The various Wisconsin glaciers advanced into the Nimishillen Creek Watershed area in two different lobes, melding nearly in the center of the watershed. The Killbuck lobe covered the western part of the glaciated watershed, while the Grand River lobe covered the eastern part. Because the two lobes did not advance at the same pace, there is a zone of overlap and outwash in an interlobate area that extends from Canton northward to Lake Township (Stark County Soil Survey, 1971).

**Bedrock Geology**
The Nimishillen Creek Watershed is underlain by bedrock from the Pennsylvanian era and the formations mainly consist of sandstone, siltstone, shale, coal, and limestone formed from sediments deposited sometime between 286 and 320 million years ago (Stark County Soil Survey, 1971). Figure II-7 shows the eight different bedrock types in the watershed.

The northern glaciated portion of the watershed has a diverse mix of Middle Kittaning Coal, Brookville Coal, and Mercer Limestone as the dominate bedrock types. Vast areas of bedrock are buried by glacial deposits of more than 60 feet, primarily along valleys of Nimishillen Creek and its major tributaries. In addition, the headwater areas of the Middle Branch of Nimishillen Creek also have bedrock buried by over 60 feet of glacial deposits.

The bedrock composition in the southern unglaciated portion of the watershed is dissimilar from the northern section. The dominant bedrock types are Mahoning Sandstone, Middle Kittaning Coal, and Brookville Coal. Thick glacial deposits only reside in a narrow strip along the Mainstem of Nimishillen Creek near the Stark County - Tuscarawas County boundary.

**Mineral Resources**
Coal was and continues to be an important resource for development and manufacturing in Ohio and the Nimishillen Creek region. Coal from the Brookville and Kittaning bedrock has previously been mined from locations in the Nimishillen Creek Watershed. The peak for coal mining occurred from the late 1880s to the 1930s. According to the ODNR Division of Mineral Resources Management, at least 38 local underground mines, primarily in the unglaciated regions of the watershed, were in operation during this time producing coal to meet the industrial needs of Northeast Ohio. Figure II-8 shows the location of the abandoned mines in the watershed. However, these mines had all been abandoned by the end of the 1930s as coal deposits became more difficult to mine and the more profitable surface mining technique became the standard for coal mining in Ohio. Unfortunately standards for abandoning mining operations did not exist prior to 1972 resulting in acid water polluted with heavy metals discharging directly into Nimishillen Creek and its tributaries. This problem is known as acid mine drainage (AMD). See Section IV, Water Quality Issues, for more information on the known abandoned mines in the watershed.
Figure II-7
Bedrock Geology
Nimishillen Creek Watershed

- Mahoning Sandstone
- Upper Freeport Coal
- Middle Kittanning Coal
- Brookville Coal
- Mercer Limestone
- Bedrock > 60' Below Surface
- Subwatershed Boundary
- Political Boundary

Northeast Ohio Four County Regional Planning and Development Organization, 2005
Source: Ohio Department of Natural Resources (ODNR)
Figure II-8
Abandoned Mines
Nimishillen Creek Watershed

Northeast Ohio Four County Regional Planning and Development Organization, 2005
Source: Ohio Department of Natural Resources (ODNR)
Also according to the ODNR Division of Mineral Resources Management, there are eight “active” mines in the Nimishillen Creek Watershed. Three of the mines produce coal and are located in Sandy Township (Tuscarawas County) and Pike Township (Stark County) and all are located in the Mainstem subwatershed. Combined they produced 33,000 tons of coal in 2004. The remaining five mines are sand, gravel, and clay producing over 815,747 tons. Two of the mines are located in Jackson Township, two are in Plain Township, and the final one is located within Canton Township. One of the mines is in the Hurford subwatershed, two in the Middle Branch subwatershed, and two are in the West Branch subwatershed. The largest sand and gravel mine is operated by Central Allied Enterprises, Inc. and produced 777,908 tons in 2004 (ODNR, 2004).

Soils
Soils play a integral role in the overall quality of Nimishillen Creek. The type of soil determines, in part, the vegetation cover, farming practices, rainfall infiltration, pollution runoff rates, erosion, and sedimentation (Ohio EPA, 1997). Varying soil characteristics can also affect development by limiting areas suitable for building or for the installation of home sewage treatment systems (See Section VI: HSTS Plan).

