# Chapter 2
# NATURAL FEATURES AND EXISTING LAND USE

The following discussion highlights the significant physical features of the Township and several aspects of the local environment that are important planning considerations for Heath Township. The material presented has been drawn from a variety of published sources and texts.

## Regional Location

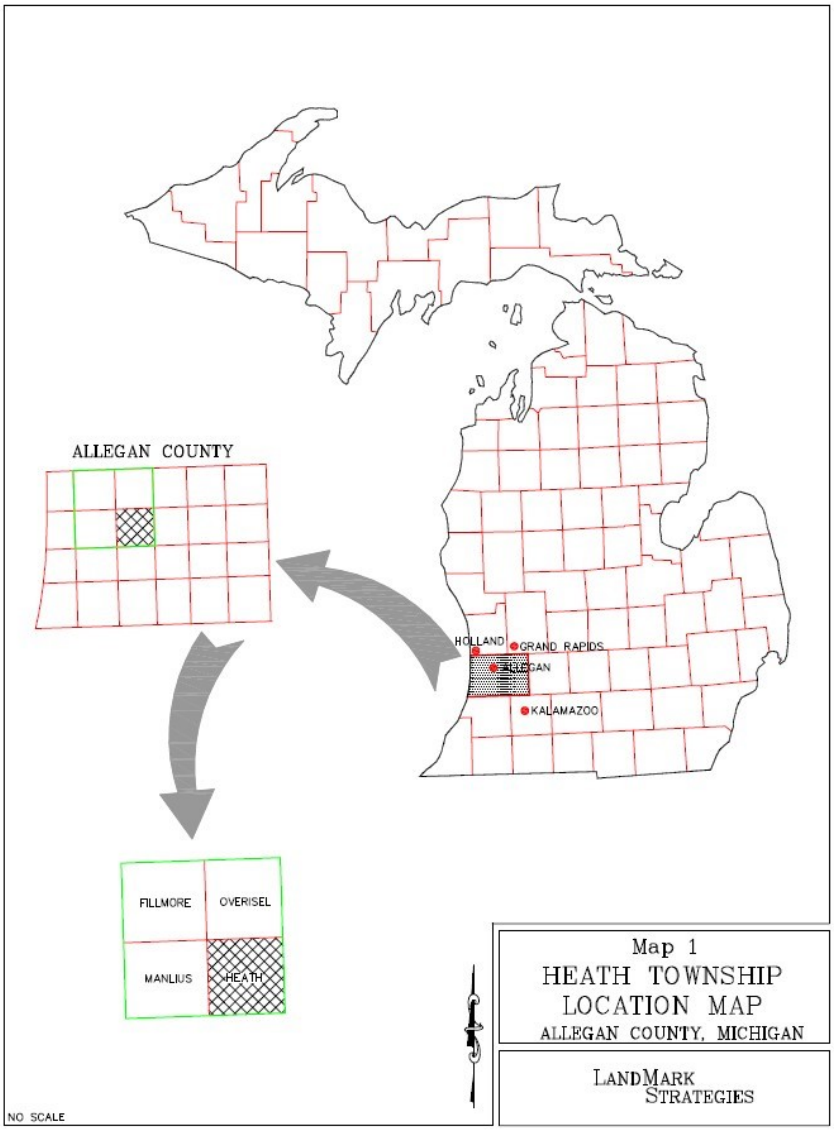
Heath Township is located in southwest lower Michigan in Allegan County (see Map 1) and encompasses 36 square miles of land area. It is approximately 6 miles southeast of the City of Holland and approximately 25 miles to the south west of Grand Rapids metropolitan area. The Township is eleven miles east of Lake Michigan and the City of Allegan is 6 miles to the southeast. The village of Hamilton is the unincorporated population center of the Township and is located in its extreme northwest corner.

The Township is traversed diagonally from northwest to southeast by M-40, a two lane state highway that connects directly to I-196 at the Holland exit. Highway M-89 crosses the area from east to west and forms the southern boundary of the Township. It connects the region to US-131 via the Otsego exit and with I-196 at the Fennville exit.

The Kalamazoo River flows northwesterly through the southwest corner of the Township to Lake Michigan.

## Topography

A basic understanding of the Township's topography is useful because differences in ground elevation and slope significantly influence the pattern of development and land use. As with most of southwestern Michigan, Heath Township was shaped by the most recent glaciers as they were receding. This created Lake Michigan and most of the major inland water features as well as hills, ridges and low areas. Subsequent to glaciation, drainage and erosion have further sculpted the surface of the area. Today, the most identifiable landforms are those that have been formed by the Kalamazoo River and its direct tributaries that include the Rabbit River and Bear Creek and the lesser tributaries of Silver Creek and Sand Creek.




The topography of Heath Township ranges from gently rolling to hilly. In general terms, the flattest terrain occurs in the central and south central portions and the steepest terrain exists in the southeast and east central sections of the Township. Heath Township's relatively minor topographic changes occur within a general range of between about 800 feet above sea level (in the southeast along 124th Ave, east of M-40) in Section 36) to just below 600 feet above sea level in Section 30 where the Kalamazoo River exits the southwest corner of the Township. The east central and southeast one third of the Township contains numerous ridgelines, woodlands, lakes and wetlands and is the most topographically diverse area.

## Climate

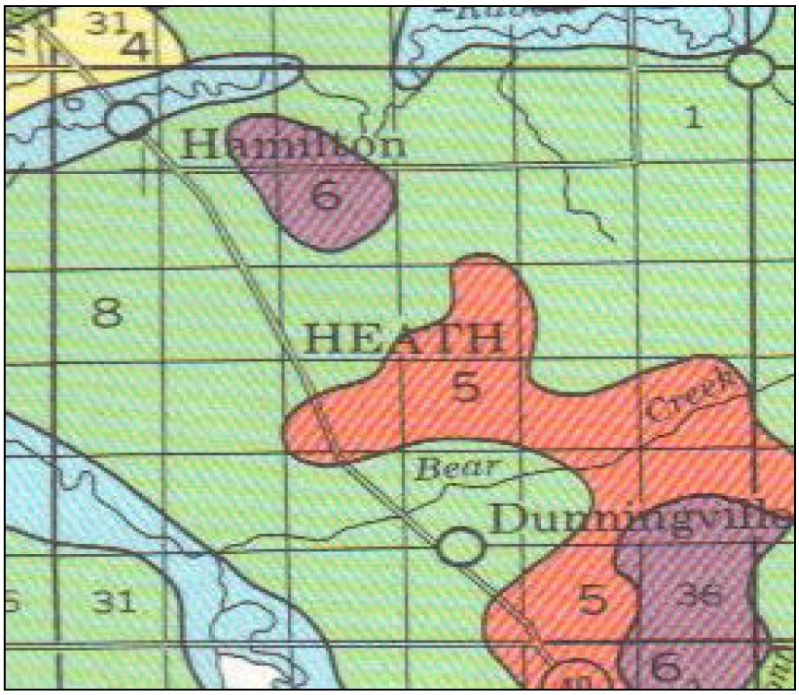
The Midwestern Regional Climate Center (MRCC) is an organization that monitors climatic conditions in the Great Lake region. According to their records, between 1971 and 2001 the average annual climatic conditions and temperatures at Hope College in nearby Holland range broadly throughout the year. Average annual low temperatures are 39.1°F, with the lowest temperatures (17.6°F) occurring in January. Average high temperatures were 57.9°F annually and 80.9°F in July. Yearly rainfall has averaged nearly 36.4 inches, and snowfall was just over

than 78 inches. These climatic factors are typical of seasonal change in a mid-latitude climate, and produce fertile grounds for agriculture, woodlands and wetlands.

