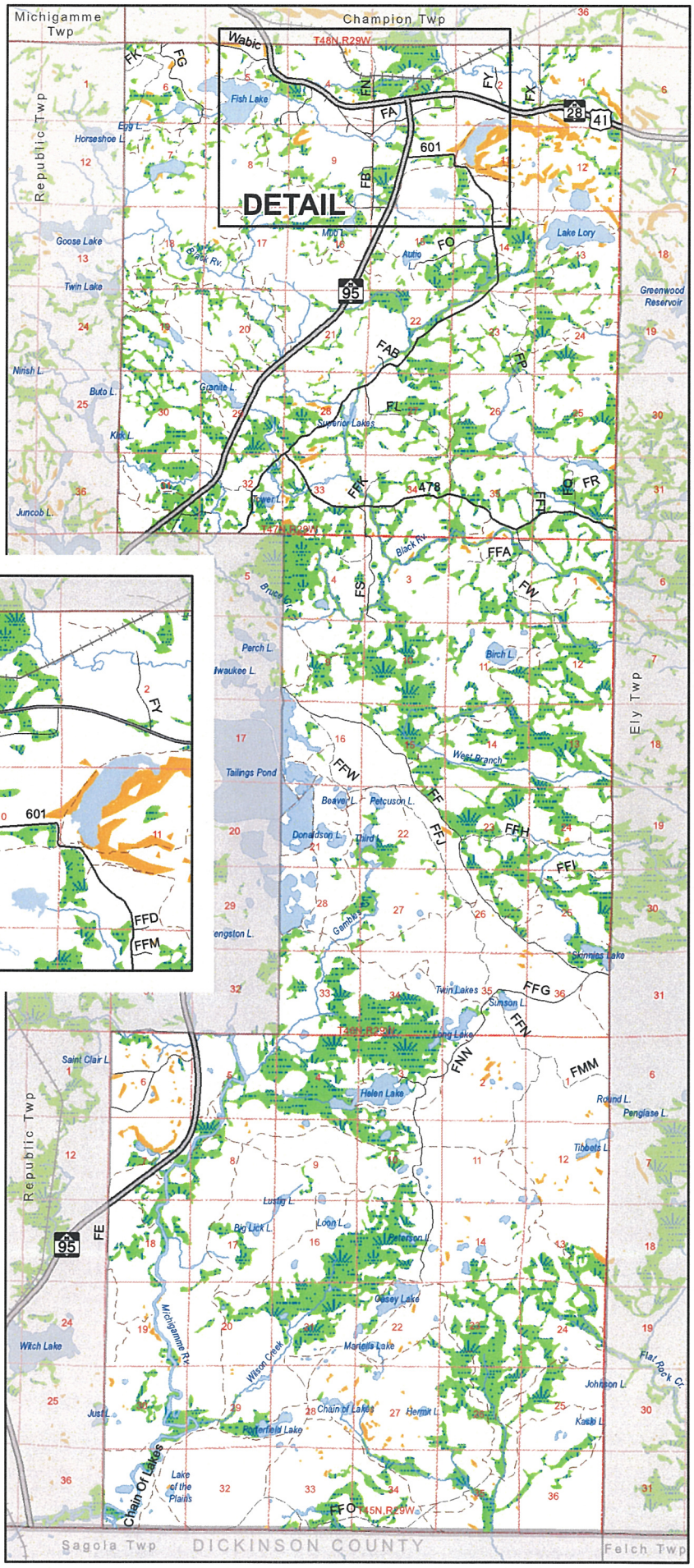
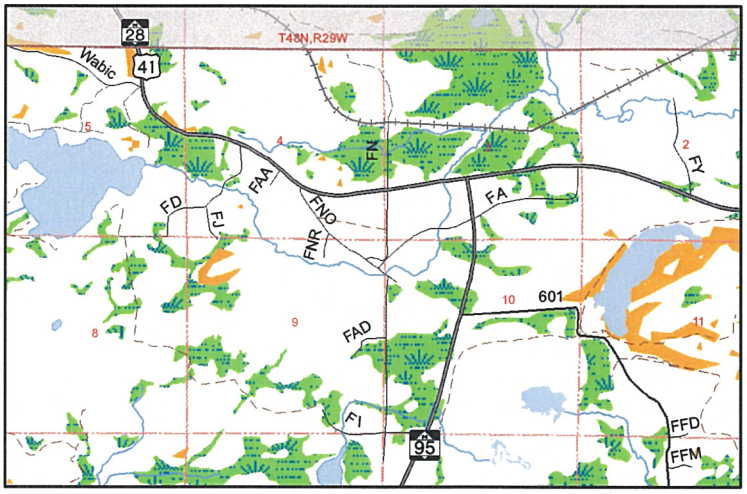
Map 8-4 Critical Soils and Slopes





