4.0 Natural Resources

The Little Traverse Bay region was settled and then developed over the years primarily due to its abundance of beauty and natural resources. When the area is referred to, usually one hears about the glistening blue bay, the inland lakes and rivers, the wooded hillsides, the variety of wildlife, or the depth of the snow. Be it for boating, swimming, skiing, golfing, hunting, biking, wildlife viewing or snowmobiling, resorters and tourists have been coming to the area for over 100 years. It is for these same reasons that the growth rate continues to escalate as more people are moving to the area to live in a place with high quality of life features.

At the same time poorly managed growth could threaten or diminish local quality of life. The more land is developed, the more impact it could have on rural and lake view sheds, water quality, forest lands, and wetlands. It is for this reason that Township residents and officials need to understand existing natural features in the Township before planning for the future. By understanding the climate, geology, topography, soils, forest cover, and water resources, growth can be directed into the least environmentally sensitive areas. A good analysis of natural features will enable the Township to understand the potential impacts of growth and preserve the essence of the community's character.

Climate

The climate in Northern Michigan is what has drawn people to the area for the last century. Moderate summers allowed visitors to escape the heat of the cities. Snowy winters provide winter recreation. At the same time, it is helpful to know the climate to understand building code requirements, utility depths, and planning for erosion control and energy usage. In general, Little Traverse Township experiences climatic differences like many of the coastal areas in Northern Michigan. The "Lake Effect" includes long winters that extend into spring, due to the cold temperature of the lakes, and late falls due to warm lake temperatures.

The Midwest Climate Center in Champaign, IL has collected weather data from 1961 to 1990 for various cities and villages throughout the State. The closest and most similar city to Little Traverse Township is Petoskey, and that City's climate data will be used in the following analysis.

The lowest average minimum temperature is in the month of February, being 14.6^{o}F, the maximum average for that month is 27.8^{o}F and mean is 21.2^{o}F. July is the month with the highest maximum temperature at 77.1^{o}F, the minimum being 58.5^{o}F and the mean being 67.8^{o}F.

The average annual precipitation for the area is 31.43 inches per year. September appears to be the wettest month of the year averaging over four inches of rain. The average annual snowfall is 110.6 inches. January is the most snowy month with an average of over 40 inches of snowfall. The snowfall averages can vary greatly from year to year, but in general there is snow cover in Little Traverse Township from late November to early April.

The last day of freezing temperatures in the spring, on average, is May 10 and the first day of freezing temperatures in the fall on average is October 16. The length of the season between these two freeze dates is 160 days. In contrast, the shortest growing season was 137 days, the longest was 190 days, and 90% of the time the season is 175 days between freezing dates in Spring and Fall.

Geology
The geology of Little Traverse Township, which is typical for Northern Michigan and Emmet County, will be described in terms of bedrock geology (sedimentary rocks underlying the glacial deposits) and the surface or quaternary geology (materials deposited by continental glaciers).

The bedrock underlying Little Traverse Township was formed 350 to 400 million years ago and was developed during the Middle Devonian age of the Paleozoic Era. More specifically, Little Traverse Township is located on the Traverse Group formation. Most of the tip of Michigan is made up of the bedrock formed in the Middle Devonian System. There are no known outcrops of this bedrock occurring in Little Traverse Township.

The surface geology of the Township developed 10,000 to 12,000 years ago through continental glacial activity. Numerous advances and retreats of the glaciers left a pattern of erosion and deposition. Little Traverse Bay was formed by a glacial lobe that, over time, widened and deepened an existing pre-glacial river basin. At the same time, many of the lakes, rivers, streams, and wetlands typical of the area were created by melting ice blocks from the glaciers that had been embedded within the soils.

Little Traverse exhibits these glacial characteristics. There are large hills in the northeast and northwest part of the township with large depressions on either side, making it fairly obvious where the glacial lobes were located. The large hills, which house two local ski areas, are made up of coarsely textured glacial till which consists of unsorted sand and gravel left by the glacier. These hills are called moraines.

The area separating these hills, which runs in line with Pleasantview Road up the center of the Township, is made up of glacial outwash sand and gravel and post glacial alluvium. Glacial till was deposited on fluvial terraces along glacial drainageways as well as in alluvial fans and in broad sheets flanking glacial end moraines.

The rest of the Township, around the Bay and inland lakes, is primarily made up of lacustrine (lake related) sand and gravel deposited along the glacial Great Lakes shoreline. In the very southwest part of the Township, dune sand is evident around the Menonoqua Beach Association properties, deposited by wind action.

