

Chapter 2 - Environment

Overview

Upland forest is the predominate land cover in the County, with much of that being pine and oak. These drought tolerant species prefer and thrive on the mostly sandy soils. Farming is limited in Alcona County, as indicated in a countywide land cover/use inventory, compiled in the early 1980's, which found approximately 41,600 acres of farmland. As in other parts of the State, there is a downward trend in the number of active farms. Farmland tends to be concentrated in eastern parts of Caledonia, Mikado, Hawes, and Curtis Townships; and around the communities of Barton City and Curran. The Au Sable River, Pine River, Black River and Thunder Bay River systems, with their interconnected network of smaller streams and creeks, and the many lakes and impoundments provide an abundant source of high quality surface water features.

The greatest attraction for the residents and visitors of northern Michigan is the area's environment and the rural nature of 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 recreation opportunities, the natural environment is a major economic base and income generator.

At the same time, the environment places constraints on human activities. Certain critical and sensitive parts of the natural landscape cannot be altered without creating problems that are not easily corrected. Increased flooding and soil erosion due to the indiscriminate filling of wetlands and clearing of land are but two examples. Therefore, it is essential that any future development respect the different characteristics of the natural environment. This is important in preserving the attractiveness of this part of the State, preventing potential hazards related to undue alteration of the land, and maximizing the economic benefits of the tourist and recreation industry.

Climate

Typical of northern Michigan, the distinct four seasons offer an ever changing landscape. Long snowy, cold winters, and moderately warm summers are separated by a cool, green spring and a cool colorful fall. Located in the northeastern part of the northern lower peninsula, the eastern boundary of the County is formed by Lake Huron. Given this geographic location, the weather is influenced by the moderating effect of Lake Huron. The climate along the immediate Lake Huron shore is semi-marine in nature and lacks many of the temperature extremes found only a few miles inland.

According to the USDA Soil Survey of Alcona County, the average annual precipitation is 29.46 inches (includes water equivalent of snowfall). Precipitation is heaviest during the summer months with 60 percent of the annual precipitation from April through September. The average annual snowfall is 49.5 inches. Records show a long term average of 93 days when there is at least one inch of snow on the ground. Of course, the number of days varies greatly from year to year. The average daily temperature ranges from 67.9 °F for the month of July to 20.0 °F during January. The average mid-afternoon relative humidity is 61 percent. Since humidity levels are highest at night, the average relative humidity at dawn is 83 percent.

Alcona Severe Weather

Data from the National Oceanic and Atmospheric Administration shows that from 1950 through 2011 there were 185 severe weather events recorded in Alcona County. Damages from these events in Alcona County and the surrounding region are estimated at nearly 13 million dollars.

Although relatively rare, tornados have occurred in Alcona County and have caused massive amounts of damage. 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 colder water of Lake Michigan during the spring and early summer months, a prime period of tornado activity. Michigan averages approximately 15 tornadoes per year. Over the past 49 years, 12 tornados touched down in Alcona County, causing over \$3,121,000 in property damage. Tornados are most common in the afternoon and all of the tornados in Alcona County occurred in the afternoon between the hours of 1:00 and 7:00 P.M. In Northern Michigan tornados are most likely in the summer months, although some have occurred in the spring and fall. In Alcona County, two tornados have been recorded in the month of March. The most destructive tornado to touch down in Alcona County was an F3 tornado that occurred on March 27, 1991 causing \$2.5 million in damages. The magnitude of a tornado is described by using the Fujita Scale. The Scale ranks tornados from F0 to F6 based on wind speed and intensity. F0 and F1 tornado's are described as weak tornado's with wind speeds from 40 to 112 mph, F2 and F3 are strong tornado's with wind speeds from 113-206 mph, F4 and F5 are violent tornado's with wind speeds from 207 to 318 mph and an F6 is an inconceivable tornado with wind speeds above 319 mph. Of the 9 tornados that have struck Alcona County, two were F3, one was an F2, five were an F1 and one was an F0.

Strong winds and thunderstorm winds are a common severe weather that affects Alcona County. Annually, thunderstorms will occur on an average of 24 days per year and on average one or two thunderstorms per year will have severe winds. Since 1962 there have been 57 severe wind events recorded in the County. Strong winds are most likely to be associated with thunderstorms that occur in the summer, but can occur any time of year. One of the most powerful windstorms ever recorded in the Great Lakes region occurred on November 10, 1998. Wind speeds from this powerful storm reached 82 knots.

Winter weather hazards consisting of heavy snow, freezing rain and blizzards are the most prevalent seasonal hazards in Alcona County and can be expected to occur several times every year. Since 1993, 54 winter storm events, which included heavy snowstorms and blizzards, have been recorded in Alcona County. In 1993 heavy snowstorms, freezing rain and or blizzards occurred 8 times while in 1995 only one heavy snow storm was recorded.

Topography

Alcona County's topography is classified as consisting of level and undulating plains and rolling to hilly moraine areas. Elevations in the county range from 577 feet above sea level at the shoreline of Lake Huron (the eastern boundary of the county) and climbing to the highest elevation of 1,273 feet above sea level, in an area three miles southwest of Curran. There is much gradual sloping, but there are also portions of the County where elevations fall drastically, as along the western and eastern shoreline of the Alcona Dam Pond; these steep slopes are extremely unstable.

Geology

The rolling hills, river valleys, swamps and lakes were created by the retreating continental glacier some 12,000 years ago. Beneath this thick mantle of the glacial deposits lays a foundation of layered sedimentary bedrock. This section will describe the glacial landforms or quaternary geology and the underlying bedrock geology.

Surface Geology

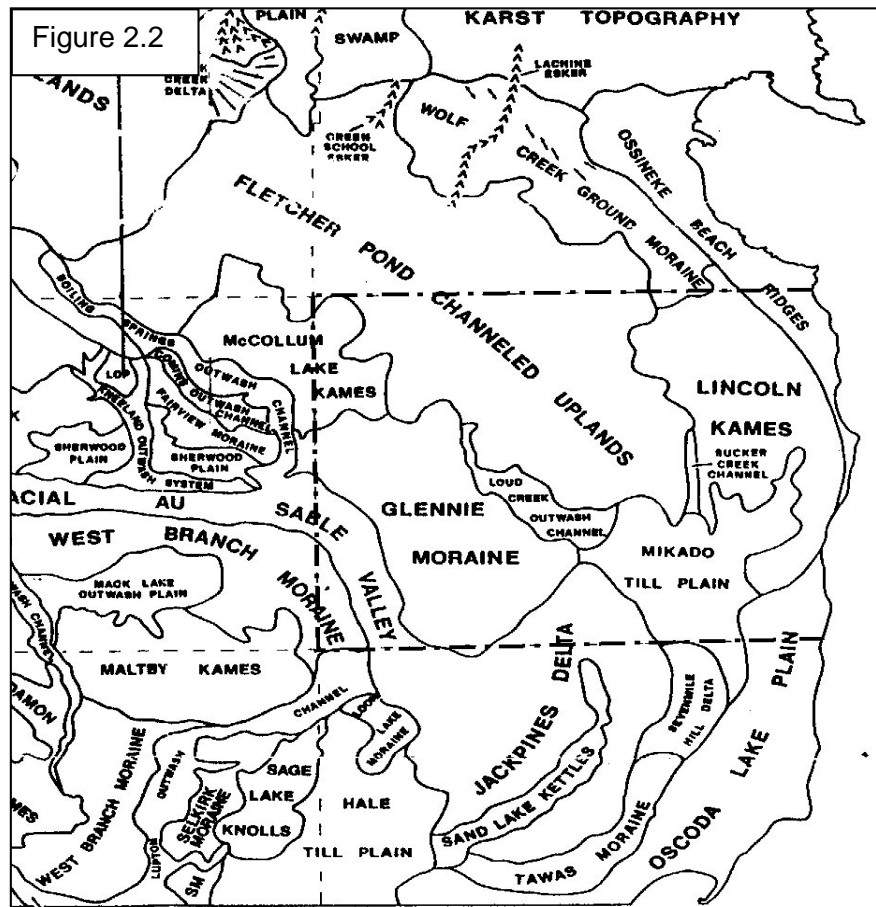
Starting some 2 million years ago, during the Pleistocene era, continental glaciers formed in the Hudson Bay area. Several times, over this two million year period, the massive sheets of ice built up and inched their way south across what is today Michigan. The massive ice sheets, more than one mile thick, advanced in a southerly direction, bulldozing their way across the landscape. The glacier pushed material in front of it, incorporated rocks and soil into the debris laden ice; and scraped, ground and broke apart the sedimentary bedrock of the Michigan Basin.