Nimishillen Creek has nine major soils associations each with unique characteristics and properties: Fitchville-Sebring, Chili-Wheeling-Shoals, Ravenna-Canfield, Canfield-Wooster, Carlisle-Willette-Linwood, Wadsworth-Rittman, Loudonville-Wooster, Latham-Keene, and Muskingum-Gilpin-Dekalb. Below is a brief description of each of these soil types.

Fitchville-Sebring Soil Association:
The Fitchville-Sebring soils are found on near level area or old glacial lake beds and are generally lower than the surrounding topography. These areas are scattered throughout the watershed, but are mainly found in the headwater areas of the Middle and West Branches of Nimishillen Creek and along the middle portion of Sherrick Run. These soils are generally somewhat poorly drained soils with a loamy subsoil. Poor drainage is the main limitation for both farming and development. Undrained areas with this association are valuable as habitat for wetland wildlife.

Chili-Wheeling Association:
The Chili-Wheeling soil deposits are irregularly shaped surrounding Canton and extending northward primarily along the West and Middle Branches. The soils occupy sloping and steep hills in Lake, Plain, and Jackson Townships. The Chili and Wheeling soils were formed primarily in glacial outwash areas characterized by silty material underlain by gravely outwash. These soils are well drained. However, the Shoals soils formed in more recent alluvium and are somewhat poorly drained. The soils in this association are well suited for general farming and dairying, and they have few limitations for development. Erosion of these soils is a hazard in the more sloping areas, and flooding is a concern with Shoals soils. Lastly, groundwater contamination from failing HSTSSs is a concern,
especially in high density housing areas, because of the high permeability of the soils.

Ravenna-Canfield Association:
The soils in this association occupy large undulation to rolling areas in Marlboro, Nimishillen, and Tuscarawas Townships in the East and West Branches of Nimishillen Creek. Topography, like similar glacial till areas, is nearly level. The Ravenna soil types are less sloping than the Canfield soils and are somewhat poorly drained. Conversely, Canfield soils are moderately well drained. The subsoils for this association have a dense, compact subsoil that restricts the movement of water and the growth of roots. These soils reside in the less populated areas of the Nimishillen Creek Watershed and are primarily used for general farming and pastures. Wetness from the poor subsoils is the main limiting factor for these soils. Artificial drainage is usually needed for good crop growth and dry building foundations and basements. Erosion is also a concern with these soils in cultivated areas and/or construction sites. Lastly, poor permeability can limit the effectiveness of tradition HSTS leach fields.

Canfield-Wooster Association:
The Canfield-Wooster soils occur in various formations throughout the glaciated northern portion of the watershed. The soils were formed in deep glacial till and are moderately to well-drained soils. The Canfield soils, like mentioned previously, have a dense, compact subsoil that limits the movement of water and plant roots. The Wooster soils do not have compacted subsoils and are generally higher and steeper than the Canfield soils. This association is used for both farming and development in the watershed. Erosion is the primary hazard with these soils, but seasonal wetness in the spring can delay usage of the land. For non-agriculture uses, soils are limited by moderately slow permeability and, in some areas, by steep slopes. For buildings, Canfield soils need artificial drainage to insure dry foundations and basements. The compact subsoils of the Canfield soils can also limit the function of a HSTS leach field.

Carlisle-Willette-Linwood Association:
The soils of the Carlisle-Willette-Linwood Association occur in scattered, nearly level and depressional areas in Lake, Plain, Jackson, and Canton Townships. The association consists of muck soils that are underlain by mineral soil material at various depths. Naturally these are wetlands because of the very poorly drained organic soils. Poor drainage is the main limitation to farming because the muck tends to oxidize and subside when the water table is lowered. When dry, all areas of these soils can be damaged or destroyed by fire; as well as, being susceptible to soil blowing. Farming these soils requires intensive management that includes artificial drainage and control of the water table. The soils have severe development limitations because the muck is unstable and often subsides.
Wadsworth-Rittman Association:
In the Nimishihlen Creek Watershed, the Wadsworth-Rittman soils occur only in the headwater of the Middle Branch in Marlboro Township. These soils were formed in clay loam or silty clay loam glacial till and have a compact layer in the subsoil that restricts the infiltration of water. The Wadsworth soils are mainly level and are somewhat poorly drained. The Rittman soils are sloping and moderately well drained. Both soil types naturally have a seasonally high water table. Farming and pasturing are the primary uses of this land, and artificial drainage is needed on the Wadsworth soil for good crop production. Erosion from farming or construction is a hazard for Rittman soils. Development of these soils is severely limited due to the seasonally high water table. Home sewage treatment systems with filter beds will also not function properly even during dry periods.