The "lake effect" of nearby Lake Michigan on the overall climate is substantial and results in temperature extremes and averages that are a full three degrees warmer in winter and cooler in summer than areas just 30 miles to the east. The moderating influence of the lake is one of the reasons that Allegan County as a whole is one of the state's leading agricultural counties.

**Soils**

Soils play an important part in determining the suitability of land for specific types of land uses. Agricultural uses, in particular, are determined based on the type of crops that can be grown in the soil type(s) that are present on a given parcel of land. More intensive uses of the land can also be influenced soil characteristics such as permeability, slope, filtering capacity, bank stability, wetness etc. In any community where the preservation of its rural qualities is a goal, attention to the




**GENERAL SOIL MAP**
**HEATH TOWNSHIP, MICHIGAN**

**Map 2**

LEGEND

GLENDORA-ADRIAN-GRANBY association: Nearly level, poorly drained and very poorly drained soils formed in sandy and organic material; on flood plains, outwash plains, lake plains, and till plains

CHELSEA-OCKLEY-OSHTEMO association: Nearly level to gently rolling, somewhat excessively drained and well drained soils formed in sandy and loamy material; on moraines, outwash plains, terraces, and valley trains

MOROCCO-NEWTON-OAKVILLE association: Nearly level and undulating, somewhat poorly drained, very poorly drained, well drained, and moderately well drained soils formed in sandy material; on outwash plains, lake plains, and beach ridge s

MARLETTE-CAPAC-METEA association: Nearly level to very hilly, moderately well drained, somewhat poorly drained, and well drained soils formed in loamy and sandy material; on moraines and till plains

OAKVILLE association: Nearly level to steep, moderately well drained and well drained soils formed in sandy material; on outwash plains, lake plains, dunes, moraines, and beach ridges

Source U.S. Department Of Agriculture, Soil Conservation Service Michigan Agricultural Experiment Station

natural suitability and limitations of the soil is therefore important. The soils in Heath Township range from predominantly sandy soils to scattered areas of heavy loams, clays and mucks. An overview of the area's "soil associations" or major soil groupings is useful in identifying the general suitability of soils for certain types of land use and provides further insight into the topography and drainage of the Township. The various soil associations are illustrated on the above map and are described in the text that follows. (Note: *The Soil Survey of Allegan County, 1987 is a complete resource on the area's soils and provides more detailed descriptions of the various soil associations and their characteristics*).

1. CHELSEA - OCKLEY - OSHTEMO. This association of soils covers over only a small portion of the Township's land area in section 6 in the northwest corner of Hamilton. These soils are predominantly sandy and loamy and are moderately suited to well suited for building and septic systems. Poor filtration capacity is the primary limitation.
2. MARLETTE - CAPAC - METEA. This association is situated two relatively small areas of the Township. One area is south east of Hamilton in parts of Sections 4, 5 8 and 9 and the other is in the extreme southeast, covering Section 36 and parts of sections 25 and 35. In both areas the topography is hilly with several low wetland depressions and small lakes. The major soils are moderately well drained to poorly drained sands and loams. In the southeast, most of the land is presently wooded or farmland. In the north, most is farmland. Those soils presently being farmed are fairly well suited for that purpose. Because of an underlying clay layer most of these soils exhibit moderate to severe development and septic tank limitations and are therefore not well suited for intensive development without sewer and or water utilities.
3. MOROCCO-NEWTON-OAKVILLE. This association soils covers much of the southeast part of the township, extending as far north as 130th Ave. and as far west as 44th St .The topography is undulating. The combination of soils range from somewhat poorly drained, very poorly drained, well drained, to moderately well drained soils formed in sandy material. They were formed on outwash plains, lake plains, and moraines. Permeability is rapid and other limitations include slope and wetness. Development and septic suitability generally ranges from moderate to severe in this areas. Numerous wetlands and areas of hydric soil are found in this area.
4. OAKVILLE. The Oakville association covers roughly 65 percent of the Township. It consists of topography ranging from nearly level to steep. Soils are sandy and are either moderately well drained or well drained. In Heath, they are located on outwash plains, lake plains, moraines and ancient beach ridges. The majority of soils in this association exhibit slight limitations on septic systems and slight limitations on construction and development.
5. GLENDORA-ADRIAN-GRANBY. These bottom land soils that are nearly level, poorly drained and very poorly drained. In Heath Township they were formed in sandy and organic material within the flood plains of the Kalamazoo and Rabbit rivers. Flooding and wetness are severe limitations on development.

