Commented [BC1]: This is an updated Ohio NPS-IS Plan Example Document. It is expected that, just like NPS-IS plans created by local partners, this example will be changed, updated and improved as people use it, improvements are realized and policies/program guidance change. Watch for the latest version and date as changes are released.

Version 1.1
August 30, 2016

Nine-Element Nonpoint Source Implementation Strategic Plan (NPS-IS plan)

Ottawa River-Frontal Lake Erie: Tenmile Creek HUC-12 (04100001 03 06)

EXAMPLE

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EXAMPLE

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Acknowledgements

Clean Stream Partners would like to thank the many partners who helped to compile the information, maps and projects needed to create this document. This NPS-IS plan will help direct projects to expeditiously address the nonpoint source impairments in the **Tenmile Creek HUC-12** of the Ottawa River watershed.

Commented [BC2]: *This section should include recognition for those person(s) and/or organizations(s) that assisted in the development of the NPS-IS plan.*

EXAMPLE

Chapter 1: Introduction

The **Tenmile Creek HUC-12** (04100001 03 06) is located at the northern edge of Lucas County, Ohio. This HUC-12 is immediately downstream from the *Headwaters Tenmile Creek HUC-12* (041000010 03 04) and *Prairie Ditch HUC-12* (041000010 03 03); and immediately upstream from its confluence with North Tenmile Creek where it becomes—Ottawa River. At 11.21 square miles in size, the *Tenmile Creek HUC-12* is relatively small. The landscape of the watershed is quite diverse. It includes high density residential, multiple industrial sites, row crop agriculture, pastures, parks, and wooded riparian areas.

State and Federal nonpoint source funding is now closely tied to strategic implementation-based planning that meets U.S. EPA's nine minimum elements of a watershed plan for impaired waters. Clean Stream Partners and Rivers America have taken the lead in authoring this NPS-IS. They are working with numerous other groups and municipalities; all of which have agreed to collaborate toward the development of Nine-Element Nonpoint Source Implementation Strategic Plans for every HUC-12 watershed within the Metro-Toledo area. This NPS-IS for the **Tenmile Creek HUC-12** is one of more than a dozen under development or being planned under this collaborative effort.

Commented [BC3]: *This Chapter is to give the reader a rough bearing of where your watershed is located in Ohio, who was involved in creating the document and the reasons for creating it.*

1.1 Report Background

This NPS-IS was created as an update to the *Maumee Area of Concern (AOC) Stage 2 Watershed Restoration Plan (Watershed Plan)* (Maumee RAP, 2006). That plan was created as a one-stop-shop for restoration of the watersheds of the Maumee Area of Concern (AOC). It addressed the needs of many programs at the time, including the Ohio Department of Natural Resources (ODNR) Watershed Coordinator Program and Ohio EPA AOC Program. The Ottawa River watershed was included in this report.

Commented [BC4]: *Description: This section should be **5 paragraphs or less** explaining why this NPS-IS plan was created. Include as many images, maps, tables, etc. as needed to illustrate the area to be addressed.*

The *Watershed Plan* was submitted in January 2006 for State endorsement by ODNR and Ohio EPA. The *Watershed Plan* received "Full Endorsement Pending" status from the State of Ohio's watershed plan program and could be fully endorsed with the completion of a Coastal Nonpoint Source Pollution Management Measures section. This additional section was never written. With the change of program focus this NPS-IS is being created to guide the region in addressing nonpoint source pollution issues for the Ottawa River-Frontal Lake Erie: Tenmile Creek (HUC-12: 04100001 03 06), rather than a watershed plan for all issues in the watershed. Other programs will be creating plans or lists to address others impairments that need attention in order to restore the area to fishable, swimmable and drinkable waters that meet water quality standards. Community partners expect to create NPS-IS documents for all the impaired waters with hydrologic unit codes (HUCs) in the Maumee AOC.

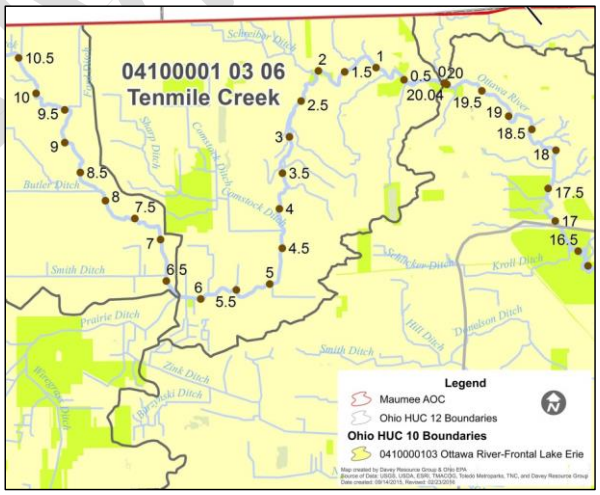

FIGURE 1: RIVER MILE MAP OF TENMILE CREEK HUC-12 AT THE OTTAWA RIVER CONFLUENCE (CLEAN STREAM PARTNERS, 2016)

EXAMPLE

1.2 Watershed Profile & History

The Ottawa River is 45 miles long with a drainage basin of 220.9 square miles; 146.7 of which are in Ohio. (Maumee RAP, 2006) The Ottawa River begins with the 27.4-mile-long Tenmile Creek west from Ohio St. Rt. 109 and south from U.S. Rt. 20 in Fulton County. With an origin elevation of 755', the stream falls an average of 4.9'/mi to an elevation of 620' in the city of Sylvania, Lucas County. Tenmile Creek (81 mi^2) joins North Tenmile Creek (42 mi^2) in Sylvania. This confluence forms the Ottawa River. Just upstream of this confluence is where the **Tenmile Creek HUC-12** that is the focus of this NPS-IS plan is located. Ohio EPA identifies this juncture to be 19.75[1] miles upstream from the Ottawa River's Lake Erie mouth (Figure 1). From this point the 19.75-mile-long Ottawa River maintains a similar grade (4.7'/mi) over through village of Ottawa Hills and the city of Toledo to where it joins Maumee Bay and Lake Erie in Monroe County. (Ohio EPA, 2015)

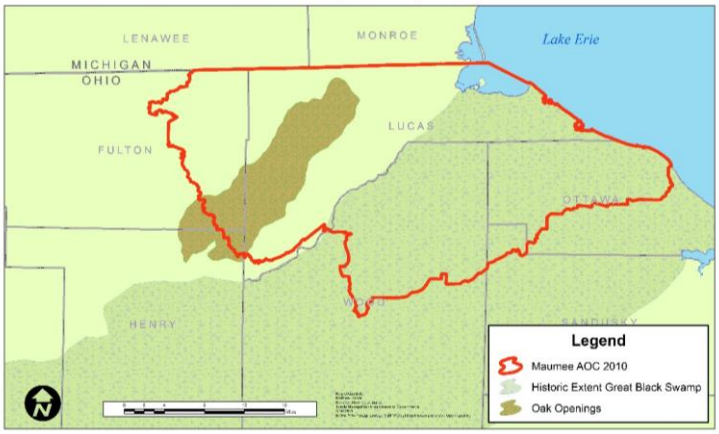

FIGURE 2: THE OAK OPENINGS REGION IN OHIO COMPARED TO THE GREAT BLACK SWAMP (CLEAN STREAM PARTNERS, 2016)

Oak Openings

Much of the Oak Openings Region in northwest Ohio and southeast Michigan is former beach, reflecting higher lake levels in ancestral Lake Erie at the close of the last ice age. The sand was reworked by the wind to form sand dunes over broad areas when water levels dropped. Also at about this time, rivers began to dig themselves into the landscape as glacial waters drained away.

