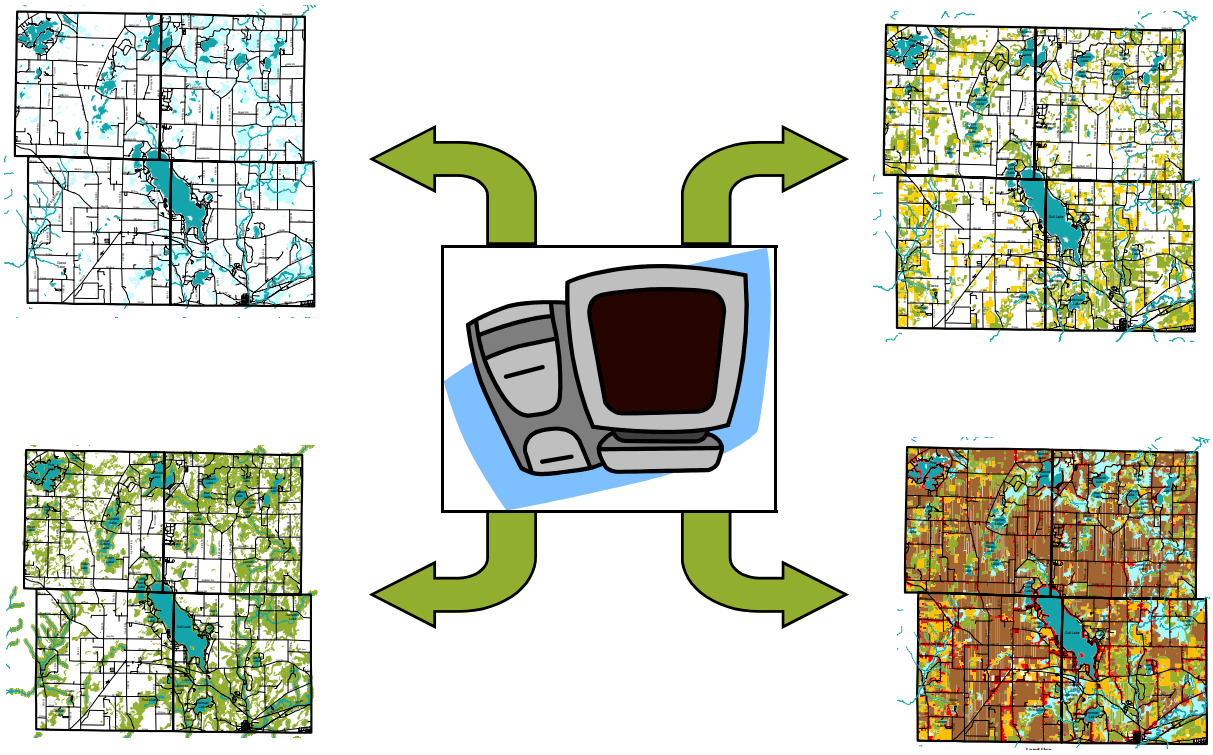
Four-Township Geographic Information System



Four-Township Water Resources Council
Michigan State University W.K. Kellogg Biological Station
Progressive AE

April 2001

Four-Township
Geographic Information System

Introduction

A geographic information system (GIS) is a sophisticated computer-based tool that allows users to access information from a variety of sources to create and analyze high-quality maps. Years ago, maps were laboriously hand-drawn on paper with additional layers created on transparent plastic. With GIS, those maps can be created in seconds and can greatly assist local officials and others in making land use decisions.

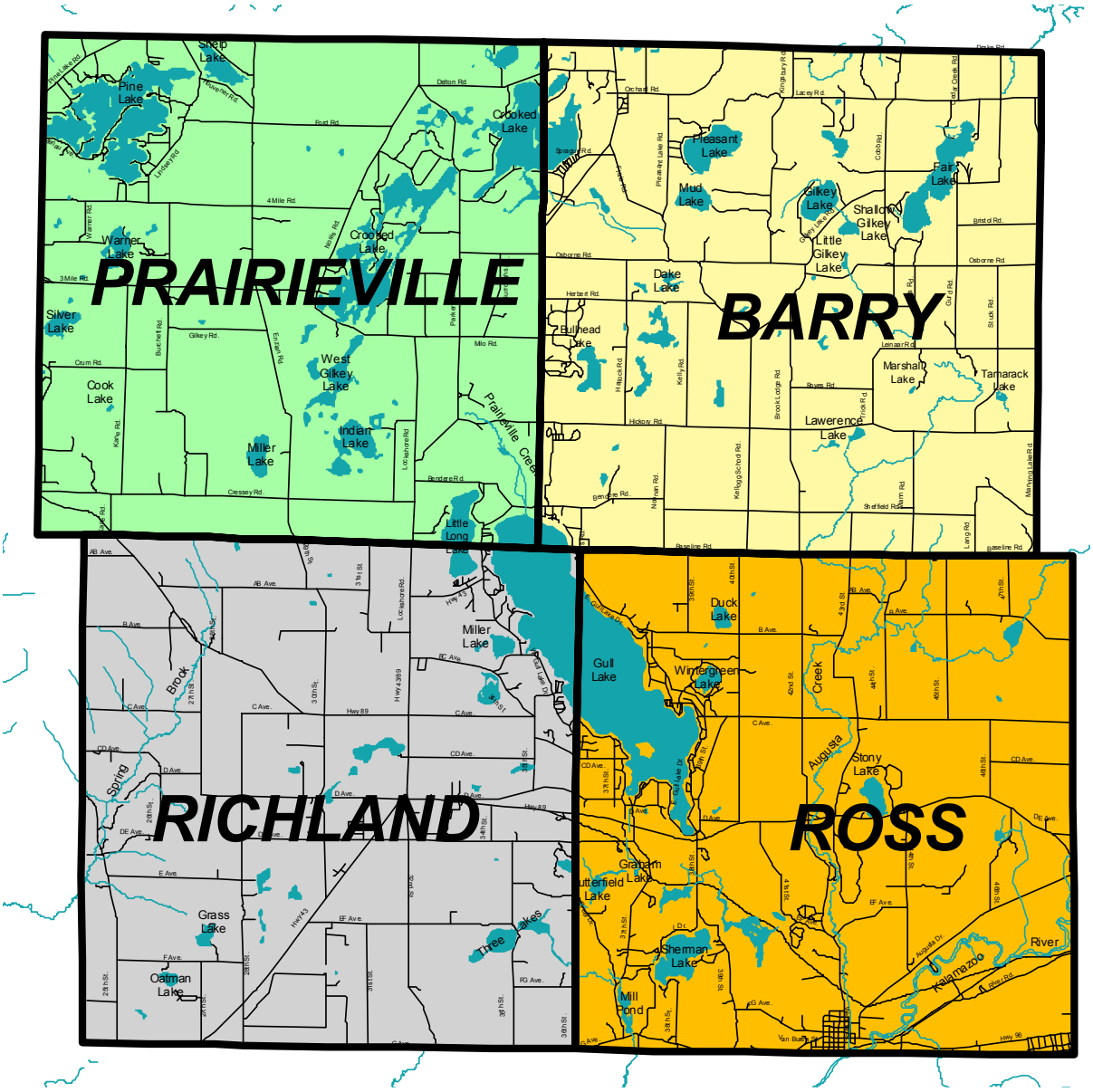
A GIS was developed for the Four-Township Water Resources Council to assist local government officials and area residents manage and protect local land and water resources. GIS can be used to help manage growth by allowing a community to monitor development patterns and analyze their cumulative impact. The GIS can also be extremely useful in identifying land with environmental attributes worthy of protection. The project is funded with a non-point source pollution control grant awarded under Section 319 of the federal Clean Water Act.