Topography
Slope is another important development consideration. Steep access ways, erosion control issues, septic field limitations, and excavation costs are all concerns of development of steep slopes. Little Traverse Township ranges from lowlands along the shores of the Bay and between Crooked and Round lakes, to steep dunes, bluffs, and steeply rolling terrain.

According to the 1983 USGS Quadrangle Maps, the lowest point in the Township is along Little Traverse Bay between Wequestonsing and Ramona Park, being at 571’ above sea level. In general, the high water mark of Lake Michigan is known to be at 581’ whereas Crooked and Round lakes are approximately 590’ above sea level. The highest point in the Township is just south of the northerly Township Line near Nubs Nob ski area at 1280’ above sea level. The summits of Nubs Nob and the Boyne Highlands ski hills in Pleasantview Township are 1330’ above sea level.

Another interesting topographic feature of the Township is that the resorts along the Bay sit at approximately 595', but the highway, M-119 is at about 670'. A steep bluff of 75 feet separates the resorts from the highway and the rest of the community. On the north side of M-119 another hill begins, rising steeply another 165 feet in elevation. These elevation changes create some difficult building sites but at the same time make many properties desirable because they have a panoramic view of the bay. This creates growth pressures in some very ecologically sensitive areas.

Steep sand dunes, which rise more than 80 feet from the Bay, are common along the southern shore of the Bay. In the southwest part of the Township the land is nearly level between Crooked and Round lakes, with many wetlands, bogs, and rivers.

Soils

Soil characteristics are an important factor when planning for future land use. By understanding the soils capacities and limitations for development, sound planning for growth can occur. To best match sites to their development potential, areas that have severe limitations for development could be planned for conservation, recreation purposes, or low density use. Prime agricultural lands could be conserved for future food production lands while lands with a large carrying capacity for development could be considered for higher density housing and commercial purposes.

The United States Department of Agriculture Soil Conservation Service published the 1973 Emmet County Soil Survey, which was used for the following soil analysis. The majority of the County, mainly north of the M-119 / West Conway Road alignment, is made up of soils in the Blue Lake Series.

The Blue Lake soil series is a predominant soil in Little Traverse Township. This soil series is described in the soil survey as nearly level to very steep, well-drained soils. It is formed in loamy sand and sand and occur on till plains and moraines on predominantly undulating to hilly uplands. Blue lake loamy sand, with a 0 to 12 percent slope, is associated with ridges, knolls and foot slopes in the uplands. Most of these areas are or were at one time under cultivation. A few areas remain wooded. Blue Lake soils should be adequate for residential growth as there is only slight chance of septic limitations. But because of their rapid permeability, there is a chance of contamination of shallow water supplies.

Soils from the Blue Lake series with 18 to 60 percent slopes have very severe limitations due to the steepness of the topography. Usually these areas are kept wooded (except for the ski hills). The soils have a thinner profile than those with less slope and have severe limitations due to management of the steep slopes, erosion, and droughtiness. Septic limitations are also severe.

Blue Lake soils from 12 to 18 percent slope have moderate limitations, but with sensitive building practices they could be built upon; septic limitations are likewise moderate.

Along Little Traverse Bay, below the bluff in the areas dominated by resorts, the soil is primarily Tawas Muck of the Tawas Series. The Tawas series consists of very poorly drained organic soils. The soils generally occur in large natural drainageways on lake plains, outwash plains and moraines. These soils have severe limitations for septic tanks and because of the high water table there are limitations for low foundations. Most of the developed portions of this area are on a public sewer system.

The bluff area along M-119 and the adjacent areas on either side of West Conway road are made up primarily of Kalkaska - East Lake Loamy Sands with a 0 to 6 percent slope. This soil has a high susceptibility to erosion, an important note, due to the bluff line on which it sits. At the same time there is only a slight chance of septic limitations and the soil is well drained and good for low foundations.

The area between Crooked Lake and Round Lake are made up of many different soil groups, primarily of soils in the Thomas-Brevort-Iosco Association. These soils can have severe wetness issues in the spring and fall but can be used for farming of crops. Carbondale Muck, Brevort Mucky Loam, and Tawas Muck soils are mixed in near Round Lake, Crooked Lake and along natural drainages in the area. These soils can be very wet and have severe frost freeze problems. All of these soils have severe limitations for septic tanks and low foundations as the soils are very poorly drained with a high water table with moderate to rapid permeability.

The last soil group is the dunes located in the southeast part of the Township. This area is made up of Deer Park sand from 6 to 45 percent slopes. This area has been developed into the Menonoqua Beach Association. Much of the steep slope area is designated Critical Dunes by the MDNR, and has been donated to the Little Traverse Conservancy as the Menonoqua Woods Preserve. These soils are stabilized on the north, east, and south sides with tree covered slopes but the west sides are subject to soil blowing and erosion issues.

