

CHAPTER 6

NATURAL RESOURCES AND THE ENVIRONMENT

INTRODUCTION

Few locations within the State of Michigan, or the United States as a whole, are so rich in the quality and variety of natural resources as Leelanau County. These resources include abundant high quality water resources, unique and sensitive environments, world class dunes, extensive wetlands, rolling hillsides, woodlands, special flora and fauna, and more.

The natural resources of the County are vitally important in providing a strong and healthy environment. The quantity and quality of natural resources throughout the County are the fundamental reasons for living in the County. Also, they are critically important to the economy as its tourist industry thrives upon the County's natural landscape.

Future growth and development will place increasing pressures upon the quantity, integrity and solitude of the County's natural resources. If the current resources are to be protected for future generations, and yet still be "utilized" for economic benefit, purposeful actions must be taken to assure a healthy balance between growth, development, and the County's natural environment. The **Leelanau General Plan** recognizes that a healthy sustainable economy depends upon a healthy environment. The plan further recognizes that maintaining environmental quality and improving the local economy need not be conflicting objectives, and are in fact, mutually reinforcing.

ISSUES

The principal issues related to natural resources and the environment include:

- air quality
- water quality
- groundwater quality
- woodland and hillside development
- protection of sensitive natural features
- farmland protection
- wildlife protection



Sleeping Bear Dunes

Air Quality

Air quality in the County is quite high, but it is lower than it used to be. This is largely due to ozone pollution. Ozone is a gas formed when certain vehicular and industrial pollutants react in the presence of heat and sunlight. The ozone gas is an irritant and causes respiratory problems in humans. Evidence suggests that it is industrial activities from outside of Michigan which pose the greatest ozone threats. Major concentrations of smog (which heighten ozone levels) cross Lake Michigan from the Greater Chicago Area.

Approximately 60% of the mainland portion of the County rests upon "sensitive" aquifers.

Water Quality

More than two dozen creeks and rivers assist in collecting stormwater runoff and carrying it to inland lakes as well as to Lake Michigan and Grand Traverse Bay. These creeks and rivers reflect a far wider quality range than do the lakes in the County, though it can be said that the rivers and streams are of relatively very high quality. With two small exceptions, all water courses in the County are designated trout streams, an indication of their high water quality level. There are, however, portions of major water courses, including Houdek Creek, which are currently showing the negative impacts of land use and development activities. Sedimentation and agricultural chemicals are principal threats facing streams today. Best management practices to minimize the negative impacts of stormwater runoff are needed. Additional monitoring is also needed.



Leelanau State Park

Groundwater Quality

Groundwater is the unseen water resource and one which nearly the entire County is dependent upon for potable water. This reliance for basic human health rests on a fragile resource at best. Approximately 60% of the mainland portion of the County rests upon "sensitive" aquifers. These underground water resources are overlain by highly permeable soils and thus easily susceptible to contaminants leaching down from the land surface (septic system leachate, petroleum spills, other hazardous spills, etc.). See Map 6-1. Even those aquifers which are somewhat better protected by being situated below low permeable clay soils or rock are vulnerable to contamination if adjacent aquifers become contaminated as underground water often flows freely between aquifers. Currently, there are 134 sites of contamination in the County where serious surface and groundwater contamination has been discovered, as listed by the Michigan Department of Environment, Great Lakes & Energy (EGLE). One of the sites, the former Grand Traverse Overall Supply, is included in the Environmental Protection Agency's National Priorities List (Superfund Site), which identifies the contaminated sites that are most dangerous to human health. New sites are being discovered yearly throughout Michigan. While attention is being focused on uncovering and cleaning up contaminated sites in the County, it is equally important that steps be taken to prevent the creation of new contamination sites.

Seven of the County's largest lakes are classified as oligotrophic, the highest of three lake quality classifications related to water biological productivity.

Future growth and development in the County could further jeopardize groundwater and surface water resources. The lack of uniform stormwater management techniques to control erosion and sedimentation leads to further degradation of lakes and streams as does the practice of inappropriate application of fertilizers and pesticides. The lack of a comprehensive septic system monitoring and of an improvement program continues to allow inadequately treated human waste to enter the County's lakes and groundwater resources. In most areas, the lack of a well established monitoring program to provide baseline data and benchmarks of current water quality conditions makes future water quality data that much more difficult to decipher. The collection and compilation of well records and other water quality data into the county's GIS system will be a major step forward.

Woodlands and Hillsides

Woodlands and hillsides are abundant natural resources throughout the County. Shaping the rural character of the County, woodland stands are often found covering the County's rolling terrain. See Maps 6-2 and 6-3. The hillsides, at times in combination with the woodlands, are the focus of many dramatic vistas and define many of the visual corridors throughout the County.

The woodlands provide habitats for much of the County's animal and plant life and provide economic returns through harvesting and regeneration. These resources may become increasingly threatened as growth

All water courses in the County are designated trout streams, an indication of their high water quality level.

often make woodlands and hillsides attractive home sites. As increased residential development occurs, incremental encroachment upon the hillsides and woodlands can be anticipated. At present only very limited county and local programs effectively preserve the functional and aesthetic values of these resources.

Sensitive Natural Features

The abundance of the County's more common resources, including clean air, water, woodlands, and hillsides, is nearly matched by abundant sensitive environmental resources. Floodplain areas provide for the retention of runoff associated with heavier rains. In accommodating periodic heavy runoff flows, the floodplains in the County support special plant and animal ecosystems dependent upon the floodplain environment. While floodplain areas in the County are few due to the limited number of major rivers, abundant lake waters, and the sandy soils, they are particularly vulnerable to changes in land use.

