

CHAPTER 3: NATURAL RESOURCES AND ENVIRONMENT

SUMMARY

Natural features, such as wetlands, woodlands, lakes, and streams help shape community identity. This is especially true in Antrim County. New land developments can significantly impact natural features and consequently impact community character. The purpose of this section is to describe the significant natural features that exist in Antrim County.

This information will help the Antrim County Planning Commissioners recommend development into areas which are the least environmentally sensitive and minimize adverse impacts to these areas.

The natural features discussed in this chapter include: geology, topography, soils, climate, wetlands, lakes, rivers, streams, watersheds, fisheries and wildlife, vegetation, groundwater, extraction sites, the sky, and the environment.

PHYSICAL FEATURES (Surface characteristics that give shape to a community)

Geology

The surface geology, like much of Northern Michigan, is characterized by upland areas or moraines, coastal areas and lakebeds, dunes along Lake Michigan, and outwash and glacial channels.

Topography

The surface topography in Antrim County ranges from flat marshy areas to very steep and rolling hilly sections. The highest point in the county is approximately 1,460 feet above sea level, which is located in the extreme southeast corner of Antrim County. The lowest surface elevation is the lake level in Grand Traverse Bay that averages 580 feet above sea level (see Map 3-1, Antrim County Topography).

As depicted on Map 3-2, there are several areas that have slopes exceeding 15%. These areas are located primarily in Kearney, Forest Home, Echo and Banks Townships. Much of the eastern shore line along Torch Lake also has steep slopes.

Soils

Generally soils in the area tend to be sand, acidic, and low in fertility. Upland soils are characterized by Kalkaska-Montcalm soils, which are well-drained, nearly level to very steep, sandy soils on hills, ridges, and knolls. According to the 1978 United States Department of Agriculture Soil Survey, soils along rivers, streams and riparian to lakes are often characterized as Tawas-Ensley-Roscommon soil types that are considered very poorly drained, nearly level, mucky, loamy, and sandy soils in depressions on plains. See Map 3-3, Antrim County Soils and Map 3-4, Antrim County Drainage Classification.

Climate (Michigan Department of Agriculture's Climatologic Division provided this data)

In winter months, the temperature ranges in the high to mid-20's for an average high and the average low temperature is in the mid-teens. During the growing season, the average highs are about 70 degrees and the lows are near 50 degrees at night. The temperatures are modified in the spring and fall from the lake effects. This "Great Lake effect" provides cooler temperatures in the spring and warmer temperatures in the fall. This temperature modification makes for more ideal conditions for the production of specialty crops such as cherries and grapes.

Growing degree-days are equivalent to the "heat units." During the month, growing degree-days accumulate by the amount that the average temperature each day exceeds a base temperature (50 degrees F). The normal monthly accumulation is used to schedule single or successive plantings of a crop between the last freeze in spring and the first freeze in fall. The scheduling of pesticide application is also based on degree days.

The total annual rainfall ranges from 30 to 33 inches. Of this rainfall, 18.7 inches usually fall in April through September. The growing season for most crops falls within this period. Evaporation generally exceeds rainfall during the growing season.

The average seasonal snowfall, as recorded by the Road Commission is 156 inches and the winter storage of water in the root zone is important for the production of forest and agricultural crops for the upcoming year. Thunderstorms occur on approximately 31 days of each year.

The average relative humidity in mid-afternoon is about 63%. The sun shines 75% of the time possible in summer and 40% in winter. The prevailing wind is from the southwest. Lake Michigan on the western portion of the County impacts the weather for an average distance of 10 to 15 miles inland.

In the west half of the County, the presence of Lake Michigan tends to lessen extremes in temperature and creates a climate favorable to the growing of fruits. The inland lakes and soil conditions of this western area permit such types of agriculture not otherwise feasible at this high latitude. During the summer, the off-the-lake air currents tend to prevent high temperatures and maintain humidity. In the fall, they retain heat and in the spring retard premature growth with the cold retained in the lakes.

