Making a TMDL Report Work for You

Integrating TMDLs into your SWMP

What Does the Permit Require?

- Ohio Small MS4 NPDES Permit (OHQ000003)
- Part III. Storm Water Management Programs (SWMP) (Page 5 of 24)
  - A. Requirements

a. The best management practices (BMPs) that you or another entity will or already does implement for each of the storm water minimum control measures. Where applicable, BMPs shall be selected to address U.S. EPA approved TMDL recommendations for identified water quality problems associated with MS4 discharges within your MS4's watershed(s).

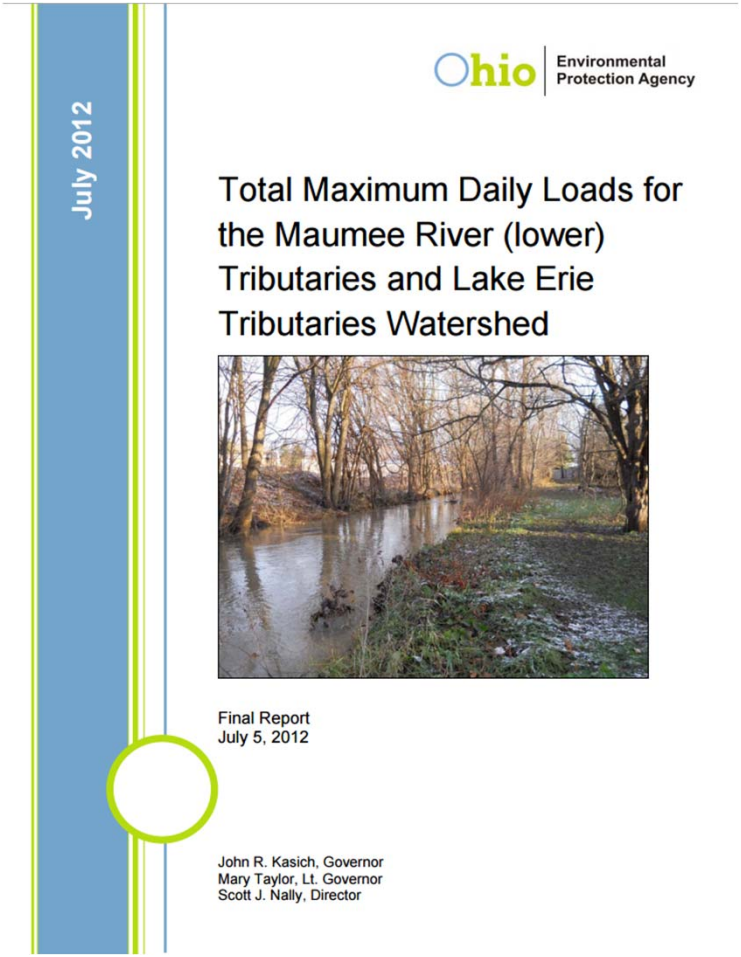
Requirements

- Your SWMP is required to incorporate the recommendations of the TMDL reports
- Not only that, but your proposed BMPs have to address water quality issues addressed in the TMDL Report that could be associated with MS4 activity
- The TMDL Report (or data contained therein) is the Tao of your SWMP (where it may or may not apply)

What Do I Do?

- Read the TMDL Report
- Find out what it recommends for that particular watershed
- Distillation
- Identify sources, BMPs meant to address

Reading the TMDL Report



Reading the TMDL Report

- Maumee River and Lake Erie Tributaries (used in example)
- 175 Pages in length (not including appendices)
- Filled with tables, graphs, and maps that may be difficult to understand for non-aquatic biologists and/or environmental engineers

Reading the TMDL Report

Table 2-4. *E. coli* standards for Ohio

Recreation use	*E. coli* (counts/100 mL)	
	Seasonal geometric mean	Single sample maximum [a]
Bathing Waters	126	235 [b]
PCR – Class A	126	298
PCR – Class B	161	523
PCR – Class C	206	940
SCR	1,030	1,030

Notes
Based on Table 7-13 of *OAC-3745-1-07*.
PCR = primary contact recreation; SCR = secondary contact recreation
a. Except as noted in footnote b, those criteria must not be exceeded in more than 10 percent of the samples taken during any 30-day period.
b. This criterion will be used for issuing beach and bathing water advisories.

Utility for MS4 Managers

- Despite its density and complexity, an MS4 manager can gain a wealth of knowledge from the TMDL Reports

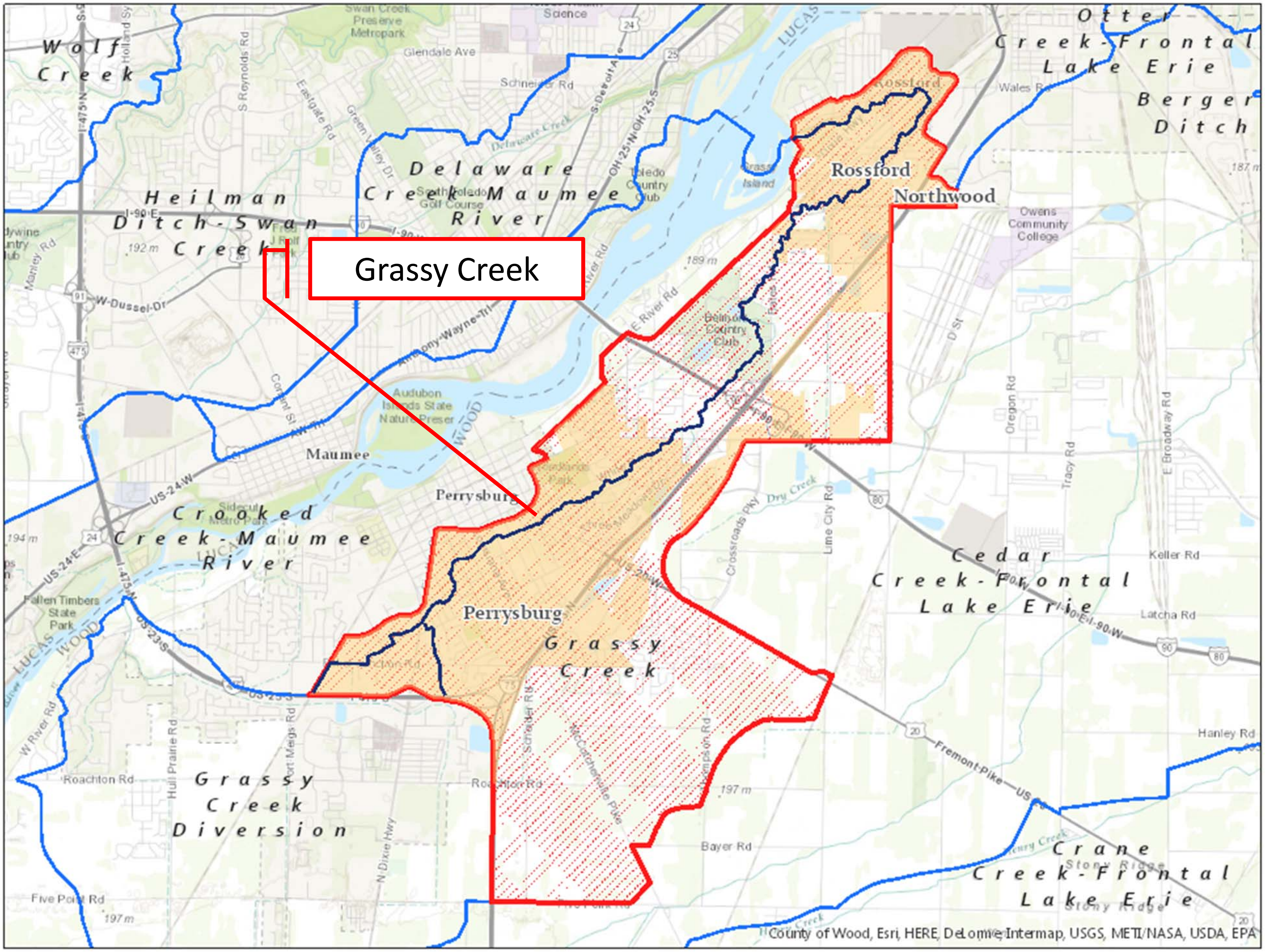
Listed Impairments

Table 2-9. Impairments to the lower Maumee River tributaries (HUC 04100009 09)