This booklet provides a visual summary of some of the GIS data available for the four townships.

This GIS was developed by Michigan State University, W.K. Kellogg Biological Station, in conjunction with the Four-Township Water Resources Council and Progressive AE. Additional data were provided by the Western Michigan University GIS Research Center and the Barry County Land Information Systems Department.

For more information about the GIS or to learn about other available information, contact Dean Solomon, Kellogg Biological Station Land & Water Program, 3700 E. Gull Lake Drive, Hickory Corners, MI, 49060. Phone 616-671-2412.

The Four-Township Water Resources Council was established to assist with the development and implementation of land use strategies that retain the rural environment currently enjoyed by township residents, protecting lakes, streams, drinking water, agriculture, and open space. For more information about Council activities, contact us at Four-Township Water Resources Council, P.O. Box 364, Richland, MI 49083-0634.



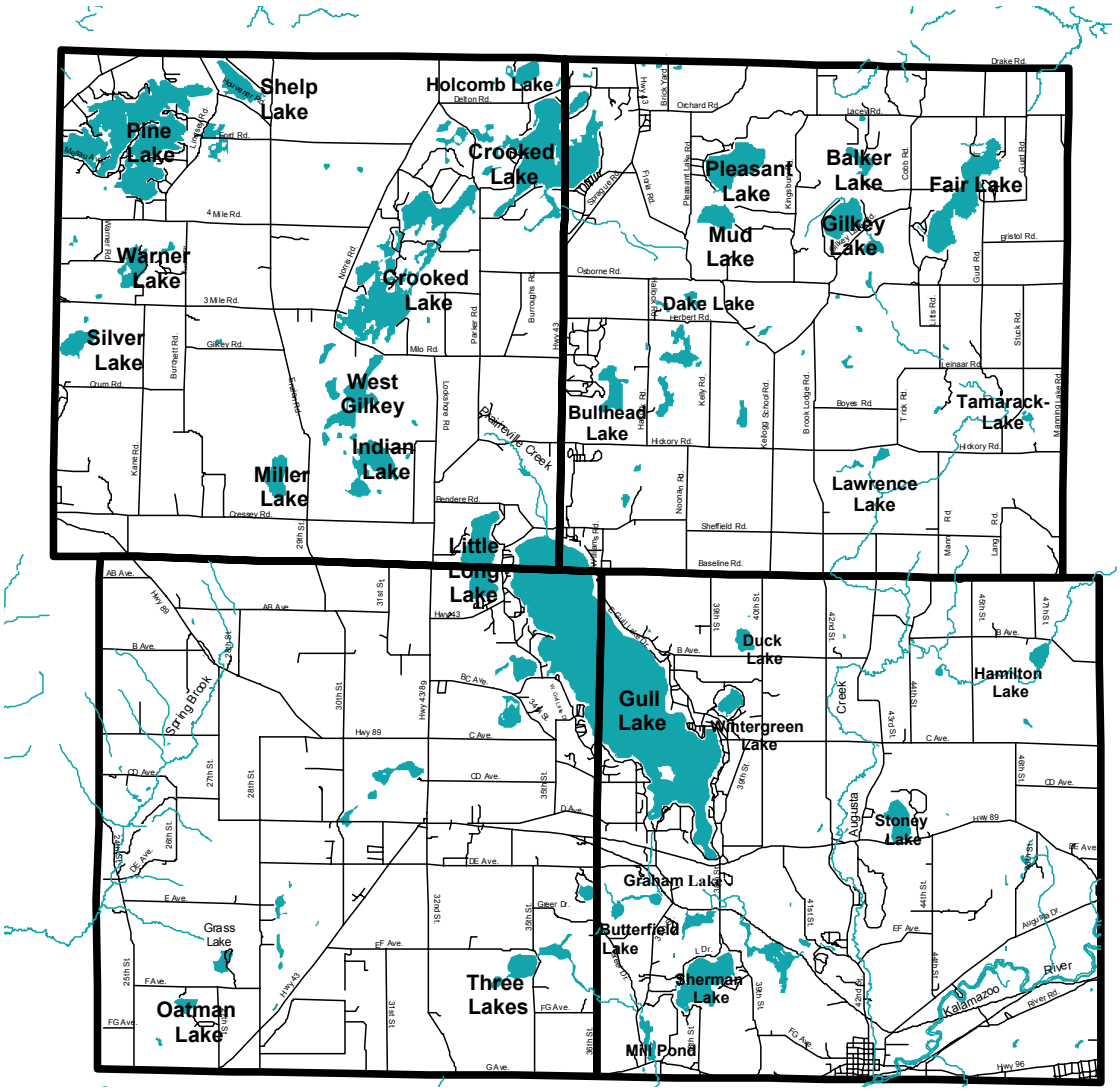
The four townships are located in Michigan's Barry and Kalamazoo counties.

Lakes and Streams Map

The four township's water resources are diverse and plentiful.

The four townships contain about 5,300 acres of open water and several high-quality streams, including Prairieville Creek, Spring Brook, and Augusta Creek. Developing land use strategies to protect these valuable resources is one of the Council's top priorities. Special studies of Pine Lake, Crooked Lake, Gull Lake, and Sherman Lake are currently underway to evaluate their environmental and recreational carrying capacities.

A complete guide to water resources in the four townships is contained in the Council's Four-Township Water Atlas.