Each advance and retreat of the continental glaciers took tens of thousands of years. This reoccurring process shaped and reshaped the land; obliterating and then creating hills, valleys, rivers and lakes, swamps and marshes. The last glacial period, called the Wisconsin era, created the landscape we

know today. The glacier left behind boulders, rocks, cobble, sand, gravel, silt, clay and loam. In some areas the material was deposited in unsorted masses called till plains, ground moraines and end moraines. Water flowing from the melting glaciers also sorted materials, creating outwash channels, sand deltas, kames and eskers. Fine materials, captured in the fast moving glacial meltwater, settled to the bottom of expansive glacial lakes creating lacustrine clay and silt plains. **Figure 2.1** on the following page shows how glacial landforms were created.

According to a map prepared by W. A.

Burgess and D. F. Eschman (**Figure 2.2**), titled "Landform Units in Northeastern Lower Michigan," Mikado Township is dominated by a sand delta and till plain, both created by the glacial meltwaters.



At the front of the massive retreating glaciers, large streams originated from the melting ice. The debris laden water carved through moraines and outwash plains creating wide drainageways and outwash channels. The AuSable River follows one of those large glacial river valleys. As the continental glaciers melted, water flowed across the landscape creating landforms and pooling into the expansive post glacial lakes. These emerging lake basins were the beginnings of our Great Lakes. During different periods, the post glacial Great Lakes were both much higher and lower than the lake levels we have grown accustomed to in recent times. Geologists have identified and named the different post glacial great lake stages.

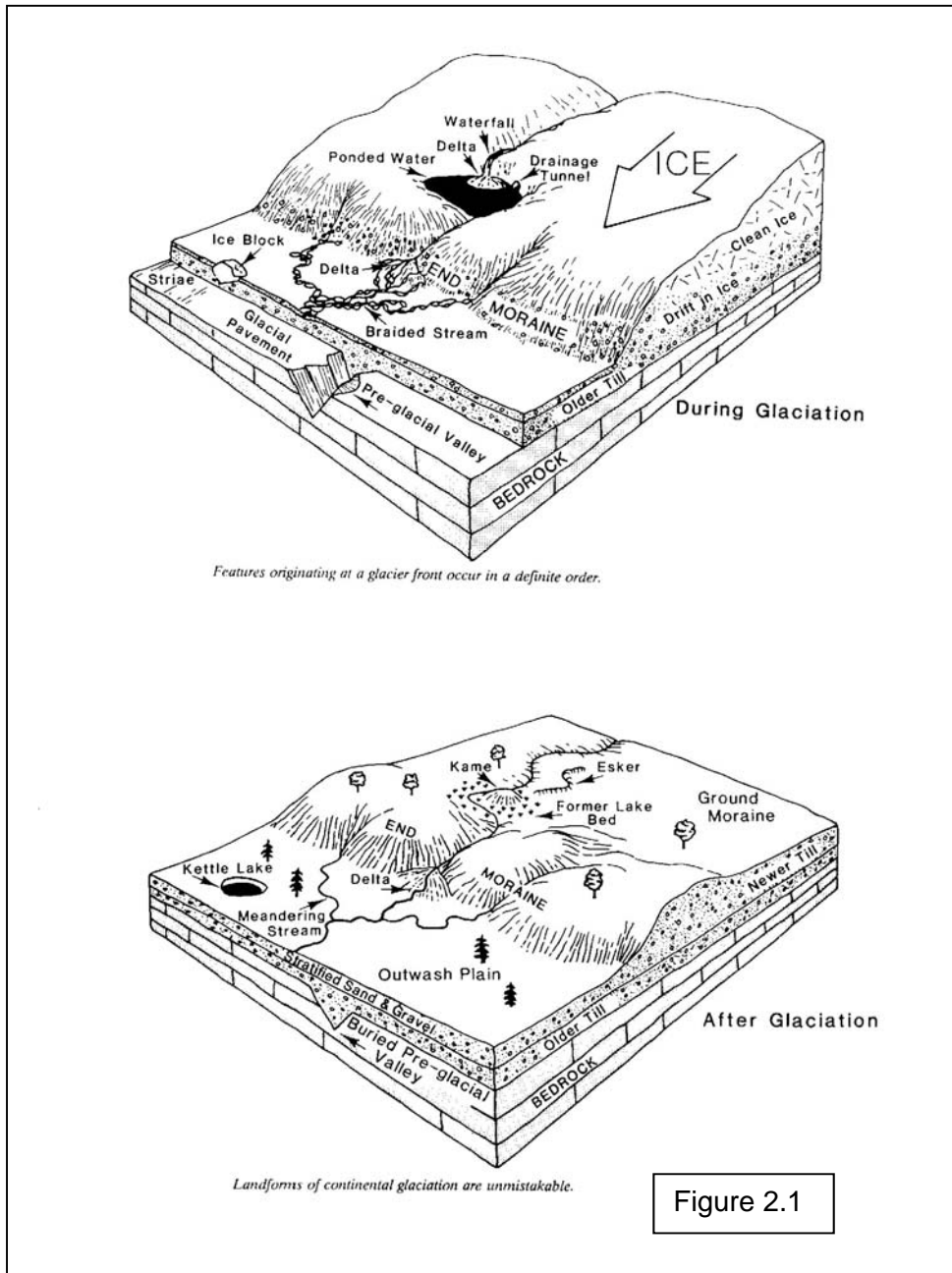
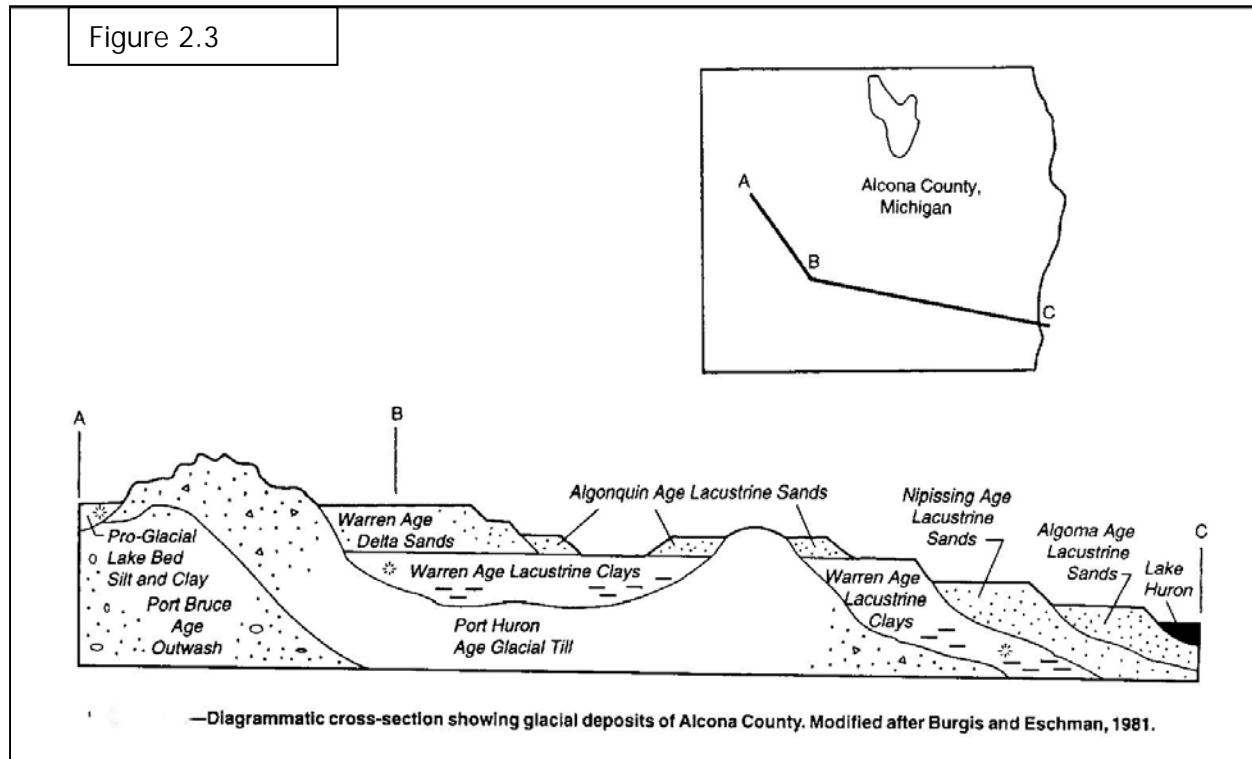


Figure 2.3 shows the different stages of the glacial great lakes Warren, Algonquin, Nipissing and Algoma. Landforms and soils in eastern Alcona County were heavily influenced by these different lake stages. Glacial Great Lake Warren formed at the front of the melting Huron glacial lobe around 12,000 years before present and was the most extensive, flooding much of the land area of Alcona, Haynes, Harrisville, Greenbush, and Mikado Townships.



