

CHAPTER 3: Environmental Analysis

Without a doubt, the greatest attractions for the residents and visitors of northern Michigan are the area's natural environment and rural atmosphere in this portion of the State. Recreational activities such as hunting, fishing, golfing, snowmobiling, boating and a multitude of other outdoor activities attract people from urban areas of Michigan, as well as from other states. Many long time visitors decide to move to the area upon retirement. Because of the abundant outdoor recreational opportunities, the natural environment is a major economic base and income generator.

Climate

Summer months are usually mild with considerable sunshine. The average annual total precipitation for the county is 28.8 inches. Most of the of the summer precipitation consists of rain and thunderstorms which normally occur during the months of June, July and August. Thunderstorms will occur on an average of 24 days each year. Michigan is located on the northeast fringe of the Midwest tornado belt. The lower frequency of tornadoes occurring in Michigan may be, in part, the result of the tempering effect of Lake Michigan water temperature during the spring and early summer months, a prime period of tornado activity. During 1950-87, Michigan has averaged 15 tornadoes each year. During this same period, 4 tornadoes occurred within Alpena county. Hailstorms average less than one per summer. The average length of the summer growing season is 156 days. The average date of the fall frost is October 4th.

Winter months are generally cloudy with little sunshine and frequent snow flurries. Nearly all of the precipitation in winter is in the form of sleet and snow, usually accumulating in sufficient amount to form a ground cover for summer grasses and winter grains. The 1961 through 1990 average seasonal snowfall was 87.4 inches. The following snowfall extremes, based on the time period of this station's published record, are: greatest observation-day total, 16.3 inches, recorded January 26, 1978; greatest monthly total, 49.4 inches, recorded March 1926; greatest seasonal total, 166.3 inches, recorded during 1970-71; least seasonal total, 26.9 inches, recorded during 1936-37; and greatest snow depth, 35 inches, recorded February 18, 1936.

For most of the county, runoff from the spring thaw poses little danger of flooding. However, over the past 45 years, the Alpena area has transitioned from farm and forest to subdivisions, apartments, offices, streets and parking lots. The change from pervious to impervious surfaces has created some flooding and stormwater runoff problems. Buildings and roads have been built where stormwater once flowed and critical parts of the natural drainage system have been replaced with a haphazard manmade system. In the spring of 1998, there was a major flood event in a portion of the study area (**Figure 3.1**). The City, in cooperation with the MDOT has since made replacements of culverts to correct these problems.

Flooding affected residents, neighborhoods, and commercial businesses in the Oxbow subdivision and portions of Ralph Street, Parker Avenue, Thomas Avenue, and Arbor Lane. Sanitary sewer manholes were submerged allowing excessive infiltration into the sanitary sewer system and backing up in homes of higher elevation.

The flooding that occurred was felt to be a result of several climactic factors, including a late snowfall, a rapid snow melt due to warm temperatures, and heavy rains which combined to overwhelm the existing natural and manmade drainage system. Additionally, runoff from land areas to the north and west, that normally flows through other natural and manmade stormwater conveyance systems, entered the Fletcher Creek drainage basin and was a major contributor to the flooding.