Watershed (HUC 04100009)	Cause(s) of impairment	Potential source(s) of impairment
Grassy Creek Diversion (09 01)	Bacteria	▪ HSTS ▪ Urban Area
Grassy Creek (09 02)	Bacteria	▪ HSTS ▪ Urban Area
	Sedimentation/siltation	▪ Channelization ▪ Urban runoff and storm sewers
Delaware Creek – Maumee River (09 04)	Bacteria	▪ HSTS ▪ Golf course
	Flow regime alterations, nitrate plus nitrite, phosphorus (total), sedimentation/siltation.	▪ Channelization ▪ Urban runoff and storm sewers ▪ Channel erosion/incision from upstream hydromodifications

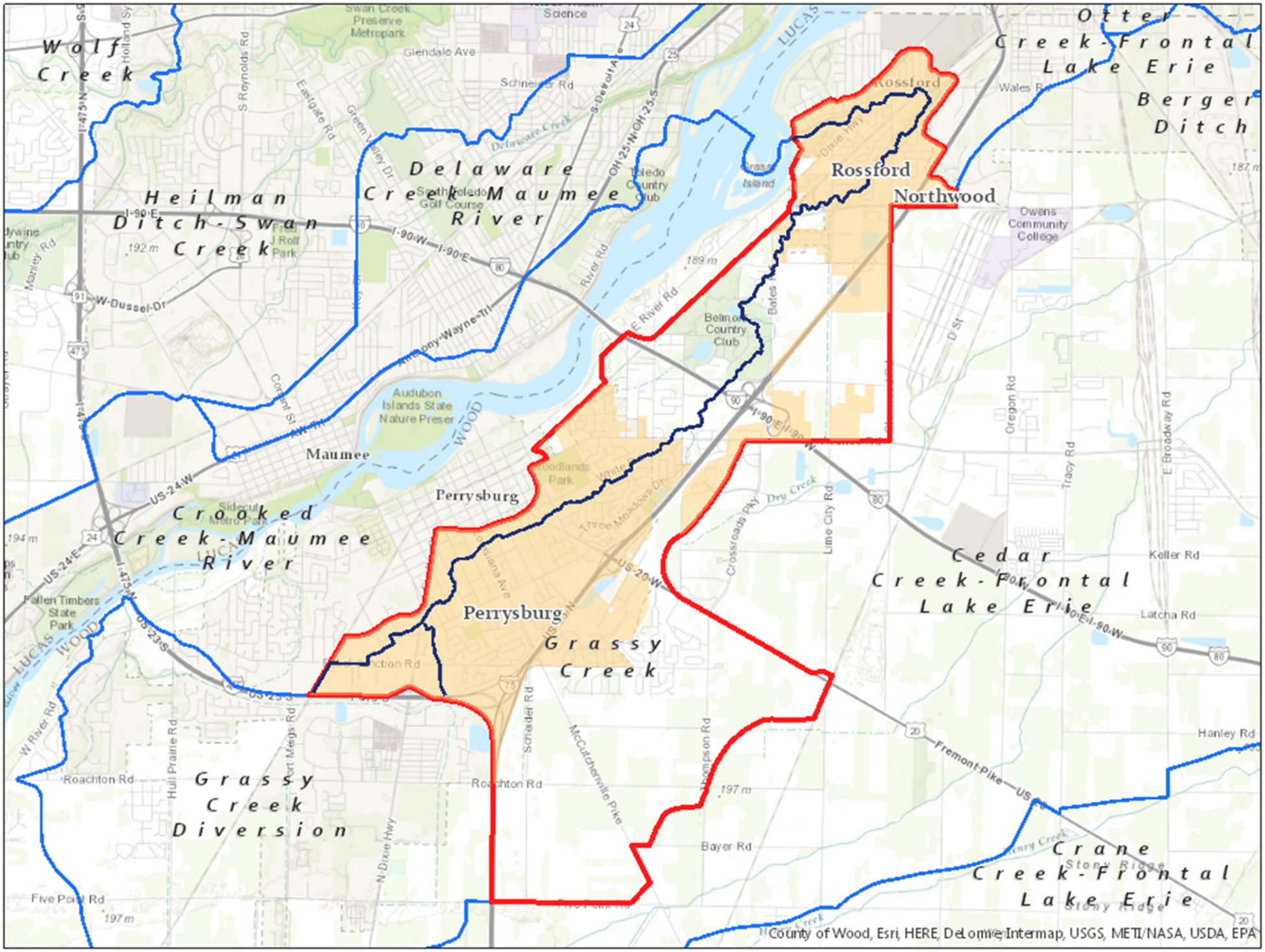
Source: Ohio EPA 2010a.

Note: HSTS = home sewage treatment system.


Grassy Creek
Wolf Creek
Heilman Ditch-Swan Creek
Delaware Creek-Maumee River
Otter Creek-Frontal Lake Erie
Berger Ditch
Rossford
Northwood
Maumee
Perrysburg
Crooked Creek-Maumee River
Cedar Creek-Frontal Lake Erie
Grassy Creek Diversion
Crane Creek-Frontal Lake Erie
County of Wood, Esri, HERE, DeLorme, Intermap, USGS, METI/NASA, USDA, EPA