Wetlands include marshes, swamps, and other usually low areas between dry land and open water. Wetlands provide a multitude of vital benefits. They serve as filters which minimize the amount of organic materials and sediments discharged into streams and lakes while at the same time they retain stormwater runoff and limit flood impacts. Wetlands also provide ideal habitat for wildlife and are vital links in the County's overall ecosystem. The sensitivity of this resource is perhaps best illustrated by the fact that even minor changes in the water levels of marshes, swamps, and other wetland environments can dramatically impact the quality of the wetland resources and their long term viability.

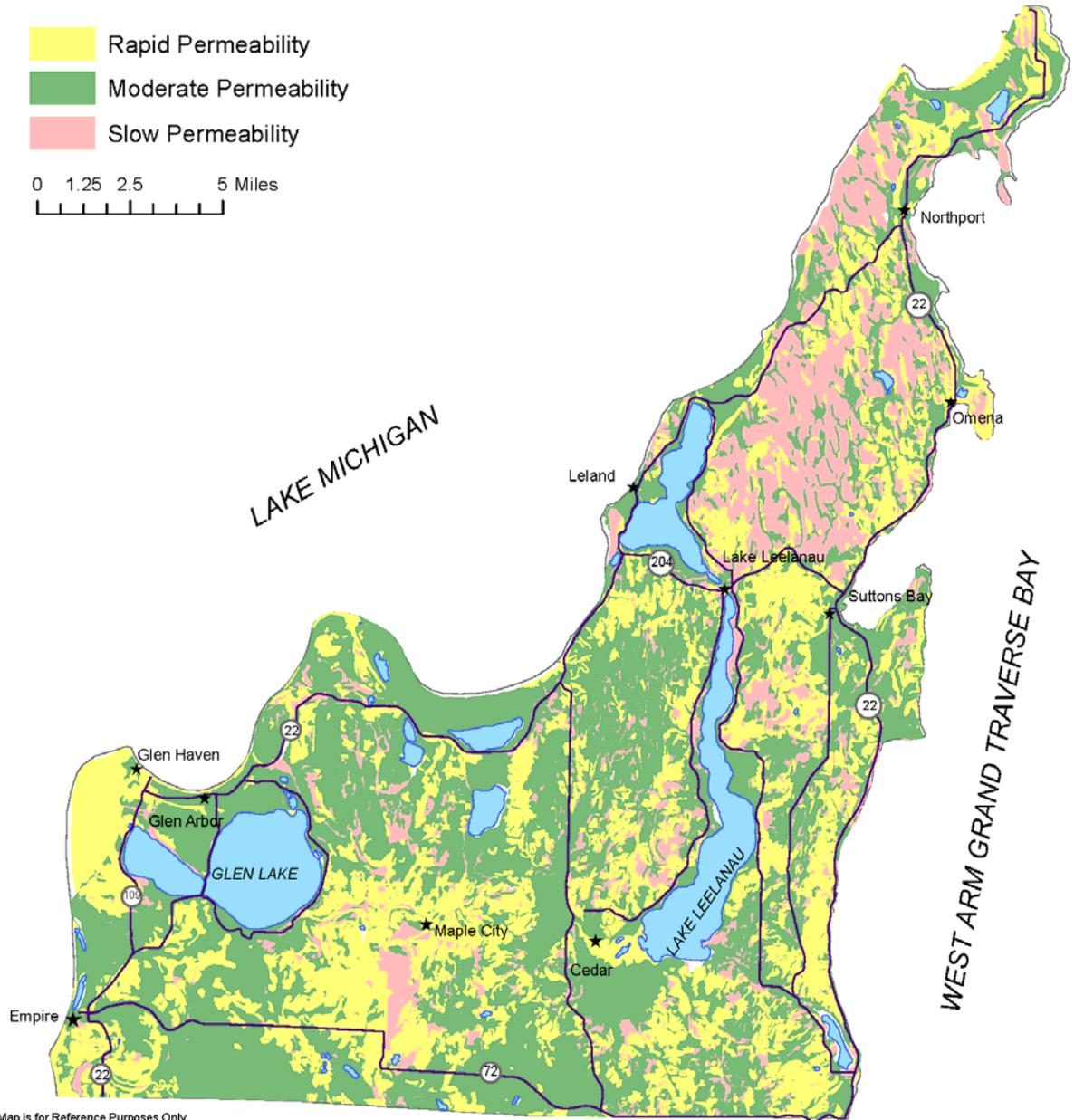
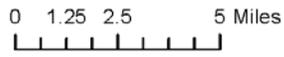
Lake Michigan shorelines (including Grand Traverse Bay) and dunes are also sensitive and unique environmental resources. See Map 6-4. Seemingly endless shorelines and monumental dunal formations epitomize the grandeur of the area. While these resources serve as critical components of the County's tourism and recreation industry, they are particularly vulnerable to wind and wave action, as well as to any land use and development activities which disturb the stability of the dunes. The clearing of vegetation along shorelines and dunes seriously increases their susceptibility to erosion, shifting, and demise. Disturbance of their natural character by land use activities heightens their vulnerability to winds and waves, and other climatic forces. Many of the County's shoreline areas and dunal formations are considered "high risk erosion areas." See Map 6-5. The significance of these areas is highlighted by their inclusion for protection under the Michigan Natural Resources Act 451. This Act serves to protect designated "critical dune areas", including Sleeping Bear Dunes and Empire Bluffs as well as less prominent dune areas.

The Lake Michigan shoreline and dunal formations harbor yet another sensitive environmental resource - threatened and endangered plant and animal species. Inventories by the Michigan Department of Natural Resources have identified numerous unique plant and animal species in the County which rely largely upon shoreline and dune areas for their survival. See Chart 5-3b in Chapter 5. Other threatened species which rely upon a more inland environment have also been identified. The fact that these plant and animal species are already considered unique due to their threatened survival emphasizes the need to prevent disturbances in the ecosystem in which they thrive.

