tiltbed	CS: Baldwin 52	
SKIDGINE	John Deere skidgine	CS: Baldwin 58	
CREW TRANSPORTATION	Dodge Pickup 4 dr 4x4	CS: BD-50	
CREW TRANSPORTATION	1 ton 4x4 pickup 8 foot box	CS: BD-51	
TRACTOR-PLOW, TYPE III	JD-350D	CS: BD-53B	
TRUCK-TRACTOR, TANDEM AXLE	Peterbilt	CS: BD-54	
ENGINE, SMALL	Hummer	CS: BD-55	
ENGINE, LARGE	Navistar, no plow	CS: BD-57	

EVART FIELD OFFICE

Voice:(231)734-5840 Fax:(231)734-6491

Staff Name	Call Sign/800 ID	Office Phone
Raymond Cole FIRE OFFICER	CS: Evart 51	(231)734-5840

Equipment Type	Description	Call Sign/800 ID	Stand by Location
PUMPS, PORTABLE	Wicke Pump		
PUMPS, PORTABLE	Homelite porta Pump		
PUMPS, PORTABLE	Jaguar Portable pump		
OTHER	Sprinkler Kit w/ Box		
OTHER	Suppression foam		
CREW TRANSPORTATION	Dodge 1/2 t 4 dr 4x4 Pickup	CS: EV-51	
TRACTOR-PLOW, TYPE III	JD-450E LPG	CS: EV-53	
TRUCK-TRACTOR, TANDEM AXLE	Peterbilt	CS: EV-54	
ENGINE, LARGE	AM-Gen 6x6	CS: EV-57	
ENGINE, LARGE	2006 Navistar 4x4 Foam Plow	CS: EV57B	MCBAIN
ENGINE, SMALL	Chevy 1 ton 4x4	CS: Evart 55	

MANTON FIELD OFFICE

Voice:(231)824-3591x12 Fax:(231)824-9340

Staff Name	Call Sign/800 ID	Office Phone
Bret Baker FIRE OFFICER	CS: Manton 51	(231)824-3591x12

Equipment Type	Description	Call Sign/800 ID	Stand by Location
PUMPS, PORTABLE	portable pump		
OTHER	Honda 4x4 ATV		
OTHER	Class A foam per gallon		
CREW TRANSPORTATION	2010 Ford F150 4x4 crew cab	No radio	
CREW TRANSPORTATION	1/2 ton 4x4 pickup shortbed	No Radio	
CREW TRANSPORTATION	1/2 ton 4x4 pickup shrtbed	No Radio	
DOZER, TYPE 3	450H Tractor plow	CS: Manton 53	
TRUCK-TRACTOR, TANDEM AXLE	Freightliner semi tractor	CS: Manton 54	
CREW TRANSPORTATION	Ford F 350 4x4 reg. cab p.u.	CS: MN 51	
ENGINE, SMALL	Chev C-30 4x4	CS: MN-55	
ENGINE, LARGE	AM General 6x6, 5 Ton	CS: MN-57	
ENGINE, LARGE	Navistar 4x4 with plow	CS: MN-57B	Fife Lake