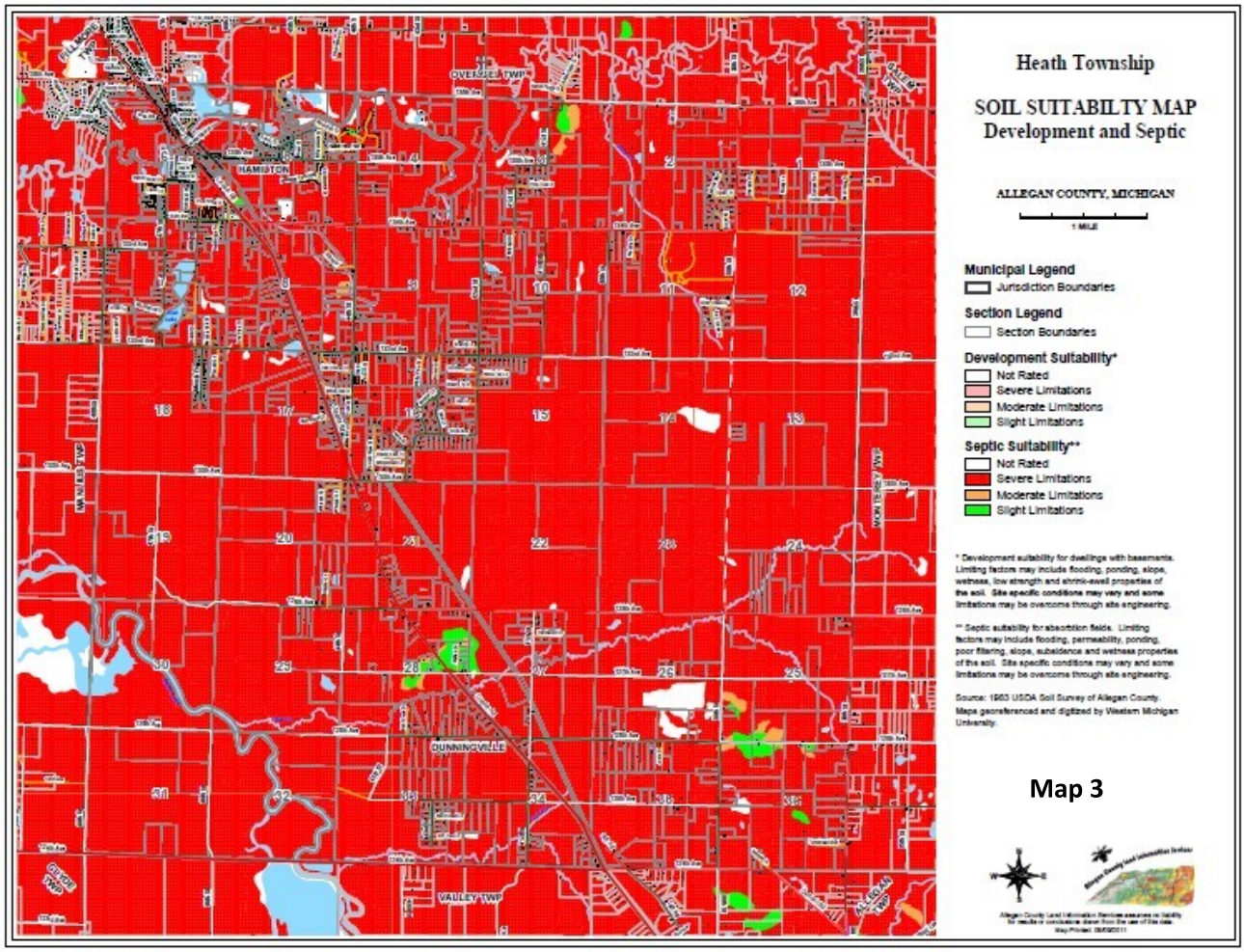
*Development Suitability*

In a predominately rural area such as Heath Township where public sewer facilities are not available and the prospect for their near future provision on a large scale is unlikely, the ability of soils to accommodate private septic systems is a crucial element in land use planning. Due to poor percolation and wetness, and in the other extreme, the inability of permeable soils to adequately

filter effluent before it reaches an aquifer, many areas of Heath Township must be considered generally unsuitable for intensive development. As a result, the location and character of new development must in part be determined by the ability of soils to accommodate private septic systems.

The suitability of soils for supporting building structures is another important influence factor on development. Some areas of the Township have soils which due to a high water table, flooding, shrink-swell potential, steep slope and other factors, place severe limitations on the ability to construct buildings. Often times these limitations are so severe that special designs, special and costly construction methods and increased maintenance are required.

The "Soil Suitability" Map illustrates those areas of the township having characteristics of




soil, topography and drainage that are considered poorly suited for both structural development and septic systems. The map, in effect, rates surface soils as to their suitability for supporting buildings

(development) and also rates soils on their ability to attenuate wastewater leachate from septic systems. The map is based on information contained in the "Soil Survey of Allegan County, Michigan" prepared by the U.S. Department of Agriculture. The map takes into consideration soil percolation rates, wetness, filter qualities, shrink-swell properties and slope.

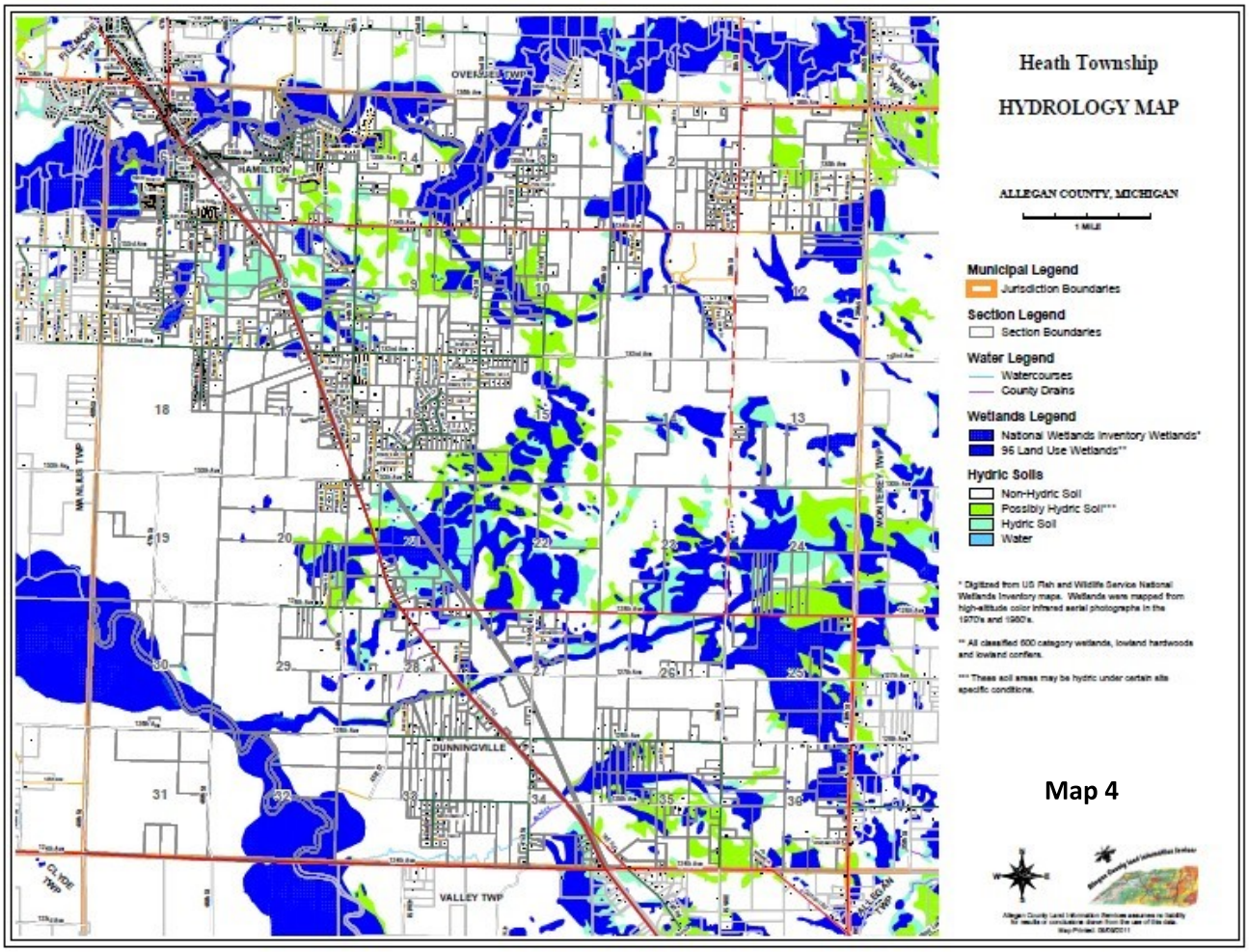
It should be noted that soils identified as being “generally unsuitable for development or septic use” may still be judged useful after a more detailed site analysis or with on-site modification. However, significant development in these areas could greatly increase the potential for groundwater degradation and public health hazards and in turn, may eventually lead to a need and demand for public utilities. If such problems and their associated high cost are to be avoided, the density and intensity of development in rural areas with poor soils should be held to a minimum.

As a general rule, the least suitable soils for development are those that are classified as “hydric” soils. These soils are very poorly drained, saturate easily and retain large quantities of water. When hydric soils are artificially drained, they are often suitable for farmland use. Hydric soils are commonly found near waterways and correspond to current or former wetlands.

In Heath, hydric soils are found along the Kalamazoo River and Rabbit River, Bear Creek, Swan Creek and Silver Creek. The most notable concentrations are the “muck lands” located south and southeast of Hamilton in Sections 5, 8 and 9 where artificial drainage has enabled them to be cultivated. Other concentration are found in the east central portion of the Township in Sections 21, 22, 23, 24 and 25 and elsewhere such as in Sections 10, 35 (see Hydrology Map). Residential, commercial and industrial development in areas containing hydric soils is typically avoided and if proposed it should be carefully scrutinized.