Loudonville-Wooster Association:
This association occurs in widely separate areas mainly in the southern half of the Nimishihlen Creek Watershed. In most areas the glacial till is less than four feet thick over residuum from shale and sandstone. Loudonville soils are formed in glacial till 20 to 40 inches thick over bedrock. These soils are well drained on sloping to very steep sloping land. The Wooster soils formed in glacial till greater than 40 inches thick and are well drained and contain a fragipan. Much of the land with these soils is used for pasture, but can be used for general farming, dairying, or growing fruit. In many areas these soils are so steep that erosion is a severe hazard if cultivated or developed. Rapid runoff is also common with these soils. However, many areas have scenic values because of these unique characteristics.

Latham-Keene Association:
The soils of the Latham-Keene Association occupies scattered areas in the south-central, unglaciated portion of the Nimishihlen Creek Watershed. Sloping to steep topography is commonly associated with these soil types. Latham soils developed in place from weathered shale and are well drained but have a low permeable subsoil. Keene soils also formed in place from weathered shale and a thin layer of siltstone bedrock. Keene soils are generally not as steep as Latham soils and are moderately well drained, but permeability is moderately slow in the upper part or the subsoil and slow in the lower part. Most of these area are forested, but some acreage have been strip mined for coal and shale. Erosion is a hazard because of the steep slopes and rapid runoff from these soil areas. Dense development is limited due to the steep slopes, but some areas have been used for single family homes. However, even developing homestead sites is limited because the poor soil permeability is not suitable for HSTs.

Muskingum-Gilpin-Dekalb Association:
This soil association occurs in the unglaciated, sloping to steep areas in the southern portions of the Nimishihlen Creek Watershed. The Muskingum soils formed in the residuum from siltstone, sandstone, and shale. The Gilpin soils
formed in the residuum from thin beds of siltstone, shale, and sandstone, and the Dekalb soils originated in the residuum from sandstone and thin beds of siltstone. All of these soil types are well drained, low in natural fertility, and droughty. Large areas of this association have been strip mined for coal. Row crops are grown in very few areas, but general farming and fruit production can be accomplished in these soils. The less sloping areas can also be used for pasture lands. Because runoff is very rapid on these soils, intense erosion control is needed in all cultivated and construction areas. Development is limited due to slopes and, in some areas, by bedrock near the surface.

Biological Features

Rare, Threatened, and Endangered Plant Species
According to the Ohio Department of Natural Resources (ODNR) Division of Natural Areas and Preserves, the Nimishillen Creek Watershed and surrounding areas (Stark County) have six endangered, sixteen threatened, and thirty-two potentially threatened plant species (ODNR-DNAP, 2001). There are currently no plant species that are presumed locally extirpated. A complete list of these plants listed on the Ohio Natural Heritage Data Base for Stark County can be found in Appendix D. Also, none of the plants in the watershed found on the State of Ohio’s threatened and endangered species list are currently included on the federal threatened and endangered species list.

Several factors account for the list of threatened and endangered plant species in the Nimishillen Creek Watershed. Some of the plants require specialized habitats such as bogs or fens, which naturally limit a plant’s abundance. While other species range has been limited by current and past land use practices that have turned areas such as native forest, wetlands, and grasslands into farms, houses, and businesses. Also the invasion of non-native plant species (see below) can also reduce habitat. In order to increase the numbers of a rare plant species, the habitat in which it thrives must be increased in any watershed.

Invasive, Non-Native Species
An inventory of invasive, non-native exotic species has not been conducted for Stark County, Summit County, or the Nimishillen Creek Watershed. However, the types of invasive species and the ensuing problems created are equivalent to other areas in Northeast Ohio.

