

## Chapter II River Basin Descriptions

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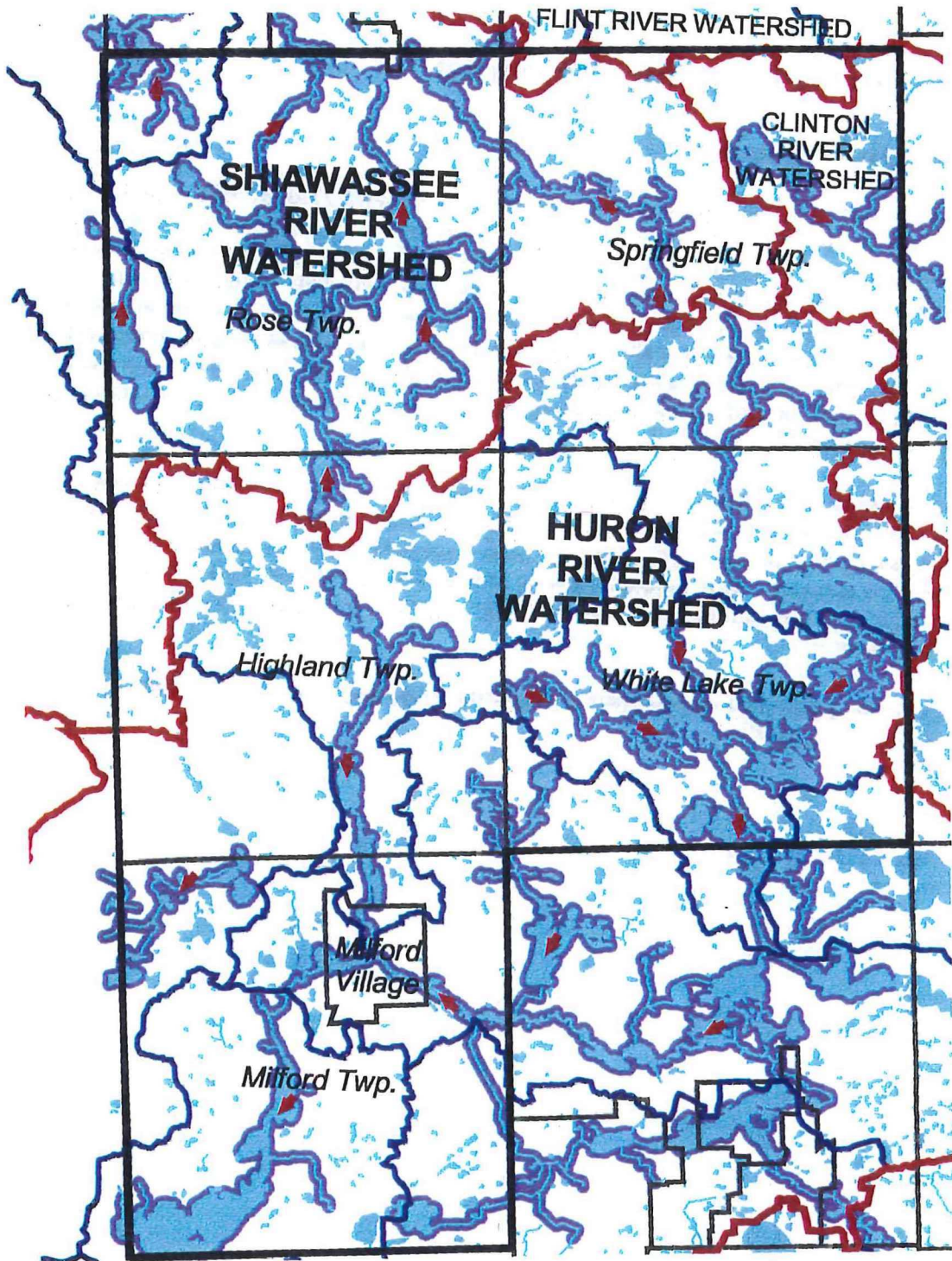
## Chapter II. RIVER BASIN DESCRIPTIONS

### Natural Resource Context

The Shiawassee and Huron Headwaters Resource Preservation Project study area contains the headwaters of two rivers: the Huron and the Shiawassee Rivers. In addition the study area includes a small portion of the Clinton River Watershed. Each river has a watershed, or drainage area, which is the land area from which all surface water will eventually drain into that river. Utilizing the three rivers' respective watersheds, the project area was divided into distinct units of analysis. The Huron River Watershed is the most prominent in size, making up almost 3/5 of the entire study area. The Shiawassee River Watershed makes up the remainder of the study area, except for a small part of the Clinton River Watershed, which is less than 6 square miles (see Watershed map on next page).