Wetlands, Lakes, Rivers, and Streams

Antrim County has more than 31,000 acres of inland water area (lakes, rivers and streams), and more than 6,500 acres of wetlands. Based on the information presented in Land Use Changes 1978 to 1998 section, Antrim County gained 113 acres of water acreage and 130 acres of wetland acreage. Because of the relatively small size these acres changes, it is suspected the gain in acreage may reflect a higher water table in 1998 compared to 1978. Future land studies will allow acreage comparisons as a means of verifying the size of these areas.

It is estimated that wetlands make up 2% of Antrim County (see Map 3-5, Wetlands). Wetlands are a part of floodwater control, groundwater recharge and discharge, water quality, sediment entrapment, shoreline stabilization, fish and wildlife habitat, and recreation. Although regulated by the 1994 Natural Resources and Environmental Protection Act (NREPA), wetland environments can be impacted by draining and filling practices. Forest fractionalization, residential construction, golf course construction, and roads continue to affect the wetlands in the area.

Wetlands contain many species of plants and animals whose survival depends on this unique environment. Compared to other kinds of ecological areas, they may be no more or no less important to the health of the larger ecosystem. However, because they are often associated with lake, river and stream shorelines, they have received considerable attention as the pressure to develop along these shorelines increases.

The Natural Resources and Environmental Protection Act defines a wetland and describes what types of activities are permitted on or adjacent to a wetland. The United States Army Corps of Engineers and the Michigan Department of Environmental Quality (MDEQ) regulate water and wetlands that adjoin the Great Lakes. Permits from these agencies are required prior to development on a property that has a wetland, as defined by the MDEQ and/or Army Corps of Engineers.

There are 76 inland lakes in Antrim County, with more than 25 miles of Great Lakes shoreline. The streams total 264 miles in length and most are high quality fishing

streams (see Map 3-6, Antrim County Lakes, Rivers, and Streams). The lakes and rivers in Antrim County comprise of an area of nearly 20,480 acres.

The headwater for the Jordan River is in Antrim County and it flows all but two miles in Antrim County. Over 30,000 acres of state forestlands border this river.

The Manistee River, part of the Upper Manistee River watershed, is located in the northwestern portion of Michigan's Lower Peninsula. It has a drainage area of 590 square miles. The watershed includes parts of five counties: Antrim, Otsego, Crawford, Kalkaska and Missaukee. The mainstream is approximately 78 miles long and originates in southeast Antrim County (approximately six miles from the village of Alba), at an elevation of 1,250 feet.

Quick Note
Antrim County has over 155 public access sites on most of the 76 inland lakes and Grand Traverse Bay.

The Cedar River known as “A Blue Ribbon Trout Stream” is a popular fishing area. It flows mostly westward through Antrim County into the Intermediate River in Bellaire. The Cedar River rises in southwest Chestonia Township, near the boundary with Mancelona Township.

Chain of Lakes (*the following information was derived from Fish of the Elk River Chain of Lakes publication*)

A key natural resource in Antrim County is the Chain of Lakes, commonly referred to as the Chain ‘O’ Lakes by the locals. The Chain of Lakes has over 200 miles of shoreline and almost 60 square miles of water. This continual connection of water embraces 14 lakes and interconnecting rivers. In addition, there are more than 200 high quality groundwater fed tributaries (many of which are trout streams such as the Cedar and Rapid Rivers).

The 14 lakes include: Beals, Scotts, Six Mile, St. Clair, Ellsworth, Wilson, Benway, Hanley, Intermediate, Bellaire, Clam, Torch, Skegemog, and Elk.

Beals Lake is 41 acres, has a maximum depth of 16 feet, a mean depth of 10.2 feet, and is 0.50 miles long. It is the uppermost lake of the chain and is also the smallest.

Scotts Lake is 63 acres, has a maximum depth of 30 feet, a mean depth of 13 feet, and is 0.70 miles long. At this time, this is the only lake that does not have a public boat launch.

Six Mile Lake is 378 acres, has a maximum depth of 31 feet, a mean depth of 13 feet, and is 4 miles long. This lake has more tributaries than any other lake in the chain; however most of the tributaries are unnamed.

St. Clair Lake is 91 acres, has a maximum depth of 32 feet, a mean depth of 10 feet, and is 1.25 miles long. This lake was once known as Campbell Lake.

