

**TOLEDO METROPOLITAN AREA  
REGIONAL STORM WATER MANAGEMENT  
STUDY**

**FINAL REPORT**

**BY THE STORM WATER POLICY BOARD AND  
THE MAUMEE RIVER RAP  
URBAN RUNOFF ACTION GROUP**

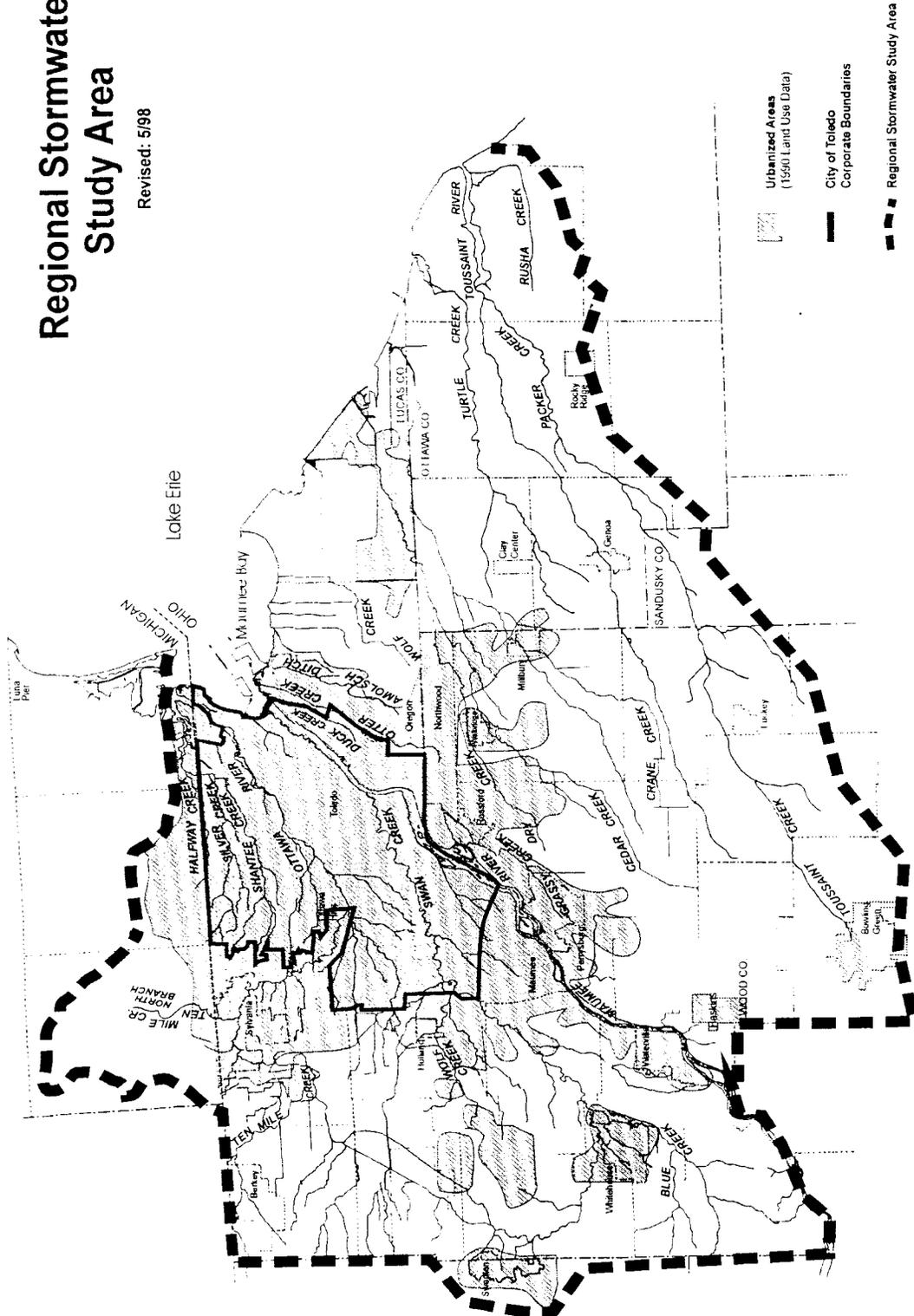


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# Regional Stormwater Study Area

Revised: 5/98



# ACKNOWLEDGMENTS

This study was conducted with the cooperation, assistance, and guidance of two TMACOG committees: the Storm Water Utility Policy Board and Maumee RAP's Urban Runoff Action Group. A list of the members of these committees can be found in Appendix B.

The Maumee River RAP Urban Runoff Action Group played a key role in identifying potential solutions to the storm water problems within the region and authorized this report.

The Storm Water Utility Policy Board provided valuable direction for the study through their insight into the feasibility of the proposed storm water management options.

# ABSTRACT

**Title:** Toledo Metropolitan Area Regional Storm Water Management Study

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**Abstract:** This report contains the findings and recommendations of a two-year study of how best to address and fund storm water management within the Maumee River's Area of Concern. It summarizes the research conducted to determine the extent of the storm water problem in the region as well as various alternatives for regional management activities and funding mechanisms. This report provides a recommendation for a regional storm water management district and further steps for implementation.

# EXECUTIVE SUMMARY

Storm water runoff draining to the Maumee River and its tributaries poses a significant flooding threat to the region and is a detriment to the quality of our lakes, rivers, and streams. The area of land draining to the river in the greater Toledo area, also known as the Lower Maumee River Watershed, has been designated as an "Area of Concern" (AOC) because of the water quality of the river and its tributaries. The Maumee River Remedial Action Plan (RAP) developed to improve the quality of the river, recognized storm water runoff as a priority issue. The RAP recommended evaluating a watershed based storm water utility as a mechanism for regional storm water management. A storm water utility, similar to other utilities such as water and sewer, provides a management structure for storm water control based on the needs of the drainage system and is funded on a "user charge" basis. In this case, the "user" of the system is any property owner benefiting from a storm water drainage system. The "charge" for use of the system is based on the amount of storm water the property generates. This utility method has been implemented in several individual communities in Ohio and is considered to be one of the most equitable ways of funding storm water management because it is tied to the amount of storm water generated. This report documents the evaluation of this and other regional management alternatives.

In the past, the legal responsibility for storm water quality control has been that of larger cities like Toledo. Many larger cities are required under federal law to obtain permits for the discharges from their storm sewer systems to local water ways. Toledo, however, is only part of the Maumee River Watershed and is at the downstream end of several streams including the Ottawa River, Swan Creek, and the Maumee River. Suburbanization in the AOC has increased the amount of impervious surface area in the watershed causing more storm water to runoff into the drainage system. This drainage system in many cases was not designed to handle this additional flow resulting in increased flooding. As more storm water moves through the drainage system, it picks up speed and carries with it a variety of pollutants. Stream sampling data indicates that many of the pollutants attributed to Toledo are also found upstream of Toledo that by themselves violate water quality standards.

While it is clear that storm water runoff is concern throughout the watershed, it is less clear how the problem can be addressed at a watershed level. To effectively manage storm water at a watershed scale, cooperation is needed among the political jurisdictions that make up the watershed.

Over the last two years, the Storm Water Policy Board (SWPB) and the Maumee RAP have undertaken a study of regional storm water management mechanisms using the concept of a regional utility as a starting point. Through this study effort, the local elected officials involved with the SWPB have been meeting to evaluate various alternatives. The Maumee RAP's Urban Runoff Action Group has provided technical assistance to the SWPB as it evaluates these alternatives. The study covered:

1. Existing storm water utilities within and outside of Ohio to gain a sense of the feasibility and applicability of such a system in the area.
2. Information on existing storm water management programs in communities throughout the region.
3. Information on regional storm water management programs and the potential for regional storm water management under the Ohio Revised Code (O.R.C.).
4. Opinions of the Storm Water Policy Board on what storm water management activities should be undertaken regionally.

5. Funding options for a regional storm water management program.
6. A number of regional storm water management alternatives and recommended options based on their feasibility.

## **Recommendations**

After an evaluation of several options, the Storm Water Policy Board, at its November meeting, recommended the exploration of a “regional storm water management district.” Such a district would have the ability to address storm water on a watershed basis, develop and implement all of the potential activities of a regional storm water management plan, provide an effective funding mechanism for storm water projects, and formalize the commitment of local governments to regional storm water management.

### *Regional Storm Water Management District*

The proposed storm water management district would be formed as a regional water and sewer district under Chapter 6119 of the O.R.C. for the explicit purpose of regional storm water management. The district would primarily address those storm water management issues of regional concern, leaving the normal operation and maintenance of local storm water systems to the individual jurisdictions. Membership in the district would be voluntary with individual jurisdictions able to join or leave the district at their discretion.

### *Duties of Proposed District*

- Develop regional storm water management standards
- Enforce regional standards or certify local communities to do so
- Develop a regional storm water master plan to identify regional drainage problems and determine approximate costs of improvements
- Coordinate inter-jurisdictional projects
- Leverage grant monies to be used for regional improvements
- Assessment of property tax or levying of user charges to fund above duties

The plan of operation specifying the duties of the district can be modified as the governing board of the district sees fit. The duties of the district could evolve into providing services similar to that of a storm water utility.

### *Benefits of District for the Region*

- Address storm water runoff issues on a regional, watershed basis
- Ensure use and enforcement of consistent storm water control standards throughout region
- Will fund and implement regional storm water master planning
- Potential funding source for regional storm water projects
- Make the region more competitive for planning and capital improvement grants
- Provide easier and less expensive compliance with federal and state storm water regulations

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# REGIONAL STORM WATER MANAGEMENT

## *NEED FOR STUDY*

Storm water runoff from the urbanized portions of the Maumee River Area of Concern (AOC) has been identified as a significant contributor to the degraded water quality of many streams in Northwest Ohio. The Maumee River Remedial Action Plan (RAP) identified storm water runoff as a priority issue and recommended evaluating a watershed-based storm water utility as a mechanism for implementing water quality improvements. Such a utility has been implemented in several municipalities in Ohio, but never for a multi-jurisdiction watershed. This study undertook a pioneering effort in Ohio by examining the feasibility of a storm water utility based on voluntary, intergovernmental cooperation.

The problem of storm water runoff is not just confined to our urban areas. The amount of runoff being delivered to our drainage systems depends on how much of it is able to soak into the ground. As urbanization in the watershed area increases, so does the amount of land being paved, limiting the area for storm water to infiltrate into the ground and increasing the amount of runoff. In Swan Creek, for example, flood flows have increased 17 to 85 percent from presettlement times<sup>1</sup>. Our drainage systems, river, streams, creeks, ditches and storm drains carry the storm water through several communities before delivering it to Lake Erie. As the drainage system experiences ever increasing volumes of runoff, flooding becomes more prevalent and water quality begins to decrease. Increased flooding has greater erosive power and carries greater pollution loadings of sediment and nutrients. In this way, water quantity and quality are inseparably linked.

Land use changes in the Maumee River AOC have occurred rapidly. The two percent loss of population of Lucas County between 1980 and 1990 does not adequately tell the story of the significant shifts in population from the urban to the suburban and rural areas of the county. Toledo lost over six percent of its population during that period while many surrounding communities saw population increases of six to almost 30 percent. Similar to western Lucas County, Wood County has experienced above average growth over the same period. Much of this has occurred in the northern portion of Wood County which is in the AOC.

Dealing with pollution from storm water has not been addressed in the past for several reasons. The main reason is that urban runoff did not receive the attention given the more obvious point sources: municipal wastewater treatment plants, combined sewer overflows, and industrial discharges. However, from a legal standpoint and under the Clean Water Act, urban runoff from conveyances such as storm sewers is considered a point source. Another more recent reason for addressing storm water pollution has been the focus on the larger cities (over 100,000 in population) who are now required to obtain storm water discharge permits from U.S. Environmental Protection Agency (EPA) under the National Pollutant Discharge Elimination System (NPDES) (In Ohio, this permit is issued

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<sup>1</sup> Flooding and Erosion Related to Urbanization: Swan Creek Watershed, Lucas County, Ohio. Earthview, Inc., April 1973.

by the Ohio Environmental Protection Agency, OEPA). While the larger cities certainly do contribute a proportionate share of stream pollution, existing stream sampling data indicates that many of the pollutants attributed to the larger cities are also present in the flows generated by their upstream neighbors to a degree that would by themselves cause water quality violations.

EPA storm water regulations up to now have laid the responsibility for controlling storm water pollution on the larger cities – in this case, the City of Toledo. Toledo, however, is only part of the watershed. Toledo is at the downstream end of several streams: the Ottawa River, Swan Creek, and the Maumee River. Part of the urban storm water pollution problem originates upstream of Toledo's corporate boundaries. Some time near the end of calendar year 1999, storm water regulations for smaller, urbanized communities will be required to obtain a permit for their discharge of storm water. While the details of these requirements are not yet known, it is almost certain that the EPA will look favorably on permits written for storm water management at the watershed level.

To adequately control current and future storm water runoff, the problem needs to be looked at from a watershed perspective. A management plan is needed to control both the quantity and quality of storm water. Much of the control of storm water currently occurs within each community through a variety of subdivision regulations and other ordinances. Maintenance of ditches, storm sewers, and drainage systems is largely the responsibility of a county engineer or the community itself. Many communities in the Maumee River (AOC) do not have a specific funding source devoted to the operation, maintenance, or capital costs of their storm water system; and several drainage systems within the region flow through more than one community. Without some type of agreement between communities to jointly take care of their common drainage systems, there is no guarantee that the natural watershed system will work to provide adequate drainage and water quality.

Recognizing the need for a watershed approach to improve the drainage and water quality of the AOC, the Maumee RAP Urban Runoff Action Group (URAG) applied and received a grant from the Lake Erie Protection Fund. This funding has allowed the URAG to study the feasibility of using a regional storm water utility as a mechanism to address regional storm water issues. A storm water utility provides a funding mechanism that can be devoted to the operation, maintenance and improvement costs of a storm water system. Funding is based on user charges similar to that of other utilities such as water and sewer. In the case of a storm water utility, the charges are based on the amount of storm water runoff generated from every parcel of land in a watershed. This is done by determining the amount of impervious surface area in each parcel and calculating the amount of storm water runoff for each parcel. This type of system has long been considered the most equitable method of providing funding for storm water activities because it is based on the amount of storm water generated.

### **Study Goals and Objectives**

The goal of this study is to reduce regional flooding problems, pollutant loading and improve water quality in area streams, rivers, and Lake Erie. To attain this goal, the following objectives were established:

1. Implement a watershed approach to reduce individual community costs and increase the effectiveness of the storm water management program.
2. Evaluate the feasibility of using a regional storm water utility to manage urban runoff on a watershed basis, and provide an equitable user charge system to provide funding for erosion control and improving water quality through implementation of storm water best management practices (BMPs).

### **Benefits to Study**

The Urban Runoff Action Group saw many benefits to planning for storm water management at the regional level.

- Reduce flooding and pollutant loading and improve water quality in area streams, rivers and Lake Erie
- Provide for consistent storm water control standards and enforcement throughout the region
- Improve planning and implementation of regional storm water projects
- Further the goals of the Maumee Remedial Action Plan, NPDES Storm Water Permit Program and the Ohio Non-Point Source Management Program
- Focus attention and resources on regional storm water problems
- Allow the region to prepare for Phase II of the NPDES regulation to be implemented some time in the early part of the next decade. Similar to the Phase I regulations the City of Toledo is permitted under. These regulations would require permits of the discharge of municipal separate storm sewers for communities under 100,000 in population. There is a possibility that all of the communities in the Maumee AOC could be put under a “General Permit” which would require one permit for the whole region.
- Assist communities with their compliance with Ohio EPA’s Anti-Degradation Rules.

### **Study Area**

The study area for the storm water management study originally consisted of the Maumee River Area of Concern (Figure 2 of Appendix A). The Storm Water Policy Board expanded the study area to include jurisdictions whose watershed boundaries drained to the AOC but whose jurisdictional boundaries were not entirely within the AOC. These included: The City of Bowling Green and the Village of Haskins in Wood County, the Village of Swanton in Fulton and Lucas Counties and the townships of Bedford, Erie, and Whiteford in Monroe County Michigan. The expanded study area is shown in Figure 5 of Appendix A.

### **Study Oversight**

The Urban Runoff Action Group (URAG) undertook the feasibility study for a regional storm water utility in late 1996. In April of 1997, a Storm Water Utility Policy Board (later shortened to Storm Water Policy Board (SWPB) was formed. The SWPB consists of local elected leaders from throughout the AOC and is charged with the task of evaluating alternatives for a regional storm water management program. Members to the SWPB were appointed through a resolution of cooperation adopted by each participating jurisdiction in support of the utility study (See Appendix B). The SWPB met periodically to review the work of the URAG and to provide further direction for the study. The URAG met monthly to develop this study and acted as the technical committee for the Storm Water Policy Board. The URAG also presented its progress at the regular meetings of the

## Components of Study

### 1. Existing Storm Water Utilities

Information was gathered on other storm water utilities within and outside the State of Ohio to learn from the strengths and weaknesses of these programs. Interviews were conducted with administrators from six municipal storm water utilities to obtain detailed information on the operation and the public acceptance of the utility.

### 2. Needs Assessment Surveys

Information on storm water management programs in the region was gathered from a number of communities within the study area through a "Needs Assessment Survey." Survey information consisted of:

- existing storm water management problems
- operation and maintenance activities
- capital improvements devoted to storm water management
- existing policies and procedures to address storm water management

### 3. Evaluation of Alternatives

- Various institutional mechanisms were analyzed for managing storm water regionally. Legal opinions were obtained from both the Lucas and Wood County Prosecutors offices on the feasibility of using Chapter 6115 (Sanitary Districts), Chapter 6117 (County Sewer Districts), or Chapter 6119 (Regional Water and Sewer Districts) of the Ohio Revised Code to implement a regional storm water utility. The opinions indicated that all three of these statutes could be used for regional storm water management.
- Two unique existing programs were investigated in depth: the Rouge River National Wet Weather Demonstration Project and the Lake County Illinois Storm Water Management Commission

### 4. Regional Management Activities

Members of the SWPB were surveyed for their opinion of the storm water management activities that should be undertaken regionally and those that should be left to individual jurisdictions. Members of the URAG provided options on how to undertake these regional activities.

### 5. Fiscal Analysis

Conducted a fiscal analysis of funding options for a storm water utility. Revenue projections were determined per jurisdiction and of the region based on users contributions of storm water to the drainage system.

### 6. Recommendations for Regional Storm Water Management

Over the course of the study the SWPB, with the assistance of the URAG, evaluated a number of different regional and local storm water management alternatives. Based on these

evaluations, recommendations for regional storm water management activities have been made. These alternatives were judged based on their:

- Ease of implementation
- Financial burden
- Equitability
- Legality
- Ability to address regional storm water problems.

The following “chapters” document the analysis and conclusions of these tasks.

## **EXISTING STORM WATER UTILITIES**

The following six communities were surveyed about storm water utility rates, budgets and use of revenues, storm water management services provided by the utility, staffing of utility, legal basis for the utilities and public acceptance.