Map 6-1 Soil Permeability



-  Rapid Permeability
-  Moderate Permeability
-  Slow Permeability

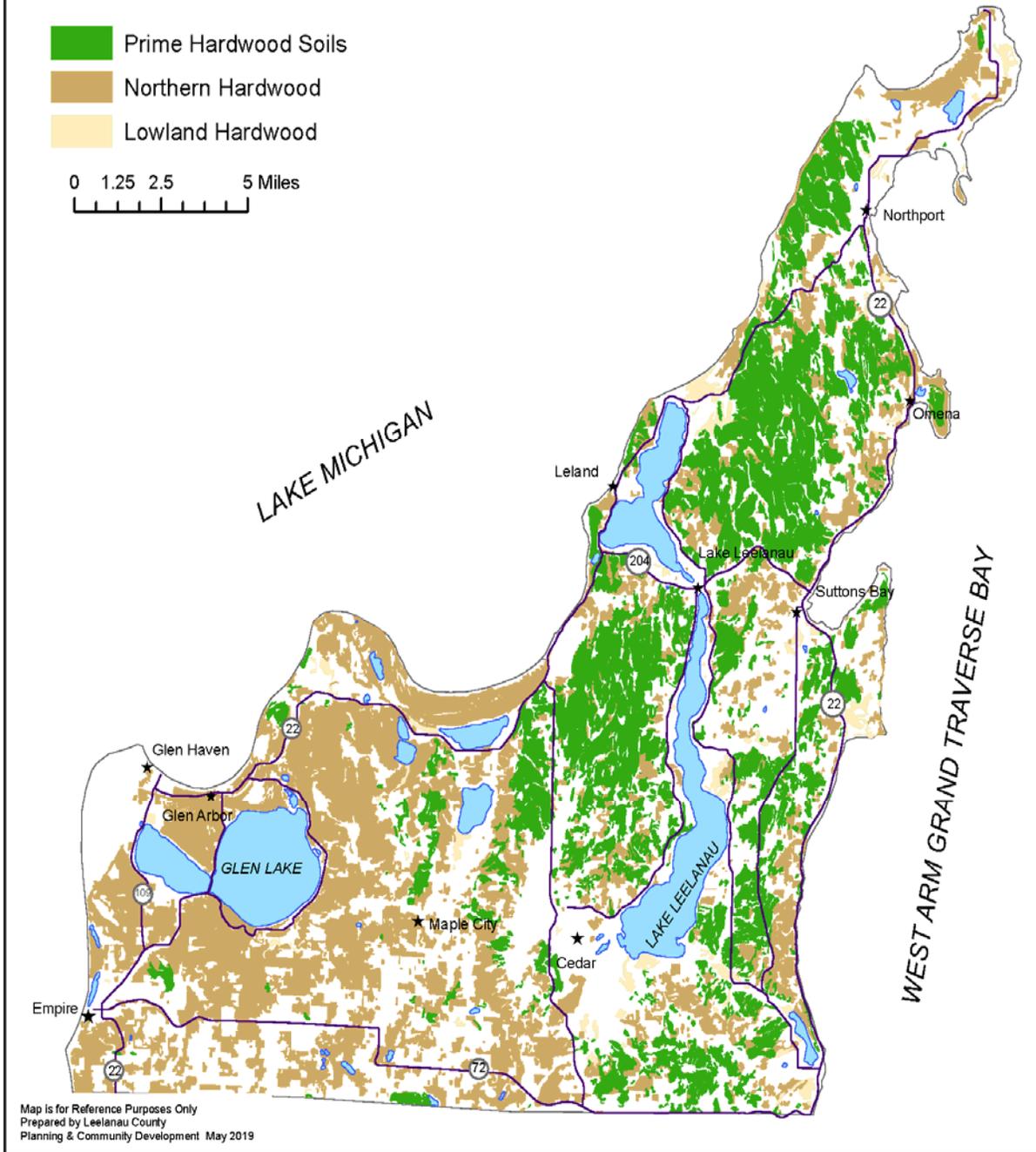
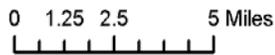


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Map 6-2 Prime Hardwood Forestlands Prime Hardwood Soils