The early pioneers traveling to northwest Ohio and southeast Michigan must have found the Oak Openings a welcomed sight. After wallowing and hacking their way through the dense woods and mire of the Great Black Swamp— it could take nearly a week to traverse the 25 or so miles between Fremont and Perrysburg—the Oak Openings would have been like a dream come true to those early travelers. (Figure 2) There, on the high sandy dunes, tall prairie grasses grew under an open canopy of widely spaced oak trees. They could easily zigzag their wagons through the dry open woodland without even having to cut a path.

Presently the Oak Openings Region contains some of the rarest plant communities in the world. Nearly one-third of Ohio's rare plants are found in the Oak Openings. Five of the six natural plant communities in the region are considered globally rare. Since the earliest naturalist explored this area, the Oak Openings Region has been famous for the diversity and rarity of its local plant life. The region has gained global attention, especially by The

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[1] *It should be noted that the river mile maps used in this document were created using data digitized by TMACOG utilizing 2004 aerial photography and may not represent current stream lengths or correlate to other river mile data sets, notably they do not precisely align with Ohio EPA river mile delineations.*

FIGURE 3: PRAIRIE RESTORATION AT THE OLANDER PARK SYSTEM SYLVAN PRAIRIE. PHOTO CREDIT TO THE OLANDER PARK SYSTEM.

Nature Conservancy, as a matrix of rare global communities. The basis of this attention is the rare and unique flora of the Oak Openings. Since the first rare plant list was created in early 1980, Lucas County has led the state with more numerous rare plant species than any other county in Ohio. This is primarily because of the presence of the Oak Openings Region and, to a lesser extent, the Lake Erie marshes. Over 70% of landscape has been developed or is in agriculture, leaving less than 30% in natural cover. Because of the globally rarity conservation actions should be targeted within priority restoration and conservation areas of this region to efficiently protect the unique plants and animals. (The Nature Conservancy, 2016)

1.3 Public Participation and Involvement

It is important to have diverse involvement in the development of any restoration plan. This should include not only the public but businesses, academia, non-profit groups and organization among others. In the Tenmile Creek HU there are lots of partners working to restore the watershed. Their focus varies from streams to wetlands and fish to birds.

Commented [CAB6]: *Description: This section should be a **10 paragraph** or less summary of who was involved in the development of this document, including information on of any public meetings or reviews that were held to assist in the development of this NPS-IS plan. Include as many images, maps, tables, etc. as needed.*

Over the last twenty-five years there has been lots of attention on the Ottawa River from businesses, government, academia and local watershed groups interested and involved in improving the Ottawa River watershed. Most of that attention was directed at addressing brownfields and contaminated sediments in the lower reaches. However, in the **Ottawa River-Frontal Lake Erie: Tenmile Creek HUC-12** protection, enhancement and restoration of natural habitat and stream health have been the focus.

Clean Stream Partners (CSP) works directly with citizens, businesses, governmental agencies, and other non-profit organizations who take local ownership in their rivers, streams, and lakes. CSP strives for clean, clear and safe waters by connecting organizational and individual partners through educational opportunities, conservation programs, stream clean-ups and outreach programs for the benefit of local and regional water in Northwest Ohio. CSP will be one of the principle authors of this NPS-IS for the **Ottawa River-Frontal Lake Erie: Tenmile Creek HUC-12.**

CSP also works as the facilitating organization for the Maumee Area of Concern Advisory Committee (MAAC). Through the MAAC, a diverse assortment of interested citizens, government agencies, businesses, and other non-profit organizations collaborate and plan together to meet the broader goals set for AOCs (Areas of Concern) by under the International Great Lakes Water Quality Agreement. The AOC Program in Ohio is under direction of the Ohio Environmental Protection Agency with guidance from U.S. Environmental Protection Agency.

Rivers America is another key partner working toward restoration of area waterways and principle author of this document. They are working to protect wild rivers, restore damaged rivers, and conserve clean water for people and nature. Since 1973, Rivers America has nationally protected and restored more than 150,000 miles of rivers through advocacy efforts and on-the-ground projects. (Rivers America, 2016)

EXAMPLE

Some of the other key partners working in the Ottawa River HU include: The Olander Park System (TOPS), Metroparks of the Toledo Area, Toledo Metropolitan Area Council of Governments (TMACOG), The Nature Conservancy, Lucas County, and the cities of Sylvania and Toledo.

Chapters 1, 2 and 3 were primarily authored by CSP and Rivers America utilizing *Biological and Water Quality Study of Tenmile Creek and the Ottawa River*, 2011 (Ohio EPA Technical Report EAS/2014-06-06) (Ottawa River TSD). (Ohio EPA, 2015) Project information for Chapter 4 was compiled from the on-line Maumee AOC Data Management and Delisting System (DMDS) (Clean Stream Partners, 2016) and by working with community partners at meetings. Two special meetings were held to discuss this NPS-IS plan and the projects that should be included in it. One was held in the **Ottawa River-Frontal Lake Erie: Tenmile Creek HUC-12** at Olander Park – Nederhouser Community Hall on May 13, 2016 and just upstream at the Metroparks of Toledo Area Secor Metroparks on May 26, 2016. Both meetings were well attended and lots of good information was collected for inclusion in this document.

EXAMPLE

Chapter 2: Tenmile Creek HUC-12 Watershed Characterization and Assessment Summary

2.1 Summary Watershed Characterization for Tenmile Creek HUC 12

2.1.1 Physical and Natural Features

The Ottawa River-Frontal Lake Erie HUC-10 watershed is comprised on nine HUs. This document is focusing on the #06 HU of the **Ottawa River-Frontal Lake Erie HUC-10—Tenmile Creek HUC-12** (04100001 03 06). The **Tenmile Creek HUC-12** which is located in the middle of the *Ottawa River-Frontal Lake Erie HUC-10*. Tenmile Creek is the principle waterway flowing through this portion of the *Ottawa River-Frontal Lake Erie HUC-10*. The Tenmile Creek watershed begins in the *Headwaters Tenmile Creek HUC-12* (04100001 03 04). It is joined by the *Prairie Ditch HUC-12* (04100001 03 03) to establish the upstream node of the **Tenmile Creek HUC-12**. The confluence of Tenmile Creek with the *North Tenmile Creek HUC-12* (04100001 03 05) serves as the downstream terminal node for the Tenmile Creek watershed and the upstream initial node for *the Heldman Ditch-Ottawa River HUC-12* (04100001 03 07). It is at the confluence of Tenmile Creek with North Tenmile Creek that the Ottawa River is formed. (Ohio EPA, 2015)

The *Ottawa River-Frontal Lake Erie HUC-10* watershed is wholly contained within the Huron/Erie Lake Plains (HELP) ecoregion. Upstream of and into the **Tenmile Creek HUC-12**, agriculture prevails on Lake Plain glacial till deposits overlying Devonian bedrock. Rural and suburban development is also dominant in the **Tenmile Creek HUC-12** largely occupying the Sand Plains of the Oak Openings on top of a Devonian or Silurian base. As you move downstream in the **Tenmile Creek HUC-12** and into the Ottawa River there are urban areas on Lake Plain lacustrine fine sand, silt, and clay deposits over Silurian bedrock. Area bedrock is dense, offering little ground water storage or contribution to surface flows. Soils throughout the basin are poorly drained.

