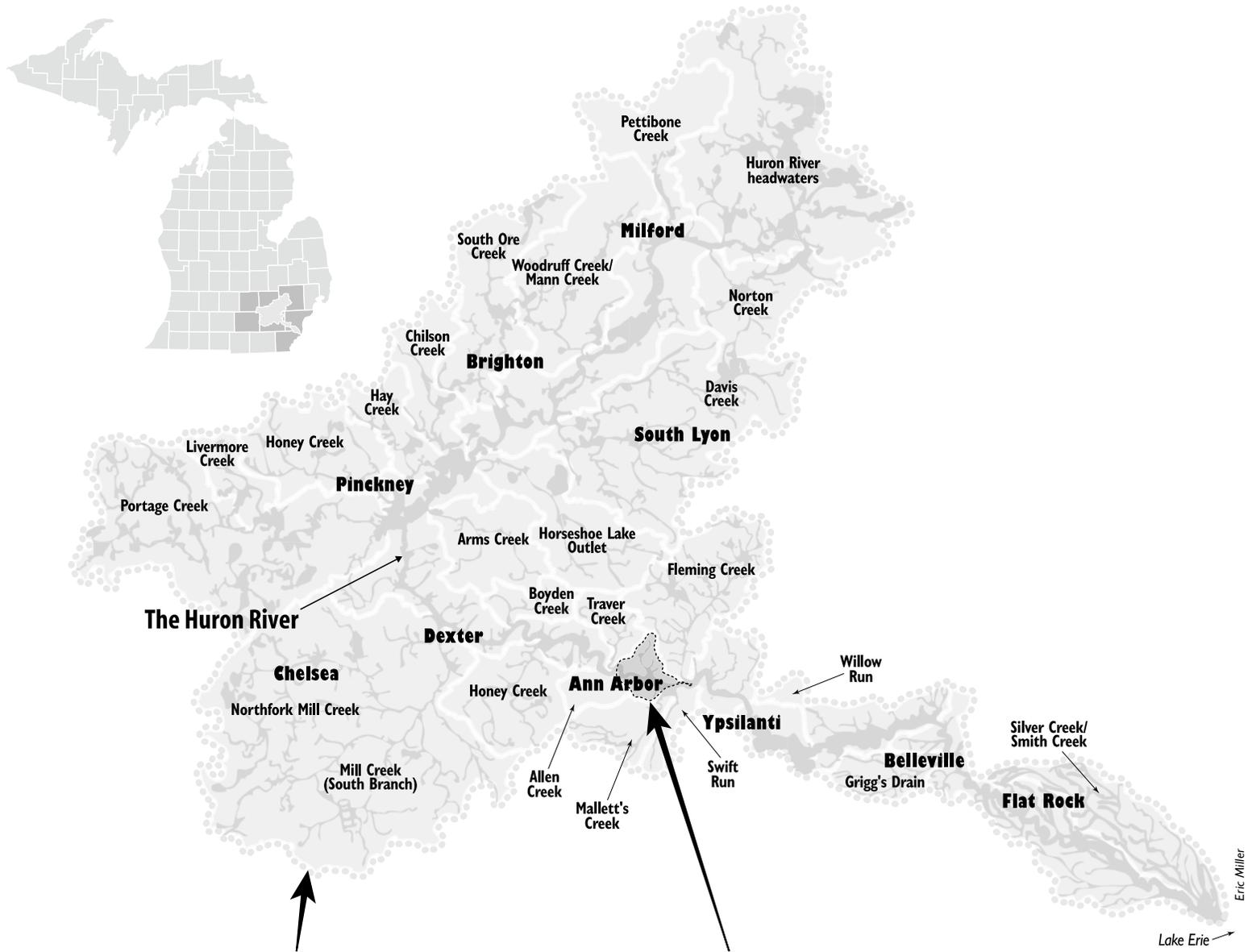


# Storming Down a Lovely Valley: The Millers Creek Report





### The Huron River Watershed

The Huron River begins at Big Lake in Oakland County and flows 125 miles before emptying into Lake Erie. It is fed by a watershed that covers more than 900 square miles and includes parts of seven counties: Ingham, Jackson, Livingston, Oakland, Monroe, Washtenaw, and Wayne.

### The Millers Creek Watershed

*See detailed map on page 4*

Millers Creek ripples down an unusually steep channel in northeast Ann Arbor, rests in the ponds of Geddes Lake and slowly meanders in a large wetland prior to flowing into the Huron River. It is small but powerful, includes several small lakes and flows through beautiful forest fragments and wetlands. Unfortunately, it is overwhelmed by excessive volumes of stormwater.

# Introduction

## Working Together To Save a Creek

This report is about a creek with terrific potential. While the creek suffers from the effects of high volumes of stormwater runoff, it is fortunate to be located in a community that wants to help the creek to solve the problem.

Northeast Ann Arbor is a special place. It harbors many of the City's natural features, including wetlands, scenic vistas, large native forest fragments that contain few invasive plants, steep slopes and rolling hills. Its distinctive neighborhoods host parades and pool parties. A public library and shops that address necessary needs, such as hardware and ethnic groceries, are within walking distance. Consistent with the history of community effort that has shaped the neighborhoods, residents and local businesses have begun working together to save Millers Creek and the natural areas that nurture it.

A community interest in Millers Creek began in 1993, when Robert Black, then facilities manager at ERIM, envisioned the potential for a community effort to protect the creek and at the same time showcase the natural features in the northeast gateway to the City. He spearheaded a group of representatives from local businesses and organizations including the City, the Drain Commissioner, ERIM, HRWC, PDA, the University, and neighboring institutions. For a few years the group encouraged educational projects and discussed possible ways to factor impacts on the creek into their decisions about the use of their land in the watershed.

Recent interest in Millers Creek was awakened in 2001 when Pfizer became concerned about erosion of the creek's banks on its property near Plymouth Road. Pfizer made the innovative decision to investigate the erosion problem in the context of the entire Millers Creek watershed instead of focusing on only fixing the immediate problem. The Millers Creek Action Team (**MCAT**) grew out of that decision.

Acting on the advice of the Drain Commissioner and HRWC, Pfizer commissioned a \$350,000 study of Millers Creek and asked MCAT to advise on the study. The study completed the Millers Creek Watershed Improvement Plan (MCWIP) in 2004. The MCWIP provides a scientific basis for decisions about effective ways to restore the creek and provides a blueprint for effective community involvement to improve the creek and protect our resources by reducing the impact of stormwater and preventing pollution.

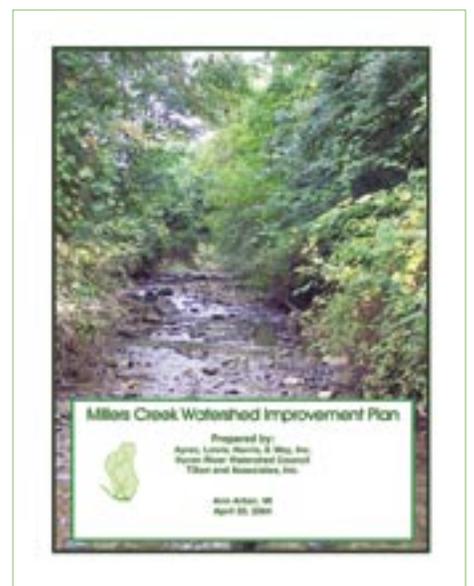
This Millers Creek Report highlights the history of human use of the land in the Millers Creekshed, the impacts of land use on water flow, physical and hydrological characteristics of the creek, and descriptions of many potential projects in each neighborhood that would protect, enhance and preserve the creek. A number of the improvement actions could be done by individuals or by schools or scout troops as service projects.



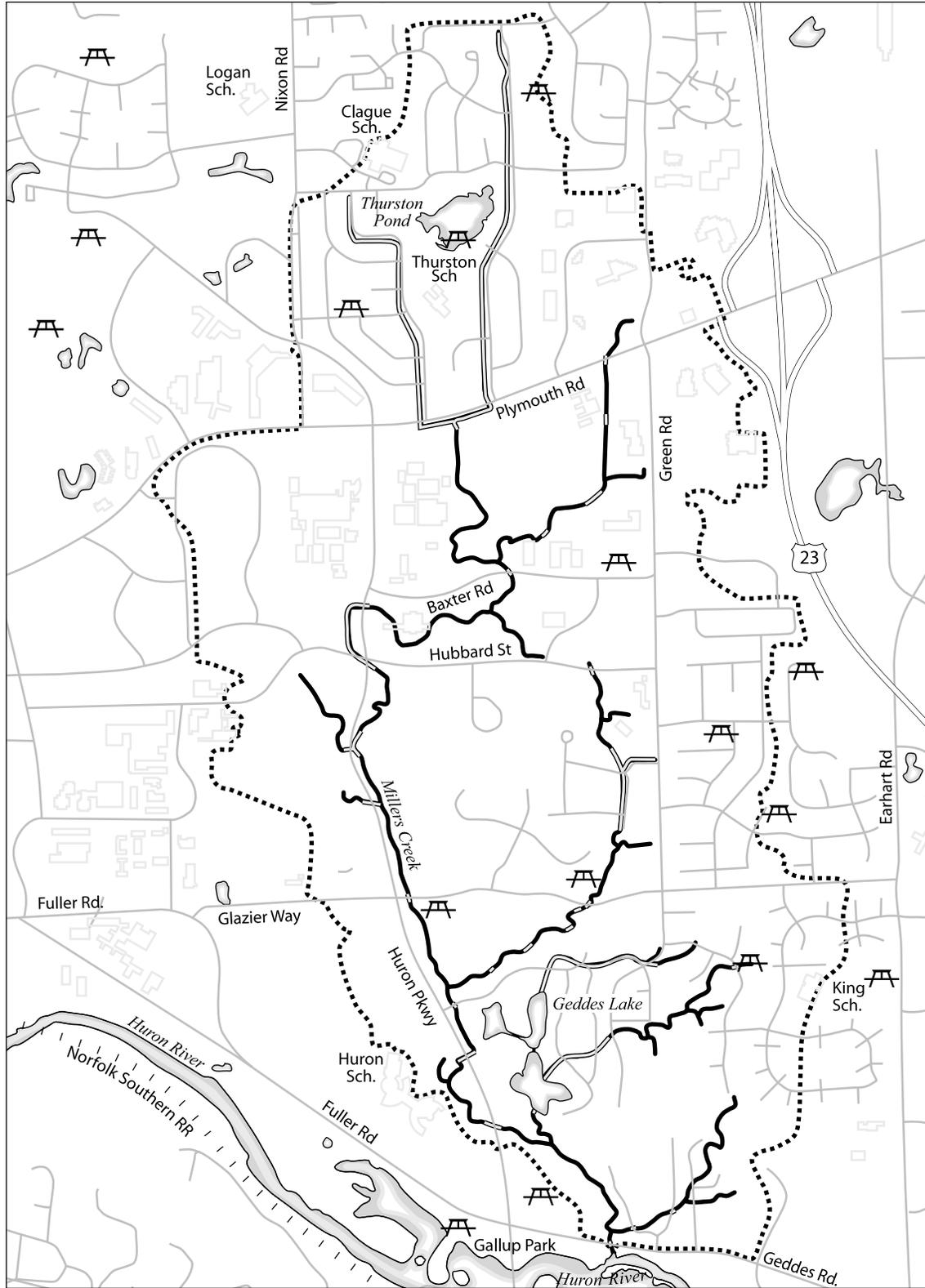
HRWC

Volunteer surveyors prepare to measure the Millers Creek channel.

**MCAT** membership includes Altarum Institute (Altarum) - [formerly Environmental Research Institute of Michigan (ERIM)], Ayres Lewis Norris May (ALNM), the City of Ann Arbor (City), Huron River Watershed Council (HRWC), Pfizer Global Research and Development (Pfizer), Pollack Design Associates (PDA), Tilton Associates Inc (TAI), the University of Michigan (University), the Washtenaw County Drain Commissioner (Drain Commissioner), and concerned residents.



# Millers Creek Watershed



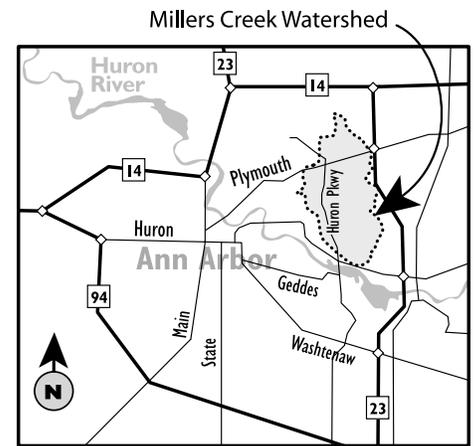
-  Stream (above ground)
-  Watershed Boundary
-  Underground Pipe
-  Park

Illustration: Gary Hochgraf

# Creek Facts

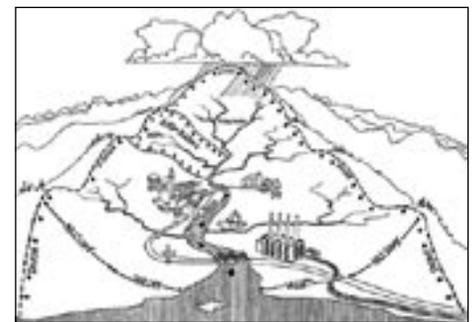
## Where is Millers Creek?