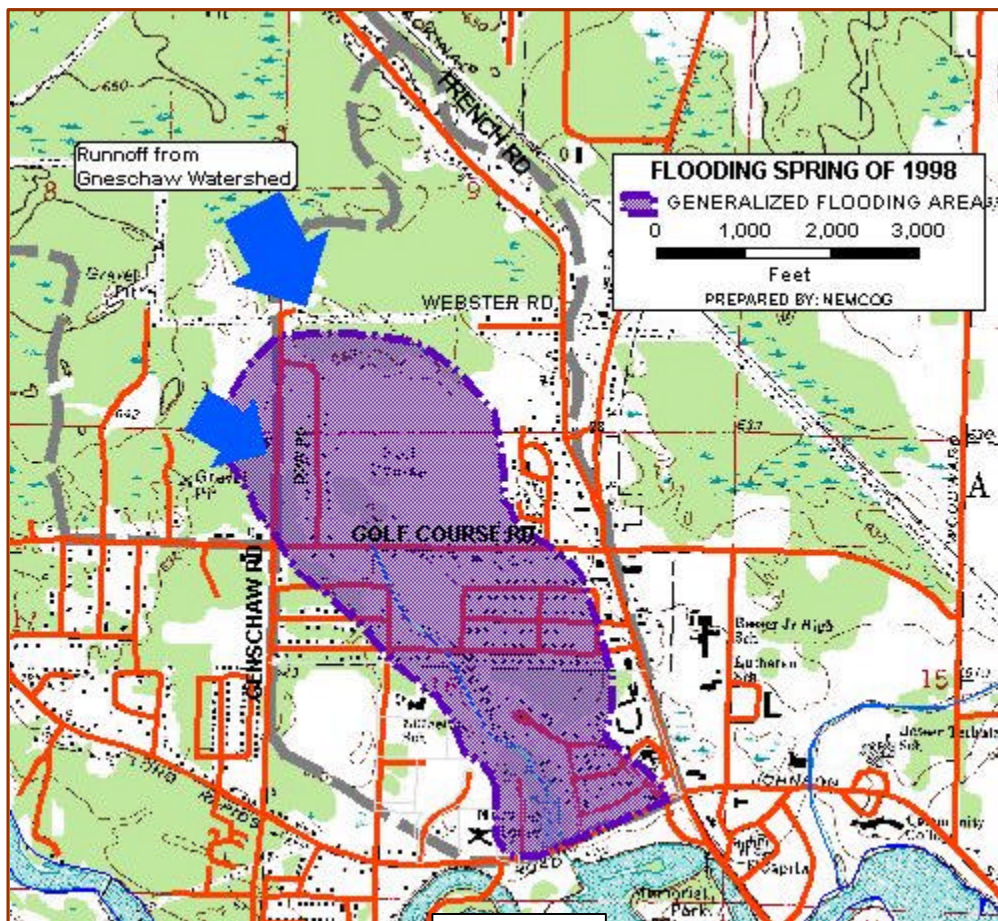


Figure 3.1

Topography

The county presents little topographic relief of any magnitude as the general elevation ranges from about 580 to 1140 feet above mean sea level (ASL), a difference of only 560 feet. The elevation ranges from about 600 feet ASL in the City of Alpena to the high area of 1140 feet ASL near the southwest corner of the county.

The county has some topographic diversity, however, with sloping and choppy areas, gently undulating areas, low swells or ridges, level plains, areas of swampy soils, and numerous streams and lakes. The broader surface features are expressions of glacial activity. The more hilly areas, for the most part are moraines. Glacial outwash deposits underlie some of the level plains, and the other parts of the level plains are sandy drift that were probably deposited under the ice sheet. This topography is well suited for a diverse agriculture, recreation and forest industry. This topography also makes for a beautiful setting in which to live.

Soils and Soil Constraints

Soil characteristics help define the land's capacity to support certain types of land uses. Soils most suitable for development purposes are well-drained soils with slopes less than 10%. Adequate drainage is important to minimize storm water impacts and maximize the efficient operation of septic drain fields. Moderate sloping areas can be developed with less environmental impact and at a much lower cost than steeply sloped areas. Constraint maps have been prepared using information from the USDA Alpena County Soil survey. As of the date of this study, the soils data was not yet certified, but was available in completed digital format. The constraint maps should only be used as a general guide, and on-site verification of soil conditions should be completed prior to any specific land use planning or development.

Slopes 18% and greater

Steep slopes have severe constraints for building homes and roads and are difficult and costly to develop (**Figure 3.2**, page 3-4). Erosion during and after construction can be difficult to manage and construction on steep slopes can have lasting environmental impacts. The mass grading required and special design standards such as erosion control, stormwater retention, re-vegetation and slope stabilization all increase construction costs.

In the study area the majority of the steep slopes are found south of M-32 between Tamarack and Indian Reserve roads in sections 25 and 36 of Wilson Township and sections 30 and 31 in Alpena Township. It is interesting to note that the majority of the soils shown in these areas are the Proper-Deford-Rousseau complex and while slopes range from 0-40%, the building constraints listed for these soils is only moderate. North of M-32 some steep slopes are located in section 24 of Wilson Township between Lake Winyah Road and the County Airport property. Active and reclaimed quarries may account for some of these slopes.

Hydric Soils

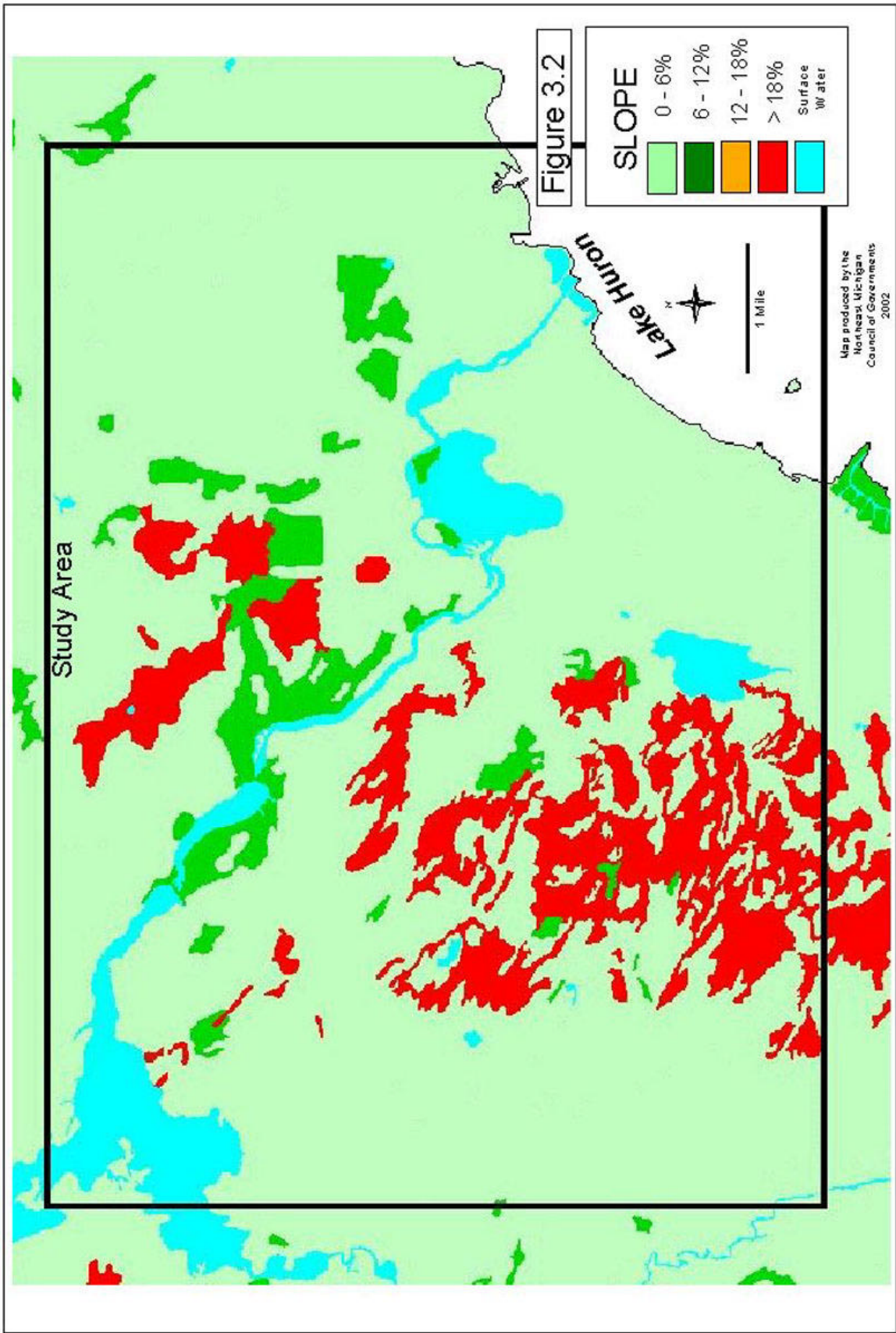
Hydric soils are saturated, flooded, or ponded during part of the growing season and are classified as poorly drained and very poorly drained soils (**Figure 3.3**, page 3-5). Hydric soils have poor potential for development. Civil engineering techniques can be employed to improve drainage and maintain adequate separation from the water table, although such techniques are expensive and difficult to maintain. Development in hydric soils can also have long term impacts on water and wildlife resources. The areas mapped include hydric soils and soils that are hydric in depressional areas.