Much of the **Tenmile Creek HUC-12** has severely wet soils that are generally unsuitable for basement building foundations, septic leach fields or manure application without artificial drainage (Ohio EPA, 2015)

FIGURE 4: A NICE SUMMER DAY AT OLANDER PARK. PHOTO CREDIT TO THE OLANDER PARK SYSTEM.

Along the mainstem of Tenmile Creek (especially at the downstream portion of the HUC-12) there exists a wide wooded riparian buffer with mature riparian habitat that supports important populations of wildlife. In early 2014, bald eagles were found to have built a nest within the riparian area east of Centennial Road, situated in a group of trees near Tenmile Creek.

Specific landmarks and features in this watershed include:

- Near water riparian tree removal (River-Left)—From Sylvania Ave. (RM 4.3) to Brint Rd. (RM 3.0)
- The Centennial Quarry - a reclaimed quarry used as a recreational/entertainment area
- An active quarry—Hanson Aggregates Midwest, LLC— Discharge permit #s 2IJ00039 and 2IJ00096
- Pre-cast concrete yard
- Landscape/mulch yard
- Trucking companies
- Former landfill

Commented [BC7]: *This Chapter is intended to be an overview and scoping of the full geographic extent of the HUC-12 addresses in this document. Chapter 2 should be a brief non-technical description/overview of the overall watershed/HUC-12 conditions as context for the rest of the document. It is expected that for most watershed(s) /HUC-12s this information has already been captured in other document(s) (i.e. TSD, TMDL, WAP) and can be summarized here with details incorporated by referencing the other document. As new data becomes available this Chapter should be updated. This Chapter should be written for a single HUC-12. If the authoring organization prefers to address more than one HUC-12 (i.e., all the HUC-12s in the HUC-10) then all the HUC-12 NPS-IS plans may be combined into one document.*

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Possible Data Sources: Ohio EPA Technical Support Documents (TSDs), Ohio EPA Total Maximum Daily Load Reports (TMDLs), Ohio EPA Integrated Report, other reliable data and information

EXAMPLE

- Golf course
- Several parks in The Olander Park System including: Olander Park, Fossil Park, Sylvan Prairie Park, Nona Frances Centennial Park & Terrace
- Commercial/business and residential housing at downstream portion of the HUC

It should be noted that the Sylvania Quarry II facility is located south of Sylvania Avenue and is currently not an active site. Mining has taken place at the location but the excavation site currently does not have the ability to pump water to discharge. There are no immediate plans to discharge from the site, but Hanson Aggregates keeps the permit active for potential future use.

The discharge from Quarry I is from the active mining area water collection pit. The water is pumped from the pit via a duplex pump system to an unnamed tributary to Tenmile Creek. The facility has the ability to divert water from the discharge pipe to the process water pond and the wash water waste pond. It was indicated that the process water pond and wash water waste pond do not have discharges but are recycled back into the process. Water is used on the site to wash the stone and for a wheel washing system as the trucks leave the site. All of the runoff from the used water is kept onsite.

There have not been any recent violations or impacts documented from operations at this quarry. The discharge flow rate to Tenmile Creek is generally between 3 and 6 cubic feet per second (CFS) (i.e., between 2 and 4 million gallons per day (MGD)). Based on the current activities at these sites, there doesn't appear to be much, if any, impact to the stream.

According to a U.S. Army Corps of Engineers report, erosion and sedimentation are together a significant nonpoint pollutant issue that impacts the watershed, both environmentally and economically. Sediments from rural and urban areas are deposited in various drainage and stream channels that must be cleaned out to function properly and there is also an effect of sedimentation on water quality. Wetlands areas that had served to filter runoff and

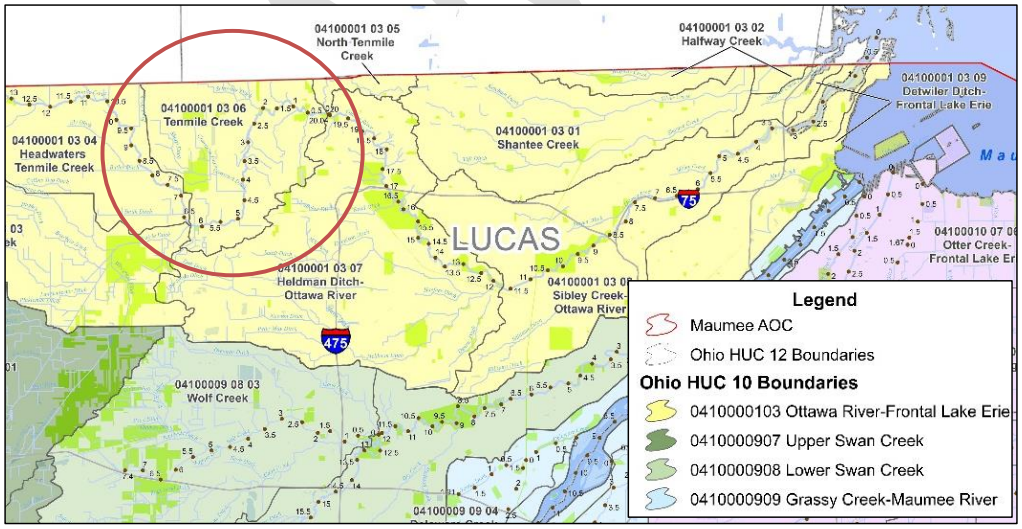

FIGURE 5: GREEN HIGHLIGHTED AREAS ARE PUBLICLY OWNED PARKS AND PROTECTED LAND. (CLEAN STREAM PARTNERS, 2016)

trap sediment, nutrients and pesticides have been drained and/or filled. Restoration of natural hydrology and flow characteristics has been a consistent identified need by multiple agencies within the watershed. Removal of all impediments to flow, protection of floodplains and wetlands, as well as sediment loading reduction programs need to take place in order for this to be achieved. Sediment loading and stream channel modifications increase flood peaks and downstream flooding as well as transport sediment in Lake Erie. Increased vegetative buffers and floodplain protection in areas where possible is needed to prevent this. (U.S. Army Corps of Engineers, 2009)

he 1975 study by the Great Lakes Basin Commission reports on the analyses of erosion and sedimentation processes. A good portion of the analyses were dedicated to predicting future trends in erosion and sedimentation rates. The report estimated that as much as 15% of the stream banks in some areas were affected by erosion. The erosion rates in the Western Lake Erie watershed are among the highest in the Great Lakes basin. (Great Lakes Basin Commission, 1975) Actively eroding streambanks in the Ottawa River watershed contribute to the sediment loading problems. Some lower reaches of the Ottawa River are especially susceptible to the deposition of fine-grained sediments that tend to adsorb contaminants, diminish channel flow capacities and impede navigation. (U.S. Army Corps of Engineers, 2009)

2.1.2 Land Use and Protection

In the **Tenmile Creek HUC-12**, stream habitat quality mirrored the surrounding land use. One-third of the **Tenmile Creek HUC-12** is devoted to row crops (28%). Another half consists of Sylvania area housing developments (51%). A large quarry (8%). The **Tenmile Creek HUC-12** downstream from Prairie Ditch has a mix of wooded riparian corridor and undeveloped property (13%). Upstream of the **Tenmile Creek HUC-12** most of the watershed is

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Possible Data Sources: Ohio EPA Technical Support Documents (TSDs), Ohio EPA Total Maximum Daily Load Reports (TMDLs), Ohio EPA Integrated Report, other reliable data and information