Millers Creek flows through northeast Ann Arbor and islands of Ann Arbor Township. A tour of the creek begins at Thurston Pond, the northern origin of the creek system (see map at left). Moving downstream, you can walk on top of the creek as it flows underground to Plymouth Road. This is the creek's main stem, which emerges south of Plymouth Road and continues south where it is joined by the eastern branch before crossing under Baxter Road. The creek then turns west and is visible under the "toaster" building (N. Campus Administrative Complex) on its way to an underground pipe carrying it under Huron Parkway, under the wetland on the northwest corner of the intersection and back under Huron Parkway. The creek emerges again in the woods south of Hubbard and flows along Huron Parkway, joined by tributaries from the east, to join the Huron River south of Geddes in Gallup Park.



## How large is the watershed? How steep is the creek?

Millers Creek has one of the smallest **watersheds** in the 900 square mile Huron River system, draining only 2.4 square miles. However, it is the steepest tributary by far, averaging a gradient of 52 feet per mile compared to the average for the entire Huron River of 3.5 feet per mile. In the half-mile from Hubbard Road to Glazier it is extremely steep, dropping more than 70 feet!



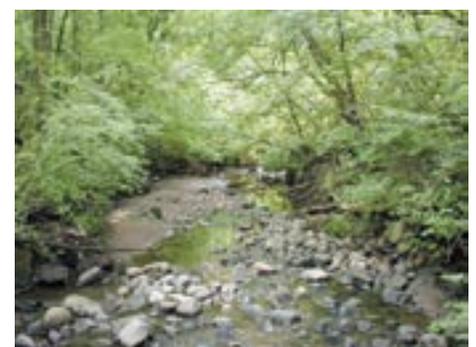
## What else is unusual about Millers Creek?

Whenever a substantial amount of rain falls or snow melts, the small stream rapidly becomes a torrent. The potential of Millers Creek to cut its banks and move the channel results from three features. First, the creek's path was shortened when the City constructed Huron Parkway. Second, it has a very steep gradient. Third and most important, the watershed is covered by extensive impervious surface, which results in excess runoff during rain events. Those three features working together give the water carried in Millers Creek enormous power to erode and reshape the land. (This is discussed further in Conditions, p. 9)

A **watershed** or basin is the area of surrounding land that drains into a creek. For instance, rainwater carries dirt and debris downhill into Millers Creek from roads, parking lots, and land within the basin. Watershed boundaries are more easily seen in the mountains; similar land contours create the edges of the watershed in flat land.

## Who has jurisdiction over land that affects the creek?

The two largest land-owners in the watershed are the University of Michigan (20% of the land) and Pfizer Global Research and Development (11%). City parks, several of which are managed as natural areas, include Baxter, Bromley, Earhart West, Glacier Highlands, Glazier Hill, Oakridge, Oakwoods, and Ruthven. City schools include Thurston and King Elementary, Clague Middle School, and Huron High School.



The creek flows through a beautiful setting below Hubbard Road, but it does not begin to fill the channel on a sunny day.

Merle Johnson

John Cramer

### How are people using the land that drains into Millers Creek?

The primary land use is residential; there are about 3000 homes (including apartments) in the watershed. There are many shops and businesses along both sides of Plymouth Road, including two small shopping malls. Several institutions are located on Green Road (the Great Lakes Science Center, Michigan Municipal League, United Methodist Church, and the Church of Jesus Christ of Latter Day Saints) and Huron Hills Baptist Church is on Glazier Way.

### Are there any lakes in this creek basin?

Thurston Pond, at the upstream end of the watershed, was once a marsh. It was converted to a pond during the development of the Bromley and Orchard Hills subdivisions. Downstream of Glazier Way are three small interconnected “Geddes Lakes” that were created by the developers of Geddes Lake Cooperative Homes following sand and gravel mining operations.

Why is there no apostrophe in **Millers Creek**? The U.S. Board on Geographic Names has since its inception in 1890 discouraged the use of the possessive form, which includes the apostrophe and the s. The possessive form using an s is allowed, but the apostrophe is almost always removed. There is nothing in the Board's archives explaining the reason.

A **County Drain** is an open or enclosed stormwater conveyance system, such as a creek, that is under the legal jurisdiction of the County Drain Commissioner for construction, operation and maintenance. Streams become designated as county drains through a petition where property owners or the local government petitions the Drain Commissioner to establish a county drain.

**Kames** are small but dramatic hills or ridges formed by glaciers. They consist of gravel and sand carried by melt-water that flowed into holes in the glacial ice. As the water drained away and the surrounding ice melted, the deposited sediments slumped down, often forming conical-shaped hills. A distinctive kame is located northeast of the corner of Huron Parkway and Geddes, at the center of Ruthven Park.

## History

### Naming an Orphan Creek

The name “**Millers Creek**” appears on a 1907 Huron River Atlas prepared by Gardner S. Williams for the Detroit Edison Company. The large area of land owned by Orrin White (including the section where Millers Creek joins the Huron River) was purchased by Samuel Miller, a land speculator, in 1881. For many years, Millers Creek was known as the North Campus Drain, even though it was never designated as a **County Drain**. (Such designation is now under consideration.) In 1995 the City of Ann Arbor formally changed the name to Millers Creek in response to Tom Beauvais' research of original maps.

### Uses of the Land

Glaciers formed the watershed of Millers Creek about 10,000 to 14,000 years ago. Remains of mastodons have been found in the area of Green Road east of Geddes Lake Homes.

This area was important for the Potawatomi, who returned to Michigan following the 1701 peace treaty that ended the 60-year Iroquois Wars. The Potawatomi Trail passed through the current intersection of Huron Parkway and Geddes and then crossed over the Huron River at the mouth of Millers Creek. The Potawatomi might have canoed up Millers Creek from the Huron through the marshy delta, around the glacial **kame**, and upstream past present day Glazier Way to collect plants, like wild rice, from the wetland

areas and to hunt for game and waterfowl. Three burial mounds were located in this area, overlooking the Huron River (Hinsdale, [Archaeological Atlas of Michigan](#), 1931).

In 1800 the natural landscape was a mosaic of mature hardwoods (oak-hickory and mixed oaks) towering 150-200 feet, creating an immense pristine forest interspersed with park-like oak savannah and patches of tall grass prairie. The slopes of Millers Creek lay beneath this hardwood forest that stretched all the way east to Dixboro. The valley of the creek passed through stretches of wet prairie, such as the large prairies in the current Thurston Nature Area and also along Millers Creek from Glazier Way to the river.

In 1836, John Gordon described the countryside during an autumn horseback ride from Dixboro to Ann Arbor. “The country to that place [Ann Arbor] is a little rolling for the first few miles from Prays [Dixboro] and then the oak openings begin. They are cluttered with a thin growth of large Brash White Oak, & some Burr Oak at long intervals (say 30 or 40 feet) with an undergrowth 5 or 6 feet high which has the appearance of being annually burnt down, as I am informed it is...it assumes the appearance of a grove carefully kept near a gentleman’s residence and it is difficult to divest yourself of the impression that you are approaching a stately mansion through a stately forest.”

The first pioneers settling in the Millers Watershed had arrived before the Chicago Road or the Central Railroad were built, while the Potawatomi were still in the area. Colonel Orrin White, who was in charge of the local militia, owned a large area in the Millers Creek watershed in the early 1800’s, including the kame, the mouth and delta of Millers Creek where he built a **cobblestone house** (that stands today) and an area west of Green between Hubbard and Glazier Way. “During the 1820’s the family nervously shared the farm’s flatlands with several hundred Indians who camped there annually while enroute to Windsor to receive treaty gifts from the British, their allies in the War of 1812.” (Reade and Weinberg, 1992, [Historic Buildings, Ann Arbor, Michigan](#)).



This is what you might have seen near Millers Creek in the 1800’s. (Courtesy Edward E Ayer Collection, The Newberry Library, Chicago)

W. H. Bartlett



Ann Arbor District Library

The **cobblestone house** at 2940 Fuller Road was the home of the Miller family in the 1880’s. It was built in 1836 by Orrin White.

The areas on **steep** slopes had less impact from logging, farming and soil turning and from development than where slopes are gentle. Because the materials comprising steep slopes are substantially sand and gravel (being glacial moraines) they are great recharge aquifers with seeps everywhere. In places where seeps occurred there were fens (see p. 30). So, steep slopes tend to harbor a higher percentage of the great natural features of the town – especially small ponds and wetlands, fens, the river, high quality forests, and big trees.

The term “**Underground Railroad**” was coined by a slaveholder in 1833 puzzling how one of his slaves had escaped across the Ohio River. It refers to a secret organization that helped enslaved laborers flee from the southern United States to Canada or other places of safety prior to the abolition of slavery. Estimates place over 1,000 escaped slaves transiting Washtenaw County, hiding out in barns, false spaces in houses, and being transported in wagons with false bottoms. “Conductors” escorted the slaves and the “stations” were marked by special bricks in chimneys, and signals in windows such as candles/lanterns. Glazier was the conductor on the Adrian-Ann Arbor-Farmington segment of one of two routes passing through the area.



Madeline Conboy

Bill Stapp impressed neighborhood children with a resident snapping turtle from Thurston Pond in 1965.

Clear-cut logging felled the forests across much of Ann Arbor by about 1860. Farming on lands not too steep to cultivate began in the later 1800's. The uncultivated **steep** land in the Millers Watershed now has high quality native forest fragments where a facsimile of the original forests of Ann Arbor have re-grown.

The Millers Watershed also played host to a stop on the **Underground Railroad**. Robert Glazier, a member of the Michigan Anti-Slavery Society founded in Ann Arbor in 1836, harbored escaped slaves in his home on Glazier Way. The railroads and creeks were convenient forms of transportation. Escaped slaves might have been hidden in railroad cars and then got off at Geddes station or they might have made their way across the Huron River and up Millers Creek to Glazier's home.

Agriculture operations continued in many locations of Millers Watershed until the 1950's, when the University of Michigan bought 800 acres to establish North Campus, and the Michigan Department of Transportation began acquiring land for the US-23/Plymouth Road interchange.

The City acquired 25 acres of adjacent “waste land” that included a swamp when the Bromley, Orchard Hills, and Maplewood subdivisions were designed in 1955. Residents removed 15 truckloads of debris in 1966 from the area that is now Sugarbush Park and the Thurston Nature Area. Ann Arbor recognized the value of acquiring public land long before anyone realized the need to manage stormwater runoff from impervious surfaces. People did not understand the free services provided by healthy creeks and the ways to keep creeks in good condition until the 1980's.

In the 1960's Parke Davis and other firms located along Plymouth Road and growth of the area began in earnest. The City straightened parts of the natural path of Millers Creek and placed portions of the creek in underground pipes when it constructed Huron Parkway through the creek's primary valley in 1964 -1967.

Thurston Elementary School opened in 1964, and the Thurston Nature Center Committee was established in 1965. In 1967, neighbors planted over 4,000 trees and other plants, built bridges and walkways, and erected bird houses, display cases and signs. All of this was captured on the film, “We're on our Way” as part of Ladybird Johnson's National Youth Conference on Beauty and Conservation. Families have been planting and nurturing trees in the Thurston Nature Center ever since.

In 1968, a heavy July storm caused flooding to homes in Bromley and Orchard Hills. The City responded by building a berm around the southern edge of Thurston Pond and installing a pipe to take stormwater overflow from the top of the Georgetown Boulevard storm sewer to the NE side of the Pond. A second pipe carries stormwater from the Clague School roof and parking lot to the NW side of the Pond.

Glazier Way became a Natural Beauty Road in 1986. The City acquired additional parkland in the 1980's and 1990's. Hotels, commercial centers, office buildings and residential projects were added in the 1990's, when this area was the fastest growing part of Ann Arbor. While there are many shops, offices, research corporations and the University of Michigan, individual homes and apartments dominate the land use of the watershed.

# The Study of Creek Conditions:

## Millers Creek Has a Stormwater Problem

Starting in 2002, staff at TAI, ALNM, and HRWC, along with nearly 100 trained volunteers, studied land use, vegetation, storm drains, rainfall, characteristics of Millers Creek and its channel, and the concerns of local residents. The study was extensive in actual field research, and that, coupled with exceptional public involvement, resulted in a carefully-planned set of improvements and a model for evaluating them.



HRWC

Gary, Don, Nancy and John measure the channel of Millers Creek.