OCEANA FIELD OFFICE

Voice:(231)861-5636 Fax:(231)861-2682

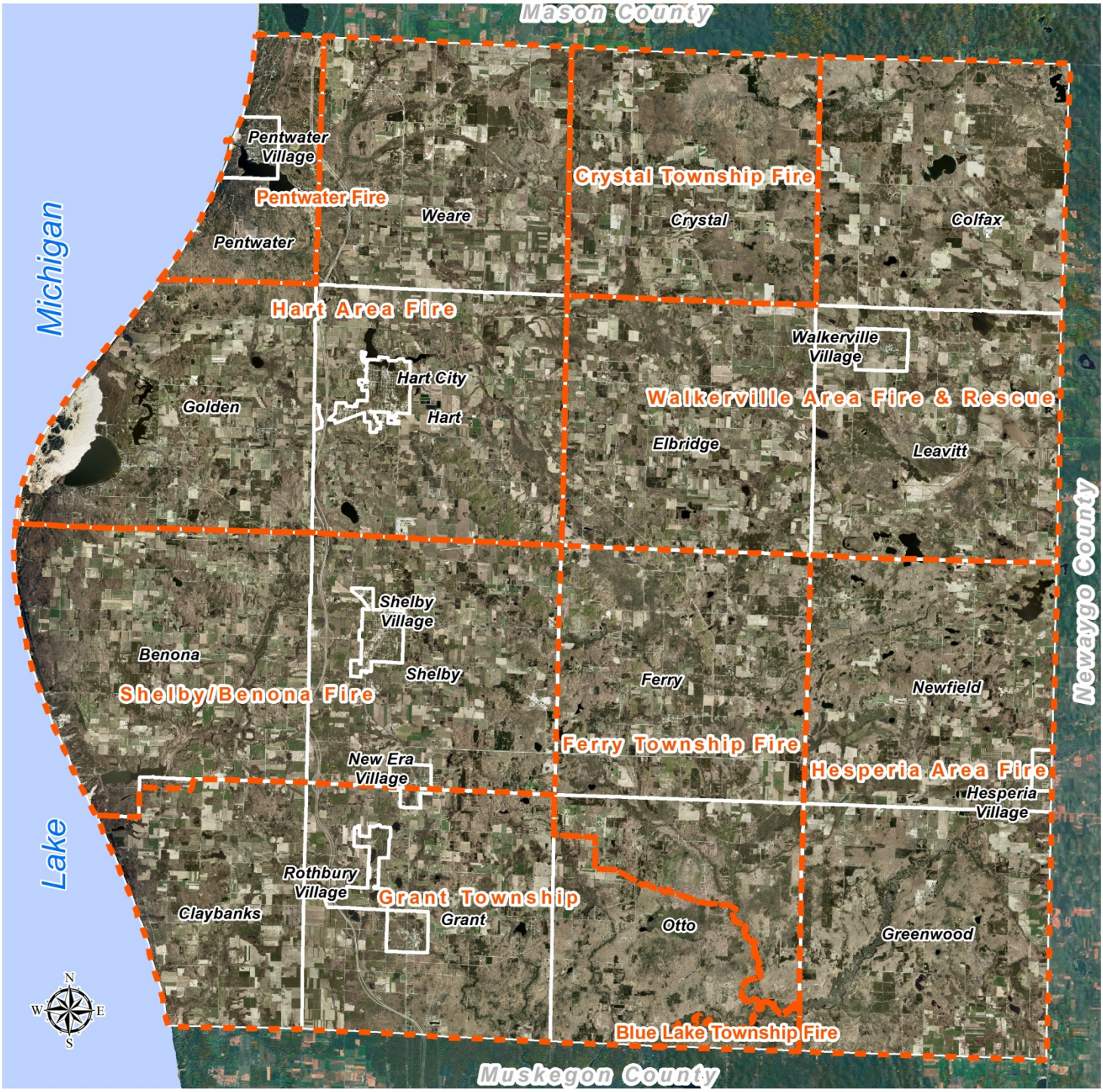
Staff Name	Call Sign/800 ID	Office Phone
Warren Herring FIRE OFFICER	CS: Oceana 51(A)	(231)861-5636x10

Equipment Type	Description	Call Sign/800 ID	Stand by Location
PUMPS, PORTABLE	Wick 250 pump		
OTHER	Foam		
CREW TRANSPORTATION	Ford F250 4x4 Pickup extended cab	CS: OC51	
TRACTOR-PLOW, TYPE III	JD-350D Relife	CS: OC53	
TRUCK-TRACTOR, SINGLE AXLE	Internationa WorkStar Semi-Tractor AWD single axle	CS: OC54	
ENGINE, SMALL	Hummer 4x4	CS: OC55	
ENGINE, LARGE	Am-Gen 6x6	CS: OC57	