### **Austin, Texas**

Regional Utility, established in 1982, covers 130 square miles, serving 350,000 people.

### **Cincinnati, Ohio**

City Utility established in 1984, covers 78 square miles and serves 385,000 people. Considering expanding to regional service.

### **Columbus, Ohio**

City Utility established in 1994, covers 201 square miles, serving 664,000 people. User charges predated the utility.

### **Fort Wayne, Indiana**

City Utility established in 1991, covers an area of 74 square miles, serving a population of 200,000. Although the storm water utility covers only the city, it works closely with the Metropolitan Water/Sanitary District, which is county-wide.

### **Lake County, Illinois**

A county-wide Storm Water Management Commission established in 1991; not a utility. The Commission sets and enforces consistent standards for all 52 municipalities, but the municipalities retain the responsibility for carrying them out.

### **Louisville / Jefferson County Kentucky**

Regional Utility established in 1987, which includes Louisville, the county, and five of ten smaller municipalities. Covers 275 out of 375 square miles of the county, and a population of 685,000.

The following information was obtained from the surveys:

### Storm Water Utility Rates

- Charges are a rate for service, not a tax.
- Rates are based on runoff that a parcel produces.
- Runoff depends on how much impervious surface (area covered by pavement or structures) is included in the parcel.
  - “Impervious Surface” can be figured based on *average* size of a parcel *for residential properties, or*
  - The actual square footage of impervious features on the commercial property.
- Residences pay a standard, flat rate.
  - Austin:** \$3.67/month
  - Cincinnati:** \$2.11/month
  - Columbus:** \$1.64/month
  - Fort Wayne:** \$1.80/month
  - Lake County:** \$0.005 per \$100 of assessed valuation (equivalent to \$0.42/month on a \$100,000 house)
  - Louisville:** \$2.86/month
- Commercial rates follow a formula that depends on area. Charge per given area unit varies widely. Some examples:
  - Louisville:** flat charge of \$2.86 per 2500 square feet regardless of land use
  - Austin:** \$39.59 per month per developed acre
  - Cincinnati:** \$7.17 per month for every 2,000 square feet of land — Commercial  
\$5.06 per month for every 2,000 square feet of land — Multi-Family  
\$0.68 per month for every 2,000 square feet of land — Agricultural  
(Cincinnati has 10 different land use categories)
- Collection with water/sanitary sewer bill is method of choice.
  - Fits logically with water/sanitary sewer because it is also a water-based municipal service.
  - Does not require additional collection mechanism — utilities cut off service for non-payment of joint water/sanitary/storm bill.
  - Requires land use information and ability to link information with billing system.
  - Some utilities bill storm water with property taxes. Easier to implement, but may be perceived as a “tax.”
  - City of Toledo property tax already includes ditch maintenance assessment. May be phased out in favor of City Utility.
- Some utilities grant credits or exemptions where a parcel has an onsite storm water system, or because of where it’s located, does not receive service from the utility.
- Combined sewer areas are not charged differently from areas with separate sanitary and storm sewer systems.

## Budget and Use of Revenues

- Budgets of the utilities surveyed are summarized below, including their basic flat rate for single-family residences and population bases, for purposes of comparison.

	Total Budget	Capital Improvements	Operation & Maintenance	Administration	Monthly Residential Cost	Population
Austin	\$23.8 M	\$4.9 M 21%	\$2.5 M 11%	Included with O/M	\$3.67	350,000
Cincinnati	\$6.83 M	\$4.0 M 59%	\$2.5 M 37%	\$0.33 M 5%	\$2.11	385,000
Columbus	\$13.2 M	\$6.5 M 49%	\$5.3 M 40%	\$1.4 M 11%	1.64	664,000
Fort Wayne	\$9.06 M	\$1.15 M ('96) \$0.53 M ('97) 6%-13%	\$3.1 M 34%	\$0.664 M 7%	\$1.80	200,000
Lake County	\$1.5 to \$2.0 M	Depends on grants		\$0.9 M 45%-60%	Assessment	
Louisville / Jefferson County	\$15 M	\$10 M 70%-80%	20%-30%	Included with O/M	\$2.86	685,000

## Storm Water Management Services

The services provided by the utilities surveyed varied depending on local need. The following summarizes those services; many, but not all, are provided by most utilities.

- Storm water infrastructure maintenance
  - Flood control ponds
  - Culverts & bridges
  - Cleaning drainage ditches, storm sewers, catch basins
  - Storm sewer repair
- Capital improvements
  - Storm sewer, pumping, or other drainage improvements to alleviate flooding
  - Erosion control improvements
  - Watershed based retention/detention ponds
- Design standards and regulations
  - Set consistent standards through a Regional Storm Water Management Plan. May include floodplain, retention/detention, water quality regulations. Usually enforced through permitting system.
  - Environmental code review and inspection
  - Construction plan review and inspection

- Water Quality
  - Prepare and implement NPDES Permit where applicable
  - Locate & eliminate cross-connections and illegal discharges to storm sewer
  - Spill and pollution complaint response
  - Best Management Practices
  - Water quality planning and non-structural controls
- Public Education
  - All utilities conduct public outreach programs, usually through media, flyers, and/or presentations to public groups.
  - Newsletter
  - Flood Awareness Week
  - Wetlands Information Campaign

### Staffing of Storm Water Utilities

- Staffing of utilities ranged widely depending on budget and services provided. From 12 for Lake County (which is just a Management District) to 815 for Louisville/Jefferson County.
- Some utilities are part of a larger Metropolitan Sewer District (MSD). Those that are technically separate work closely with water/sanitary sewer service providers, sharing costs and even staff.
- When a utility is part of the MSD, staff can shift duties as needed. For instance, we interviewed Louisville during the spring '97 flooding, and all MSD staff were working on storm water.
- A utility often frees up general revenue funds by taking over operation and maintenance of storm water facilities.
- In many cases, the field operation are handled by existing maintenance personnel with small staff for clerical and technical duties.

### Legal Basis

- As Ohio municipalities have the power to establish a storm water utility within its own boundaries, several cities have done so.
- There have been legal challenges to city utilities in Ohio
  - City of Wooster v. Graines. The City won this case at the Ohio Supreme Court, which was a refusal to pay the storm water utility charge.
  - Cincinnati has also won collection cases.
  - Columbus has not been successful in getting the airport to pay.
- Utilities in other states have also had legal challenges. Some have lost, and others have won. The basis is that the utility provides a *service* for which it charges a *fee*.
- Louisville had a challenge from a partnership of the Southern Baptist Church and the Farm Bureau. The utility withstood this challenge.
- Both the Wood and Lucas County Prosecutors have written favorable opinions on the use

of O.R.C. 6119 (Regional Water and Sewer Districts) for management of storm water. Such a district could cross jurisdictional, including county, lines. Its establishment would require a petition before the Court of Common Pleas.

- Other O.R.C statutes (6101, Conservancy District; 6115, Sanitary District; 6117, Sewer Districts) could also be used, each with its own restrictions.
- The City of Toledo Law Department has also written an opinion that O.R.C 6119 allows Regional Storm Water Districts

### **Public Acceptance**

- Providing drainage service, particularly to relieve serious flooding, was the driving force behind creating all utilities.
- Informing the public of what we are doing and why is important.
- Successful outreach efforts built a strong case for the need for regional storm water management.
- When an area has severe flooding and erosion problems, and can be documented with a record of complaints, citizens are generally supportive.
- Each utility's experiences were different as to where their "sales problems" were. Those mentioned include:
  - Agriculture
  - Multi-family residential
  - Commercial, especially large land-area facilities
  - Farm Bureau
- Establish an appeal procedure for those who object to their storm water charge.
- Cincinnati advises presentation to large corporations through a Business Association.
- Columbus advises that sooner or later you have to fight the money battle. You may as well get on with it, and mentioning money at a public meeting gets the audience's attention.

# NEEDS ASSESSMENT SURVEYS

Over the course of the study, members of the Urban Runoff Action Group conducted “Needs Assessment Surveys” of many jurisdictions within the study area. All local governments within the study area (county, city, village, and township) were invited to participate in the survey. A survey form was developed (see appendix C) to gather community information pertaining to storm water management. A cost of services analysis and summary of future projects identified through these surveys can also be found in Appendix C. The survey asked questions regarding:

- problems associated with storm water runoff
- review of existing storm water system including operation, maintenance and administration
- current and future storm water capital improvements
- revenue and budget
- storm water pollution regulations

Interviews were conducted with elected officials and/or public service administrators. The following tables summarize the results of the interviews. The percentages indicates those who responded yes to the question.

## Communities Responding to Survey

Townships	Villages	Cities	Counties
Lake	Berkey	Bowling Green	Lucas
Monclova	Holland	Maumee	Wood
Springfield	Ottawa Hills	Northwood	Monroe (MI)
Swanton	Swanton	Oregon	
Sylvania	Walbridge	Perrysburg	
Washington (Lucas Co.)		Rossford	
		Sylvania	
		Toledo	
		Waterville	

## *Storm Water Problems*

Flooding	76%
Soil Erosion	60%
Property Damage	56%
Sedimentation	44%
Overloading of WWTP	52%
Water Pollution	40%

## Storm Water Infrastructure

<b><i>Culverts</i></b>	<b>2,451</b>
Number in Excellent Condition	508 (20.7%)
Number in Good Condition	552 (22.5%)
Number in Fair Condition	745 (30.4%)
Number in Poor Condition	457 (18.7%)
Number in Critical Condition	187 (7.6%)
<b>“Repair or Replace Cost (Need)”</b>	<b>\$55,227,000</b>

The “Repair or Replace Cost” does not necessarily represent immediate need, but rather an estimate of overall storm water systems repair needs. Immediate needs are addressed through the capital improvement programs of individual communities.

<b><i>Storm Sewers</i></b>	<b>9,129,764 linear feet (1,729 miles)</b>
Number in Excellent Condition	1,245,125 l.f. (236 miles)
Number in Good Condition	2,010,135 l.f. (381 miles)
Number in Fair Condition	1,726,075 l.f. (327 miles)
Number in Poor Condition	2,526,091 l.f. (478 miles)
Number in Critical Condition	13,348 l.f. (2.5 miles)
Number in Unknown Condition	20,000 l.f. (3.8 miles)

Note: In some instances only the total length of the entire ditch system was available. “Conditions” were not available for all communities.

<b><i>Ditches</i></b>	<b>18,985,500 l.f. (3,596 miles)</b>
Number in Excellent Condition	123,000 (23 miles)
Number in Good Condition	1,322,000 (250 miles)
Number in Fair Condition	1,268,000 (240 miles)
Number in Poor Condition	343,000 l.f. (65 miles)
Number in Critical Condition	13,000 l.f. (2.5 miles)
<b>“Repair or Replace Cost for Ditches/Sewers (Need)”</b>	<b>\$205,287,360</b>

Note: In some instances only the total length of the entire ditch system was available. “Conditions” were not available for all communities. The “Repair or Replace Cost” does not necessarily represent immediate need, but rather an estimate of a storm water system’s overall repair needs. Immediate needs are addressed through the capital improvement programs of individual communities.

## Operation and Maintenance

### O&M Functions

Storm Sewer Cleaning	96%
Storm Sewer Repair	96%
Catch Basin Cleaning/repair	92%
Manhole Repair	88%
TV Inspection of Storm Sewers	44%
Installation of Storm Tiles	29%
Ditch Cleaning	72%
Emergency Storm Water Pumping	76%

### Total Operation and Maintenance Costs **\$10,362,000**

O&M Priorities Set on Need	67%
Practice Preventative Maintenance in Addition to Need	33%
Communities who see the need for:	
Preventative Maintenance	79%
Better Response to complaints	50%
Better Inventory and Records	58%

### Capital Improvements

Number of Future Projects (~1999-2003)	113
Cost of Future Projects	\$55,604,997
Number of Current/past Projects (~1994-1998)	104
Cost of Current/past Projects	\$39,036,591

NOTE: For this study, only capital improvements costs directly related to storm water drainage have been identified. The cost of drainage related to road construction/reconstruction have not been included. Drainage associated with road projects can be as high as 50 percent of the project cost. In addition, most communities do not anticipate that all of their future capital improvement projects (CIPs) will be funded. Funding for these projects is largely dependent local budget and grant availability.

### Revenue Sources

Grants	92%
General Revenue	79%
Income Tax	54%
Gas Tax	50%
License Plate Fees	45%
Real Estate Tax	35%
Assessments	38%

56% indicated revenue adequate to address storm water problems

*System Administration*

Complaint Response	100%
Enforcement	76%
Design Standards	76%
Plan Review	68%

*Regulations in Effect*

Meet FEMA Floodplain Requirements	80%
Retention/detention Requirements	76%
Contractors must Control Runoff	68%
Prohibition of Illicit Connection	58%
Spill Response Through Fire & Rescue	64%
Local Protection for Wetland/floodplain	48%
Local Restrictions on Filling in Floodway or Floodplain	60%
Local Requirements for Spill Control Plan	38%
Public Education Program	32%
Regular Street Cleaning	31%
Stream Sampling Program	29%

# EVALUATION OF ALTERNATIVES

## *ROUGE RIVER NATIONAL WET WEATHER DEMONSTRATION PROJECT*

In the summer of 1997, the Urban Runoff Action Group visited the Inkster area in Michigan to study the work of the Rouge River National Wet Weather Demonstration Project. The Rouge Project is a watershed based national demonstration project funded through a multi-million dollar grant from the U.S. Environmental Protection Agency. "The Demonstration Project analyzes, develops, and implements pollution control methods for the Rouge River Watershed and examines the pollution sources which impact the river's water quality. The Rouge Watershed is a highly urbanized watershed located within Wayne, Oakland and Washtenaw Counties. It looks beyond political boundaries in developing a watershed-wide management approach. The goal is to identify the most cost-effective controls for wet weather pollution sources while assuring maximum use of the water resource."

The Rouge River Watershed was selected as a national demonstration project due to the severity of its water quality problems which include:

- Designation as one of the most polluted rivers in the Great Lakes Basin by the International Joint Commission
- County Health Department prohibition on whole body contact
- No municipal or industrial dischargers
- Fish consumption advisory in place
- Nearly 30% of the area served by combined sewers
- Combined sewer overflows (CSOs) from 168 outfalls
- Storm water runoff is a major pollution source
- Major septic tank failure problems

### **General Storm Water Permit**

The Rouge Project is considering the adoption of a "General Storm Water Permit" for communities within the Rouge River Watershed. This permit would require the development of an overall watershed management plan, agreed to by all of the communities within the watershed. Under the permit conditions, each community would be responsible for performing the tasks assigned to it under the watershed management plan. See Appendix E for a list of benefits to the General Storm Water Permit.

### **Best Management Practices**

The Rouge Project is in the process of extensively researching the use of best management practices (BMPs) for storm water management. The URAG had the opportunity to visit some demonstration BMPs including an enhanced and expanded wetland area used for the treatment of storm water, a regional sediment basin, linear sand filter storm inlet, and retrofitted pond outlet designed to increase the detention time of storm water in the pond and allow pollutants to settle out. The research findings

on the effectiveness, feasibility, and costs of these demonstration BMPs will be made available by the Rouge Project.

Staff from the Rouge Project cited a number of the project's accomplishments. These include:

*Pollutant Load Findings*

- Combined sewer overflow control alone will not affect river useability.
- Storm water and other non-point source loads are a major impact to the river.
- Illicit connections and septic system failures are a significant threat to the river's water quality.

*Public Outreach Efforts*

- Strong support for Rouge Education Project including watershed studies and hands-on river sampling
- Public information disseminated through newsletter, speakers bureau, Rouge friendly neighborhood and business programs, and activity books

The Project also has several lessons learned through the years:

- The federal and state governments are willing to enable the locals to drive the process.
- The local units of government are unlikely to proceed unless the program is incrementally developed at the local level and the general public wants to proceed.
- There is a point at which technical analysis becomes far less important than institutional momentum.
- People do not want or accept that a public health threat is allowed to exist in their back yard
- Human health is their primary concern
- Actual chemistry data confuses many
- Stream morphology and habitat restoration is critical to the types of uses the public desires

**Conclusion**

The Rouge Project offers a number of resources and has conducted a great deal of research into storm water management issues and best management practices. The Urban Runoff Action Group obtained a great deal of useful information from this visit and should continue contact with the project staff to keep informed of their progress.

# *LAKE COUNTY ILLINOIS STORM WATER MANAGEMENT COMMISSION*

Another alternative the Storm Water Policy Board and the Urban Runoff Action Group looked into was the Lake County (Illinois) Storm Water Management Commission (SWMC). The commission was created by the county board of commissioners on an equal partnership between municipalities and the county government. It is a quasi-independent agency, receiving partial funding from the county but not directly governed by the county. The Commission itself is comprised of six county commissioners and six mayors of cities within the county. It has a staff of 13 people and receives funding for its \$1.2 million annual budget from a county-wide property tax assessment, permit fees, and grant funding. The Commission is very successful in leveraging grant monies for watershed management projects largely due to its multi-jurisdictional approach. For every one dollar it receives through tax assessments, it is able to leverage six dollars in grant funding.

## **Watershed Management Board**

The Commission also makes use of what are known as watershed management boards. These boards, one for each major watershed in the county, consist of elected officials within the watershed. Their primary purpose is to allocate watershed related capital improvement plan (CIP) monies to projects within the watershed. The CIP monies are used as one-to-one cost share monies with the communities within the watershed.

## **Storm Water Management Plan & Watershed Development Ordinance**

The Commission was created as a way to address storm water management at the county level. One of the first tasks of the Commission was to create a comprehensive storm water management plan for the county. This plan recommended “that the regulations [for storm water management] be uniformly, and consistently enforced throughout the county, by all agencies.” Implementation of this plan led to the development of the county-wide “Watershed Development Ordinance” as a regulatory tool to unify storm water management standards throughout the county as they relate to new development. Enforcement of the ordinance is either performed by the SWMC or by “certified communities” who are certified by the SWMC as being able to enforce the ordinance (enforcement officer must be a professional engineer). Of the 52 political jurisdictions within the county, 41 are “certified communities.”