Data collected from the creek included measures of water quality such as temperature and conductivity, aquatic habitat, invertebrate communities, flow regime and channel shape. This study was preceded by several **previous studies**. The results are available in the Millers Creek Watershed Improvement Plan (MCWIP), which you can find in area libraries and on the web ([www.aamillerscreek.org](http://www.aamillerscreek.org)).

**Previous studies** of Millers Creek started with Thurston Pond and the vegetation in the Thurston Nature Center in 1965. Since 1992 HRWC volunteers have been monitoring a site on the creek upstream of Glazier Road. An Eagle Scout project mapped a portion of the main channel in 1992. Soil Conservation Specialist Dennis Rice conducted a walking inspection of erosion problems in the main channel in 1993 for the Drain Commissioner. Classroom studies (and occasional Science Fair projects) have been conducted by students at Huron High since 1993.

Highlights of the study results include the following.

- **FLOW:** Millers Creek has an unnaturally dramatic pattern of flow. When it rains, water rises quickly in the creek due to rapid runoff. During these rain events, the force of the flow erodes the banks and tumbles rocks on the stream bottom making the creek inhospitable to most aquatic life. To make matters worse, when it's not raining, the baseflow of Millers Creek doesn't come close to filling its deeply-eroded channel. This leads to extremely slow flows and shallow depths that further stress aquatic organisms.
- **WATER QUALITY:** Millers Creek carries high loads of **phosphorus** into the Huron River, where the excess phosphorus leads to nuisance algal blooms that degrade the reservoirs of the River including Gallup Pond, Ford Lake and Belleville Lake. Millers Creek has high **bacteria** levels and

**Phosphorus** is a naturally occurring element that is an important nutrient in aquatic systems. Only a small amount is needed however, and excess phosphorus stimulates the growth of excessive amounts of algae. This green muck reduces the recreational opportunities on the Huron River and it is harmful to aquatic species. On average, only 20% of the phosphorus in the Huron River comes from natural sources. Sewer cross-connections, animal waste or lawn care could contribute to the high concentrations in Millers Creek (occasionally over 0.5 mg/L). Evaporation from standing pools will concentrate chemical constituents and may play a role in some of the high phosphorus concentrations.

*E. coli* (or *Escherichia coli*) is a type of **bacterium**

commonly found in the intestines of animals and humans. The presence of *E. coli* in water is a strong indication of recent sewage or animal waste contamination, which may contain many types of disease-causing organisms. *E. coli* concentrations under 200 cfu/100 mL are considered safe in waste water discharge. During the 2003 study the average concentration in Millers Creek was 1,127 cfu/100 ml, while the peak measured was 19,000 cfu/100 ml.



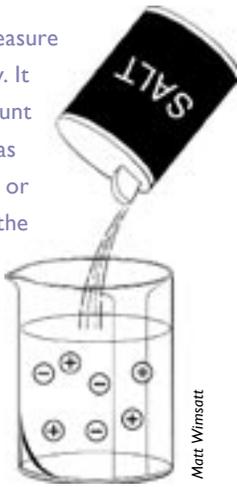
**Conductivity** is a measure of general water quality. It increases with the amount of dissolved ions, such as those derived from salt or metals, in the water. If the average conductivity measured at a site is 800 micro-Siemens ( $\mu\text{S}$ ) or less, it is considered natural for stream water in the Huron Watershed.

Conductivity over 800  $\mu\text{S}$  may indicate the presence of toxic substances. (However, many toxins are not measured by conductivity.) This measure is used as a red flag, signaling a need for further investigation of what is dissolved in the water.

**Groundwater** is rain that has soaked into the ground. It travels slowly through layers of soil and rock to an “aquifer,” or underground layer of porous material, that holds water, whence it recharges wells, streams, and the river. With a good supply of groundwater, a creek has a source of cool, clean water even in dry summer months.

The creatures living on the bottom of a river make up the **benthic community**. Samples of the invertebrates – creatures that have no backbone, such as clams, crayfish, worms, and varieties of insects – are commonly studied. The benthic community is a particularly useful indicator of problems in a creek because it is affected by many aspects of the stream and therefore reveals the state of both the water quality and the physical conditions of the stream. The community in a degraded creek will be restricted to a few types of invertebrates hardy enough to survive.

A **Floristic Quality Index (FQI)** is a relative measure for how undisturbed an area is. “Areas with a FQI higher than 35 possess sufficient conservatism and richness that they are floristically important from a statewide perspective.” (State’s Floristic Quality Assessment for Michigan) The FQI of the Narrow Gauge area is 47.5.



both the highest and the lowest **conductivity** levels seen in the entire Huron system. Streams normally have readings close to 500  $\mu\text{S}$ , the level in **groundwater**. The conductivity of the water in Millers Creek below Plymouth Road ranges from 166  $\mu\text{S}$  (comparable to rainwater) to 34,700  $\mu\text{S}$  (which approaches the conductivity of saltwater). Factors causing these unusual conductivity levels have not been explained.

- **PLANTS:** There are many sites in the watershed that have woodlands, forested wetlands, and extensive streamside vegetation. Such natural areas need to be protected because they help stabilize creek flow and benefit wildlife. The areas are identified in the following six sections.
- **INDICATOR SPECIES:** Most of Millers Creek is in poor condition. A creek’s **benthic community** is often a reliable indicator of the condition of the creek. A creek in good condition supports a diverse benthic community that includes several kinds of insects that are sensitive to organic pollution. However, most of the eight study sites in Millers Creek have only a few types of aquatic insects, the ones that are able to live in poor conditions (such as fluctuating flows and poor water chemistry). There is only one site that supports several types of sensitive insects.
- **A SPECIAL PLACE:** The headwaters of a tributary to Millers Creek flow through a glen on the east side of Narrow Gauge Way where the native trees and wildflowers have a high **floristic index**. In addition, this tributary has a high quality aquatic invertebrate community only found in unpolluted streams.

Stoneflies are highly sensitive to organic pollution. Their presence at a site indicates that the creek is in good condition.



### Flow is a Critical Problem

The problems in this creek primarily result from its erratic flow. At low flows, the stream moves so slowly at its mouth that it is difficult to measure. During a storm, however, flows in Millers Creek rise very rapidly – sometimes from a few inches to a few feet in less than an hour! When sampling for macroinvertebrates one spring following a rainstorm, a volunteer working at Glacier had to jump out of the channel because the water was rising so rapidly! The term “flashy” is often used to describe streams with flows that change rapidly in response to storm events.

Flashy flows in Millers Creek are exacerbated by its straightened path. Once runoff enters the channel, the steepness of the creek causes the excess water to move through the system very quickly. Large volumes of water moving rapidly result in a tremendous amount of power and explain the horrific erosion occurring throughout Millers Creek.

The stream bed is seldom disturbed in a healthy creek. Rocks provide stable habitat for many types of aquatic invertebrates and can also sustain algae, which is an important food source for invertebrates and fish. The rocks in the steep parts of Millers are smooth and barren because the powerful flows actually move the streambed.

While the creek has many good areas of vegetated corridor lining the banks, portions of the banks are crumbling and eroding, threatening to undermine the bike path on Huron Parkway and eventually the Parkway.

### The Source of the Problem

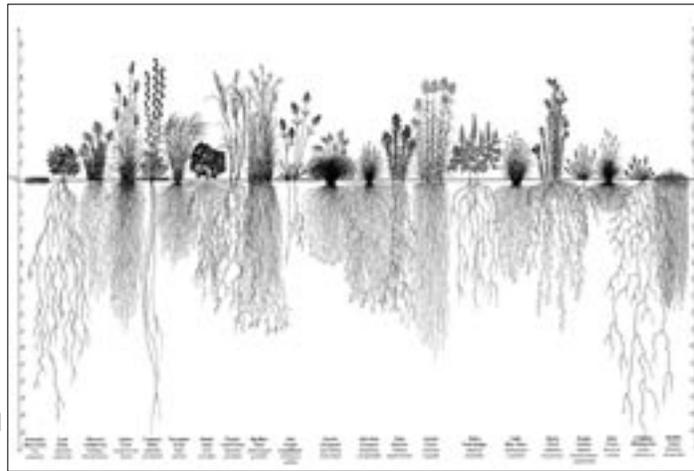
The source of the problems affecting Millers Creek is the way that land in the watershed has been developed without managing for the effects of stormwater on the creek. The creek provides a prime example of the importance of managing stormwater runoff.

In areas with a high percentage of **impervious surfaces**, like the Millers Creek watershed, rain and melting snow cause a destructive amount of **runoff**. When runoff in a city is not managed, an increased amount of water flows through storm pipes or overland directly into the creek. The water is not filtered through plants and soil where it would be cooled and cleansed. Instead, this higher volume of runoff creates a forceful flow that erodes stream banks, increases flooding, washes away aquatic animals and carries trash and chemicals from yards and streets into the creek. This water, warmed by the pavement, causes the stream water temperature to rise, which adds to the stress on many of the aquatic plants and animals. The extreme variations in flow will continue unless runoff is managed to allow rainwater to filter into the ground or at least hold it back and release it slowly. There are many ways of controlling, cleaning, and infiltrating stormwater, as described in the sections on opportunities to improve Millers Creek.

### Opportunities

The MCWIP identified over one hundred opportunities for specific improvements in the watershed. The opportunities for each neighborhood are described in the neighborhood sections of this report. The area in each section is a sub-watershed of Millers Creek. It includes the land that contributes runoff to the downstream location of the creek in that area, which was a site of creek study. Many of the opportunities could be implemented with minimal funding. Others will require outside funding, which is being sought by MCAT.

**Impervious surfaces** are hard surfaces (such as roads and roofs) that prevent water from soaking into the ground. As we build homes and businesses, we cover the ground with impervious surfaces. These impervious surfaces cover 35% of the Millers Creek watershed. Even lawns can be nearly impervious if they are on land that has been graded and packed by heavy equipment during construction. Turf grass has a very short root system and does not open soil to help water infiltrate.



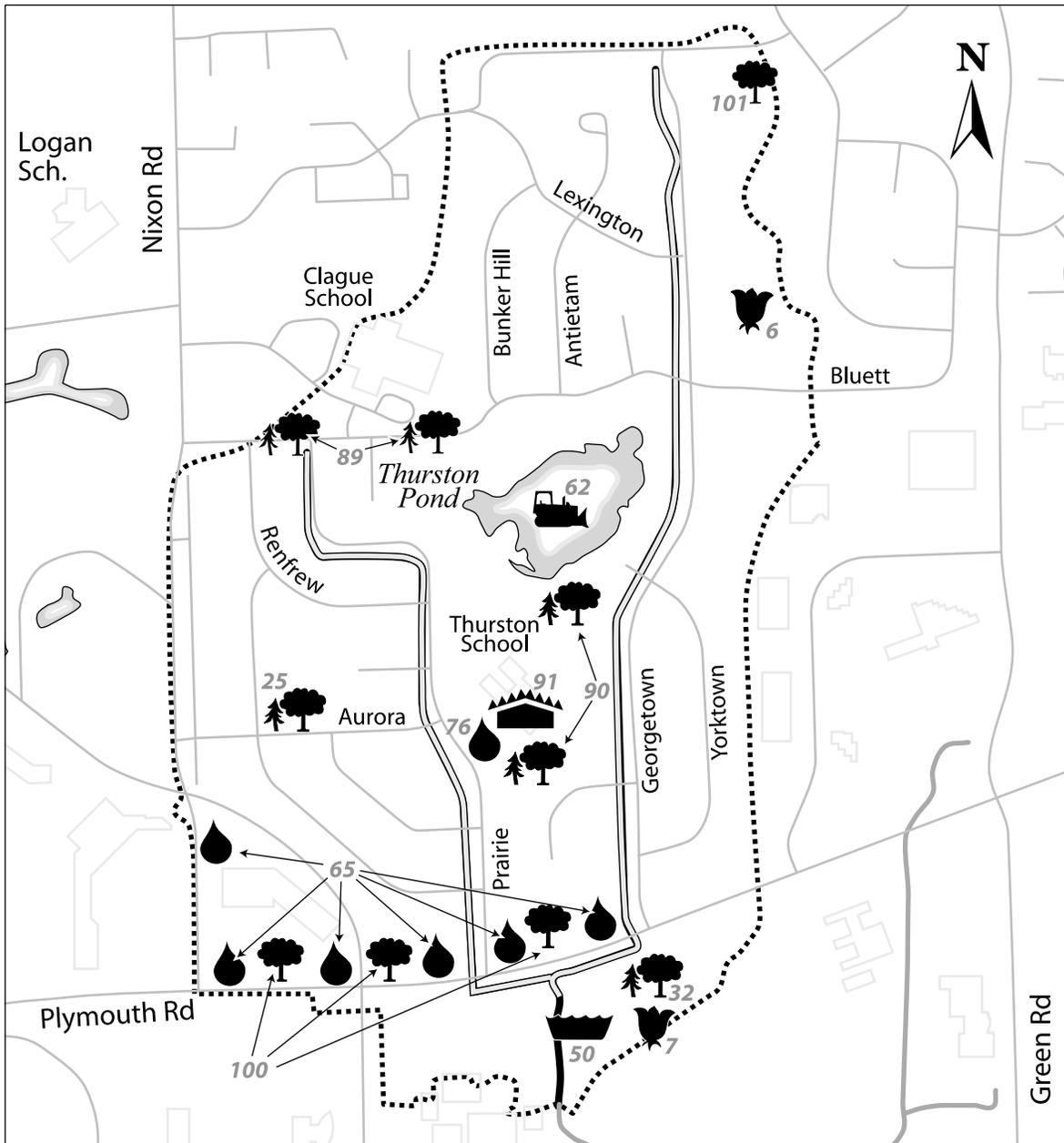
The roots of native prairie plants help water to infiltrate even compacted soil. Turf grass is at the far left.

