Improving access and signage will build more interest in the park. Future improvements could include trail enhancement and the design and installation of a boardwalk adjacent to the wetland complex. In fact, hydraulic modeling for this project found that entire wetland complex in Ruthven and immediately to the east of the park is within the Millers Creek/Huron River 100-year floodplain. This area of 100-year floodplain is effectively un-developable. **Figure 7.1** shows the recommended area for parkland acquisition (the area is shown as recreation and as Ann Arbor Township property immediately adjacent to Ruthven Park). The City should explore acquiring this land to expand Ruthven Park. Two alternative recommendations for improving access to Ruthven Park are:

- Alternative One: Acquire a public easement on the parcel to the immediate north of Ruthven Park (parcel ID: 01-26-200-028). This would make an excellent access area for the park and possibly enhance the value of any developments that might be built on that site.
- Alternative Two: Widen Geddes Road between Gallup Park and Ruthven Park and install a pedestrian island between the two lanes. Provide other traffic calming measures, including signage.

Focus Area #15

Pfizer Campus – 2800 Plymouth Road and UM's Northwood V Residential Housing

a) Additional reforestation opportunities exist both in Northwood V and on Pfizer's campus.
b) The directly-connected roof drains at Northwood V could be disconnected from the storm sewer and re-routed as overland flow to roof gardens or drywells (see **Figure 8.7** below).
c) The 48-inch storm sewer that runs under Pfizer's parking lot on 2800 Plymouth Road carries most of the runoff from Northwood V. Northwood V has no detention storage. Possible re-routing of storm water from Northwood V to Pfizer's storm water management system was investigated. However, re-routing storm water from the 48-inch line to existing Pfizer ponds does not appear feasible because the pipe appears to be too low. However, Pfizer staff have noted that pond 5B rarely holds water and thus may have intercepted a sand lens. Pfizer is investigating the possibility that this pond has a high infiltration capacity.

Focus Area #16

Huron Parkway Median

Much of the Huron Parkway median is a thriving native prairie community. However, there are areas of turf grass and opportunities for utilizing more of the median for storm water management. Strategic curb cuts along the entire median could help capture Parkway runoff. A meandering low-flow channel with a shallow floodplain could be excavated in the median. Overflows could be directed to one of the many culverts that run under the Parkway. The two subareas identified with high infiltration capacities are Huron HS and Geddes. This idea would be particularly effective for application at the low end of the median near the High School. This work should be designed in close coordination with the NAP group in order to preserve the existing prairie communities they have worked so hard to create. Another possibility in conjunction with this work would be the installation of infiltration gutter pans along the outside curbs of the Parkway.

8.3.3 EXISTING MIDDLE HURON INITIATIVES AND TMDL IMPLEMENTATION ACTIVITIES

Several water quality improvement programs for the Huron River are already in progress. These programs are applicable because they address some of the water quality problems in the Millers Creek watershed, which is a source of phosphorus and *E. coli* to the Huron River. As such, the activities being implemented under those existing programs have been incorporated into the Millers Creek Improvement Plan. The two applicable programs are described below.

Middle Huron Initiative

The Middle Huron phosphorus TMDL was the first TMDL completed in the State of Michigan. The TMDL was completed and approved by EPA for Ford and Belleville Lakes in 1995, and it incorporates the Middle Huron River from Mill Creek to Belleville Dam, including Millers Creek and other tributaries. Phosphorus loading from Millers Creek must be reduced by 50% to meet the regulatory requirements of the Ford and Belleville Lake phosphorus TMDLs. Many of the Millers Creek improvement opportunities and project implementation alternatives have been designed to reduce phosphorus sources in the watershed.