- Prime Hardwood Soils
- Northern Hardwood
- Lowland Hardwood



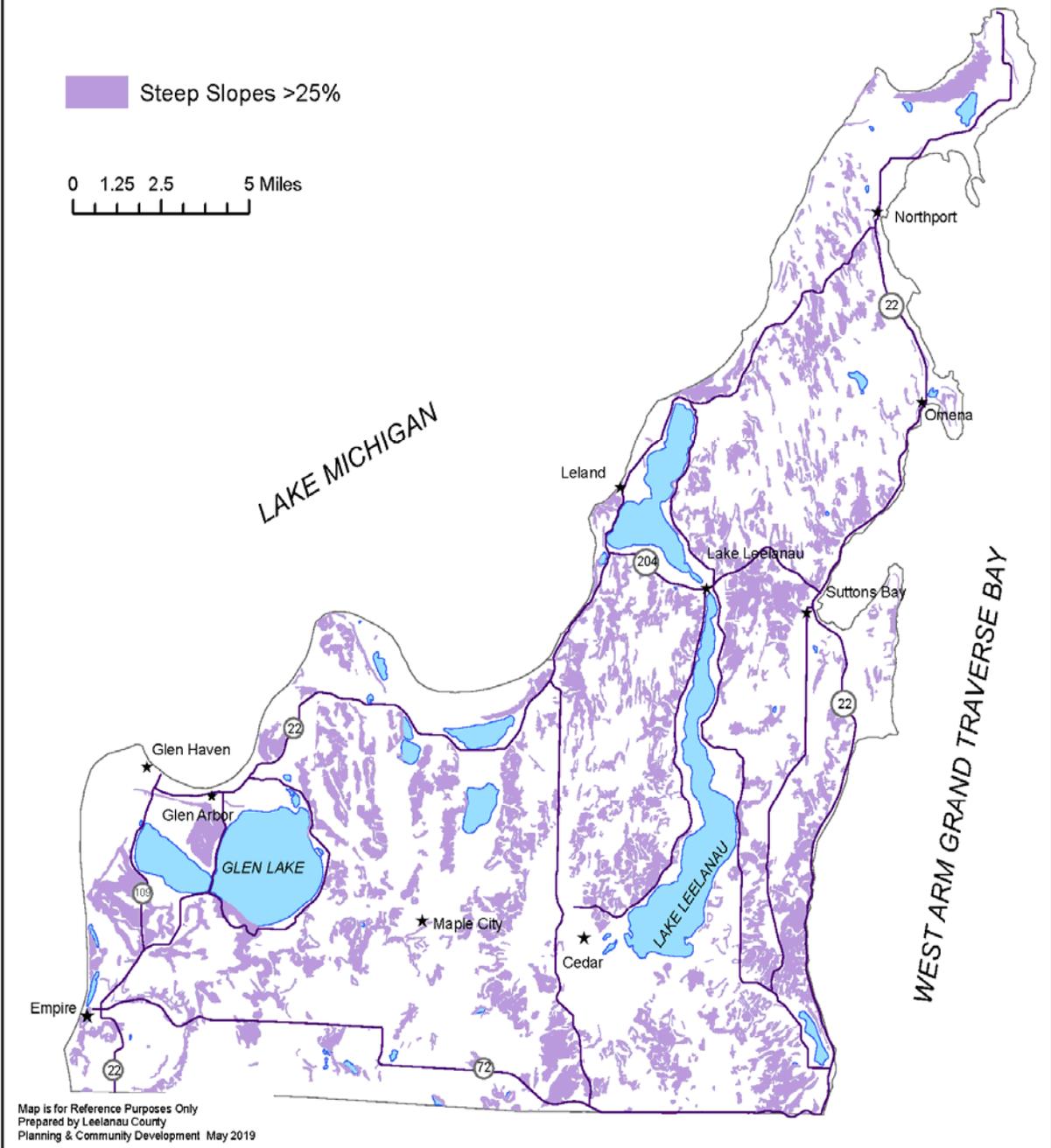
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Map 6-3 Steep Slopes



 Steep Slopes >25%

0 1.25 2.5 5 Miles

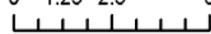



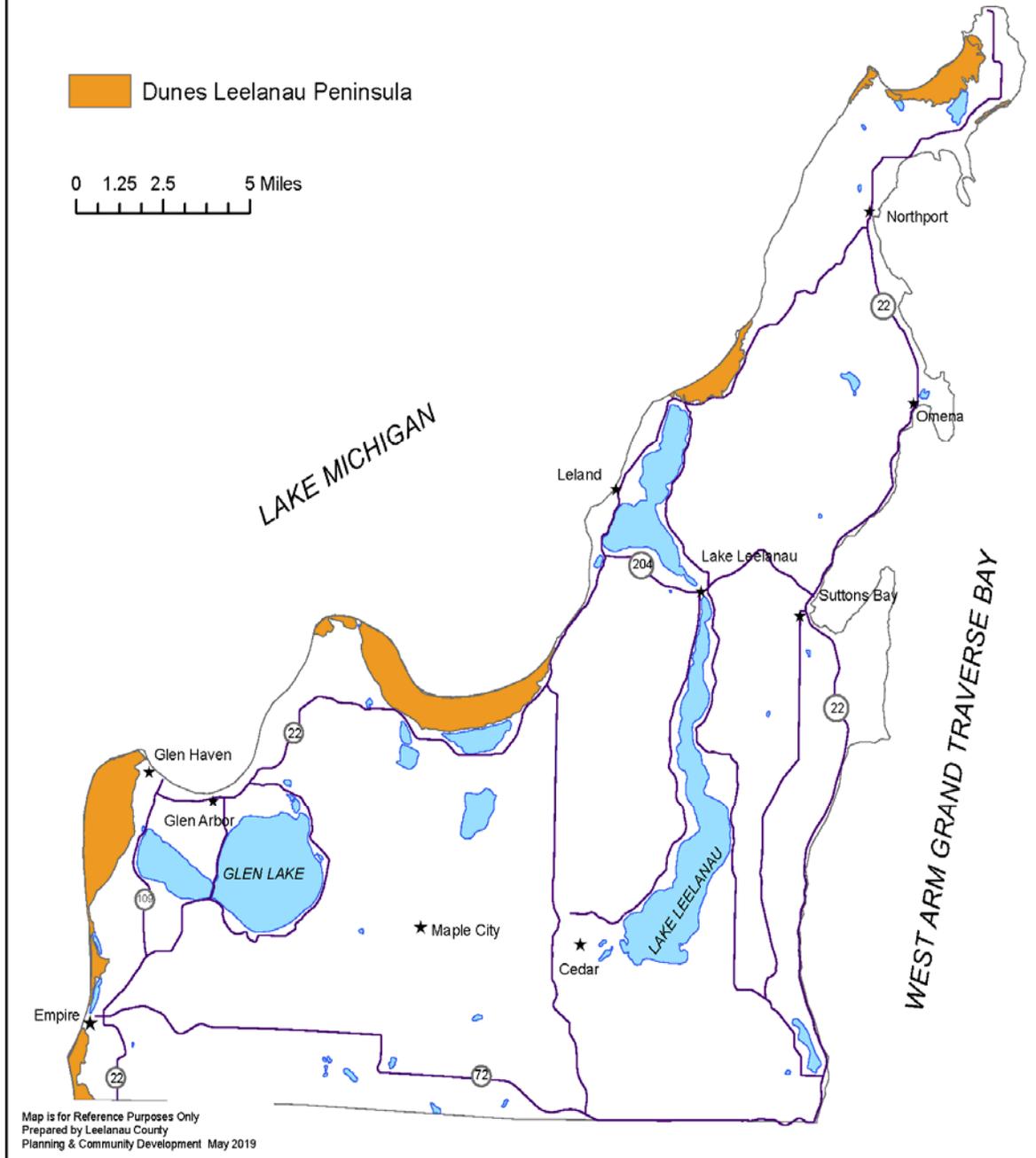
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Map 6-4 Critical Dunes