Conservation Research Institute

**Runoff** is water that does not soak into the ground, but flows to the creek overland as well as in ditches and storm drains. (Water in storm drains flows unfiltered directly to the creek.) As water runs off the streets and land, it carries with it litter, sediments, and pollutants, such as fertilizers, pesticides, pet waste, and leaking oil from cars. Runoff from urban, suburban and agricultural sources has been identified as a primary source of water quality problems in the Huron River. The MDEQ has identified two significant water quality problems in the Huron River related to the impact of runoff: high concentrations of [1] phosphorus and [2] bacteria (*E. coli*).



## The Headwaters



- |   |                          |   |                         |   |                       |
|---|--------------------------|---|-------------------------|---|-----------------------|
|  | Tree Planting            |  | Stormwater BMP          |  | Stream (above ground) |
|  | Reforestation            |  | Roof Drain Modification |  | Underground Pipe      |
|  | Natural Area Protection  |  | Flood Plain Storage     |  | Watershed Boundary    |
|  | Detention Basin Retrofit |   |                         |   |                       |

# The Headwaters

“The most distinctive thing about this neighborhood is its design; the way the open spaces run through it so that all the homes are close to the parks and natural areas. I also love that the nearby commercial zones seem to have everything residents need. We are within walking distance to banks, restaurants, grocery stores, drug stores, the library, the post office, elementary & middle schools, doctors. I think the way Plymouth Road is ‘populated’ contributes to the pastoral feel of the whole northeast side. There are ‘strip malls’, but Pfizer and North Campus and all the sidewalks make it seem very different from, say, areas where you need a car to get anywhere.”

– Cathy Behrendt, resident

The Headwaters area comprises the source for the main stem of Millers Creek. It includes Thurston and Clague Schools, a Nature Center, social neighborhoods, a shopping mall, numerous businesses and research centers. Problems in this area have included erosion, flooding and the shrinking of beloved Thurston Pond.

The residential developments were built in the 1960s before the City controlled the management of stormwater. The areas where water historically could be stored were covered with streets and roofs to form the Orchard Hills and Bromley neighborhoods, and the creek was buried in a pipe (called a **storm sewer**), causing all of the rain to move rapidly to the creek during a storm.

This area has lively underground springs that provide about 30 gallons per minute following the winter thaw. Thurston Pond was originally a wetland and was deepened into a pond in the 1960’s during the construction of the adjacent neighborhoods. Now the pond is drying up while the spring water is directed to the storm sewer. Both the creek and Thurston Pond would benefit if water were redirected away from the storm sewer and into the pond.

Until recently, there was a problem with basement flooding in this area. The City is correcting the problem by disconnecting about 17,000 **footing drains** from the sanitary sewers and directing them into the storm sewers. The volume of water that this adds to the creek is so much less than the amount of storm runoff that it should not add to the stormwater problem.



Mike Conboy

The water level in Thurston Pond reached a 20 year low point in 2003.

The **storm sewers** are large pipes that transport stormwater runoff from streets directly to surface water bodies, including rivers and creeks, to avoid street flooding. They should not be confused with sanitary sewers and are not intended to ever carry waste or for the water to be processed at a waste water treatment facility.



A grate in the street covers the entrance to the storm sewer.

**Footing drains** are pipes around a home’s basement that collect ground water and drain it away from the basement, thus keeping the basement dry.

The creek first emerges from the storm sewer downstream of Plymouth Road. It often has a force during storms that erodes the stream banks. Less noticeable to local residents are two other problems here: water pollution and extremely unstable creek flows. When the tiny stream emerges from the storm sewer pipe, it is hardly moving most of the time but rises rapidly when it rains. For instance, the flow increased almost 300-fold during one storm in 2002. Runoff from the headwaters converges in the area south of Plymouth Road yielding the highest concentrations of bacteria, total phosphorus (average 240 ug/L), and salts anywhere in the Millers Creek.



### Sudden rise in flow in Millers Creek

The discharge (flow) near to Plymouth Road increased over 100-fold (from 0.1 to 14.7 cubic feet per second) in 20 minutes during a midnight cloudburst in mid-summer of 2004. It rained 0.20" during the hour before midnight; the second cloudburst was 0.27". The flow in Fleming Creek, which is adjacent to Millers (to the east), barely changed during the same storm.



Healthy **trees** can reduce the amount of stormwater runoff. An average sized maple tree moves over 200 quarts of water *per hour* in the summer from the ground, up through the tree, and into the air as evaporation from the leaves. Runoff from forested areas is 17% less than that from developed areas. In fact, the nation's urban trees are providing \$400 billion worth of storm management (- Washington Arbor Day Council, Tacoma, WA)

There are very few aquatic creatures living in this short stretch of open stream, the least found anywhere in the creek. During dry periods the stream flow diminishes and areas become stagnant, occasionally smelling rotten.

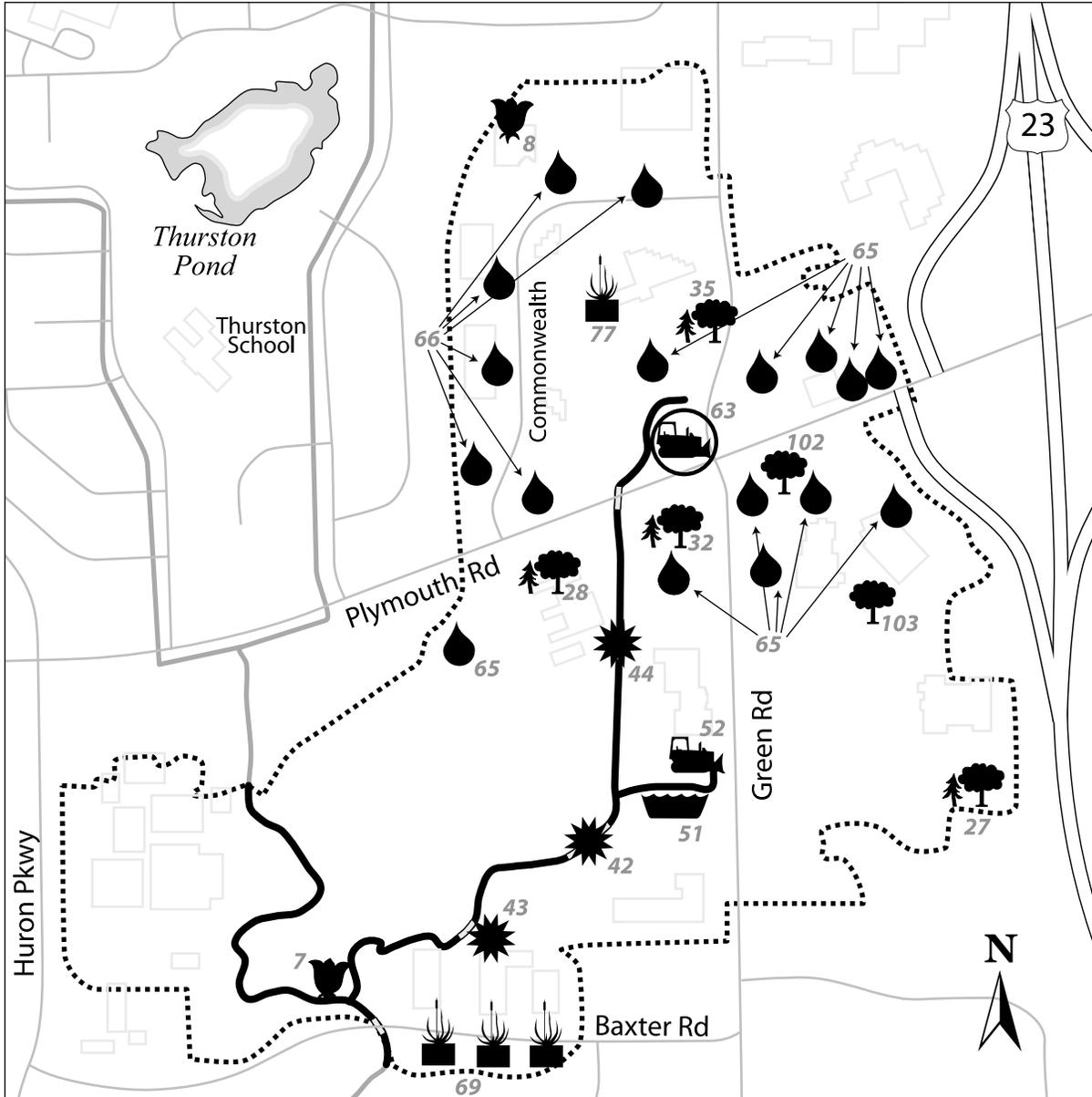
The stream bottom is primarily clay, which resists erosion. As a result, the forceful flows erode the banks, widen the stream, form meanders, and carry away land that affects property values as well as the ecosystem. The unpaved land in this area is dominated by lawns and shrubs. The MCWIP recommends one small improvement that, if made by every property owner, would help to reduce the extreme storm flows: plant **trees** and replace part of your lawn with native shrubs and flowers.

MCWIP recommendations specific to this area (Numbers refer to locations on the map on page 12 and also in the MCWIP):

- 6 The woodlot in Sugarbush Park should be conserved as part of future development.
- 7 *Kudos! The woodlots at the north and south ends of Pfizer's land will remain, according to the **Planned Unit Development** on file with the City. The woodland will be managed by removing invasive species and prescribed burning.*
- 25, 32 A portion of the open area in Bromley Park, and also along Plymouth Road could be converted to forest in areas where additional trees would not conflict with park uses. *(Kudos: Pfizer planted hundreds of trees and many acres in prairie in 2004.)*
- 50 A floodplain could be created to store stormwater on the east side of Millers Creek along a small woodland on the south side of Plymouth Road. This might reduce the bank erosion occurring here. *(Kudos: Pfizer has planned a detention basin in this area for on-site stormwater management, which could potentially be shared for off-line flood storage.)*
- 62 Thurston Pond is an important recreational and aesthetic resource for the community and also offers wildlife habitat. However, Thurston Pond currently suffers from an insufficient water supply. It may be possible to retrofit the pond, storm sewer system, and footing drains to direct additional flow to Thurston Pond during rain events, benefiting the pond and the creek by storing stormwater. *(Kudos: The Thurston Nature Center Committee has a 2004 plan to guide restoration of the pond.)*
- 65 The older stores and offices along Plymouth Road need to manage stormwater. However, they have limited space, consisting mostly of buildings and paved parking areas. They might install mechanisms in the parking lot catch basins to spin debris out of the stormwater. Later, when repaving becomes necessary, they should consider using "pervious" pavement that allows water to flow through the surface and infiltrate into the ground. (Learn about "pervious" pavement at [http://www.coolcommunities.org/cool\\_pavements.htm](http://www.coolcommunities.org/cool_pavements.htm))
- 76 There is space that could be used for holding and/or filtering stormwater in the Thurston School parking lot. Alternatively, the Public Schools could install mechanisms in the parking lot catch basins to spin debris out of the stormwater.
- 89 & 90 Existing open areas on Clague and Thurston grounds could be reforested. *(Kudos! The Ann Arbor Public Schools are already planting trees. They recently planted two at Thurston and 15 – 20 at Clague.)*
- 91 Roof drains at the Thurston Elementary School carry stormwater onto impervious surfaces. However, unlike other locations in the watershed, the school setting provides special opportunities for managing roof drain stormwater, including rain gardens and schoolyard habitats, which would provide an outdoor "classroom" for environmental education.
- 100 The perimeter and islands of parking lots in the Plymouth Road retail/office complex provide an opportunity for tree planting to take up stormwater in managed landscapes.
- 101 The open spaces of Sugarbush Park provide an opportunity for tree planting to increase tree density in the managed landscapes of the park.