Grassy Creek

Grassy Creek (09 02)	Bacteria	▪ HSTS ▪ Urban Area
	Sedimentation/siltation	▪ Channelization ▪ Urban runoff and storm sewers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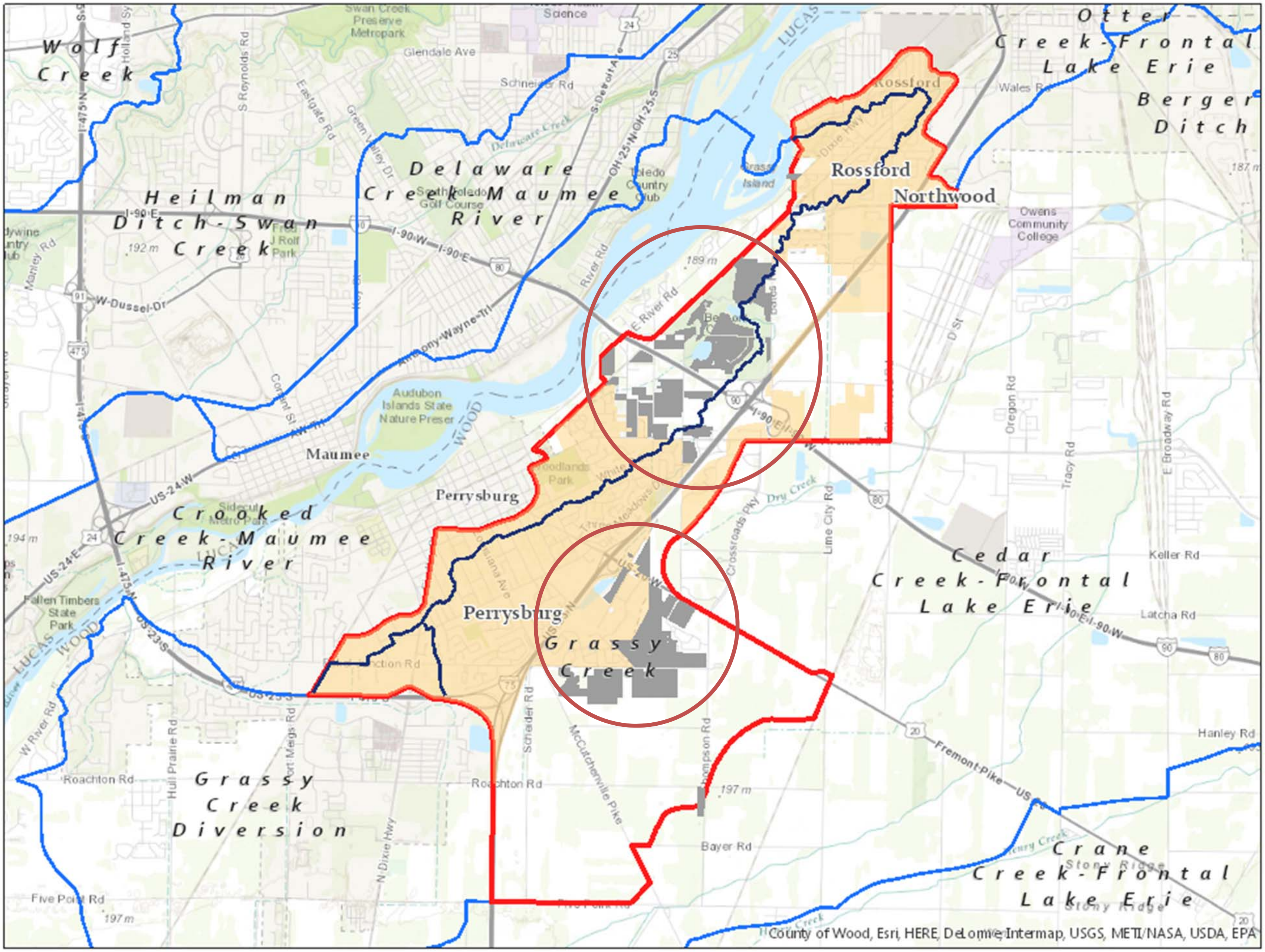
Otter Creek-Frontal Lake Erie
Berger Ditch
Crooked Creek-Maumee River
Grassy Creek
Grassy Creek Diversion
Cedar Creek-Frontal Lake Erie
Crane Creek-Frontal Lake Erie
Rossford
Northwood
Maumee
Perrysburg
Swan Creek Preserve Metropark
Glendale Ave
Schneider Rd
S Reynolds Rd
Eastgate Rd
Green Valley Dr
Delaware Creek
Toledo Country Club
Grassy Island
South Toledo Golf Course
Wales Rd
Owens Community College
Belmont Country Club
Audubon Islands State Nature Preser
Woodlands Park
Three Meadows Dr
Dry Creek
Crossroads Pky
Lime City Rd
Oregon Rd
Tracy Rd
E Broadway Rd
Keller Rd
Latcha Rd
Hanley Rd
Fallen Timbers State Park
Sidecut Metro Park
Roachton Rd
Hull Prairie Rd
Fort Meigs Rd
N Dixie Hwy
Schrader Rd
McCutchenville Pike
Thompson Rd
Bayer Rd
Five Point Rd
Fremont Pike
W River Rd
E River Rd
River Rd
W Dussel Dr
Anthony Wayne Trl
Manley Rd
Bates Rd
D St
Stony Ridge
Stony Creek
192 m
189 m
187 m
194 m
197 m
County of Wood, Esri, HERE, DeLorme, Intermap, USGS, METI/NASA, USDA, EPA

Grassy Creek

- 8,746 Ac.
- 4,037 Ac. Is Urban (46.16%)



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Delaware Creek-Maumee River
Otter Creek-Frontal Lake Erie
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Maumee
Perrysburg
Crooked Creek-Maumee River
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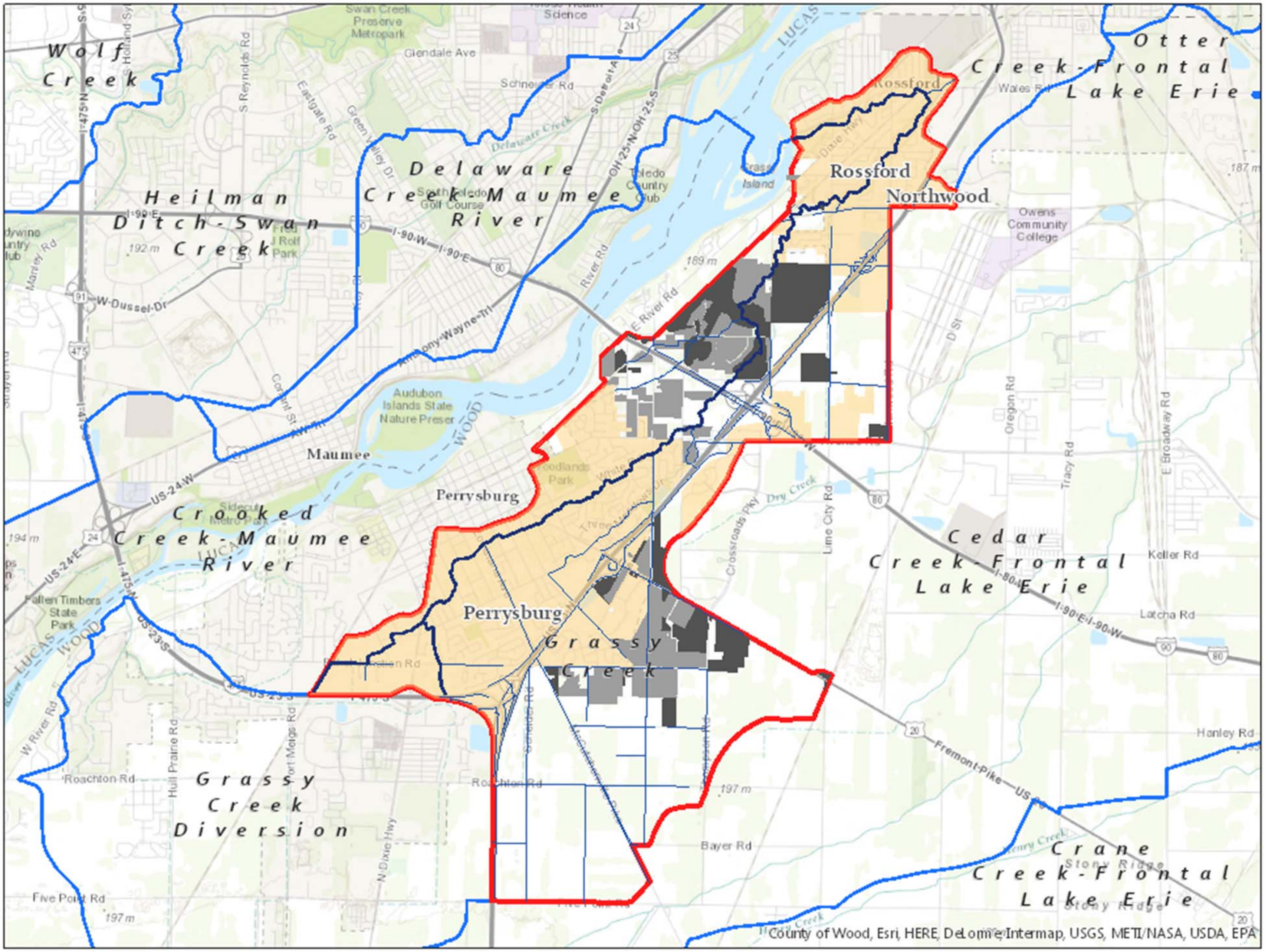
Grassy Creek
Grassy Creek Diversion
Crane Creek-Frontal Lake Erie
County of Wood, Esri, HERE, DeLorme, Intermap, USGS, METI/NASA, USDA, EPA