Fortunately, the Stark County Park District has recently begun tracking and removing invasive plant species in their parks. Invasive species they have documented are Japanese knotweed (Polygonum cuspidatum), garlic mustard (Alliaria petiolata), multiflora rose (Rosa multiflora), purple loosestrife (Lythrum salicaria), privet (Ligustrum spp.), amur honeysuckles (Lonicera maackii), Canada thistle (Cirsium arvense), phragmites (Phragmites australis), crown vetch (Coronilla varia), Queen Ann’s lace (Daucus carota), and reed canary grass (Phalaris arundinacea).
Invasive plants can cause severe economic, recreational, or environmental harm if left uncontrolled. Nearly all invasive species are non-native to the watershed thereby lacking natural predators or controls which results in rapid reproduction and dispersion. Because of these traits, invasive plants force out native plants often creating monocultures of the invasive plant. Wildlife is often affected by plant invasions because many animals depend on a variety of native plants for food and cover. In Ohio, invasive plants are now considered the second largest threat to biodiversity and endangered species, only behind habitat loss (Windus, 2003).

Controlling invasive plant species is often a time, labor, and/or resource-intensive process. Attacking invasive plants during the early stages of establishment is generally the best strategy because once well established, multiple control strategies with follow-up treatment are often needed. Specific control measures will vary depending on the targeted plant, but will fall into one of three control categories: biological (natural enemies), mechanical (cutting, digging, etc.), or chemical (herbicides).

**Wildlife**
An extensive survey of wildlife has not been completed for the Nimishihllen Creek Watershed. However, various organizations and agencies have conducted surveys of certain wildlife segments providing a general picture of animal diversity found in the watershed. Specifically, the Stark County Parks Department conducts bird, amphibian, and reptile surveys, while the Ohio EPA has extensively sampled fish and macroinvertebrates. Generally the wildlife is typical of similar areas in Northeast Ohio. The list below is a condensed list of the most common wildlife in the watershed as gathered from the surveys and general field observations:

**Fish:**
- Largemouth Bass
- Smallmouth Bass
- Rock Bass
- White and Black Crappie
- Yellow, Brown, and Black Bullhead
- Common Carp
- Bluegill Sunfish
- Green Sunfish
- Pumpkinseed Sunfish
- Yellow Perch
- White Sucker
- Northern Hog Sucker
- Creek Chub
- Blacknose Dace
- Striped Shiner
- Bluntnose Minnow
- Central Stoneroller
- Johnny Darter
- Greenside Darter
- Rainbow Darter
- Mottled Sculpin

**Amphibians:**
- American Toad
- Bull Frog
- Green Frog
- Grey Tree Frog
- Spring Peeper
- W. Chorus Frog
- Wood Frog
- Four-Toed Salamander
- Tiger Salamander

**Waterfowl:**
- Canada Goose
- Mallard Duck
- Wood Duck
Mammals:
White-Tailed Deer
Beaver
Red Fox
Muskrats
Ground Hogs
Mink
Raccoons
Coyotes
Least Weasels
Long Tail Weasels
Eastern Chipmunk
Squirrels (Fox, Grey, Flying, Black)
Eastern Cottontail Rabbit
Striped Skunk
Voles
Deer Mice
Big Brown and Little Brown Bats

Raptors/Birds:
Bald Eagle
Broad-Winged Hawk
Coopers Hawk
Red-Tailed Hawk
Sharp-Shinned Hawk
Great Blue Heron
Osprey

Reptiles:
Eastern Garter Snake
Eastern Box Turtle
Spotted Turtle
Snapping Turtle
Northern Brown Snake
Water Snake

Water Resources

Climate and Precipitation
Weather conditions in Northeast Ohio throughout most of the year are generally mild, but can be extreme in the winter. The region in which the Nimishillen Creek resides averages approximately 37 inches of precipitation each year. May through September are generally the wettest months averaging better than 3.4 inches per month. January and February typically have the least amount of precipitation averaging less than 2.6 inches. However, extreme variations in precipitation can occur for any month, any given year (Oelker, 2005). Average monthly temperatures range from a low of 33°F in January to 82°F in July.