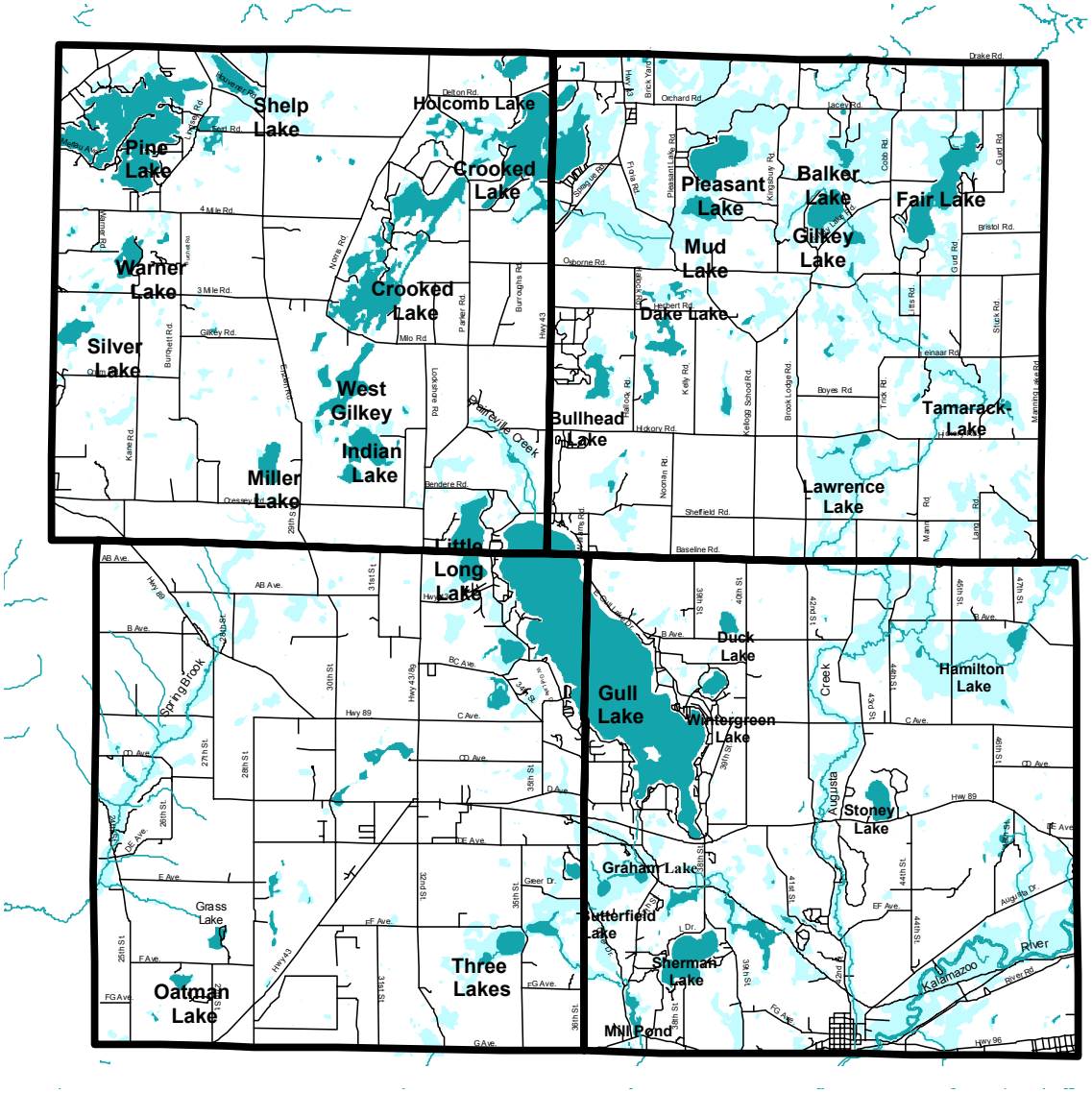
Lakes and streams

Lakes, Streams and Wetlands Map

The wetlands in the four townships have been identified by combining information available from various federal and state agencies.

Currently, about 10% of the four townships are wetland. In addition to fish and wildlife habitat, these wetlands provide many vital functions including groundwater recharge, flood and pollution control, and outdoor recreational opportunities. Estimates provided by the U.S. Fish and Wildlife Service indicate that about 50% of Michigan's original wetlands have been lost.

By knowing the location of wetlands, future development can be better planned to avoid wetland impacts.