A **Planned Unit Development** (PUD) is a zoning technique that permits flexibility in site design. In return for greater design flexibility, the developer must provide special benefits which advance certain public objectives such as the exceptional preservation of open space, unique or fragile natural features. Pfizer's PUD for the Green Road site states, "...The intent is to protect landmark trees ... to keep the woodlot intact, to enhance wetlands when at all possible, and to restore the site using Michigan native species where appropriate. Restored areas and existing ecosystems will be managed to encourage quality and diversity. ... Another potential benefit is to relocate approximately less than an acre of the existing northeast watercourse currently inside the test track to a more secure, stable and permanent location outside the development zone."

## The Baxter Watershed



- |   |                          |   |                    |   |                       |
|---|--------------------------|---|--------------------|---|-----------------------|
|  | Tree Planting            |  | Bio-swale          |  | New Storm Detention   |
|  | Reforestation            |  | Stormwater BMP     |  | Stream (above ground) |
|  | Natural Area Protection  |  | Floodplain Storage |  | Underground Pipe      |
|  | Detention Basin Retrofit |  | Stream Daylighting |  | Watershed Boundary    |

# The Baxter Watershed

“We have always spoken about the Plymouth/Green Road intersection as the Northeast gateway to the City of Ann Arbor. And between the large spruce we planted on the southwest corner and the cattail wetland on the northwest corner, the image of that gateway is clearly about natural systems. This quality of natural areas integrated into the built environment is what gives the U-M North Campus area its character and also sustains some of the highest commercial land and lease values in Southeast Michigan.”

– Robert Black, architect

The Baxter watershed includes an entrance to Ann Arbor as well as the Altarum Institute, Ave Maria School of Law, Black and Veatch, Cleary College, Commonwealth Business Park, Emergency Physicians Medical Group, Pfizer, and Plymouth/Green Shopping Center. It is home to the headwaters of the eastern branch of Millers Creek, which originates in the cattail wetland, west of the corner of Green and Plymouth Roads (63 on the map). It would be a significant improvement to add a regional detention facility here for the land upstream of that wetland.

Altarum, formerly known as ERIM, is located on Green Road just north of the Greenbrier Apartments. It has developed a reputation for practicing good land stewardship, such as preserving existing trees during construction, installing bio-infiltration swales and planting native species in their retention basins. (See [www.aamillerscreek.org](http://www.aamillerscreek.org) for details.)

The western portion of the Baxter area includes the main stem south of Plymouth Road where the creek has a broad and active floodplain, which serves to spread out and lessen the erosive force of storm flows.

The study site just north of Baxter Road has the best physical quality of all eight of the study sites on Millers Creek. Here the creek has a meandering gravel-bottom and a variety of habitats, including riffles, fallen trees, islands, and an occasional pool.

MCWIP recommends:

*Numbers refer to locations on the map on facing page and also in the MCWIP*

**7** *Kudos! The woodlots at the north and south ends of Pfizer’s land will remain, according to the Planned Unit Development on file with the City. The woodland will be managed by removing invasive species and prescribed burning.*

**8** The woodlot at Michigan House in the northwest corner of the commonwealth business park should be conserved.

**27, 28, 32** The linear open space along the north side of Black & Veatch, along Plymouth Road in front of the Pfizer campus, and along Plymouth and Green Roads could be converted to a forested or native plant community. (*Kudos: Pfizer planted hundreds of trees and many acres in prairie in 2004.*)



Traffic on Plymouth Road pauses by the wetland at the headwaters of the eastern branch of Millers Creek.



Native vegetation in a bioswale on Altarum’s property is maintained with fire, an ecologically sound way to encourage natives and discourage weeds.

*Numbers refer to locations on the map on page 16.*

- 35** Open space on the Ave Maria campus could be reforested.
- 42** Millers Creek flows through the southeast corner of Pfizer's parcel. Approximately 200' of Millers Creek is buried in a pipe at the east property line bordering the UM green lot. The open creek channel could be restored by removing the culvert enclosure.
- 43** Another 75' of Millers Creek is enclosed in a culvert beneath an old test track along the south edge of Pfizer's parcel. Opening the creek channel has been recognized in Pfizer's PUD to be considered as part of future site development.
- 44** Upstream of the former ERIM building stream crossing, the creek flows through a short culvert. If the two-track access road over the creek is no longer useful, this culvert could be removed.
- 51** Pfizer's vacant lot north of the UM Green Road commuter lot could be used to create a floodplain wetland alongside Millers Creek to reduce peak flows and improve water quality. Fortunately, it is recognized in the PUD as a potential stormwater storage facility.
- 52** A tributary to the east branch of Millers Creek flows north of the UM Green Road commuter lot. On the north side of this tributary on the Pfizer property is a detention basin. The basin, which appears to no longer receive flow from the tributary, could be improved by increasing the size, installing an inlet from the stream, and adding an outlet structure that would detain stormwater. This is also recognized in the PUD as a potential stormwater storage facility.
- 63** An emergent cattail wetland on the north side of Plymouth Road receives stormwater from a relatively small upstream drainage basin. Limited sediment and nutrient removal may already occur, providing some stormwater management benefits. However, this system could be enhanced by increasing its capacity, routing more stormwater to it, and increasing the detention time with an outlet structure. This site offers an opportunity for a regional detention facility capable of storing and treating stormwater from areas that are now directly connected to the storm sewer system.
- 65, 66** The older stores and offices along Plymouth Road and the Commonwealth Business Park need to manage stormwater. However, they consist mostly of buildings and paved parking areas, which leaves limited space for storage or treatment. They might install mechanisms in the parking lot catch basins to spin debris out of the stormwater. Later, when repaving becomes necessary, they should consider using "pervious" pavement that allows water to flow through the surface and infiltrate into the ground. (Learn about "pervious" pavement at [http://www.coolcommunities.org/cool\\_pavements.htm](http://www.coolcommunities.org/cool_pavements.htm))
- 69** The UM Plant Services and adjacent buildings on the north side of Baxter Road have a storm drain that discharges directly to Millers Creek. Altering this outfall so that it discharges into a vegetated swale or micro wetland detention basin would provide some pollutant removal during first-flush storms, which carry the most pollutants.

**77** Drainage from a portion of the north side of Plymouth Road flows along the west side of the Ave Maria property in a grassed swale. Infiltration and pollutant removal could be improved if the grass swale were converted to a bio-swale with native prairie grasses and/or wetland vegetation.

**102** Trees could be planted to increase the density of trees in parking islands and along the perimeter of the parking lots in numerous commercial and retail parking lots in the Plymouth and Green Road area.

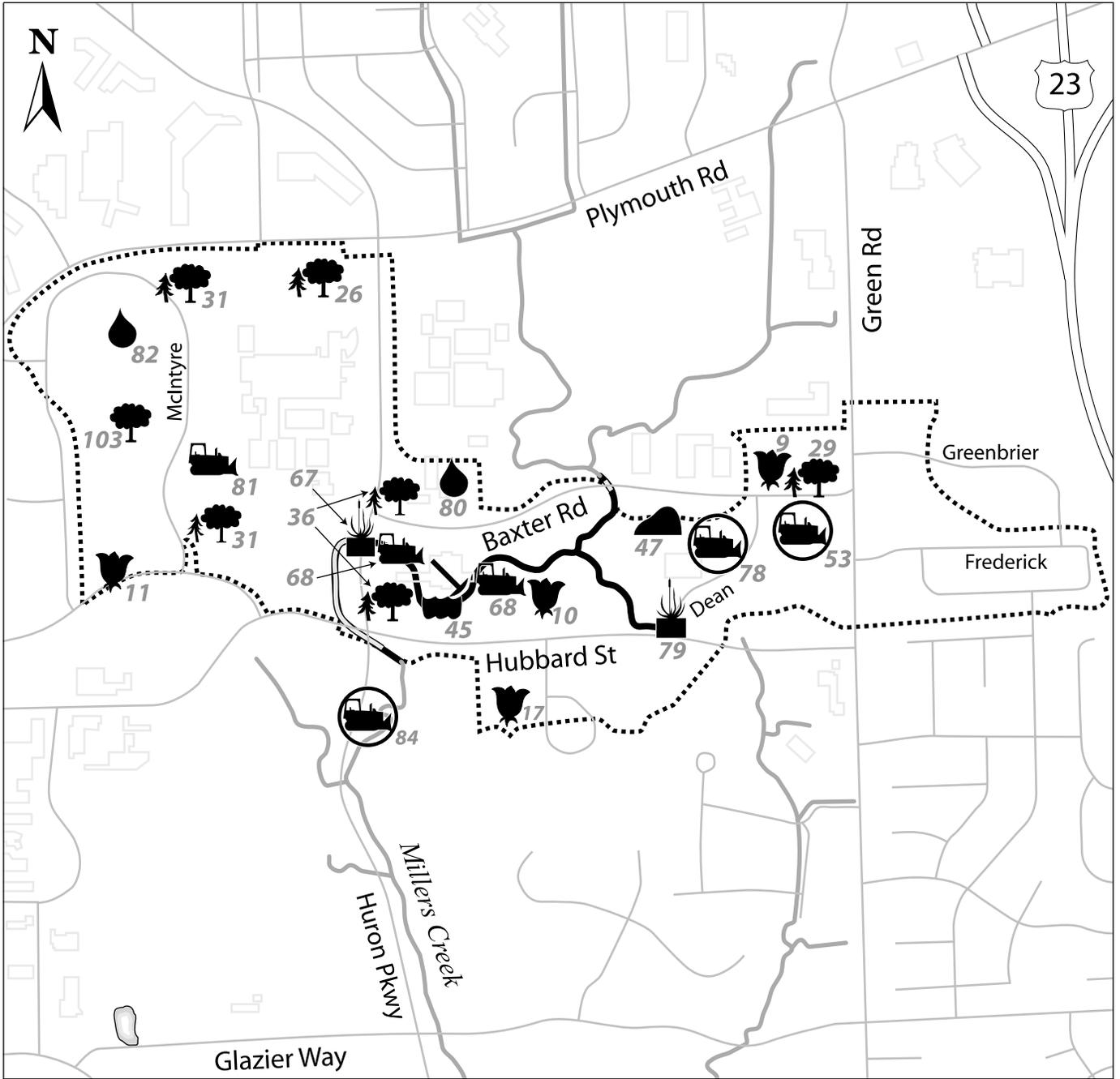
**103** Plant trees on the open turf grass area at the east end of EPMG's parking lot. During storm events, water from this open area may run onto the parking lot surface once the soil becomes saturated. Additional trees will increase interception of rainwater and reduce runoff onto directly connected impervious surfaces.



Trees grace the land with untold beauty.

Nichols Arboretum

# The Hubbard Watershed



- |   |                          |   |                            |   |                             |
|---|--------------------------|---|----------------------------|---|-----------------------------|
|  | Tree Planting            |  | New Storm Detention        |  | Debris/Sediment Containment |
|  | Reforestation            |  | Bio-swale                  |  | Stream (above ground)       |
|  | Natural Area Protection  |  | Stormwater BMP             |  | Underground Pipe            |
|  | Detention Basin Retrofit |  | Stream Channel Restoration |  | Watershed Boundary          |

# The Hubbard Watershed

The Hubbard area is primarily composed of University of Michigan land surrounding Pfizer property. Northwood IV housing is west of McIntyre while the University Health System Administration Building, Hubbard Woods, the laundry (78 on the map) and other campus maintenance facilities are east of Huron Parkway. Baxter Park (9) and the Michigan Municipal League (53) are on the west side of Green Road, while high-density residences (Greenbrier Apartments) are on the east side. There are open spaces and woodlots here that need to be preserved.

An enormous volume of stormwater pours through this watershed from the storm sewers and tributaries upstream, damaging stormwater structures, eroding the channel, and greatly disturbing the habitat in the creek below Hubbard Road. The lack of stormwater control has had devastating effects on the creek. In July 2002 the severely eroded banks towered as much as 4 feet above the water level. Much of the potential habitat, such as the undercut banks perched above the water level, is unavailable to the aquatic community.

MCWIP recommends:

*Numbers refer to locations on the map on facing page and also in the MCWIP*

9 The “Parks & Recreation Open Space Plan 2000-2005” mentions possible expansion of Baxter Park. The University owns a small lot adjacent to the west side of Baxter Park that might be acquired by the City to expand Baxter Park, accommodating passive uses and maintaining natural plant communities.

The following 3 woodlots on University property should be conserved should the area be developed. Fortunately the University notes that “Areas with significant natural features have lower priority for potential development.”

- 10 The large woodlot east of the University Health System Administration Building.
- 11 The small woodland south of the Northwood IV housing complex and north of Hubbard road.
- 17 The woodlots east, west, and south of the Northwood V housing complex.

26 The linear open space along Pfizer’s road frontage could be converted to a forested or prairie grass community if the area is not slated for development. *(Kudos: Pfizer planted hundreds of trees and many acres in prairie in 2004.)*

29 The southern portion of Baxter Park could be converted to a forested plant community offering both ecological and educational opportunities.



John Cramer

It is remarkable that this small creek rises up to cause the bank erosion evident here.