Appendix C

MAPS

Oceana County
Oceanal County Aerial

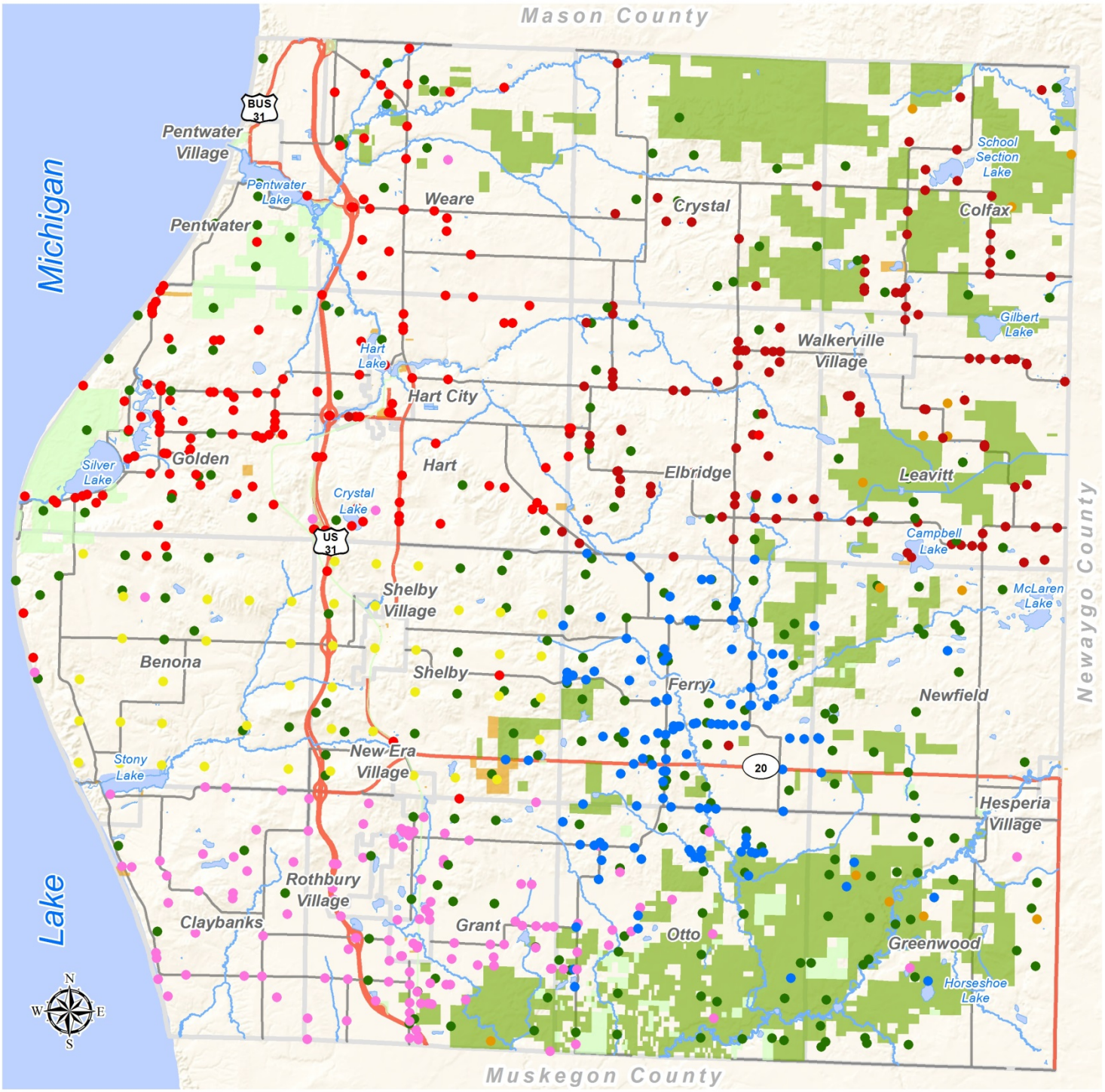


Fire Districts

WMSRDC WEST MICHIGAN SHORELINE REGIONAL DEVELOPMENT COMMISSION

Map Created March 2014 Source: Source: Esri, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AEX, Getmapping,

Oceana County
Reported Wildfires



Fire Department

- DNR (1986- 2013)
- Ferry (1988-2013)
- Grant (1992- 2013)
- Hart (2000- 2012)
- Shelby/Benona (2003- 2013)
- USFS (1986- 2010)
- Walkerville (1993- 2013)