The ordinance specifies the type of development that will require a permit from the SWMC. There are four general development conditions under which a permit will be required:

1. The project is in a floodplain
2. The project will impact a wetland
3. The project will be larger than three acres or be more the 50 percent paved
4. The project will modify a drainage swale

To obtain a permit, the applicant must show the SWMC how the development will address the following issues:

### *Basic Storm Water Management*

- Storm water runoff
- Runoff volume and rate reduction
- Storm water conveyance systems
- Storm water management requirement

### *Water Quality Protection*

- Federal water quality regulations
- Best Management Practices (BMPs)
  - Storm water storage
  - Infiltration
  - Source controls
  - Treatment practices
  - Filter basins (Retention/Wet Detention Ponds)
  - Buffers strips
  - Sediment control practices

### *Floodplain Protection*

- No net loss of flood plain area
- Elevate residential buildings to flood protection elevation

### *Wetlands*

- Classify wetlands based on their functionality
- Mitigation Options
  - Restoration - on site
  - Enhancement - improve existing, degraded wetland
  - Creation - establish a new wetland
  - Contribution - donation of money or land to wetland bank
  - Mitigation ratio 1:1
- Long-Term Maintenance Requirements

### *Operation & Maintenance*

- Maintenance Plan for Development
  - Plan must show how maintenance will be funded
    - Home owner association dues
    - Endowment by developer
    - Special service area
    - Dedication of a public agency for maintenance

## **Conclusion**

The Lake County Storm Water Management Commission provides an example of how storm water management can work at the regional level. It successfully uses intergovernmental cooperation to implement a watershed based agenda for the county that identifies and funds regional storm water planning and improvements. While the commission does not utilize a user charge based funding mechanism, it does equitably distribute the funding it receives through the watershed management boards. The Storm Water Management Plan has also made the county very competitive in grant funding opportunities as evidenced by its impressive grant leveraging record. The use of the watershed development ordinance provides a consistent set of storm water management standards for the region, providing better water quality protection while making the permit process less confusing for the development community.

## *MECHANISMS FOR REGIONAL COOPERATION*

The Urban Runoff Action Group conducted an analysis of the institutional options available to address regional storm water problems.

### **Municipal Utilities**

Municipal corporations have authority under Article XVIII § 4 of the Ohio Constitution to establish and operate public utilities, and the Ohio Supreme Court has indicated that storm water service is a public utility. Therefore, municipal corporations can undertake a wide range of storm water services on their own initiative and are not limited to property owner assessments as a means of funding projects. A storm water utility may be funded through monthly user charges similar to water and sanitary sewer utilities where charges are based on the amount of storm water runoff generated from each property. The services that a storm water utility can provide include among others: catch basin cleaning, ditch maintenance and upgrade, log jam and debris removal, storm sewer improvements, pollution prevention, water quality monitoring, planning and public education.

#### *Limitations*

Since a municipal utility may only be formed by a municipal corporation, it may not be suitable for a watershed approach, especially a large watershed such as the Maumee River Area of Concern, unless outside areas contract with the municipality for services through intergovernmental agreements.

### **Regional Water and Sewer Districts**

Regional Water and Sewer Districts may be established under Chapter 6119 of the Ohio Revised Code for the purpose of developing and implementing a regional storm water management program. Any area situated in any un-incorporated part of one or more contiguous counties or in one or more municipal corporations, or both, may be organized as a regional water and sewer district. A petition must be submitted to the clerk of courts in one of the counties affected, signed by representatives of all participating governmental entities. The district would be governed by a board of trustees pursuant to the petition approved by the court. A plan of operation must be prepared with regard to the present and prospective needs and interests of the area. The methods for funding the district must also be identified.

### **County Sewer Districts**

County sewer districts may be created under Chapter 6117 of the Ohio Revised Code for the purpose of establishing a storm water management program. The board of county commissioners can establish one or more sewer districts within their respective counties. The board of county commissioners can further establish sewer districts for municipal corporations if authorized by the legislative authority of the municipal corporation.

#### *Limitations*

A county sewer district would not be suitable for a large watershed, such as the Maumee River AOC, that encompasses more than one county. However, it may be feasible for a smaller watershed located within a single county.

### **Sanitary Districts**

Sanitary districts may be formed under Chapter 6115 of the Ohio Revised Code to prevent and correct the pollution of streams. Under their statutory authority, sanitary districts could possibly be used to establish a storm water management program. A sanitary district may include all or part of one or more counties. It is governed by a board of directors appointed by a special court of common pleas court judges from each county in the district. A plan must be prepared for the improvement for which the district is created.

### **Conservancy Districts**

Conservancy districts may be established under Chapter 6101 of the Ohio Revised Code for the purpose of establishing a storm water management program. The conservancy district is governed by a special court of common pleas judges from each county in the district. This court appoints three directors who administer the operation of the district. The same land can be included in more than one district, or two or more conservancy districts can be united into one district. This is relevant since the Maumee Watershed Conservancy District already covers a portion of the Maumee River Area of Concern.

### **Intergovernmental Agreements**

It may be feasible for the subdivisions in the Maumee River Area of Concern to enact intergovernmental agreements for implementing a regional storm water management program. Through an intergovernmental agreement, each subdivision would be responsible for undertaking those activities identified in the regional storm water management program that apply to it. The program would be periodically updated and revised by the Policy Board or Area-wide Water Quality Planning Council.

Intergovernmental agreements would allow each subdivision to retain control over its storm water system. Each subdivision would also be able to participate in developing and periodically updating the regional storm water management program. A regional program would also allow communities to respond most efficiently to EPA's proposed storm water regulations.

As was previously mentioned, intergovernmental agreements would allow smaller subdivisions in the area to contract with larger subdivisions for services such as catch basin cleaning, ditch maintenance, storm sewer maintenance, water quality monitoring, plan review and public education. In some instances, it may be practical for the subdivisions to implement storm water utilities as a means of providing these services.

### **Basin Council**

Subdivisions in the Maumee River Area of Concern would sign an intergovernmental agreement to form a basin council to implement a regional storm water management program. Such a council could be governed by a board made up of representatives of some or all of the participating subdivisions. A director and/or small staff could make recommendations to the board and execute board resolutions and perform tasks such as developing a watershed master plan, developing model ordinances, coordinating intergovernmental agreements, proposing regional projects, applying for

funding, and negotiating with the Ohio EPA on permitting issues. The ultimate power, authority, and implementation of the storm water management program would remain with the individual subdivisions. The council's operating expenses could be funded by dues paid by the member subdivisions which could be raised through property assessments, developer fees, storm water utility fees or other mechanisms.

### **General Storm Water Permit**

A storm water management program could be implemented without a basin council and intergovernmental agreements through the Ohio EPA's storm water permitting process. The subdivisions of the Maumee River Area of Concern will apply for a general storm water permit under the upcoming Ohio EPA Phase II NPDES permitting process. The general permit would allow watersheds more flexibility than individual subdivisions in developing their storm water management programs.

The permit would require the subdivision to participate in the development of a watershed management plan. Upon agreement and approval of each subdivision and the Ohio EPA, each subdivision would then be responsible for performing the tasks assigned to it by the overall watershed management plan. Each subdivision would be responsible for its own water management, but that responsibility would include participation in the watershed plan. Intergovernmental agreements between two or more subdivisions could be used to pool resources on one or more tasks such as catch basin cleaning or public education.

### **Conclusion**

The alternatives were evaluated by the SWPB. The Urban Runoff Action Group has received opinions from the Lucas and Wood County Prosecutors and Ohio EPA's Water Attorney regarding the legality of these mechanisms for implementing a storm water management program. It appears that each of the alternatives is feasible from a legal standpoint.

After an evaluation of these and other options, the Storm Water Policy Board recommended the exploration of a "regional storm water management district" (See "Recommendations for Regional Storm Water Management"). This regional district would be created as a Regional Water and Sewer District under O.R.C. 6119 for the sole purpose of storm water management.

A regional district would encompass the diversity of programs and issues needed to successfully address storm water management on a regional basis through its ability to:

- address storm water management on a watershed basis
- develop and implement all the potential activities needed for a regional storm water management program including Phase II NPDES storm water permits applications
- provide an effective funding mechanism for regional storm water management planning and projects
- formalize the commitment of local governments in the area to regional storm water management

# REGIONAL STORM WATER MANAGEMENT ACTIVITIES

In developing a regional storm water management program, it is necessary to understand the specific activities that are to be accomplished. Some storm water management activities are best addressed at the local level. These would include local storm sewer and ditch improvements and maintenance of the system. Other activities would benefit from regional cooperation. These would include uniform standards, projects that cross jurisdictional boundaries, and storm water master planning. To gain a sense of the specific storm water management activities that would make sense to address on a regional basis, taking into account their feasibility and equitableness, input was requested from the Storm Water Policy Board. Nine communities responded to a survey that asked which activities are currently performed at the local level and which would make sense to address regionally. The activities fell into four broad categories:

- Capital Improvements
- Codes and Enforcement
- Operation and Maintenance
- Planning and Administration

Those activities that received 70 percent or more of the votes in favor of regional participation were used by the URAG as the basis for making a regional storm water management program recommendation. The following sections analyze how each of these activities might be implemented on a regional level and are based on the following framework:

- The need for the specific task
- Goals and objectives for the task
- Evaluation of the available options
- Recommendation based on this evaluation

## SUMMARY OF RESPONSES TO PROPOSED STORM WATER MANAGEMENT ACTIVITIES

ACTIVITY	Community		Regional	
	Yes	No	Yes	No
<b>CAPITAL IMPROVEMENTS</b>				
Construction of sewers, ditches, pump stations, basins, etc.	9	0	1	4
Financing (general fund, bonds, grants, loans, etc.)	9	0	5	2
Regional conveyance facilities (ditches, trunk sewers, etc. that cross political boundaries)	6	3	6	1
Regional detention basin	2	6	5	2
Structural Best Management Practices (BMP) to remove pollutants in runoff (settling ponds, filters, constructed wetlands, etc.)	3	3	6	0
Other	0	0	0	0
<b>CODES AND ENFORCEMENT</b>				
Building codes re: drainage, detention	7	2	5	2
Building inspection re: drainage, detention	7	2	3	3
Commercial development review re: drainage, detention	8	1	2	5
Construction ordinances (erosion control, etc.)	5	3	4	3
Design standards (sewers, curbs, ditches, etc.)	9	0	6	2
Erosion control	7	2	4	3
FEMA compliance (flood insurance)	7	0	5	2
Floodplain management/preservation	6	2	7	1
Industrial inspections (good housekeeping, illicit disch., etc.)	5	3	6	2
Permit (storm water) compliance and reporting	5	4	4	3
Subdivision regs. (right-of-way requirements, public improvements, bldg. location, etc.)	9	0	3	5
Wetlands preservation	4	5	5	1
Zoning	9	0	0	8
Other	0	0	0	0

Note: Shaded activities are those which received >70% feedback to address regionally.

ACTIVITY	Community		Regional	
	Yes	No	Yes	No
<b>OPERATION AND MAINTENANCE</b>				
Catch basin maintenance	9	0	1	7
Complaint response re: storm water	9	0	1	7
Ditch maintenance	9	0	4	4
Emergency pumping	9	0	1	6
Illicit discharge detection/hotline	3	6	7	1
Log jam removal	6	3	7	1
Monitoring/sampling of storm water	2	7	6	2
Pollution prevention in municipal operations	6	1	4	2
Spill response	7	1	6	2
Storm sewer maintenance	9	0	2	6
Street cleaning	8	1	1	7
Street maintenance	9	0	1	7
Structural BMP maintenance	2	4	4	2
Other	0	0	0	0
Other	0	0	0	0
<b>PLANNING AND ADMINISTRATION</b>				
Flood control planning and preparedness	7	2	7	1
Inventory/map of storm water pollutant sources	0	8	8	0
Inventory/map of storm water system	9	0	6	2
Land use planning/inventory re: runoff issues	5	4	5	2
Operate storm water utility (collect fees, etc.)	2	7	3	5
Outreach activities re: storm water management	5	4	8	0
Public education (dumping, litter, household haz. waste, lawn chemicals, etc.)	4	5	8	0
Public involvement in storm water management	5	3	7	1
Storm drain stenciling	4	4	8	0
Storm water master planning	6	2	6	2
Storm water program evaluation and assessment	4	3	6	1
Other	0	0	0	0
Other	0	0	0	0

Note: Shaded activities are those which received >70% feedback to address regionally.

# CAPITAL IMPROVEMENTS

## *STORM WATER MASTER PLANNING/REGIONAL STORM WATER CONVEYANCE AND DETENTION FACILITIES*

### **Description of Need**

There is a need within the proposed storm water management district to provide a workable, comprehensive plan for the development of future storm water drainage improvements.

The present drainage system is an outgrowth of the drainage ditches constructed in the 1800's which were intended to serve primarily agricultural areas. As farmlands are converted to residential and commercial areas, an ever increasing amount of runoff is channeled into the existing drainage facilities. The existing systems are much too small and severe seasonal flooding results. Flooding, in turn, contributes to erosion and water quality problems.

### **Goals**

A master storm water drainage plan will aid in the orderly development of new drainage facilities. It must be recognized that providing adequate facilities is a broad, complicated and interrelated problem. Solving problems cannot be accomplished by constructing isolated, individual and non-related projects. A master plan for storm water drainage is necessary to establish the guidelines for maintaining and improving the existing facilities, as well as providing for future development.

The improvements outlined in a master plan would be based on ultimate development of the drainage areas that comprise the storm water management district. Ultimate development is a projection based on existing land use, proposed land use and current land use trends.

### **Options**

The general approach to providing drainage relief would be both a non-structural and structural one. These are often referred to as non-structural and structural best management practices. The non-structural approach uses land use planning, flood plain management and site design guidelines to plan for and manage the anticipated storm water runoff from new development. While these methods are effective in avoiding flooding problems in areas of new development, they are ineffective in addressing existing problems. Therefore, structural modifications to the drainage systems are necessary to correct existing problems.

Structural modifications consist of ditch improvements and construction of strategically located regional storm water detention facilities. A system of ditch improvements and detention facilities could be created that would emphasize scenic, recreational and environmental features. The plan would call for planting trees and vegetation along the drainage corridors. The drainage corridors could also accommodate walking and bike trails. Detention facilities could be constructed as

artificial wetlands or as wet or dry ponds to provide additional environmental and recreational benefits. In this way, the master plan would provide for an environmentally attractive and aesthetically pleasing drainage system that would address flooding and water quality concerns.

### **Who Would Perform the Master Planning**

A district wide master plan should cover those regional streams and ditch systems that serve two or more political subdivisions. A listing of the drainage systems and corresponding political subdivisions which are tributary to them is included in Tables 1 and 2. The drainage systems are shown in Figure 1.

Finkbeiner, Pettis & Strout, Inc. has developed comprehensive storm water drainage master plans for the Cities of Toledo and Oregon. Toledo's master plan was completed in 1971, and then updated in 1984 and 1985. Oregon's master plan was completed in 1974. Both master plans continue to serve as a reliable basis for long range planning.

The Toledo and Oregon master plans could be used as a basis for a district wide master plan. Several of the ditches that were studied as part of Toledo's master plan extend into western Lucas County, Swan Creek in Fulton County and Ten Mile Creek in southern Monroe County, Michigan. Toledo's master plan could be updated to include these areas. Likewise, the City of Oregon's master plan includes ditches that extend into northern Wood County. Oregon's master plan could be updated to include these areas. By utilizing the previous master plans, a district wide master plan could be completed in an efficient manner.

### **How Can this Activity Be Funded**

The most equitable approach for to fund master planning and capital improvements would be for each community to participate in its share of the costs according to the amount of runoff it generates from within its boundaries. The costs could be passed on to residents of each jurisdiction in the form of storm water user charges or generated from other sources. A detailed description of funding options is contained in "Financing of Capital Projects".

The cost to perform the master planning is estimated to range from \$5,000 to \$10,000 per stream mile. The range takes into account varying degrees of urbanization and available information (flood insurance studies, existing ditch plans, highway plans, etc.) on the various stream segments. The cost of the capital improvements is estimated to range from \$1.5 to \$2.0 million (in 1998 dollars) per stream mile based on costs developed in the Toledo and Oregon master plans.

It is possible that not all of the drainage systems identified in Tables 1 and 2 would need to be surveyed under the storm water master planning process. To gain a better sense of the streams needing improvements, engineers for each county and municipality in the study area could provide input on the priority of the streams that should be studied.

One tremendous advantage of a watershed approach is the increased ability to obtain state and

## *FINANCING OF CAPITAL PROJECTS*

### **Need for Task**

Financing storm water capital projects is often a difficult task. Unlike sewer and water improvements, none of the political jurisdictions in the study area have a dedicated revenue source for storm water improvements, although the City of Toledo is pursuing implementation of a storm water utility at this time.

Capital projects which cross political boundaries are even more difficult to fund. There must be agreement between the political jurisdictions involved as to the need, priority, scope, and who pays what share of the project. The need, priority, and scope of storm water capital projects can be defined by regional storm water master planning as discussed in a later section of this study. This chapter will focus on the funding of such projects.

### **Goal**

To develop equitable, reliable, affordable, implementable, and publicly acceptable funding sources for storm water capital improvements, including those that cross political boundaries.

### **Options**

The following options are available for funding storm water capital projects:

#### *Status Quo*

Currently, each community funds its own storm water capital projects. Very few capital projects are implemented which cross jurisdictional boundaries. The source of the funding can be special assessments, general funds, street or highway funds, or grants and loans from outside agencies.

#### *Special Assessments*

Special assessments can be levied against benefitting property owners to fund specific projects. Municipal corporations, county sewer district, sanitary districts, conservancy districts and regional water and sewer districts have the ability to levy special assessments within their jurisdictions. Special assessments can also be levied in unincorporated areas within or across county boundaries in accordance with the county ditch law. The amount of each assessment must be related to the amount of benefit derived. For storm water improvement projects, this benefit can be based on the estimated amount of runoff from all tributary properties, whether or not they are contiguous to the project.

Municipal corporations and smaller sewer and sanitary districts are limited in the extent of projects which can be funded in this manner because their ability to assess does not cross their political boundary. Regional water and sewer districts and conservancy districts can be set up along watershed boundaries to allow regional projects to go forward.

The special assessment process varies depending on the type of jurisdiction, but it usually involves

the following: a petition process to initiate a project; development of plans, cost estimates, and estimates of assessments, hearings, and an appeals process.

### *Property Tax Levies*

Municipal corporations, regional water and sewer districts, and some other districts may levy property taxes to pay the interest on bonds issued to raise capital for storm water improvements. In this way, improvements can be funded by all property owners in a jurisdiction without having to demonstrate direct benefit. A capital fund can be established to address capital needs throughout the jurisdiction on a priority basis. However, arguments of equitableness could arise if some property owners perceive that they are receiving little benefit for the amount they are paying. Projects which cross jurisdictional boundaries would be difficult to implement without agreement and participation of the adjoining jurisdiction. A regional water and sewer district has the advantage of being able to establish jurisdictional boundaries along watershed boundaries.

### *Fee-in-Lieu of On-Site Detention*

Land developers could be charged an impact fee to fund regional detention basins and downstream conduit improvements. This fee could be charged in lieu of requiring the developer to construct a detention facility on site. The impact fee could be proportional to the increase in impervious surface caused by the development and should reflect the approximate cost of constructing a new detention facility including land costs.

The fee would be placed in an escrow account and combined with fees from adjacent developments to fund a regional detention facility and any required downstream conduit improvements. Ideally, these facilities would be part of a storm water master plan for the affected area. This would allow the fees to be estimated more accurately. Where rapid development is occurring, projects could be funded by bonds in anticipation of future developer fees.

Impact fees can be levied by municipal corporations, counties, and townships. They could also be levied by a regional water and sewer district which would have the advantage of accumulating funds from entire watersheds and siting detention facilities at the most advantageous locations within the watershed. Other jurisdictions would be limited to their jurisdictional boundaries which may not follow watershed boundaries.