Numbers refer to locations on the map on page 20.

**31, 36** The open space along Plymouth Road on the UM Northwood IV site as well as surrounding the Family Housing center at the northeast corner of Hubbard and McIntyre, and also along Huron Parkway by the UM Transportation Research Institute and University Health System Administration building could be reforested.

**45** The University could replace the turf grass along the edge of Millers Creek by the Health System Administration Building with a diverse vegetative community to reduce direct runoff, which increases bank erosion.

**47** Storms wash sediment from the gravel surface adjacent to the UM refueling station on Baxter Road onto Baxter Road and into the storm sewers or directly into the small tributary to Millers Creek. The gravel surface could be stabilized with pervious paving material or other methods could be implemented to capture and/or filter runoff from the site. *Kudos: "A project has been initiated for improvements to the debris containment structure and the adjacent area. This will include a roof for the structure, improvements to the sill, and paving of the adjacent area." – University of Michigan, December 2004.*



John Cramer

**53** The Michigan Municipal League owns a large open space on the west side of its property along Dean Road that is currently managed turf grass. Stormwater from the parking lot that drains onto this grassy area should be detained before flowing into the storm sewer on Dean Road. The improvement would be even greater if off-site stormwater were then directed to the detention basin.

**67** *Kudos! The existing prairie plantings within the Huron Parkway median are an excellent example of good land stewardship in the Millers Creek watershed that should be enhanced where they already exist and expanded into additional*

*areas. The boulevard medians can be lowered to form shallow depressions, then re-planted with prairie grasses and wildflowers. Precipitation falling directly on the medians would infiltrate as it flows down hill. The parkway curbs could be cut to allow stormwater to enter the depressed medians. Infiltration gutter pans could also be installed along the outside curbs of the parkway.*

**68** The two older retention basins on the site of the University Health System Administration could be retrofitted to store additional runoff from surrounding impervious areas and/or to provide off-line storage for high flows in Millers Creek. *Kudos: This is being reviewed as part of a University study of potential retrofits to improve the campus stormwater basins.*

**78** Runoff from the University refueling station and laundry facility could be directed to the existing depression on the southwest corner of Baxter and Dean Roads for infiltration and detention. This area could also potentially detain water from the plant services buildings north of Baxter as well as from both roads.

**79** Improvements are needed to the ditches along Dean and Hubbard Roads to increase infiltration, and remove sediment and nutrients and slow the flow of stormwater to a small creek that joins Millers Creek in the University Woodlot.

**80, 82** The University Transportation Research Institute site and the Northwood IV site have open space, which could be used for stormwater detention and/or filtration that is needed to handle stormwater from the parking lots. Alternately, proprietary catch basin devices could be used in the parking lot to improve stormwater treatment. *“These sites may be potential student projects. Depending on the design recommendations, the BMPs may be implemented by volunteers, staff, or a contractor as funding is available.” – University of Michigan, December 2004.*

**81** The detention basins on the west side of the Pfizer campus could be retrofitted as series of wet detention and infiltration basins.

**84** Two storm pipes originating at the Northwood V housing complex discharge into Millers Creek between Hubbard Rd. and the culvert under Huron Parkway. Modifications to the culvert inlet under the Parkway could detain stormwater during high flows. *This is a potential student project. Details at (734) 936-5238.*



John Cramer

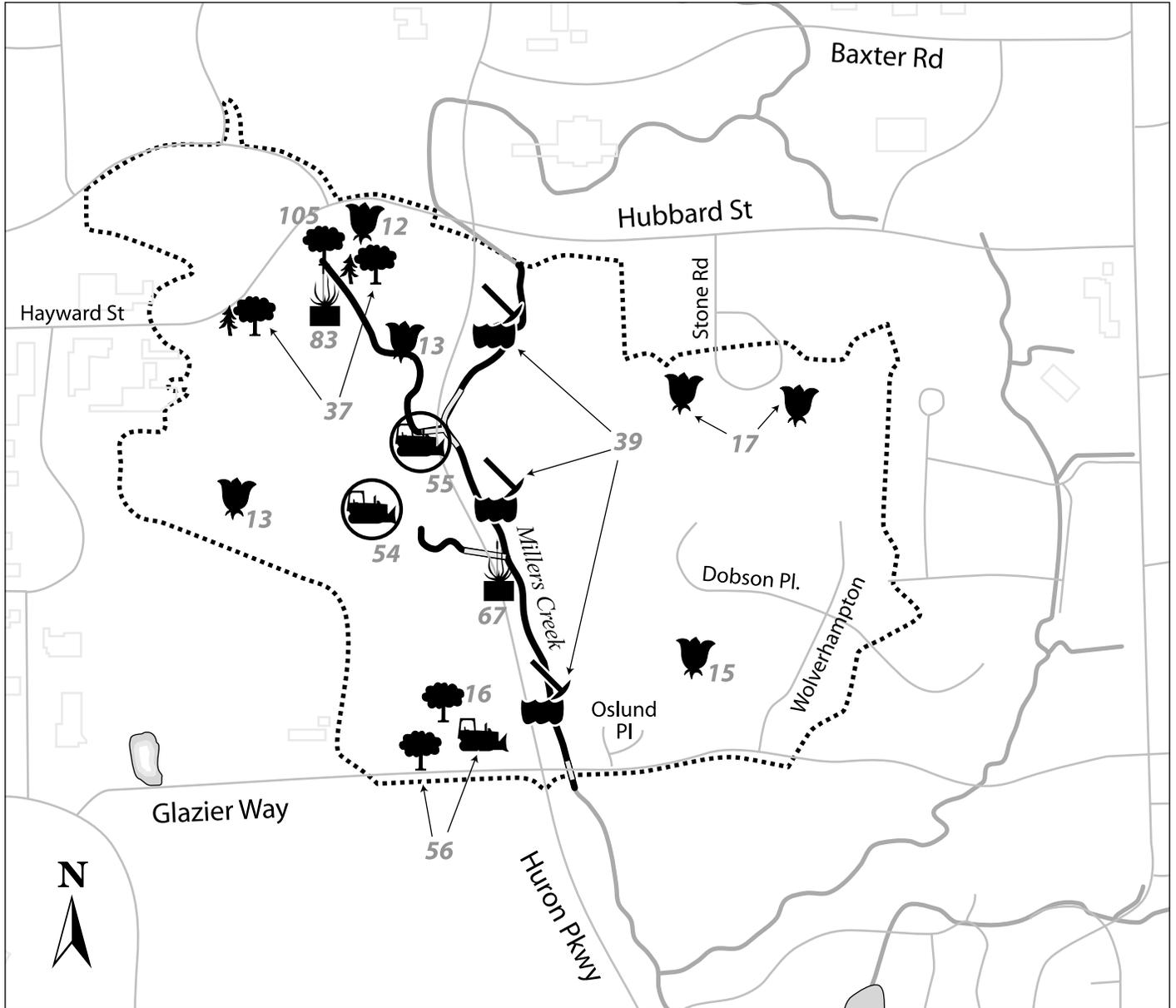
A culvert shows the size available for storm flow in Millers Creek.



John Cramer

Red jack-in-the-pulpit berries brighten the woods by Millers Creek.

## The Glazier Watershed



- |   |                          |   |                            |   |                       |
|---|--------------------------|---|----------------------------|---|-----------------------|
|  | Tree Planting            |  | New Storm Detention        |  | Stream (above ground) |
|  | Reforestation            |  | Bio-swale                  |  | Underground Pipe      |
|  | Natural Area Protection  |  | Stream Channel Restoration |  | Watershed Boundary    |
|  | Detention Basin Retrofit |   |                            |   |                       |

# The Glazier Watershed

The Glazier watershed includes much land owned by the University of Michigan as well as the Woodlands neighborhood, the Oslund development and some individual homes. A beautiful large area of steep slopes and climax forest, with some parts resembling the forests that preceded logging in the 1800's, enriches the east side of the Parkway. This is only a small portion of the 600-acre Goss estate that stretched from Plymouth Road to Glazier Way and from Green Road to what is now Huron Parkway. In 1916, Arnold Goss founded the Kelvinator Corporation. During the 1920s and 1930s, he also raised nationally recognized Jersey cattle at The Oaklands dairy on Plymouth Road.

This is the steepest portion of the creek, a location where you can clearly see the effects of its power. The banks tower 12 feet above the stream at a precipitous angle. In one location, the bank is less than 10 feet from the sidewalk and is still being undercut. A long curved culvert along the Parkway discharges to an enormous concrete structure called a baffle-box (on the east side of the Parkway, 55 on the map) that has four-foot-high concrete blocks to dissipate some of the energy in the flow. The concrete support for the baffle-box apron has large openings, and the hole scoured out of the streambed downstream of the structure is relatively shallow, causing the scour energy to work outwards and actively erode the banks.

The stretch below the baffle box appears to be over-steep, which is a sign that the stream is going to cut into the stream bed further upstream, if it can overcome the restraint imposed by the baffle box and its foundation.

Both the channel and its banks in this reach of Millers Creek are very actively changing. The stream has deepened the bed and channel and the stream banks are some of the most severely eroding in the watershed. Eroding banks are contributing large amounts of sediment to the stream and the stream bed is no longer connected to its former floodplain.

The University facilities on the west side of Huron Parkway drain to Millers Creek by way of two stormwater channels through culverts under the Parkway. These transient tributaries are cutting their stream bed, progressing from downstream to upstream, which has caused the end sections of the culverts to collapse into the creek.

MCWIP recommends:

*Numbers refer to locations on the map on facing page and also in the MCWIP*

The following woodlots should be conserved should the area be developed. Fortunately the University notes that "Areas with significant natural features have lower priority for potential development."

- 12 West of the University North Yellow Lot (NC53) between Hayward and Hubbard Roads.
- 13 Northeast and southwest of the University Grounds Service Facility.



Sally Bund

"Skylodge," a Georgian Colonial Revival home built by Arnold and Gertrude Goss in 1923 is the centerpiece of Woodlands, the neighborhood of homes on Dobson Place and Wolverhampton. It was restored in 1987 by Sally and Ian Bund, who have preserved it and the surrounding five acres.



HRWC

Stormwater shoots against four-foot high concrete blocks in this baffle box structure that is located above the steepest portion of the Millers Creek channel a few feet from Huron Parkway.

Numbers refer to locations on the map on page 24.

Johnson, A.W. and J.M. Sypula, King County DPW, Seattle, WA



Banks are **stabilized** and protected from further erosion by both hard materials and growing plants, provided the force of the stream flow doesn't overcome such measures.

Extended **detention** ponds hold stormwater for some minimum time (24 - 72 hours) by means of an outlet that controls release of the water. This time allows particles and associated pollutants to settle out of the quiet water and the slow release minimizes the impact on the receiving stream.

Center for Watershed Protection



Landscaped retention ponds can be beautiful.

- **15** The large and beautiful area north of Glazier Way and west of Wolverhampton Lane.
- **16** East and west of the University (NC51) parking lot, and
- **17** East, west, and south of the Northwood V housing along Huron Parkway.

**17** *Kudos! Professor Nassauer's 2005 University Landscape Ecology class is researching ways to disconnect the roof drains at the Northwood V housing units and provide detention or retention at the site.*

**37, 105** The perimeter areas of the University NC53 parking lot should be converted to forest and the parking islands and perimeter space should be planted with trees to provide complete canopy coverage of the open space.

**39** It is important to **stabilize** the stream bank and streambed in order to improve water quality and aquatic habitat, but such measures cannot be designed until after the stream flow is modified.

**54** A small drainage tributary exists north of the Orange Commuter Lot (NC51) and southeast of the University Grounds Service Facility; much of the property surrounding the facility drains to this tributary. *Kudos! The University has begun constructing a new retention basin designed to eliminate runoff from this drainage area to Millers Creek. This project should be complete by Spring 2006.*

**55** The University could delay stormwater from the yellow lot (NC53) tributary flowing under the Parkway by making a storage area utilizing existing topography and the Parkway grade.

**56** *Kudos! The University is completing an evaluation of all existing stormwater management basins on campus. The linear **detention** basin along the east side of the Orange Commuter Lot (NC51) is proposed for reconstruction to improve detention and stabilize its eroding side slopes. Native trees, shrubs, and grasses could be planted to provide shading, stabilize the side slopes, and make the basin more attractive.*

**67** *Kudos! The existing prairie plantings within the Huron Parkway median are an excellent example of good land stewardship in the Millers Creek watershed that should be enhanced where they already exist and expanded into additional areas. The boulevard medians can be lowered to form shallow depressions, then re-planted with prairie grasses and wildflowers. Precipitation falling directly on the medians would infiltrate as it flows down hill. The parkway curbs could be cut to allow stormwater to enter the depressed medians. Infiltration gutter pans could also be installed along the outside curbs of the parkway.*

**83** Infiltration swales could be constructed along the east side of the University lot (NC53). Curbs could be cut to allow stormwater to flow into the swale instead of into the existing catch basins. This would provide the opportunity for infiltration and pollutant removal before stormwater enters the sewer network and tributary.