0 0.25 0.5 1
Miles

N

0 0.5 1 2
Miles

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MARQUETTE COUNTY

HUMBOLDT TOWNSHIP

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MP Critical Soils & Slopes Map 5.18.12

CHAPTER 8.0-NATURAL FEATURES

Table 8-1
General Soil Associations, Humboldt Township

Association	Description	Management Concerns	Management Considerations	Sanitary Facilities
Keewaydin-Michigamme-Rock Outcrop Association	Rock outcrop and very deep and moderately deep, nearly level to very hilly, well drained soils; on bedrock controlled moraines	Erosion hazard, equipment limitations and plant competition	• Building roads on the contour, installing water bars and seeding logging roads to help prevent excessive soil loss • Special logging methods, such as yarding with a cable may be necessary in the very hilly areas • Selective cutting can reduce the wind throw hazard • Site preparation helps to control plant competition.	• Severe limitations for septic tank absorption fields due to slope, poor filtration and depth to rock • *See footnote
Pits-Dumps-Mike-Slickens Association		On site investigation is needed to determine the suitability for specific uses		
Kalkaska-Carbondale-Deford Association	Very deep, nearly level to very hilly, somewhat excessively drained, very poorly drained and poorly drained, sandy and mucky soils; on outwash plains and outwash terraces	Erosion hazard, equipment limitations, seedling mortality, wind throw hazard and plant competition	• Building roads on the contour, installing water bars and seeding logging roads to help prevent excessive soil loss • Access is easiest during the winter. Year round logging roads require a gravel base. Culverts are needed to maintain the natural drainage system • Because of wetness, seedling mortality and plant competition, trees are generally not planted on the Carbondale and Deford soils • Planting special nursery stock or containerized seedlings can reduce the seedling mortality rate in areas of Kalkaska soils • Harvest methods that do not leave the remaining trees widely spaced can reduce the wind throw hazard.	• Severe limitations for septic tank absorption fields due to slope and poor filtration • *See footnote

*** This is the dominant soil condition but does not eliminate the need for onsite investigation.**

CHAPTER 8.0-NATURAL FEATURES

Table 8-1
General Soil Associations, Humboldt Township continued

Association	Description	Management Concerns	Management Considerations	Sanitary Considerations
Pence Association	Very deep, nearly level to very hilly, somewhat excessively drained, sandy soils; on outwash plains and outwash terraces	Erosion hazards and equipment limitations	• Building roads on the contour, installing water bars and seeding logging roads to help prevent excessive soil loss • Special care is needed in laying out logging roads and operating logging equipment in the very hilly areas. The grade should be kept as low as possible.	• Severe limitations for septic tank absorption fields due to slope and poor filtration • *See footnote
Rubicon-Keweenaw Association	Very deep, gently undulating to very hilly, excessively drained and well drained, sandy soils; on disintegration moraines	Erosion hazard, equipment limitations and plant competition	• Building logging roads on the contour, installing water bars and culverts and seeding logging roads help to prevent excessive soil loss in the very hilly areas • Because loose sand can interfere with the traction of wheeled equipment, logging roads should be stabilized • Special care is needed in laying out logging roads and operating logging equipment in the very hilly areas. The grade should be kept as low as possible • Site preparation helps to control plant competition.	• Slight to severe limitations for septic tank absorption fields due to slope and poor filtration • *See footnote
Sagola-Rubicon Association	Very deep, gently undulating to very hilly, well drained and excessively drained, loamy and sandy soils; on disintegration moraines	Equipment limitations, seedling mortality and plant competition	• Year round logging roads should be stabilized • Planting special nursery stock or containerized seedlings can reduce the seedling mortality rate in areas of Rubicon soils • Site preparation to control plant competition	• Slight to severe limitations for septic tank absorption fields due to poor filtration • *See footnote