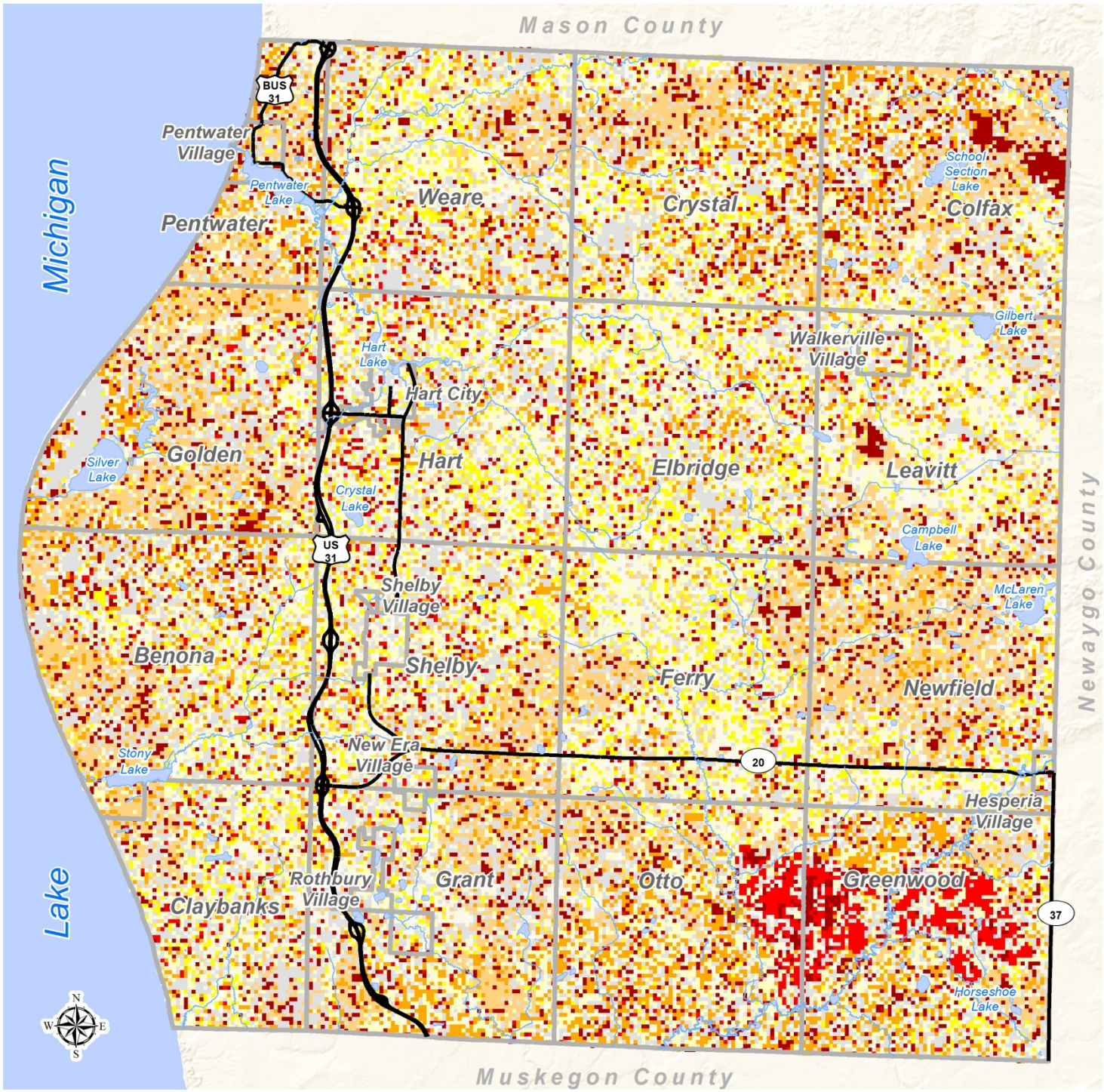
- USFS Land
- DNR Parks/ Land
- Municipal Parks/ Land

Note: For general planning puproses only. Fire location may be duplicated due to mutual aid response. Locations may not be exact.

WMSRDC WEST MICHIGAN SHORELINE REGIONAL DEVELOPMENT COMMISSION

Map Created May 2014 Source: USGS TNM, USFS, MIDNR, Oceana Fire Departments, MI Geographic Framework V12