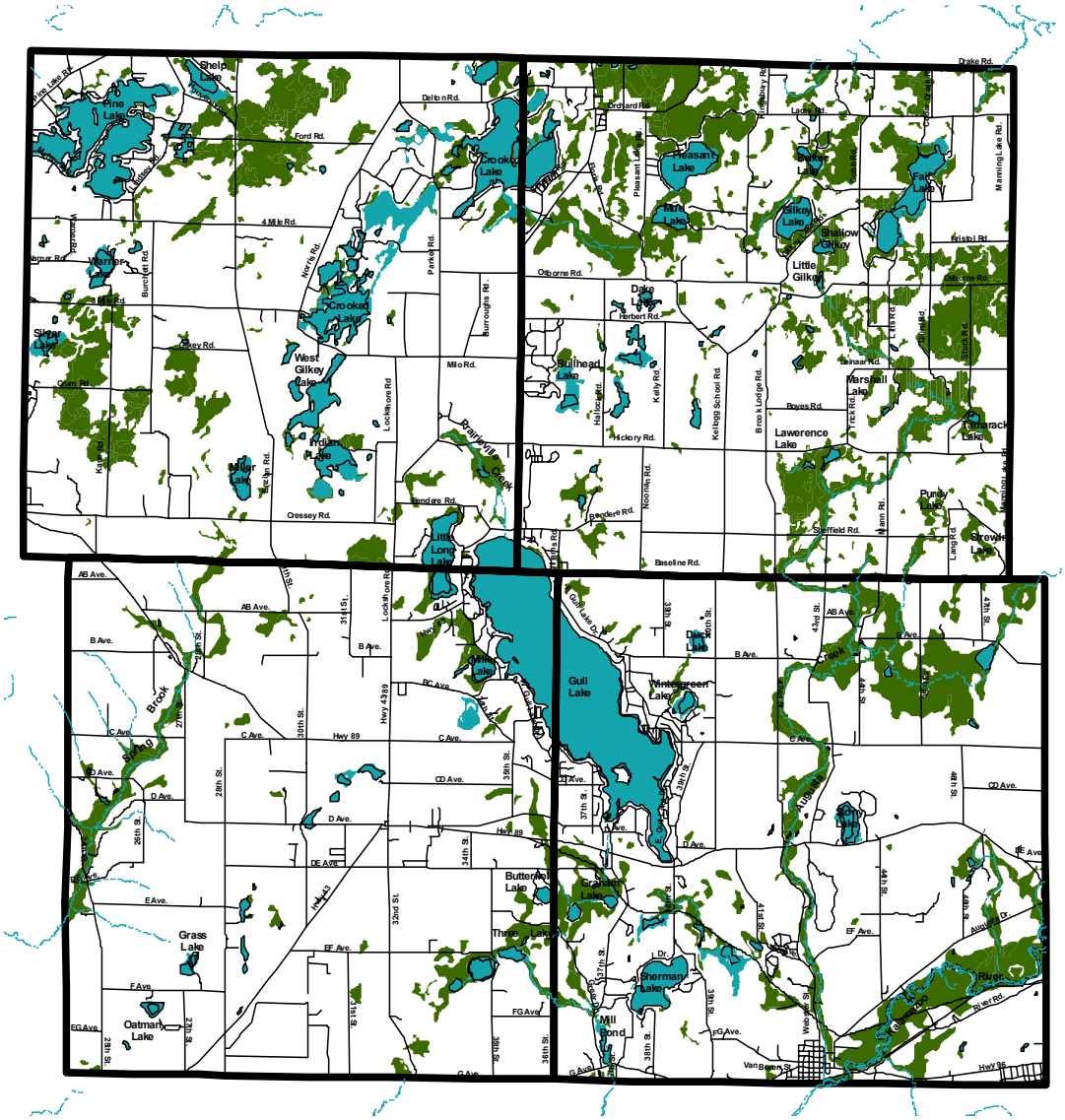
Wetlands

Lakes and streams

Septic System Limitation Map

While many of the area's larger lakes, including Pine, Crooked, Fair, and Gull, are served by a community sewer system, many of the remaining areas rely on septic systems.

The adjoining map indicates areas where limitations to placing septic systems exist due to a high water table or poor soil percolation. Improperly located or maintained septic systems have the potential to contaminate both surface and groundwater.



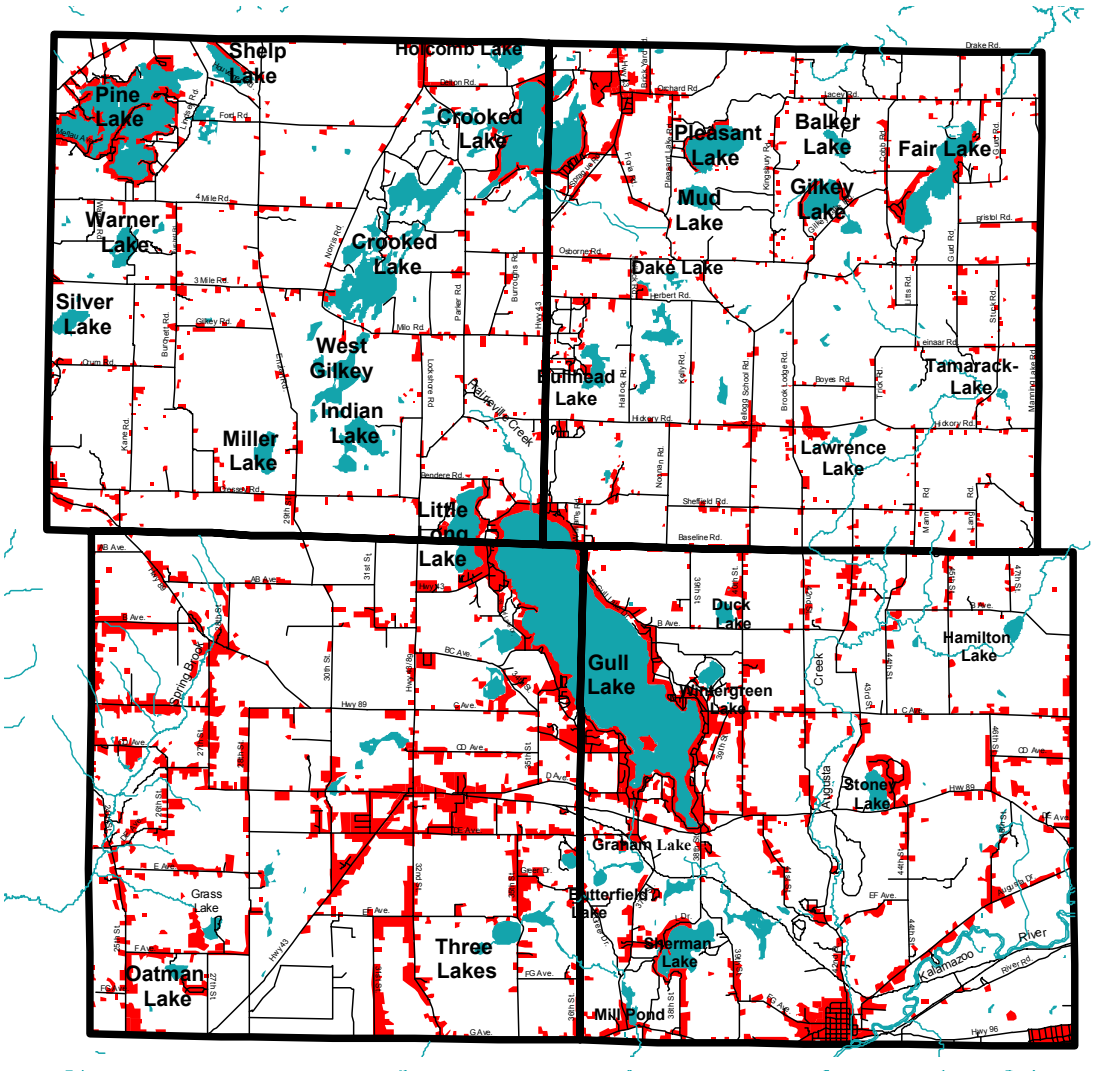
Areas with septic system limitations due to wet or poorly percolating soils

Urban Land Map

Urbanization of the rural landscape is occurring at a rapid pace within the four townships. Between 1960 and 1990, the population of Prairieville and Richland Townships nearly doubled.

The red areas on this map are places currently in residential, commercial or industrial use. Only the areas actually in these uses are marked, not necessarily the whole parcel. For instance, if a 10-acre parcel had a house and lawn occupying 2 acres, the remaining 8 acres would be classified as forest, agriculture, open area or some other use.

The location of the four townships between the urban centers of Grand Rapids, Kalamazoo, and Battle Creek and the desire of people to ”move to the country” will undoubtedly stimulate additional development. Accommodating future development while maintaining rural character and environmental quality in the four townships will require sound and proactive planning.