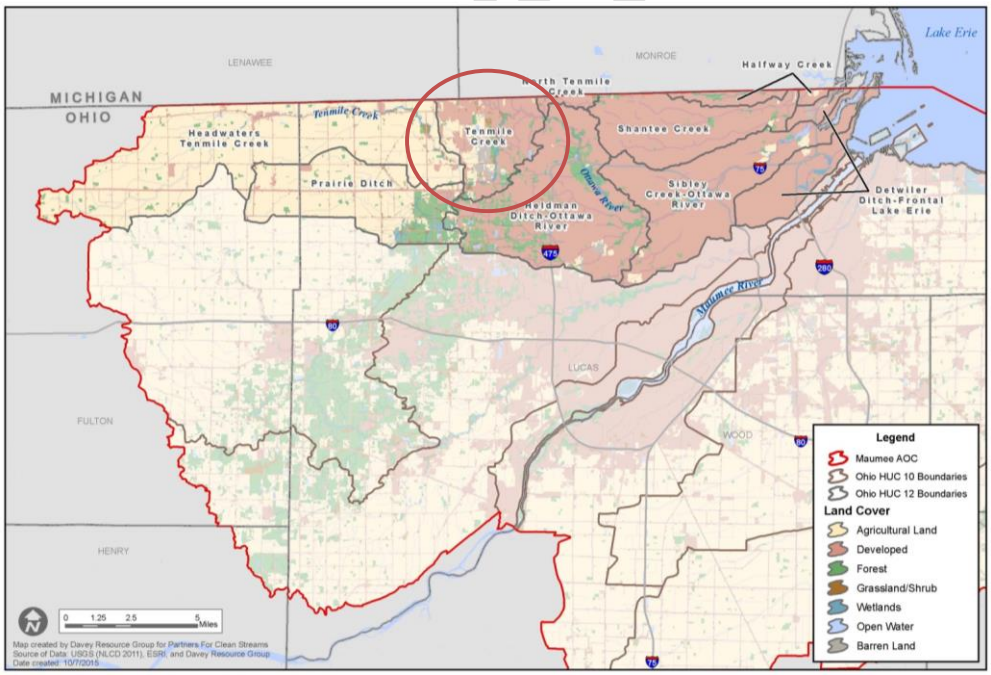


FIGURE 6: LAND USE IN THE OTTAWA RIVER: FRONTAL LAKE ERIE (HUC-10: 0410000103) (CLEAN STREAM PARTNERS, 2016)

maintained as a treeless ditch; which may be having some effect on the **Tenmile Creek HUC-12.** (Ohio EPA, 2015) A more detailed breakdown of the **Tenmile Creek HUC-12** and the adjacent upstream HUCs (*Headwaters Tenmile Creek HUC-12 and Prairie Ditch HUC-12*) that may have an influence on the **Tenmile Creek HUC-12** are also listed for reference in Table 1. (Homer, 2015)

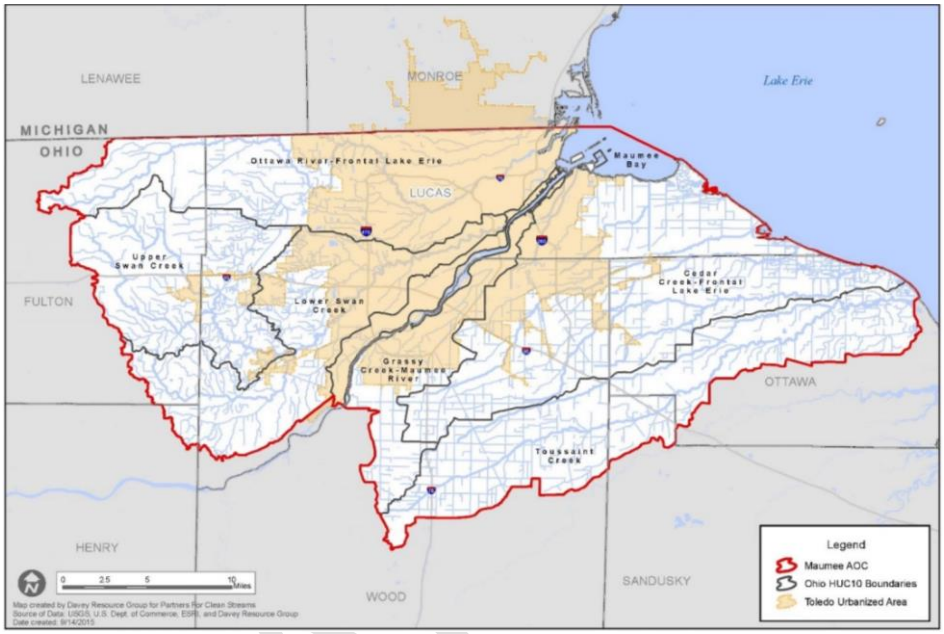
TABLE 1: LAND USE CLASSIFICATIONS FOR SELECTED TENMILE CREEK WATERSHEDS (HOMER, 2015)

Cover classification	% watershed area	Area (mi^2)	Cover classification	% watershed area	Area (mi^2)	Cover classification	% watershed area	Area (mi^2)
Tenmile Creek *(41000010 03 06)*			***Headwaters Tenmile Creek*** *(41000010 03 04)*			***Prairie Ditch*** *(41000010 03 03)*		
Barren	6.17%	0.69	**Barren**	0.06%	0.02	**Barren**	0.11%	0.02
Crop	19.05%	2.14	**Crop**	87.92%	35.05	**Crop**	69.94%	13.02
Hay/Pasture	0.75%	0.08	**Hay/Pasture**	2.32%	0.92	**Hay/Pasture**	12.25%	2.28
Deciduous Forest	8.55%	0.96	**Deciduous Forest**	0.18%	0.07	**Deciduous Forest**	0.04%	0.01
Evergreen Forest	0.01%	0.00	**Evergreen Forest**	1.72%	0.69	**Evergreen Forest**	2.41%	0.45
Mixed Forest	0.02%	0.00	**Mixed Forest**	0.45%	0.18	**Mixed Forest**	0.39%	0.07
Herbaceous	2.35%	0.26	**Herbaceous**	5.36%	2.14	**Herbaceous**	8.73%	1.63
Herbaceous Wetlands	0.14%	0.02	**Herbaceous Wetlands**	0.01%	0.00	**Herbaceous Wetlands**	0.27%	0.05
Woody Wetlands	1.41%	0.16	**Woody Wetlands**	0.01%	0.00	**Woody Wetlands**	0.00%	0.00
Shrub/Scrub	0.00 %	0.00	**Shrub/Scrub**	0.60%	0.24	**Shrub/Scrub**	2.45%	0.46
Developed, High Intensity	2.29	0.26	**Developed, High Intensity**	0.94%	0.38	**Developed, High Intensity**	1.53%	0.29
Developed, Medium Intensity	8.91%	1.00	**Developed, Medium Intensity**	0.00%	0.00	**Developed, Medium Intensity**	0.00%	0.00
Developed, Low Intensity	33.04%	3.71	**Developed, Low Intensity**	0.11%	0.04	**Developed, Low Intensity**	0.12%	0.02
Developed, Open Space	16.36%	1.83	**Developed, Open Space**	0.00%	0.00	**Developed, Open Space**	0.00%	0.00
Water	0.96%	0.11	**Water**	0.33%	0.13	**Water**	1.75%	0.33
Total	100.00%	11.21	**Total**	100.00%	39.87	**Total**	100.00%	18.61

With approximately 70% of the **Tenmile Creek HUC-12** being within the NPDES regulated Municipal Separate Storm Sewer System, the effects of storm water are worth mentioning in this NPS-IS plan. Storm water can be one of the most significant and difficult nonpoint source pollutants to address within a watershed. Storm water is problematic because any substance such as chemicals, nutrients, sediment, and other debris is carried into the storm sewer system which is discharged untreated into the surrounding waterbodies. This has subsequent effects on drinking water, recreational activities, and industries that rely on clean water. The main sources of storm water runoff come from urban, suburban, and agricultural activities; with each source effecting water quality in a variety

of ways. The city of Sylvania, Sylvania Township and Lucas County are all regulated under by Ohio EPA under the program for storm water.