 Dunes Leelanau Peninsula

0 1.25 2.5 5 Miles




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Shorelines of inland lakes are also sensitive natural resources. The calmer waters and areas of interface between the land and water are particularly important habitats for wildlife and plant life. Understandably, these areas are also actively sought for development and recreational use. The resulting threat to these environments through soil erosion and sedimentation, disturbance of the natural shoreline and vegetation, and leachate from faulty septic systems is a concern today and will become more significant as the County's population grows.

The incremental consumption of land for residential and other intensive land uses can be expected to encroach directly upon the County's natural resources or the ecosystems within which these resources are found. Reliance upon state and federal regulatory programs may not be adequate to assure the integrity of the County's sensitive environmental resources.

While local programs have been put in place to help protect the quality of the County's sensitive natural resources, local governments and other organizations still encounter difficulty in evaluating conditions and effectively enforcing regulations. The lack of resource base-line data, monitoring, and evaluation of the effectiveness of protection programs prevents wise future decisions regarding natural resource management initiatives and policies. At particular risk are the sensitive environmental areas at the edge of the extensive County acreage in public ownership including the Sleeping Bear Dunes National Lakeshore, Leelanau State Park, and Pere Marquette State Forest.

Reliance upon state and federal regulatory programs may not be adequate to assure the integrity of the County's sensitive environmental resources.

Farmland

Farmland is a special natural resource in the County. See Map 6-6. Orchards are the dominant land cover. See Map 6-7. They contribute greatly to the economic well being of the County as well as to its beauty and pastoral character. As important as this renewable natural resource is, there has been a decline in the number of acres devoted to farming over the past several decades. Once farmland is converted to another use, it rarely reverts to agriculture. Fragmentation of farmland through the splitting of large farmland parcels for residential use resulted in farmland loss as much or more than the farmland converted to actual residences, yards, and roads.

The increasingly dispersed settlement pattern across the County is the reason why this irreplaceable resource is being chipped away. Under present conditions, this pattern can be expected to continue. We must acknowledge the conflicts which will arise when farmers and other large landowners try to "capitalize" on development potential by subdividing. For many, this land is their retirement plan. However, if most of the farmland and open space in Leelanau County are converted to residential use (as current trends illustrate), much of the scenic beauty of the County will be lost for existing residents and tourists.