Ellsworth Lake is 120 acres, has a maximum depth of 42 feet, a mean depth of 17 feet, and is 1.6 miles long. At one time, property abutting Ellsworth Lake was the highest-ranking ground water contamination site in Michigan. The fish and other aquatic wildlife

were found to contain contaminants, but in low levels. This site was cleaned by the Michigan Department of Environmental Quality.

Wilson Lake is 106 acres, has a maximum depth of 48 feet, a mean depth of 11.5 feet, and is 1.4 miles long. Much of the west shore is undeveloped because of a railroad right-of-way that existed until the 1980s.

Benway Lake is 131 acres, has a maximum depth of 42 feet, a mean depth of 15 feet, and is 1.1 miles long. Similar to Wilson Lake, much of the west shore is undeveloped because of a former railroad grade.

Hanley Lake is 93 acres, has a maximum depth of 27 feet, a mean depth of 10.6 feet, and is 1.5 mile long.

Intermediate Lake is 1,520 acres, has a maximum depth of 80 feet, a mean depth of 28 feet, and is 8 miles long. This lake was once known as Central Lake. A 1999 survey found that this lake's fish population appeared to be in excellent shape. This is a popular fishing and boating spot.

Lake Bellaire is 1,793 acres, has a maximum depth of 95 feet, a mean depth of 42 feet, and is 4.5 miles long. This lake was once known as Grass Lake and has deemed to be moderately productive. This is a popular fishing and boating spot.

Clam Lake is 439 acres, has a maximum depth of 27 feet, a mean depth of 13 feet, and is 3.25 miles long. This is another popular site in Antrim County. The majority of the banks have been developed with homes, restaurants, and marinas.

Torch Lake is 18,473 acres, has a maximum depth of 302 feet, a mean depth of 140 feet, and is 18 miles long. It was called "Was-Wah-go-nink" or "lake of torches" by the Native Americans, reference being made by the use of torches in spearing of whitefish and trout. Torch Lake is commonly known as one of the worlds most beautiful lakes in the world.

Skegemog Lake is 2,560 acres, has a maximum depth of 29 feet, a mean depth of 12.4 feet, and is 3.7 miles long. Approximately 80% of the shoreline property parcels have been developed. Skegemog Lake the home of the lake sturgeon, muskellunge, and walleye among others, providing fishing and ice fishing activities in Antrim County.

Elk Lake is 7,730 acres, has a maximum depth of 192 feet, a mean depth of 71 feet, and is 9 miles long. This lake divides the Village of Elk Rapids and is a popular boating spot. It also has a high level of calcium carbonate; therefore, it is nutrient rich, which creates a minimal amount of aquatic plant growth.

Grass River and Grass River Natural Area

The Grass River is 2.5 miles long and connects Lake Bellaire to Clam Lake. Its overall watershed is about 175 square miles. It has been deemed one of the most scenic spots along the Chain of Lakes. It flows through an expansive marsh and dense conifer swamp. Most of the river is undeveloped and is protected by the Grass River Natural Area, a 1,325-acre Antrim County preserve, which, in addition to the river, includes over a mile of Clam Lake shoreline, a half mile on the Intermediate River, and two miles on

Lake Bellaire. The Natural Area's trail guide lists 49 species of mammals, 33 species of reptiles and amphibians, 65 species of birds, and more than 400 species of plants.

The Grass River Natural Area, Inc. administers the area under contract with Antrim County. More information regarding recreational and educational activities is available at www.grassriver.org.

Watersheds

A watershed is a land area, also known as a drainage area, which collects precipitation and contributes runoff to a receiving body of water or point along a water course. In the southern corner of the County is the headwater area of the Manistee River Basin. The Manistee River drains southwesterly to Lake Michigan, and drains approximately 30-40 square miles of Antrim County.

The Jordan River originates in Antrim County, flows westerly then north into Lake Charlevoix at East Jordan. The Jordan River drains approximately 127 square miles in Antrim and Charlevoix counties.