To implement the TMDLs, the Middle Huron River Initiative was formed. This partnership of state agencies, local units of government, and institutions developed a phosphorus reduction strategy in 1996. The purpose of the partnership is to work together to voluntarily reduce phosphorus by 50% in the Middle Huron River and its tributaries. In general, the initiative involves:

- Improve modeling and monitoring of the basin to better identify sources of phosphorus;
- Support increased research and monitoring in the middle Huron;
- Support watershed education and planning efforts;
- Assist landowners and municipalities to develop and implement BMPs to reduce phosphorus, and other pollutants, to the watershed;
- Upgrade sewage treatment facilities;
- Provide for changes in the operation of wastewater treatment plants; and
- Provide a source of support to test innovative ideas to reduce phosphorus discharge to the middle Huron.

The Middle Huron Initiative, the partnership working to meet the nutrient TMDL, has pursued pollutant reductions for six years. Most of the stakeholders in the phosphorus TMDL are signatories to a five-year agreement to voluntary reduce phosphorus contributions to the middle Huron River, which will be re-evaluated in 2004 to determine whether significant progress has been made toward reducing phosphorus by 50 percent of 1996 levels. Some of the Initiative's partners have participated in MCAT and will continue to be involved in the implementation of the Millers Creek plan under the existing guise of the Middle Huron Initiative.

Geddes Lake, Huron River Pathogen (E. coli) TMDL

The Michigan Department of Environmental Quality (MDEQ) finalized the Geddes Pond/Huron River *E. coli* TMDL in August, 2001. The TMDL was approved by U.S. EPA on September 17, 2001. The listed segment addresses approximately five miles of the Huron River located in the Ann Arbor area, from Geddes Dam at Dixboro Road upstream to Argo Dam. This segment is also the receiving water for Millers Creek, among other tributaries (Allen Creek, Traver Creek, Malletts Creek, and Swift Run Creek). Previous water quality sampling in this area has shown that Michigan Water Quality Standards (WQS) for *Escherichia coli* (*E. coli*) are not consistently being met in the middle Huron River or its tributaries. Water quality sampling was conducted as part of the current Millers Creek Improvement Study. The results of that sampling confirmed that the *E. coli* WQS is being exceeded in Millers Creek (Refer to Chapter 5). All surface tributaries (not enclosed) are required to comply with the WQS of 130 *E. coli* per 100 ml as a monthly average. This requirement applies to Millers Creek, among others (Traver Creek, Malletts Creek, and Swift Run Creek).

Measures to reduce *E. coli* will include activities that, to a large extent, are already required of the National Pollutant Discharge Elimination System (NPDES) municipal storm water Phase I permittees within the watershed and other municipalities within the watershed under Phase II of the municipal storm water permitting program. Currently, the City of Ann Arbor, U-M and the Michigan Department of Transportation hold NPDES Phase I municipal storm water permits, while Ann Arbor Township has recently obtained a NPDES Phase II permit. Both Phase 1 and Phase II municipal storm water permits provide mechanisms for controlling bacterial loads to Geddes Pond and Millers Creek. Storm water permits require that a plan for effective elimination of illicit discharges and prohibition of illicit discharges be developed, that all catch basins be mapped and regularly cleaned, that effective storm water management in areas of redevelopment and new development occur, and that a public education program regarding storm water management and impacts of storm water pollution be implemented.

There are several specific actions being taken or planned by the regulated storm water communities to reduce *E. coli*. These actions pertain to, and will address, *E. coli* sources in the Millers Creek watershed. For specific information on these activities and there implementation, see the *E. coli* TMDL implementation plan in Appendices.

- Septic System Inspections (Ann Arbor Township, SE part of Millers Creek watershed)
- Illicit Discharge Elimination Plan
- Occupancy Permits, Disallow pending inspection for illicit connections
- Community Partners for Clean Streams
- RV Waste Disposal Education
- Storm Water Marking Project
- Information and Education Mass Media Campaign/Public Education Program (PEP)
- Information and Public Education Through the Internet
- Phase II public education and public involvement/Farmland Education (Agriculture)
- Education on Pet Waste
- Doggie Bags in Parks
- Pooper Scooper Ordinance
- Operation Goose Down
- Native Landscaping Ordinance Development
- *Update Storm Water Management Standards (Pond Landscaping Section)*
- Farmland Protection Program
- Comprehensive Plan
- Wetlands Protection Program
- Rules and Ordinances for Storm Water Management