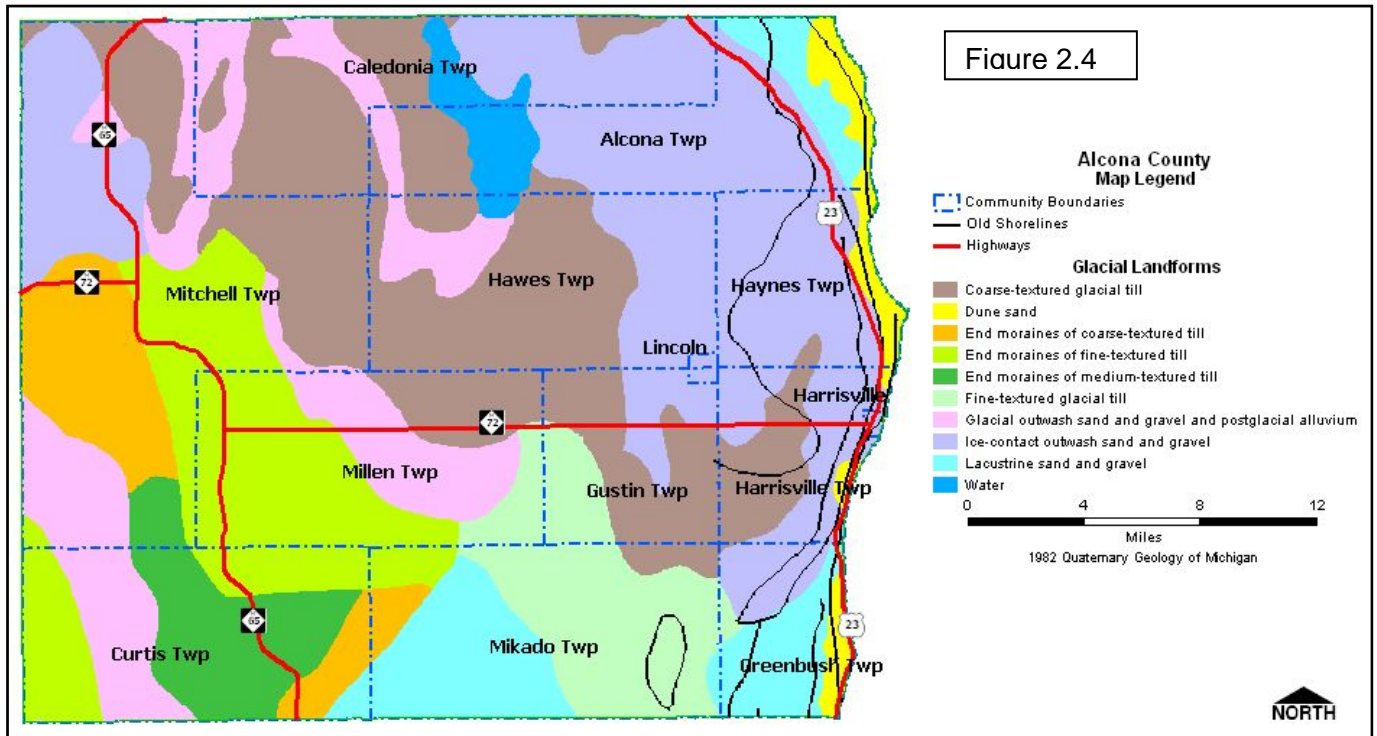
The ancient shoreline of Lake Warren was 850 feet above sea level as compared to 577 feet above sea level of Lake Huron. In other words, the lake level of Lake Warren was 273 higher than Lake Huron! As the debris laden meltwaters of the large glacial AuSable River emptied into Lake Warren, the coarse sands settled out first. This created a sand delta called the Jack Pines Delta, one of the largest glacially formed sand deltas in Michigan. This delta extends southward covering much of the north central part of Iosco County. The delta is characterized by broad, nearly level plains, dissected by widely spaced streams and creeks. The soils are excessively drained to somewhat excessively well drained sandy soils. As noted by its name, the area is dominated by Jack Pine forests, and has a long history of wildfires.

The Mikado Till Plain is located in the south central part of the county. When the water slowed to a near standstill in Lake Warren, the fine materials, clays and silts settled to the bottom. According to the Alcona County soil survey, the lake plains are characterized by nearly level to undulating areas dominated by moderately well drained to poorly drained loamy soils. At the transition of the higher sand deltas and the lower lake plains the soils are somewhat poorly drained to very poorly drained sandy and mucky soils. The Pine River watershed centers on the till plain and due to the relatively level topography and poorly drained soils, historic flooding incidents have occurred.

The Glennie Moraine, West Branch Moraine and Fletcher Pond Channeled Uplands cover much of the central and western parts of the County. During some periods, the continental glacier's retreat stagnated, that is to say, the ice at the face of the glacier melted as fast as it

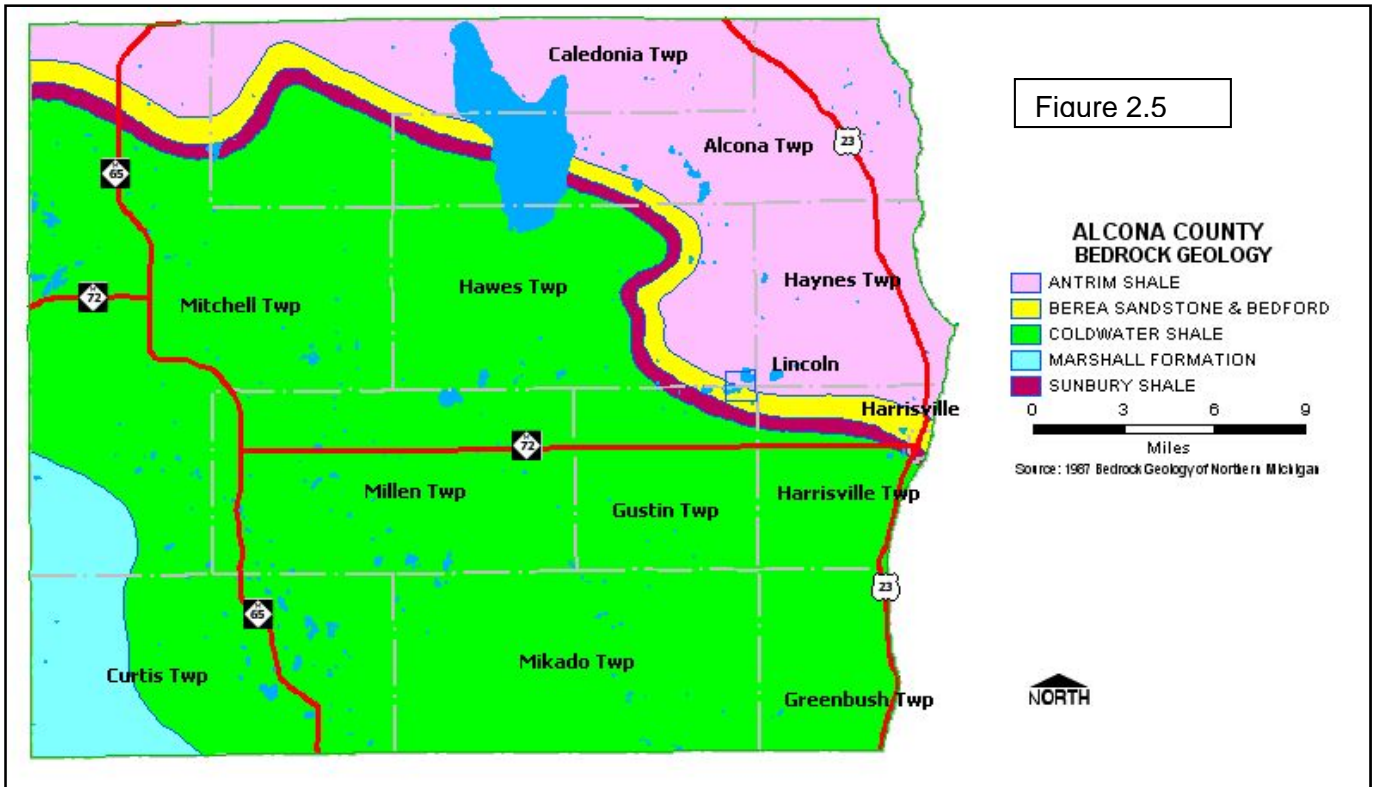
advanced southward from the polar ice cap. The debris laden, glacial ice then deposited large amounts of materials in one locale. Acting like a large conveyer belt, the materials piled up at the front of the glacier forming moraines or glacial hills. There were periods when the retreating continental glaciers re-advanced southward, and like a huge bulldozer, it pushed the previously deposited materials into larger hills. These are called push moraines. The topography is rolling to steeply sloping. Pine, oak and northern hardwood forests are common in these areas.