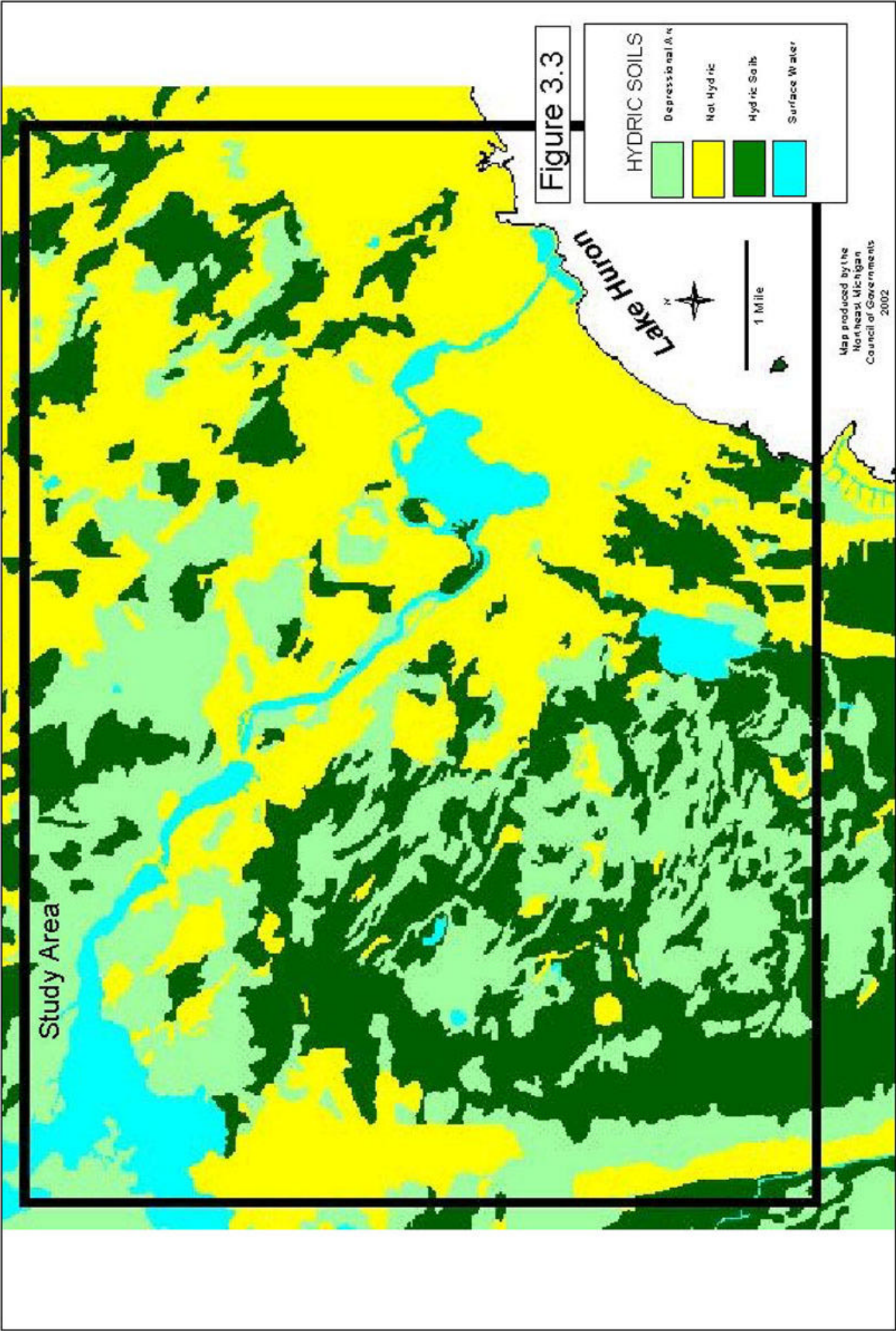
In the study area, most of the hydric soils are found in Wilson and Maple Ridge Townships. The portions of these two Townships included in the study area are predominantly classified as hydric or hydric in depressional areas. Due to the amount of development in and around the City of Alpena, these areas are not shown as having hydric soils, although some areas of these soils can be found. In Alpena Township, hydric soils are found in the south in the Sunset Lake area and in the north in sections 2, 3, 10, and 11 near Hamilton and Wessel Roads.