The three watersheds are described in the following section. Typical landforms are also provided which show distinct natural resources areas that make up the watersheds' landscape. The typical landforms are based primarily on water depth and plant communities. Topography and soils were also used as determinants. Soil information was obtained from the Soil Survey for Oakland County. Vegetation information was based on the Michigan Resource Information System (MIRIS) maps.

The following pages also include maps that illustrate the study area's natural resources including topography and vegetation.



## Watershed

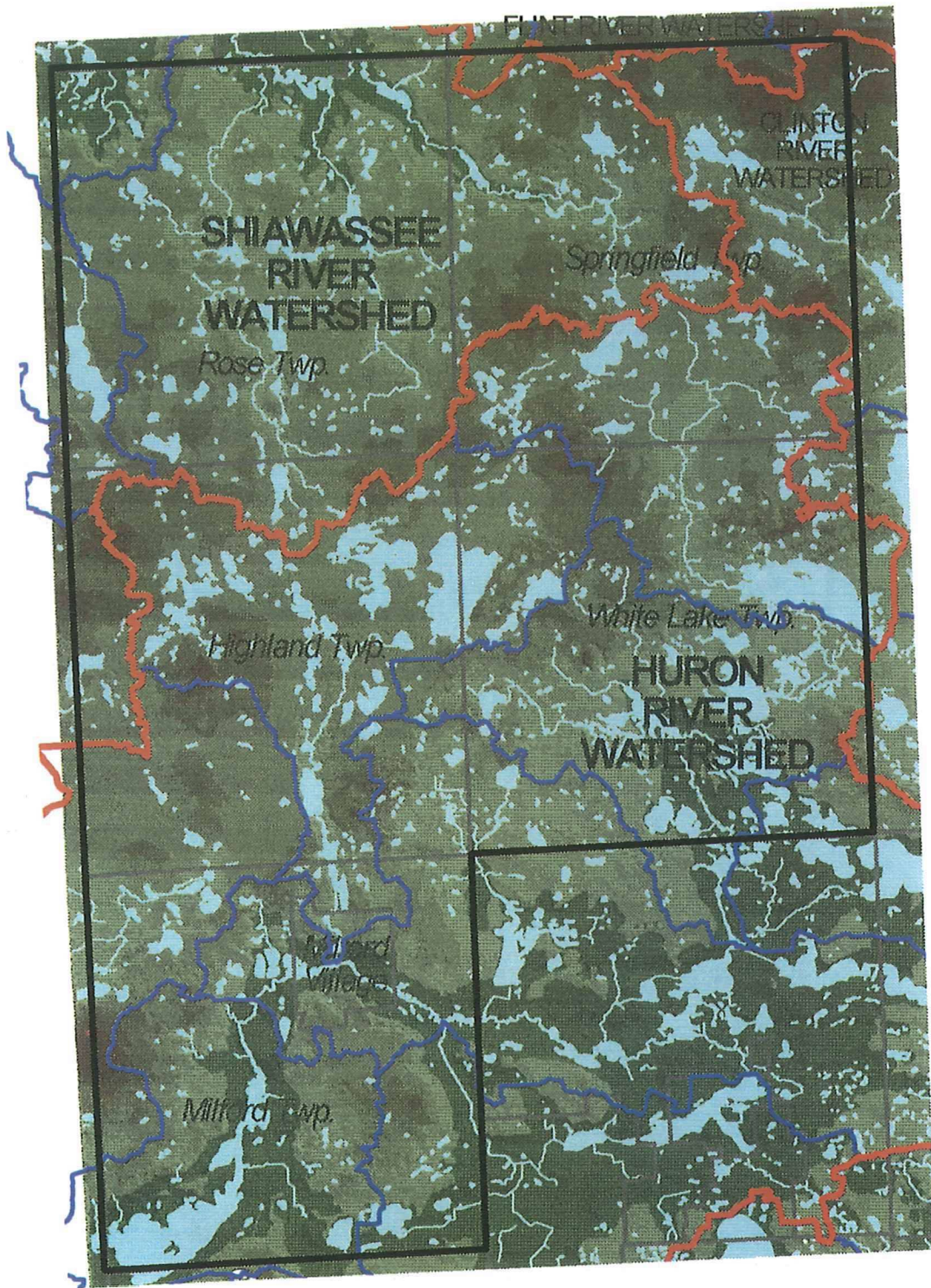
### LEGEND

-  Major River/Stream Corridor
-  Drainage Direction

-  Community Boundary
-  Watershed (major)
-  Watershed (minor)
-  Water Body







# Topography

## LEGEND

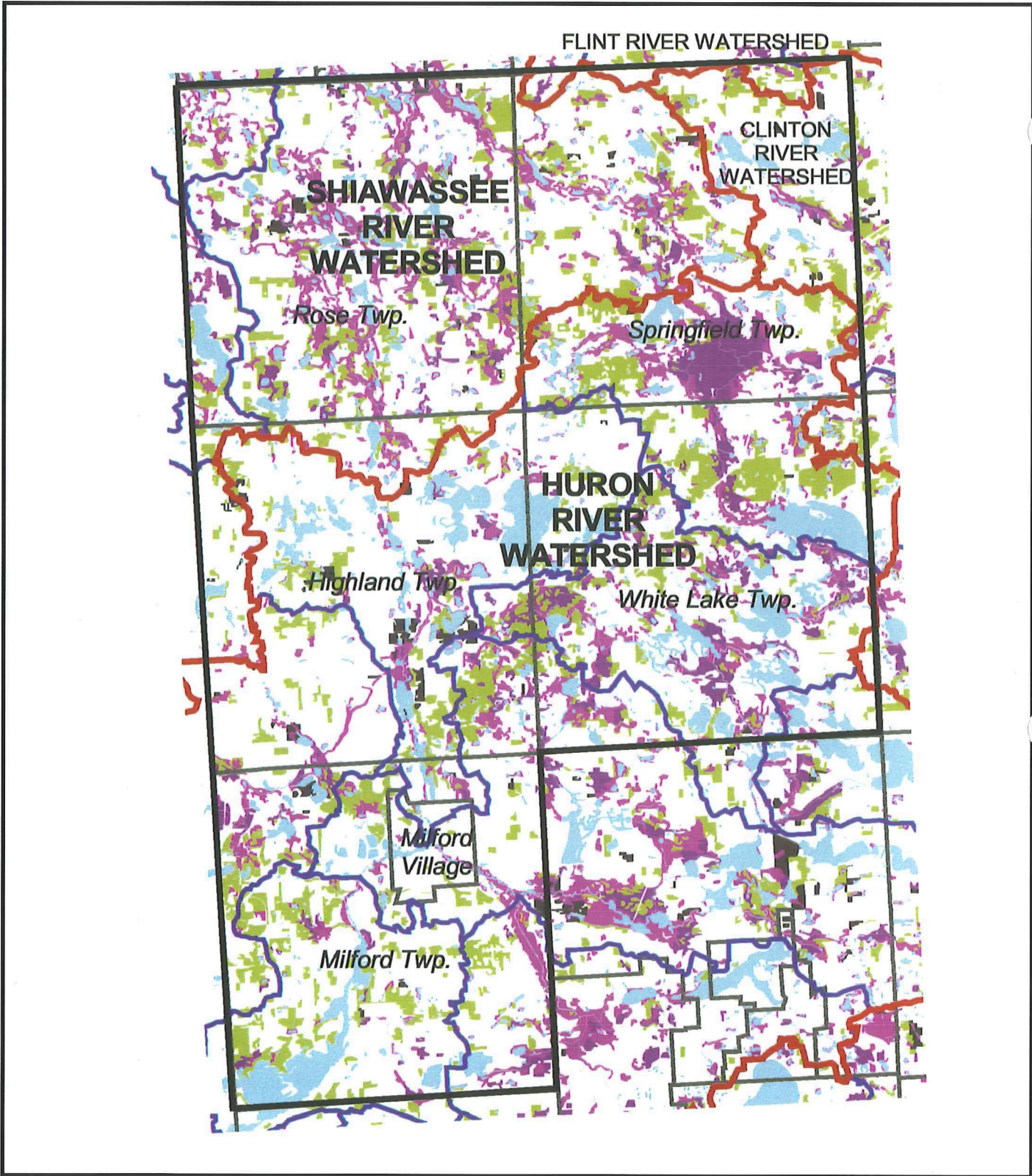
| Elevation Range |             |
|-----------------|-------------|
|                 | 1200 - 1250 |
|                 | 1150 - 1200 |
|                 | 1100 - 1150 |
|                 | 1050 - 1100 |
|                 | 1000 - 1050 |
|                 | 950 - 1000  |
|                 | 900 - 950   |
|                 | 850 - 900   |
|                 | 800 - 850   |

- Community Boundary
- Watershed (major)
- Watershed (minor)
- Water Body



Shiawassee & Huron  
Headwaters Resource Preservation Project





## Vegetation

### LEGEND

- Non Forested Wetlands
- Forested Wetlands
- Coniferous Woodlands
- Deciduous Woodlands

- Community Boundary
- Watershed (major)
- Watershed (minor)
- Water Body



## Huron River Watershed

### Location

The Huron River Watershed, the largest in the study area, encompasses the southern portions of Springfield Township, most of Highland and White Lake Townships, and the entire area of Milford Township and the Village of Milford.