Oceana County
Average Year Fire Risk Map

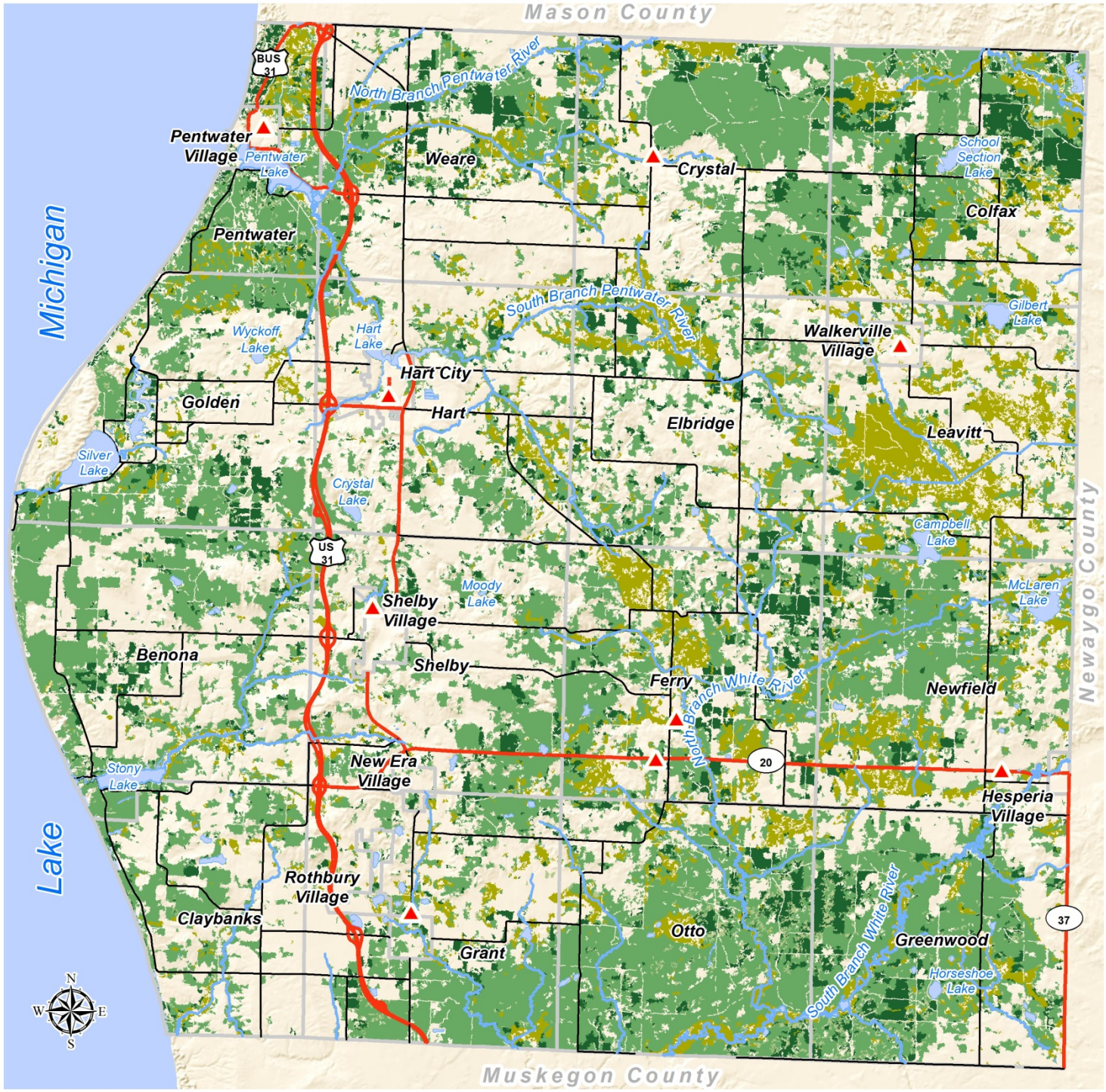


Crown	Low surface
Very high surface	Very low surface
High surface	Non-vegetated
Moderate surface	