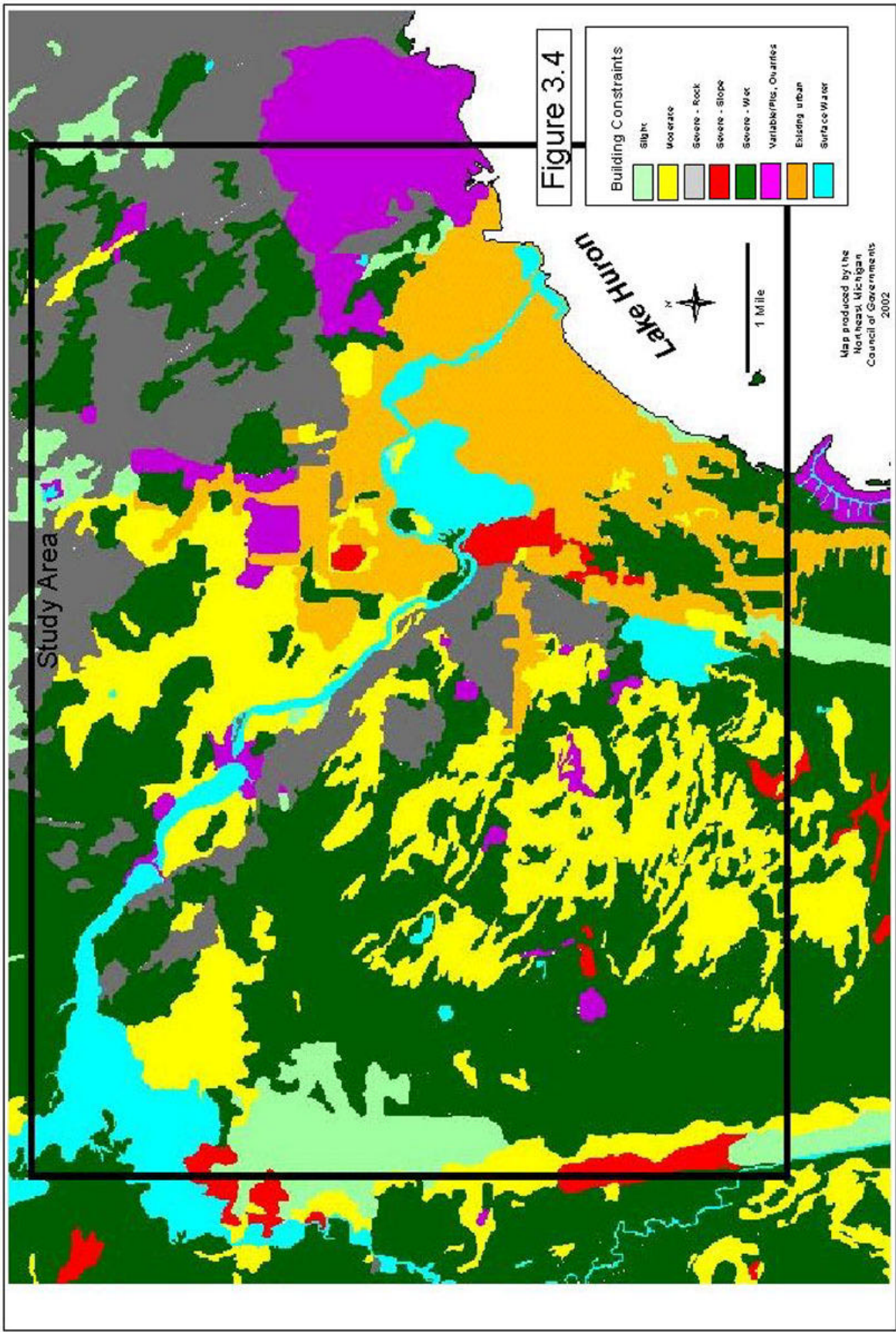
Building Constraints

The USDA Soil Survey for Alpena County rates soils for various uses such as building site development and the most limiting factors are identified (**Figure 3.4**, page 3-6). The rating system is slight, moderate or severe limitations. Using the rating system developed by USDA, soils limitations for building have been mapped. Areas with well drained soils and slopes less than 10 percent tend to have slight limitations for building development .