Impact fees would only address storm water impacts caused by new development and would not address existing storm water problems. Storm water impacts caused by new development could also be addressed by enforcement of consistent detention requirements. The impact fee merely allows the developers some flexibility where site constraints may preclude construction of local detention. Maintenance of regional detention basins should also be more cost effective. However, a mechanism to fund the maintenance of these facilities would need to be established. One way would be to build future maintenance costs into the impact fee.

### *Storm Water User Charges*

Funds for capital improvements can also be derived through a storm water user charge system. The

“charge” to property owners is based on the amount of impervious surface area on their property and an estimated of the amount of storm water runoff they contribute to a drainage area. User charges are typically based land use categories including agriculture, residential, commercial, and industrial. Projects which provide a specific benefit to a well defined area, such as a storm sewer serving a local area of several blocks, may be more equitably funded by a special assessment to those benefitting.

A user charge system can be implemented at a regional and/or local level. At the regional level, this system has the benefit of being able to fund projects which provide benefit to multiple jurisdictions and fund those projects with revenues from all of the benefitting parties. A local user charge system could be used to raise funds for local projects or the local share of a regional project where the regional project is funded according to some kind of cost share formula (see Intergovernmental Agreements).

### *Potential Funding Sources*

A number of grant and loan opportunities are available for funding storm water improvements. These include:

1. Natureworks (Soil and Water Conservation Districts)- Provide small grants for projects that demonstrate best management practices for water quality improvements, such as detention basin retrofits or constructed wetlands.
2. Ohio Water Development Authority Research and Development grants and loan programs
3. Ohio Public Works Commission (State Issue 2) - Provides grants and loans for infrastructure improvements. Funding is based on a point scoring system with emphasis given to replacement and rehabilitation projects.
4. U.S.D.A. Rural Development Program - Provides grants and low interest loans for infrastructure projects to small (less than 10,000 population) rural communities serving lower income residents. Funding priorities tend to place sanitary sewer and drinking water project ahead of storm water projects.
5. Army Corps of Engineers (COE) - Can provide assistance through the Water Resources Development Act to perform watershed studies and participate in funding storm water improvements.
6. Ohio Department of Transportation (ODOT) - The new Federal Transportation Equity Act for the 21st Century (TEA-21) includes approximately \$600,000 per year for the TMACOG planning area set aside for “transportation enhancements”. These enhancement projects can include environmental and water quality improvements. TEA-21 also provides that up to 20% of the cost of a transportation facility project may be used for environmental mitigation, pollution abatement or construction of storm water treatment systems.
7. Housing and Urban Development (HUD) Community Development Block Grant Program - Funding available to provide viable urban communities with decent housing, a suitable living environment, and expanding economic opportunities for low to moderate income residents, including infrastructure improvements. Again, funding priorities tend to place water service

and sanitary sewer project ahead of storm water projects.

8. Economic Development Administration (EDA) - Aids infrastructure construction needed to create or retain permanent jobs.

U.S. and Ohio Environmental Protection Agency Supplemental Environmental Protection funds can provide funding for a variety of storm water and watershed based projects.

Grants can be applied for by any entity; however, a regional authority would have greater ability to apply for and fund projects which cross political jurisdictions. Funding agencies also give preference to communities which are cooperating on a regional basis, have undergone regional planning, and which are proposing projects in accordance with those regional plans.

### *Pool of Funds of Contributions Based on Drainage Area of Jurisdictions*

Area communities could agree to participate in a consortium which pools funds for regional storm water improvements. The formula for determining cost share could be based on total area or impervious area of each jurisdiction. This pool could be used to fund selected inter-jurisdictional projects from a storm water master plan. Equitableness would be a prime challenge to make sure that all contributing jurisdictions are receiving a proportionate share of benefit.

### *Intergovernmental Agreements*

Inter-jurisdictional projects could be funded on a case by case basis through intergovernmental agreements which specify the cost share for each participating jurisdiction. This cost share could be based on drainage area or impervious area contributing to the project. Agreement would also have to be made on the project scope and benefits. One entity would need to take the lead in contracting and applying for grants, etc.

## **Recommendation**

The recommendation for funding capital projects will depend on the management structure which is adopted. In general, any funding mechanism should be equitable in terms of balancing costs and benefits; provide a consistent, reliable funding source; be responsive to the capital improvement needs of the region; be agreed to by all participating jurisdictions; and be acceptable to the public.

### *Long Term*

The management structure which best fits these criteria is a regional storm water management district. Project funds can be raised and spent in the most equitable manner throughout the district. To insure equitableness, the regional district may require that a certain percentage of capital funds be spent in each political jurisdiction in proportion to the amount raised from those jurisdictions. A regional district would have a dedicated funding source for capital projects, could leverage grants and loans, levy special assessments, and could impose developer impact fees. A regional district could be funded by property tax levies or user charges to each property owner. User charges would be more equitable but may be more difficult to implement initially. A district would have the most flexibility and would be most responsive to funding regional projects which cross other jurisdictional

boundaries. Funding of local projects which serve only one jurisdiction could be left to the local jurisdiction. A regional district would require the consensus of all of the jurisdictions it encompasses.

### ***Short Term***

Forming a regional district is a long process which could meet with opposition at any stage and be delayed. In the short term, it is recommended that communities participate in a regional consortium which agrees to share costs on regional projects according to a specific formula based on contribution of runoff. The consortium could also charge dues according to the established formula to raise funds for the purpose of implementing a regional district and possibly to begin regional master planning.

Regional projects identified by a storm water master planning process could be funded on a case by case basis, with separate intergovernmental agreements being drawn up by the participating jurisdictions. However, much of the funding framework and agreement to participate would already be in place. Each jurisdiction participating in a project would raise their share of the money as they see fit (e.g. special assessment, storm water utility, general fund). Local projects would continue to be funded by the local jurisdictions. A portion of the consortium's membership dues could be allocated to provide a pool of funds which could be used as seed money for regional projects with provisions for insuring that this money is equitably spread among the communities. The consortium could also apply for grants and loans for regional projects and establish regional standards, including developer impact fees which would be collected by the local jurisdictions.

### **Required Ordinance/Enforcement**

The steps for setting up a regional district or storm water management consortium are described in the recommendation section of this study. The regional district's establishing legislation or consortium agreement must include language about how regional projects will be funded, including the distribution of capital funds and cost sharing formulas.

## *STRUCTURAL BEST MANAGEMENT PRACTICES*

### **Need for Task**

Best management practices (BMPs) are any managerial, vegetative, or structural practices used to treat, prevent, or reduce water pollution or flooding caused by storm water runoff. Storm water BMPs range from pollution prevention activities to wetland and floodplain preservation to structural practices including impoundments. They can be designed to promote ground water recharge, remove pollutants, and prevent or lessen streambank erosion and downstream or upstream flooding. This section briefly looks at structural BMPs.

Our rivers, streams, and bay are among the most valuable environmental features within the area of concern. Urbanization, more than any other common land use, changes the watershed characteristics and damages the water quality of these resources.

Storm water management is necessary to reduce or eliminate the negative impacts of storm water runoff. Initial efforts to reduce the impact of urbanization traditionally focused on controlling peak runoff rates from relatively large storms and applied generic solutions to reduce sedimentation from construction sites. Since urbanization changes watersheds in many ways, traditional solutions have not been able to maintain the integrity of our water resources. We must look at solutions that will improve water quality in addition to reducing peak flows. By implementing best management practices we can meet these goals.

### **Objectives**

Structural BMPs are able to address water quality and flooding problems for existing developed areas as well as areas of new development. When employed on a regional or watershed basis and strategically located, large detention basins or wetlands can take the place of several smaller detention basins.

Properly designed and constructed BMPs can be an asset to a site and add value to the abutting property. Sites adjacent to a well-designed wetland or storm water pond generally can command higher prices and are often sold or rented at a faster rate than those elsewhere.

BMPs should protect the quality of local receiving streams, reduce development costs, protect sensitive areas, and result in more attractive landscapes. BMPs designed and constructed on a watershed or regional basis can usually be more effective and aesthetic, and less expensive than those designed for each individual site. BMP costs are greatest for small sites and drop rapidly for larger sites where they can be spread out among many users.

### **Options**

BMPs can be designed to promote recharge, remove pollutants, and prevent or lessen streambank erosion and downstream flooding.

Structural BMPs that can be used to lessen pollutants to receiving streams include:

### *Extended Detention Basins*

Storm water runoff, instead of being conveyed directly to a receiving stream, is routed through a detention basin. These impoundments hold the water allowing many pollutants to settle to the bottom of the pond. Water is gradually released to the stream reducing the chances of flooding. Extended detention basins can be an effective, low cost solution of improving water quality and reduce flooding in a watershed. Generally, the longer the storm water is detained the greater the removal of pollutants.

### *Wet Detention Basins*

Storm water entering this type of detention basin replaces existing water which flows out of the basin. The entering runoff is stored in a permanent pool until the next incoming storm water flow forces it out. This can allow for long detention times with high pollutant removal rates while also providing flood protection. Larger pond sizes result in longer detention times, which increases pollution removal rates. Ponds with aquatic plants can also remove significant amounts of soluble nutrients, reducing downstream algal growth.

Existing detention basins designed to limit storm water quantity can often be retrofitted into an extended detention basin or wet basin to address storm water quality.

### *Infiltration Basins*

Infiltration basins retain storm water until some or all of it filters into the surrounding soil. These are effective for removing both fine particulate and soluble pollutants. Coarse particles can clog these basins and should be removed by another BMP or by regular maintenance. This type of structure can aid in ground water recharge. Large basins can also be effective for controlling peak runoff rates during large storms.

### *Porous Pavement*

Various types of porous pavements such as open paving bricks enable storm water runoff to infiltrate through the pavement into the underlying soil thereby reducing the amount of runoff generated from the site. This allows for a high degree of soluble and fine particulate pollutant removal and ground water recharge. Porous pavements are feasible on relatively flat sites with permeable underlying soils and deep water table and bedrock levels. This type of structure requires frequent maintenance as larger, coarse particles can clog the pavement.

### *Water Quality Inlets*

Water quality inlets, also called oil/grease separators, remove sediments, oils, and greases from parking areas and industrial runoff prior to discharge to the storm water system. These usually provide a moderate amount of coarse sediment, oil/grease, and debris removal. Regular maintenance is necessary to remove collected pollutants.

### *Constructed Wetlands*

Constructed wetlands or marshes can be established to address such issues as soluble pollutant removal, wetland mitigation, habitat enhancement, and stabilization of bottom sediments. They are similar to wet detention basins but generally cover a larger area and are shallower with a diversity of plant types. Constructed wetlands often include small permanent pools and extended detention storage to contain the required detention volume. Since sediment control is critical to sustaining storm water wetlands, the permanent pools will often be located at the inlet and outlet of the area to capture sediments and keep them out of the marsh area.

### **Recommendation**

BMPs perform best when they are used as part of an overall plan for storm water management. Planning for storm water control, whether at the site or regional level, should involve the preservation and conservation of the natural features that perform storm water management functions before structural BMPs are specified.

Most of the BMPs reviewed here have site specific applications. Their use in local building codes and subdivisions regulations should be encouraged where appropriate as part of an overall site planning process. Regional BMPs such as detention basins, should be used in conjunction with a regional storm water master plan for the area that will identify the most appropriate areas for their use.

# CODES AND ENFORCEMENT

## *REGULATORY REQUIREMENTS FOR STORM WATER MANAGEMENT*

### **Need for Task:**

Requirements for storm water management often stipulate what type of developments will need to implement storm water control measures such as detention and retention ponds. These requirements have primarily been developed to control and limit flood damage and the impacts to water quality from storm water runoff. Storm water control measures, while not fool proof, do provide a way to control these impacts (see “Structural Best Management Practices”). Currently, storm water management requirements vary considerably from one jurisdiction to another, leading to confusion among developers and ineffective control of storm water. Drainage systems receive storm water runoff from an entire watershed that may extend through several communities. To effectively manage storm water runoff on a watershed basis, each community within the watershed should use similar requirements and standards for storm water management. However, the current requirements, with a few exceptions <sup>2</sup>, have not been designed to manage storm water at a watershed level. Responsibility for the adoption and enforcement of these requirements resides with the various communities in the study area. In addition, these requirements should require a review for impacts to sensitive natural areas such as wetlands, floodplains, and ground water recharge areas that provide natural storm water management functions.

### **Goal**

To develop a uniform set of development standards throughout the study area that requires storm water management for all new development and improvements. The codes should be equitable, have a reasonable administrative burden, and be publicly acceptable.

### **Options**

#### *Status Quo*

Current responsibility for the development and adoption of storm water management requirements lies with each jurisdiction. Many of the communities in the study area have similar requirements. Some communities within the study area elect to have their county engineer enforce county regulations for storm water control in their community. While this system addresses storm water management at the individual jurisdictional level, it does not provide for continuity throughout the study area and does not provide uniform, watershed based requirements. It does not allow for the targeting of requirements to specific watersheds.

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<sup>2</sup> The City of Maumee, through its [Graham Ditch Drainage Study](#), bases its storm water storage requirements on a watershed approach.

### *Uniform Requirements*

This option would develop a set of uniform storm water management requirements that could be adopted by each political subdivision within the study area at will. The requirements developed within each jurisdiction should take into consideration the various watersheds within the community and tailor the requirements to accommodate the needs of threatened drainage systems. These requirements should also inform permit applicants of their obligations and duties to seek a permit from the appropriate federal, state, and local agencies with jurisdiction over sensitive natural areas such as wetlands and floodplains. Adoption of these requirements by a majority of the jurisdictions in the study area would improve the regional drainage systems' ability to handle runoff from future development. Uniform requirements would also eliminate some of the confusion for developers and would provide a level playing field, enhancing regional growth.

### *Storm Water Management District*

A storm water management district would cover a multi-jurisdictional area (county or multi-county) and would adopt an ordinance for that area requiring storm water management for all new developments and improvements. Enforcement of the ordinance would occur through either the regional district or by each jurisdiction with the district.

### **Recommendations**

Develop model ordinance language requiring storm water management for all new development and improvements.

### **Required Ordinance/Enforcement**

An outline for a model storm water management ordinance is contained in Appendix F. This ordinance language could either be enforced by a storm water management district or by individual jurisdictions.

# *STORM WATER MANAGEMENT DESIGN STANDARDS*

## **Need for Task**

Storm water control measures, when properly implemented, have proven to alleviate flooding problems and enhance water quality. Standards for the design of control measures can greatly influence their effectiveness and efficiency. The use of a uniform set of design standards would ensure that a consistent approach to storm water management is taken throughout the study area. Uniform standards would also provide consistency for developers in the permitting process.

## **Goal**

To develop a uniform set of design standards that, if implemented, would reduce flooding and water quality problems associated with new development and improvements. The standards should be equitable, have a reasonable administrative burden, and be publicly acceptable.

## **Options**

### *Status Quo*

Within the study area, several jurisdictions utilize design standards for storm water management. The cities of Toledo, Oregon and Maumee have and enforce their own standards. The Lucas and Wood County Engineers' offices have developed and enforce design standards for development within much of the unincorporated areas of their respective counties. Table 3 provides an overview of the standards used throughout the region.

### *Uniform Design Standards*

Uniform standards, whether developed for implementation within individual jurisdictions or as part of a storm water management district would essentially be the same. Implementation of the standards by individual jurisdictions would allow each community to adopt, implement, and enforce the standards as they see fit. The standards used as part of a storm water management district would be adopted by the district and then implemented and enforced through either the district or each community that is certified by the district.

## **Recommendation**

Create uniform standards through the development and implementation of a regional storm water management district. Appendix F provides an outline for model storm water management regulations and standards. The development of these standards should be performed by a committee representing those jurisdictions who will be governed by the standards.

***CURRENT REGULATORY REQUIREMENTS FOR STORM  
WATER MANAGEMENT WITHIN STUDY AREA***

<b>CONTROL MECHANISM</b>	<b>City of Toledo</b>	<b>City of Oregon</b>	<b>Lucas County</b>	<b>Lake County IL</b>
Performance Criteria: BMPs to control site erosion	Yes	No	No	Yes
Pre- vs. Post Development runoff rates and volumes for std. Design Storm	Yes	Yes	Yes	Yes
Establish Maintenance Responsibility	Yes	No	Yes	Yes
Plan Review Permit Approval Requirements	Plan Review	Plan Review	Plan Review	Yes
Site Plan Content and Provisions	Yes	Yes	Yes	Yes
Performance Bond/Guarantee	No	Yes	No	Yes
Inspection/Enforcement Actions	Yes	Yes	No	Yes
Penalties for Violations	Yes	Yes	Yes	Yes
Granting Variances	Yes	Yes	Yes	Yes
Appeal Process	Yes	Yes	Yes	Yes
Administrative Responsibilities	Yes	Yes	Yes	Yes
Permit Application Format	No	Yes	No	Yes

# *USING WETLAND AND GROUNDWATER CONSERVATION AS A PROACTIVE STRATEGY FOR STORM WATER MANAGEMENT*

## **Need for Task**

Northwest Ohio has a rich heritage of extensive wetland areas. Historically, the Great Black Swamp and the closely associated Oak Openings Region were part of a vast wetland complex that covered an area over half the size of the Florida Everglades. Reaching from Fort Wayne, Indiana to Sandusky, Ohio, the Great Black Swamp was the single largest wetland area in Ohio. This extensive wetland formed approximately 13,000 years ago as higher predecessors of Lake Erie receded and left behind a poorly drained landscape of swamp forests, wet prairies and marshes. The water from these wetlands slowly flowed across the land through shallow depressions and creeks and into Lake Erie through the Maumee River and other smaller streams. This water was rich with nutrients derived from decaying plants, but relatively low in sediment because of the low water velocity and extensive ground cover. It was the water from these wetlands that helped to make Lake Erie the most biologically productive of all the Great Lakes combined.

Today over 95% of these vast wetlands are gone, primarily as a result of drainage efforts in the late 1800's and subsequent conversion of the region to agriculture. This enormous effort was made possible by the creation of nearly 15,000 miles of drainage ditches and countless miles of hand laid drainage tile. The wetlands that survived this process are invaluable remnants of this once vast ecosystem.

Today, Northwest Ohio's major wetland areas are concentrated along the Lake Erie shoreline, in the Oak Openings Region and along stream corridors. Within the Oak Openings Region, a sandy belt of land in Lucas, Fulton and Henry formed from ancient lake beaches, the wetlands and associated oak savanna uplands now sustain more rare species than any other area in Ohio. A fact even more significant is that most of these rare species are found within the Oak Opening's five globally rare plant communities. The Lake Erie coastal marshes, and to a lesser extent the inland wetlands, are still critical habitat for an enormous number of migratory and breeding birds. These larger wetlands, and the numerous smaller wetlands scattered throughout Northwest Ohio, are also the crucial feeding and breeding areas for a host of insects, amphibians, reptiles and mammals.