WMSRDC
WEST MICHIGAN SHORELINE REGIONAL DEVELOPMENT COMMISSION

Map Created May 2014 Source: USGS TNM, USFS,

Oceana County
Forest Cover Map

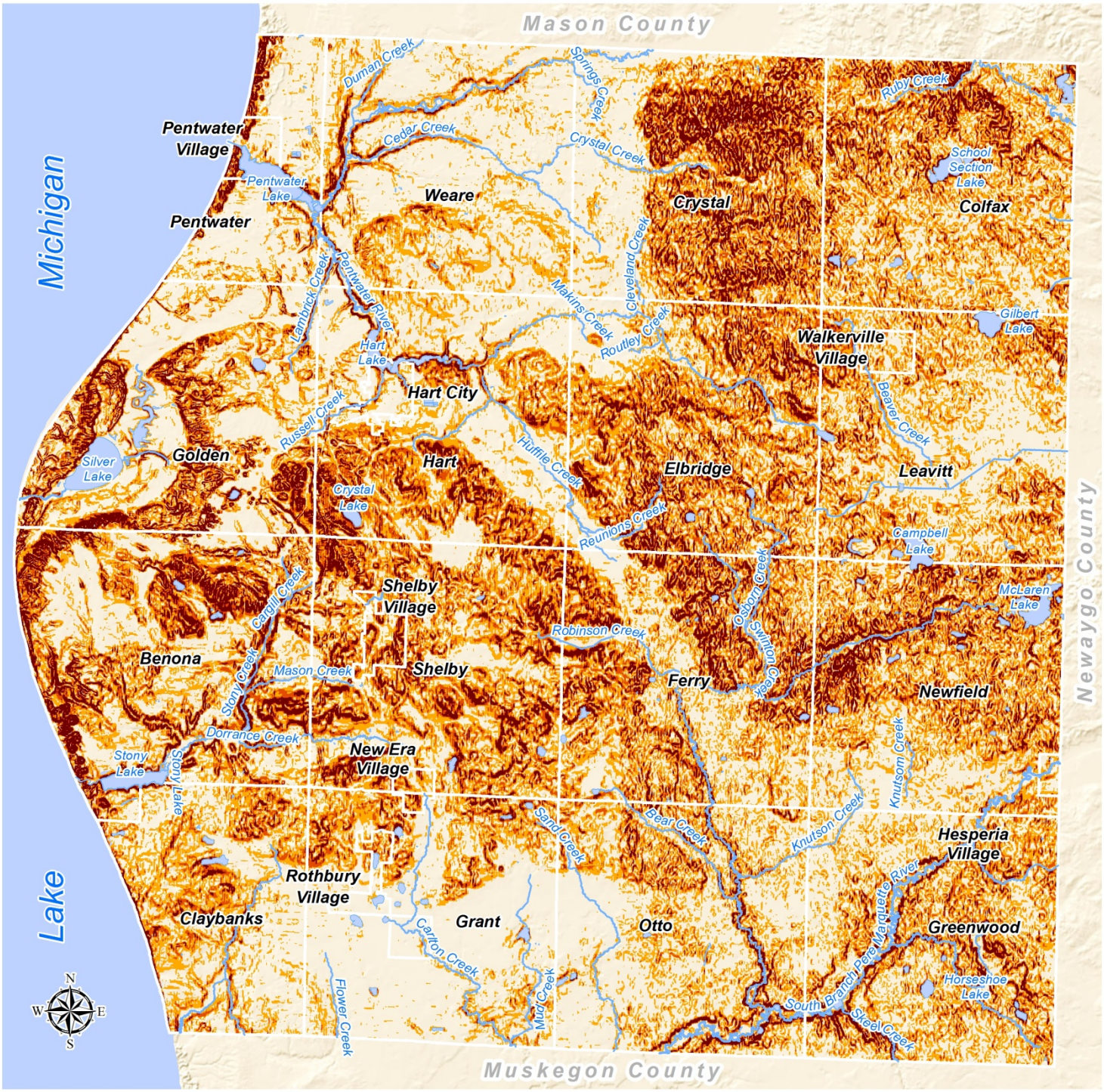


Interstate/Trunkline
County Primary
Fire Station
River/Stream
Lakes
Deciduous Forest
Evergreen Forest
Mixed Forest
Woody Wetlands

WMSRDC WEST MICHIGAN SHORELINE REGIONAL DEVELOPMENT COMMISSION

Map Created March 2014 Source: USGS TNM, MRLC NLCD Database 2011, MI Geographic Framework V12