Surface Water
The Nimishillen Creek Watershed covers 188 square miles in Stark, Summit and Tuscarawas Counties of Northeast Ohio. The Mainstem has a length of 24.5 miles and flows into Sandy Creek to the south. The five major tributaries to Nimishillen Creek are Hurford Run, Sherrick Run (also called Sherrie Run), West Branch, Middle Branch, and East Branch. Sherrick Run has a length of 6.8 miles and drains an area of just over 11.2 square miles. Hurford Run’s length is 4.95 miles with a drainage area of approximately 8 square miles. The Middle Branch is the longest of the tributaries flowing 16.6 miles and covering over 95.2 square miles. East Branch length is 10.4 miles with an area of 43.56 square miles. And finally the West Branch flows for 9 miles and drains 46.5 square miles.

Lake resources in the Nimishillen Creek Watershed are limited. According to the Ohio Department of Natural Resources’ Ohio Lake Inventory, there are only sixteen waterbodies greater than five acres in size in the entire Nimishillen Creek Watershed. Of that total, ten are ten acres or less in size and are primarily man
made impoundments as a result of mining activities or recreational enhancements like fishing ponds. The only public lake is the twelve acre Pertos Lake located on Stark County Metro Parks property in the Hurford Run Subwatershed. Meyers Lake has the largest surface area of 134 acres and is located between the Cities of Canton and Massillon in the West Branch Subwatershed.

Appendix E contains information on lakes greater than 5 acres listed in the Ohio Lake Inventory. However, this should not be considered a comprehensive list of waterbodies since the inventory was completed in 1980 and there are additional lakes greater than five acres that have been created over the past 26 years. Conversely, some of the waterbodies listed in the inventory may have been filled in and no longer exist, especially in mineral resource areas like mines or gravel pits. In general, lakes may provide localized water quality, wildlife, and/or recreational benefits in their immediate vicinities, but the influence on the overall surface water quality, wildlife, and recreational opportunities in the Nimishillen Creek Watershed is minimal.

Flow Regime

The United States Geological Survey (USGS) operates two stream gauges along Nimishillen Creek to measure the Creek’s height and flow volume (discharge). Figure II-9 shows the guage locations, and listed below is a summary information from the USGS about these gauging stations.

**Gauge Identification:** 03118000 - Middle Branch Nimishillen Creek, Canton, OH  
**Location:** Lat 40°50’29”, Long 81°21’14”, on the downstream end of right bridge abutment on Martindale Road, 0.8 mile upstream from Rt. 62 bridge over Middle Branch Nimishillen Creek, and 2.4 miles upstream from the mouth.  
**Drainage Area:** 43.1 mi²  
**Period of Record:** September 1941 to Current Year  
**Annual Mean Flow Range:** 16.4 ft³/sec (1944) to 70.5 ft³/sec (1996)  
**Peak Flow:** 2,470 ft³/sec (Jan. 22, 1959)  
**Comments:** Station operated in cooperation with the City of Canton

**Gauge Identification:** 03118500 - Nimishillen Creek at North Industry, OH  
**Location:** Lat 40°44’03”, Long 81°21’08”, on left bank upstream abutment of Baum Rd. bridge, 400 feet northeast of Ridge St., and 2.1 miles downstream from Sherrick Run.  
**Drainage Area:** 175 mi²  
**Period of Record:** October 1921 to Current Year  
**Annual Mean Flow Range:** 86.9 ft³/sec (1931) to 355 ft³/sec (1990)  
**Peak Flow:** 8,600 ft³/sec  
**Comments:** Station operated in cooperation with the Ohio Department of Natural Resources - Division of Water and the U.S. Army Corps of Engineers
Figure II-9
USGS Stream Gages
Nimishillen Creek Watershed

- USGS Stream Gage
- Lake/Pond
- Stream
- Road
- Political Boundary
- Subwatershed Boundary

Northeast Ohio Four County Regional Planning and Development Organization, 2005
Source: Ohio Department of Natural Resources (ODNR)
**Floodplain Areas**

Floodplains are land areas along Nimishillen Creek that are subject to recurring water inundation during high water flows. Events that trigger flooding of these areas are typically heavy rain storms and/or snow melt. Flooding is a natural process and can be beneficial to both the creek and adjacent lands. Specifically, floodplains act as natural water retention basins slowing down and holding flood waters. Floodplains reduce the force and volume of water transported downstream resulting in less erosion and flooding. A floodplain is functioning properly when the deposition of soil and mineral particles occurs in flooded areas which results in less sediment, nutrients, and pollutants being transported downstream. An ancillary benefit from this deposition is that floodplains are often fertile agriculture lands.