Northwest Ohio was once covered with forests, prairies, and marshes that slowed runoff, held the soil in place and stored and moderated flood waters. But, now the land is covered in seasonally vegetated agricultural fields, turf lawns, impervious asphalt and concrete. Add to this an extensive network of ditches and drainage tile designed to quickly move water out of the area, and you have a landscape that encourages high runoff peaks, increases erosion and produces intense flooding in concentrated areas. An ever increasing amount of runoff and downstream erosion is inevitable if urbanization of the region continues at its current rate.

Instead of reacting to erosion problems, proactive approaches should be considered. One technique that could be utilized to help minimize erosion and sedimentation is to conserve existing wetlands. Northwest Ohio wetlands are already functioning as "natural retention ponds" by holding storm waters and then slowly releasing them over time. With careful planning, the cost of conserving these

areas can likely be less than the cost of increasing and maintaining the artificial storm water runoff infrastructure that must be built to compensate for their loss. Conservation of wetlands sites also has many significant additional benefits that storm sewers and artificial retention ponds do not provide. Preservation of biological diversity, protection of green space and the addition of park land are just a few of these added benefits.

Wetlands also provide other intangible benefits aside from their obvious biological benefits. Wetlands help to filter, clean and recharge both surface and groundwater, each being a major source of drinking water for many residents of Northwest Ohio. The massive loss of wetlands along the western basin of Lake Erie has been one of the primary reasons for the decline in water quality within the lake. Without these wetlands, sedimentation rates of the Lake and Maumee Bay have increased dramatically.

## Options

A variety of options are available to protect wetlands areas. Wetlands are currently protected by federal laws and destruction of areas larger than 1/3 of an acre must be authorized by the U.S. Army Corps of Engineers. However, wetlands larger than 1/3 of an acre are destroyed regularly because of the difficulty in enforcement. Wetlands are also negatively affected by adjacent impacts to unprotected uplands. Fee acquisition is the most obvious and perhaps permanent strategy for protection, although it is also the most expensive. Conservation easements are another option and can be effective in situations where private landowners desire to retain ownership. Easements could be purchased from landowners to protect the wetland and adjacent buffer, while permitting use of the remaining land. A regional storm water management district could play a role in identifying particularly valuable and threatened wetland areas for acquisition or placement in to conservation easements. Other protection options are available depending upon the circumstances.

Another proactive technique that should be considered is the limitation of basement construction in areas with a high water table. In these locations each basement, by necessity, has a sump pump which regularly draws water out of the ground and discharges it into a ditch or storm sewer. Water that could serve to recharge wells and sustain wetlands is being removed and flushed into a stream, contributing to downstream erosional problems. Most home buyers are unaware of the implications of high groundwater and are often disappointed to encounter wet basements even with the use of sump pumps. Solutions to a wet basement are often expensive and could be avoided altogether if the basement was never built.

The use of drainage swales instead of storm water sewers is another proactive approach that can be used to decrease runoff, especially in areas with sandy soils such as the Oak Openings Region. By allowing rainfall to run off roadways into adjacent swales, instead of into storm sewers, the water is permitted to seep into the ground, recharging the groundwater and helping to sustain area wetlands. Public education would be critical in this type of approach. Homeowners should be made aware of the function of swales and understand that intermittent standing water is an illustration of a functioning system.

By focusing on the sources of storm water erosion and implementing some proactive solutions, it is possible to minimize some of the regions erosional problems. By investing a relatively small amount in the present, we can avoid spending an excessive amount in the future.

### **Recommendation**

Options for donating and conserving wetlands should be made available to any land owner with wetland areas on their property. Significant tax benefits can be realized by donating a wetland or placing it into a conservation easement with a land trust. Local governments can become involved with conservation efforts by informing property owners about donation and conservation easement options through land trusts, offering to become the recipient of a conservation easement for wetland areas, or by offering development density bonuses for site designs that preserve wetland areas.

In addition, the standards local governments use to review site plans should include provisions for reviewing projects for wetland impacts. At a minimum, construction activities that require dewatering for basement construction should direct the discharge to an area on site, preferably one that has ground water recharge potential. Further, storm water management system design at the site level should be encouraged to direct runoff into swales and other areas with high ground water recharge rates.

An inventory of wetland, ground water recharge areas, and areas with high water tables would significantly aid the implementation of these recommendations. The Maumee RAP Open Space and Wetlands Committee is undertaking an inventory of wetlands adjacent to Swan Creek and the Ottawa River. While the future plans of where this inventory might expand to are unclear, this type of information would be very useful for local communities in their site plan review process. Alternatively, local governments could make, as part of their site plan review process, permit applicants provide them with this information.

### **Required Ordinance/Enforcement**

Provisions would need to be made in the zoning code of local governments wishing to implement these recommendations allowing density bonuses for site designs that preserve wetlands. In addition, local building codes and/or subdivision regulations would need to direct storm water runoff to areas with ground water recharge potential.

## *FLOODPLAIN MANAGEMENT/PRESERVATION*

### **Need for Task**

Most jurisdictions in the study area currently enforce the requirements of the Federal Emergency Management Administration's regarding development in floodplains (see separate chapter on FEMA Compliance). These requirements, while prohibiting the filling of the main stream channel floodway, allow the filling of the majority of the floodplain (floodway fringe). Floodplains are an essential component of storm water management. They provide a temporary storage location for flood flows, reducing peak flows downstream and allowing filtering and infiltration of those flows. The filling of floodplain forces peak flood flows through ever narrower passage-ways. In the absence of any federal or state requirements, local ordinances are needed to protect floodplains from filling.

### **Options**

Local ordinances to protect floodplain are in effect in some jurisdictions in the study area. The City of Toledo requires the replacement of floodplain area lost due to filling activities. Lake County, Illinois has a similar requirement. Wetlands are often found in floodplains and enforcement of wetland requirements is another mechanism for protecting the floodplain.

### **Recommendation**

Uniform storm water management regulations should include provisions to prohibit the filling of floodplains. or, if development is proposed in the floodplain, the original amount flood storage area should be maintained.

# OPERATION AND MAINTENANCE

## *ILLICIT DISCHARGE DETECTION*

### **Need for Task**

Within the study area, Toledo is the only community required as part of its NPDES storm water permit to monitor its storm water drainage system for illicit or dry weather discharges. These discharges are typically from sanitary sewers or septic systems and can pose a significant threat to human health and the environment if not corrected promptly. In many communities outside of Toledo, detection of these discharges are reported to the county board of health who will investigate the discharge. Much of the storm water drainage system in the study area is not regularly monitored for illicit discharges.

### **Options**

#### *Status Quo*

Within the study area there are proactive and reactive approaches to the detection of illicit discharge. The City of Toledo Environmental Services Department routinely inspects its storm drainage system for dry weather discharges and moves to correct the problem when discovered. Other agencies within the study area including the county boards of health, Ohio EPA, the Coast Guard, and the local emergency planning committees (LEPCs) will respond to the detection of illicit discharges depending on the nature of the discharge and its potential to affect human health. Response to spills of hazardous materials is usually the purview of the local fire department and the LEPC, again depending on the severity and location of the spill. Greater publicity about the agencies able to assist with and the procedures to follow when an illicit discharge or spill of a hazardous material is detected could increase the number of discharges reported and decrease the risk injury. The Maumee RAP Outreach and Education Action Group could work with the county LEPCs and boards of health to develop educational programs and information about the procedures to follow when an illicit discharge or spill is detected. Alternatively, an illicit discharge detection "hotline" staffed by county health or emergency response personnel could be developed and publicized as a way of informing the public.

#### *District wide illicit discharge detection program*

A regional storm water management district could coordinate an illicit discharge protection program for the study area. Communities with monitoring programs already in place, could provide training to communities or county agencies interested in the development of a district wide detection program. Alternatively, the district could contract or develop inter-governmental agreements with existing monitoring programs to provide service for the district.

### **Recommendations**

The Maumee RAP Public Outreach and Education Action Group should work with county LEPCs and Toledo Environmental Services to develop an education program that includes appropriate

# *REMOVAL OF STREAM OBSTRUCTIONS*

## **Need for Task**

Log jams are a natural reality of trees growing and dying along stream banks. These obstructions are most severe in medium and small size streams. There are several consequences of these obstructions that have serious effects for land near the stream. The most serious problem is reduced stream flows. This increases flooding problems and also restricts drainage inflow to the stream from the watershed. Log jams can also disrupt septic and agricultural drainage systems, disturb wildlife nesting attempts, and accelerate stream bank erosion. Many farmers are being encouraged to participate in programs that encourage riparian planting. Unfortunately these plantings could lead to further stream obstructions.

## **Goal**

To maintain a free flowing drainage system, the Ohio Department of Natural Resources (ODNR) Stream Team provides the following recommendations to achieve this goal: only remove downed or leaning trees, use bioengineering techniques to protect bank erosion areas where trees are to be removed, evaluate the severity of existing log jams through the services of appropriate groups such as NRCS, ODNR, U.S. Army Corps of Engineers, Environmental Groups. A program to remove stream obstructions will require annual maintenance in order to have continuing success.

## **Options**

### *A. Who performs the task:*

Currently, there are two possible systems that could be used: Senate Bill 160 legislation for ditch maintenance projects or newly proposed legislation through the Maumee Conservancy District. Neither system has been used extensively for log jam removal. The right of ingress and egress would be necessary to work on land of hostile landowners.

### *B. How will the work be funded:*

Both of these options would require landowners in the watershed to be charged on a uniform basis as established by the (SB 160). ODNR, and other groups as appropriate, may provide grants to assist in lowering the cost of these operations. Obstructions would be surveyed and cost estimates for their removal could be developed. Lowest and best bid would be accepted and standards for the work would be established and enforced. Provisions for maintenance of work on an annual basis would be established. The work of county engineers could also be funded through a regional storm water management district.

## **Recommendations:**

The Maumee Conservancy District initiative to remove log jams as it develops seems to be a possible alternative. Since this type of effort is relatively new and untested, it may be difficult to get results quickly and easily.

A time line should be establish to initiate the process and evaluate its progress. If this fails, work could proceed through SB 160 legislation similar to the Blanchard River project.

## *STORM WATER MONITORING AND SAMPLING*

### **Need for Task**

As a requirement of its NPDES municipal storm water permit, the City of Toledo must sample and monitor the quality of its municipal storm water discharges. This allows the city to keep record of the quality of its discharges and detect illicit discharges to its storm water system. Expansion of this type of system to the study area, (on a less frequent basis), would allow for increased vigilance in the detection of pollutants to the storm water system. It would also prepare the region for the implementation of Phase II NPDES permit requirements that will be imposed on communities less than 100,000 in population and will likely have some type of monitoring requirements. A coordinated sampling approach would be more cost-effective and meaningful than each jurisdiction performing its own sampling.

### **Goal**

To reduce the pollutant discharges from a municipal separate storm sewer system to the receiving stream and improve overall water quality. Be able to detect and identify significant sources of storm water pollution to the regional drainage system.

### **Options**

Any jurisdiction discharging municipal storm water under a NPDES permit is obligated to comply with all conditions of their issued permit. Permits are required to be issued for storm sewers serving municipalities with populations greater than 100,000 people and small municipalities located in urbanized areas. The permitted jurisdictions must sample and test their storm water discharges to develop and implement a storm water management program.

### **Recommendations**

To expand this activity to a regional level, a cooperative agreement between the jurisdictions in the study area will be needed. Water quality monitoring and sampling within the study area would most likely occur on a contractual basis where one or more municipalities with sampling capability would sample and monitor at designated sites within the study area. Funding for this operation could also come from a regional funding mechanism such as a regional storm water management district.

## *INDUSTRIAL INSPECTIONS*

### **Need for Task**

There are a number of industrial facilities throughout the study area who have permits to discharge to area surface waters under Ohio EPA's Industrial NPDES permit program. These industries are required to develop and implement a storm water pollution prevention plan. Within the City of Toledo, industries are routinely inspected for adherence to their plan and general good housekeeping. These inspections are a requirement of Toledo's storm water permit. Outside the City of Toledo, there is little enforcement of industrial storm water requirements.

### **Goal**

The goal is to improve overall water quality by performing industrial inspections while encouraging good housekeeping and pollution prevention practices to prevent illicit discharges throughout the study area.

### **Available Options**

The City of Toledo Division of Environmental Services performs inspections on 92 significant industrial uses and inspects approximately one hundred minor facilities (potential dischargers) on an annual basis in the City of Toledo as part of the NPDES Pretreatment Program requirements. This program monitors the effectiveness of procedures used to treat industrial effluent before it leaves a facility.

As a requirement of its storm water permit, part of the inspection of significant industrial users is devoted to storm water discharges. Facilities storing 100 gallons or more of any one or more chemicals on site are required to have a written Spill Prevention Control Plan. The plan details how a company's housekeeping, raw materials and hazardous waste storage practices, and loading dock and storm sewer protection activities will prevent unwanted discharge of materials to the storm drainage system. An annual inspection of these facilities is performed to ensure compliance with these plans.

A similar "storm water" component could be added to the industrial pretreatment inspections now being conducted by the various wastewater treatment plants in the study area. The results of these inspections could be collected and sent to a regional storm water management district on an annual basis and included in the annual report to Ohio EPA.

Other facilities that are not considered Significant Industrial Users (SIUs) by definition but are potential SIU's could be inspected every three to five years by the City of Toledo's storm water program. Presently, the Division of Environmental Services is responsible for Air Permitting sources within all of Lucas County including the City of Rossford in Wood County.

Funding for the performance of the industrial inspections could be provided for by a newly formed regional storm water management district or through inter-jurisdictional agreements.

## **Recommendations**

Have the Pretreatment Program personnel in all the waste water treatment plants in the study area conduct annual storm water inspections of their plants. Institute inter-jurisdictional agreements to perform inspections in areas without pretreatment requirements but with potential Significant Industrial Users.

## **Required Ordinances for Enforcement**

The City of Toledo Division of Environmental Services has two ordinances for preserving water quality. Chapter 930, Sewer Use Ordinance prohibits illicit discharges to both the sanitary and storm water sewers and is a requirement of the Pretreatment Program. Chapter 941, also of the Toledo Municipal Code, Storm Water Discharge Control prohibits illicit discharge to the storm sewers of anything but storm water except discharges pursuant to an NPDES and fire fighting activity. The ordinance also controls runoff from construction sites and is a requirement of the storm water permit. Both ordinances spell out potential fines for a violation of the ordinance.

Enforcement on a regional basis could take place within the confines of the separate individual ordinance or requirements similar to those of Chapters 930 and 941 of the City of Toledo's municipal code could be written into the operating procedures of a regional storm water management district.

# PLANNING AND ADMINISTRATION

## *FEMA COMPLIANCE (FLOOD INSURANCE)*

### **Need for the Task**

The National Flood Insurance Program (NFIP) was established by Congress in 1968 to make low cost, subsidized flood insurance available to residents of flood-prone communities. In return for providing the insurance, the federal government requires participating communities to regulate new construction and substantial improvements in areas subject to flooding. The NFIP is administered by the Federal Emergency Management Agency (FEMA), and coordinated in the State of Ohio by the Ohio DNR, Division of Water.

The federal government has the responsibility to identify and map the flood hazard areas of all communities. The local communities then have the responsibility to regulate all development located within the identified flood hazard area (IFHA) in compliance with minimum flood damage reduction criteria if they wish to participate in the NFIP. The NFIP is administered in two phases: an Emergency Phase and a Regular Phase. A community's status as an Emergency or Regular Phase participant depends upon the type and detail of flood data provided by the federal government. Most communities are in the Regular Phase.

Non-participation in the NFIP would have several effects, including the following: flood insurance no longer would be available, no resident would be able to purchase a policy or renew an existing policy, no federal grants or loans for buildings could be made in identified flood hazard areas (IFHAs), insurance would be provided in IFHAs. In addition, the local governing body may be liable for the above loss of assistance or insurance because of non-participation in the program.

The above FEMA requirements are uniform for all participating communities. However, the regulations are just the minimum requirements and as such more stringent requirements or higher standards may be prudent. The regulations are mainly for prevention of flood risk for new developments and only identify existing structures as being in IFHAs. They do not correct or improve or eliminate the flood risk of existing structures.

If stricter regulations are considered, it would be advisable to make them uniform for communities which are part of the proposed storm water management district. Regulations and storm water management which are regional could affect land development and long term planning.

### **Goals**

The primary goal of the FEMA compliance activity is to maintain eligibility for the Federal flood insurance program by continuing to comply with FEMA regulations. In complying with these regulations, communities will also limit their exposure to flood damage by limiting development in

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### **Goals**

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flood plains. Regional storm water management provides opportunities for complying with the FEMA regulations in a more efficient and uniform manner. It also allows the region to look at stricter standards to further reduce its exposure to flood damage.

### **Available Options**

Options for addressing FEMA compliance range from the status quo, where all jurisdictions take care of their own compliance, to more regional approaches such as establishing regional standards or empowering a regional district to take over the compliance activities.

Regional standards would, of course, include the minimum Federal requirements but could also look at strengthening these requirements to further limit the regions exposure to flood damage and advance the regions other storm water management goals. Additional requirements and features which some communities have adopted include:

- requiring offsetting cut and fill in the floodplain so there is no net loss of floodplain volume,
- requiring buffer strips along stream and ditch corridors,
- considering the “buy-out” alternative to flood control projects whereby existing structures in the floodplain are acquired and demolished in lieu of constructing a flood protection project,
- requiring floodplain hydraulic and mapping studies for projects which will alter the 100-year flood levels.

This last point is important since FEMA is no longer updating its flood insurance rate maps (FIRM).

The “buy-out” option is receiving increasing support and is often by far the least cost alternative. Tulsa, Oklahoma bought and relocated or rebuilt on higher ground more than 900 buildings. This action virtually eliminated flooding damage for the area of concern while creating a wildlife habitat, parks and 50 miles of biking and jogging paths.

The need for addressing the NFIP on a regional basis could have flooding prevention advantages if it is found that pooling resources is economical and works with regional planning. Another consideration is that the federal government’s resources have been shrinking and are expected to continue this trend for the foreseeable future. Because of this trend there may be little choice but for local communities to become more involved. Because of dwindling budgets and other priorities this may only be possible if the communities band together through some type of coalition or management district and address flood control on a regional basis. Flood control management necessitates plan review and inspection of new development, consideration of impacts on 100-year flood levels, and development of projects to address existing flood hazard areas. These activities could be performed in a more cost-effective and technically effective manner by a regional authority.

An example of the need for more regional involvement is as basic as the Flood Insurance Rate Maps (FIRM) for the City of Toledo. These 18 year old maps define Toledo's IFHAs and are the first and only maps made. To date FEMA has no plans to update the maps and their policy makes it the responsibility of the property owner to revise the map if improvements are made which affect the flood area boundaries.

Obviously, these types of activities are something which only a community or regional group of communities would have the resources to accomplish. In addition, a regional management approach would have the probable advantage to better define flooding problems and solutions in a more efficient and timely manner.