In summary, in much of Heath Township there are ample areas where building limitations (ability to construct) are slight and as a result, the development pattern is consistent with the quality of the soils. Of significance however, is the fact that much of the land in the Township that is least suitable for development, is within the Allegan State Game Area. Because of its public ownership, it has not seen environmental degradation due to development pressure. Almost the entire Township is, nonetheless, layered by soils that pose severe limitations for septic system absorption fields. For this reason intensive development may ultimately require public investment in wastewater collection and treatment facilities or private “engineered” sanitary sewer facilities. Care must also be taken when developing land limited by slope and wetness. These limitations sometimes cannot be sufficiently overcome to accommodate the development and the Township’s development

policies should reflect this.

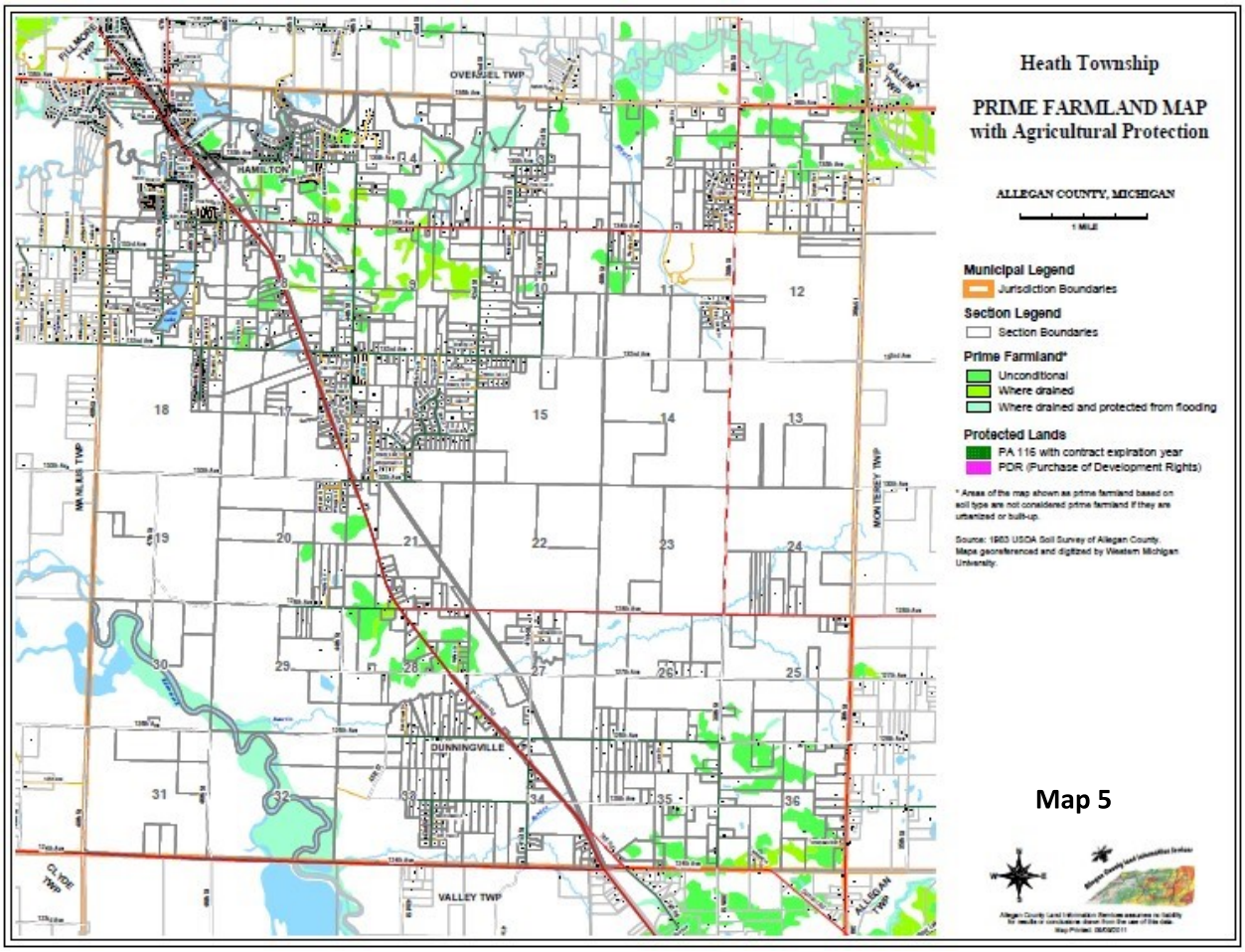



*Prime Farmland Soils*

The "Prime Farmlands" map shows the location of prime agricultural lands within the Township as determined by the U.S. Department of Agriculture. Prime farmland is land that is naturally endowed with the soil quality, growing season and moisture content that allows it to sustain high crop yields under average farming practices. The Prime Farmlands Map illustrates areas that are considered prime in their natural state as and also shows areas that are "prime" when augmented by improved drainage systems. In many rural Michigan communities farm tracts have been protected through enrollment in the P.A. 116 "Farmland and Open Space Preservation Program". The map key on the Prime Farmland map makes reference that program but there are presently no farms in Heath Township that are enrolled in the program.

The Township's prime farmland soils are not very extensive and are limited to scattered

areas in the northern and southeast sections of the Township. Larger areas of active, “less than prime” soils generally surround the “prime” soils and collectively they comprise over 3000 acres and represents roughly 25% of the privately held land area of the township. Prime Farmland coupled with the more extensive areas of “less than prime” cultivation farmland are, therefore important influences on the Master Plan for the Township.