Oceana County
County Slopes Map



Percentage Slope

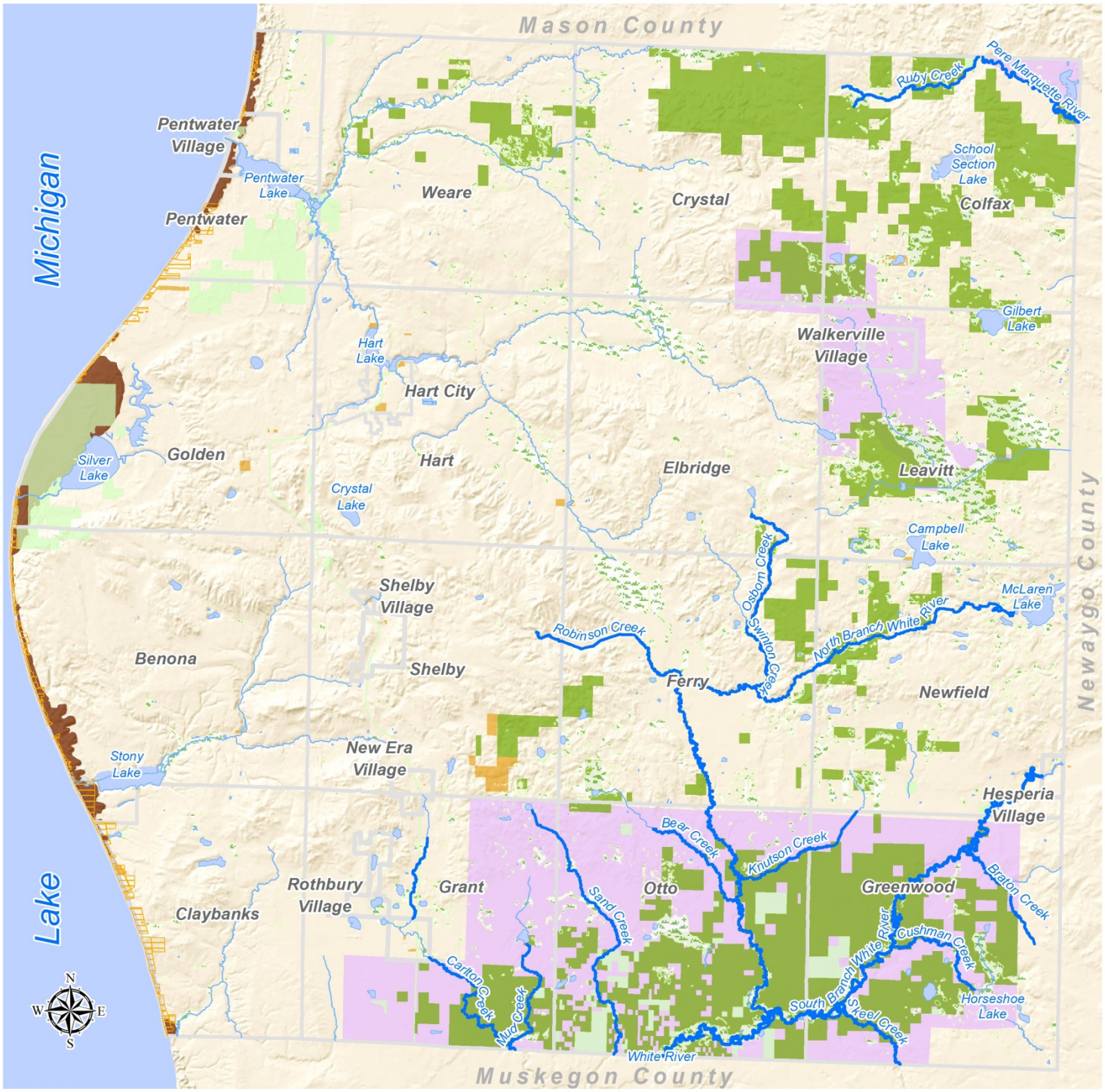
- 11 - 20% Moderate
- 21 - 30% Significant
- 31% + Severe