8.4 MONITORING AND ADAPTIVE MANAGEMENT

The Millers Creek Improvement Plan is a working document that is intended to guide the improvement of Millers Creek and the Huron River. Due to the complexity of natural systems and urban landscapes, it is difficult to fully understand functional relationships between public administration, land use practices, weather, infrastructure, pollution sources, water quality, human behavior, hydrology, and other aspects of watershed management. It is expected that the implementation process will reveal new information, deeper understanding, and practical realities that can be used to improve the plan. An adaptive management approach is recommended for implementation of the Millers Creek Improvement Plan to facilitate the process of discovery, effective decision-making, and plan updates. Adaptive Management is the process of acting and then responding to the results of actions with informed decision-making. Adaptive management dictates, to varying degrees, the course and nature of future actions through a process of learning from previous actions.

An effective adaptive management program requires input from continuous monitoring to assess the effectiveness of implementation activities. The following monitoring activities are recommended to assess the effectiveness of the Millers Creek Improvement Plan. **Table 8.2** summarizes the recommended monitoring plan and proposed costs. The recommended monitoring activities have been selected to specifically measure the attainment of the plan's identified goals. As such, they are presented below in relation to the goal they are intended to assess.

1) **Watershed Land Use and Management**
The watershed land use and management goal has a stated objective that emphasizes stewardship through various resource protection and management activities. The qualitative nature of this objective calls for a qualitative monitoring approach that is consistent with typical Phase I and II storm water reporting. Monitoring watershed land use and management practices will be modeled after, and in some cases integrated with, the Middle Huron Initiative. Activities and related costs will be tracked and reported.

2) **Hydrology**
To meet the hydrology goals, the plan has a stated objective of reducing peak flows by approximately 50% for the bankfull storm event. We define the bankfull event at approximately the 1-year to 2-year design recurrence interval storm event. To assess the attainment of this objective, HRWC should maintain two transducers (at the Plymouth and Glazier sites) to collect continuous (10-minute intervals) flow data throughout the ten-year implementation schedule (years 1,4,5,9 and 10). HRWC should recreate the rating curves at a minimum of four of the flow study sites during the 10-year implementation period. HRWC should also repeat the geomorphology (channel shape) measurement once for each of the 5 study sites. Measuring the channel shape will allow HRWC to determine the areas and extent of bank erosion and channel adjustment. Collected rain data from either the Pfizer and/or the UM rain gage should be compiled annually as well.

3) **Water Quality**
The water quality goal of the plan has two stated objectives: decrease phosphorus loading by 50% from existing conditions and reduce *E. coli* numbers in surface waters to the state WQS of 130/100 ml (per Huron River phosphorus and *E. coli* TMDLs). Attainment of these regulatory requirements will be assessed by conducting periodic water quality sampling, but water quality improvements will take time to accrue. Water quality sampling should be conducted once every five years during the ten-year implementation schedule at the stations used during the Millers Creek study. Sampling shall be conducted between April 1 and November 1 during both wet and dry weather

events to evaluate illicit connections and storm water related sources of phosphorus and *E. coli*.

4) **Fish and Wildlife Habitat**
The objective of the fish and wildlife goal is to improve the habitat and biological integrity of Millers Creek. To assess this objective, HRWC should continue to monitor three sites annually during the 10-year period. Monitoring will rotate between eight sites to allow the flexibility to monitor sites near where improvements are being made and to build on existing data, without monitoring every study site every year. In-steam habitat should be assessed between one and two times during the ten-year implementation schedule.

5) **Public Understanding and Support**
Public Involvement is a crucial step to support the plans to improve Millers Creek. By the time the Millers Creek study had been completed, a number of citizens in the watershed had become concerned and knowledgeable about the creek and its problems. The time is ripe to build upon this momentum and develop a focused effort to mobilize public support for protection and improvement of the creek. HRWC proposes to take a leadership role in this effort.