Nimishillen Creek’s floodplain areas vary in both size and frequency of inundation. Like many streams in Ohio, the floodplain of Nimishillen Creek has been altered over the years by human actions, primarily urban/suburban development and agriculture. The reduction in floodplain land from encroachment in conjunction with sections of the Nimishillen Creek being straightened, wetlands filled, and open land covered with buildings and pavement has resulted in more water reaching Nimishillen Creek at a faster rate and in greater volumes. Over time the floodplain areas of the creek change in response to these and other actions.

Mapping of the floodplain areas is the responsibility of the Federal Emergency Management Agency (FEMA) and is primarily for insurance purposes. Figure II-10 shows the 100-year floodplain areas in Nimishillen Creek as determined by FEMA. The term “100-year floodplain” is used to express the probability of a given area to flood any given year, and not the occurrence interval between major floods. A 100-year floodplain simply means that the area has a one percent chance of flooding in any given year, while a 50-year floodplain has a two percent chance of flooding. The extent of floodplain areas fluctuate to reflect changes within the basin. For example, if a floodplain is filled (developed) upstream, the footprint of downstream floodplains will likely increase to hold the increase volume of water.

Figure II-10 was created using the current FEMA floodplain map; however, the map is currently being updated and digitized by FEMA and should be available in 2006. For the new flooding maps, the 100-year floodplain areas are anticipated to increase in size to reflect increased flood volumes from development within the watershed.

Extensive flooding occurred within the Nimishillen Creek Watershed in 2003 and 2004. Some areas significantly impacted by these floods include the cities of Louisville, Canton, North Canton, Jackson Township, and Canton Township. Damage primarily affected houses and businesses built within the current 100-year floodplain. Although the focus of this study is water quality, flooding and water quality issues should also be considered for projects or action when appropriate.
Figure II-10
100-Year Floodplain
Nimishillen Creek Watershed
2005

Legend:
- Red: 100-Year Floodplain
- Blue: Lake/Pond
- Green: Subwatershed Boundary
- Blue Line: Stream
- Gray Line: Road
- Black Line: Political Boundary

Sources: Ohio Department of Natural Resources (ODNR), FEMA
Water Quality Improvement Efforts
Water quality improvement efforts in the watershed have largely been limited to existing programs administered through various agencies. Some examples of these typical efforts include the Stark Soil and Water Conservation District (SWCD) monitoring construction site runoff, the Natural Resources Conservation Service (NRCS) working with the agricultural community to implement various agricultural best management practices, and the Stark County Health Department investigating failing HSTSs.

Some improvement efforts that are unique to the watershed include the City of Canton constructing a storm water treatment wetland adjacent to the Middle Branch. Modest testing of the wetland’s efficiency at removing pollutants has shown a reduction in sediment and nutrients from storm water runoff entering the Middle Branch. Also, the Nimishillen Creek Watershed Partners hold an annual creek clean-up each fall to remove trash and tires from various sections of Nimishillen Creek. The Stark County Health Department held an Environmental Expo in 2005 to promote, in part, the health of local water resources. Lastly, the Stark County Parks District has been purchasing riparian habitat along various sections of Nimishillen Creek for habitat preservation and community recreation. They have a long-term goal of establishing a recreational trail along the Nimishillen Creek corridor.

These current efforts show the interest and commitment from local stakeholders to improve their local water resources. Future programs and activities like the TMDL study and NPDES Storm Water Phase 2 (see below) will call on the stakeholders to implement and support additional improvement efforts. This Action Plan is an initial attempt to focus both on-going and future efforts on water quality improvements.