- Lake
- River/Stream

WMSRDC WEST MICHIGAN SHORELINE REGIONAL DEVELOPMENT COMMISSION

Map Created May 2014 Source: USGS TNM
MIDNR, MI Geographic Framework V12

Oceana County
Significant Landscape Map

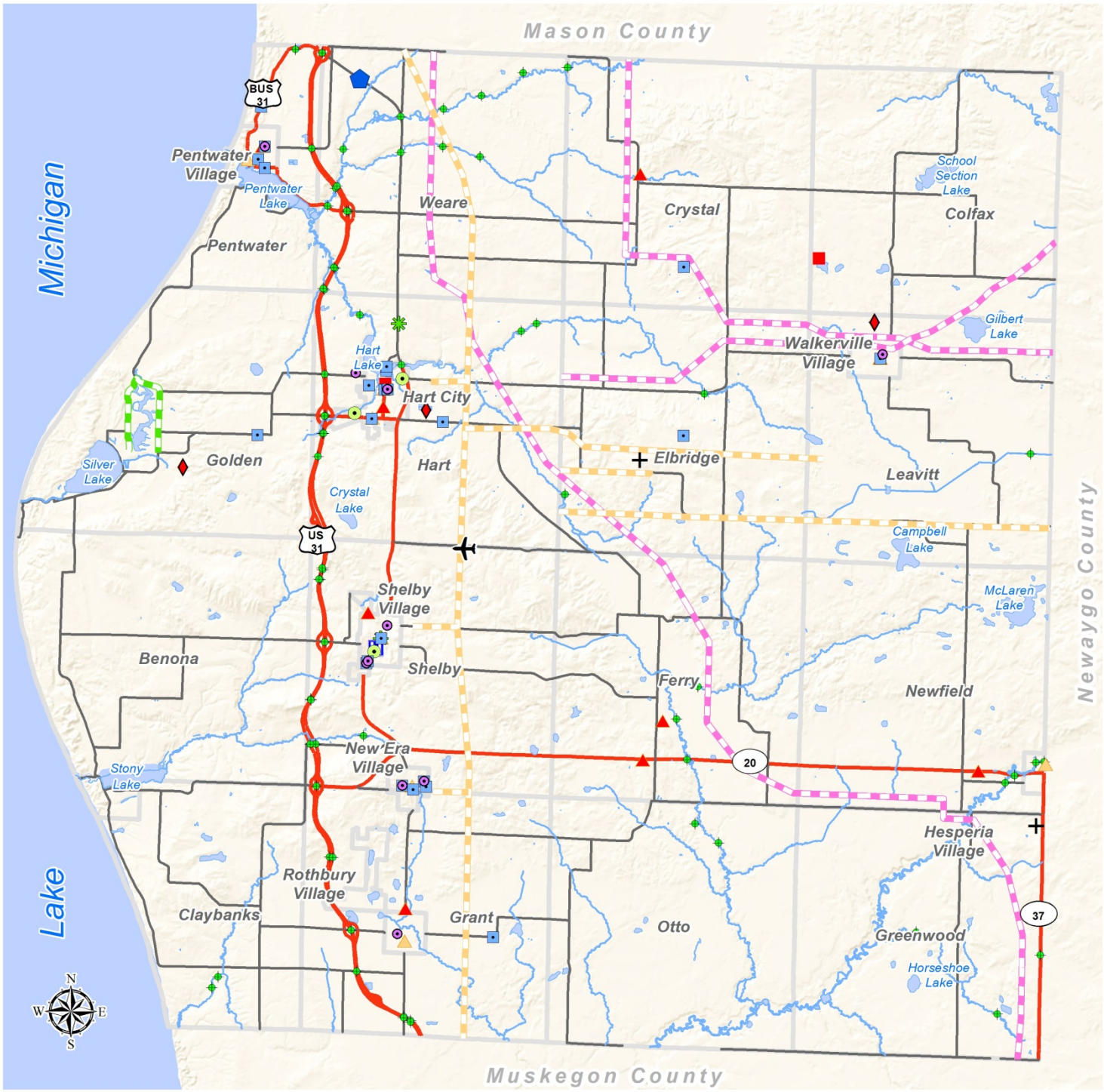


- Karner Blue Butterfly Management Area
- USFS Land
- DNR Parks/ Land
- Municipal Parks/ Land
- Michigan Natural Rivers
- Swamps & Marshes
- High Risk Erosion Area
- Critical Dunes

WMSRDC West Michigan Shoreline Regional Development Commission

Map Created 2014 Source: USGS TNM, USFS, MIDNR, MI Geographic Framework V12

Oceana County
Critical Facilities Map



- Interstate/Trunkline
- County Primary
- Gas Pipeline
- Power Line
- Propane Pipeline
- Airport
- Dam
- Bridge
- Wastewater Facility
- Communications Tower
- School
- Shelter
- Hospital
- Medical Facility
- Central Dispatch
- EMS
- Fire
- Police
- Correctional Facility

WMSRDC West Michigan Shoreline Regional Development Commission

Map Created May 2014 Source: USGS TNM, USFS, MIDNR, MI Geographic Framework V12

Appendix D

ACKNOWLEDGEMENTS

This plan was made possible with a grant from the Community Wildfire Protection Plan Grant Program of the Michigan Department of Natural Resources.

An exceptional degree of participation was exhibited during the planning process. The following entities were represented at some point, if not throughout, the planning process:

Local Fire Departments

Crystal Township Fire Department
Ferry Township Fire Department
Grant Township Fire Department
Hart Area Fire Department
Hesperia Area Fire Department
Pentwater Fire Department
Shelby-Benona Fire Department
Walkerville Area Fire & Rescue
Blue Lake Fire Department (Muskegon County)

Oceana County Agencies & Departments

County Planning Commission
Emergency Management
Equalization
Mason-Oceana 911 Dispatch
Road Commission
Sheriff's Department

State of Michigan

MDNR – Forest Resources Division
Hart Montague Trail State Park
Mears State Park
Silver Lake State Park

United States Forest Service

Michigan State University Extension

Local Municipalities

Benona Township
Crystal Township
Golden Township
Grant Township
Shelby Township
Shelby Village
Walkerville Village

Homeowners Associations

Sahara Sands Subdivision
Timbershores Drive Association

West Michigan Shoreline Regional Development Commission

A number of resources and documents were researched and referenced during the development of this plan. The following documents were most helpful during this process.

- Lake County CWPP (updated 2010)
- Newaygo County CWPP (2010)
- Whitefish Township CWPP (2010)
- Community Guide to Preparing and Implementing as Community Wildfire Protection Plan (2008)
- Preparing a Community Wildfire Protection Plan (2004)

GIS information used during the formation of this plan was obtained from the following sources.

U.S. Forest Service
U.S. Geological Survey
LANDFIRE
Multi-Resolution Land Characteristics Consortium
Michigan Geographic Data Library
Oceana County GIS
WMSRDC

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