Map 6-5 High Risk Erosion Areas

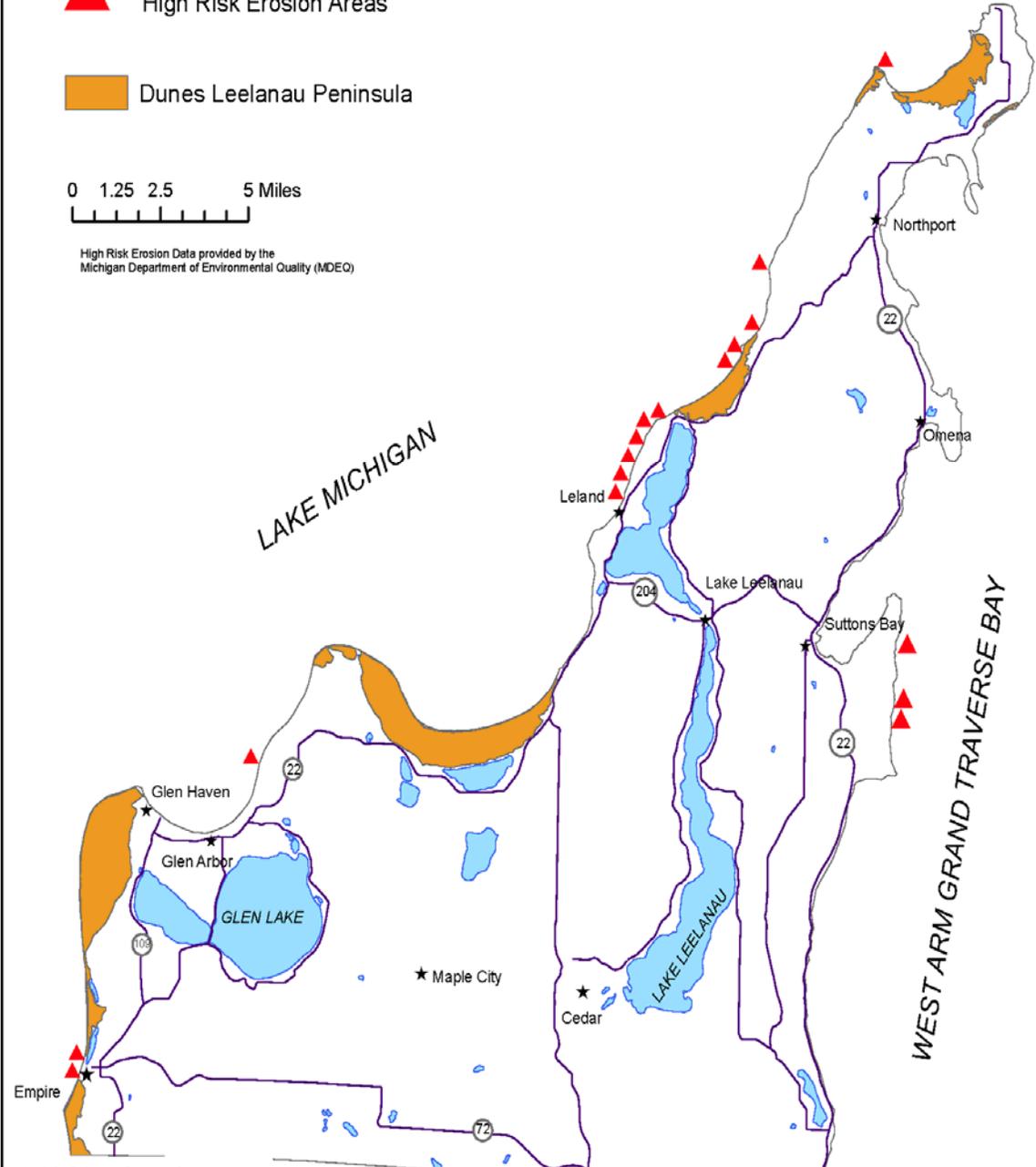


 High Risk Erosion Areas

 Dunes Leelanau Peninsula

0 1.25 2.5 5 Miles

High Risk Erosion Data provided by the Michigan Department of Environmental Quality (MDEQ)



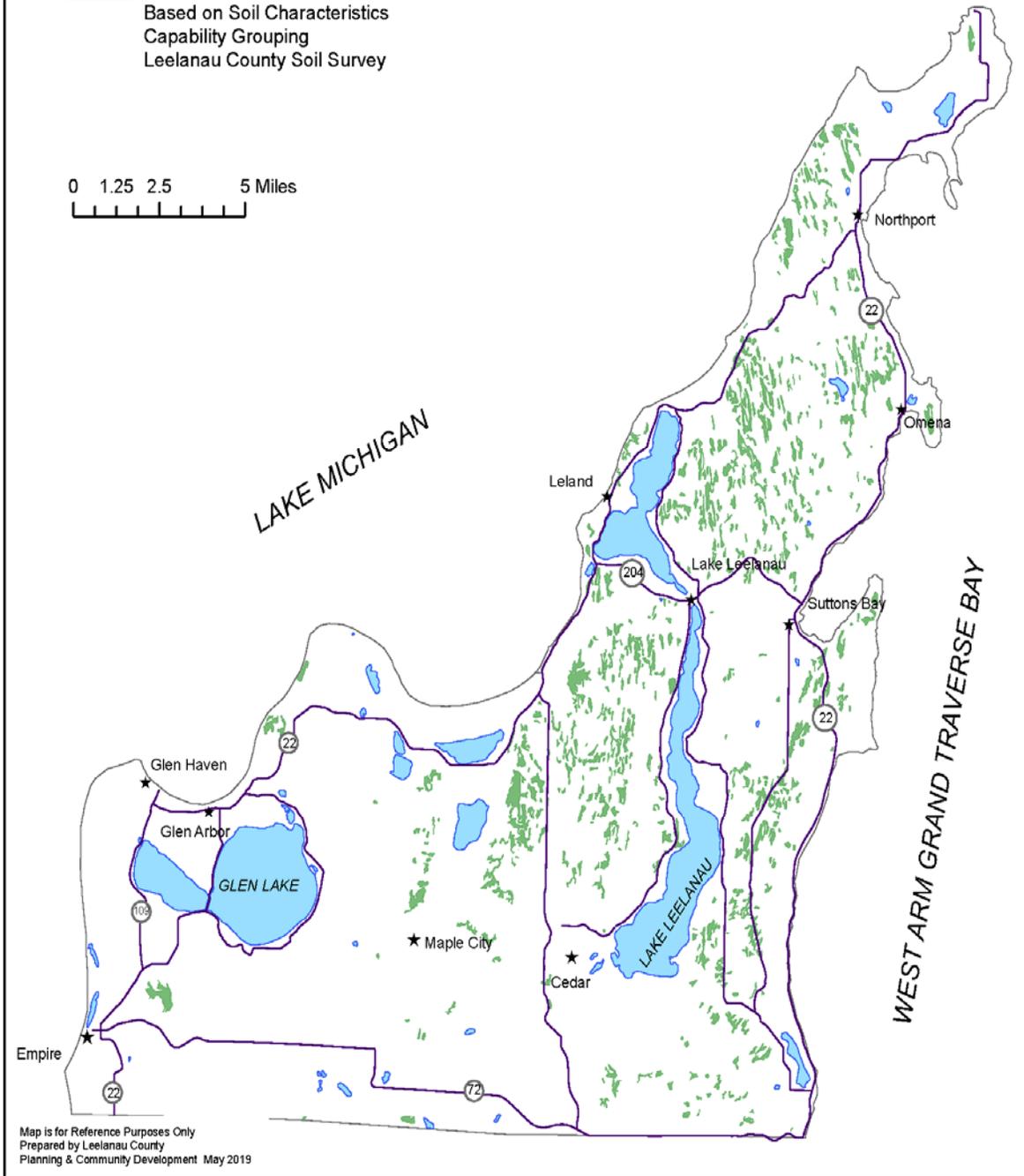
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Map 6-6 Cropland Suitability



 Land best suited for field crops
Based on Soil Characteristics
Capability Grouping
Leelanau County Soil Survey

0 1.25 2.5 5 Miles

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While local programs have been put in place to help protect the quality of the County's sensitive natural resources, local governments and other organizations still encounter difficulty in evaluating conditions and effectively enforcing regulations.