Figure 2.4 is a quaternary geology map of Alcona County.



Bedrock Geology

Beneath the glacial deposits, hundreds of feet below the surface, is sedimentary bedrock that was created during the Late Mississippian ages of the Paleozoic Era. The bedrock was formed in ancient seas which covered the area some 310- 345 million years ago. The shallow marine seas deposited layers of silt, clay, sediments, marine animals, plants, coral, and other calcareous materials. These deposits formed sandstone, shale, limestone, and dolomite bedrock. The uppermost bedrock in Alcona County consists of materials from the upper and lower Mississippian series of the Paleozoic era. Various strata contain minerals of varied importance. In addition to the oil and natural gas which has formed in porous rock or pockets between strata, economic deposits of limestone, gypsum, salt & brine were found. Coldwater Shale and Antrim Shale bedrock formations subcrop most of the County, see **Figure 2.5**. Marshall Sandstone, one of the most important bedrock aquifers in the state, subcrops the southwestern corner of the county. Antrim shale contains rich deposits of natural gas. In recent years, intensive exploration has resulted in numerous producing wells throughout the region. Other bedrock formations beneath the glacial overburden include Sunbury shale, Berea sandstone and Bedford shale.



Soils

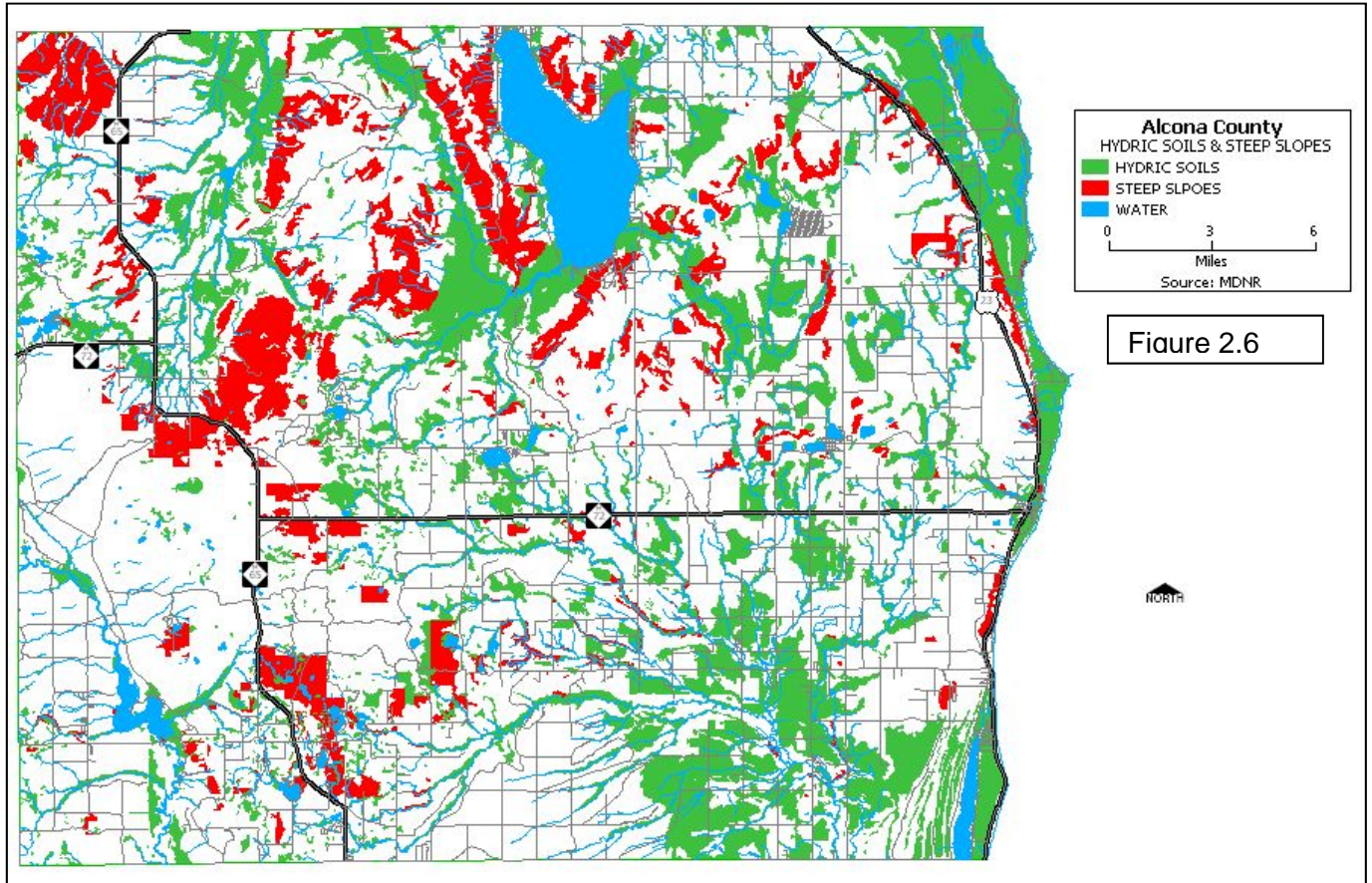
When planning for types and intensity of land uses, soil types and slopes are two important factors that determine the carrying capacity of land. The construction of roads, buildings and septic systems on steeply sloped areas or areas with organic and hydric soils require special design considerations. In addition, costs for developing these sensitive areas are greater than in less constrained parts of the landscape. If developed improperly, the impacts to natural resources can be far reaching.

Hydric Soils and Steeply Sloped Areas

The Natural Resource Conservation Service completed a detailed soil survey of Alcona County. A digital or computerized version of the soil survey maps was acquired from the Michigan Department of Natural Resources, MIRIS program. The soil survey identified 153 different kinds of soil in the county. The soils range widely in texture, natural drainage, slope and other characteristics. Well drained and moderately well drained soils make up about 68 percent of the county, somewhat poorly drained soils make up about 20 percent, and poorly drained soils make up about 12 percent.

Figure 2.6 is a color thematic map that classifies hydric soils and soils on steep slopes. Lower density and less intensive development should be directed to these areas with severe building constraints. Hydric soils are saturated, flooded or ponded during part of the growing season and are classified as poorly drained and very poorly drained. Hydric soils have poor potential for building site development and sanitary facilities. Wetness and frequent ponding are severe

problems that are difficult and costly to overcome. Sites with high water tables may be classified as wetlands and a wetlands permit would be required to develop these areas. The hydric soils are mainly located adjacent to streams and creeks. This connectivity of riparian wetlands and surface water features can be seen throughout the landscape. There are extensive hydric soils areas to the southwest of Hubbard Lake, in large areas of southeast Alcona County, and in areas along the Lake Huron shoreline.