### Existing Conditions

Residential land uses dominate the Huron River Watershed, comprising approximately 70% of existing land use. The density of these residential areas differs greatly throughout the watershed, but, in general, density around the lakes is relatively higher with an average of one dwelling unit/.5 acre. The Village of Milford has an average density of more than one dwelling unit/.5 acre. The remainder of the area is mostly one dwelling unit/1 to 4.9 acres with Highland Township averaging considerably less dense development at one dwelling unit/10 acres.<sup>1</sup> Commercial and industrial uses are also important, and are focused along M-59, Ford Road, I-96 Milford Road exit, and Milford Road. Recreational and conservation land is another prominent use in the area with Highland Lake State Recreation Area, Indian Springs Metropark, Kensington Metropark, Pontiac Lake State Recreation Area, Proud Lake State Recreation Area, and Timberland Nature Sanctuary being the largest areas.

The Huron River Watershed has several significant transportation corridors. M-59 (Highland Road) is the major highway that runs east to west through White Lake and Highland Townships. Other roads with high traffic volumes include Duck Lake Road, Ford Road, GM Road, Livingston Road, Maple Road, Milford Road, and Plank Road. The Grand Trunk Railroad runs diagonally through Springfield Township and abuts the northeast boundary of the Huron Swamp. The Chesapeake & Ohio Railroad runs north to south in Milford Township, Milford Village, and Highland Township parallel to Milford Road.

Substantial information is available regarding the quality of the Huron River. According to Michigan Department of Environmental Quality (MDEQ) studies, variables that affect aquatic life and uses of the river, such as temperature and a variety of chemical constituents, are generally good, though certain portions suffer degradation through point and non-point source inputs. The Huron River Watershed Council has coordinated several site-specific monitoring studies of the river. These studies base water quality indicators upon the benthic population, insects and other organisms that spend at least part of their lifecycle on the bottom of a river. One such monitoring site is a section of the Huron River located three and a half miles downstream from its origin at Big Lake, and is the monitoring site closest to the headwaters. The findings of the study were that the water quality was of exceptional quality and this was the highest quality part of the river in all of the Council's monitoring sites. The Watershed Council notes, however, that the benthic populations have decreased over the past few years, and sedimentation has increased, resulting in compromised water quality. The United States Environmental Protection Agency also has general information regarding the health of the entire Huron River watershed. The limitation of human use of the river and loss of wetlands are more serious indicators of compromised health. Also, the watershed's health is highly vulnerable due to population increases, and moderately vulnerable due to loss of rare aquatic species, urban runoff, agricultural runoff, hydrological modification, and air deposition.

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<sup>1</sup> Taken from Oakland County Composite Zoning map

## **MNFI Sites**

Michigan Natural Features Inventory (MNFI) staff, as part of the S&H Project, has inventoried several ecologically significant sites in the Huron River Watershed. They are:

- **The Huron Swamp:** Considered highly ecologically significant, this site is dominated by a southern swamp and southern mesic forest with some wet meadow, shrub-carr, vernal pools, and a prairie fen. The presence of rare species, such as the threatened red shoulder hawk, have been verified on the site.
- **Huron River Corridor:** Contiguous with the Huron Swamp Site, this site has a distinct flat lowland area that consists of southern shrub-carr, relict conifer swamp, southern swamp, southern mesic forest, and southern dry-mesic forest. There is also a distinct upland area consisting of very hilly forested uplands composed primarily of southern dry-mesic forest.
- **GM Road Site:** Though relatively small and degraded, the site's relict conifer swamp, southern shrub-carr, emergent marsh, and forest represent a significant area of undeveloped land within Milford Township, near the Village of Milford.

The map on page 67 shows all of the potentially significant sites identified by the MNFI.