A FRAMEWORK FOR FUTURE POLICY

Trends and current conditions negatively affecting the County's natural resources have resulted from the lack of a focused resource protection program throughout the County. Residents realize that the resources are critical to their future welfare, and they recognize the need for a more responsible approach to resource protection. The **General Plan** recognizes the critical link between economic, social, and healthful well-being and protection of its natural resources. The plan seeks to establish a far more proactive approach, recognizing that long term protection must originate from a purposeful, strategic, and comprehensive conservation program.

At the heart of this program is the adoption of a land and water stewardship ethic by all populations of the County including local government officials, residents, real estate brokers, farmers, students, and land developers. The future of the County depends on how its people manage its abundant natural resources. The widespread adoption of a land and water stewardship ethic requires broad public understanding of the dynamics of ecosystems, the relationship and impacts between natural resources and land use, and the County's economy as it relates to the natural environment. This understanding must be strengthened by continued research and evaluation of the dynamic relationships between environmental costs and economic gains.

The **General Plan** recognizes that the quality of a single natural resource may vary across a township, and that the plan must respect the practical opportunities and constraints associated with resources of varying values. To this end, the plan calls for the identification of those resource areas in the County which are characterized by particularly high productivity and provide the basis for long term economic viability and protection.

This is especially applicable to prime agricultural (and especially orchard) lands, but should also be extended to include forestlands, mineral deposits, and other resources of economic and natural ecosystems importance.

These and other resource areas such as wetlands, dunes, shorelands, and wildlife corridors must be provided with increased protection through better coordinated local stewardship. This stewardship should be implemented through a number of strategic initiatives including: 1) preparation of model ordinances for local environmental protection, including development of environmental overlay zoning districts; 2) inclusion

The future of the County depends on how its people manage its abundant natural resources.

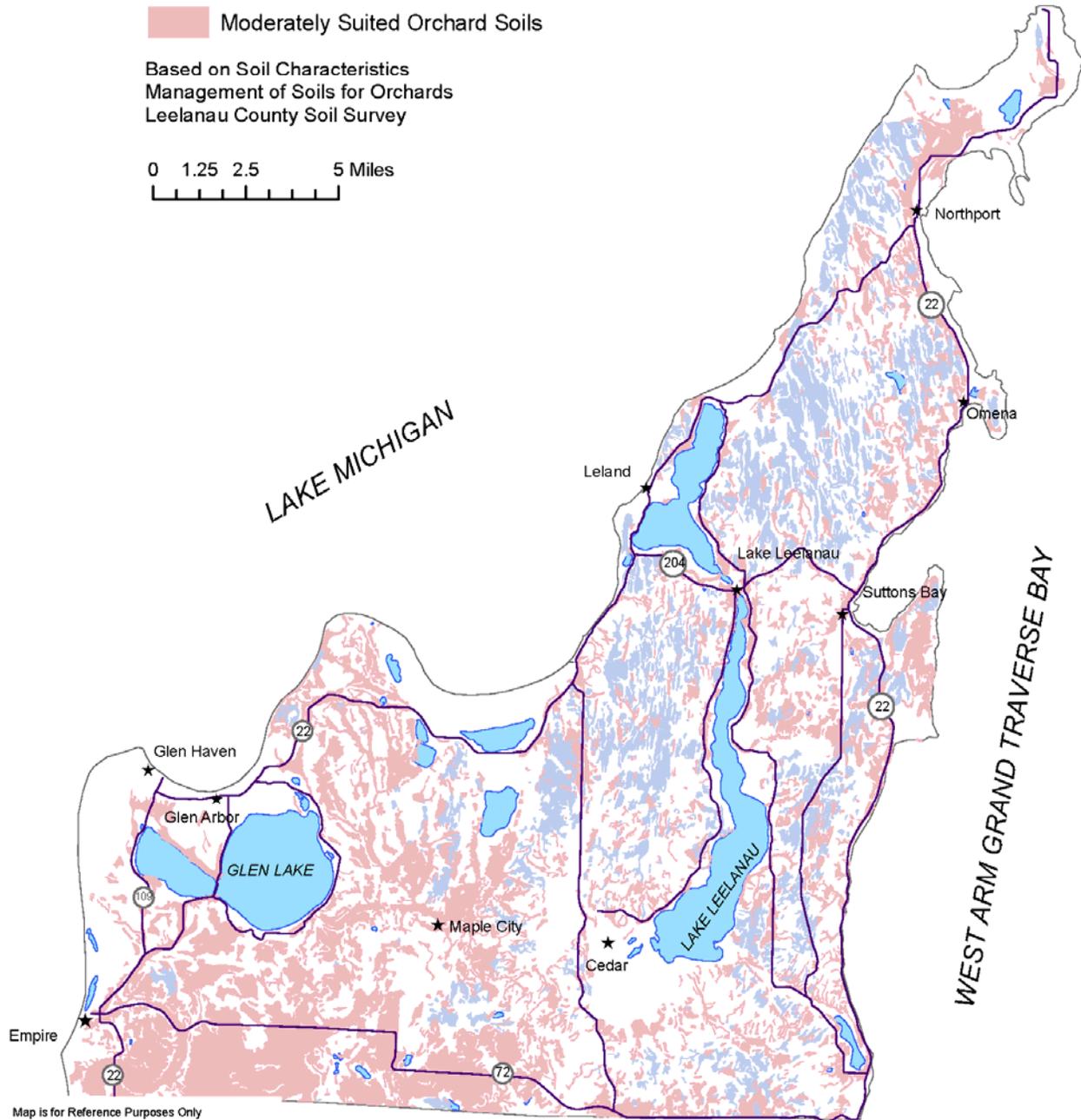
Map 6-7 Orchard Suitability



-  Most Suited Orchard Soils
-  Moderately Suited Orchard Soils

Based on Soil Characteristics
Management of Soils for Orchards
Leelanau County Soil Survey

0 1.25 2.5 5 Miles

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preservation of natural resources while still meeting the intent of the ordinances; 3) development of incentive programs for landowners to protect sensitive and productive natural resources.