Hills and steeply rolling terrain may provide opportunities for spectacular views of the landscape. However, steeply sloped sites have severe building constraints, are more difficult and costly to develop. Maintenance costs tend to be higher on steeply sloped terrain. Special design standards such as erosion control measures, limiting size of disturbed areas, retaining natural vegetation, re-vegetation, slope stabilization and on-site retention of water run-off from impervious surfaces would all serve to minimize resource impacts. According to information presented in the Alcona County Soil Survey, areas with slopes 18 percent and greater are minimal and are concentrated in the northwest corner of the Township. Steep slopes can also be found in central areas of the County, in the northwest corner of Mitchell Township, and on the west side of US-23 near the coast.

Forests

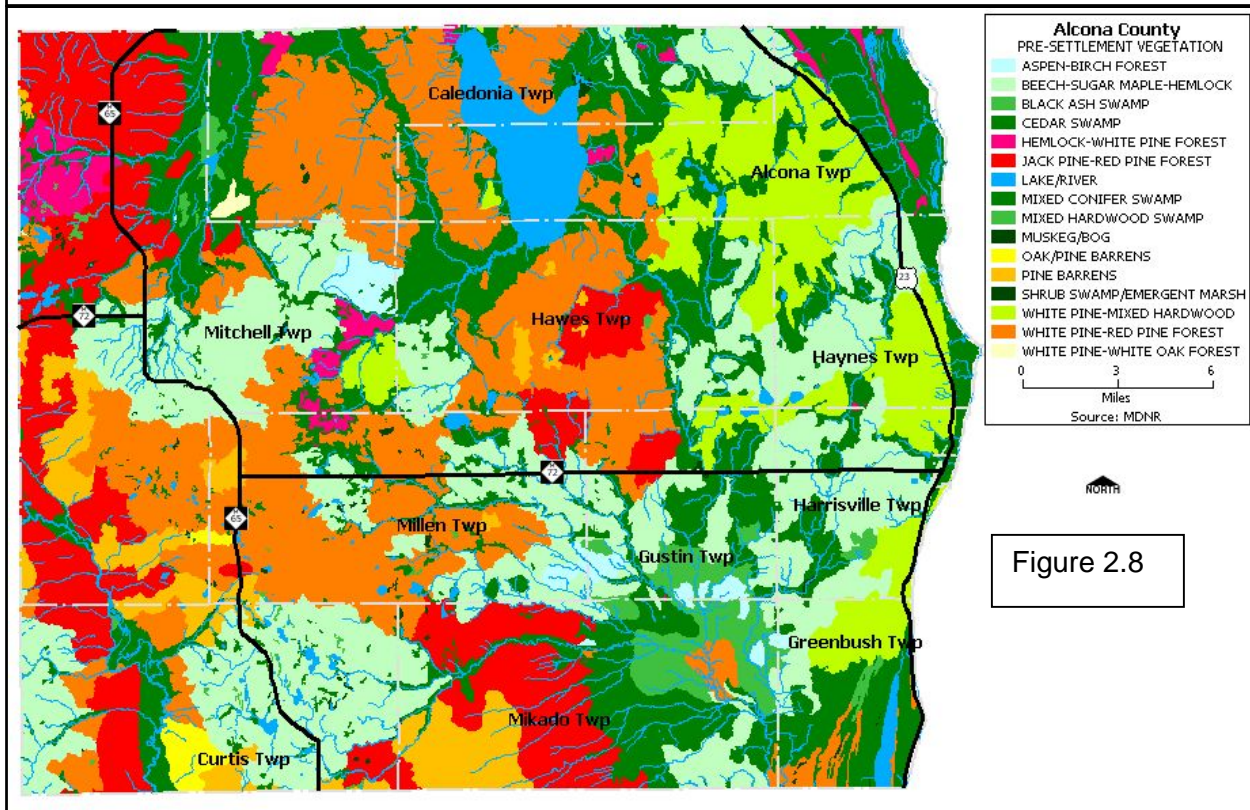
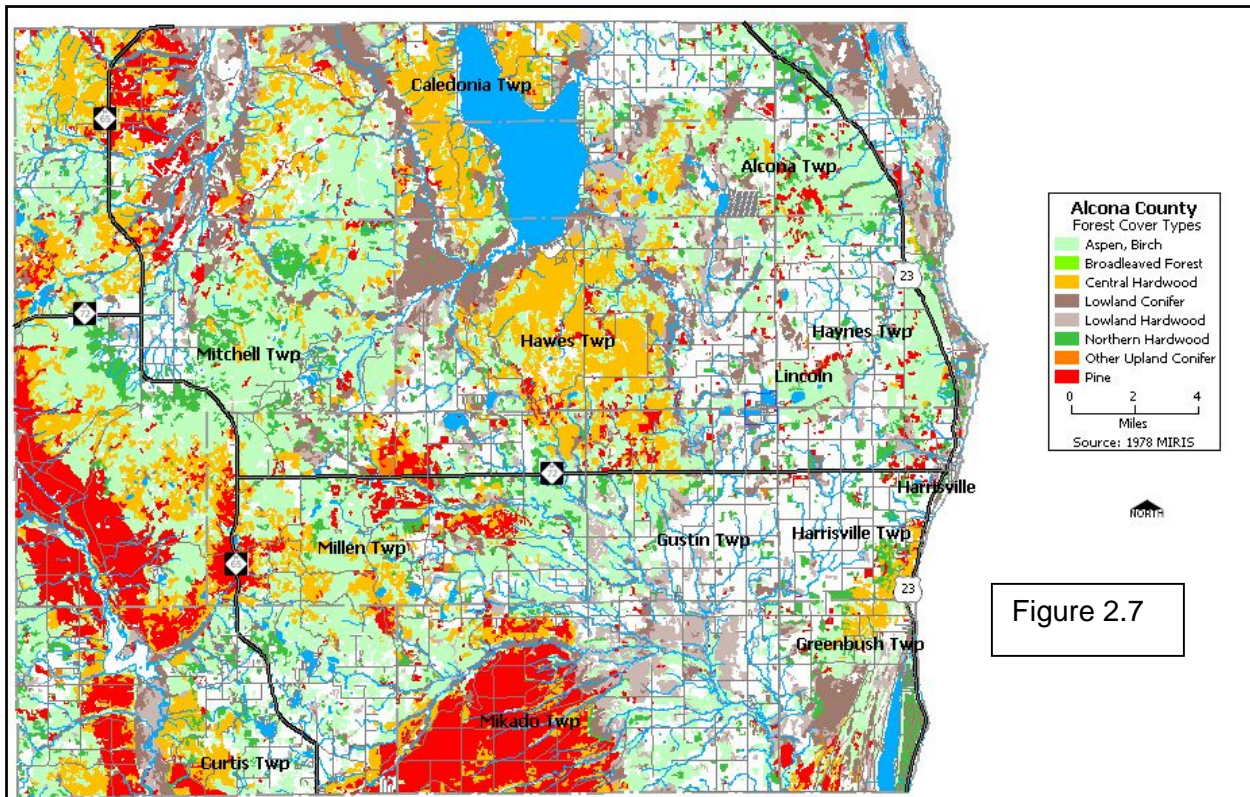
Since over 73 percent of the County is forested and forest fires have been identified as the number one natural hazard in the Alcona County Hazard Analysis Plan, an analysis of forest types will assist in defining vulnerable areas and populations. The Michigan Resource Information System's (MIRIS) 1978 land use inventory compiled land cover maps that depict forest types in the county (**Figure 2.7**). Tree species vary depending upon the soils, moisture and past activities such as logging, fires and land clearing. Aspen-birch, red oak-white oak and jack-red-white pine are the most common forest types. Under dry spring conditions forest fires can occur in any forests type. However some forest types have higher risks. Jack and red pine forests have a high risk for wildfires. Oak and white pine forests have a moderate risk for wildfires. According to the MIRIS Land Cover/Use Inventory, jack pine and red pine forest types cover approximately 14 percent of the forestland. Oak and white pine forests account for another 20 percent. Draughty, low fertility sandy soils, found in outwash plains and channels, supported pre-settlement pine forests that for thousands of years were perpetuated by wildfires. Today, residential development has occurred within the same wildfire prone areas. There is a concentration of pine forest types in Mikado, Curtis and Mitchell Townships.