### **Recommendation**

At a minimum, regional standards for flood control management and FEMA compliance should be developed. Flood control management would benefit from regional standards just like other aspects of storm water management. There would be less confusion among developers and the region as a whole would be better able to compete. The advantages of a regional authority to address FEMA compliance and other flood management issues are also readily apparent.

### **Required Ordinance/Enforcement**

In the absence of a regional authority, it is possible that all concerned communities could simply agree to follow the same regulations. The requirements for ordinances and enforcement for a regional program are not defined in detail, but should not be a hindrance. A regional management district through O.R.C. 6119 would have the power to adopt the necessary ordinances to further the cause of flood control management.

# *FLOOD CONTROL PLANNING AND PREPAREDNESS*

## **Need for Task**

Flood control planning and preparedness involves executing emergency response activities which occur during an actual flood event. Planning and implementing procedures to follow in the event of a flood can save lives and limit property damage. However, many people are often unprepared for floods and underestimate the flood potential in their area. Reducing the potential for flooding can also be addressed through storm water best management practices and improvements to the local and regional drainage systems.

## **Options**

### *Flood Preparedness*

In the study area, response to flooding situations is largely coordinated between the Coast Guard and the county local emergency planning committee (LEPCs). A flood gauge at Point Place in Toledo is monitored by the Coast Guard when weather conditions show a flood potential. In addition the City of Toledo has installed gauges on Swan Creek and the Ottawa River that automatically dial the city's fire department when the streams begin to reach flood level. (Currently these gauges are not in use. The city hopes to install additional gauges and start using them in the near future.) The Coast Guard, Toledo Police and Fire Departments, and the county LEPCs have a list of procedures they follow depending on the height of the flood gauges. These procedures range from installing flood gates to evacuating of flooded areas. Unfortunately, most residents and property owners do not have a similar list of procedures they can follow.

- The Maumee RAP Public Outreach and Education Action Group or a regional storm water management district could work with the Coast Guard and county LEPCs to develop educational material for residents in the study area informing them of the agency they can contact in the event of a flood and steps they can take to prepare themselves for a flood.
- The Federal Emergency Management Agency (FEMA) has developed a program known as "Project Impact" that provides information on how to develop a "disaster resistant community". This program outlines procedures that can be used to involve the community in disaster planning.

### *Flood Control*

Flooding potential can be reduced by examining the storm water drainage system to determine where the greatest flooding problems are and implementing improvements or best management practices to correct the problem (See storm water master planning). Most communities have a good idea of where the needed repairs in their drainage system are. However, there are a number of streams and drainage ways in the study area that flow through more than one community. These regional systems require maintenance their entire length for proper drainage. Intergovernmental agreements could be developed between the communities with these regional drainage systems to insure their regular

maintenance.

### **Recommendations**

At a minimum, more information should be provided to the general public about flood preparedness and procedures to follow in the event of a flood. A regional storm water master plan for the study area should be developed to determine which regional drainage systems would benefit most from improvements. A regional storm water management district could undertake the maintenance of these regional drainage systems or help develop intergovernmental agreements between communities sharing regional drainage systems to provide for their continued maintenance.

### **Required Ordinances/Enforcement**

None

# INVENTORY/MAP OF STORM WATER POLLUTANT SOURCES

## Need for Task

There are numerous sources of storm water pollution, from traditional point sources covered by NPDES permits, to non-point sources, to sources that have yet to be addressed. Before solutions to water quality impacts can be developed, the sources must be identified and presented in a complete, organized, and user friendly manner. By creating an inventory of pollutant sources, we can best determine the most effective and economic controls to improve our environment. Such an inventory would assist in land use planning, public education, water quality/quantity modeling, and economic development.

## Goal/Objectives

To establish and maintain a useful inventory of storm water pollution sources, several steps are needed. First, a list of desired information, including source names and outfall locations, must be determined. It will be necessary to develop a procedure to obtain this information. Then, a system must be acquired to store and arrange the data so that it is in an accessible and user friendly format. Lastly, the resources to continue verifying and updating the inventory must be established.

## Options

Currently under Phase I of the Storm Water Program, Ohio EPA requires point source discharges of storm water from three categories to obtain NPDES permits. The categories include 1) municipal separate storm sewers that service a population of 100,000 or more, 2) construction sites of 5 or more acres, and 3) certain industrial activities. Phase II Regulations, which are due to be issued by March 1, 1999, will include smaller municipalities/urbanized areas and construction sites between 1 and 5 acres. The majority of the permitted industrial sites and all of the permitted construction sites regulated under Phase I are typically issued general NPDES Storm Water permits. Ohio EPA Division of Surface Water maintains a list of the general NPDES permits on an electronic database. Also included in the file are discharges covered by the general NPDES Non-Contact Cooling Water and Petroleum Corrective Actions permits. These entities discharge either directly to a stream or to a storm water conveyance system.

Several industries have been identified as significant sources of pollution and have been required to obtain individual NPDES permits for their storm water discharges, while others have their storm water mixed with a process wastewater discharge (also under NPDES permit). These facilities are maintained on a separate Ohio EPA database. Both the general permit database and the individual permit database will be entered into Ohio EPA's SWIMS (Surface Water Information Management System) electronic data system in the future.

There are possible sources of pollution which may fall outside the scope of current Ohio EPA NPDES permitting requirements which should be evaluated. They can include facilities that use/store/generate hazardous wastes or commercial establishments that expose pollutants to storm water. Examples of commercial establishments include facilities like gas stations and grain

elevators. Ohio EPA Division of Hazardous Waste maintains an inventory of small and large quantity hazardous waste generators. The list contains a facility name, identification number, and location, but no information relevant to storm water discharges. For those generators that do not have an NPDES permit, information would need to be obtained by a different mechanism on the location of their out falls and the degree of risk they present to the watershed. While Hazardous Waste Treatment Storage and Disposal facilities have been included in the Ohio EPA's Geographic Information System, large and small quantity generators have not. Information on Ohio EPA's databases can be provided upon request.

To create an inventory of sources not included in an Ohio EPA database, there are two alternatives: a system of self registration or dedicating staff to canvass areas and conduct reconnaissance inspections. A method of self-registration would demand the least amount of "leg work". This could be required based upon a facility's activity descriptions, land use, or an investigation which identifies pollution sources. Some sources can be identified and added to the inventory through a water quality monitoring program and an illicit discharge program. For existing sources based upon activity or land use, notification for registration could be included in their utility bills. By passing an ordinance requiring registration, existing sources would be more inclined to respond to the notification. For future sources, registration may be done during the planning stage of development. If a registration requirement was tied into planning approval or building permits, a more accurate inventory may be compiled, as people are eager to obtain these approvals. For existing and new sources, an incentive program for self-registration could be offered. Possible incentives include one time tax or utility abatements or free advertising in the Maumee RAP or Regional Storm Water Program publications.

The storm water pollutant source inventory could be compiled in a spreadsheet or a database program. However, spreadsheets of data tend to be confusing and difficult to manipulate. A visual presentation of data is quicker and easier to comprehend. In order for the inventory to be viewed in a more user friendly manner, it should be compiled in a database format compatible with a geographic information system (GIS)

Even with self registration, funding is required for equipment, forms, and data entry, including information verification. A registration fee could be established to cover the data entry of sources into the inventory. Grant money may also be available for equipment or staff time, and funding from a storm water management district could be dedicated towards the upkeep of the inventory.

### **Recommendation**

A self registration program and related ordinances should be established to create an inventory of pollutant sources. The Storm Water Policy Board should place a request with Ohio EPA to add general NPDES permits to the Ohio EPA's GIS. To facilitate an areawide inventory, it will be necessary to have a central person to coordinate inventory updates from each public entity and disseminate the collective inventory back to each public entity. Opportunities for grant funding should be pursued along with establishing a fee structure to cover program costs.

### **Required Ordinances/Enforcement**

To implement a registration program, an ordinance may be passed that requires registration of certain business activities (sources) when making submittals for plan approval or obtaining building permits. The rule should make compliance a condition of any plan approval or permit issuance. The ordinance would need to contain a registration cutoff date for existing and new sources. An enforcement and penalty system may also need to be established, including monetary penalties and the ability to revoke permits due to noncompliance.

# *LAND USE PLANNING AND STORM WATER RUNOFF*

## **Need for Task**

Land use and storm water runoff are intricately related. Runoff volumes and peak flows are directly related to the degree of development within the watershed. This degree of development also greatly impacts the level of pollutants in the runoff. Land use planning should take into account storm water management issues. The storm water management costs of further development of upstream rural areas needs to be recognized. Sensitive areas such as wetlands, floodplains, and riparian buffer zones should be protected for the benefit of the watershed.

To properly plan for the future capacity of storm water drainage system within a watershed, an estimate of the amount future storm water runoff is required. (See storm water master planning). Typically as a watershed develops, storm water runoff increases as the amount of impervious surface area increases within a watershed. Not all development has the same level of imperviousness: residential development will have less than a commercial or industrial development while park land will have less than residential development. Land use plans showing the type and location of future land use can be very useful in determining the future capacity needs of the region's drainage system future storm water capacity.

Land use planning in the state of Ohio is the purview of each local jurisdiction. Regional and County plan commissions can develop county wide land use plans, but they are advisory in nature and cannot supersede local land use plans. In 1995, TMACOG undertook an exercise to estimate the future land use for its region (Lucas, Wood, Sandusky, Ottawa, Erie, and Seneca Counties). This exercise asked local officials to provide their "best guess" of future land use through the year 2025. This plan was adopted by the TMACOG Board of Trustees in 1995. This exercise, however, did not provide a greater level of information as to specific land uses. Rather it estimates where future "growth" is likely to occur.

## **Goal**

To incorporate storm water management issues into the land use planning process and gain an accurate assessment of future land use in the region through a composite of individual future land use maps.

## **Available Options**

### *Status Quo*

Lucas and Wood counties are in the process of completing future land use maps. Several communities in Lucas County have completed land use plans in the last five years or are in the process of completing one. These plans provide policies for future land use within each county. In 1999, the Ottawa County Plan Commission staff will begin updating the land use plans of the townships.

The future land use information contained in these plans will be very useful in designing the future capacity of the drainage system within and immediately adjacent to these individual communities.

Several other communities however have not updated their land use plans in many years. The land use planning process can be lengthy and expensive but worth the time and effort. In addition to its many other benefits, land use planning can play a significant role in reducing flood risk and improving water quality within a community. By identifying and mapping natural and sensitive areas such as parks, wetlands, or areas with steep slopes, these areas can be preserved for their water quality benefits.

### *Composite of Regional Land Use*

To make the best use of the available land use (current and future), a mapping system such as a geographic information systems (GIS) should be developed to incorporate existing future land use maps from all of the communities in the study area and any that will be developed in the future. This information could then be used in a storm water master planning process to assess future needs of the drainage system at the watershed level.

TMACOG's Growth Strategies Department will likely be undertaking this exercise in the coming year. Work of this nature could possibly be funded through grants, or through a regional storm water management district.

### **Participate in the Land Use Planning Process**

Storm water management issues should be brought into the land use planning process through the local and county plan commission level. A regional storm water management district or regional consortium should represent itself during the development of local and county comprehensive and land use plans to advocate the protection of wetlands, flood plains and sensitive riparian corridors and insure that the storm water impacts of development are considered.

### **Recommendation**

Every community within the study area should be encouraged to update its land use plan on a regular basis (every five to ten years). The Storm Water Policy Board should work closely with the local and county plan commissions to develop land use plans and zoning ordinances that protect sensitive natural features from development activity. The SWPB should also work the county plan commissions and TMACOG's Growth Strategies Department in the development of county and multi-county composites of local land use plans to obtain the information needed to perform a storm water master planning process.

No enforcement required.

## *STORM WATER MANAGEMENT OUTREACH ACTIVITIES*

### **Need for Task**

For proper storm water management techniques to be implemented in the study area, people need to know about them. The general public and the business community need to understand the importance of good storm water management and how it can benefit them. This won't happen however, if there isn't a significant outreach program about the subject.

### **Goal**

To provide the public, school systems and the business community with accurate, reliable, and implementable information about storm water management techniques. To provide the same with information about the efforts of the Maumee River RAP and other water quality initiative in the region.

### **Options**

Initiate a lake-friendly business certification program that allows local businesses to implement storm water control techniques on a voluntary basis and receive public recognitions for their efforts. The Maumee RAP could work with local businesses and institutions to examine and implement techniques such as: natural plantings that require less water and fertilizer, check valves in parking lot catch basins, regular parking lot cleaning schedule, alternative ice control method (no salt), tree plantings, and so forth.

The Maumee RAP should also promote storm water management through speaking opportunities to existing community groups. The Maumee RAP has conducted and should continue to conduct workshops and informational meetings for public officials, municipal administrators, developers, etc. on proper management practices for storm water from urban and developing areas.

### ***Public Education:***

County Soil and Water Conservation Districts (SWCDs) already utilize the EnviroScape watershed model and other techniques to educate the public about erosion, lawn care, storm drain dumping, construction site erosion, and the value of trees. Other activities include information about:

- The storm drain stenciling program to remind citizens that storm drains outlet directly to the nearest water body
- Keep Toledo/Lucas County Beautiful litter control program - RAP should work with this program and encourage the development of similar efforts in adjacent counties.
- Household hazardous waste: RAP should develop a complete outreach campaign (campaign could include colorful booklets targeting children and parents with activities and information, new homeowners manual, PSA's on radio and TV, displays at local events, etc.) to educate the public about the proper use, identification, and disposal of these items. Alternative and less toxic substitutes should be suggested. Regular collection and disposal should be

instituted in the area.

- RAP should work with county extension offices to develop education material on the proper application of lawn chemicals.
- Erosion: RAP, working with Soil and Water Conservation Districts, should target contractors and encourage them to implement the erosion control practices that are necessary. The public should also be educated about ways to control erosion on their property.
- Land use - decision makers need to know and act on the fact that upstream development creates higher flow and contamination rates downstream, contractors and homeowners should learn about runoff reducing techniques such as use of pavers or gravel for driveways and walks instead of impervious surfaces.
- RAP and SWCD's should work with local enforcement agencies to provide education to developers about the need to implement soil erosion and sedimentation control measures.

Civic and academic groups should be encouraged to apply storm water management practices to their own property and businesses. Demonstration sites using sound storm water management practices should be developed and promoted using tours of the facilities. These demonstration projects could also document the costs and costs savings of storm water management. They can also become involved in RAP volunteer activities like storm drain stenciling, working on a RAP committee, etc.

**TABLE 1**  
**REGIONAL DRAINAGE SYSTEMS**

Drainage System	Political Subdivisions
Halfway Creek	Bedford Twp., Erie Twp., Toledo
Silver Creek	Bedford Twp., Erie Twp., Toledo
Eisenbraum Ditch	Sylvania Twp., Toledo
Shantee Creek	Sylvania Twp., Toledo, Washington Twp.
Peterson Ditch	Sylvania Twp., Toledo
Bowen Ditch	Ottawa Hills, Toledo
Ottawa River	Richfield Twp., Berkey, Sylvania Twp., Sylvania, Whiteford Twp., Springfield Twp., Ottawa Hills, Toledo, Harding Twp., Spencer Twp.
Zinc Ditch	Sylvania Twp., Springfield Twp.
Heldman Ditch	Sylvania Twp., Springfield Twp., Toledo
Haefner Ditch	Springfield Twp., Toledo
Hill Ditch	Sylvania Twp., Toledo
Tenmile Creek	Richfield Twp., Berkey, Sylvania Twp., Sylvania, Whiteford Twp., Harding Twp., Spencer Twp.
N. Br. Tenmile Creek	Whiteford Twp., Sylvania
Schmitz Ditch	Richfield Twp., Berkey
Langenderfer Ditch	Richfield Twp., Spencer Twp.
Schreiber Ditch	Whiteford Twp., Sylvania Twp., Sylvania
Smith Ditch	Richfield Twp., Sylvania Twp.
Swan Creek	Swanton, Swanton Twp., Providence Twp., Waterville Twp., Whitehouse, Waterville, Monclova Twp., Harding Twp., Spencer Twp., Springfield Twp., Holland, Maumee, Toledo
Drennan Ditch	Harding Twp., Spencer Twp., Springfield Twp., Holland
Good Ditch	Springfield Twp., Toledo
Butler Ditch	Spencer Twp., Springfield Twp.
Wolf Creek	Springfield Twp., Spencer Twp., Holland, Toledo
Zaleski Ditch	Monclova Twp., Springfield Twp.
Stone Ditch	Monclova Twp., Springfield Twp.
Cairl Creek	Monclova Twp., Springfield Twp.
Prairie Ditch	Harding Twp., Spencer Twp., Richfield Twp.
Wire Grass Ditch	Harding Twp., Spencer Twp., Richfield Twp., Swanton Twp.
Graham Ditch	Maumee, Toledo
Heilman Ditch	Maumee, Toledo
Blystone Ditch	Waterville, Waterville Twp., Monclova Twp.
Farnsworth Ditch	Waterville, Waterville Twp.
Blue Creek	Providence Twp., Waterville Twp., Whitehouse
Harris Ditch	Providence Twp., Waterville Twp.

Drainage System	Political Subdivisions
Otter Creek	Northwood, Oregon, Toledo
Wolf Ditch	Oregon, Northwood
Grassy Creek	Perrysburg, Perrysburg Twp., Rossford
Dry Creek	Perrysburg Twp., Lake Twp., Walbridge, Allen Twp.
Cedar Creek	Perrysburg Twp., Lake Twp., Walbridge, Allen Twp., Jerusalem Twp.
N. Br. Cedar Creek	Perrysburg Twp., Lake Twp.
Reno Sidecut Ditch	Perrysburg Twp., Lake Twp., Walbridge, Allen Twp., Jerusalem Twp.
Wards Canal	Perrysburg Twp., Lake Twp., Walbridge, Allen Twp., Jerusalem Twp.
Henry Creek	Perrysburg Twp., Lake Twp., Millbury
Crane Creek	Perrysburg Twp., Troy Twp., Lake Twp., Millbury, Allen Twp., Jerusalem Twp., Benton Twp.
Ayers Creek	Lake Twp., Allen Twp.
Packer Creek	Webster Twp., Perrysburg Twp., Troy Twp., Clay Twp., Genoa, Benton Twp., Carroll Twp.
Toussaint Creek	Bowling Green, Middleton Twp., Plain Twp., Center Twp., Webster Twp., Troy Twp., Luckey, Clay Twp., Benton Twp., Rocky Ridge, Carroll Twp.







# *EVALUATION AND ASSESSMENT OF STORM WATER PROGRAM*

## **Need for Task**

A great deal of effort has already gone into the study of a regional storm water management system. Significant additional efforts will be required to bring this concept into fruition. Mechanisms should be put in place to evaluate and assess the evolving regional storm water management program to justify continued outlays of time and effort. Tracking and documenting progress in storm water management will also be a requirement of future NPDES Phase II storm water permits.

The benefits of regional storm water management are at the same time obvious and elusive. Following is an attempt to develop measurable standards which can be used to document and quantify these benefits.