The largest watershed in Antrim County is the Elk River Chain of Lakes Watershed, which supplies 60 % of the water flowing into the Grand Traverse Bay each day. The Elk River Chain of Lakes Watershed covers an area of about 316 square miles or 202,060 acres in Antrim, Charlevoix, and Kalkaska Counties. Over 90 % of the Elk River Chain of Lakes Watershed is in Antrim County. A small area in the northeast corner of Antrim County contains portions of the Boyne Watershed. There is 81 acres of the South Arm of Lake Charlevoix Watershed in the northern tip. See Map 3-7, Antrim County Watershed for their locations.

Fisheries and Wildlife

Antrim County offers the sport fisherman an abundance of fishing opportunities with over 264 miles of quality fishing streams. This area is a focal point for trout and salmon fishing. With the introduction of the salmon into Lake Michigan in the mid 1960's came a fishery-industry that is unsurpassed in fresh water fishing. Fish and wildlife in the Antrim County area is an important industry and reflects the importance of maintaining a high level of water quality.

Hunting for whitetail deer attracts many people to the county annually. The deer harvest in Antrim County is approximately 2,000 – 4,000 annually. The stag or buck harvest is approximately 1,600 annually.

A variety of habitat also provides the hunter with good ruffed grouse, woodcock, squirrel, rabbit, and turkey hunting opportunities. Other game species of importance to trappers are bear, beaver, otter, muskrat, raccoon, opossum, skunk, red fox, coyotes and weasel.

An environmental review through the Michigan Natural Features Inventory database (MNFI) identified 15 threatened species and 9 species of concern that exist within Antrim County. The MNFI is continuously updating this information.

Vegetation

More than half of Antrim County is forested; (180,000 acres or 282 square miles). The land use study discussed in Chapter 2 shows that an additional twenty thousand acres became an established forest during this time period. This occurred from the natural ecological succession from grass and shrub land and from the loss of farmland. Most of the forest in Antrim County is privately owned and it is the largest single natural resource.

Commercial Forest Land

Antrim County has 4,938 acres enrolled in the Commercial Forest Act as of 2001. The Commercial Forest Act was enacted in 1925 as a way to encourage management of private forestlands and production of forest products. Landowners interested in long-term forest management can enroll their land through a process administered by the Michigan Department of Natural Resources and the local county agencies. Land enrolled is put on a special tax roll and annual property taxes are substantially reduced. Land must be 40 contiguous acres or more, have no buildings and not producing any income other than forest products. Land shall be open to public hunting and fishing. It is not otherwise public and users must obey and respect private property rights. There is a withdrawal fee and a substantial penalty to remove lands from listing. Information can be obtained at local DNR offices and on the DNR web site at www.dnr.state.mi.us and proceeding to Forest Management.

Antrim County Owned Forest Lands

Antrim County has approximately 2,745 acres of land classified as Antrim County Forest Land. Antrim County received most of these parcels from the State of Michigan in the 1930’s under what is now PA 451 NREPA. Most of the land was considered tax reverted land and deeded to the County to be utilized for “forestry purposes”. It is understood that the term “forestry purposes” relates to the management of these parcels for the production of forest products as well as forestry education within the community. Additionally, recreational activities such as hunting, fishing, hiking, snowmobile and other low impact uses are permitted on the parcels. Antrim County Forest Lands are administered by the Antrim Conservation District Forester through the County Lands, Agriculture, and Forestry Committee under the supervision of the County Commissioners, see Map 3-8, Antrim County Managed Areas.

Forest Lands in Antrim County contain the following species:

Northern Hardwood Forest	1,669 acres	60%
Pine Forest	317 acres	11%
Aspen Forest	249 acres	9%
Lowland Conifer Forest	292 acres	10%
Upland brush/open	85 acres	3%
Oak Forest	120 acres	4%

SUBSURFACE TRAITS (Underground elements that impact community design...)

Groundwater/Wells

Groundwater in varying amounts can be found from both glacial drift and in the various kinds of bedrock geology found in Antrim County. Map 3-9 shows the Groundwater Contours and Wells.

The quality of the water from the water-bearing aquifers varies considerably. Some nitrate testing has been completed to determine the movement and possible sources for contamination. Additional monitoring and sampling should be completed to thoroughly comprehend the complexity of the groundwater resource. Protection of our wellheads should be addressed in all areas of the county to help maintain the integrity of our groundwater.