The map shows that severe building constraints can be found in the north east corner of the study area and paralleling the south side of the Thunder Bay river from Lake Besser to Lake Winyah. Building limitations due to wetness, flooding and/or ponding are predominant in the west half of the study and are also found mixed in with the rocky soils found in the north east corner. The majority of the central portion of the study area is covered by existing development or has moderate building constraints. A small amount of lands in the study area have building constraints due to slope. Areas with unique characteristics, such as dams, and areas where access was denied for purpose of the soil survey, were labeled "Variable" and are located in a limited number of areas. Several pits and quarries can be found scattered through out the study area.







Water Resources

Surface Water

There are 5 major surface water resources found in the study area, four of which are directly linked and diagonally bisect the study area. Lake Winyah, located in far northwest corner of the study area is connected to the Wildfowl Sanctuary and to Lake Besser by the Thunder Bay River which then empties into Thunder Bay and Lake Huron. Lake Winyah and Lake Besser are hydro-electric impoundment's created by dams. Three dams are located in the study area; Norway Point dam (also known as the 7 mile dam) located in section 12 of Maple Ridge Township, Four Mile dam located in section 7 of Alpena Township and Ninth Street dam located in the City. The other major surface water feature found in the study area is Sunset Lake which is located in the south east quadrant of the study area in sections 29 and 32 of Alpena Township.

Groundwater

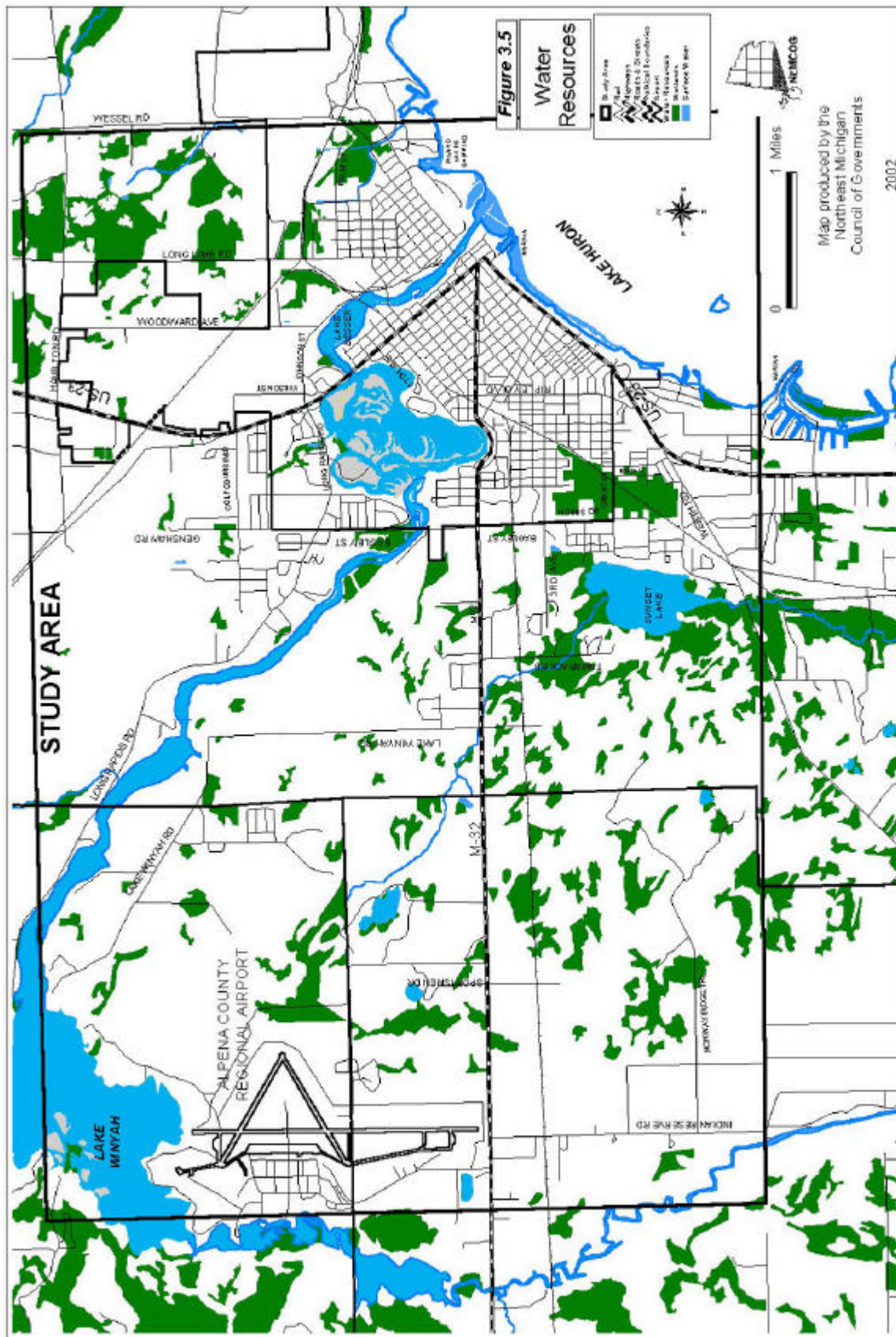
Contaminated groundwater is often a dangerous problem because it can travel unnoticed until detected in a water supply well. Some contamination may remain undetected because no odor, taste, or color is evident. Once contaminated, groundwater is difficult and expensive to clean up. The contaminant disperses in the groundwater, is difficult to remove, and may persist for decades. It is always simpler, less expensive, and easier to prevent groundwater contamination than it is to clean it up.