## **Goals**

Evaluating the success of a regional storm water management program will be a matter of comparing accomplishments with established goals and objectives. Therefore, it is first necessary to establish measurable goals and objectives for the program. A proposed list of goals and objectives follows. It will be up to the policy board or governing body of a future district to establish a final list.

### *Goals*

1. Reduce flooding
2. Reduce pollution associated with storm water runoff
3. Improve maintenance of storm water infrastructure region-wide
4. Establish consistent storm water rules and regulations region-wide
5. Upgrade storm water infrastructure region-wide
6. Provide a funding mechanism which is equitable, affordable, reliable and implementable for region-wide activities

Objectives to attain the above goals are listed below. Possible mechanisms for measuring each objective are listed in parentheses.

### *Objectives*

- 1.a. Increase the miles of ditches under maintenance (track)
- 1.b. Implement log jam removal projects (track no. of projects)
- 2.a. Produce a regional storm water master plan
- 2.b. Implement regional storm water detention projects based on information from a storm water master plan (track no. and cost of projects)

- 2.c. Implement inter-jurisdictional storm water conveyance projects as identified in a storm water master plan (track no. and cost of projects)
- 3.a. Improve storm water runoff quality (Toledo sampling data)
- 3.b. Reduce stream bank erosion (note active erosion sites and track their progress, track erosion control projects)
- 3.c. Improve public awareness of storm water pollution (document educational efforts; survey)
- 3.d. Implement illicit discharge hotline region-wide (yes/no)
- 3.e. Provide for industrial inspections region-wide (no. of inspections/year)
- 3.f. Implement structural best management practices project (track no. and cost of projects)
- 3.g. Preserve wetlands and floodplains (wetlands/floodplain land use database)
- 4.a. Reduce street and basement flooding due to storm conveyance backup (track)
- 4.b. Reduce storm water inflow and infiltration to sanitary sewers (representative treatment plant records)
- 4.c. Reduce peak flows in major streams (evaluate stream gage data versus storm events)
- 5.a. Implement consistent regional storm water requirements (track adoption of regional standards)
- 5.b. Provide mechanisms to enforce consistent regional storm water requirements (evaluate enforcement/plan review/inspection programs)
- 6.a. Provide mechanisms for regional funding such as regional water and sewer district, consortium with dues, cooperation on inter-jurisdictional projects, developer impact fees, etc. (track)

### **Available Options**

Tracking the above objectives will require an authority who can get a picture of the entire region and put forward the time and effort to produce a progress report. This would be difficult to do if storm water management is left entirely to individual jurisdictions. Who would be responsible and how would the work be funded? If some type of inter-jurisdictional agreement or consortium is established, this work could be coordinated by an organization such as TMACOG, but would still require a commitment of resources. If a regional management district or utility is established, this work could be budgeted for and performed by the district.

### **Recommendation**

A regional management district or utility would be in the best position to evaluate progress on program objectives and produce an annual report.

### **Required Ordinance/Enforcement**

None.

# FISCAL ANALYSIS

Most storm water utilities are funded through a user charge system that determines an assessment per parcel based on the amount of storm water it generates. The “rate” derived from this process is also gauged against the financial need of the community to repair and maintain its storm water system. While the Needs Assessment surveys provided this study with financial information about the storm water needs of individual communities, the cost of addressing regional storm water management problems is still largely unknown. (Regional problems are those that involve a drainage systems that follows a path through more than one community.)

A regional storm water management program will need to fund a variety of efforts: development of regional storm water management standards, regional storm water master plan, and improvements to the regional drainage system. The cost of many of these tasks have yet to be identified. The fiscal analysis used here tries to identify potential revenue that could be generated from a regional user charge system. It does not establish a rate based on an identified cost, but rather it estimates potential revenue based on hypothetical rates. **THIS ANALYSIS IS A ROUGH ESTIMATE** and should be used as framework to compare the cost of regional activities when they are determined.

Costs for improvements to the regional drainage system could be estimated through discussions with county engineers in the region to determine which portions of the identified drainage system are in need of improvement. Once the number of miles of needed improvements are determined, the cost of capital improvement per mile identified in the storm water master planning section of this report can be used to estimate the total regional cost of improvements.

At the time of this report, the Storm Water Policy Board has recommended a regional storm water management district as the alternative it will explore for a program to address regional storm water management. If this district comes to fruition, the user charge system would be the most equitable method of funding its operation. The design of the billing system necessary to implement a user charge system is more complicated than the fiscal analysis presented here, and therefore is beyond the scope of this report. The plan of operation necessary to implement the regional storm water management district will need to address the design of the system.

## **Method for Determining Potential Revenue from Storm Water User Charges**

The method used to determine the potential revenue from a storm water user charge is called the “equivalent residential unit” method. The calculations used to determine an equitable charge for users of a storm water system are based on the amount of storm water runoff produced by their parcel of land. The more intensely a parcel is developed, the more runoff it will produce. For example, a commercial property will produce more runoff than a residential property. In general, commercial and industrial parcels are thought to have about twice as much impervious surface area per acre as residential and agricultural parcels do. This assumption has been used in the following calculations.

An equivalent residential unit (ERU) is defined as the average impervious area of a detached single

family property. The ERU method compares the average amount of impervious surface in residential parcels to that of all other land use types (for the purposes of this study, agricultural parcels are considered as one ERU). Because residential units are the majority of parcels in most communities, they are used as the “base rate” for all the parcels within a jurisdiction. Residential users will pay a flat rate whereas nonresidential users will pay the flat rate time the number of equivalent residential units in their parcel. The calculations shown for the regional study area are a summation of all of the communities within the study area. Similar analysis have been performed for all of the jurisdictions in the study area.

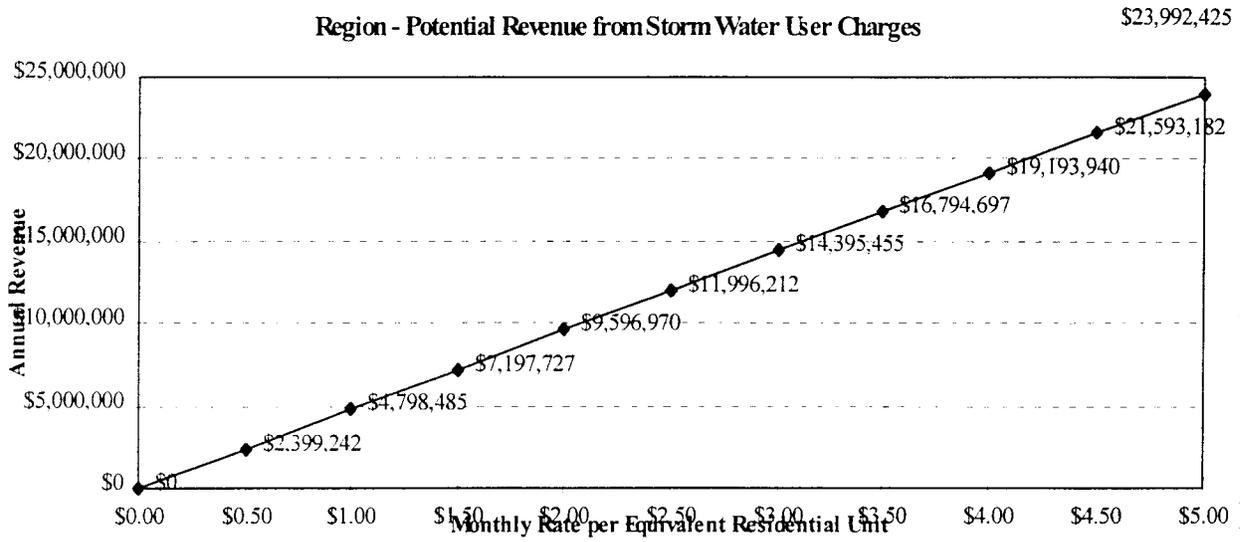
### *EXAMPLE*

#### **Equivalent Residential Unit (ERU) Method to Determine Industrial ERUs in a Community**

1. Determine the average impervious level for all industrial parcels in the region
  - $(\text{Total industrial acres in region}) * (\text{Impervious factor}) / (\text{Total industrial parcels in the region}) = \text{Impervious acres per parcel in the region}$
2. Divide industrial impervious acres per parcel by the residential impervious acres per parcel for the region
  - This will give you the ERUs per industrial parcel in the region
3. Multiply this ratio by the number of parcels in the land use type (industrial)
  - This will give you the total number of industrial ERUs in your community

#### **Calculation of Annual Revenue**

1. Add the ERUs for each land use type together to determine the number of ERUs for all land uses.
2. The total number of ERUs multiplied by a monthly rate will determine a monthly revenue.
  - Multiplied by 12 will determine the annual revenue.



## *REGIONAL STORM WATER STUDY AREA*

Land Use	Parcels	Acres	Impervious Factor	Impervious Acres/Parcel	ERU/Parcel	Total ERUs
Agricultural	6,009	192,760.20	0.05	1.60	1.00	6,009.00
Residential	199,314	79,571.61	0.30	0.12	1.00	199,314.00
Industrial	2,963	16,759.52	0.60	3.39	28.34	83,959.77
Commercial	18,788	22,075.47	0.60	0.70	5.89	110,590.98
<b>Total</b>	<b>227,074</b>	<b>311,166.81</b>				<b>399,873.74</b>

# Equivalent Residential Unit Calculations

Jurisdiction	Agricultural Parcels	Acres	Impervious Factor	Impervious acreage <sup>1</sup>	ERT <sup>2</sup> /parcel	Total Agricultural ERUs	Residential Parcels	Acres	Impervious Factor	Impervious acreage <sup>1</sup>	ERT <sup>2</sup> /parcel	Total Residential ERUs	Industrial	Acres	Impervious Factor	Impervious acreage <sup>1</sup>
Harding Township	151	2,017.30	0.05	1.05	1.00	151	291	864.11	0.30	0.12	1.00	291	0	0	0.00	3.39
Jenaville Township	289	10,560.00	0.05	1.65	1.00	289	3,554	2,737.9	0.30	0.12	1.00	3,554	1	1.52	0.60	3.39
Monrovia Township	245	7,208.50	0.05	1.65	1.00	245	2,311	4,179.40	0.30	0.12	1.00	2,311	11	212.49	0.60	3.39
Providence Township	359	12,142.00	0.05	1.65	1.00	359	1,240	3,559.6	0.30	0.12	1.00	1,240	3	26.13	0.60	3.39
Ridgfield Township	241	3,912.20	0.05	1.65	1.00	241	461	1,220.31	0.30	0.12	1.00	461	0	0	0.60	3.39
Spencer Township	167	4,027.80	0.05	1.65	1.00	167	818	2,595.5	0.30	0.12	1.00	818	8	73.86	0.60	3.39
Springfield Township	172	3,112.60	0.05	1.65	1.00	172	7,664	6,270.70	0.30	0.12	1.00	7,664	14	56.09	0.60	3.39
Swanton Township	162	2,249.50	0.05	1.65	1.00	162	1,032	1,448.80	0.30	0.12	1.00	1,032	14	56.09	0.60	3.39
Sylvania Township	114	3,281.90	0.05	1.65	1.00	114	10,606	5,943.40	0.30	0.12	1.00	10,606	79	1,112.00	0.60	3.39
Waterville Township	219	7,855.20	0.05	1.65	1.00	219	681	667.37	0.30	0.12	1.00	681	5	49.85	0.60	3.39
Werkley Village	56	17.00	0.05	1.65	1.00	56	143	317.86	0.30	0.12	1.00	143	1	4.80	0.60	3.39
Holland View Village	0	0.00	0.05	1.65	1.00	0	162	11.02	0.30	0.12	1.00	162	0	0.00	0.60	3.39
Holland Village	4	88.81	0.05	1.65	1.00	4	408	116.06	0.30	0.12	1.00	408	19	46.63	0.60	3.39
Ontario Hills Village	0	0.00	0.05	1.65	1.00	0	1,771	781.76	0.30	0.12	1.00	1,771	0	0.00	0.60	3.39
Swanton Village (Lucas Co.)	3	115.87	0.05	1.65	1.00	3	14	13.91	0.30	0.12	1.00	14	0	0.00	0.60	3.39
Waterville Village	11	609.37	0.05	1.65	1.00	11	1,600	667.38	0.30	0.12	1.00	1,600	33	204.65	0.60	3.39
Whitehouse Village	26	827.34	0.05	1.65	1.00	26	955	546.55	0.30	0.12	1.00	955	15	82.43	0.60	3.39
Maumee City	21	675.39	0.05	1.65	1.00	21	5,866	1,410.50	0.30	0.12	1.00	5,866	69	566.98	0.60	3.39
Oregon City	317	7,280.60	0.05	1.65	1.00	317	8,263	4,264.20	0.30	0.12	1.00	8,263	56	1,673.60	0.60	3.39
Sylvania City	2	41.43	0.05	1.65	1.00	2	6,166	1,290.47	0.30	0.12	1.00	6,166	27	0.43	0.60	3.39
Toledo City	46	860.80	0.05	1.65	1.00	46	109,284	17,749.06	0.30	0.12	1.00	109,284	1,205	4,415.40	0.60	3.39
<b>Lucas County Total<sup>1,2</sup></b>	<b>2,599</b>	<b>69,772.04</b>	<b>0.05</b>	<b>1.65</b>	<b>1.00</b>	<b>2,599</b>	<b>162,789</b>	<b>57,135.60</b>	<b>0.30</b>	<b>0.12</b>	<b>1.00</b>	<b>162,789</b>	<b>2,281</b>	<b>8,744.14</b>	<b>0.60</b>	<b>3.39</b>
Center Township	372	14,307.68	0.05	1.65	1.00	372	471	1,537.27	0.30	0.12	1.00	471	2	14.00	0.60	3.39
Lake Township	402	13,034.55	0.05	1.65	1.00	402	2,642	3,118.94	0.30	0.12	1.00	2,642	61	609.50	0.60	3.39
Middleton Township	459	16,430.21	0.05	1.65	1.00	459	998	2,151.98	0.30	0.12	1.00	998	24	177.15	0.60	3.39
York Township	482	15,182.01	0.05	1.65	1.00	482	4,805	4,199.68	0.30	0.12	1.00	4,805	219	1,994.09	0.60	3.39
Ivy Township	880	15,063.48	0.05	1.65	1.00	880	1,025	2,457.84	0.30	0.12	1.00	1,025	10	52.93	0.60	3.39
Wadon Township	988	17,151.36	0.05	1.65	1.00	988	579	1,115.94	0.30	0.12	1.00	579	4	0.00	0.60	3.39
Herkens Village	22	785.78	0.05	1.65	1.00	22	538	88.65	0.30	0.12	1.00	538	4	65.57	0.60	3.39
Lucky Village	4	7.16	0.05	1.65	1.00	4	602	106.96	0.30	0.12	1.00	602	0	0.00	0.60	3.39
Millery Village	2	190.62	0.05	1.65	1.00	2	1,213	145.64	0.30	0.12	1.00	1,213	4	14.45	0.60	3.39
Walbridge Village	7	154.83	0.05	1.65	1.00	7	6,091	455.27	0.30	0.12	1.00	6,091	136	341.40	0.60	3.39
Bowling Green	28	647.18	0.05	1.65	1.00	28	3,001	906.21	0.30	0.12	1.00	3,001	98	1,162.60	0.60	3.39
Northwood	45	1,472.50	0.05	1.65	1.00	45	5,971	650.175	0.30	0.12	1.00	5,971	27	51.54	0.60	3.39
Perryburg	64	1,008.84	0.05	1.65	1.00	64	2,927	380.85	0.30	0.12	1.00	2,927	25	227.59	0.60	3.39
Rossford	29	685.22	0.05	1.65	1.00	29	31,063	17,929.06	0.30	0.12	1.00	31,063	650	4,710.82	0.60	3.39
<b>Wood County Total<sup>1</sup></b>	<b>2,707</b>	<b>96,121.22</b>	<b>0.05</b>	<b>1.65</b>	<b>1.00</b>	<b>2,707</b>	<b>17,929.06</b>	<b>17,929.06</b>	<b>0.30</b>	<b>0.12</b>	<b>1.00</b>	<b>17,929.06</b>	<b>650</b>	<b>4,710.82</b>	<b>0.60</b>	<b>3.39</b>
Allen Township	143	4,461.55	0.05	1.65	1.00	143	935	1,190.45	0.30	0.12	1.00	935	4	73.54	0.60	3.39
Benton Township	237	2,685.54	0.05	1.65	1.00	237	617	1,254.76	0.30	0.12	1.00	617	2	72.31	0.60	3.39
Carroll Township	205	7,966.17	0.05	1.65	1.00	205	966	921.24	0.30	0.12	1.00	966	2	2,378.08	0.60	3.39
Clay Township	164	4,410.55	0.05	1.65	1.00	164	896	648.84	0.30	0.12	1.00	896	1	400.03	0.60	3.39
Clay Center Village	2	49.67	0.05	1.65	1.00	2	111	16.82	0.30	0.12	1.00	111	2	345.13	0.60	3.39
Genoa Village	1	19.42	0.05	1.65	1.00	1	736	27.83	0.30	0.12	1.00	736	5	9.28	0.60	3.39
Rocky Ridge Village	6	165.32	0.05	1.65	1.00	6	119	65.49	0.30	0.12	1.00	119	0	0.00	0.60	3.39
<b>Ohio County Total<sup>1,2</sup></b>	<b>698</b>	<b>26,749</b>	<b>0.05</b>	<b>1.65</b>	<b>1.00</b>	<b>698</b>	<b>4,400</b>	<b>4,115</b>	<b>0.30</b>	<b>0.12</b>	<b>1.00</b>	<b>4,400</b>	<b>16</b>	<b>5.278</b>	<b>0.60</b>	<b>3.39</b>
Swanton Village (Polk Co.)	5	317.72	0.05	1.65	1.00	5	1,062	491.53	0.30	0.12	1.00	1,062	16	26.19	0.60	3.39
<b>Pulaski County Total<sup>1,2</sup></b>	<b>5</b>	<b>317.72</b>	<b>0.05</b>	<b>1.65</b>	<b>1.00</b>	<b>5</b>	<b>1,062</b>	<b>491.53</b>	<b>0.30</b>	<b>0.12</b>	<b>1.00</b>	<b>1,062</b>	<b>16</b>	<b>26.19</b>	<b>0.60</b>	<b>3.39</b>
Bedford Township <sup>3</sup>	31	2,545.00	0.05	1.65	1.00	31	6,814	4216.8	0.30	0.12	1.00	6,814	29	66,255	0.60	3.39
Eric Township <sup>3</sup>	49	2,105.08	0.05	1.65	1.00	49	353	282.3	0.30	0.12	1.00	353	9	4.22	0.60	3.39
Wintford Township <sup>3</sup>	341	14,394.85	0.05	1.65	1.00	341	1,184	1,781.25	0.30	0.12	1.00	1,184	21	248.175	0.60	3.39
<b>Monroe County Total</b>	<b>411</b>	<b>19,045</b>	<b>0.05</b>	<b>1.65</b>	<b>1.00</b>	<b>411</b>	<b>8,351</b>	<b>6,280</b>	<b>0.30</b>	<b>0.12</b>	<b>1.00</b>	<b>8,351</b>	<b>59</b>	<b>319</b>	<b>0.60</b>	<b>3.39</b>
<b>REGIONAL TOTAL</b>	<b>6,420</b>	<b>211,805.11</b>	<b>0.05</b>	<b>1.65</b>	<b>1.00</b>	<b>6,420</b>	<b>207,665</b>	<b>85,851.96</b>	<b>0.30</b>	<b>0.12</b>	<b>1.00</b>	<b>207,665</b>	<b>3,022</b>	<b>17,078.17</b>	<b>0.60</b>	<b>3.39</b>