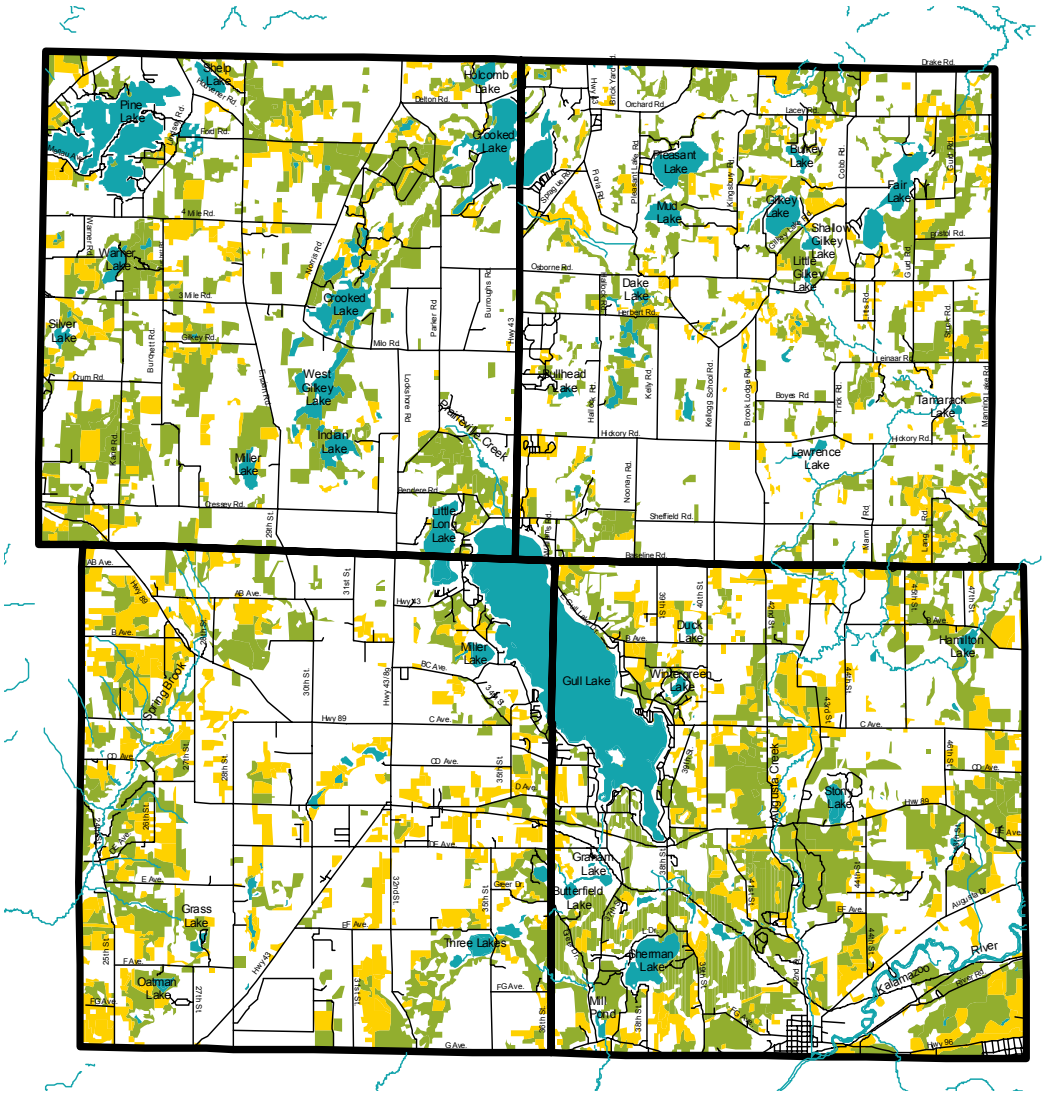


Urban land uses

Undeveloped Open Space and Forest Land Map

The four-townships are fortunate to have substantial areas that are forest and relatively undeveloped open (not used for agriculture) land.

Open space zoning is a technique that many communities are implementing to preserve open space and protect water resources. This approach calls for concentrating development where appropriate and permanently preserving open spaces and forested areas through conservation easements or deed restrictions. If properly done, open space zoning can help limit urban sprawl and the impact of development on land and water resources.



Forest land

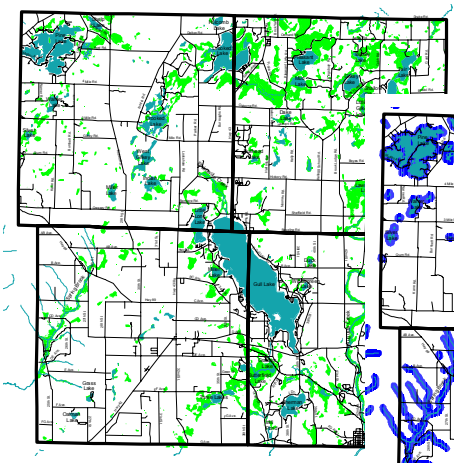
Undeveloped open land

Environmentally Sensitive Areas Map

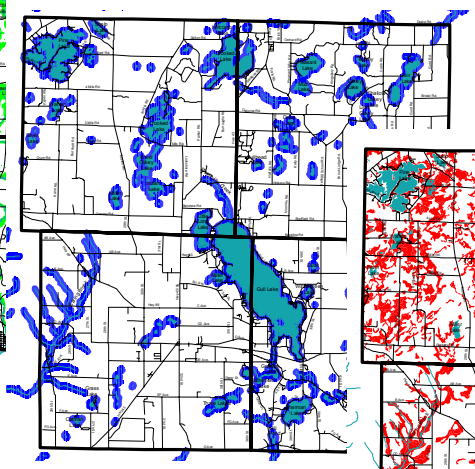
One of the GIS system's most useful features is the computer's ability to create ***overlays***. In this example, three different maps from different sources of information were created, then combined to create a composite map showing all environmentally sensitive areas in the four-township area.

For this map, environmentally sensitive areas have been designated as wetlands, steeply sloped lands, and areas within 500 feet of lakes and streams.