*** This is the dominant soil condition but does not eliminate the need for onsite investigation.**

CHAPTER 8.0-NATURAL FEATURES

Table 8-1
General Soil Associations, Humboldt Township continued

Association	Description	Management Concerns	Management Considerations	Sanitary Facilities
Kalkaska-Ishpeming Rock Outcrop Association	Rock outcrop very deep, & moderately deep, gently rolling to very hilly, somewhat excessively drained, sandy soils; on bedrock controlled moraines	Erosion hazard, equipment limitations, and seedling mortality	• Building roads on the contour, installing water bars, and seeding logging roads help to prevent excessive soil loss. • Special logging methods, such as yarding with a cable, may be necessary in the very hilly areas. • Planting special nursery stock or containerized seedlings can reduce the seedling mortality rate.	• Severe limitations for septic tank absorption fields due to slopes and poor filtration. • *See footnote
Sundog-Minocqua-Channing Association	Very deep, nearly level to very hilly, well drained, poorly drained, and somewhat poorly drained, loamy soils; on outwash plains and outwash terraces	Erosion hazard, equipment limitations, seedling mortality, wind throw hazard, and plant competition	• Building roads on the contour, installing water bars, and seeding logging roads help to prevent excessive soil loss. • The seasonal high water table in areas of the Minocqua and Channing soils restricts the use of equipment to midsummer, when the soils are dry, or midwinter, when there is adequate snow cover. Year-round logging roads require a gravel base. Culverts are needed to maintain the natural drainage system. • Special care is needed in laying out logging roads and operating logging equipment in the very hilly areas of the Sundog soils. The grade should be kept as low as possible. • Because of wetness, seedling mortality, and plant competition, trees are generally not planted on the Minocqua and Channing soils. • Harvest methods that do not leave the remaining trees widely spaced reduce the wind throw hazard in areas of the Minocqua and Channing soils.	• Severe limitations for septic tank absorption fields due to wetness, ponding and poor filtration. • *See footnote

*** This is the dominant soil condition but does not eliminate the need for onsite investigation.**

CHAPTER 8.0-NATURAL FEATURES

Table 8-1
General Soil Associations, Humboldt Township continued

Association	Description	Management Concerns	Management Considerations	Sanitary Facilities
Goodman-Sundog-Greenwood Association	Very deep, nearly level to very hilly, well drained, loamy soils and very poorly drained, peaty soils; on disintegration moraines	Erosion hazard, equipment limitations, and plant competition	• Building logging roads on the contour, installing water bars and culverts, and seeding logging roads help to prevent excessive soil loss in the very hilly areas. • Special care is needed in laying out logging roads and operating logging equipment in the very hilly areas. The grade should be kept as low as possible. • Such harvest methods as selective cutting can reduce the seedling mortality rate. • Because of extreme acidity and wetness, the Greenwood soils are generally unsuited to woodland.	• Moderate to severe limitations for septic tank absorption fields due to slow perc, wetness, ponding and poor filtration. • *See footnote

*** This is the dominant soil condition but does not eliminate the need for onsite investigation.**

Impermeable soils do not allow effluent to filter through the underlying soil and highly permeable soils allow effluent to pass through rapidly. In both instances, the conditions impose limitations on building development requiring on-site septic systems. Soil limitations for building site development include the presence of shallow bedrock that can make the construction of basements difficult; wetness, which can result in wet basements or unstable support for foundations; or steep slopes, which increase the potential for structures to slide.