In many areas in the county the depth to groundwater within this matrix of sand, gravel and clay is less than 50 feet below the surface. Near lakes, streams, and wetlands the depth to ground water is much shallower and commonly can be found only a few feet below the surface. Because of the abundance of shallow groundwater in the county, many drinking water wells are also shallow, just deep enough to reach the uppermost region of the aquifer. The combination of shallow wells and high water table places the ground water of Alpena County (and the study area) at special risk for contamination. For groundwater protection planning, it should be assumed that the entire county is vulnerable to contamination.

Wetlands

A wetland is land where water is found, either on the surface or near the surface, at any time during the year. Poorly drained soils and water loving vegetation also may be present. Wetlands are often referred to as marshes, swamps or bogs. Residents of Michigan are becoming increasingly aware of the value of wetlands. Beyond their aesthetic value, wetlands improve water quality of lakes and streams by filtering polluting nutrients, organic chemicals and toxic heavy metals. Wetlands are closely related to high groundwater tables and serve to discharge or recharge aquifers. By absorbing excess water when river levels are high and releasing water when levels are low, wetlands help prevent floods and droughts. Wetlands are also dynamic ecosystems which are home to a wide variety of plants and animals.

Wetlands are present throughout the study area with almost every section included in the study having some amount of wetlands (**Figure 3.5**). Large areas of wetlands are found northeast of the City of Alpena in Section 10, 11, 14 and 15 in Alpena Township. Other large wetlands are found surrounding much of Sunset Lake and on the east side of the airport in sections 13 and 14 of Maple Ridge Township and section 23 and 24 of Wilson Township.



Fishing, Wildlife, and Hunting

Sheltered by evergreen and hardwood forest, Alpena County's wildlife includes raccoon, fox, mink, beaver, wildcat, deer, elk, black bear, partridge, and turkey. . Hunting for white tailed deer and small game species such as cottontail rabbit, tree squirrels, wild turkey, and ruffed grouse attracts many people to the county annually (see "Tourism Traffic" in **Chapter 5**). Other game species of importance to trappers are beaver, otter, muskrat, raccoon, opossum, skunk and weasel. Alpena County also provides prime water fowl habitat which is supplemented by private ponds, beaver dams, pothole wetlands and wooded flood plain areas. Alpena County is part of the Mississippi flyway.

Fishing

Alpena County offers the sport fisherman and abundance of fishing opportunities. The many lakes, rivers and streams, as well as the near shore waters of Lake Huron, offer a wide range of warm, cool and cold water species. Historically, the Thunder Bay River provided an important link between inland habitats and Lake Huron, with the fish using the corridor for spawning and nursery habitats. Although most of the riverine habitat is now inaccessible to Lake Huron fishes, due to the presence of hydro-power projects, the watershed is still providing nutrient input to the near-shore waters of Thunder Bay and is important to the fishery resources from an energy standpoint.

Within a 20 mile radius, Alpena County offers multiple opportunities for sport fishing on rivers, lakes and Great Lakes. In addition to world class catches of brown trout, pan fish, crappies and salmon, other fish include rainbow trout, lake trout, brook trout, largemouth bass, small mouth bass, perch, walleye and pike.

Lake Huron offers many fishing opportunities. Brown trout, lake trout, rainbow trout and salmon are all plentiful. Fishing on Thunder Bay can be accessed from the North Point to Scarecrow Island as well as from Rock Port and Squaw Bay. Although fishing from shore is possible at both Squaw Bay and Small Boat Harbor, charter boat services are available. Since 1990, according to the Michigan Department of Natural Resources (MDNR) fish stocking report, Lake Huron has been stocked with over 1.2 million brown trout and 2.8 million lake trout.

One of the most scenic and rustic waterways in the area is the 8,970 acres of Fletcher Pond. Located on the extreme western border of Alpena County, this impoundment was created by damming of the Thunder Bay River. It is Michigan's 12th largest inland body of water, but the maximum depth is only 10 feet. Although the shallow, stump-laden waters hamper power boats, Fletcher Pond offers some of the best largemouth and small mouth bass fishing in the State. Pike, crappies, perch and other pan fish are also abundant in these waters. Year long fishing activity includes ice fishing which generally begins in late December.

Long Lake is located on the northern border of Alpena County. Covering 5,652 acres, its maximum depth is 25 feet. Long term fish stocking programs make walleye abundant in these waters. Largemouth and small mouth bass, pike and pan fish are also caught

Beaver lake covers 665 acres and is located in the southwest part of the county. This lake contains largemouth and small mouth bass, perch, pike, and other pan fish. Since 1990 the MDNR has stocked the lake with 56,000 pike, 104,000 walleye and 2,000 tiger musky.

The waterway that appears to have the least fishing activity is the Thunder Bay River. This picturesque river winds its way along the country side, through the City of Alpena, and into Lake Huron. Most of Michigan's game and pan fish are found along this river that covers over 100 miles of Alpena County. There are several impoundments along the river's path, varying in size from Fletcher Pond to smaller Lake Winyah. Formed when the Seven Mile dam was constructed, Lake Winyah is a favorite area for those seeking the challenge of landing northern pike. Since 1990, The MDNR has stocked the Thunder Bay River with over 600,000 walleye, 225,000 steelhead.