Storm Water
NPDES Storm Water Phase 2 Communities
In an effort to preserve, protect, and improve water resources throughout the nation from polluted storm water runoff (drainage), the United States Environmental Protection Agency (USEPA) in 2003 mandated that most urban areas develop a program to manage their community’s runoff. This regulatory mechanism is called the National Pollutant Discharge Elimination System (NPDES) Storm Water Program Phase 2 and is authorized by the 1987 Water Quality Act (WQA). By 2008, all affected communities must develop and implement at least six minimum control measures to control polluted storm water runoff. Those control measures are:

1. Public Education and Outreach Program
2. Public Involvement and Participation
3. Elimination of Illicit (Illegal) Discharges
4. Construction Site Storm Water Ordinance
5. Post Construction Storm Water Ordinance
6. Pollution Prevention and Good Housekeeping
The following communities in the Nimishillen Creek Watershed are designated as NPDES Phase II communities:

- **Counties:** Stark and Summit
- **Cities:** Canton, Green, Louisville, and North Canton
- **Villages:** East Canton, Hartville, Hills and Dales, and Meyers Lake
- **Townships:** Canton, Jackson, Lake, Marlboro, Nimishillen, Osnaburg, Perry, Pike, and Plain

All of the above communities except the City of Green, Village of Hills and Dales, and Marlboro Township submitted individual applications for their NPDES Phase 2 permit from the Ohio EPA. Marlboro Township and Hills and Dales received waivers from the Ohio EPA and do not have to participate in the Phase 2 Program. The City of Green is a co-permittee in the *Summit County Countywide Storm Water Management Program* Phase 2 Permit application. For more information about NPDES Phase II in the Watershed, refer to the above plans available from the Ohio EPA’s Division of Surface Water or any of the permitted communities.

**Stark County Drainage Task Force**

The Stark County Drainage Task Force is a coalition of elected officials, water resource professionals, and citizens that was formed in the fall of 2003 in response to extensive flooding that occurred in Stark County that year. The Task Force is directed by a Steering Committee comprised of representatives from every township, village, and city in the county, local environmental professionals (SWCD, County Engineer, NEFCO, non-profit organizations, etc.), and citizens. Their initial goals are:

1. Categorize drainage problems and create a list of short-term and long-term projects in both municipal and township areas.
2. Review current municipal and county regulations, address jurisdiction issues, and create uniformity of regulations throughout Stark County.
3. Create opportunities for public input throughout the planning process and explain to the public the pros and cons of various solutions.
4. Educate Stark County citizens about watersheds and increase awareness of proper environmental/water management.
5. Identify possible funding options and create criteria which promotes equitable resolution of drainage problems.

To accomplish these goals, four subcommittees were formed: problem identification, education, regulations, and business plan. The Task Force’s subcommittees in 2004 and 2005 mapped all known problem flooding areas, created a website, held public meetings, reviewed current regulations (subdivision, floodplain, etc.), and worked to secure money for a diagnostic study for the County. As a result of these efforts, Stark County was appropriated one million dollars by Congress through the U.S. Army Corps of Engineers for a detailed engineering study of drainage issues. The study will likely occur in 2007.
The Task Force intends to improve both water quantity and quality issues when addressing flooding. Open space preservation, riparian protection/restoration, wetland mitigation, and water quality detention ponds are all proposed methods of dealing with drainage issues in the Stark County and the Nimishillen Creek Watershed.

**Wetlands**

Wetlands have been described as the kidneys of a watershed because of the functions that they perform in the hydrologic and chemical cycles. They function as the downstream receivers of wastes from both natural and human sources. Wetlands can cleanse polluted waters, prevent floods, protect shorelines, and recharge groundwater. They also provide unique and important habitat for plants and animals (Mitsch, 1993). Unfortunately, the benefits of wetlands have not always been appreciated by mankind. Over the years they have been drained, ditched, and filled for agriculture and development. Mass wetland destruction began in the mid-1800s and continued nearly unchecked until the mid-1970s when wetlands began receiving legal protection by the United States and state governments.

In Ohio, wetland area has declined by an estimated 90 percent over the last 200 years. Wetlands currently cover 1.8 percent of the State covering approximately 483,000 acres (Dahl, 1990). No study has been done for the Nimishillen Creek Watershed to determine historic wetland loss, but it is believed to be equal to or greater than the percentage of wetland loss throughout the State. This observation is based on the extensive urban/suburban development in the Canton region and the extensive agricultural activity in the headwater sections of the East and Middle Branches.