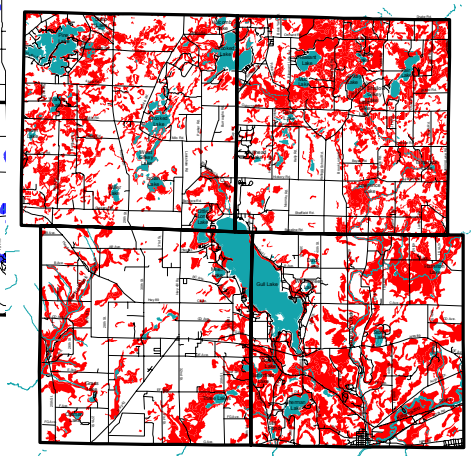
Development in these areas must be planned to minimize impacts to adjacent water resources. Environmentally sensitive areas may be afforded special protection through a zoning technique called an overlay district. An overlay district is a zoning district that applies to a specific geographic area, such as a lake shoreland or stream corridor. In an overlay district, proposed developments must meet all the conditions of the underlying district, in addition to the provisions set forth in the overlay district.



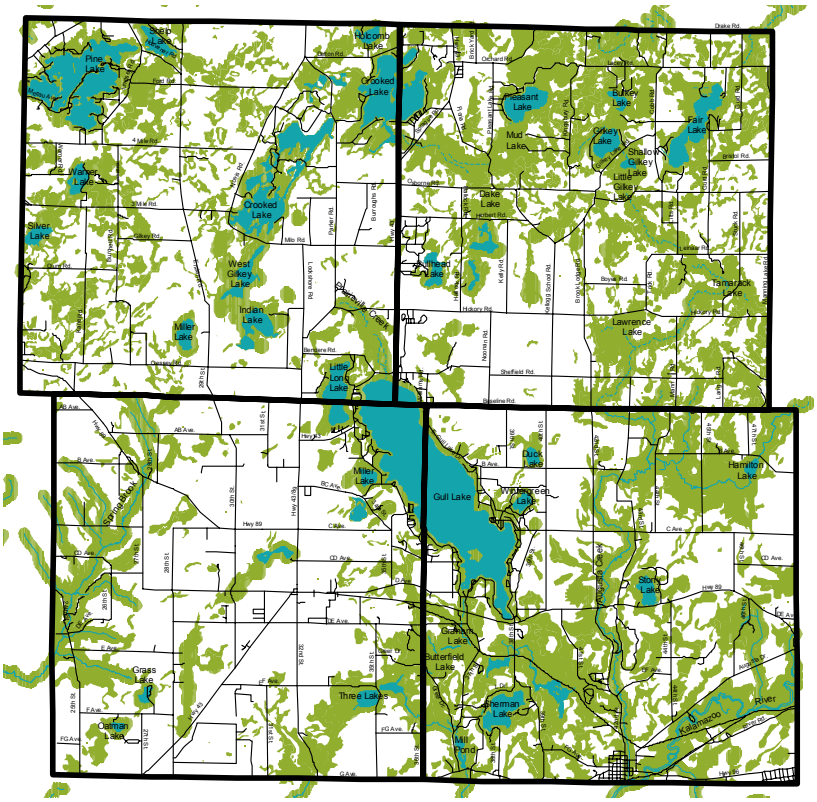
Wetlands



Buffer areas (500 feet) around lakes, streams & wetlands



Wet soils and steep slopes



Environmentally sensitive land

Richland Township Parcels Less Than or Equal to 20 Acres

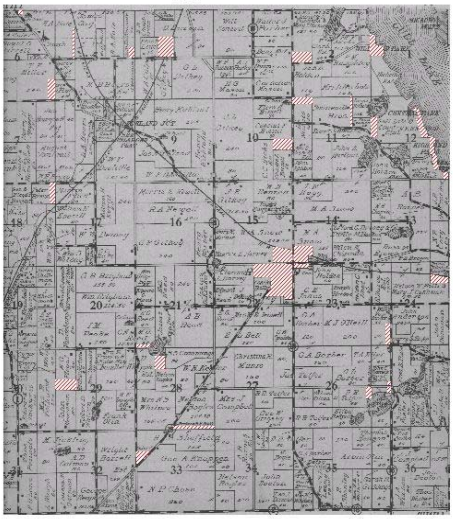
1913 – 1998

This map shows trends in land ownership in Richland Township. Parcels equal to, or smaller than 20 acres are highlighted, because they are most likely residential and no longer used for agriculture. Development trends are similar in Ross, Prairieville and Barry Townships.

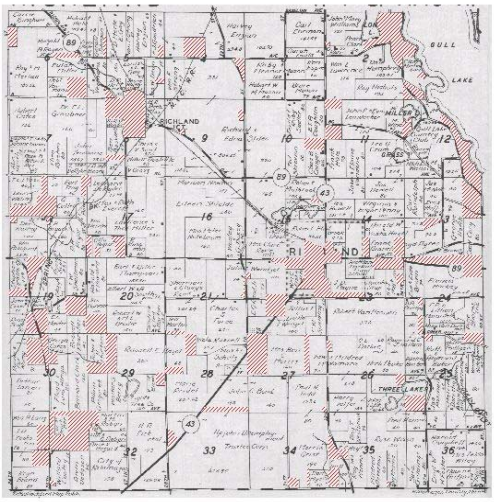
Urban sprawl and the conversion of prime farmland are occurring statewide. A recent study of land use trends noted that, at current growth rates, as much land will be urbanized between 1990 and 2020 as was occupied in 1990. The study pointed out that farmland losses would be most pronounced in the Grand Rapids, Kalamazoo, and Traverse City areas.

At the state level, several strategies are currently being discussed to curb sprawl and preserve farmland. These include tax incentives and land use policies and programs that encourage development where infrastructure is most available.