Hunting

Hunting opportunities are available in Alpena County for most species of animals and game birds common to Michigan. White tail deer are abundant for the big game hunter and black bear populations, though low overall, are high in areas of dense forest. Along with privately owned forest lands, more than 43,000 acres of State land provide ample habitat for wild turkey, partridge, woodcock and other upland birds. Small game such as the cottontail rabbit, snowshoe hare and squirrel are also abundant in these woodlands. State owned lands are open to the public for hunting unless posted.

Unfortunately, the large deer population combined with indiscriminate feeding practices were contributing factors to the spread of Bovine Tuberculosis (TB) in Alpena County and across northern Michigan. TB is a serious disease caused by bacteria attacking the respiratory system. There are three main types of TB - human, avian, and bovine. Human TB is rarely transmitted to non-humans, and avian TB is typically restricted to birds. Bovine TB - also known as 'cattle TB' is the most infectious of the three, and is capable of infecting most mammals.

Although the State of Michigan attained Bovine TB accredited-free state status in 1979, it is now thought that during earlier periods of high TB reactor rates in Michigan cattle there was spillover of Bovine TB from infected cows into Michigan's white-tailed deer population. In 1994, a TB infected deer was killed by a hunter in Alpena County. Since then over 87,000 deer have been tested with 397 testing positive or being suspected of having the disease¹. In 2001 Alpena County had 21 deer test positive for TB. Although primarily found in bovine's, and not considered a health risk to humans, humans can and have contracted Bovine TB. Several other species of animals in Alpena County and Northern Michigan have been found with the disease. TB has been found in coyotes, raccoons, black bear, bobcat, red fox and opossum. In 2001 Alpena County had 1 coyote and 1 black bear test positive¹.

The effort to eradicate the disease has led to an aggressive TB testing campaign and the creation of a 42 county surveillance area and Deer Management Unit (DMU) 452. Hunters in the surveillance area are asked to submit deer heads for testing, in DMU 452 testing is mandatory. The entire southwest quarter of Alpena County is included in DMU 452 and the rest of Alpena County is in the surveillance area. There also have been changes in deer feeding rules, increases in quotas and hunting days, and the banning of new deer or elk farms. As the eradication effort continues, more changes in hunting and feeding rules can be expected.

¹ Source: State of Michigan Bovine Tuberculosis Eradication Project Report February 5, 2002

Table 3.1 Alpena County Inventory of Game Species		
Species	Relative abundance	Management Potential
Deer	High	Good. Timber cuttings on private land could increase deer carrying capacity
Bear	Low overall High in places	Limited. Population holding at low level. High in less populated forest land held for hunting recreation. Gradual reduction is expected.
Bobcat	Medium overall	Good. Long range maintenance of swamplands is vital.
Raccoon	Moderate	Good. Moderate hunting and trapping pressure maintains population at a desired level
Squirrel	Moderate	Good. Population fluctuates with winters and crops.
Snowshoe Hare	Up and Down	Good. Fluctuate on 10 to 15 year cycle. Continued survival depends on large areas of swamp land
Ruffed Grouse	Moderate	Good. Population numbers are Increasing. Habitat improves with clear cutting coniferous cover
Waterfowl	Low to Medium	Canada Geese number increasing. Wood Duck numbers have Increased with local nest box placement. No change in mallard numbers.
Wild Turkey	Moderate	Good. Population is expanding numbers continue to increase
Fox, Beaver, Badger, Muskrat	Low to Moderate	Low level. Populations fluctuate.
Source: Tom Carlson, DNR Wildlife habitat biologist, Atlanta MI. 1989		

Threatened and Endangered Species

Alpena County is also home to a number of different plants and animals that are threatened endangered or are of special concern. The following list presents the Endangered (E) or Threatened (T) plant and animal species of Alpena County which are protected under the Endangered Species Act of the State of Michigan (Public Act 203 of 1974 as amended). This list also includes plant and animal species of Special Concern (SC). While not afforded legal protection under the act, many of these species are of concern because of declining or relict populations in the state. Protection of Special Concern species before they reach dangerously low population levels, would prevent the need to list them in the future by maintaining adequate numbers of self-sustaining populations.