## **Natural Resources**

The Huron River's headwaters emanate in southern Springfield Township. The river then flows south through White Lake Township, into Commerce Township (not part of the study area) where it turns west, and then flows south again through the Village of Milford and Milford Township. The Huron River watershed can be divided into nine subwatersheds within the study area. In general, the watershed has the following upland or lowland characteristics:

### **Upland**

Topography: There are several distinct upland units in the Huron Watershed. These units are:

- Southwestern Springfield Township and northern White Lake Township with a highest elevation of 1,150 feet and hilly topography with several areas of very steep slopes (United States Geological Survey (USGS) datum);
- Western Highland Township with a highest elevation of 1,190 feet and a nearly level to undulating topography;
- Eastern Highland Township with a highest elevation of 1,090 feet and very hilly topography with several areas of very steep slopes;
- Western Milford Township with a highest elevation of 1,150 feet and very hilly topography and several areas of very steep slopes;
- Southeastern Milford Township with a highest elevation of 1,120 feet and hilly topography and areas of steep slopes.

Soils: General soil conditions in the upland areas are dominated by the Fox and Oshtemo series, which are sandy soils that are well drained. Upland soils also consist to a lesser extent of both the Oshtemo and Spinks series, characterized by nearly level to steep, well-drained sandy soils, and Urban land-Spinks-Oshtemo, defined by urban land and nearly level to rolling, well-drained sandy soils. These soil series are generally well suited to building site development.

Vegetation. Upland woodlands, consisting mostly of northern hardwood, cover approximately 15% of the upland areas

### **Lowland**

**Topography** The riparian corridors of the watershed all lay in the lowland areas, as do the majority of the lakes. The highest elevation in the lowland area is 940 feet in Springfield Township within the headwaters of the Huron River. The lowest point in the lowlands is 890 feet at Kent Lake. Within the Huron River Watershed, the 100-year floodplain elevations vary from 1,010 feet (USGS datum) at its highest point at the Huron Swamp to 890 feet at its lowest point at Kent Lake in Milford Township.

**Soils** General soil conditions in the lowland areas are approximately equally comprised of Oshtemo-Spinks-Houghton, Fox-Oshtemo-Houghton, and Urban land-Spinks-Oshtemo. The lowlands also contain a small portion of Riddles-Marlette-Houghton, characterized by nearly level to steep, well-drained, moderately well drained, and very poorly drained loamy and mucky soils. Again, most of these soil series are generally well suited to building site development; however, the mucky Houghton soils, dominating the soils around wetlands and riparian corridors, pose severe restrictions.

**Vegetation:** Surface water covers approximately 35% of the lowland areas. Significant bodies of water in the lowland areas are the Huron River (which flows entirely through the lowlands of the area), the Pettibone Creek, Kent Lake, and Mill Pond. Wetlands cover approximately 25%. These wetlands, though scattered throughout the watershed's lowlands, are mostly focused along the riparian corridors. The largest wetland complex is at the headwaters of the river in Springfield Township, and is composed predominately of lowland hardwood wetlands with some emergent wetland and shrub/scrub vegetation. Following the corridor of the Huron River into White Lake Township, other wetland systems are found, composed mainly of lowland conifer, shrub/scrub, lowland hardwood, and emergent plant communities. An emergent wetland is along the riparian corridor of Mann Creek, which runs through Highland and Milford Townships. An emergent wetland exists along the riparian corridor of the river in eastern Milford Township with patches of aquatic bed and lowland conifer wetlands throughout. Highland Township's Pettibone Creek and associated lakes contain significant wetlands composed primarily of lowland hardwood-conifer swamp, aquatic bed, and shrub/scrub plant communities. Woodlands cover another 15% of the area.



## Shiawassee River Watershed

### Location

The Shiawassee River Watershed encompasses most of the western half of Springfield Township, all of Rose Township, and small portions of eastern and northern Highland Township.

### Existing Conditions

Residential land use dominates the Shiawassee River Watershed, comprising approximately 85% of existing land use. The predominant residential density in Rose Township, which is most of the watershed, is one dwelling unit/10 acres or greater. Density in Springfield Township is predominantly one dwelling unit/2.5 to 4.9 acres. Commercial land use comprises less than 5% of total land use with centers in western Rose Township, western Springfield Township, and at the I-75/Holly Road intersection. Recreational and conservation land is another use in the area with Oakland County's Rose Oaks and Springfield Oaks and Springfield Township's Shiawassee Basin Preserve being the largest areas.

The Shiawassee River Watershed has several significant transportation corridors. I-75 runs diagonally along the eastern edge of the watershed in Springfield Township. Milford Road in Rose Township and Rattalee Lake Road in Rose and Springfield Townships are important arterial roads in the area. The Grand Trunk Railroad runs diagonally through the northeast corner of Rose Township and east through Springfield Township. The Chesapeake and Ohio Railroad runs north to south bisecting Highland and Rose Townships.