FIGURE 7: TOLEDO URBANIZED AREA AS DEFINED BY THE 2010 CENSUS (CLEAN STREAM PARTNERS, 2016)



2.2 Summary of Biological Trends for Tenmile Creek HUC-12

In 2011 Ohio EPA sampled most of the Ottawa River-Frontal Lake Erie HUC-10; except the lower 9 miles. In January 2015 they released *Biological and Water Quality Study of the Tenmile Creek and the Ottawa River, 2011 Technical Report EAS/2014-06-06*. The report was used extensively in the development of this *Ottawa River-Frontal Lake Erie: Tenmile Creek HUC-12 NPS-IS Plan*. The Ottawa River, Tenmile Creek, and North Tenmile Creek are designated and were previously confirmed for the warmwater habitat (WWH) aquatic life use (Ohio EPA, 2016). (Ohio EPA, 2015)

A summary of the sample locations and their biological status in the **Tenmile Creek HUC-12** are provided in Table 2. Also included in Table 2 for reference are the sample locations immediately upstream and downstream from the **Tenmile Creek HUC-12**. A map of this sample information is shown in Figure 8. The aquatic community of the Tenmile Creek watershed was predominated by macroinvertebrates and fish that tolerate pollution and the limiting aspects of silty substrates. The prevalence of pollution tolerant aquatic assemblages in Tenmile Creek watershed was consistent with the presence of various stressors documented through water chemistry analysis. Data from Tenmile Creek watershed indicated than an unreliable and chaotic dissolved oxygen (D.O.) regime exists from its headwater origin downstream to near the Brint Road location (RM 2.9) in the **Tenmile Creek HUC-12** where D.O. values were consistently above the 5.0 mg/l average WWH criterion. The aquatic assemblage consisted of those species resistant to extremes in dissolved oxygen (D.O.) availability, nutrient pulses, water temperature, and flow. (Ohio EPA, 2015)

Commented [BC10]: *Description: This section should be a **10 paragraph or less** summary of Ohio's biological water quality indicators (i.e. fish (IBI, MIwb), macroinvertebrates (ICI), habitat (QHEI)) for the watershed(s) /HUC-12 included in this NPS-IS plan. This section should be a simple summary of the trends and overall conditions for a HUC-12; not specific site-by-site conditions. Detailed site-by-site conditions will be captured in the Chapter 4. Include as many images, maps, tables, etc. as needed to illustrate NPS water quality.*
Possible Data Sources: Ohio EPA Technical Support Documents (TSDs), Ohio EPA Total Maximum Daily Load Reports (TMDLs), Ohio EPA Integrated Report, other reliable data and information

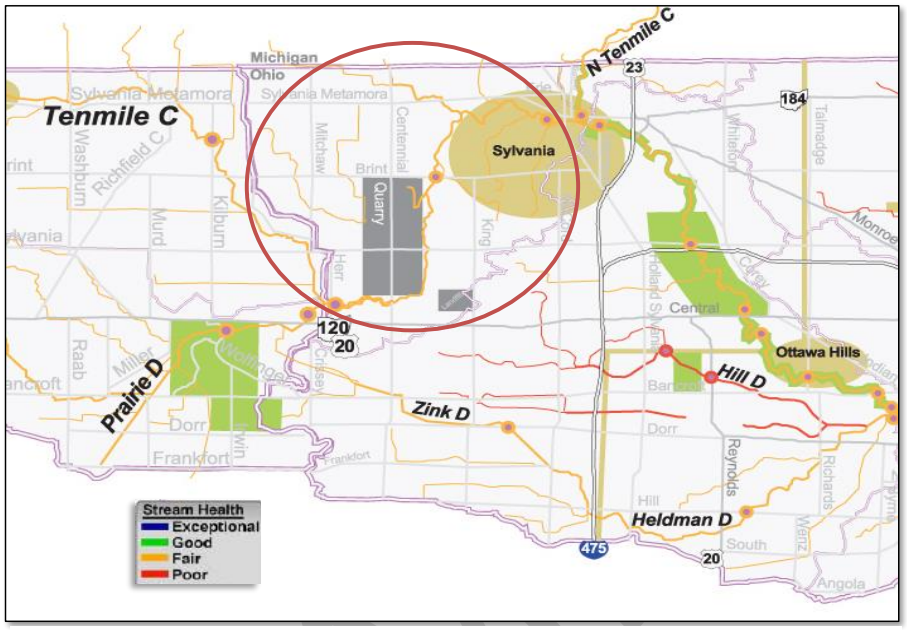


FIGURE 8: ATTAINMENT MAP AND SAMPLING LOCATIONS (OHIO EPA, 2015)

TABLE 2: OVERALL BIOLOGICAL INDICES SCORES FOR SELECTED SITES IN TENMILE CREEK WATERSHEDS (OHIO EPA, 2015)

RM (Drain. area mi²)	IBI/ MIwb[a]	ICI[b]	Status	QHEI	Location
Tenmile Creek HUC-12 (04100001-03-06) *(WWH) (downstream of confluence of Prairie Ditch with Tenmile Creek)*					
5.9 (64.5)[w]	34/7.0[ns]	18*	Partial	52.5	Herr Road
2.9 (70.0)[w]	37/6.1*	26*	NON	51.0	Brint Road
0.5 (81.0)[w]	39/7.4	38	Full	77.0	Silica Drive
Headwaters Tenmile Creek HUC-12 (04100001-03-04) *(WWH) (first site upstream on Tenmile Creek)*					
9.2 (43.0)[w]	31[ns]/ 6.7*	Good	Partial	49.0	Kilburn Road
Prairie Ditch HUC-12 (04100001-03-03) *(recommended MWH) (first site upstream on Prairie Ditch)*					
0.3 (17.3)[w]	28	Fair	Full	19.0	Central Avenue
Heldman Ditch-Ottawa River HUC-12 (04100001-03-07) *(WWH) (first site downstream of confluence of North Tenmile Creek and Tenmile Creek)*					
19.5 (124.6)[w]	37/ 6.3*	34	Partial	78.0	Harroun Road

* *Significant departure from ecoregion biocriterion; poor and very poor results are underlined.*
ns Nonsignificant departure from biocriterion (≤4 IBI or ICI units; ≤0.5 MIwb units).
a The MIwb (Modified Index of well-being) is not applicable to headwater sites (<20mi²).
w Wading site.
b Narrative evaluation used in lieu of ICI (Good; MG=Marginally Good; Fair; L Fair=Low Fair; Poor; VP=Very Poor).

Fishes (Modified Index of Well-Being [MIwb] & Index of Biotic Integrity [IBI])
The performance of the whole Tenmile Creek watershed fish community in the biological indices was most affected by the absence of species with narrow niches. No pollution intolerant species were collected in the Tenmile Creek watershed. All samples achieved moderate total native species IBI metric scores, and better substrates at the most downstream site (Silica Dr. – RM 0.5) in the **Tenmile Creek HUC-12** were associated with an abundance of darters (37%).