Prime Farmlands

After reviewing the soils, it is obvious that there is very little prime farmland in Little Traverse Township. There is some prime farmland, as designated by the USDA Soil Conservation Service, in the areas with Thomas and Iosco Soils. In this area there is one active farm, located just north of Powell Road in the southeast part of the Township. This farm is designated as a "significant agricultural resource outside of a farm community" in the *Emmet County Master Plan*. This means that the County has designated it as a farm that not only is active with prime soils, it has become part of the community and its image.

There are some "Additional Farm Lands" as designated by the USDA in the northwest part of the Township utilized for tree farms and such. The County has also designated some active nurseries and tree farms off Quick Road as "significant agricultural resources" that are important to the community image. It will be important to balance farmland preservation with residential development as many of the soils that are excellent for residential development are also excellent for farming.

In Michigan, under Public Act 116, a property owner can agree to keep land in active agricultural use for contract periods of 10 years. In exchange for agreeing to forego land conversion or development during the contract period, the land owner receives a preferential tax status. That is, land is taxed for its agricultural, not development, value. There is only one farmstead in Little Traverse Township included in a PA 116 contract. It is 160 acres in size, and is located in Section 23 of T35N-R5W.

Water Resources

Water is one of the most important resources in the community. Currently the water quality of both surface and ground water is very high in Emmet County and in Little Traverse Township. But without proper management, these critical resources could be damaged and have a dramatic impact on the community. Proper development and land use controls, education about pollution impacts, pesticide controls, septic tank inspection, greenbelt regulations, and soil erosion controls all can help manage, improve, and preserve our critical water resources.

Ground Water

Almost all of Little Traverse Township relies on ground water as their source of drinking water by individual or group wells. Water availability should not be a problem in Little Traverse due to sufficient water quantities. Due to a confined aquifer under a great deal of pressure, there are many artesian wells in the area near Little Traverse Bay and Crooked Lake.

According to the District #3 Health Department, typical domestic well depths range from 50' to 450' in mostly sandy gravel, sandy clay, and sand. There are no known problems regarding the ground water quality or quantity. Well yields range from 15 to 40 gallons per minute per well, which is more than adequate for domestic use.

A review of the "Aquifer Vulnerability to Surface Contamination in Michigan" map prepared by the Center for Remote Sensing and Department of Geography at Michigan State University shows that most of Little Traverse Township has highly permeable soils over highly sensitive drift lithology or unknown drift lithology. Health Department representatives stated that they are issuing permits in the Township at record rates, and although there are no water quality concerns at this time, precautions should be taken when developing in the permeable soils and on steep slopes.

Surface Water

Little Traverse Township has over three miles of Lake Michigan shore line, and over a mile of Crooked Lake shore line within its bounds. Crooked Lake surface water is described as good to very good by the Tip of the Mitt Watershed Council. There are no rivers in the Township, as shown on the USGS map, but there are many seeps and springs that run from the hillsides to the lakes.

When working to effectively protect surface water resources, it is important to consider protection measures for the entire watershed. Little Traverse Township is split, almost down the middle, between the Lake Michigan / Lake Huron Watershed Divide. Therefore in the west half of the Township water runs to Lake Michigan and in the east half of the Township waster runs to Lake Huron via the Cheboygan River Watershed through various courses including sub-watersheds of Round Lake, Crooked Lake, and the Maple River. (See **Figure 4-1**, Watershed Map).

The Northeast Michigan Council of Governments and the Tip of the Mitt Watershed Council worked together to develop the *Crooked-Pickerel Lakes Watershed Non-Point Source Pollution Management Plan*. This plan found that the projected sources of sediment into the watershed (in order from most detrimental to least) include changing land use, stormwater, agriculture, shoreline management, road/stream crossings, and then logging. It found that sources of nutrients into the watershed included shoreline management, changing land use, agriculture, stormwater, logging, and then road /stream crossings. This information shows that better land use practices can help the community preserve vital water resources.

Wetlands

Wetland is an area of land that water is found either on the surface or near the surface. Wetlands can be called a marsh, swamp, or bog. In the past, wetlands were considered wastelands and many were filled for development. But in more recent history, there has become an awareness of the important benefits of wetlands to our entire ecological system, as follows:

Figure 4-1 Watershed Map

- Wetlands help to improve the water quality of our lakes, rivers, and streams by acting as a filtering mechanism. Wetlands can be storm water drainage areas which can prevent flooding.
- Wetlands can act as discharge/recharge aquifers for our ground water resources.
- Wetlands provide important habitat for fish and wildlife.
- Wetland plant life control erosion along our shorelines.