**99** Detention could be constructed at the outfalls from the University Northwood V housing to slow the discharge of stormwater.

# Upstream of Lakehaven

“Our neighborhood is distinctive because ... trees were only cut in the area where the houses would stand. As a result, we enjoy 70, 80 and 90 year-old oaks, the majority type of tree in Vintage Valley.” – Beth Kelley. Her neighbor Margaret Steiner enjoys seeing many resident animals, including a barred owl outside her laundry room, a possum, raccoons, a fox, and also deer.

The southwestern tributary, or Lakehaven Branch, drains several hundred acres north of Glazier Way and on both sides of Green Road from Hubbard to Glazier. While Lakehaven Drive is part of the Geddes Lake Homes, this watershed is totally separate from the land that affects the ponds of Geddes Lake. (See map on next page.)

This attractive creek is easily viewed where it crosses under Glazier Way by the Huron Hills Baptist Church (**40** on the map on page 28). The area includes a portion of Woodlands, Vintage Valley, and the neighborhoods that host an annual Memorial Day parade and celebration in Glazier Highlands Park (**107**). In addition to Huron Hills and the park, this watershed includes the following non-residential properties: Glazier Hill Park (along the creek north of Glazier Way), Great Lakes Science Center (GLSC) (**86**), United Methodist (Greenwood) Church (**18**), and the Church of Jesus Christ of Latter Day Saints (**20**). The extent of paved surface would have been larger if the Church of Jesus Christ of Latter Day Saints had not been able to use the neighboring GLSC parking lot when their parking needs enlarged.

The GLSC was built in 1963 on land purchased from the University. At that time there were only a few homes in the area surrounded by open fields and woodlands. Later the university deepened and graded parts of this branch. Early residents persuaded the City and developers to put in sidewalks and to include essential services, such as a hardware store and a library that are on Plymouth Road. Several wells on the GLSC property have been providing water for GLSC fish ponds and for the creek for many years.

MCWIP recommends:

*Numbers refer to locations on the map on next page and also in the MCWIP*

**18, 19, 20** The woodlands on the east half of the Greenwood Church property, on the Huron Hills Baptist Church property, and on the Church of Jesus Christ of Latter Day Saints property should be conserved as part of future development.

**40** The tributary that flows under Glazier Way is severely eroding the channel bottom and the banks, adding sediment to Millers Creek and significantly diminishing the quality of stream habitat. The stream bank and streambed need to be stabilized to improve water quality and aquatic habitat but this construction should be designed only after other improvements to the stream flow are made.

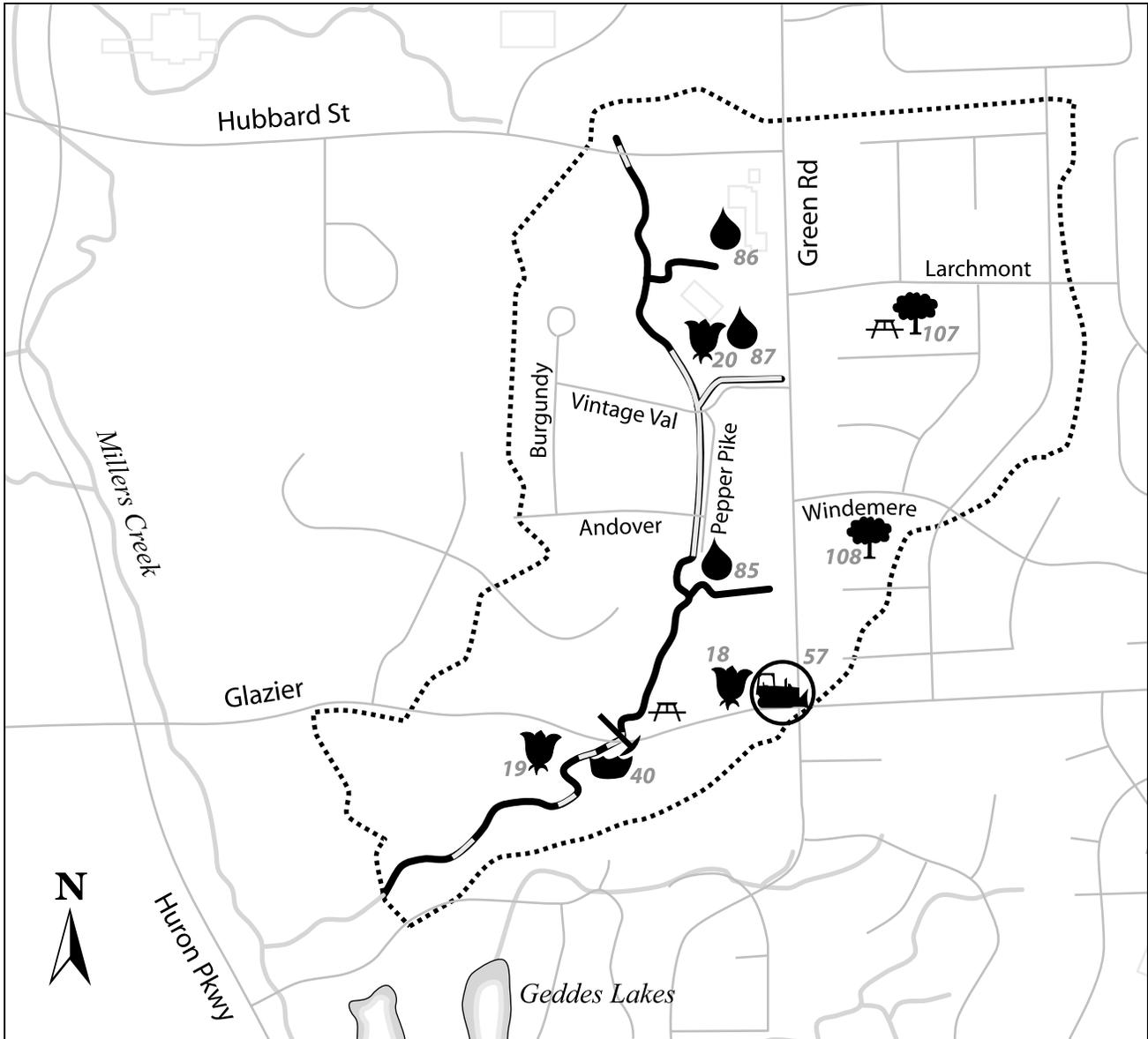
**57** The Greenwood Church does not have on-site stormwater detention. There is room on the south end of the parking lot to create a small detention basin to detain stormwater from the parking lot and roof drains.



HRWC

The Lakehaven Branch approaches Huron Hills Church south of Glazier Way

## Upstream of Lakehaven



- |   |                            |   |                       |
|---|----------------------------|---|-----------------------|
|  | Tree Planting              |  | Park                  |
|  | Natural Area Protection    |  | Stream (above ground) |
|  | New Storm Detention        |  | Underground Pipe      |
|  | Stormwater BMP             |  | Watershed Boundary    |
|  | Stream Channel Restoration |   |                       |

**85** The Glazier tributary is badly eroded and adds to the sediment problem in Millers Creek. Rapid run off from surrounding neighborhoods during storm events degrades the channel. A detention pond could be built at the Peppertike outfall and/or above the Glazier Way stream culvert in Glazier Hill Park.

**86, 87** The parking lots at GLSC and the Church of Jesus Christ of Latter Day Saints have no mechanisms for handling stormwater. There is room for stormwater detention and/or filtration. Alternatively, catch basins in the parking lot could be fitted with devices to provide some stormwater treatment.

**107** The open spaces of Glazier Highlands Park provide an opportunity for additional trees to increase tree density in the managed landscapes of the park.

**108** Tree planting is recommended at the Windemere Road subdivision, which contains many open turf grass areas with low-density tree coverage.



HRWC

A healthy growth of riparian plants shade the small Lakehaven Branch in Geddes Lake Homes.

# The Southern Watershed



Nicole Petrica

This photo shows the “Front Lake” at GLCH before they created a natural border of plants around the lakes to help stabilize the shoreline.

**Fens** are peat-forming wetlands that receive nutrients from sources other than precipitation: usually from upslope sources through drainage from surrounding mineral soils and from groundwater movement. Fens differ from bogs because they are less acidic and have higher nutrient levels. They are therefore able to support a much more diverse plant and animal community. The fen in Millers watershed must have been magnificent. In 1947 aerial photos it seems to stretch from the east side of the Ruthven Kame at Gallup Park all the way up nearly to Hubbard, filling the valley bottom in which the road now runs.

A **delta** forms at the mouth of a river where, mixing with the surrounding water, its velocity is checked, causing it to deposit its load of gravel, sand, silt and clay (alluvium). As the layers of sediment are deposited, a platform builds up and it eventually rises above the water, which can now be called the delta. The water overflows the banks into different channels called distributaries. The vegetation that later grows on the alluvium stabilizes the delta.

The southern end of the watershed has a striking landscape. The glacier left its signature some 10,000- 14,000 years ago, when it deposited the end moraines that embrace the Huron River valley and the kame (see p. 6) in Ruthven Park. The developers of Geddes Lake Cooperative Homes (GLCH) sculpted three small lakes (retained by dams) out of a gravel quarry in the late 1960’s.

Two steep tributaries flow into these three lakes that are the focal point of the 360-home residential community. The lakes receive stormwater that runs off of the 65-acre GLCH as well as approximately 152 acres upstream. The branch that flows from Fox Hunt to the southern-most lake has distinctive natural features including a very high quality native forest fragment containing a unique portion of Millers Creek.

Upstream of Green Road, a tiny stream trickles year-round through a lovely valley east of Narrow Gauge Way. The unusually diverse population in this stream, including stoneflies and other insects sensitive to organic pollution, indicates high quality conditions there.

The main branch of Millers Creek from just north of Glazier Way down to the River is much changed from its original condition. The construction of dams on the River (which back-flooded parts of Ruthven Park) and the construction of Huron Parkway (which straightened the stream bed) wrought huge changes. The area once held Ann Arbor’s greatest **fen** with gentians, orchids and rare sedges; now only minor vestiges can be found. This is said to be one of the greatest losses of natural areas in the history of the City.

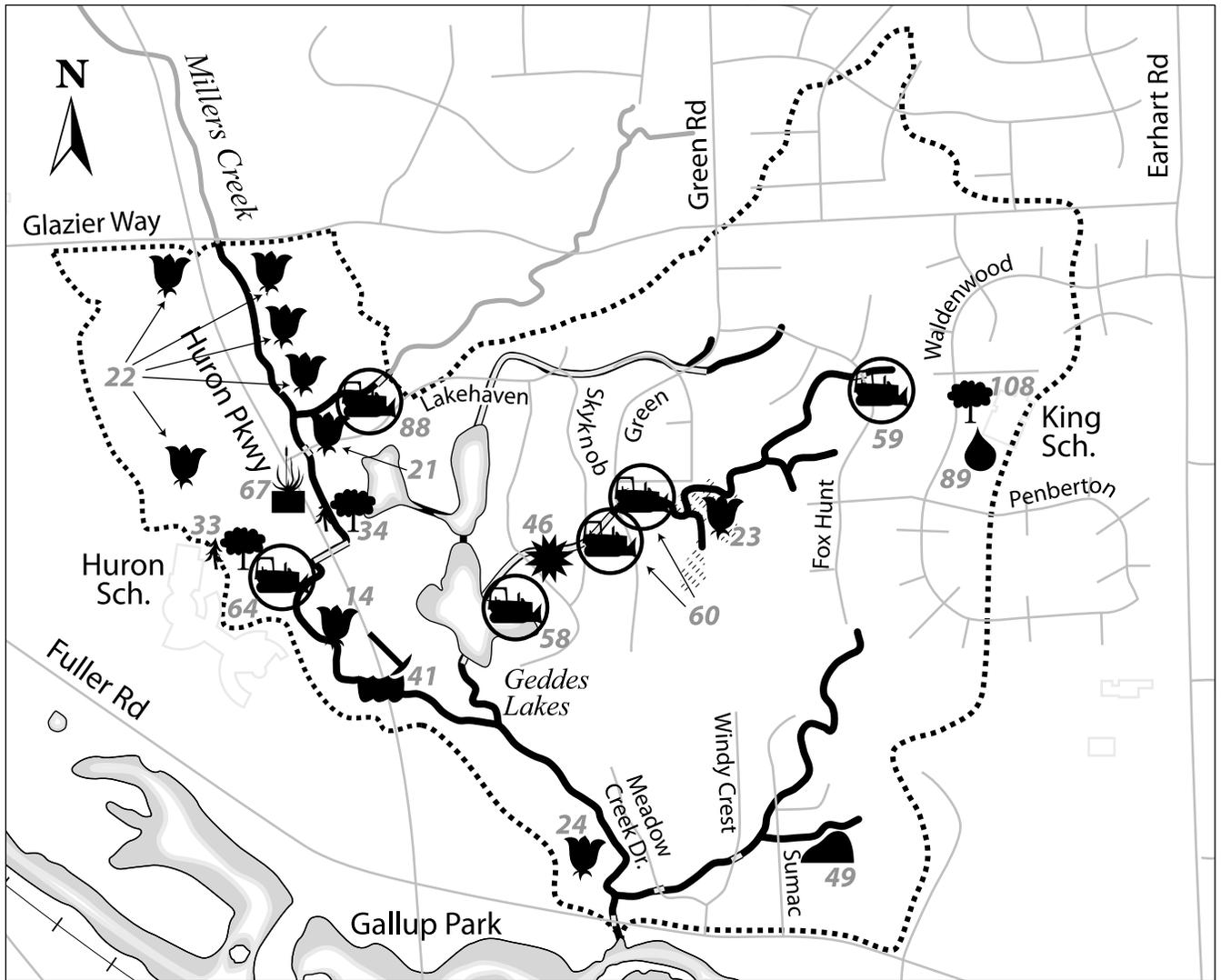
Further downstream, this watershed includes a wetland complex that is the stream **delta**, where sediment dislodged from the steeper parts of the creek along Huron Parkway comes to rest. This is a remarkably dynamic portion of the stream bed, where the channel actually shifted several feet following a single storm in 2004!