Large and contiguous open spaces should be recognized for their multi-functional values, including wildlife habitats and rural vistas, and be afforded the same protection emphasis as the County's more sensitive resources. This is not to suggest no development should occur in these areas, but that it is more desirable that it be designed to relate to, rather than against nature.



Lake Leelanau Narrows

The stewardship ethic should extend to the protection of the County's air and water resources, through continuous air, groundwater and surface water quality monitoring, establishment of base line data and benchmarks, and long term management initiatives, including a County-wide water quality protection program. This program should include specific provisions to assure the adequacy of existing and future private septic systems and wells and standards for underground storage tank operations and activities. All agencies with an interest in the quality of these resources should be included in the development and implementation of the program.

The **General Plan** recognizes that these and other related natural resource protection initiatives would naturally occur within a framework of interjurisdictional coordination and cooperation to assure that the initiatives are County-wide, that they achieve a heightened level of consistency across the County, and that permitting processes are streamlined among the various levels of government.

NATURAL RESOURCES AND ENVIRONMENTAL PROTECTION POLICIES AND ACTION STATEMENTS

The following goals, objectives and action statements are intended to establish the blueprint of the **General Plan's** vision for sustaining the County's natural resources. It should be noted here, as throughout, that the positions taken in the following policy and action statements were supplied directly by the citizens of the county and not drawn up by a single board, however representative and concerned.

Goal: To Balance long-term economic gain and environmental protection concerns in county and local government policies and programs.

Objective:

County and local policies and programs should be drafted and frequently assessed to ensure environmental protection while encouraging appropriate local economic development.

Action Statement:

County and local policy-makers shall document both the environmental and economic effects of policies under consideration.

Goal: Protect air and water quality

Objective:

County and local governments should initiate proactive measures to monitor and protect air, groundwater, and surface waters.

Action Statement:

County and local governments should use relevant air and water quality data to establish benchmark standards in Leelanau County. Such standards shall serve as a reference against which future data will be evaluated.

Action Statement:

Continue to maintain and update a well log and septic system database as part of the County's GIS system, using the records at the Benzie-Leelanau Health Department.

Action Statement:

Adopt programs and regulations to ensure safer and more effective on-site sewage disposal and potable water.

Action Statement:

Establish a countywide Water Quality Strategy Plan.

Action Statement:

Provide GIS and other relevant data to local governments and lake associations in the development of watershed management plans to prioritize efforts to protect water quality of inland lakes and streams.

Action Statement:

County government should provide model ordinances for local governments to adopt to protect air and water quality such as lake access and road end access.

Action Statement:

Encourage township use of the EGLE's "County and State Environmental permits checklist" and a hazardous reporting form to ensure environmental issues are adequately considered in the local zoning process.

Action Statement:

County and local governments should utilize the EGLE list of contaminated sites to offer assistance and available resources for cleanup, and provide incentives to identify and cleanup unknown sites.

Objective:

On-site sewage disposal and potable water.

Action Statement:

Develop, in concert with other county and local organizations, a program for water quality testing of inland lakes and streams to identify water quality change and the source of any contaminants.

Action Statement:

Work with state and local officials to streamline the process and timeline for onsite sewage and potable water for developments.

Objective:

To insure an adequate knowledge and information base for County and Local policy makers in areas related to Air and Water Quality.

Action Statement:

Continuously assess, develop and promote educational material related to the maintenance of air and water quality.

Goal: Protect environmentally sensitive areas, including wetlands, dunes, steep slopes, shorelands, and wildlife corridors.

Objective:

To initiate proactive measures to protect and enhance environmentally sensitive areas.

Action Statement:

Distribute information identified on the Geographic Information System (GIS) for farmland and environmentally sensitive areas, to various county agencies and local governments, and interested parties such as developers and landowners.

Action Statement:

Establish overlay zoning districts for environmentally sensitive areas through the coordinated actions of county and local government.

Action Statement:

Encourage use of incentive programs to protect environmentally sensitive areas, as well as areas with significant open space and/or scenic vistas. These incentives programs would include the acquisition of fee simple or conservation easements by non-profit organizations. The incentive program should place an emphasis on "filling gaps" between existing preservation holdings to increase ownership of contiguous areas.

Action Statement:

County and local governments should Initiate efforts to establish common protective measures for environmentally sensitive areas that fall across multiple jurisdictions.

Action Statement:

Develop and enact model flexible site development standards to minimize topographic changes, reduce the extent of paved areas, and avoid environmentally sensitive areas wherever possible.

Goal: Protect farmland and open space protection, including scenic vistas/corridors.

Objective:

Protect farmland and minimize consumption of open space, including scenic vistas and corridors, from loss through land fragmentation and/or development.

Action Statement:

County Planning should assist local governments by providing model regulations to encourage clustering of new residential development in order to minimize consumption of open space and scenic vistas.

Action Statement:

County and local governments should encourage landowners to research and utilize local programs which focus on timberland, wildlife, wildlife corridors, and other natural resources.

Action Statement:

The County should help provide information and materials to educate citizens and local governments about farmland protection options, including capturing the development value of their land.

Action Statement:

The county and local governments should establish future Land Use Plans that focus development in or immediately adjacent to existing villages.