Red jack and white pine forest types are included in the pine forest category. Bigtooth aspen, quaking aspen, white birch, red maple and red oak are the primary tree species found in the aspen-birch type. Red oak, white oak, black oak and northern pin oak are the primary species growing in the oak forests. Northern hardwoods include species such as sugar maple, red maple, American beech, basswood and yellow birch.

Poorly drained, lowland areas support northern white cedar, tamarack, balsam fir, black spruce, eastern hemlock, white pine, balsam poplar, trembling aspen, paper birch, black ash, speckled alder and shrub willows. Northern white cedar dominates the wetland areas where there is good lateral water movement and the soils are high in organic content. Lowland forests are typically located adjacent to water features and function as riparian forests and water quality buffers. The network of lowland forests, associated with rivers and creeks, also function as wildlife corridors and are the backbone of large regional ecological corridors. Lowland forests adjacent to the Great Lakes are prone to flooding during periods of high lake levels. Lowland forests adjacent to rivers and streams are prone to flooding during the spring snow melt, particularly when combined with heavy spring rains. Extensive areas of lowland forests can be found in Curtis, Mikado, Greenbush, Hawes, Mitchell, Caledonia and Alcona Townships.

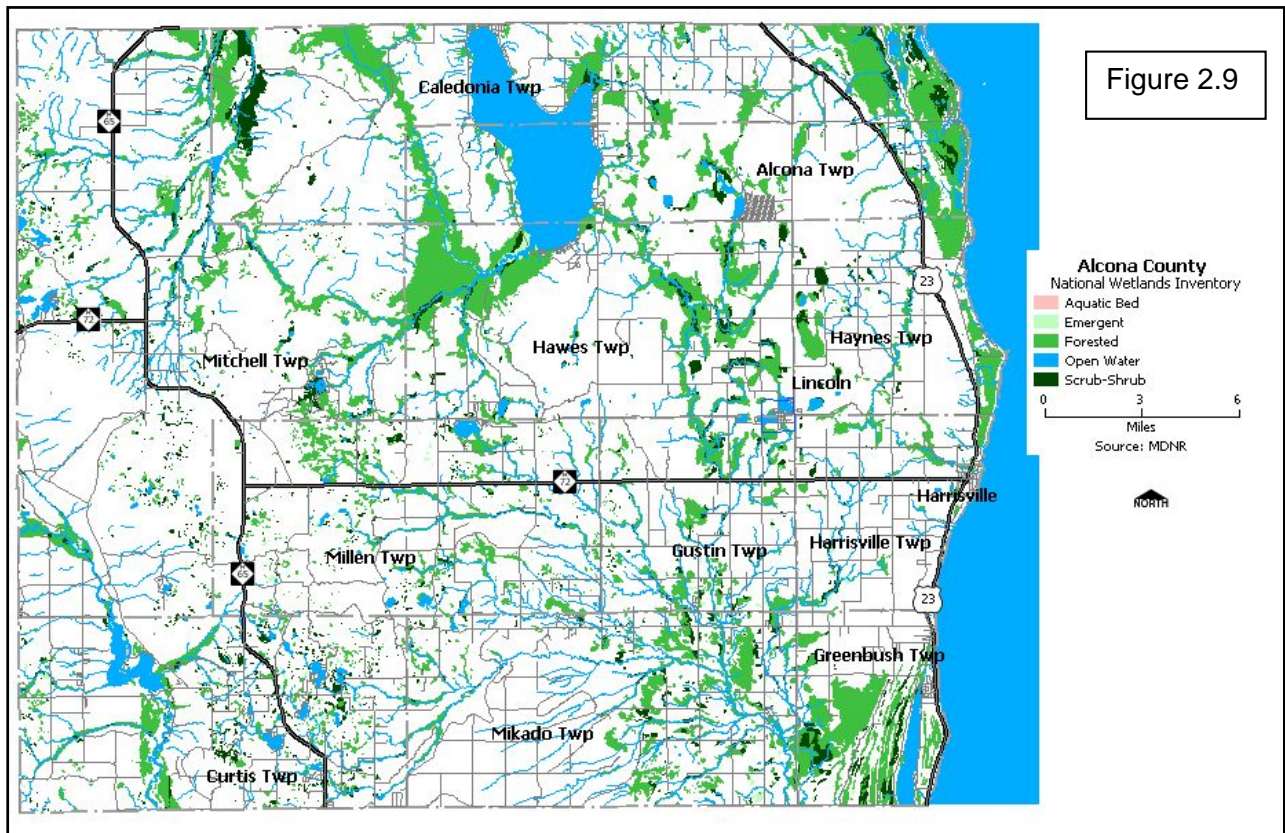
Presettlement Vegetation

The Michigan Department of Natural Resources has compiled pre-settlement vegetation maps of counties in Michigan. The maps were generated from information contained in the first government land survey notes in the 1800's along with information such as current vegetation, land forms and soils. A review of the presettlement vegetation map of Alcona County show extensive areas were covered with pine and oak forests, see **Figure 2.8**. This clearly shows a long history of wildfires in the area. The map delineates jack pine-red pine forest, white pine-red pine forest, pine barrens and pine/oak barrens, which combined, covered 36 percent of the County. In the late 1800's extensive logging and subsequent wildfires resulted in the conversion of white pine-red pine forests to oak and aspen forests. This is most noticeable in Caledonia, Alcona, Hawes, Millen, and Mitchell Townships. Areas that were once covered with pine forests still have a high propensity for wildfires.



Wetlands

Poorly drained, lowland areas support northern white cedar, tamarack, balsam fir, black spruce, eastern hemlock, white pine, balsam poplar, trembling aspen, paper birch, black ash, speckled alder and shrub willows. Northern white cedar dominates the wetland areas where there is good lateral water movement and the soils are high in organic content. These lowland forests are typically located adjacent to water features and function as riparian forests and water quality buffers. The network of lowland forests, associated with rivers and creeks, also function as wildlife corridors and are the backbone of large regional ecological corridors. Nonforested wetland types include lowland brush, marshes and bogs. Forested and nonforested wetlands are a finite resource in the County. Land use planning activities should focus on protecting and preserving these limited and critical resources. **Figure 2.9** is a color thematic map prepared from the US Fish and Wildlife Service National Wetlands Inventory. Green areas depict emergent, scrub-shrub and forested wetlands areas.



Water Resources

According to the *Alcona County Resource Plan*, there are 233 bodies of water in Alcona County which, when combined, are over 13,000 acres of surface water. The combined length of all rivers and streams in the county is 301 miles. And, there is more than 68 miles of Lake Huron shoreline along the Coast of Alcona County.

The largest lakes that are at least partially found within the County are: Hubbard Lake (9,200 acres), Alcona Dam Pond (1,008 acres), Cedar Lake (775 acres in the County), Jewell Lake (193 acres), Vaughn Lake (115 acres), Crooked Lake (97 acres), Brownlee Lake (90 acres), Badger Lake (88 acres), North Lake (86 acres), McCollum Lake (81 acres in the County), and Lincoln Lake (77 acres). Lakes and river shorelines are continually facing increased pressure from development as more seasonal homes and retirement homes are being built in the County. The recreation industry of Alcona County can be impacted by this development. There are other factors to consider as development occurs near shorelines, such as nutrient delivery rates into lakes & streams, accidental spills of contaminants, erosion control, and even scenic view quality.

Groundwater supplies in the county are very productive in the predominant gravels and sands of the glacial drift. The groundwater aquifers are recharged by precipitation which is readily absorbed by the permeable soils. Individual wells near the lakes and streams are usually quite shallow due to the high water table. The county drains into the AuSable, Pine, and Comstock River systems, eventually reaching Hubbard Lake or Lake Huron.