Water quality information is limited for the portion of the Shiawassee River within the study area. The United States Environmental Protection Agency (U.S.EPA) does provide basic information on general health for the entire watershed. The U.S.EPA notes that a more serious indicator of decreased watershed health is fish and wildlife consumption advisories, and less serious indicators of watershed health are wetland loss and compromised ambient water quality for conventional pollutants. The watershed's health is highly vulnerable due to agricultural runoff, and moderately vulnerable due to threats to aquatic species at risk, population increases, hydrologic modification, and air deposition.

### MNFI Sites

MNFI staff, as part of the S&H Project, has inventoried several highly ecologically significant sites in the Shiawassee River Watershed. They are:

- **I-75 Woods:** The I-75 Woods site is a large, high quality, and highly diverse wetland complex that lies along a stream corridor and a large upland forest interspersed with numerous wetland depressions. The site contains the unique natural feature of a prairie fen.
- **Long Lake:** The Long Lake site is bisected by the Shiawassee River, and consists of wetlands, relict conifer swamps, wet meadows, a large, high quality prairie fen, and an upland forest. The MNFI notes that this and the I-75 Wood site, together with the Rattalee Lake site form an undisturbed, intact, and highly significant natural complex of exceptional ecological value.
- **Buckhorn Southeast:** The primary significance of the Buckhorn Southeast site is its location just south of the Buckhorn Lake Complex, and the northward flow of surface water. No high quality natural communities were found at the site and the majority of wetland and upland patches found at the site are small in size.

- **Buckhorn Lake Complex:** The Buckhorn Lake Complex is a significant wetland and forested upland complex. It is a site of high ecological value due to the occurrence of a large high quality prairie fen. This fen is considered high quality because of its overall native plant species diversity, high proportion of sedges and grasses, large size, and intactness.
- **Perch Lake Complex:** Perch Lake is a large forested complex consisting of contiguous wetlands, lakes, and upland forest. A wetland complex located in the center of the site is the most ecologically significant area of the site and is dominated by a mixed hardwood-conifer forest.

### **Natural Resources**

The Shiawassee River Watershed can be divided into four subwatersheds. The Shiawassee River's headwaters emanate in north central Springfield Township. The river flows west through Rose Township and then turns north into the Village of Holly (not in the study area). In general, the watershed has the following upland or lowland characteristics:

#### **Upland**

Topography: There are several distinct upland units in the Shiawassee River Watershed. These units include the following:

- Central Springfield Township with a highest elevation of 1,137 feet and very hilly topography with several areas of very steep slopes (USGS datum);
- Northern Springfield Township with a highest elevation of 1,100 feet and undulating topography to the north and a very hilly topography with areas of steep slopes near Long Lake;
- Western Springfield Township with a highest elevation of 1,153 feet and very hilly topography with several areas of steep slopes;
- Southeast corner of Rose Township and north central portion of Highland Township with a highest elevation of 1,130 feet and relatively flat topography with a few areas of steep slopes;
- Southwestern Rose Township and western Highland Township with a highest elevation of 1,140 feet and relatively hilly topography with several areas of steep slopes.

Soils: General soil conditions in the upland areas are comprised fairly equally of Riddles-Marlette, Fox-Oshtemo, and Oshtemo-Spinks series. These soils are characterized by being located on land whose topography ranges from undulating to ridges, and from moderately to well drained. These soils are suitable for building site development with possible limitations due to slope. While most soils are acceptable for septic systems, Marlette soils pose limitations due to slow permeability, and all series have limitations given existing slope.

Vegetation: Upland woodlands, consisting mostly of Northern Hardwood, cover less than 10% of the upland areas.

#### **Lowland**

Topography: The riparian corridors of the watershed all lay in the lowland areas. The highest elevation in the lowland area is 1,010 feet and is found within the headwaters area of the Shiawassee River in Springfield Township. The lowest point in the lowlands is 915 feet near

Arrowhead Lake in Rose Township. It is also important to note that there is a large area of lower elevation in the center of Rose Township. Within the Shiawassee River Watershed, the 100 year floodplain elevation varies from approximately 990 feet at its highest point in central Springfield Township (USGS datum) to 930 feet at its lowest point at the north-central border of Rose Township.

**Soils:** Soil conditions in the lowland areas directly adjacent to riparian corridors and in wetlands consist mainly of Houghton Adrian Muck. These soils are not suitable for building development or septic systems because they are poorly drained and water run off is very slow which results in ponding. More general soil conditions along the Shiawassee River and a main tributary, Buckhorn Creek, consist of Oshtemo-Spinks-Houghton series. The Riddles-Marlette-Houghton, Marlette-Capac-Houghton, and Fox-Oshtemo-Houghton also make up some of the lowland area soil conditions. While most of these soil series are generally suited to building site development and septic systems, Houghton, Marlette, and Capac series pose moderate to severe restrictions due to slow permeability.