Construction and maintenance of roads are affected by a soil's shrink-swell potential, frost action potential, depth to bedrock or water table and slope. As with other soil constraints, construction techniques are available to overcome many limitations, however, they may be costly. Moreover, more frequent maintenance may be required to sustain a good condition. All soil data available should be used when evaluating any land use proposal.

8.5 Topography

The unique character of an area is derived from the physical features of its landscape. Topography describes this character in terms of elevation above mean sea level. This reveals the size and shape of watersheds and places to avoid with future development because grades may be in excess of recommended standards. The topography of Humboldt Township is characterized by extremely old bedrock covered with large amounts of glacial drift and rock

CHAPTER 8.0-NATURAL FEATURES

8.5 Topography continued

outcroppings. Topography is dominated by rocky knobs and wetlands; however, some of the land was high and fertile enough for marginal farming in the early 20th century.

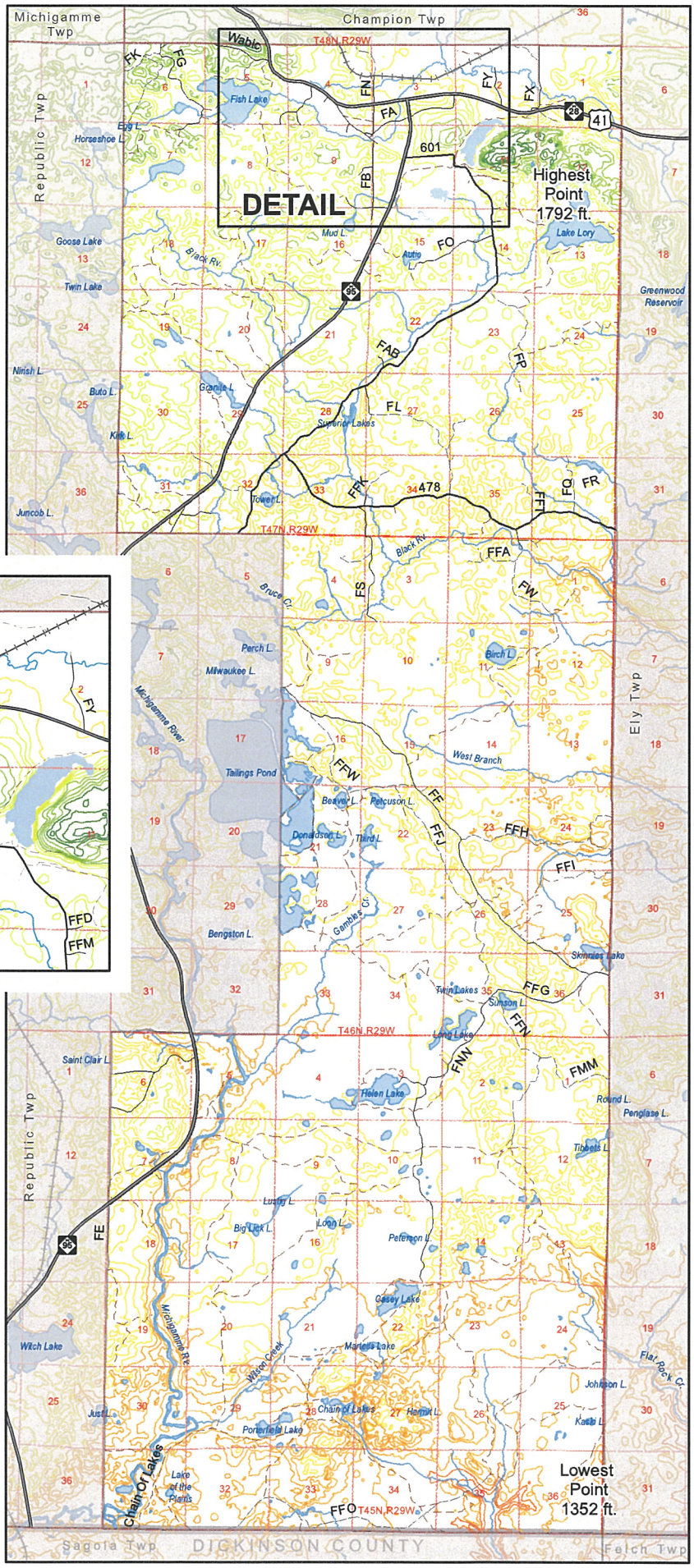
The area with the greatest relief and the highest densities of rock outcroppings is the former Humboldt Mine area located in the northeast corner of Humboldt Township. There are areas throughout Humboldt Township exceeding a ten percent gradient on certain slopes, located particularly in the northern third near the former Humboldt Mine (See Map 8-4, Unsuitable Land).