Grassy Creek

- 8,746 Ac.
- 4,037 Ac. Is “Urban” (46.16%)
- + 740 Ac. is platted subdivisions (Developed)
- 54% (4,777 Ac.)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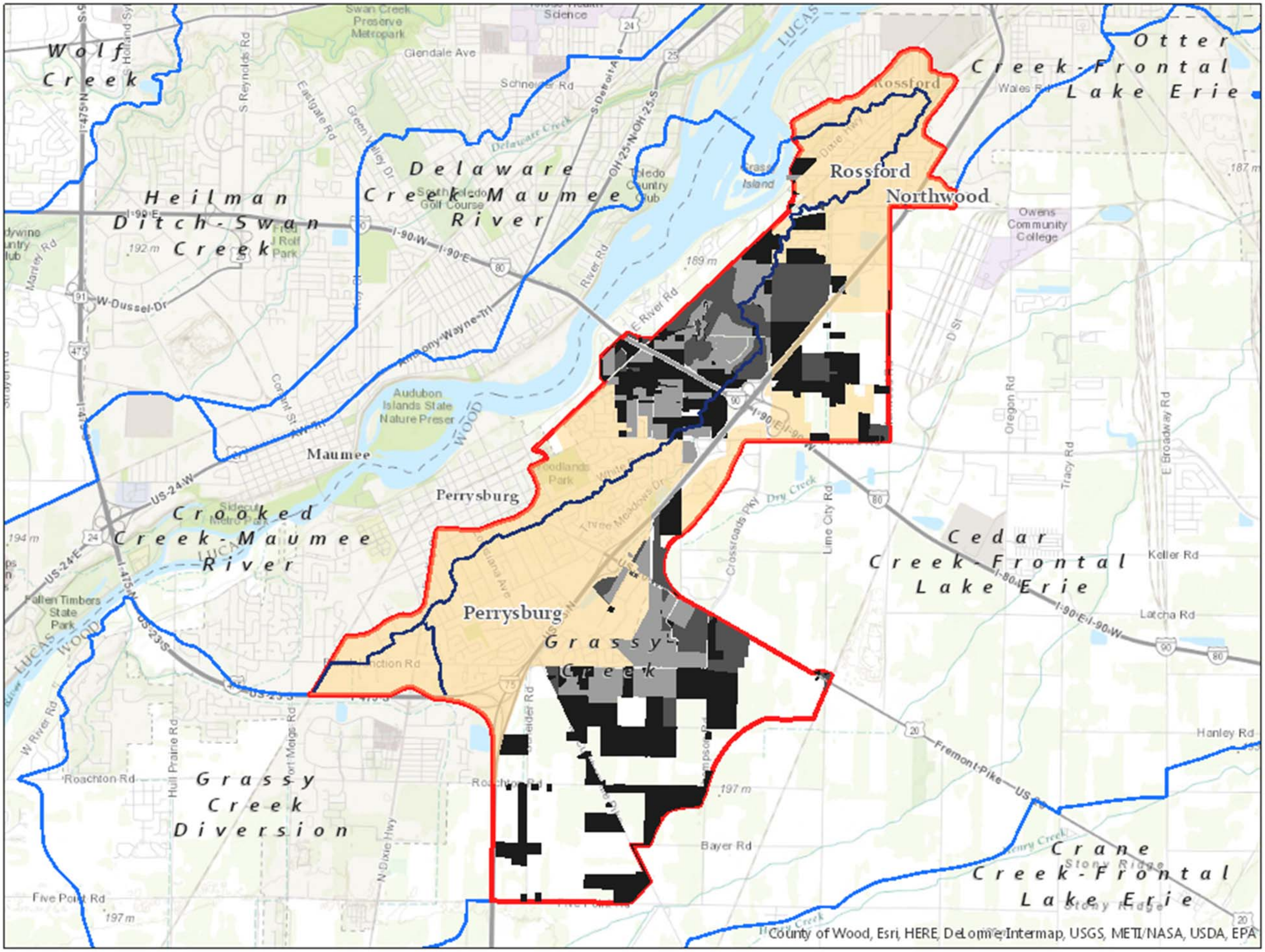
Perrysburg
Grassy Creek
Grassy Creek Diversion
Crane Creek-Frontal Lake Erie
County of Wood, Esri, HERE, DeLorme, Intermap, USGS, METI/NASA, USDA, EPA