**Vegetation:** Surface water covers approximately 20% of the lowland areas. Significant bodies of water in the lowland areas are the Shiawassee River, Eliza Lake, Long Lake, Davis Lake, Kirby Lake, Rattalee Lake, Mill Pond, Braemer Lake, Buckhorn Lake, Tipsico Lake, Fish Lake, and Perch Lake. Wetlands cover approximately 20%. These wetlands, though scattered throughout the watershed's lowlands, are focused mainly along the riparian corridors. At the headwaters of the Shiawassee River in Springfield Township, there are lowland hardwood, lowland conifer, emergent, and aquatic wetlands and shrub/scrub vegetation. The emergent wetland follows the riparian corridor of the river through Springfield and Rose into Holly. Another emergent wetland complex is adjacent to the riparian corridor of Buckhorn Creek. A riparian corridor which flows parallel to the Chesapeake and Ohio Railroad in Rose Township contains an emergent wetland with lowland hardwood and lowland conifer along much of its length. Approximately 15% of the lowlands are woodlands.



## **Clinton River Watershed**

### **Location**

The Clinton River Watershed, which covers the smallest portion of the study area, encompasses the northeastern area of Springfield Township and very small portions of northeastern and southeastern White Lake Township.

### **Existing Conditions**

Residential land use dominates this portion of the Clinton River Watershed, comprising approximately 75% of existing land use. Density of these residential areas is mostly 1 dwelling unit/1 to 2.4 acres. Higher density residential and areas of commercial and industrial uses exist along the Dixie Highway corridor in Springfield Township. A small portion of the watershed is part of the Pontiac Lake State Recreation Area in White Lake Township. I-75 is also an important transportation corridor in the watershed area.

Water quality information is limited for the portion of the Clinton River Watershed located within the study area. The U.S.EPA, however, has information on general health for the entire watershed. Wetland loss is noted as a more serious indicator of decreased health within the watershed. The watershed's health is moderately vulnerable due to threats to aquatic species at risk, agricultural runoff, population increases, hydrologic modification, and air deposition.

### **MNFI Sites**

MNFI staff, as part of the S&H Project, has inventoried no sites in the Clinton River Watershed. There have been, however, extensive studies of the highly ecologically significant site of the Bridge Valley area: in 1997 by the University of Michigan, in 1995 by the Nature Conservancy, and in 1988 by the MNFI. The Bridge Valley site is a high quality upland-wetland complex composed of a prairie fen of exceptional significance, as well as threatened and special concern plant populations. Recognizing its significance, a conservation easement and builder-developer agreement were instituted on a portion of the site.

### **Natural Resources**

The portion of the Clinton River Watershed located within the study area can be divided into three subwatersheds. The Clinton River's headwaters emanate from northeastern Springfield Township. The river then flows east into Independence Township. In general, the watershed has the following upland or lowland characteristics:

#### **Upland**

**Topography.** Due to the small portion of the watershed that is located in the study area and its distinctive characteristics, almost the entire watershed is upland. The highest elevation in the upland area is 1,210 feet (USGS datum) in northern Springfield Township, and the lowest point is 1,000 in southeastern White Lake Township. The two small portions of the Clinton River watershed in White Lake Township are also classified as uplands with highest elevations of 1,110 and 1,117 feet respectively. Several areas of steep slopes exist focused mainly where the uplands abruptly change to lowlands at the Clinton River riparian corridor.

**Soils:** General soil conditions in the uplands area are dominated by Riddles-Marlette and Fox-Oshtemo series. These soil series are suited to building site development with slope a possible restriction. Marlette soils pose moderate to severe restrictions for septic systems due to slope, wetness, and/or slow permeability, and Fox and Oshtemo soils pose restrictions due to slope and/or poor filtering capacity.

Vegetation: Upland woodlands, consisting mostly of northern hardwood with smaller areas of pine, cover approximately 15% of the upland area.

### **Lowland**

Topography: The lowland area consists of Bridge Lake and directly adjacent land and the riparian corridor of the Clinton River. The highest elevation in the lowland area is 992 (USGS datum) at Bridge Lake, and the lowest point in the lowlands is 980 at the site where the Clinton River crosses the Springfield/Independence border. Within the Clinton River Watershed, the 100-year floodplain elevation varies from approximately 1,000 feet to 980 feet (USGS datum) in the short distance the Clinton River runs through eastern Springfield Township.