Table 8.2 Millers Creek Recommended Monitoring Plan and Costs

Item	Stations	Monitoring Frequency	Five Year Cost	Annual Cost	10 yr cost
Benthic Monitoring	8	3 sites/yr		$3,600	$36,000
Habitat Monitoring	8	4 sites in yrs 4,5,9,10	$7,500		$15,000
Rating Curve Adjustments	6	3 sites/3 yrs starting in 2005		$11,344	$34,000
Geomorphic Measurements	5	2 sites/4 yrs starting in 2006		$8,700	$17,400
Transducer Flow Data	2	2 sites in yrs 1,4,5,9,10		$10,000	$50, 000
Water Quality	5	Once every 5 yrs	$20,000		$40,000
Website	NA	NA		$3,500	$35,000
		Annual Total		Total 10 year Cost	$227,400

8.5 Funding Sources

Table 8.3 provides a list of available funding sources that are applicable to the Millers Creek Improvement Plan. One potential source of funding not included in the list is the assessment of drainage districts. This source of funding would become applicable if all or parts of Millers Creek were designated as a County Drain. However, due to the high costs associated with improving Millers Creek, grant funding will be necessary to control local costs. Once the Millers Creek Improvement Plan has been incorporated into the Huron River plan and the MDEQ has approved the update, Millers Creek will be eligible for many types of non-point source grants, including Clean Michigan Initiative grants. The most appropriate source of funding will be determined by the nature of each individual project or action. The diversity of actions recommended for Millers Creek will require a diversity of funding sources. **Table 8.3** presents information on grants for habitat improvement projects, recreational improvements, capital improvement projects (e.g., storm water infrastructure), and public outreach programs.

Table 8.3 Potential Grant or Loan Sources for Millers Creek Improvements

Grant Information	Grant or Loan Program				
	319 Targeted NPS Control Efforts	CMI Volunteer Monitoring	CMI Local Water Quality Monitoring	CMI Illicit Storm Sewer Connections	319 NPS Watershed Implementation Projects
RFP Due Date	January	Varies Year-to-year 60 days following advertisement	TBD	December	August
Required Match	25%	25%	25%	25%	25%
Maximum Grant Amount	None	$10,000	$50,000	Varies year-to-year	
Maximum Duration of Project					
Type of Project	Implement physical improvements for TMDL waterbodies	Collect water quality data, generate local interest, promote volunteerism			Implementing non-physical elements of approved plans
Qualified Applicants	LUGs, non-profits *(qualifying watershed plan required)*	Non-profits, volunteer orgs.,LUGs		LUGs, non-profits	LUGs
Contact Information	Amy Peterson SWQD	Gary Kohlhepp SWQD		Mark Fife SWQD	
Telephone Number & E-Mail	(517) 373-2037	(517) 241-9534		(517) 241-8993	

Grant Information	Grant or Loan Program				
	Great Lakes Aquatic Habitat Fund	CMI Local Parks & Recreation	Community Foundation for Southeast Michigan	Community Foundation for Southeast Michigan	MDNR Non-Game Wildlife Grants
RFP Due Date	March 31 & September 30	April 1 & September 1 *(must have MDNR approved plan)*	June 1 & December 1	June 1 & December 1	December 1
Required Match		25%	60%	0% *(encouraged)*	0%
Maximum Grant Amount	$3,500	$750,000	$1,000,000	$100,000	$5,000
Maximum Duration of Project		2 years	2 years	1 year	
Type of Project	Empower local citizens to improve & protect water resources	Recreation infrastructure & community recreation facilities	Land grants for greenway implementation	Greenway development – planning, design, permitting, etc.	Restoration & promotion of native species and natural communities
Qualified Applicants	Non-profits, grass roots organizations	State, LUGs	LUGs, non-profits	LUGs, non-profits	Individuals, LUGs, non-profits
Contact Information		Deborah Apostol	Tom Woiwode	Tom Woiwode	Lori Sargent
Telephone Number & E-Mail		(517) 335-6871 apostold@state.mi.us	(313) 961-6675 twoiwode@cfsem.org	(313) 961-6675 twoiwode@cfsem.org	(517) 373-9125

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