Steep topography or slopes of 10 percent or greater (a rise in gradient of more than 10 feet in a horizontal distance of 100 feet) can be aesthetically attractive for residential development and some commercial establishments. However, the steep grade increases the likelihood of soil movement or slides and the weight of structures is an added force that encourages this movement. In addition, there is an added expense if development occurs on the sloping surface itself. Excavation of a hillside and/or construction of retaining walls can greatly increase building costs. There is also a problem of erosion as the water rushes down the steep grades. Natural water courses provide the pathway for such water and should be maintained in this capacity. Soil disturbance of one or more acres or within 500 feet of a lake or stream generally requires a permit as authorized under Part 91 (Soil Erosion and Sedimentation Control) of the Natural Resources Environmental Protection Act, Public Act 451 of 1994, as amended.

Map 8-5, Topographic Map, has been developed using digital elevation models. The current lowest elevation is located in the far southeastern portion of Humboldt Township and is approximately +1,352 feet above sea level datum and the highest point is at the top of a berm in the northeast corner of Humboldt Township and is +1,792 feet above mean sea level datum. For comparison purposes, the elevation of Lake Superior is 602 feet (See Map 8-5).

Map 8-5, Topographic Map, illustrates contours which join points of equal elevation above a given level. A contour map is illustrated with contour lines, which show valleys and hills, and the steepness of slopes. The contour interval of a contour map is the difference in elevation between successive contour lines. The highest elevations are located in the northeast corner of Humboldt Township.

Map 8-5 Topographic Map

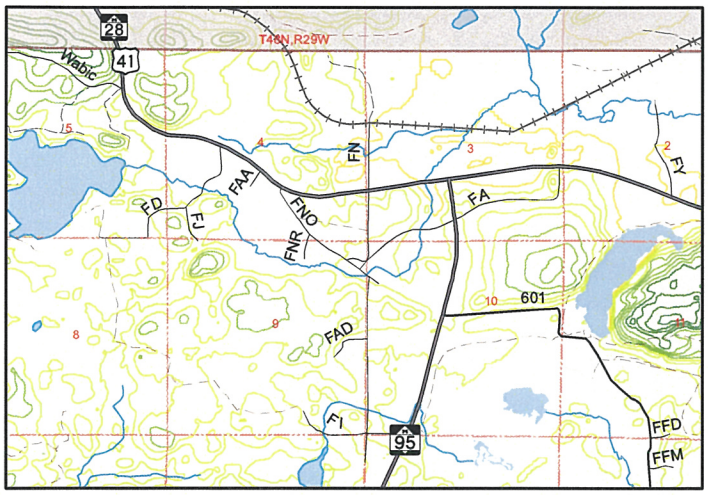


Legend

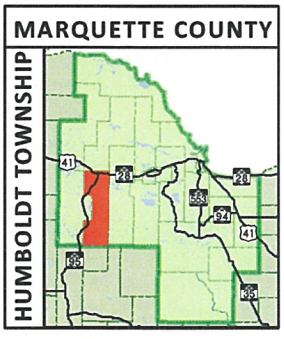
Elevations in ft.