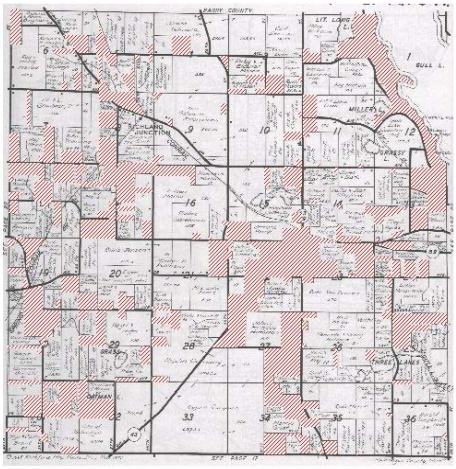
1913



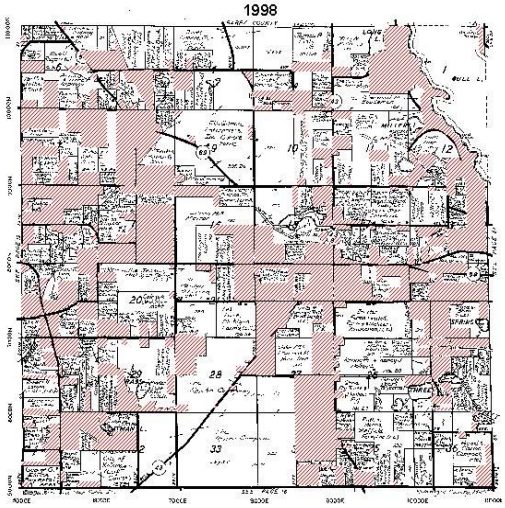
1960



1979



1998

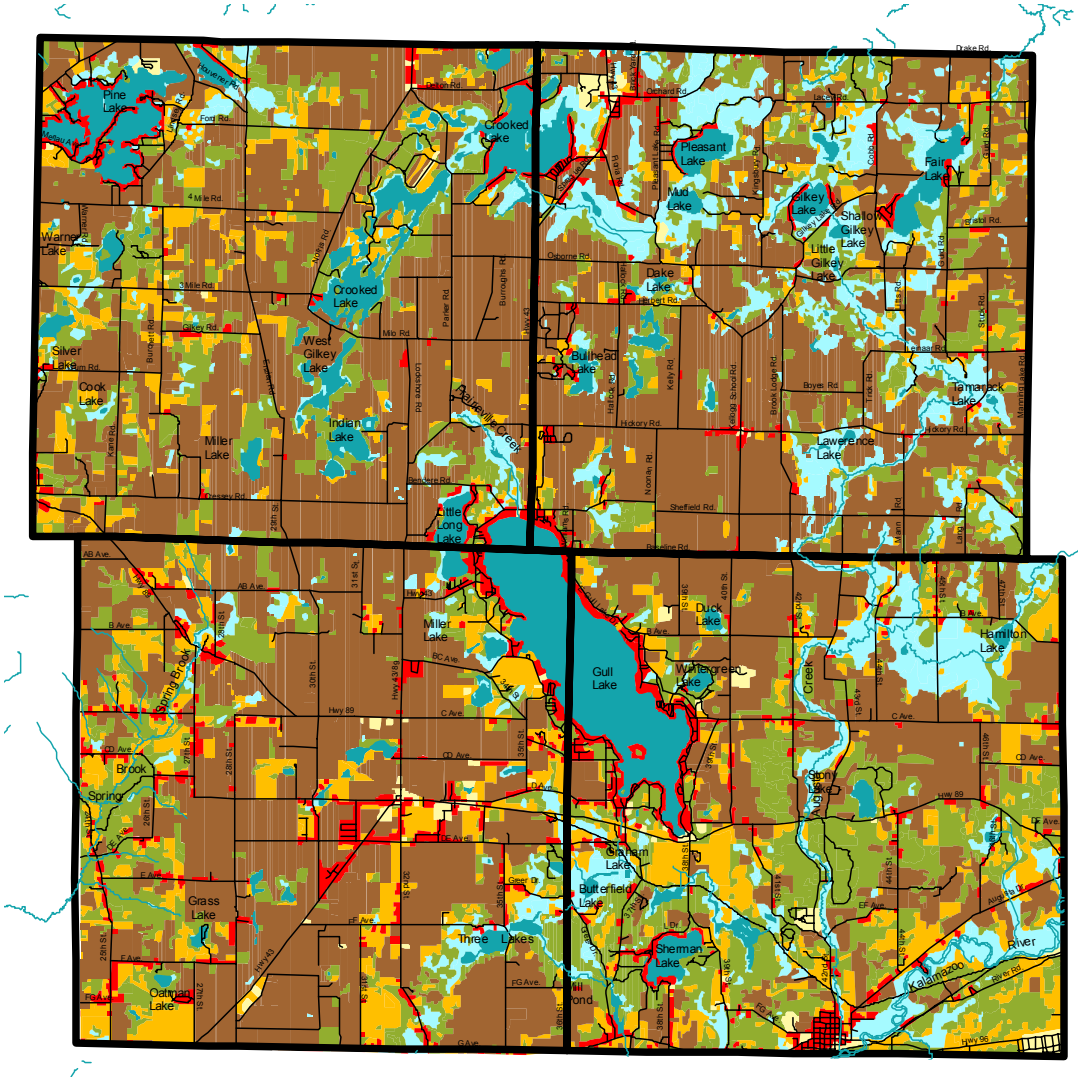


Land parcels equal to or smaller than 20 acres.

Four Township 1978 and 1994/1996 Land Use Maps

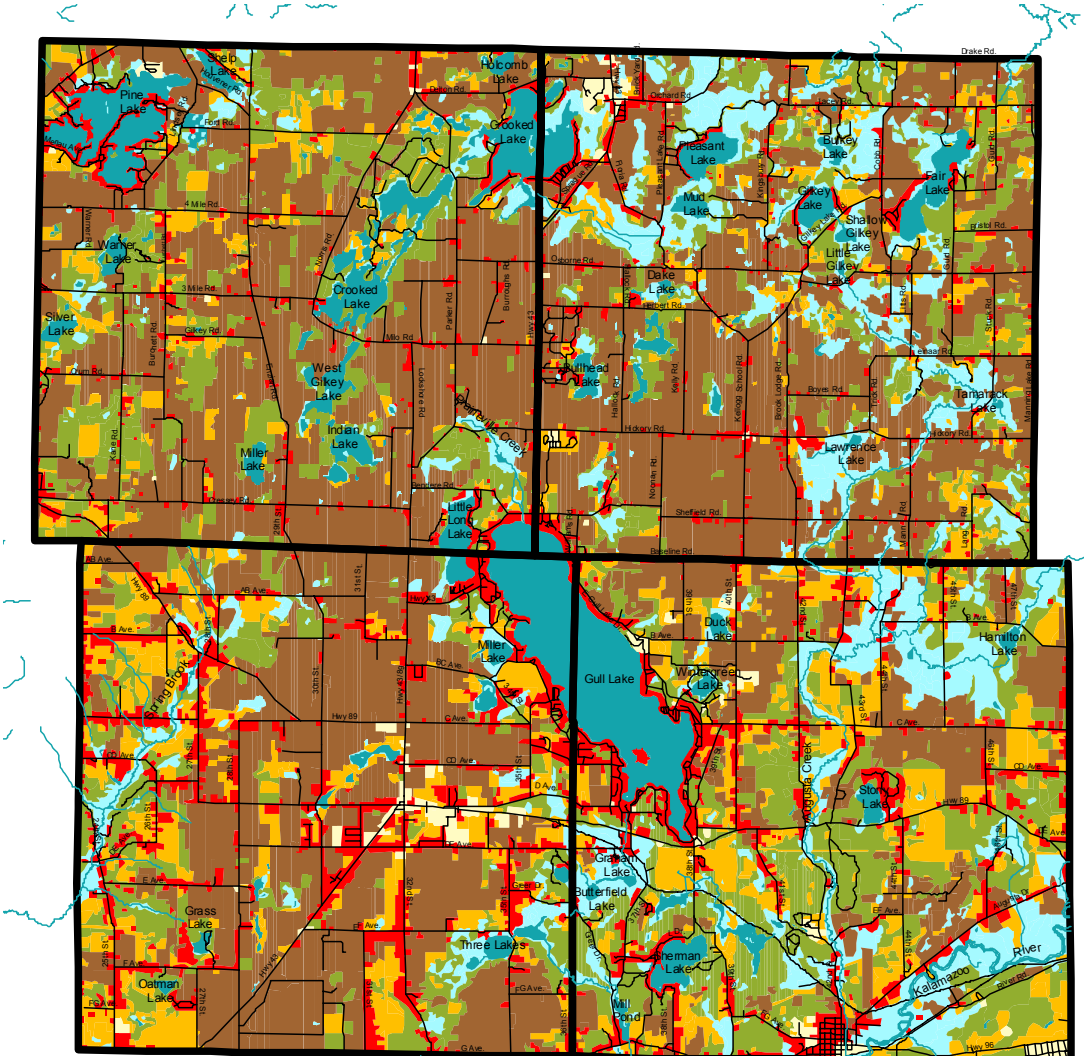
Though a significant amount of farmland remains within the four townships, land fragmentation has left few viable, large-scale farming operations. Between 1978 and the mid-1990s, about 6,000 acres of farmland (about 14 percent of the agricultural base) was converted to other uses. The four townships are a community in transition! Recognizing that significant developmental pressures exist here, landowners who want to subdivide their land should consider alternatives to help preserve rural character and protect water.