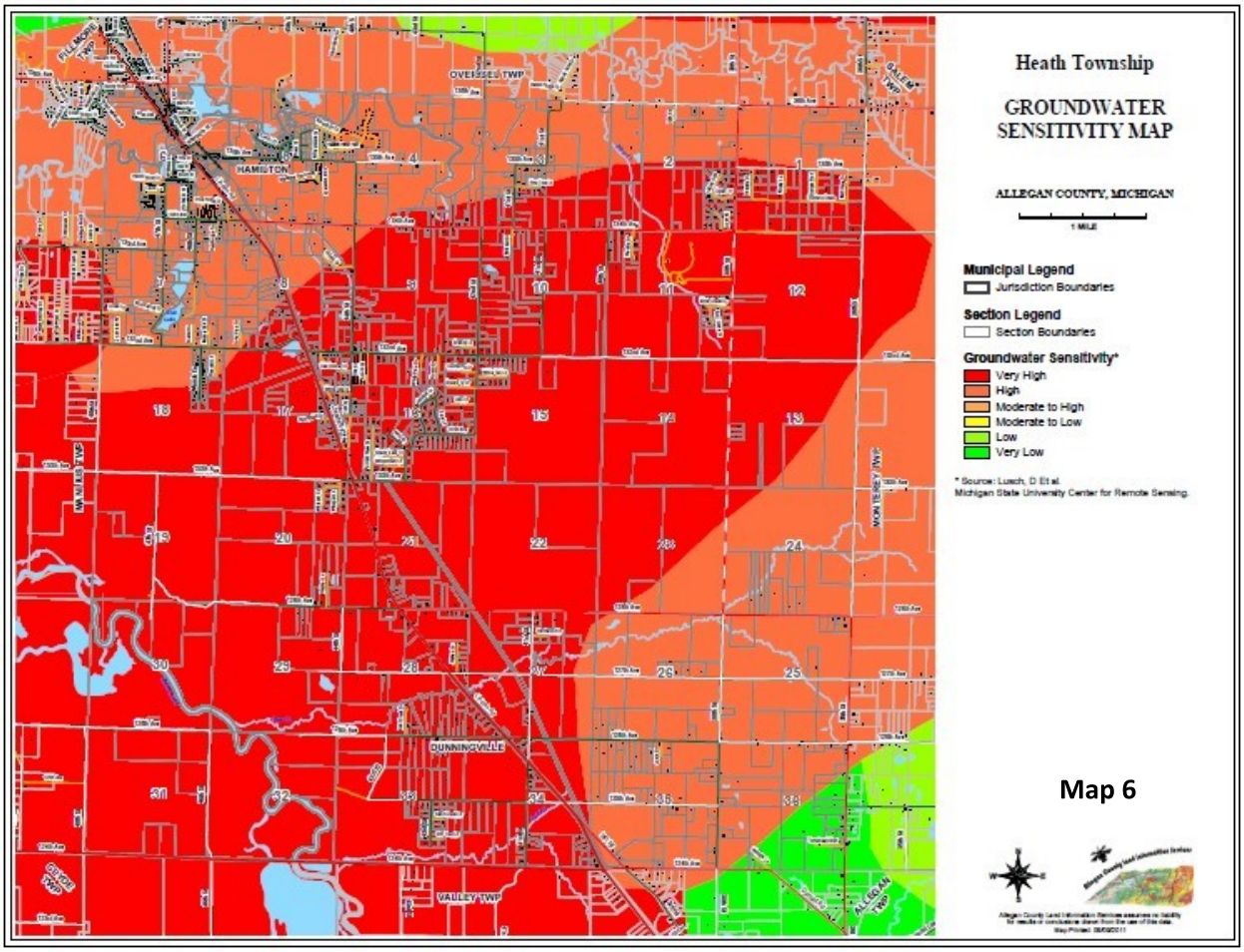

## Groundwater

Heath Township must rely on groundwater as its only supply of drinking water and private wells supply all of the water for residential, commercial and industrial land uses. Some of those wells draw from the confined, relatively deep glacial drift aquifer, which is separated from the ground surface by a "confining" layer of clay or rock. Some wells draw from the unconfined aquifer, which is nearer the surface and more vulnerable to contamination from the ground surface. In areas where surface soils are sandy or porous, as they are in most of Heath Township this can become a critical issue. Proper management of potential contaminates is therefore

crucial for Heath Township to have an unpolluted drinking water supply.

Some of the most common forms of groundwater contamination are agricultural and household chemicals in the forms of fertilizers and pesticides. Animal waste from feedlots also contributes to contamination and as previously alluded to, household and commercial septic systems can contaminate groundwater supplies due their placement in sandy-textured soils having limited filtering abilities.

The Allegan County Health Department has established standards for septic systems and if certain site characteristics are not met, permits for septic systems are not granted. Other common forms of groundwater contamination include improper disposal of industrial waste, landfills and use of salt to de-ice roadways.




The "Ground Water Sensitivity" map shows the "sensitivity" of various regions of the Township to groundwater contamination. Areas in the Township which are most vulnerable to

groundwater contamination are shown in red and are located in the north and east central areas. Those least vulnerable are shown in green and are found in the central portions. The green areas are protected by layers of heavy soils whereas the red and pink areas often have porous layers of soil that allow rapid infiltration of pollutants. As can be seen, over 50% of the Township is "in the "very high category of vulnerability and nearly all of the rest is in the "highly vulnerable" category. Less than 2 percent is in the "low" or "very low" category of vulnerability.

**Surface Waters and Watersheds**

A watershed includes the water resource (a stream, river, lake or aquifer) and all the land that drains into the resource. Watersheds are defined as areas divided by a ridge or stretch of high land where each area is drained by different rivers or river systems. Heath Township lies completely within the Kalamazoo Watershed, but only the southern one half of the Township flows directly in to the Kalamazoo River itself. The northern half flows into a major tributary, the Rabbit River. The Rabbit River joins the Kalamazoo just a few miles to the west and the Kalamazoo River continues on to Lake Michigan. Other streams in the Township that flow into the Kalamazoo River include Bear Creek and Sand Creek. Silver Creek drains into the Rabbit River before reaching the Kalamazoo.

The Kalamazoo River watershed contains 2,020 square miles of land or 1.3 million acres. Approximately 400,000 people live in the watershed, with the most being concentrated in the metropolitan areas of Kalamazoo and Battle Creek. The population centers within Allegan County include the City of Allegan, Otsego Plainwell and Saugatuck/Douglas. To protect water resources, it is necessary to address the land use because as water drains off the land or leaches down into the groundwater, it carries with it the effects of human activities throughout the watershed.

Some concerns for the overall Kalamazoo River Watershed include habitat loss and degradation, non-point source pollution, and PCB contamination. Habitat loss and degradation has occurred partially from erosion of the river causing sedimentation and different sources of pollution. Non-point source pollution is largely the runoff of contaminants to lakes, streams, rivers, and wetlands when it rains or when snowmelts. Common non-point sources of pollution are livestock operations, farm fields, urban and suburban streets, lawns, parking lots, industrial, commercial, construction and household activities. Water quality in the Kalamazoo River is significantly affected by runoff from all of these sources. Most of the original point sources of

pollution no longer exist upstream, but due to the large amount of residual contamination in the Kalamazoo River, the river was designated for “Superfund” cleanup in 1990. Cleanup has been ongoing upstream in several locations by the Michigan Department of Natural Resources and the U.S. Environmental Protection Agency (EPA). Much of the Kalamazoo River remains essentially wild and natural however and cooperative efforts between residents, businesses, local, county and state governments are needed to protect water resources within the Township and Allegan County for future generations.