Soils: General soil conditions in the lowland areas are dominated by Sloan silt loam and Houghton Adrian mucks. Sloan is found in nearly level and very poorly drained soils on floodplain. Houghton and Adrian mucks are also nearly level and very poorly drained soils. Neither of these soils is suitable for building site development or septic systems due to being poorly drained with slow water runoff and flooding.

Vegetation: Surface water covers approximately 50% of the lowland area. Significant bodies of water in the lowlands are the Clinton River and Bridge Lake. Wetlands cover approximately another 30%. Wetlands are located along the riparian corridor with a mixed wooded wetland at Bridge Lake. Another 15% of the area is forested and composed of northern hardwood.

### **Water Quality Information**

Water quality information for waterways within the S&H Project study area is limited. Where information was readily available, it has been included under the appropriate watershed description. Information on groundwater flow is severely lacking. Future studies of both water quality and groundwater flow would be appropriate.

## Summary of Typical Landform Cross Section

The three watersheds present a number of significant natural resources which are valuable components interacting within a balanced ecosystem. Based primarily on water depth and plant communities, typical landforms were identified. Topography, soils, and hydrology were also used as determinants. The watersheds can thus be broken down into the following seven distinct landforms, which are graphically shown on the next page:

- |          |    |                              |
|----------|----|------------------------------|
| Upland:  | 1. | Man-altered/developed        |
|          | 2. | Open/old or cultivated field |
|          | 3. | Forested upland              |
| Lowland: | 4. | Forested wetland             |
|          | 5. | Shrub/scrub wetland          |
|          | 6. | Wet meadow/fen               |
|          | 7. | Open shallow water           |

Generally, lowland areas are less suitable for development due to their sensitivity to disturbance. They contain several important and rare ecological features, such as riparian corridors, prairie fens, and relict conifer swamps that rely on a particular hydrological cycle.

The upland areas, on the other hand, are less sensitive to disturbance and are, therefore, more suitable for development. Uplands, however, do have a direct effect upon the more sensitive lowlands because surface water drains into these areas. They also provide critical habitat for certain animal species, such as the massasauga rattlesnake, that migrate from lowlands to uplands at certain times of the year. For these central reasons, upland areas require development that is sensitive to how it affects the environment and designed in ways to reduce negative effects.



**Summary - Typical Landforms within the Headwaters  
Sensitivity to Disturbance and Suitability to Development**



**Description**

These areas are currently developed with residential and commercial land uses

These drier areas have been cultivated in the past, but currently support grasses and shrubs.

**Sensitivity to disturbance/  
Suitability to development**

These areas have already incurred substantial changes and because of that, are not as sensitive to further disturbances. Because of their slope, soil, and vegetation characteristics, these areas are most suited to development. However, old fields can provide important wildlife habitat and offer potential for prairie grassland restoration.

**Description**

These areas consist of dry to mesic forests dominated by beech and sugar maples as well as oak hardwood forests on drier sandy loams

**Sensitivity to disturbance/  
Suitability to development**

Although these areas are most suited for development because of soil characteristics, the forested areas may be worthy of selective preservation to provide linkages and connections to other wooded areas. Other limitations to development activities are incurred in areas of steep slopes. Forested uplands have a direct impact on the adjacent lowland areas and are, in that sense, critical

**Description**

These areas consist of relict conifer swamps or bogs as well as southern swamp plant community, a wetland deciduous forest type

**Sensitivity to disturbance/  
Suitability to development**

The high water table and valuable habitat characteristic of these areas place severe limitations on development activities since these areas are sensitive to disturbances. Development would affect the plant communities and interfere with the wildlife habitat they provide. These areas are best suited for passive recreation activities such as nature viewing from a designated pathway

**Description**

These areas are characterized by fluctuating water levels and poor drainage. They are dominated by dogwoods and willows, which are successional intermediate between a wet meadow/ten or emergent marsh and a forested wetland

**Sensitivity to disturbance/  
Suitability to development**

These areas are very susceptible to disturbances. Some water fluctuation is normal and natural. Unnatural water fluctuation, loss of vegetation, or human activity could destroy or greatly impact these plant communities and their wildlife habitat values. These areas may be suited to very limited recreational activities such as restricted nature viewing from a boardwalk system

These wetland areas are dominated by sedges, grasses, and wild-flowers. Groundwater that is rich in magnesium and calcium carbonate supports these plant communities. Fens are rare because they are restricted to the southern oak region and absent from the glacial lakeplains

Open shallow waters are characterized by emergent and submergent vegetation including broad leaved and floating herbaceous plants and grasses