Four-Township Land Use—1978



- Residential
- Commercial/industrial/industrial
- Agricultural
- Open space/Recreational
- Forested
- Wetlands
- Lakes & ponds

Four-Township Land Use—1994/96



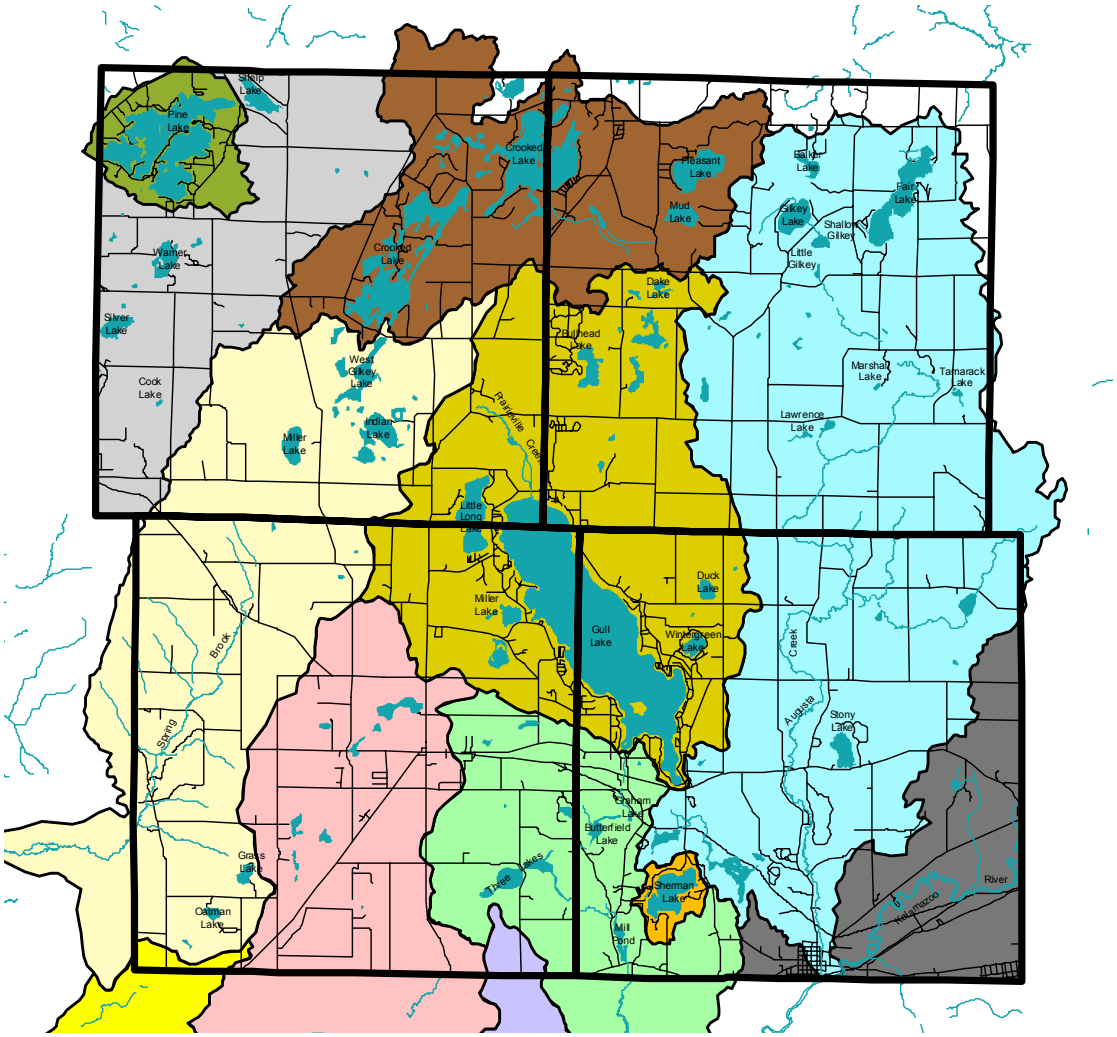
Four-Township Watersheds

This map shows surface watersheds in the four-township area. A watershed is an area of land that catches rain and snow and drains into a wetland, stream, river or lake. No matter where you live, you live in a watershed.

All watersheds in the four-township area eventually drain into the Kalamazoo River.

Understanding where watersheds are located is a very important tool for understanding the effects of development and how to protect water resources.

The map was developed by Dr. David P. Lusch, Michigan State University Center for Remote Sensing and Geographic Information Science, 2000.



- Township Boundary
- Gull Lake
- Spring Brook
- Crooked Lake
- Augusta Creek
- Pine Lake
- Sherman Lake
- Morrow Lake
- Gull Creek
- Comstock Creek
- Spring Village
- Silver Creek Drainage
- Kalamazoo River Drainage