Despite the presence of larger aggregate including boulders and cobble at many sites in the Tenmile Creek watershed, substrate quality was universally degraded by the lack of interstitial voids at all locations. The embedded substrates were usually smothered by an overabundance of silt. Although good pool depth was often present, the absence of fast current coupled with little functional instream cover was commonly more limiting.

FIGURE 9: OHIO EPA SAMPLING CREW COLLECTING FISH. PHOTO CREDIT TO OHIO EPA.

Poor habitats were encountered in the rural parts of the **Tenmile Creek HUC-12** and *Prairie Ditch HUC-12*. Aside from the adequate pool depth, the absence of most warmwater habitat qualities in these streams was further influenced by ongoing drainage maintenance practices. (Ohio EPA, 2015)

Macroinvertebrates (Invertebrate Community Index [ICI])
The **Tenmile Creek HUC-12** is immediately downstream from *Headwaters Tenmile Creek and Prairie Creek HUC-12s*. The macroinvertebrate decline downstream from *Prairie Creek HUC-12* was consistent with limited riffle availability and the smallest darter population (5%). There were half as many EPT taxa (9) (Ephemeroptera (mayflies), Plecoptera (stoneflies), Trichoptera (caddisflies)) and fewer (2-5) sensitive types present. Predominated by moderately pollution tolerant midges, this reach with low organism density was at odds with the improving trend. Better habitat at the most downstream **Tenmile Creek HUC-12** site (Silica Dr - RM 0.5) was consistent with more abundant hydropsychid caddisflies and baetid mayflies, the presence of six sensitive and one coldwater taxa and a modest density increase. Despite a good ICI score (38) relatively few EPT taxa (8) at the most downstream **Tenmile Creek HUC-12** location suggested some limiting influences were still in existence. (Ohio EPA, 2015)

Habitat (via Qualitative Habitat Evaluation Index [QHEI])
The most downstream sampling locations within the **Tenmile Creek HUC-12** and the two most upstream Ottawa River sites in the *Heldman Ditch-Ottawa River HUC-12* were found to be unique to the Ottawa River-Frontal Lake Erie HUC-10 for having very good stream habitat (QHEI $\bar{x}$ =74.5, n=3). Dolomite bedrock at these locations provided good substrate and the presence of root wads with woody debris were functional cover options.

The upper reaches of Tenmile Creek watershed have been maintained as a headwater ditch. As such Tenmile Creek's poor upstream habitat conditions generally improved with increased drainage in the **Tenmile Creek HUC-12**. Riparian trees in Lucas County contributed to fair habitat quality. In Sylvania near the mouth of Tenmile Creek

at Silica Drive (RM 0.5), very good habitat was created by clean, well washed dolomite bedrock substrates (QHEI=77.0). This very good habitat within the **Tenmile Creek HUC-12** resulted in the highest IBI score (IBI=39) on the mainstem Tenmile Creek. The majority of Tenmile Creek watershed exhibited only fair habitat quality (QHEI$\bar{x}$ =48.7, n=7). (Ohio EPA, 2015)

Table 3 shows the various water quality and habitat attributes that were documented by Ohio EPA sampling crews during the most recent monitoring effort in the Tenmile Creek Survey of 2011. The Table 3 shows that there are more numerous attributes (e.g., channelized, silt/muck substrates, etc.) in the watersheds above the **Tenmile Creek HUC-12** that are highly likely to be contributing to the *partial* and *non-attainment* in the **Tenmile Creek HUC-12.**

FIGURE 10: FALL AT SYLVAN PRAIRIE IN THE OLANDER PARK SYSTEM.
PHOTO CREDIT TO THE OLANDER PARK SYSTEM.

TABLE 3: QUALITATIVE HABITAT EVALUATION INDEX (QHEI) MATRIX WITH WARMWATER HABITAT (WWH) AND MODIFIED WARMWATER (MWH) ATTRIBUTE TOTALS IN SELECTED TENMILE CREEK WATERSHEDS (OHIO EPA, 2015)

Key QHEI Components			WWH Attributes											MWH Attributes																	
														High Influence						Moderate Influence											
River Mile	QHEI Score	Gradient (ft/mi)	Not Channelized or Recovered	Boulder/Cobble/Gravel Substrates	Silt Free Substrates	Good/Excellent Development	Moderate/High Sinuosity	Extensive/Moderate Cover	Fast Current/Eddies	Low/Normal Embeddedness	Max Depth >40 cm	Low/Normal Riffle Embeddedness	WWH Attributes	Channelized/No Recovery	Silt/Muck Substrates	No Sinuosity	Sparse/No Cover	Max Depth <40 cm	Hi-Influence Modified Attributes	Recovering Channel	Heavy/Moderate Silt Cover	Sand Substrate (Boat)	Hardpan Substrate Origin	Fair/Poor Development	Low Sinuosity	Only 1 or 2 Cover types	Intermediate/Poor Pools	No Fast Current	High/Moderate Embeddedness	High/Moderate riffle Embeddedness	No Riffle	M.I. MWM Attributes
Tenmile Creek HUC-12 (04100001-03-06) *(WWH) (downstream of confluence of Prairie Ditch with Tenmile Creek)*																															
Tenmile Creek (03-06)																															
5.9	52.5	5.26	•	•			•				•		4				•		1	•	•		•	•				•	•	•		7
3.0	51.0	3.79	•	•							•		3				•		1		•			•	•			•	•		•	6
0.5	77.0	14.29	•	•		•	•	•		•	•	•	8						0									•	•			2
Headwaters Tenmile Creek HUC-12 (04100001-03-04) *(WWH) (first site upstream on Tenmile Creek)*																															
18.3	37.3	6.41											0	•		•	•	•	4		•		•	•	•			•	•		•	7
16.0	41.5	4.90		•							•		2	•		•	•		3		•		•	•			•	•	•	•		7
15.0	32.5	4.76		•									1	•		•	•	•	4		•		•	•	•	•		•	•		•	8
9.2	49.0	3.62		•							•		2	•			•		2		•			•	•		•	•	•	•		7
Prairie Ditch HUC-12 (04100001-03-03) *(recommended MWH) (first site upstream on Prairie Ditch)*																															
1.4	27.0	2.44											0	•	•	•	•	•	5		•		•	•		•		•	•		•	7
0.3	19.0	2.44									•		1	•	•	•	•		4		•		•	•		•	•	•	•		•	8
Heldman Ditch-Ottawa River HUC-12 (04100001-03-07) *(WWH) (first site downstream of confluence of North Tenmile Creek and Tenmile Creek)*																															
2.8	39.0	10.42					•				•		2		•		•		2	•	•		•	•			•	•	•		•	8
0.1	59.0	13.51	•	•		•	•	•			•		6						0		•						•	•	•	•		5

2.3 Summary of NPS Pollution Causes and Associated Sources for Tenmile Creek HUC-12

As listed in the 2014 Integrated Water Quality Monitoring and Assessment Report, Ohio EPA has determined that the biological impairments in the **Tenmile Creek HUC-12** are primarily from the cause of sedimentation/siltation and the associated source of channelization. These are common causes and sources in Northwest Ohio and throughout the state. Much of the channelization in the upper portion of the **Tenmile Creek HUC-12** is related to agriculture land use with this area being in *Partial Attainment*. Based on the information provided in Table 3 it should be noted that another nonpoint source of impairment is *hydro-modification* (a surrogate of channelization). Likewise, the source *non-irrigated cropland* is a surrogate of hydro-modification. The lower portion of the **Tenmile Creek HUC-12** is in *Full Attainment* with primarily residential land use along with parks, a golf course and natural riparian areas. The middle portion of the **Tenmile Creek HUC-12** is in *Non-Attainment*. This portion has impacts from both the agricultural upstream land use and the impacts/disturbance from quarrying operations. See Figure 6 for a map of the land use of the **Tenmile Creek HUC-12**. There are no point source related causes and sources of impairment in the **Tenmile Creek HUC-12**.