In Little Traverse Township most of the wetlands are located in the drainageways along Little Traverse Bay and next to Round Lake and Crooked Lakes (see **Figure 4-1**, Existing Land Use Map, for wetland areas). MIRIS wetland information was not verified by field inspection and thus those shown on the map may not meet State and Federal criteria as a regulated wetland. However, the information is still valuable for general land use planning purposes.

It is interesting to note that construction of highways in the Township has caused some blockage of natural drainage, and created several wetland areas through this blockage.

Woodlands

Woodlands are found throughout the Township and play an important role in quality of life of visitors and residents alike. Woodlands can moderate the affects of flooding, block excessive noise, control erosion caused by storm water run-off, improve air quality by absorbing certain air pollutants, and create recreational opportunities. According to the Township's land use survey, approximately one quarter of Township land is presently forested (see **Figure 4-1**).

In the Northeast part of the Township, Mackinaw State Forest Lands are managed by the MDNR. Additionally, approximately 1050 acres of registered Commercial Forest Land in the Township is privately owned, managed for forestry purposes, but available for certain recreation uses. In total, the upland forests make up 24 percent of the total land cover of the Township and are made up primarily of maple, beech, oak, white and yellow birch, poplar, basswood, ironwood, white ash, pine, hemlock and spruce.

The lowland areas along the water's edge as well as between Crooked and Round Lakes, is made up of lowland forests. Lowland forests and wetlands make up approximately five percent of the total land cover of the township and include such water tolerant forest species as Tamarack, Cedar, and Willow.

Scenic Viewsheds

Scenic viewsheds are a very important part of what creates a "sense of place" for a community. It is these very viewsheds, often taken for granted, that create a visual image of home. Viewsheds become integral to a community's identity, as they are often used when describing a place or photographing a community. Most often, properties within viewsheds are privately owned. It is usually not until these properties begin to be developed that a community realizes how important views are to community image.

It is important to inventory viewsheds in the planning process in order to manage growth impacts on them in a way that will preserve their integrity. The following list describes the location of the important Township viewsheds.

- US-31 along Crooked Lake – Viewshed of the Lake and Oden Island along highway and Township parks.
- Intersection of M-119 and Pleasantview at former Township Hall site, view of airport and Little Traverse Bay.
- Quick Road east and west of Emmet Heights Road, rural open space, tree farms
- Powell Road, rural farmlands
- Beach Road, tunnel of trees
- Little Traverse Bay- view from the water of the Township, including the rural landscape of the resorts and wooded hillsides.
- Lake and river views
- Panoramic views, taking advantage of topographic variation
- Rural views, including farm and forest land

Wildlife
There is an abundance of wildlife in Little Traverse Township typical of Northern Michigan including deer, rabbit, grouse, squirrel, fox, raccoon, mink, muskrat, turtles and various populations of birds. Little Traverse Bay and Crooked Lake are good for recreational fishing; Crooked Lake is dotted with ice fishing shanties in the winter months. Fish species include trout, salmon, bass, pike, pan fish and gar pike; a healthy, diverse, well-balanced fishery.

Environmental Concerns
The Michigan Department of Environmental Quality (MDEQ) publishes an annual list of both environmentally contaminated sites (Act 307 sites) as well as the location of leaking underground storage tanks (LUST). According to December 1998 list, there were no Act 307 sites in the Township, but there is one 307 site just east of the Township line at what was the Littlefield Township Dump. This site drains into the Crooked Lake Watershed and could affect the ground water resources in the area as well as the surface water of Crooked Lake.

There were no open LUST sites and only two closed LUST sites (meaning they have been remediated) listed in Little Traverse Township. There were a few open LUST sites within the City of Harbor Springs, Littlefield Township and Pleasantview Township, not far from the Little Traverse Township lines. These sites should be monitored to make sure they are remediated.

There is one point source of pollution in Little Traverse Township which is a leaking sewage pond at the Harbor Springs Area Sewage Disposal Authority off Clayton Road (HSASDA). HSASDA is working with the MDEQ to fix the problem. They plan to put a new lining in the pond in the future. Just northeast of the Township line in Littlefield Township, there is a known point of pollution, the MDNR Oden Fish Hatchery which diffuses phosphorus into the watershed. The MDNR has been working on remediating this problem as well.

Summary
Little Traverse Township has an abundance of natural resources that are integral to the Township's livelihood and quality of life. Although these resources are relatively intact, the continued growth pressure causes concern that without sound land use planning that these resources could be dramatically impacted. When creating the planning goals, future land use plan, and steps for implementation, these natural features, must be considered and protected.