Fish and Wildlife

Alcona County has been known as a good deer range for many years. The large deer herd built up following the wildfires of the 1890's to 1920's, with the herd peaking in the late 1940's to early 1950's. Large areas of public hunting ground and the tremendous deer herd combine to attract a large number of hunters to the County.

Alcona County, along with four other neighboring counties (Alpena, Montmorency, Oscoda, and Presque Isle), is within the area which has been hit by an outbreak of Bovine Tuberculosis (T.B.) in the local deer herd and in other wild animals. The Michigan Department of Natural Resources (DNR) has created a special separate deer management unit to oversee the situation, called DMU452. This allows the DNR to enforce special regulations covering deer hunting and feeding within these counties. Although the incident of Bovine T.B. found in the deer herd of this area has been very low (estimated at under one percent of the population), the DNR and other agencies are trying to manage the situation, prevent it from becoming more wide spread and in the long run to totally eradicate T.B. from the wildlife community. The long term effect that the Bovine T.B. situation will have on hunting within the area is not known.

In addition to deer hunting, small game hunting is very popular with the local residents of Alcona County, as well as with tourists. Grouse, woodcock, rabbit, waterfowl and squirrel attract these hunters due to excellent hunting conditions.

Riparian forests adjacent to streams and lakes provide critical habitat for many species of wildlife and reptiles. The land and water interface is a long narrow, sometimes meandering, edge habitat. In Alcona County as well as throughout Michigan, natural undeveloped lakeshore habitat is one of the most endangered habitats. There is a continuing trend for lake lot owners to clear brush, aquatic weeds, dead trees and live trees that interfere with a wide-open view of the water. The native vegetation is replaced with well manicured and chemically treated lawns down to the waters edge. This practice not only degrades critical wildlife habitat but also impacts water quality by diminishing the riparian zone's capacity to filter nutrients and its ability to stabilize shoreline erosion.

Birds that use floodplain habitat for feeding and nesting include the red shouldered hawk, barred owl, kingfisher, northern oriole, red-headed woodpecker, pileated woodpecker, woodcock, wood duck and great blue heron. Deer, raccoon, northern flying squirrel, water vole, mink and river otter also frequent these areas. Numerous species of amphibians and reptiles, such as turtles, frogs, snakes, salamanders and newts can all be found in river/flood plain areas.

The rivers and lakes in particular support much of the tourist industry in the County. Canoeing is a popular sport. Fishing for trout is very popular on most streams, with several lakes also having trout populations. The warmer lakes normally have bluegill, bass, perch and pike. Tiger musky have also been stocked in several lakes.

Threatened & Endangered Species

Alcona County is home to a number of plants and animals that are threatened, endangered or are of special concern as identified in Michigan Natural Features Inventory (MNFI) database. Michigan Natural Features Inventory (MNFI) is a program of Michigan State University Extension that works in close cooperation with the Michigan Department of Natural Resources and The Nature Conservancy. The following list presents the endangered or threatened plant and animal species which can be found in Alcona County, and which are protected under the Natural Resources and Environmental Protection Act of the State of Michigan (Part 365 of Public Act 451 of 1994, as amended). This list also includes plant and animal species of special concern. While not afforded legal protection under the act, many of these species are of concern because of declining or relict populations in the State. Should these species continue to decline, they would be recommended for threatened or endangered status. 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.

The most widely known of the endangered species is the Kirtland Warbler. The warblers utilize only young jack pine stands for nesting. In a natural unmanaged setting, jack pine forests are perpetuated by forest fires. During prehistoric times, wildfires would periodically sweep across the landscape, burning native pine forests and creating favorable seed beds for species like jack pine. In fact, jack pines need fire to open the cones and release seeds. According to the Natural Features Inventory, "The Kirtland's warblers' breeding range currently encompasses ten counties in Michigan's northern Lower Peninsula and four counties in the Upper Peninsula. They primarily overwinter in the 600 mile Bahama Archipelago, although, individuals also have been observed on surrounding island chains (Evers 1994).

The bulk of the breeding population, 93% of the singing males in 2001, resides in the Northern Lower Peninsula counties of Crawford, Ogemaw, Oscoda, Roscommon, and Alcona. During the breeding season, the Kirtland warbler is dependent upon large, relatively homogeneous stands of jack pine (*Pinus banksiana*) with scattered small openings. Warblers will start using a jack pine stand when the height of the tree reaches 5 to 7 feet, or at an average tree age of 5-8 years old. Nests are built on the ground, concealed in the low cover of grasses, blueberries, sweet fern, bracken fern, blackberry, trailing arbutus, and/or wintergreen. Once jack pines reach a height greater than 18 feet (approximately 20 years old), the lower branches begin to die and the ground cover changes in composition, thereby leading to unfavorable nesting conditions. (Evers 1994). Jack pines need fire to open the cones and release seeds. All managed jack pine stands are harvested and planted or seeded mechanically to create warbler nesting habitat. Occasionally, harvested sites may be burned prior to planting or seeding."

Table 2.1: Alcona County Element List			
Current as of 6/4/2003			
Scientific Name	Common Name	Federal Status	State Status
Accipiter cooperii	Cooper's Hawk		SC
Accipiter gentilis	Northern Goshawk		SC
Buteo lineatus	Red-shouldered Hawk		T
Calypso bulbosa	Calypso or Fairy-slipper		T
Carex albolutescens	Greenish-white Sedge		T
Carex frankii	Frank's Sedge		SC
Carex nigra	Black Sedge		E
Cirsium hillii	Hill's Thistle		SC
Cirsium pitcheri	Pitcher's Thistle	LT	T
Cypripedium arietinum	Ram's Head Lady's-slipper		SC
Dalibarda repens	False-violet		T
Dendroica discolor	Prairie Warbler		E
Dendroica kirtlandii	Kirtland's Warbler	LE	E
Dry northern forest	Dry Woodland, Upper Midwest Type		
Dry-mesic northern forest			
Emys blandingii	Blanding's Turtle		SC
Festuca scabrella	Rough Fescue		T
Gavia immer	Common Loon		T
Glyptemys insculpta	Wood Turtle		SC
Great blue heron rookery	Great Blue Heron Rookery		
Haliaeetus leucocephalus	Bald Eagle	PS:LT,PDL	T
Hardwood-conifer swamp			
Panax quinquefolius	Ginseng		T
Percina copelandi	Channel Darter		E
Planogyra asteriscus	Eastern Flat-whorl		SC
Poor conifer swamp			
Poor fen	Poor Shrub/herb Fen, Upper Midwest Type		
Prunus alleghaniensis var. davisii	Alleghany or Sloe Plum		SC
Pterospora andromedea	Pine-drops		T
Rich conifer swamp			
Sistrurus catenatus catenatus	Eastern Massasauga	C	SC
Sterna caspia	Caspian Tern		T
Trimerotropis huroniana	Lake Huron Locust		T
Wooded dune and swale complex			

Source: Michigan Natural Feature Inventory, MSU Extension.
*LE = Listed endangered, LT = Listed threatened, PDL = Proposed delist, PS = Partial status (federally listed in only part of its range), C = Species being considered for federal status.
** E = Endangered, T = Threatened, SC = Special concern.

Discharge Permits

Surface Water - National Pollution Discharge Elimination (NPDES) Facilities

Anyone discharging, or proposing to discharge, waste or wastewater into the surface waters of the State is required to obtain a National Pollutant Discharge Elimination System (NPDES) permit. The NPDES program is intended to control direct discharge into the surface waters of the State by imposing effluent limits and other conditions necessary which meet State and federal requirements. The NPDES program regulates pollutants discharged directly into waterways from wastewater sources. The lists below show NPDES permits issued in Alcona County. See **Table 2.2**.