<sup>1</sup> Total excludes vacant parcels, individual jurisdictions are total parcel counts  
<sup>2</sup> Source: County auditor's office  
<sup>3</sup> Improved parcels  
<sup>4</sup> Based on 1998 parcel information and 1995 MRIS land use estimates for the areas estimated to be within the study area

# Equivalent Residential Unit Calculations

ERU/parcel	Total Industrial ERUs	Commercial	Acres	Impervious Factor	Impervious acre/parcel *	ERUs/parcel	Total Commercial ERUs	Total Parcels	Total Acres	Total ERUs
27.34	0.00	7	61.93	0.60	0.71	5.69	39.84	419	5,943.35	482
27.34	27.34	684	518.75	0.60	0.71	5.69	3,892.63	4,258	13,818.17	7,763
27.34	300.72	102	729.81	0.60	0.71	5.69	880.48	2,669	12,330.20	4,437
27.34	87.02	61	197.47	0.60	0.71	5.69	347.15	1,653	15,252.50	2,018
27.34	0.00	15	284.31	0.60	0.71	5.69	85.16	717	5,416.81	787
27.34	218.71	52	178.16	0.60	0.71	5.69	295.94	1,065	6,974.82	1,520
27.34	956.85	526	1,745.40	0.60	0.71	5.69	3,199.45	8,397	11,345.98	11,786
27.34	382.74	101	576.51	0.60	0.71	5.69	574.79	1,309	4,626.90	2,152
27.34	21,597.4	820	1,681.50	0.60	0.71	5.69	4,606.60	11,619	11,998.60	17,546
27.34	136.69	28	149.23	0.60	0.71	5.69	159.35	933	8,721.65	1,196
27.34	27.34	18	72.58	0.60	0.71	5.69	102.44	218	412.24	329
27.34	0.00	0	0.00	0.60	0.71	5.69	0.00	162	11.02	162
27.34	519.43	125	1,151.54	0.60	0.71	5.69	616	3,660.04	1,203	7,703
27.34	0.00	43	13.80	0.60	0.71	5.69	244.71	1,814	795.56	2,016
27.34	992.17	13	12.42	0.60	0.71	5.69	73.98	30	141.70	91
27.34	410.08	104	96.10	0.60	0.71	5.69	779.66	1,781	1,764.02	3,293
27.34	1,886.16	752	1,275.90	0.60	0.71	5.69	4,279.62	11,000	13,554.42	12,983
27.34	1,500.96	711	1,488.90	0.60	0.71	5.69	4,516.29	9,347	14,717.50	14,157
27.34	738.14	470	525.75	0.60	0.71	5.69	2,671.76	6,665	2,338.08	9,381
27.34	55,079.88	13,639	9,344.90	0.60	0.71	5.69	27,619.26	125,574	32,370.10	239,729
27.34	62,359.16	14,747	15,454.38	0.60	0.71	5.69	83,924.87	182,416	151,106	435,784
27.34	54.68	48	245.81	0.60	0.71	5.69	273.17	187,354	155,530	343,784
27.34	1,667.65	120	1,142.31	0.60	0.71	5.69	1,821.11	3,425	16,104.76	11,711
27.34	765.48	40	231.12	0.60	0.71	5.69	227.64	1,525	19,292.86	2,430
27.34	6,807.29	428	1,289.23	0.60	0.71	5.69	2,455.74	5,962	22,665.01	14,528
27.34	273.39	109	352.07	0.60	0.71	5.69	620.32	1,524	1,926.32	2,399
27.34	0.00	7	5.04	0.60	0.71	5.69	39.84	774	18,272.34	807
27.34	109.35	23	1.41	0.60	0.71	5.69	130.89	377	853.84	590
27.34	164.03	74	14.78	0.60	0.71	5.69	421.13	696	218.76	1,201
27.34	0.00	20	1.56	0.60	0.71	5.69	113.82	647	299.14	741
27.34	109.35	70	15.26	0.60	0.71	5.69	398.37	1,294	330.18	1,728
27.34	3,718.04	1,385	1,209.71	0.60	0.71	5.69	3,882.01	7,640	2,653.56	17,719
27.34	2,679.17	394	527.34	0.60	0.71	5.69	2,242.25	3,538	4,068.65	2,967
27.34	738.14	572	362.83	0.60	0.71	5.69	1,255.24	6,634	2,073.39	10,028
27.34	683.46	223	130.49	0.60	0.71	5.69	1,269.09	3,204	1,424.15	4,909
27.34	17,770.04	3,713	5,528.97	0.6	0.71	5.69	21,110.60	38,133	124,290.06	72,671
27.34	109.35	34	233.81	0.60	0.71	5.69	194.49	1,116	5,959.35	1,381
27.34	54.68	12	76.25	0.60	0.71	5.69	68.29	868	11,088.86	977
27.34	54.68	39	520.41	0.60	0.71	5.69	221.95	1,212	11,785.90	1,148
27.34	27.14	37	112.08	0.60	0.71	5.69	210.57	1,038	5,561.50	1,218
27.34	54.68	4	1.82	0.60	0.71	5.69	22.76	119	414.44	190
27.34	136.69	83	63.24	0.60	0.71	5.69	472.15	825	112.77	1,316
27.34	0.00	3	10.21	0.60	0.71	5.69	17.07	148	241.02	162
27.34	437.42	212	1,019.82	0.60	0.71	5.69	1,206.49	5,326	35,162.84	6,742
27.34	437.42	116	72.31	0.60	0.71	5.69	600.15	1,199	607.75	2,165
27.34	784.02	248	327.53	0.60	0.71	5.69	1,410.22	7,122	7,155.59	9,040
27.34	256.98	22	29.44	0.60	0.71	5.69	127.48	414	2,421.04	787
27.34	574.11	69	68.25	0.60	0.71	5.69	392.68	1,604	16,492.50	2,481
27.34	1,615.71	339	425	0.60	0.71	5.69	1,950.38	9,160	26,069.13	12,468
27.34	82,619.73	19,127	22,500.69	0.6	0.71	5.69	108,832.49	236,214	337,236	405,557

# RECOMMENDATIONS FOR REGIONAL STORM WATER MANAGEMENT

## Steering Committee Recommendations

Through this study the Urban Runoff Action Group evaluated several of the options in the preceding chapters and presented this information to the Storm Water Policy Board for their recommendation. After some consideration of these options, the Steering Committee of the Policy Board recommended four alternatives for the Policy Board to consider. See table "Regional Stormwater Management Options" on page 113. These were ranked in order of preference by the Steering Committee. After some consideration, the Policy Board recommended the exploration of a storm water management district, organized under Chapter 6119 of the O.R.C. with operating duties similar to that of the Lake County, Illinois Storm Water Management Commission as the storm water management program for the region. The Policy Board will make its decisions on whether to pursue this option once more details on the operation and funding of the potential district are developed.

## Regional Storm Water Management District

For the storm water management district to operate as a Regional Water and Sewer District, it will need a plan or operation detailing its operating procedures, duties, functions, and funding mechanism(s).

The process to establish the district involves:

1. Filing a petition with the Court of Common Pleas in one of the counties of the proposed district. The petition must also include a statement of necessity and purpose for the proposed district, a determination of how the board of trustees will be selected, and a method of financing the cost of operation until a revenue mechanism for the district is established. The petition must be signed by those communities wishing to be a part of it.
2. After the petition is filed, a judge from the county which the petition is filed will notify the Court of Common Pleas of each county in the proposed district.
3. After all of the courts concur on the necessity of the district and all objections have been addressed, the court issues a preliminary order establishing the district. The district then has six months to file a plan of operation after which a final hearing will be held.

Based on this procedure for establishing a district, the first and perhaps most important step will be to develop a core group of communities who would want to establish the district. Participation in the district would be voluntary and additional members could join the district after it is established. To provide communities with enough information for them to make a decision as to whether they want to be apart of the district, a detailed outline or scope of services laying out the duties, functions, and funding mechanism(s) for the district should be developed by those communities interested in becoming part of the district. This scope of services can later be developed into a plan of operation for the district.

Based on the recommendations made in this study, the district should undertake three initial tasks at a minimum:

1. the development of regional storm water management standards that could be adopted by communities in the region
2. perform a regional storm water master plan
3. the development of a funding mechanism to undertake these activities and any future maintenance or capital improvements it wishes to take on. Funding for the operation of the district could occur through property taxes, assessments, or storm water user charges.

Upon completion of these tasks, the district could decide (and thus amend its plan of operation) if it wants to pursue specific maintenance and/or capital improvement projects that would benefit the region's flooding and water quality problems based on information gained from the storm water master plan.

### **Benefits of a Regional District**

Each of these components, in and of itself, would significantly benefit the storm water management of the region. The development and adoption of regional storm water management standards would provide greater control of storm water from new development thus decreasing future flooding problems and improving water quality. The development of a regional storm water master plan would identify those portions of the drainage system most in need of improvement and prioritize these improvements by the severity of the problem and those that would provide the most benefit to the region. Funding through the assessment capabilities of a Chapter 6119 district would make possible the planning and capital improvement work necessary to make the district operational and successful. Political support is not only necessary for the formation of the district, but for the long term stability of its operation. A regional district would be more competitive in grant funding opportunities to perform planning and capital improvement projects.

A district would also prepare the region for the upcoming Phase II NPDES storm water permit requirements which are expected in the early part of the next decade. At this point, Ohio EPA expects that much of the region will be included in a General Permit which will set permit requirements for the region. With the institution of a regional storm water management district, the region will have a significant head start on these permit requirements.

## NEXT STEPS

For the regional storm water management district to be successful, it will need greater political support. To allow the time necessary to provide communities in the region with more information about the district concept, the Storm Water Policy Board is contemplating the formation of a regional storm water coalition. The coalition would replace the Storm Water Policy Board and be formed as a semi-autonomous, membership organization under the administrative umbrella of TMACOG. It could perform some of tasks recommended for the regional storm water management district such the development of regional storm water management standards and developing a scope of services for such a district. It will ultimately have to decide if a district is the best approach for the region. Further exploration of the potential of a district will help resolve this issue.

The formation of a coalition would move the Storm Water Policy Board from its current role as policy advisor to the regional storm water study to that of implementer of the study's recommendations.

The coalition would have short term goals:

1. the formation of regional storm water management standards, and
2. developing a scope of services including a funding mechanism for the regional storm water management district

and long term goals:

3. providing communities within the region with information about the scope of services for the proposed district and
4. collectively addressing Phase II NPDES storm water permits.

The scope of services for the regional district should include an:

- Estimated cost of storm water master planning process
- Approximate determination of needed regional improvements and their costs
- Outline of a proposed plan of operation
  - Statement of the necessity and purpose of the proposed district
  - Statement of the district's responsibilities
  - Specific duties of the district
  - Funding mechanism for the districts operations and activities
  - Implementation phases
  - Implementation time line

Funding options for the development of the plan of operation for the district include:

- The Ohio Water Development Authority offers Research and Development grants for innovative water development (including storm water management) projects that can be duplicated in other parts of the state. TMACOG, on behalf of the

Storm Water Policy Board/Coalition, could apply for this funding to develop the plan of operation of the proposed storm water management district.

- The Lake Erie Protection Fund offers implementation grants for projects that reduce non-point source pollution (storm water) and improve water quality
- Chapter 6119 of the O.R.C. allows member of the proposed district to front funds for planning purposes with the understanding that these funds will be recouped once the district realizes revenues through the assessment process.

Funding for the operation of the district could occur through property taxes, assessments, or storm water user charges.

Providing information and education about the proposed district will require some significant time and effort and will need an individual or individuals to act as “champion” for the district. This person (or persons) will need to provide potential members of the district, including and especially the general public, with information they can make reasonable decisions with (scope of services).

When the coalition feels there is sufficient support for the formation of the district, it can follow one of a couple options (see “Recommendation for Regional Storm Water Management or page 113 for more detail):

1. Petition the Court of Common Pleas for the formation of the district with the expectation that a plan of operation will be developed within six months or
2. Develop a plan of operation for the district upon its completion. In either event, a consultant would be hired for the development of the plan of operation.

# REGIONAL STORM WATER MANAGEMENT OPTIONS

Authority	Structure	Funding Source	Duties	Enforce Regulation ?	Membership
1. Storm water Management District	O.R.C. 6119 - Regional Water and Sewer District (RWSD). Could also function under 6115 (Sanitary District) or 6117 (County District)	Assessment capabilities of O.R.C. 6119; Storm water user charge. Can issue bonds.	Develop and enforce regional storm water management standards; issue development permits. Coordinate inter-jurisdictional permits. Leverage grant monies.	Yes. Enforce regulations developed by the RWSD.	District established under O.R.C. 6119. Political subdivisions can join/leave under provisions of code
2. Semi-Autonomous Coalition	Coalition develops annual work plan and budget. Established by TMACOG Board as a legal entity. Operation /Administration through TMACOG.	Annual membership fees determined by coalition. Can fund specific projects through voluntary contributions of members.	Coordinate inter-jurisdictional projects. Prepare model ordinance language, storm water master plans, etc. Contract for same.	Coordinate inter-jurisdictional projects. Prepare model ordinance language, storm water master plans, etc. Contract for same.	Members adopt ordinance/resolution to execute a "Agreement of Cooperation". Members need not be TMACOG members.
3. Regional Standards	Ordinance/Resolution adopted by each political subdivision	None	Adoption and enforcement of regional standards at the discretion of each political subdivision	Enforcement at discretion of each jurisdiction	Could continue under Storm water Policy Board structure
4. Storm water Utility	O.R.C. 6119 - Regional Water and Sewer District (RWSD). Could also function under 6115 (Sanitary District) or 6117 (County District)	Assessment capabilities of O.R.C. 6119; Storm water user charge. Can issue bonds.	Develop and enforce regional storm water management standards and perform some O&M functions. Assess benefiting property owners for cost incurred in planning and construction.	Yes. Enforce regulations developed by the RWSD.	District established under 6119. Political subdivisions can join/leave under provisions of code.

## *NECESSARY PROCEDURES FOR ESTABLISHING A REGIONAL WATER AND SEWER AUTHORITY*

A question arose concerning how to actually or mechanically establish a regional water and sewer authority. This procedure is outlined explicitly in Section 6119.02 of the Ohio Revised Code.

A petition needs to be filed with the Court of Common Pleas in one of the counties which the proposed district lies. (If the proposed district is located in more than one county, there is no requirement as to which the petition should be filed in. The only necessity is that some of the land covered be in that county.)

The petition must include:

- The proposed name of the district.
- The place in which its principal office is to be located.
- The necessity for the proposed district and that it will be conducive to the public health, safety, convenience, or welfare.
- A general description of the purpose of the proposed district.
- A general description of the territory to be included in the district so long as it is an accurate description of the territory. The description need not be given metes and bounds or by legal subdivisions, and may include non-contiguous territories.
- The manner of selection, number, term, and pay of the members of a governing body, called the board of trustees, for the district. (The petition may also include procedures for personnel changes or other provisions relating to the board of trustees.)
- A financing plan for the cost of operation until its own revenue stream is established, or there is proceeds for the sale of bonds.
- A prayer for the organization of the district by the named proposed, either before or after a preliminary hearing.

The petition must be signed by the following:

- One or more municipal corporations or one or more counties or one or more township or by any combination of them, after approval of by the proper legislative authority.
- The legislative authority of any municipal corporation, board of county commissioners, and the board of trustees of any township may act in behalf of their respective subdivisions.

After the initial filing with the court, a judge will determine if the petition meets all the necessary requirements. If it does not, it may be amended and resubmitted. If it does then the judge will give notice to the Court of Common Pleas for each county in which the district is located granting jurisdiction over the authority. (O.R.C. Section 6119.03)

A hearing will then be held within 60 days to determine if the proposed district is probably necessary and that it will be conducive to the public health, safety, convenience, or welfare. The court, after disposing of all objections will then issue a preliminary order declaring the district organized and an independent political subdivision of the state. (O.R.C. Section 6119.04 (A)).

The court will then instruct the district to file a operational plan within six months after which a final hearing on the matter will be held. (O.R.C. 6119.04 (A)).

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City of Toledo

# *PROPOSED STORM WATER MANAGEMENT DISTRICT*

## **Formation**

- Regional Water and Sewer District as defined under O.R.C. 6119.
- Members of initial district petition court of common pleas to form district
- One judge from the court of common pleas in each county of the proposed district is appointed to special court to oversee the district
- An initial hearing is held to determine the necessity of the district
- Members nominate township, village, city, and county representatives to board of trustees. Court of Common Pleas for the district officially appoints the nominees
- District is not formed until a plan is submitted to the court detailing the duties of the district
- Plan can be revised by the district's board of trustees with the approval of the court to modify the duties of the district
- Petitioners for the district can contribute funds for the development of the plan which will be reimbursed through the assessment process of the district
- A final hearing is held after which the district becomes a political subdivision of the state

## **Duties**

- Modeled after Lake County Illinois storm water Management District
- Develop regional storm water management standards
- Enforce regional standards or certify local community to do so
- Perform regional storm water master plan to identify regional drainage problems and determine approximate costs of improvements
- Coordinate inter-jurisdictional projects
- Leverage grant monies to be used for regional improvements
- Implement storm water permit tasks
- The plan specifying the duties of the district can be modified as the board of trustees sees fit. The duties of the district could evolve into a storm water utility at the board's discretion.

## **Membership**

- The O.R.C. 6119 statute allows for the addition or subtraction of members at the member's discretion
- Assessments of property owners would be used for the duties described above
- Improvements and O&M would occur at the local level

## **Assessment Capabilities**

- Assessment through property tax - could eventually move into a user charge that would be dependent on the amount of impervious surface area on each parcel
- Funding for improvements would remain at the local level unless a petition was brought before the district to act as the agency that would assess for improvement costs

## **Regulatory Enforcement**

- Regional standards would be developed in conjunction with all jurisdictions within the district
- Enforcement of standards would remain at the local level unless the district is asked to do so

## **Benefits**

- Address storm water runoff issues on a regional, watershed basis
- Ensure use and enforcement of consistent storm water control standards throughout region
- Will fund and implement regional storm water master planning
- Potential funding source for regional storm water projects
- Make the region more competitive for grants to perform planning and capital improvement operations
- Provide compliance with federal storm water regulations