- 1212 - 1272
- 1273 - 1372
- 1373 - 1472
- 1473 - 1552
- 1553 - 1632
- 1633 - 1712
- 1713 - 1792
- 1793 - 1952

DETAIL



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MP Topographic Map 5.18.12

CHAPTER 8.0-NATURAL FEATURES

8.6 Water Features

Water features, i.e. lakes, streams and rivers have important functions as natural resources. Among those important functions is the source of water for residential and commercial development. Land use and development patterns are heavily influenced by the presence of water features. While lakes and rivers are physical barriers that limit growth of communities and/or transportation facilities, they are attractive for residential, waterfront development or for industries requiring large volumes of water. Sufficient amounts of surface water are necessary for a variety of industries, especially critical for mining activities, and for the generation of electricity. Surface water features are also important for recreational use and often add scenic beauty to an area.

One of the most valuable natural resources in the area is the abundance of fresh water. According to the Marquette County Hazard Mitigation Plan prepared by the Marquette County Resource Management/Development Department, Humboldt Township lies within the East and Middle Branches of the Escanaba River, Black River and Peshekee River watersheds. The Escanaba and Michigamme rivers flow through Humboldt Township and each river has had a history of flooding in the area. In addition, the Black River and other tributaries of the Escanaba and Michigamme systems flow through Humboldt Township.

Humboldt Township boasts numerous water features used for recreational and residential purposes. Much of the land in the southern end of the Township is part of the Escanaba River State Forest. The Black, Escanaba and Michigamme Rivers and Fish, Helen and Casey Lakes are all utilized for residential, recreational development. There is also potential for residential development along Lake Lory, however, that would require analyzing existing sediment issues. Tailings from the former Humboldt Mine were disposed of in Lake Lory and have settled in recent years. Past mining activities may require additional water quality testing to be conducted to deal with any potential environmental concerns.

8.7 Floodplains and Wetlands

Floodplains and wetlands are important from a planning standpoint due to their potential limitations on future development. With floodplains, it is important to also consider their possible impact on existing development. These important storage areas affect the discharge characteristics of streams. Loss of floodwater storage areas to development causes rainfall to run off more rapidly and increases the potential for flooding. An existing plain that may be submerged by flood waters defines a floodplain and areas between terrestrial and aquatic systems where the water table is at, near, or above the land surface for a significant part of most years define wetlands. A wetland area may be referred to as a swamp, bog or marsh and is normally characterized by the presence of water at a frequency and duration sufficient to support wetland vegetation and aquatic life. Wetland areas help to improve water quality by filtering pollutants and trapping sediments.

CHAPTER 8.0-NATURAL FEATURES

8.7 Floodplains and Wetlands continued

The Federal Emergency Management Agency (FEMA) determines flood hazard areas in accordance with the administration of the National Flood Insurance Program. Humboldt Township does not participate in the flood insurance program. Michigan remains one of only two states to have assumed administration of the Section 404 Program under the provision of Section 404(g) of the Clean Water Act 33 U.S.C. §1251 et seq. (1972). Michigan's wetland program is administered by the Department of Environmental Quality (MDEQ). Any development occurring in wetland areas is subject to the regulatory authority of the MDEQ.

According to the Marquette County Hazard Mitigation Plan, flood prone areas encompass approximately 322 structures worth an estimated $10.2 million within Humboldt Township. Of these, 165 structures of the total number of structures, over 50 percent, were associated with permanent residences. The Township Supervisor identified areas where capital improvements could mitigate flood hazards:

1. Elevate Wolf Lake Road where it crosses the Escanaba River floodplain.
2. Metered regulation of flow on the Michigamme River. The dam that formerly controlled levels on Lake Michigamme has been partially removed and another dam at Republic may also be removed.