Grassy Creek

- + 628 Ac of Commercial/Institutional
- 5,405 Developed Acres (62%)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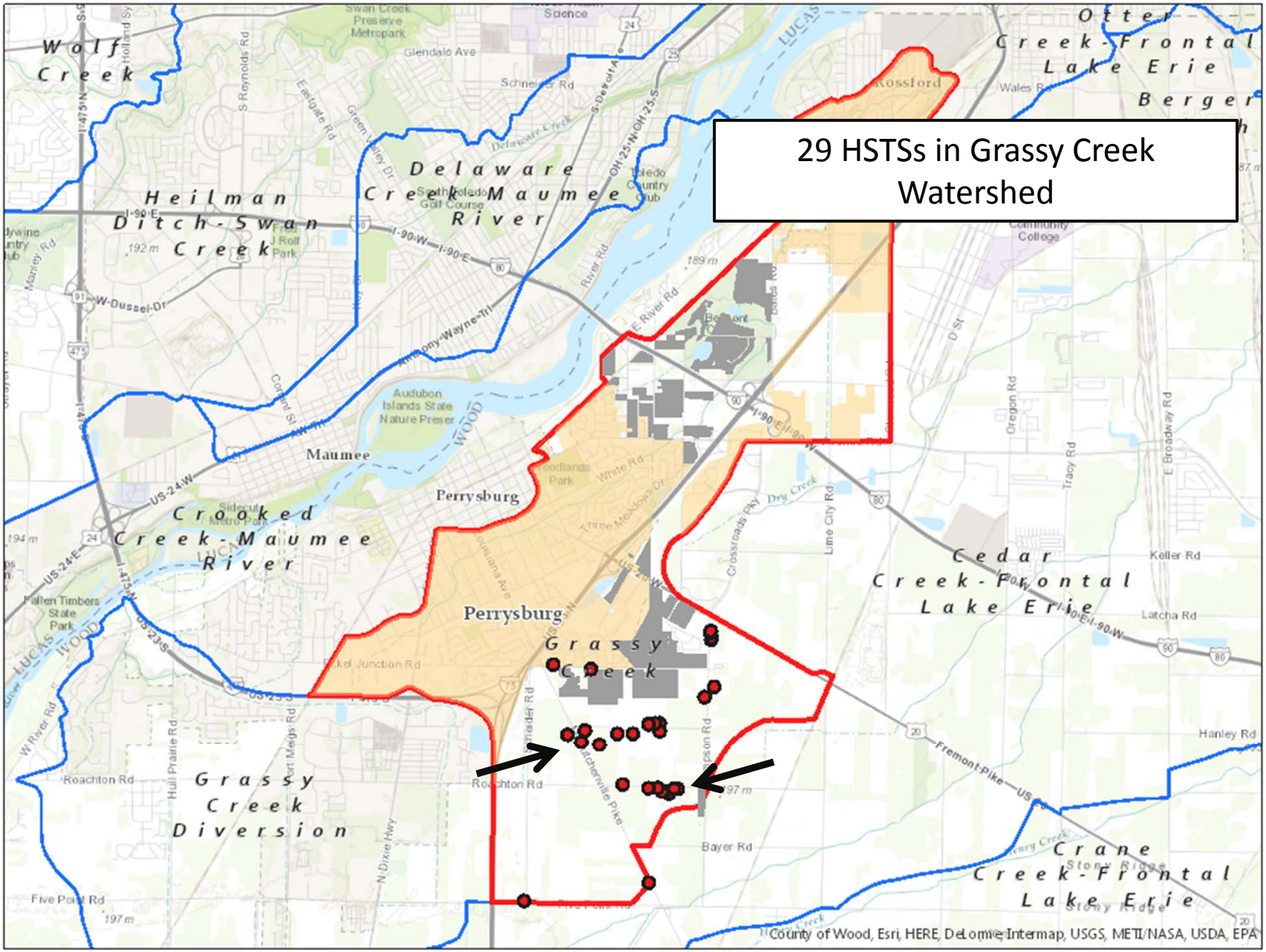
Grassy Creek

- + 1,195 Ac. of residential area
- 6,600 Ac. of developed land
- 75% of Grassy Creek Watershed is developed

Grassy Creek

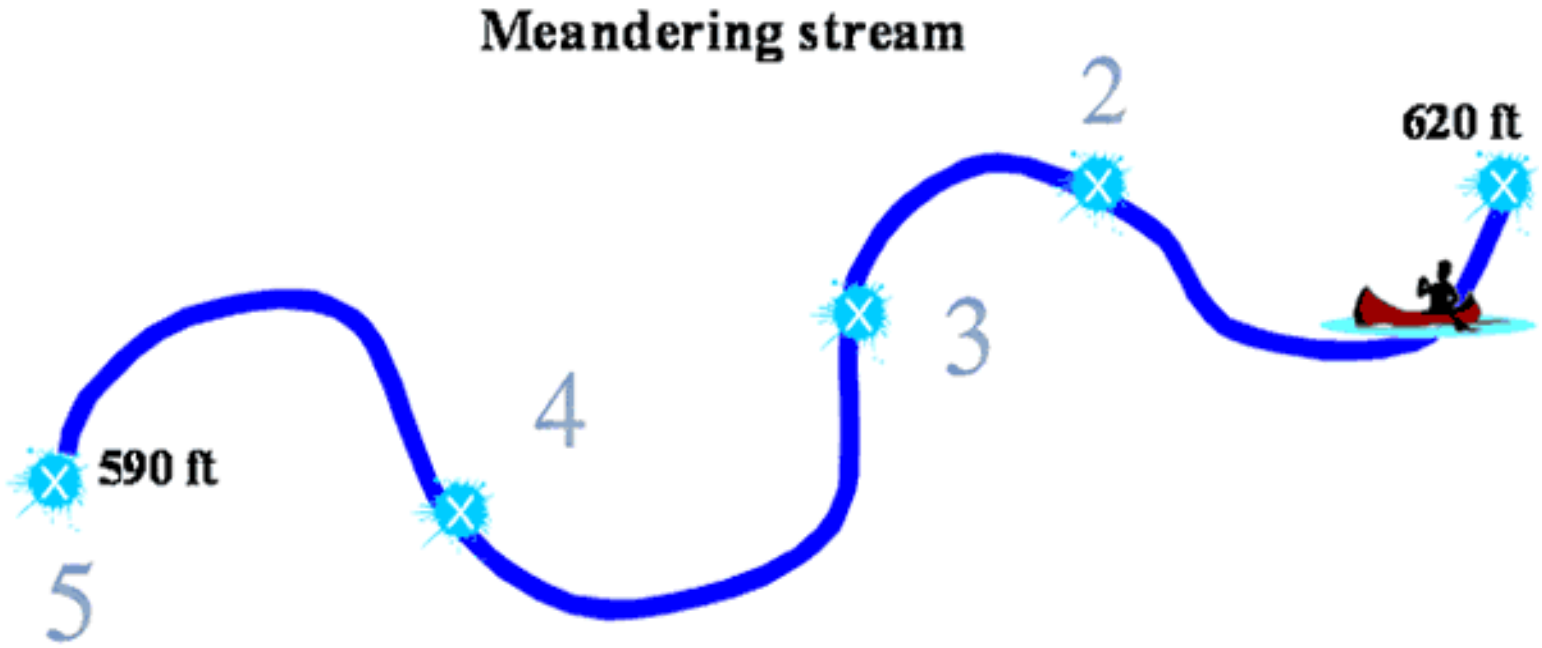
Grassy Creek (09 02)	Bacteria	▪ HSTS ▪ Urban Area
	Sedimentation/siltation	▪ Channelization ▪ Urban runoff and storm sewers


29 HSTSs in Grassy Creek Watershed
Wolf Creek
Heilman Ditch-Swan Creek
Delaware Creek
Maumee River
Otter Creek-Frontal Lake Erie
Berger
Maumee
Perrysburg
Crooked Creek-Maumee River
Grassy Creek
Grassy Creek Diversion
Cedar Creek-Frontal Lake Erie
Crane Creek-Frontal Lake Erie
Rossford
Audubon Islands State Nature Preser
Fallen Timbers State Park
Roachton Rd
Bayer Rd
Hanley Rd
Keller Rd
Latcha Rd
Five Point Rd
Fremont Pike
Anthony Wayne Trl
I-90 E
I-90 W
US-24 W
US-24 E
I-475 N
I-475 S
US-23 S
OH-25 N
OH-25 S
LUCAS
WOOD
County of Wood, Esri, HERE, DeLorme, Intermap, USGS, METI/NASA, USDA, EPA