The Ohio Department of Natural Resources and Natural Resources Conservation Service maintains the Ohio Wetlands Inventory database. This inventory was conducted using digital satellite data and other digital data to attain an estimate of wetland areas in Ohio. Figure II-11 shows the wetland areas in the watershed as determined by the Ohio Wetland Inventory. The inventory provides a general picture of wetland areas in the watershed. The largest contiguous wetlands are farmed and wooded wetlands in northern Marlboro Township and south of Hartville. The farmed wetlands in Marlboro and Lake Townships are primarily in muck soils. Woods on hydric (wetland) soils appear to be the most common wetland type in the entire watershed, primarily located along stream banks. The West Branch contains the greatest number of shrub/scrub wetlands while Middle Branch has the largest shallow marsh wetland.

However, information displayed on Figure II-11 should be viewed with caution since the data for the Ohio Wetland Inventory was collected between 1985 and 1987. Changes have likely occurred to a number of these wetland areas, especially in the Plain, Jackson, and Lake Township areas due to pressures of suburban sprawl. In addition, the wetland areas were not field checked in the Nimishillen Creek.
Figure II-11
1987 Ohio Wetlands Inventory Nimishillen Creek Watershed

Northeast Ohio Four County Regional Planning and Development Organization, 2005
Sources: Ohio Department of Natural Resources (ODNR), OWI, 1987
Watershed and areas represented as wetlands in the inventory may never have been wetlands. Conversely, there are likely wetland areas in the watershed that did not show up on the inventory due to the either the method of data collection used or wetland restoration efforts occurring after the survey was completed.

The Stark County Parks Department is in the preliminary stages of conducting a countywide wetland survey for the purposes of protecting and restoring wetland areas. Their end goal is to establish wetland mitigation banks with the county and watershed. This and similar wetland identification projects need to be supported in order to attain a clear picture of the wetland status within the watershed. The benefits of an accurate wetland inventory can lead to better wetland mitigation options, targeted wetland restorations, and enhanced protection of existing wetlands.

**Ground Water**

**Water Suppliers**

Four cities or villages, Canton, North Canton, Louisville, and East Sparta, obtain their municipal water supply from wellfields located within the Nimishillen Creek Watershed. East Canton and Hartville do not have a municipal water system and draw their drinking water from private wells. All of the above water supply areas are within areas serviced by sewers. The City of Canton also receives drinking water from wellfields outside of the Nimishillen Creek Watershed in the Sandy Creek Watershed.

Most of the remaining homes in the watershed rely on individual wells for their drinking water and are located in areas dependant on home sewage treatment systems. These areas include portions of Jackson, Lake, Marlboro, Plain, Nimishillen, Canton, Osnaburg, and Pike Townships.

**Ground Water Pollution Potential**

In 1991, the Ohio Department of Natural Resources Division of Water completed the mapping of the pollution potential of ground water resources in Stark County. The mapping program used by ODNR is called DRASTIC method and it identifies areas that are vulnerable to contamination. The program takes into account characteristics of an area including depth to water, net recharge of the ground water, aquifer media, soil types, and topography to determine a numeric value indicating the potential pollution risk to ground water resources. The higher the DRASTIC values calculated by ODNR, the greater the vulnerability to contamination. Figure II-12 shows the findings of this analysis.

In general, the ground water pollution potential is higher in the northern portion of the Nimishillen Creek Watershed. This is generally due to reduced topography and the glacial deposits underlying much of the northern portion of the watershed. The highest values are located in Canton, North Canton, Louisville, Nimishillen Township, and Plain Township along Nimishillen Creek and its East, Middle, and West Branches. In the southern portion of the watershed including
Figure II-12
Ground Water Pollution Potential Nimishillen Creek Watershed

Pollution Potential Index Range

Higher 180 - 199
160 - 179
140 - 159
120 - 139
100 - 119
80 - 99

Northeast Ohio Four County Regional Planning and Development Organization, 2006
Source: Ohio Department of Natural Resources (ODNR), 1991