Commented [BC11]: *Description: This section should be a **10 paragraph or less** summary of the identified causes and associated sources of the NPS impairments (i.e. habitat alteration, hydromodification, silt/sedimentation, nutrient enrichment) for the watershed(s) /HUC-12 included in this NPS-IS plan. This section should be a brief summary of why the watershed(s)/HUC-12 is in partial or non-attainment and how that ties to each identified cause/source. This should not a specific site-by-site explanation. Those details will be captured in the Chapter 4. Not all causes and associated sources need to be included; only those related to the NPS issues or related to the projects that are recommended in this NPS-IS plan. Include as many images, maps, tables, etc. as needed to illustrate NPS water quality.*
Possible Data Sources: Ohio EPA Technical Support Documents (TSDs), Ohio EPA Total Maximum Daily Load Reports (TMDLs), Ohio EPA Integrated Report, other reliable data and information

TABLE 4: CAUSES AND SOURCES OF NPS IMPAIRMENTS FOR SELECTED TENMILE CREEK SAMPLING LOCATIONS (OHIO EPA, 2015)

RM (Drain. area mi^2) [w =wading site]	Primary Cause	Primary Source	Status	Location
Tenmile Creek HUC-12 (04100001-03-06) *(WWH) (downstream of confluence of Prairie Ditch with Tenmile Creek)*				
5.9 (64.5)^w	Sedimentation/siltation	Channelization*	Partial	Herr Road
2.9 (70.0)^w	Sedimentation/siltation	Channelization*	NON	Brint Road
0.5 (81.0)^w	n/a	n/a	Full	Silica Drive
Headwaters Tenmile Creek HUC-12 (04100001-03-04) *(WWH) (first site upstream on Tenmile Creek)*				
9.2 (43.0)^w	Sedimentation/siltation	Channelization	Partial	Kilburn Rd
Prairie Ditch HUC-12 (04100001-03-03) *(recommended MWH) (first site upstream on Prairie Ditch)*				
0.3 (17.3)^w	n/a	n/a	Full	Central Avenue
Heldman Ditch-Ottawa River HUC-12 (04100001-03-07) *(WWH) (first site downstream of confluence of North Tenmile Creek and Tenmile Creek)*				
19.5 (124.6)^w	Sedimentation/siltation	Urban runoff/storm sewers	Partial	Harroun Road

**Addressing hydro-modification (a surrogate source w/ channelization) in both non-irrigated cropland and urban landscapes can also improve water quality.*

2.4 Additional Information for Determining Critical Areas and Developing Implementation Strategies for Tenmile Creek HUC-12

There are several organizations and agencies that work in the **Tenmile Creek HUC-12** to improve habitat and water quality. The most active groups in this area are The Olander Park System, Clean Stream Partners and the Maumee Area of Concern Advisory Committee. Each of these organization has created documents and/or plans to help identify need and direct restoration in the area. These documents were used to create this NPS-IS plan and are in the Works Cited section, as appropriate. No additional assessment data, studies or surveys were used other than Ohio EPA's stream assessment survey from 2011. (Ohio EPA, 2015) Therefore, Section(s) 2.4.x have not been included in this NPS-IS plan.

Commented [BC12]: *Description: The sub-sections in this section should be **no more than 4 paragraphs** describing each study, survey, initiative, etc. that explains relevant information gathered and used to inform the critical areas, needs and projects of the watershed(s) /HUC-12 included in this NPS-IS plan. Each sub-section should be numerically labelled in accordance with the numbering system being used/followed in these NPS-IS plans. Include as many images, maps, tables, etc. as needed to explain the conditions related to NPS water quality.*
Possible Data Sources: University studies, public agency datasets, local inventories & surveys, other reliable data and information

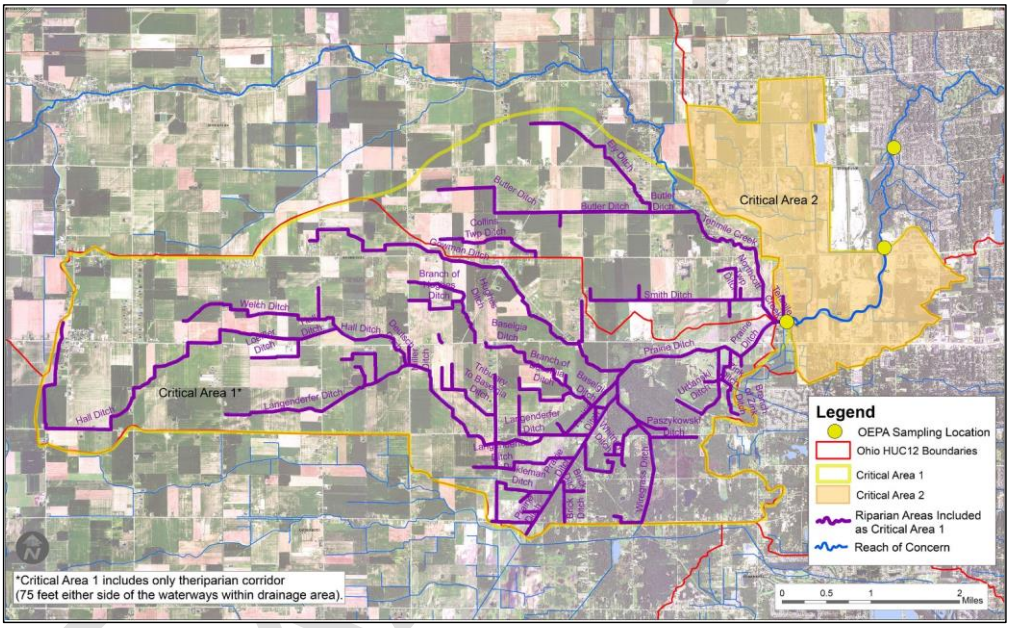
EXAMPLE

Chapter 3: Conditions & Restoration Strategies for Tenmile Creek HUC-12 Critical Areas

3.1 Overview of Critical Areas

Two of the three sampling locations in the **Tenmile Creek HUC-12** are not in *Full Attainment* of the expected aquatic life uses. The upstream sampling location at River Mile (RM) 5.9 (Herr Rd site) is in *Partial Attainment* and the middle sampling location at RM 2.9 (Brint Rd site) is in *Non-Attainment*. Two critical areas have been identified to address the nonpoint source pollution issues that are believed to be causing the impaired state.

FIGURE 11: TENMILE CREEK HUC-12 CRITICAL AREAS



3.2 Critical Area 1: Conditions, Goals & Objectives for the Upper Reach of Tenmile Creek HUC-12

3.2.1 Detailed Characterization

The Tenmile Creek sampling site at River Mile (RM) 5.9 is located at Herr Rd. where Temmile Creek is listed in *Partial Attainment* of the Warmwater Habitat aquatic life use designation. The Herr Rd. site is near the upstream terminus of the **Tenmile Creek HUC-12** watershed. Due to the sampling sites proximity to the upstream HUC-12 boundary, the source of the listed impairment at the Herr Rd. site is significantly influenced by the attributes of the contributing waterways in the adjacent and upstream watersheds and therefore the *Prairie Creek* and *Headwaters Tenmile Creek HUC-12s* must be included within Critical Area 1 of the **Tenmile Creek HUC-12**.