Grassy Creek

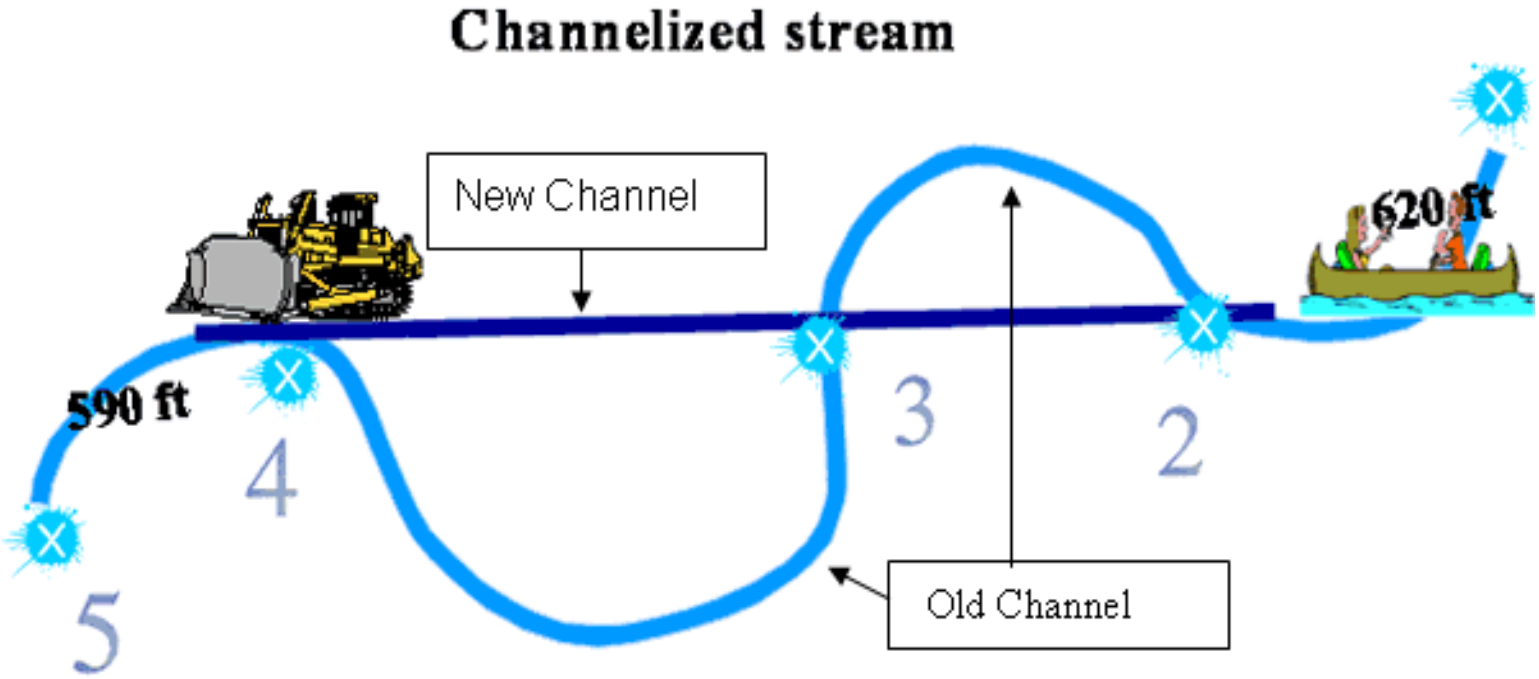
Grassy Creek (09 02)	Bacteria	▪ HSTS ▪ Urban Area
	Sedimentation/siltation	▪ Channelization (?) ▪ Urban runoff and storm sewers

Channelization



Source: Missouri Stream Team
http://mostreamteam.org/activity_guide/stream_channel/short_float.htm

Channelization



Source: Missouri Stream Team
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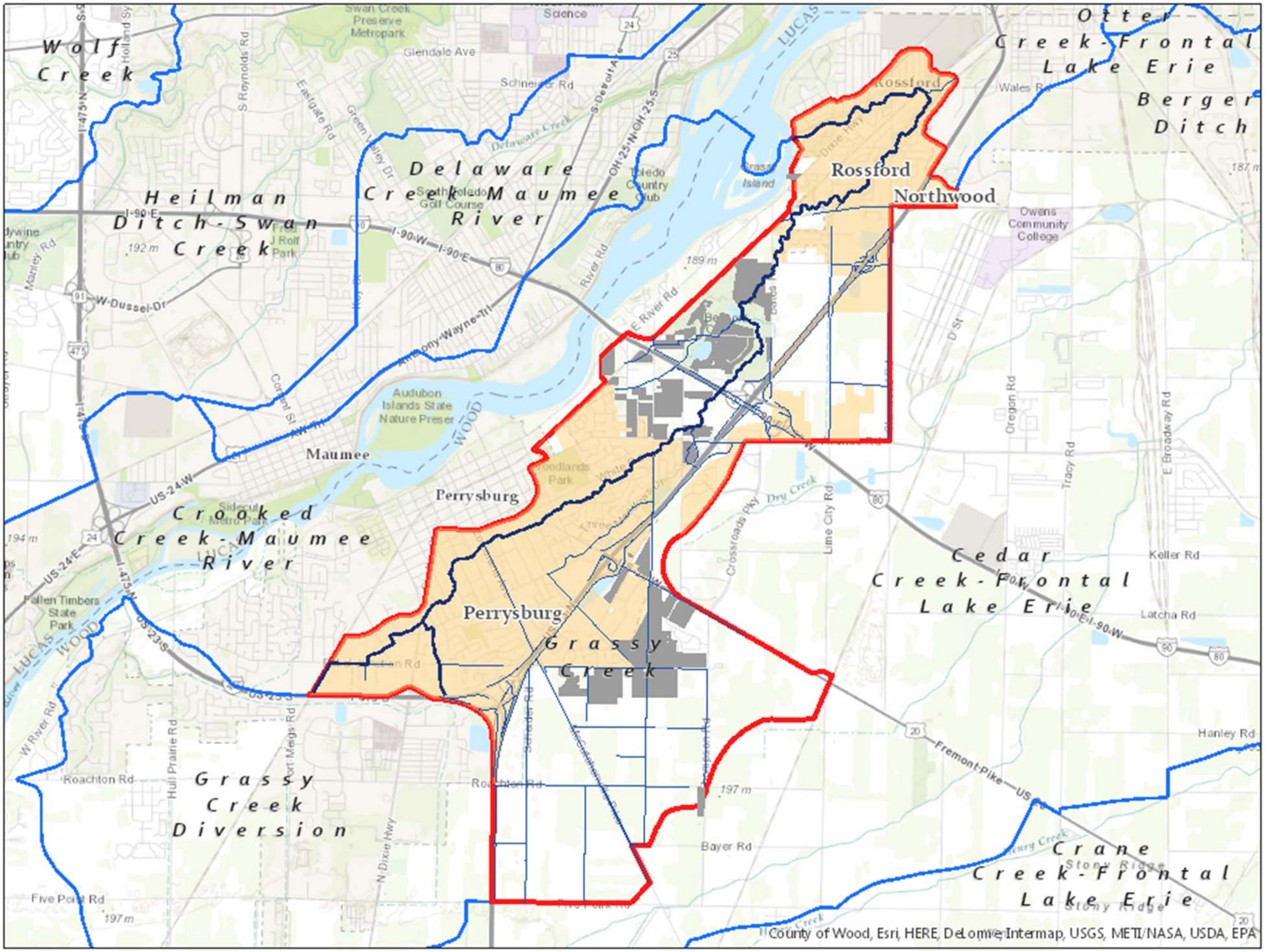
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Grassy Creek

Grassy Creek (09 02)	Bacteria	▪ HSTS ▪ Urban Area
	Sedimentation/siltation	▪ Channelization ▪ Urban runoff and storm sewers

What We Know

- Our causes of impairment are:
  - Bacteria
  - Sedimentation/Siltation
- Our sources of bacteria are most likely the urban area
  - Not ruling out HSTS – but more analysis would have to be done (dry-weather screening)
- Siltation results from a combination of development and channelization

How Does the 'Urban Area' Contribute to Bacteria

- "Regulated storm water may transport animal excrement deposited by pets or wildlife to nearby streams following precipitation events that result in storm water runoff," (TMDL for the Maumee River (Lower) Tributaries and Lake Erie Tributaries Watershed 28-29)
- "Pet excrement deposited in residential areas… may be transported to streams after precipitation events that result in storm water runoff," (TMDL for the Maumee River (Lower) Tributaries and Lake Erie Tributaries Watershed 29)

What Does this All Mean?