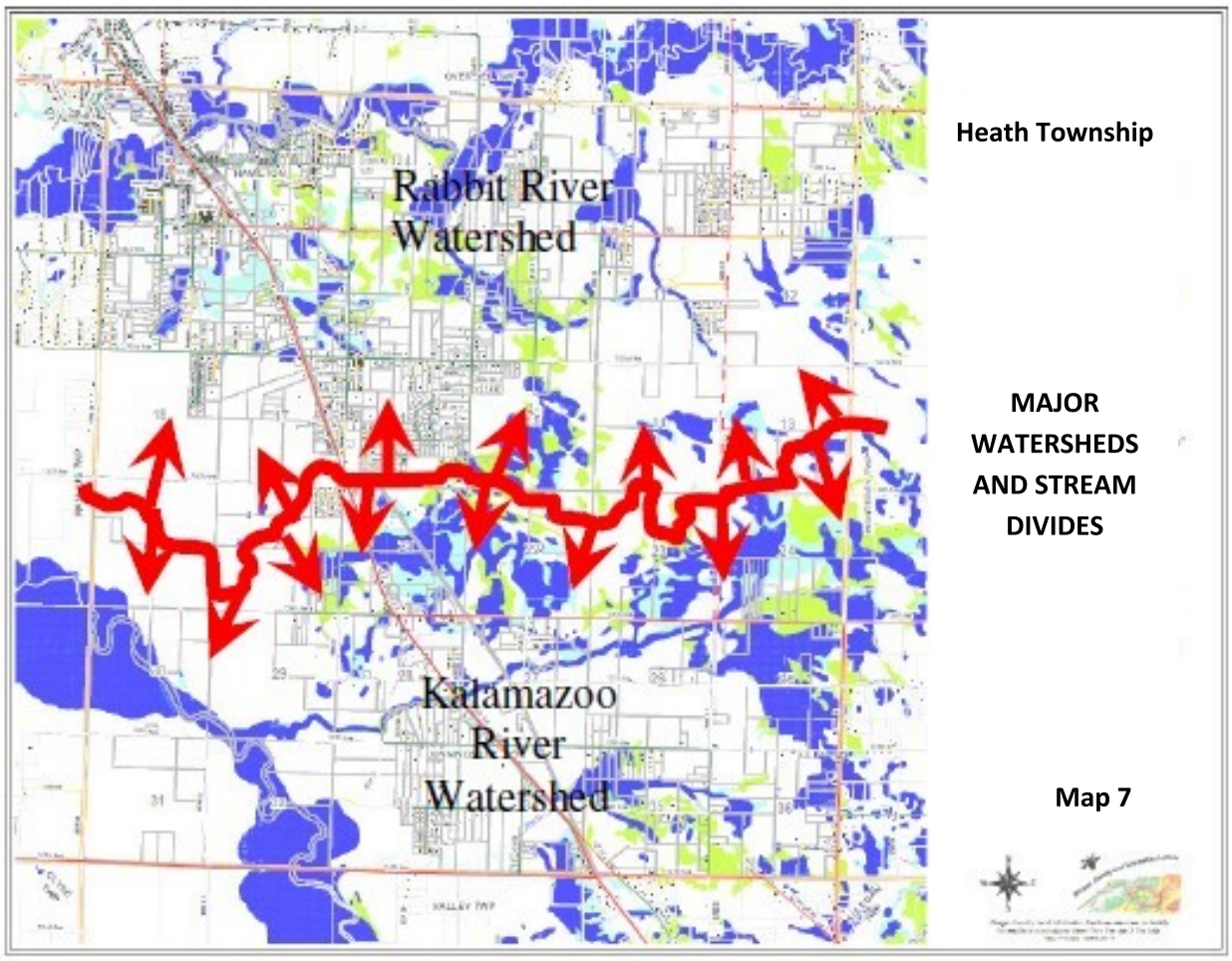
While much of the main channel of the Rabbit River and several of its tributaries (including Silver Creek) remains as a "State Designated Trout Stream", significant impairments have none-the-less occurred as a result of increased sedimentation, deforestation, and pollution. Included are a decrease in biotic diversity, reduced fish populations and flooding. The Rabbit River Watershed has been categorized as a "Conservation Priority Area” for the USDA's Environmental Quality Incentive Program to Reduce Non-Point Source Pollution.

Except for within the confines of Hamilton, the land uses along the Kalamazoo and Rabbit Rivers and the smaller tributaries in Heath Township are rural and mostly agricultural in nature and most streams banks are characterized as corridors of wooded wetland or rolling woodland. Nonetheless, to varying degrees, the streams have been directly impacted by agricultural practices and clearing associated with rural residences. Many locations immediately adjacent to the streams are subject to periodic flooding but there are no Federally mapped 100 year flood plan areas.

The system of streams has been greatly modified by man and augmented by an extensive system of surface drains and a few underground drains. The majority of these "county drains" are in the northern portion of the Township where the topography is relatively flat and the water table is naturally high. The improved drainage network has enabled much of the area’s most naturally fertile soils to be put into cultivation. The Allegan County Drain Commission has primary responsibility for maintaining this drainage system.

Water quality within any watershed is directly related to the land management practices within that watershed. For example, if a new housing development creates a large amount of impervious surface such as rooftops and streets, and storm water is not properly managed, it is possible that the rate and volume of flow into and within the creek, stream or river will increase to a point that stream bank erosion occurs. Stream bank erosion will increase

silt material on the streambed, change the chemistry of the water with phosphates, nitrogen and other chemicals and alter the turbidity of the water. Any of these changes could have an adverse effect on the wildlife that is dependent on the stream or river for survival




Heath Township was one of the first communities in Allegan County to adopt restrictive overlay zoning standards to help protect its stream corridors and there is a significant effort underway to address the water quality issues in the balance of Rabbit River Watershed. Through educational and financial assistance, the Upper Rabbit River Watershed Planning Project encourages each local unit of government within the watershed to implement "smart growth" and “low impact” development policies and provides landowners, farmers and residents an opportunity to establish goals for local water quality. The project has helped to identify and establish critical watershed areas, proposes best management practices and has produced a watershed management plan covering the 187,200 acre watershed. This project is on-going and

is being conducted in association with the Allegan Conservation District.

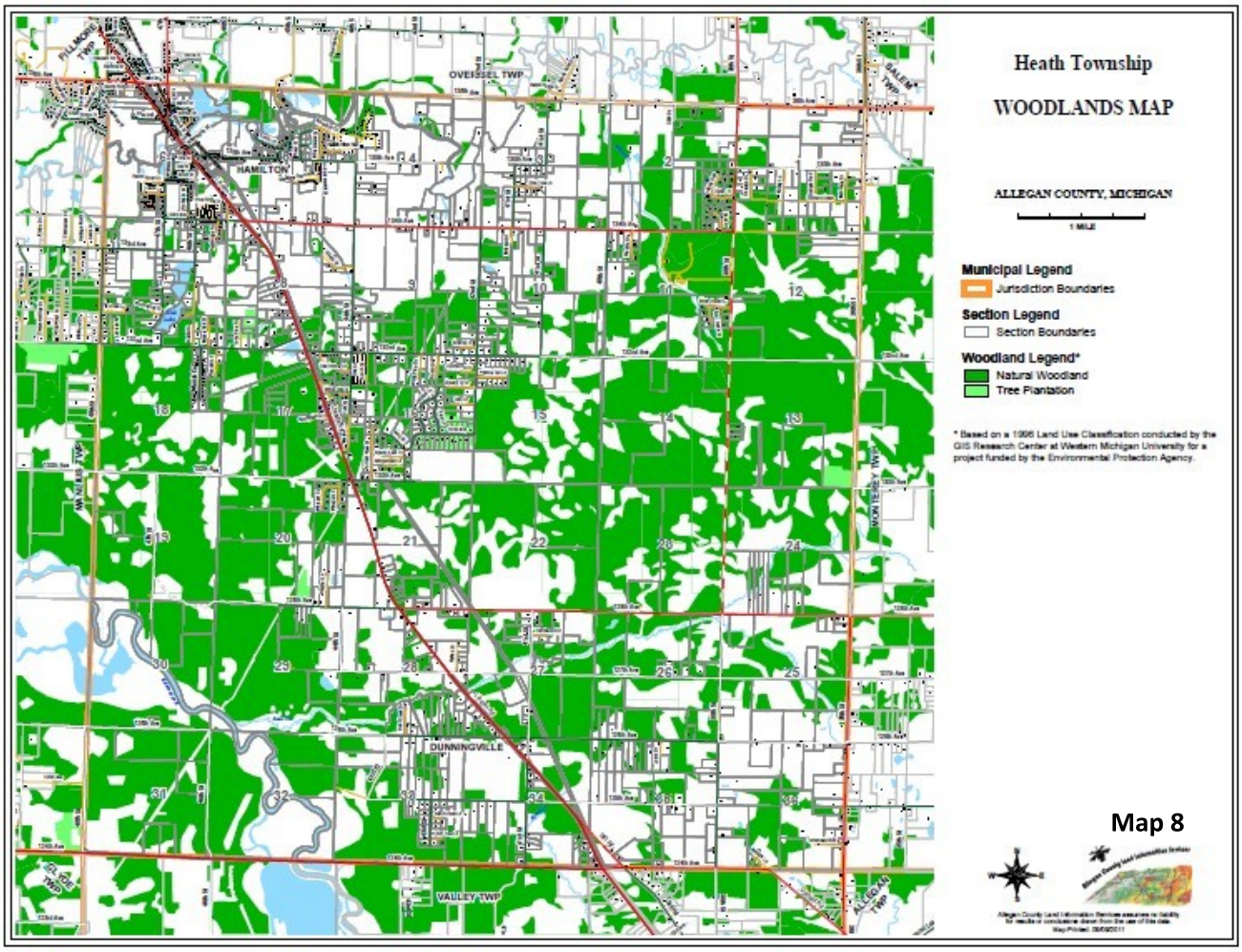
Wetlands are another important hydrological feature in Heath Township. Wetlands are complex ecological systems that provide valuable drainage, flood control as well as water purification functions. Wetlands that overlay groundwater recharge areas improve groundwater quality by filtering the water as it percolates through the soil. Wetlands located along a watercourse protect surface water quality by filtering surface run-off. Finally, wetlands are highly productive ecosystems, which provide an essential habitat to much of Michigan's fish and wildlife. The preceding "Hydrology Map" illustrates the existence of a significant number of wetlands in the Township and most are directly linked to the rivers, streams.