8.8 Jack Pine Forest

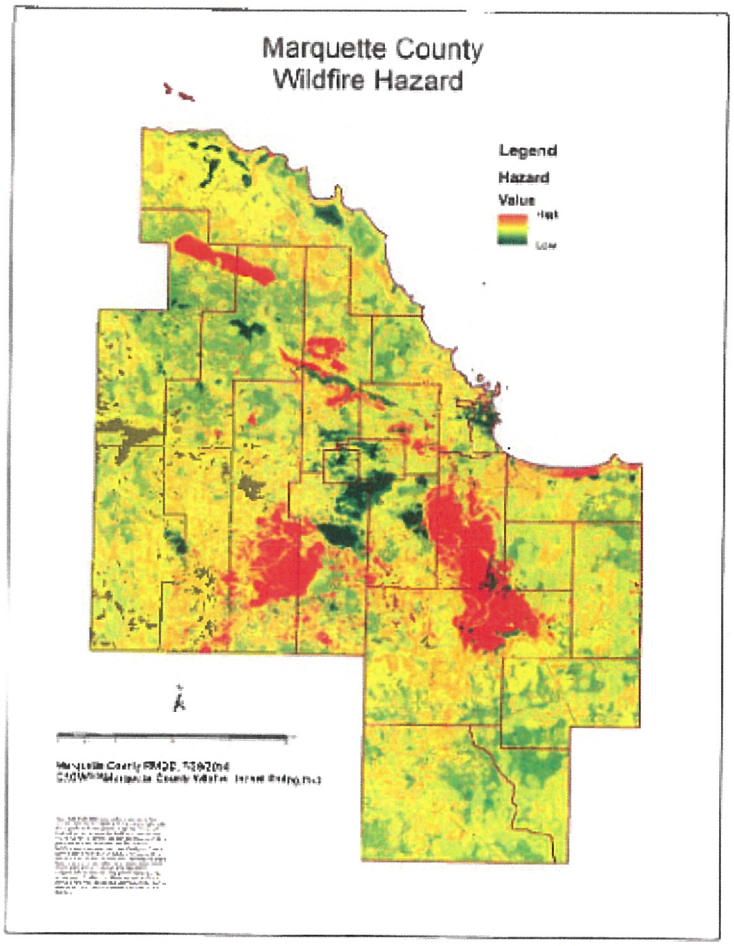
For millennia wildfire has been a natural component of the life cycle of forests. It has only become a problem since human development has encroached upon the forest. This is especially true in jack pine areas. The species is highly combustible. It requires intense heat for its cones to release seed for regeneration. Wildfire becomes a disaster when it threatens human lives or property. In most instances today, human activity causes and exacerbates wildfire. Fires can be started within the forest and spread to structures or start in a structure or yard area and spread to a forest. In many of these cases, negligence or faulty equipment are involved. The Hazard Mitigation Plan indicates that the southern half of Humboldt Township is forested with jack pines and eighty-five (85) structures were located within areas of jack pine forest, with an estimated value of $2.6 million. Nineteen of the structures, or approximately 22 percent, were associated with permanent residences.

> "The western part of Marquette County is characterized by rocky terrain dissected by streams and swamps. Forests tend to be more coniferous than in the eastern part of the County. Some areas of this zone were farmed until the mid-20th century. Fire departments are located along US-41 and M-95, and access to interior areas can be difficult."
>
> "While the Western Marquette County zone shows less wildfire risk than other parts of the county, it was the site of the largest wildfire over the past 30 years, the Tower Lake Fire of 1999. The fire began during a dry spring and at one point

8.8 Jack Pine Forest continued

threatened the community of Champion. A wind shift helped firefighters to control the blaze. Some of the affected area had been burned the previous year in the Autio Lake Fire. Tower Lake was the only wildfire in Michigan history to be given a Presidential Disaster Declaration. Responding units: Michigamme-Spurr Township, Republic Township, Champion Township, Humboldt Township, Ishpeming Township, Richmond Township, Negaunee Township, City of Ishpeming, City of Negaunee." ***Marquette County Community Wildfire Protection Plan, July, 2014***.

Map 8-6



7. Marquette County wildfire hazard.