What do I do now? What does this mean for me, my MS4 and my NPDES requirements?

There’s more!

Recommendations!

Table 8-9. Recommendations for improving water quality in impaired areas in the Maumee River (lower) tributaries (04100009 09)

Location Description (10-digit HUC) Location Description (12-digit HUC) Sources (Causes)	Restoration Categories											
	Bank & Riparian Restoration	Stream Restoration	Wetland Restoration	Conservation Easements	Dam Modification or Removal	Levee or Dike Modification or Removal	Abandoned Mine Land Reclamation	Home Sewage Planning and Improvement	Education and Outreach	Agricultural Best Management Practices	Storm Water Best Management Practices	Regulatory Point Source Controls
Grassy Creek – Maumee River (04100009 09)												
Grassy Creek Diversion (09 01)												
Failing HSTS (bacteria)								x	x			x
Urban/residential runoff (bacteria)									x		x	x
Grassy Creek (09 02)												
Channelization (sedimentation)	x			x							x	x
Urban runoff/storm sewers (sedimentation)									x		x	x
Failing HSTS (bacteria)								x	x			x
Urban/residential runoff (bacteria)									x		x	x
Delaware Creek – Maumee River (09 04) (includes Duck Creek)												
Channelization (sedimentation)	x										x	x
Urban runoff/storm sewers (sedimentation, nitrate/nitrite, phosphorus)									x		x	x
Channel erosion/incision from upstream hydromodifications (other flow regime modifications)	x										x	x
Illicit connections to storm sewers (bacteria)									x			x
Golf course (bacteria)											x	x
Failing HSTS (bacteria)	Already addressed											
Urban/residential runoff (bacteria)											x	x

Notes
HSTS = home sewage treatment systems; HUC = hydrologic unit code; WWTP = wastewater treatment plant.

Table 8-11. Recommended implementation actions in the Maumee River (lower) tributaries (HUC 04100009 09)

Restoration categories		Specific restoration activities	Grassy Creek Diversion (09 01)	Grassy Creek (09 02)	Delaware Creek-Maumee River (09 04)
Bank & Riparian Restoration	constructed	Restore streambank using bio-engineering		x	x
		Restore streambank by recontouring or regrading		x	x
	planted	Plant grasses in riparian areas		x	x
		Plant prairie grasses in riparian areas			
		Remove/treat invasive species		x	x
		Plant trees or shrubs in riparian areas		x	x
Stream Restoration		Restore flood plain			
		Restore stream channel			
		Install in-stream habitat structures			
		Install grade structures			
		Construct 2-stage channel			
		Restore natural flow			
Wetland Restoration		Reconnect wetland to stream			
		Reconstruct & restore wetlands			
		Plant wetland species			
Conservation Easements		Acquire conservation easements		x	
Dam Modification or Removal		Remove dams			
		Modify dams			
		Remove associated dam support structures			
		Install fish passage and/or habitat structures			
		Restore natural flow			
Levee or Dike Modification or Removal		Remove levees			
		Breach or modify levees			
		Remove dikes			
		Modify dikes			
		Restore natural flood plain function			
Abandoned Mine Land Reclamation	treatment	Construct lime dosers			
		Install slag leach beds			
		Install limestone leach beds			
		Install limestone channels			
		Install successive alkalinity producing systems			
		Install settling ponds			
		Install vertical flow ponds			
		Install limestone drains (anoxic and/or oxic)			
		Construct acid mine drainage wetland			
	flow diversion	Repair subsidence sites			
		Reclaim pit impoundments			

Not Just Tables

8.4 Urban Runoff and Storm Sewers

Urban runoff, including runoff that is regulated through Ohio EPA general permits (i.e. MS4, construction, and industrial), has been identified as a primary source of pollutants including *E. coli*, nutrients and sediment in the project area. In addition to runoff, illicit connections between sanitary and storm sewers are also a potential source of pollutants in the urban environment. Chapter 7 of the *Areawide Water Quality Management Plan* (TMACOG 2011) is devoted to storm water management and includes discussions of regulations/policy, illicit connections, funding and infrastructure.

Recommended activities to address these sources include storm water management and education and outreach programs. Appendix F presents additional information on these and other activities that are recommended to address sources of impairment derived from urban runoff and storm sewers.

8.4.1 Storm Water Management

Storm water management, including best management practices retrofitting and planning for future development, can be used to address the sources of pollutants derived from urban runoff and storm sewers. In addition, education and outreach is an integral component of a comprehensive storm water management program that can address diffuse sources of pollutants such as pet waste and lawn maintenance activities.

8.2 Failing HSTS and Unsewered Communities

Improper wastewater treatment from HSTS and unsewered communities are the most common sources of pollutants in the project area. Recommended activities to address these sources of pollutants are maintaining and replacing failing HSTS and connecting to public WWTPs. Appendix F presents additional information on activities to address impairments from untreated wastewater.

8.2.1 Connecting to Public WWTP

Unsewered communities cause bacteria and nutrient impairments throughout the project area. Connecting to sanitary sewers or constructing a new WWTP might be more beneficial than replacing and upgrading unsewered communities with malfunctioning and failing HSTS. TMACOG, the county health departments, and other agencies have worked together to identify areas with failing HSTS and unsewered communities. These areas are presented as critical sewerage areas in *Areawide Water Quality Management Plan* (TMACOG 2011). The plan provides recommendations for each area, which include extending sanitary sewer coverage to unsewered communities or areas with dense, failing HSTS.

8.2.2 Properly Maintaining and Replacing HSTS

HSTS are sources of impairment in 8 of the 10 HUCs. HSTS that are not operating properly or have failed are resulting in the elevated in-stream levels of ammonia, bacteria, nitrate/nitrite, and total phosphorus. Chapter 5 of the *Areawide Water Quality Management Plan* (TMACOG 2011) is devoted to on-site sewage treatment and includes discussions of state and county regulations, financial assistance, and recommended implementation practices.

Septic tanks with tile leaching fields are the most common type of HSTS in the project area (TMACOG 2011, p. 275). The most effective BMP for managing loads from septic systems is regular maintenance. When not maintained properly, septic systems can release pathogens and excess nutrients into surface water. Good housekeeping measures relating to septic systems are listed below (Goo 2004):

- Inspect the system annually and pump the system every 3 to 5 years, depending on the tank size and number of residents per household.
- Refrain from trampling the ground or using heavy equipment above a septic system (to prevent pipe collapse).
- Prevent septic system overflow by conserving water, not diverting storm drains or basement pumps into septic systems, and not disposing of trash through drains or toilets.