The Hamilton dam impoundment on the Rabbit River was created in Hamilton in the 1850's and is the largest body of water in the Township. Discussions and controversy over the removal of this historic feature for the purpose of restoring the natural habit of the River is ongoing. Sink Lake, in Section 7 near Hamilton, is the only significant standing water body within the Township. The lake is approximately 70 acres in size and is surrounded by low density residential development.

**Woodlands/Greenspace**

Significant woodlands are found throughout the Township and the most extensive are associated with steep hills and low lying wetlands and streams. Also chief among the area's woodland resources are the many forested acres included within the Allegan State Game Area. The Allegan State Game covers nearly 10,000 acres or roughly 43% of the Township and is its single most dominant land use. The Game Area consists of primarily of reforested land that was formerly cleared. Taken in combination with the patchwork of privately held woodlots and wooded wetlands there remains an extensive network of woodland cover over well over two thirds of the Township.

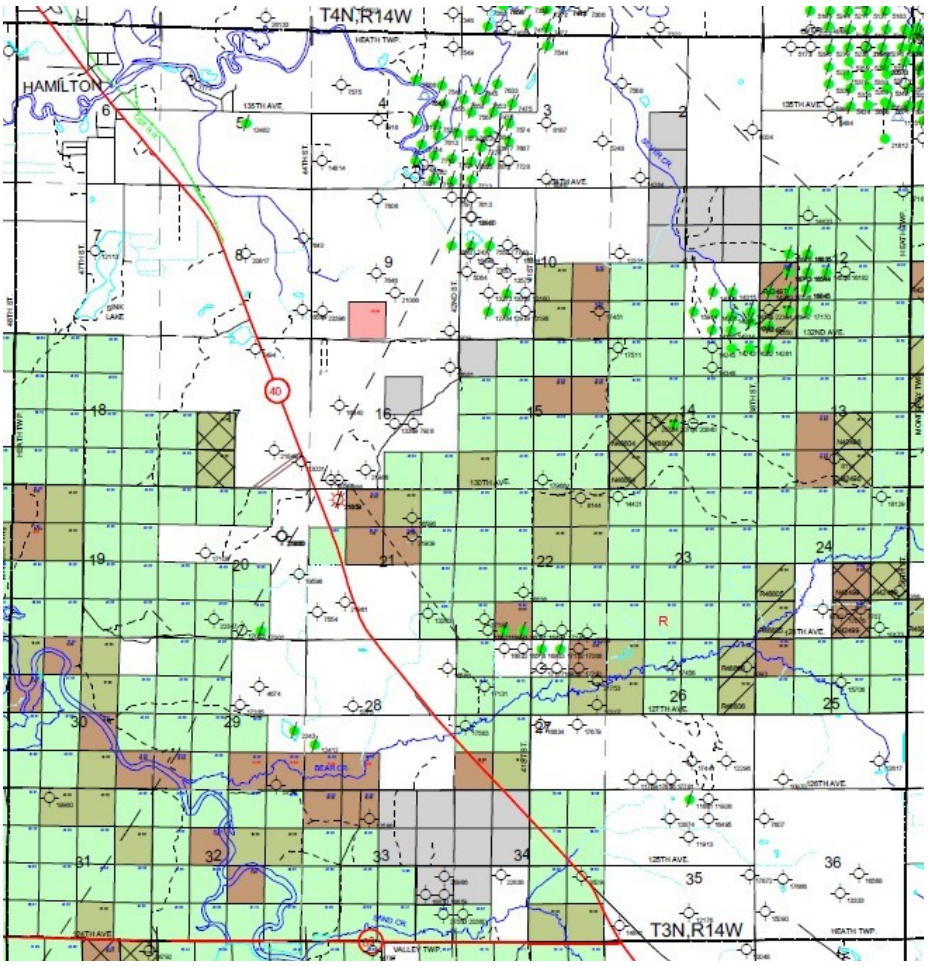
Local forested lands include northern, central and lowland hardwoods; aspen and birch associations, and pine stands. These wooded areas provide a variety of habitat settings for wildlife and are an important attribute of the local landscape. In the future, the limited woodland areas are likely to be attractive focal points for housing development. Development designs which recognize tree stands as an important amenity to be preserved should be required. Such designs will lead to better projects and will contribute to maintaining the overall rural character of the Township.




## Wildlife

With a majority of the Township covered by forests and farmland, there is prime habitat for a variety of wildlife. The brush, woodlands, wetlands, native grasslands and waterways provide good habitat for white tail deer, squirrels and raccoon. Other wildlife includes cottontail rabbits, red and gray fox, muskrat, mink, opossum, skunk, various song birds, ruffed grouse, woodcocks, Great Blue Herons, geese and other waterfowl. Sandhill Cranes, and Trumpeter Swans may also exist in the Township and the Eastern Massasauga rattle snake may also occur here as do a number of other wildlife and plant species of special concern that are protected by the State of Michigan. The many miles of small streams also support a variety of game fish. This variety of wildlife is an impressive resource and provides those who hunt, fish, and enjoy viewing wildlife with invaluable recreational opportunities.