The GLCH lakes serve as significant retention basins for stormwater from the northern portion of this watershed but not for the main stem of Millers Creek. Stormwater is slowed by a control outlet as it leaves the lakes and flows to join Millers Creek in the Ruthven Nature Area.

The GLCH lakes have accumulated nearly two feet of sediment from storm flow, have little oxygen at the bottom, produce large amounts of unsightly and unpleasant algal blooms in hot summers, and release considerable phosphorous as a result. Similar problems plague Gallup Pond. There are nearly 20 communities in Washtenaw County working to reduce the amount of phosphorous in the river to one-half of the current level. It would be very beneficial to diminish the flow of phosphorous down the Millers Creek watershed.

The challenge here has a familiar ring. The people living in the bottom land (GLCH) as well as the people wanting to enjoy good water quality in the popular Gallup Park have to deal with nutrient and maintenance problems

# The Southern Watershed



- |   |                          |   |                             |   |                       |
|---|--------------------------|---|-----------------------------|---|-----------------------|
|  | Tree Planting            |  | Bio-swale                   |  | Stream (above ground) |
|  | Reforestation            |  | Stream Channel Restoration  |  | Underground Pipe      |
|  | Natural Area Protection  |  | Stream Daylighting          |  | Watershed Boundary    |
|  | Detention Basin Retrofit |  | Debris/Sediment Containment |  | Wetland               |
|   |                          |  | Stormwater BMPs             |   |                       |

caused by erosion and runoff from the watershed above them on southern Green Road and its adjacent streets. Geddes Lake ponds, Gallup Pond, and Millers Creek turn muddy brown in every strong rain. It takes several days after such a storm for water to clear. Since water flows downhill, the problems that result from natural processes belong to everyone living in the watershed.

The Millers Creek Watershed Improvement Plan (MCWIP) recommends:

*Numbers refer to locations on the map on preceding page and also in the MCWIP*

Plant trees wherever there is space. Another tree in your yard would keep many more gallons of stormwater out of the creek; an average sized maple tree moves over 200 quarts of water per hour in the summer.

**14, 21, 22** The forested stream corridor along Huron Parkway at Huron High School, the woodlot and meadow north of Lakehaven Drive along the Millers Creek tributary, the woodlands on the southwest and southeast corners of Glazier Way and Huron Parkway (in the Oakridge Nature Area), woodlands on private parcels between Lakehaven Drive and Glazier Way, and the woodlots near University Commons should all be conserved.

**23** Preserve as a public park the very high quality natural area east of Narrow Gauge Way. This is a large undeveloped forest identified in the Ann Arbor Northeast Area Plan. *(Kudos! The neighborhood is urging the City to purchase a portion for parkland.)*

**24** Ruthven Nature Area is a wonderful undeveloped park that almost no one knows about. Improving access and adding signs would allow people to experience the merits of the park. The woodlands and wetlands owned by the City of Ann Arbor and by landowners along Meadow Creek Drive should be conserved.

**33** Establish native grass and forested plant communities on the northeast side of Huron High School.

**34** Millers Creek between Huron Parkway and Lakehaven Drive has very little vegetation near the stream. A forested corridor should be planted within 100 feet of the stream to filter pollutants, shade the stream, provide habitat for wildlife, control the flow, trap sediments and stabilize the soil.

**41** The high bank of the stream channel near the Huron High athletic facilities needs to be stabilized following implementation of hydrologic controls in the watershed and evaluation of the results.

**46** A portion of the stream flowing through GLCH that is buried in a pipe could be brought above ground to restore the aquatic habitat that enriches the environment.

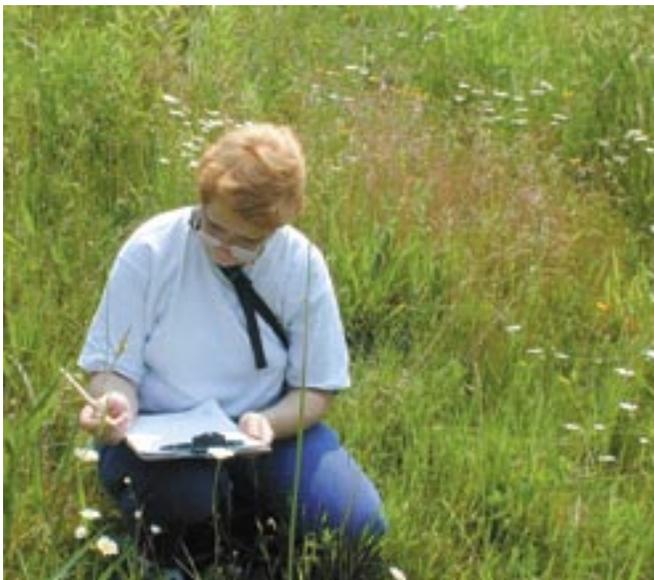
**49** Erosion of the road surface and ditches of Sumac Lane needs to be controlled to reduce the sediment delivered via a tributary to Millers Creek.

**58** *Kudos! GLCH has been retrofitted with new extended detention outfall structures, and portions of the shoreline were stabilized to reduce erosion and related sedimentation of the lake.*

**59** Earhart West Park is rich with wetlands (forested and scrub-shrub)

and might be a good location for a wetland detention basin to receive stormwater from the residential areas near Martin Luther King Elementary School.

- 60** Improve the two emergent wetlands at Green Road, one upstream and one downstream of the road crossing. Both wetlands are disturbed with extensive colonization by invasive plants. The wetlands offer an opportunity to create in-line wetland detention for stormwater storage and treatment that would improve the quality of Geddes Lake.
- 64** A natural wetland near Huron High could become a wetland detention basin (to provide storage and pollutant removal) by creating the infrastructure to direct and detain the stormwater from the high school and the water from the creek that reaches this area during high flows.
- 67** *Kudos! The existing prairie plantings within the Huron Parkway median are an excellent example of good land stewardship in the Millers Creek watershed that should be enhanced where they already exist and expanded into additional areas. The boulevard medians can be lowered to form shallow depressions, then re-planted with prairie grasses and wildflowers. Precipitation falling directly on the medians would infiltrate as it flows down hill. The parkway curbs could be cut to allow stormwater to enter the depressed medians. Infiltration gutter pans could also be installed along the outside curbs of the parkway.*
- 88** A wetland could be created in the area between Lake Haven Drive and the tributary north of it that would be a beautiful water feature for the entrance to Geddes Lake while it would also slow and clean the stormwater. The stormwater currently piped from Lake Haven Drive could be detained and cleaned here as well.
- 89** Stormwater in the King School parking lot needs to be treated and there is space that could be used for holding and/or filtering stormwater. Alternatively, AAPS could install mechanisms in the parking lot catch basins to spin debris out of the stormwater.
- 108** There is space on the King School campus for tree planting to increase the removal of stormwater.



Volunteer investigator Nancy Perlman records data while her team studies the slow portion of Millers Creek.

HRWC

## What You Can Do

**Throw a Creek Party:** Invite HRWC staff to present some enjoyable information about the creek to your community at a neighborhood party. (Consider including your neighbors, staff, or customers.)

Choose from a variety of methods to **keep water** that flows off your rooftop and yard **from going into the storm drain**.

ANYWHERE in the watershed—**add new plants** and protect them, especially non-invasive trees and shrubs, to help reduce the storm flow of the creek, as well as for shade and to reduce air pollution.

**Replace part of your lawn** with beautiful deep-rooted plants. Plants with deep roots hold the rain and help stormwater to infiltrate into the ground. Use them to make attractive borders and enjoy the butterflies that visit them.

**Choose native plants** for landscaping. Because native plants are adapted to local soils and pests, they need less watering and no chemicals or fertilizers, making your job easy once they are established.

**Scoop your pet poop** to reduce the concentration of bacteria in Geddes Pond (in Gallup Park), which often soars above the monthly average of 130/100 ml allowed by the Michigan Department of Environmental Quality (MDEQ).

**Test your soil** to determine what nutrients it needs. Soil tests in this area show that there is plenty of phosphate in most soil. Excess phosphate is carried to the creek in stormwater and is a primary pollutant in the Huron River. (The middle number on the fertilizer package should be as close to 0 as possible to limit phosphate.)

**Use less fertilizer.** One application of fertilizer in the fall is enough for healthy lawns in this area. By mulching your grass clippings into the lawn, you may not need to fertilize at all.

**Support an ordinance** to control the amount of phosphorous in fertilizer.

**Support** an increase in City **street sweeping**.

Work with the **people who care** about Millers Creek! Call Linda Cody at (734) 622-0312

**Experience** studying or helping the creek **with your children**. Call Barb Chamness at (734) 769-8485.

**Participate** with Adopt-A-Stream **in the study** of Millers Creek. See the amazing life in a creek. Call (734) 769-5971 for information.

**Join** the Huron River Watershed Council. Call (734) 769-5123.



# What MCAT (Millers Creek Action Team) Can Do

Millers Creek Action Team

Maintain a **website** ([www.aamillerscreek.org](http://www.aamillerscreek.org)) showing an events calendar, stories of neighbors helping the creek, etc.

Assist people and businesses to **find sources of support** for improvement projects.

Advise landowners about opportunities for **stormwater improvements** on their land.

**Review site plans** for proposed developments in the watershed and provide comments on stormwater improvements.

Assist residents growing **new trees**.

Assist with **land conservation** and native landscape restoration.

Assist in **educating** the public about the creek.

**Monitor the creek** and the success of improvement projects.

Encourage the possibility of **County Drain** designation for the creek.

Encourage a **fertilizer** ordinance and street **sweeping**.

Assist residents in getting their **soil tested**.

Provide resources, such as **information and guidance**, which the community can use to protect the creek.

Assist people in reporting **sediment and erosion** violations.

Assist people in providing useful **information** to community **decision-makers**.



HRWC

A healthy creek nearly fills its channel all year long.



# The Huron River Watershed Council

**Communities and individuals protecting our water together since 1965.**

Dozens of communities in a seven-county area have joined together to form the Huron River Watershed Council (HRWC). This group, made up of local governments, community officials, businesses, and private citizens, is working to protect the waters of the Huron River and the entire watershed area. Their cooperative efforts provide technical assistance, hands-on education, monitoring, and other river protection projects.

**Their vision: to keep the treasured Huron River Watershed alive and well for all of us.**

Many people have provided excellent assistance in the writing and research for the Millers Creek Report, including Lisa Bailey, Patricia Ferrer Beals, Tom Beauvais, Cathy Behrendt, Marty Boote, Dave Brooks, Wendy Carman, Barb Chamness, Malama Chock, Linda Cody, Mike and Madelaine Conboy, Katie Davison, Thomas A Edsall, Nancy French, Christopher Graham, Gary Hochgraf, Ann Hunt, Dana Infante, Merle Johnson, Patrick Judd, Steven J. Kapeller, Beth Kelley, Judy Kesler, Jo Latimore, Graham E. Lewis, Sylvia Lewis, Eric Moore, Cynthia Radcliffe, Dora Passino-Reader, Liz Ritter, Laura Rubin, Norma Jean Wade, and Michelle West.

Funding for this report came from Pfizer Global Research & Development.

The Adopt-A-Stream Program is funded by foundations, government grants, businesses, and people like you.

Consider joining the HRWC.

Consider participating in the Adopt-A-Stream Program.



*Protecting the river since 1965*

1100 N. Main Street Suite 210  
Ann Arbor, MI 48104  
(734) 769-5123  
[www.hrwc.org](http://www.hrwc.org)