Education is a crucial component of reducing pollution from septic systems. Education can occur through public meetings, mass mailings, and radio and television advertisements.

An inspection program would help identify those systems that are connected to tile drain systems and identify maintenance recruitments. All tanks discharging to tile drainage systems should be disconnected immediately.

Some communities choose to formally regulate HSTS by creating a database of all systems in an area. Such a database usually contains information on the size, age, and type of system. All inspections and maintenance records are maintained in the database through cooperation with licensed maintenance and repair companies. The databases allow the communities to detect problem areas and ensure proper maintenance.

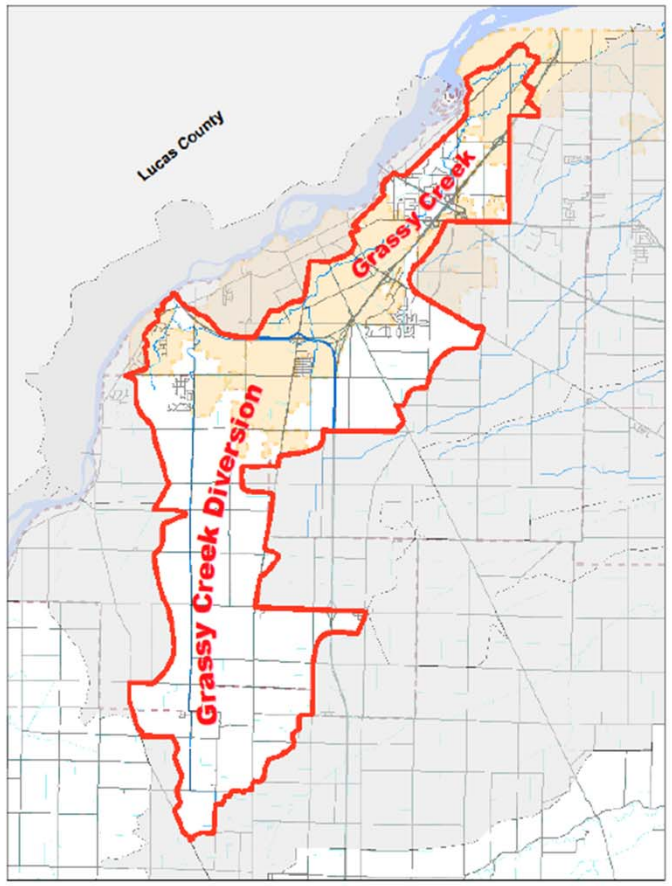
Putting it into Context

- The TMDL Reports tell us:
  - Stream/Watershed impairments (what we have to address)
  - Sources of those impairments (where we have to address it)
  - Recommendations (how we should/could address it)

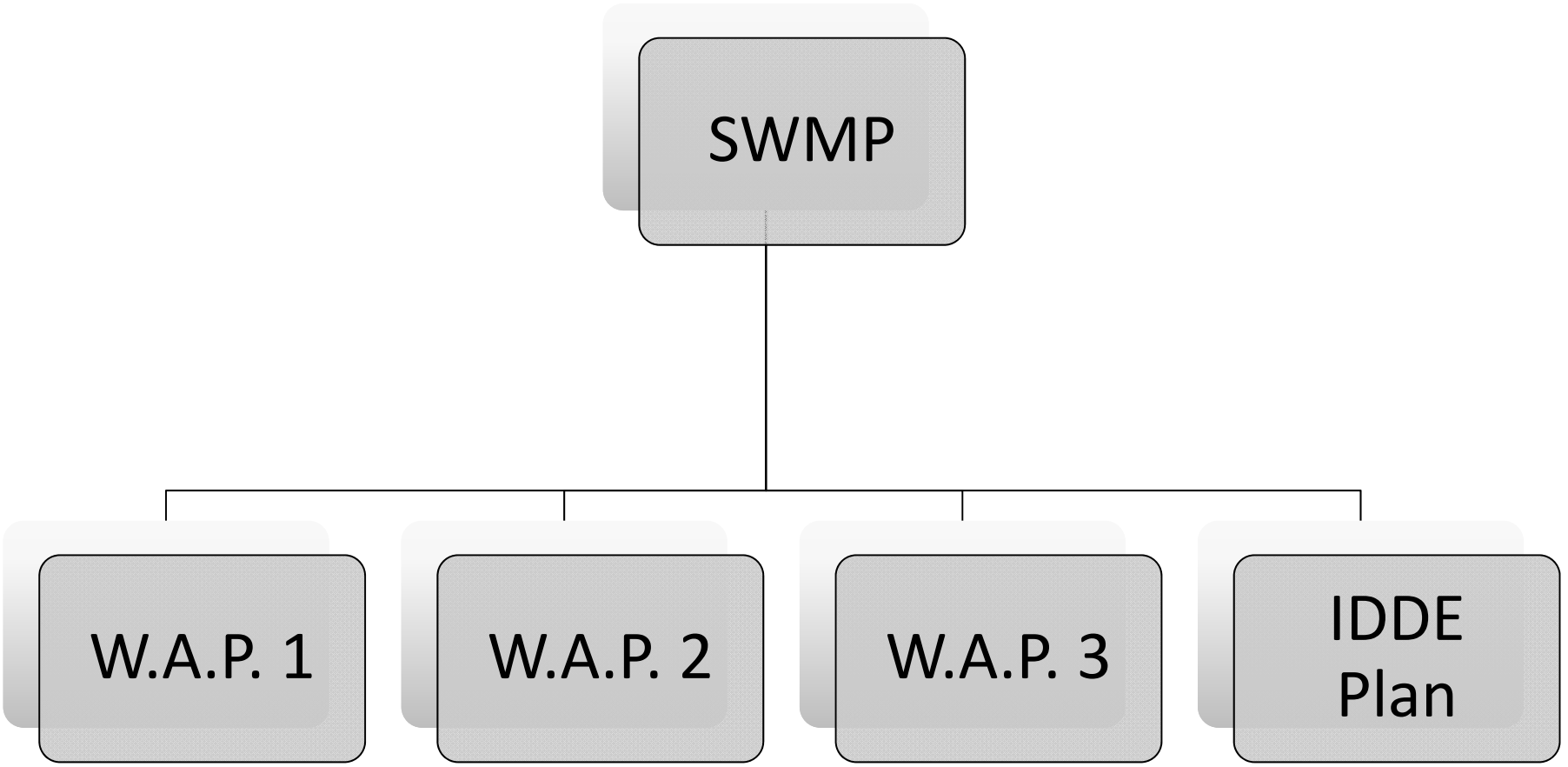
Where to Go from Here:

- Watershed Action Plans
- Revise SWMP based upon W.A.P.s
- IDDE Plan
- Hierarchy of documents

Grassy Creek & Grassy Creek Diversion Watersheds



Map 1: Combined Watershed


SWMP
W.A.P. 1
W.A.P. 2
W.A.P. 3
IDDE Plan

What We Can Do

- TMDL Reports are a goldmine for MS4 Administrators
- They are the what, why, when and how of an MS4 Program
- Required to incorporate anyway

Questions?

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Wood County Engineer's Office

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