TABLE 3.2 Alpena County Threatened and Endangered Species

Scientific Name	Common Name	Type	Federal Status	State Status
<i>Acipenser fulvescens</i>	sturgeon	Fish		T
<i>Adlumia fungosa</i>	Climbing fumitory	Vascular Plant		SC
<i>Armoracia lacustris</i>	Lake cress	Vascular Plant		T
<i>Asplenium rhizophyllum</i>	Walking fern	Vascular Plant		T
<i>Botrychium hesperium</i>	Western moonwort	Vascular Plant		T
<i>Buteo lineatus</i>	Red-shouldered hawk	Bird		T
<i>Cacalia plantaginea</i>	Prairie indian-plantain	Vascular Plant		SC
<i>Calypso bulbosa</i>	Calypso or fairy-slipper	Vascular Plant		T
<i>Carex concinna</i>	Beauty sedge	Vascular Plant		SC
<i>Carex scirpoidea</i>	Bulrush sedge	Vascular Plant		T
<i>Chlidonias niger</i>	Black tern	Bird		SC
<i>Cirsium pitcheri</i>	Pitcher's thistle	Vascular Plant	LT	T
<i>Clemmys insculpta</i>	Wood turtle	Reptile		SC
<i>Crataegus douglasii</i>	Douglas's hawthorn	Vascular Plant		SC
<i>Cryptogramma stelleri</i>	Slender cliff-brake	Vascular Plant		SC
<i>Cypripedium arietinum</i>	Ram's head lady's-slipper	Vascular Plant		SC
<i>Dryopteris filix-mas</i>	Male fern	Vascular Plant		SC
<i>Emydoidea blandingii</i>	Blanding's turtle	Reptile		SC
<i>Gavia immer</i>	Common loon	Bird		T
<i>Haliaeetus leucocephalus</i>	Bald eagle	Bird	PS,LT,PDL	T
<i>Iris lacustris</i>	Dwarf lake iris	Vascular Plant	LT	T
<i>Lanius ludovicianus migrans</i>	Migrant loggerhead shrike	Bird		E
<i>Notropis anogenus</i>	Pugnose shiner	Fish		SC
<i>Nycticorax nycticorax</i>	Black-crowned night-heron	Bird		SC
<i>Pandion haliaetus</i>	Osprey	Bird		T
<i>Percina copelandi</i>	Channel darter	Fish		E
<i>Pinguicula vulgaris</i>	Butterwort	Vascular Plant		SC
<i>Pterospora andromedea</i>	Pine-drops	Vascular Plant		T
<i>Salix pellita</i>	Satiny willow	Vascular Plant		SC
<i>Sis trurus catenatus catenatus</i>	Eastern massasauga	Reptile	C	SC
<i>Somatochlora hineana</i>	Hine's emerald	Invertebrate	LE	E
<i>Sterna caspia</i>	Caspian tern	Bird		T
<i>Sterna hirundo</i>	Common tern	Bird		T
<i>Tanacetum huronense</i>	Lake huron tansy	Vascular Plant		T
<i>Trichostema brachiatum</i>	False pennyroyal	Vascular Plant		T
<i>Trimerotropis huroniana</i>	Lake huron locust	Invertebrate		T

Source: Michigan County Element Lists-March 2001, Michigan Natural Feature Inventory

*State Status: E = endangered; T = threatened; SC = special concern

**Federal Status: C = being considered for federal status; LE = listed endangered; LT = listed threatened; PS = partial status; PDL = proposed delist

Sites of Environmental Contamination

The Michigan Environmental Response Act 307 of 1982, as amended, provides for the identification, evaluation and risk assessment of sites of environmental contamination in the State. The Environmental Response Division (ERD) is charged with administering this law. A site of environmental contamination, as identified by ERD, is "a location at which contamination of soil, ground water, surface water, air or other environmental resource is confirmed, or where there is potential for contamination of resources due to site conditions, site use or management practices.

The agency publishes a list of environmentally contaminated sites by county showing the sites by name pollutant(s) and site status. A Site Assessment Model (SAM) score is computed to assess the relative risk a site may pose and to help determine the aggressiveness of clean up efforts. SAM scores range from 0 to 48 with 0 being the least contaminated and 48 the most contaminated. In some instances where the score is high and further contamination is possible, immediate response may be required. Conversely, a location where the score is low and the conditions of the site are not likely to change, no action may be the preferred course.

In the study area there are currently 14 contamination sites which are listed in **Table 3.3**. The status of 6 of the sites are listed as active which means that some level of clean up activity is ongoing and no action is being taken on the remainder.

Table 3.3 Alpena Area-Wide Transportation Plan Contamination Sites					
#	Site ID & Status	Location	Source	Pollutant	Score
1	04000003 Active	M-32 3.3MI W of Bagley St	Refuse Systems	Lead , Benzene , Zinc	34
2	04000005 No Action	US 23N Former Kurvan Bait Shop	Sporting goods store	Benzene , Xylene , Toluene	20
3	04000009 Active	Phelps Collins A N G Base	National security	TCE Carbon Tet. BTEX , 1,2 Dichlorobenzene , 1,3 Dichlorobenzene	43
4	04000015 Active	N Long Lake Homant Oil Company	Petro Bulk Storage	BTEX	27
5	04000024 No Action Taken	132 Tuttle	Private Residence	Fuel Oil	27
6	04000026 No Action Taken	2919 Garden St Alpena Manufacturing	Metal Working Machinery	Solvents , Cutting Oils	17
7	04000030 No Action Taken	620 West Campbell Alpena Oil	Petroleum Bulk Stations	benzene , toluene , xylenes	28
8	04000039 Active	416 Ford Avenue Abitibi-Price Corp	Misc Manufacturing Industries	BTEX Metals	44
9	04000066 Active	235 Water Street Alpena Oil Company	Petroleum Bulk Stations	Petroleum Products	23
10	04000074 No Action Taken	1055 Lynn Drive	Private Households	Arsenic Copper , Calcium	34
11	04000075 No Action Taken	2341 Third Avenue	Private Households	Metals	32
12	04000077 No Action Taken	Third Avenue Soil Piles	Nonclassifiable Establishments	Metals	29
13	04000081 Active	5 Wood Street Tandem Transport	Truck Terminal Facilities	Diesel Fuel , Metals	40
14	04000125 No Action Taken	1000 Highland Court	8811	Fluorine , Fluoranthene	25
Source: Department of Environmental Quality					