Table 2.2 NPDES Permits in Alcona County			
Name	Address	Permit #	Expires
Alcona CRC-Black River Road	Black River Rd from US23 to Lakeshore Dr.	MIR111196	7/13/2014
Alcona CRC-Cedar Lake Road Reconstruction	Cedar Lake Road	MIR111643	1/3/2016
Alcona CRC- F-30	F-30	MIR111509	8/18/2015
Alcona CRC-Hubbard Lake Road	Hubbard Lake Road from Woodland Drive to Swede Road	MIR110788	7/8/2013
Alcona CRC-Mt. Maria Road	Mt. Maria Road from Ann Street to Hawes Twp. line	MIR110120	3/1/2012
Beckman Production Services Incorporated	various sites statewide	GW1510140	4/1/2015
Consumers Energy Company-Alcona Hydro Plt	Bamfield Road	MIG250377	4/1/2013
Harrisville WWSL	Clark Road	MIG580280	4/1/2014
MDOT-US-23	from Evvertte Rd north to Black River Rd.	MIR110635	3/24/2013
MDOT-US-23 North of Harrisville	960 ft N of Lakeshore Drive to 5,890 ft S of Lakeshore Dr.	MIR110727	5/27/2013
Rooney Contracting Co., Inc.	various counties statewide	GW1510085	4/1/2015
Viking Energy of Lincoln Inc. Suez Energy Generation NA	509 West State Street	MI0044407	10/1/2013
Source: MDEQ			

Air Discharge Permits

There are two Renewable Operating Permit (ROP) Air Discharge Permits issued in Alcona County. The ROP program is a national permitting system administered by each state. Each major source of pollution is subject to the program. A "major source" is a facility that is capable of emitting more than specific amounts of air contaminants.

- Viking Energy of Lincoln LLC, Village of Lincoln

Sites of Environmental Contamination

The Michigan Environmental Response Act (Part 201 of PA 451 of 1994, 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. A search of the Department of Environmental Quality's web site database found nine sites of environmental contamination in Alcona County.

Alcona County Contamination Sites

Site ID: 0100000

Site Name: Alcona County LF

Site Address: Hubbard Lake Rd.

City: Lincoln

Zip Code: 48742

County: Alcona

Source: Landfill

Pollutant(s): Lead Chlorides , Benzene Methylene , DCE

Score: 38 out of 48

Score Date: 10/4/2006

Township: 26N **Range:** 08E **Section:** 07

Quarter: NW **Quarter/Quarter:** SW

Status: Inactive - no actions taken to address contamination

Site ID: 01000004

Site Name: Iron Skillet Lincoln

Site Address: 101 Lake St.

City: Lincoln

Zip Code: 48742

County: Alcona

Source: Unknown

Pollutant(s): 1,2,4 TMB; Benzene; Ethylbenzene; Xylenes

Score: 18 out of 48

Score Date: 7/14/2005

Township: 27N **Range:** 08E **Section:** 36

Quarter: SW **Quarter/Quarter:** SE

Status: Interim Response conducted - No further activities anticipated

Site ID: 01000005

Site Name: Lincoln Vlg Hardware

Site Address: 901 N. Barlow Rd.

City: Lincoln

Zip Code: 48742

County: Alcona

Source: Unknown

Pollutant(s): Xylene Benzene , Ethylbenzene , Ethylene Dibromide

Score: 24 out of 48
Score Date: 7/14/2005
Township: 26N **Range:** 08E **Section:** 01
Quarter: NE **Quarter/Quarter:** NE
Status: Interim Response conducted - No further activities anticipated

Site ID: 01000006
Site Name: Somers Inc.
Site Address: 307 S Second St.
City: Lincoln
Zip Code: 48742
County: Alcona
Source: Gasoline Service Station
Pollutant(s): 1,2,4 TMB; 1,3,5 TMB; Benzene; Ethylbenzene; Naphthalene; Xylenes; Fuel o
Score: 31 out of 48
Score Date: 9/8/2006 8:50:31 AM
Township: 26N **Range:**08E**Section:**01
Quarter: **Quarter/Quarter:**
Status: Open - Leaking Underground Storage Tank Site Database

Site ID: 01000007
Site Name: Glennie Storm Drain
Site Address: Glennie Rd
City: Glennie
Zip Code: 48737
County: Alcona
Source: Unknown
Pollutant(s): Trichloroethene
Score: 19 out of 48
Score Date: 4/5/2004
Township: 25N **Range:** 06E **Section:** 16
Quarter: NW **Quarter/Quarter:** SW
Status: Inactive - no actions taken to address contamination

Site ID: 01000009
Site Name: Huron Tool
Site Address: 481 East State Street
City: Lincoln
Zip Code: 48742
County: Alcona
Source: Metal Stamping
Pollutant(s): Coolant sludge
Score: 17 out of 48
Score Date: 4/16/2004
Township: 27N **Range:** 08E **Section:** 36
Quarter: SE **Quarter/Quarter:** SW
Status: Interim Response conducted - No further activities anticipated

Site ID: 01000021
Site Name: Ron's Repair
Site Address: 2894 State Street

City: Glennie
Zip Code: 48737
County: Alcona
Source: General Automotive Repair Shop
Pollutant(s): Benzene; Ethylbenzene; Toluene; Xylenes
Score: 18 out of 48
Score Date: 4/5/2004
Township: 25N **Range:** 06E **Section:** 08
Quarter: SE **Quarter/Quarter:** SE
Status: Inactive - no actions taken to address contamination

Site ID: 01000028
Site Name: Viking Energy
Site Address: 507 W. State Street
City: Lincoln
Zip Code: 48742
County: Alcona
Source: Electrical Services
Pollutant(s): 1,2,4 TMB; 1,3,5 TMB; 2-Methylnaphthalene
Score: 33 out of 48
Score Date: 12/8/2003
Township: 26N **Range:** 8E **Section:** 01
Quarter: NW **Quarter/Quarter:** SW
Status: Interim Response in progress

Site ID: 01000029
Site Name: Lakeshore Terminal and Pipeline
Site Address: U.S. Highway 23
City: Harrisville
Zip Code: 48740
County: Alcona
Source: Petroleum Bulk Stations & Term
Pollutant(s): 1,2,4 TMB; 1,3,5 TMB; Benzene; Ethylbenzene; Naphthalene; Xylenes
Score: 31 out of 48
Score Date: 5/6/2005 3:08:04 PM
Township: 26N **Range:** 09E **Section:** 12
Quarter: **Quarter/Quarter:**
Status: Interim Response in progress

Site ID: 01000030
Site Name: State Park Grocery
Site Address: 302 S Huron Rd (US-23 South)
City: Harrisville
Zip Code: 48740
County: Alcona
Source: Grocery Store
Pollutant(s): 1,2,4 TMB; 1,3,5 TMB; 2-Methylnaphthalene; Benzene; Ethylbenzene; Naphthalene; Toluene; Xylenes
Score: 29 out of 48
Score Date: 8/8/2006 8:08:20 AM
Township: 26N **Range:** 09E **Section:** 13

Quarter: Quarter/Quarter:

Status: Open - Leaking Underground Storage Tank Site Database

Site ID: 01000033

Site Name: Glennie Mobil Service

Site Address: 3237 M-65

City: Glennie

Zip Code: 48737

County: Alcona

Source: Gasoline Service Station

Pollutant(s): 1,2,4 TMB; 1,3,5 TMB; Benzene; Ethylbenzene; Naphthalene; Toluene; Xylenes; sec-Butylbenzene

Score: 35 out of 48

Score Date: 7/28/2006 8:23:29 AM

Township: 26N Range:06ESection:16

Quarter: Quarter/Quarter:

Status: Open - Leaking Underground Storage Tank Site Database

Site ID: 0100003

Site Name: Harrisville Sport Center

Site Address: 216 S Huron Rd City: Harrisville

Zip Code: 48740

County: Alcona

Source: Auto Repair Services &Garage

Pollutant(s): 1,2,4 TMB; 1,3,5 TMB; Ethylbenzene; Naphthalene; Toluene; Xylene

Score: 35 out of 48

Score Date: 7/28/2006 7:53:56 AM

Township: 26N Range:09ESection:13

Quarter: Quarter/Quarter:

Status: (open) Leaking Underground Storage Tank Site Database

Site ID: 01000035

Site Name: Former Parts Manufacturing Company

Site Address: 609 South Second Street

City: Harrisville

Zip Code: 48740

County: Alcona

Source: Misc Manufacturing Industries

Pollutant(s): Acrylonitrile; Cr+6; Methylene chloride; Se; Ag; PC

Score: 35 out of 48

Score Date: 6/15/2005 12:46:48 PM

Township: 26N Range:09ESection:13

Quarter: Quarter/Quarter:

Status: Interim Response conducted