Surface Water

Surface water has the same concerns as groundwater. Most surface water pollution stems from cleaning products, automotive fluids, paints, and yard products. Old storage tanks for gasoline and other fuels can leak, old dumpsites, and businesses can produce hazardous or toxic substances. With our sandy soils, steep slope concerns, and close groundwater to surface water levels, it is easy to see how such materials can cause major clean-up problems and possibly health issues.

Extraction Sites

Oil and natural gas sites are regulated by the State. Individual homeowners may sign individually with companies regarding the use of their own private property. Drilling on publicly owned property produces revenue for the Michigan Natural Resources Trust Fund that provides funds for development and land acquisition throughout the state.

Sand and gravel pits are governed by State Law, however those townships and villages within Antrim County that have chosen to be “zoned” also have the right to have local ordinances that will address the proper use for extraction sites in their particular location. Therefore, permits must be secured prior to any operation desired. Antrim County permits are issued through the Antrim County Soil Erosion Control Officer. There are approximately 21 sites throughout the County.

ABOVE GROUND ATTRIBUTES (Night Sky Visibility)

The ability to view the stars at night is an essential rural characteristic for Antrim County. An abundance of artificial light from the ground will deter this objective. Antrim County residents have expressed their concerns in preserving this view. Many surrounding communities are now concerned with growth and the growing amount of night illumination to the rural skies and have introduced ordinances to that effect.

ENVIRONMENT

It is worth noting that the Great Lakes states (including Michigan) contain one-fifth of the entire world supply of fresh water. Researchers predict that fresh water will be the most

precious commodity on the planet by the year 2017.

Over the past few decades, there have been two major groundwater contaminations in Antrim County. In response to this the nonprofit Community Resource Development, Inc., helped initiate and facilitate grass roots community driven environmental advocacy in order to effectively respond to the existence of a major Super Fund site (Tar Lake) and a five and one-half mile groundwater contamination plume originating from that site.

Several solutions, over the period of several years, resulted from grass roots community organizations and advocacy. First, the EPA invested over fourteen million dollars in the clean up of, and the removal of 47,000 tons of contaminated material from a ground depression on the Tar Lake site. Secondly, the MDEQ installed a bio sparge system to remediate the groundwater moving off the site. Third, subsequent to CRD facilitating the creation of the Mancelona Area Water and Sewer Authority (MAWSA), the MDEQ committed 6.5 million dollars for the construction of a regional water system to provide safe water to all the properties affected by the Tar Lake and the TCE groundwater contamination plumes.

The TCE plume was discovered in 1997, runs parallel with the Tar Lake plume, and is approximately 6 miles long (the distance between Mancelona and the Cedar River). CRD is currently facilitating another grass roots coalition of community, state and national stakeholders called Antrim County United Through Ecology (ACUTE). ACUTE is working with MDEQ and EPA in identifying and advocating for solutions to the TCE plume. These initiatives serve as examples in order to illustrate the emerging and important role that grass roots activism has and can continue to play in the contest of protecting and preserving the natural resources.

IMPLEMENTATION: (What should be done next?)

1. Provide a countywide wetland educational program open to all property owners that would emphasize the legal definitions and uses of these properties.
2. There is a need for a comprehensive study of the water levels of the Chain of Lakes. In recent years there have been complaints from various lake front owners on the chain regarding the lake levels. Often these complaints come from owners located on the upper part of the chain or those along connecting rivers. Because these lakes are not allowed to naturally 'flush' all the way to Lake Michigan at Elk Rapids, natural sedimentation is a constant issue. It is recommended that various agencies of the state and federal government should be contacted for financial help and guidance for such a study.
3. The County should encourage grass roots activism to actively support and engage directly in the process. Bottom up collaboration between the counties, villages, townships, environmental advocacy groups, and ultimately the state and federal government could be facilitated and directly supported by the County.
4. Work with the County Forester to develop a tree planting plan. This plan should discuss the environmental, scenic, and financial benefits of hardwood trees to Antrim County. It should also have an outreach component.
5. Contact the Department of Environmental Quality and environmental consultants to pursue a Wellhead Protection Program.
6. Designate an area for an Environmental Green Industrial Park.