## Mining Resources




**Heath Township**
**MINERAL LEASE INFORMATION**
**AND DNR OWNERSHIP**

**Map 9**

OIL AND GAS WELLS
- Oil
- Natural Gas
- Gas Condensate
- Gas Injection
- Gas Storage
- Liquified Petroleum Gas Storage
- Gas Production and Brine Disposal
- Brine Disposal
- Dry Hole
- Water Injection
- Other Injection
- Observation
- Other
- Permitted Well Location

PLUGGED WELLS
- Plugged Well Symbol

DNR OWNERSHIP
- Surface
- Mineral and Surface
- Minerals
- Mixed Ownership
- Other Rights

*Source: MDNR, Forest, Mineral and Fire Management, DNR Land and Mineral Ownership Map, Allegan County 2/7/2012*

Within Heath Township are glacially created landforms containing extensive deposits of sand and gravel. Used as construction material, these deposits are basic resources necessary for the construction industry and economic development in general. It is necessary and unavoidable that these deposits will continue to be tapped to support the construction of new roads and other development within and near the Township. Sand and gravel deposits are found extensively throughout the north and northeastern portions of the Township as well as in the southeast. At the present time, there are several active sand and gravel mines in the Township.

There are also approximately 90 oil wells in Heath Township. Most of them are located in Section 1, near Diamond Springs in what is known as the "Diamond Springs Oil Field". Others are located two miles west of the Diamond Springs Oil Field, in sections 3, 4 and 10 and another group is also found nearby in Sections 11 and 12. Most are stripper wells, capable of producing only small volumes of oil per day. The operation of these wells is sporadic and is tied to the price of oil. Only about 15 of the wells are presently active.

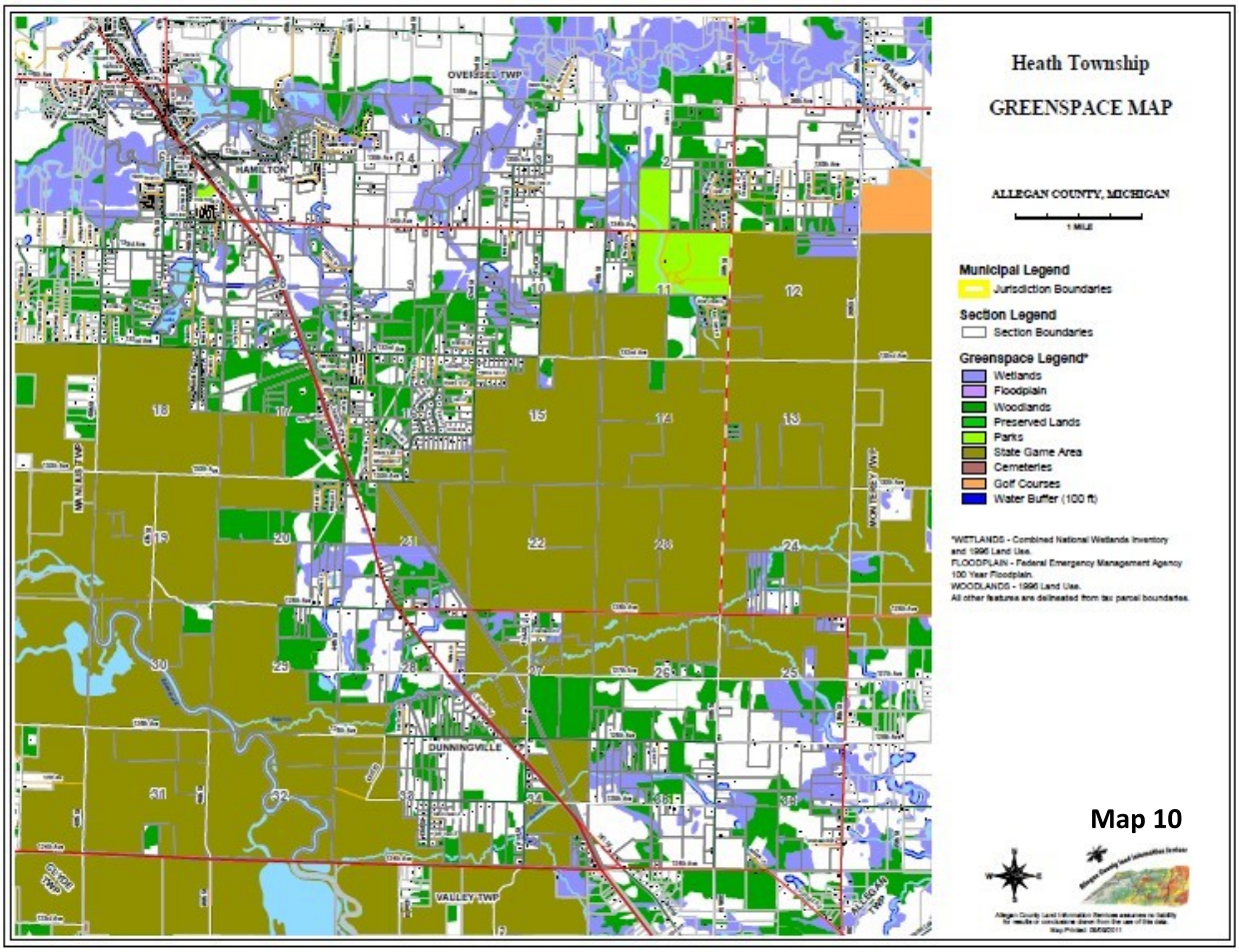
**Existing Land Use**

The Allegan State Game Area was created by the Michigan Department of Natural Resources in 1964 by combining the Allegan State Forest, Swan Creek Wildlife Experiment Station and the Fennville State Game Area into one unit. It is administered by the Department of Natural Resources Wildlife Division. This massive area cuts diagonally across the Township in a southwest to northeast direction.

The Game area is used for camping, boating, canoeing, hunting, fishing equestrian riding and winter sports activities such as Nordic skiing and snow shoeing. It is also used for wildlife and nature studies, and preservation. The presence of this area has both advantages and disadvantages. It is positive because it makes a major contribution to giving the Township a distinct open space character and reduces sprawl by forcing growth in the privately owned areas. Unfortunately the state game area cuts the Township in half, providing little sense of connection between the northwest and southeast corners.

Farmland is concentrated in the northwestern quadrant of the Township, with Section 1, 2, 3, 4, and 9 containing the largest number of acres. There are scattered tracts of agricultural land in the southeast comer of the Township, but these are generally less than 80 acres. As previously discussed, there is not an abundance of prime farmland soils in the Township. Sections 9 and 36

have the largest amount with the northern tier of sections having lesser amounts. Residential land use is a focused primarily in the Hamilton area in the northwest and extends southeast in a path along of M-40, and east along 132nd Avenue. Other residential land use is scattered on large parcels throughout the Township. From the pattern of residential development, it is easy to discern that residential land use and agricultural land use are competing for the same tracts of land. The growth pressures for residential development make it likely that there will be a long term tendency to lose farm land to residential development as time goes on.




Commercial land use is a function of the population concentration of the Village of Hamilton and of M-40 as it passes through the Village. There is a commercial core in the Village and a variety of convenience type commercial uses along M-40. Because of the fact that much of the frontage of M-40 is private property, there has been a slow but steady increase in the amount of frontage that is devoted to commercial development in the Hamilton area. South of town however much of the frontage to remains in open space and provides a scenic appearance for

motorists using the roadway.

Industrial development consisting of motor freight company small warehousing facilities and job shops and farm related support industry such as grain elevator and egg processing facility also exist The general pattern for most of the industrial land use is as an extension of the commercial areas along M-40 to the south east. Other land shown as industrial consists of gravel pits. One is located in Section 17; the other is in Section 26. The total amount of land used for gravel mining is about 360 acres.