Using the rationale described in the *Handbook for Developing Watershed Plans to Restore and Protect Our Waters* (U.S. Environmental Protection Agency, 2008)(Section 10.3.4): "In general, management practices are implemented immediately adjacent to the waterbody or upland to address the sources of pollutant loads."—

Commented [BC13]: *This Chapter should be a more detailed explanation of the Critical Area than found in the HUC-12 summary conditions in Chapter 2. Each sub-section should be written for a single Critical Area and each section MUST include a map of the Critical Area. It is recommended that all identified Critical Areas in the HUC-12 be included in this Chapter, however at least one Critical Area must be identified and explained in order for an implementation project from that Critical Area to be eligible for funding.*

Commented [BC14]: *Description: This sub-section should be* ***no more than 5 paragraphs*** *provide an overview of the Critical Areas, general observations (i.e. more ag issues than urban, lots of habitat alterations) and a map of those critical areas (if feasible) for the watershed(s)/HUC-12 that is included in this NPS-IS plan. In order to reference this information in the Project & Implementation Overview Strategy Table (section 4.1) you are encouraged to develop a numbering or tracking system for your Critical Areas. Include as many images, maps, tables, etc. as needed to explain the conditions related to NPS water quality. It is possible that a critical area for one impairment may have the same boundary or overlap another criterial area for a different impairment. All impairments for a critical area should be included in the section that addresses that critical area.*

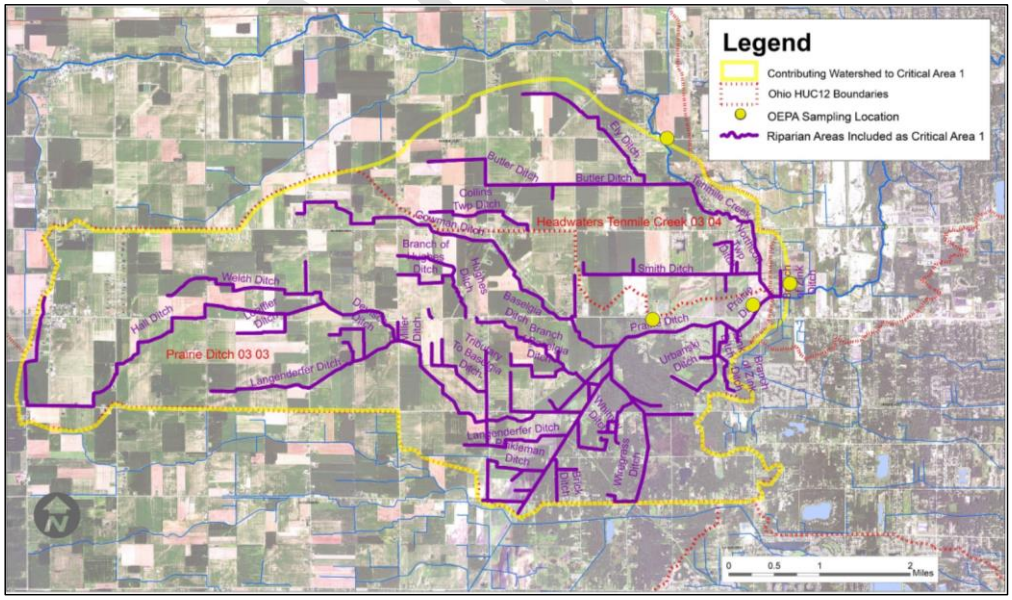
Commented [BC15]: *Description: This sub-section should be* ***10 paragraphs or less*** *succinctly describing the detailed features of one Critical Area included in this NPS-IS plan. This sub-section should be more detailed than section 2.1 and be specific to this Critical Area. Include as many images, maps, tables, etc. as needed. Possible Data Sources: Ohio EPA Technical Support Documents (TSDs), Ohio EPA Total Maximum Daily Load Reports (TMDLs), Ohio EPA Integrated Report, other reliable data and information*

Critical Area 1 includes the riparian area (75 feet each side of the tributaries and ditches that are within contributing watershed in *Headwaters Tenmile Creek HUC-12*. This is specific to the watershed upstream from Herr Road and downstream from the Kilburn Rd. *Critical Area 1* also includes the riparian area (75 feet each side of the tributaries and ditches that are within the entire watershed in *Prairie Creek HUC-12* as contributing watershed sources in this HUC are causing the *Partial Attainment* at the Herr Rd. site.

Headwaters Tenmile Creek HUC-12	Prairie Creek HUC-12
Tenmile Creek	Prairie Ditch
Ely Ditch	Hall Ditch
Butler Ditch	Welch Ditch
Collins Township Ditch	Langenderfer Ditch
Smith Ditch	Gowman Ditch
	Hughes Ditch
	Pinkleman Ditch
	Whitney Ditch
	Brick Ditch
	Wiregrass Ditch
	Baselgia Ditch

The land use of the *Headwaters Tenmile Creek and Prairie Creek HUC-12s* within *Critical Area 1* is almost entirely dedicated to row crop agriculture (approximately 90%). A 150 feet riparian zone (75 feet on either side of stream) along the following waterways and drainage ditches constituent the majority of *Critical Area 1*. It is estimated that *Critical Area 1* includes approximately 50 miles of riparian zones which equates to approximate 900 acres of land that is targeted for riparian improvement projects.

FIGURE 12: TENMILE CREEK HUC-12 CRITICAL AREA 1



The Headwaters Tenmile Creek watershed above Kilburn Rd sampling site is not included in *Critical Area 1* because Tenmile Creek is in *Partial Attainment* of its designated WWH use designation at the Kilburn Rd. sampling site and because that impairment would ideally be remedied through the implementation of strategies outlined in an NPS-IS plan developed specifically for the *Headwaters Tenmile Creek HUC-12*.

3.2.2 Detailed Biological Conditions

Table 5 below summarizes the fish community data at the Herr Road site and upstream from the Herr Rd. Site. Understanding the abundance, diversity, and pollution tolerance of existing fish species found by Ohio EPA at this sampling locations and relating that information to QHEI scores helps to inform Ohio EPA of causes and sources of impairment. The Herr Rd. sampling site is currently meeting the WWH standard for IBI score (34, goal is 28); and is meeting by only a thin margin the WWH standard standards for MIwb (6.9, goal is 6.8). With regard to habitat, scores for QHEI at the Herr Rd. sampling site are not currently meeting the WWH standard for QHEI score (52.5, goal is 60).

Commented [BC16]: *Description: This sub-section should be **8 paragraphs or less** succinctly describing the detailed biological conditions of one Critical Area included in this NPS-IS plan and state, numerically, how far the Critical Area is from attaining the aquatic life use target (i.e., fish (IBI, MIwb), macroinvertebrates (ICI), habitat (QHEI)). This sub-section should be more detailed than section 2.2 and be specific to this Critical Area. Include as many images, maps, tables, etc. as needed to illustrate NPS water quality. Possible Data Sources: Ohio EPA Technical Support Documents (TSDs), Ohio EPA Total Maximum Daily Load Reports (TMDLs), Ohio EPA Integrated Report, other reliable data and information*

TABLE 5: CRITICAL AREA 1 - FISH COMMUNITY AND HABITAT DATA (OHIO EPA, 2015)

Stream/RM	D.A. (mi2)	Total Species	QHEI	MIwB	IBI	Predominant Species (percent of catch)	Narrative Evaluation
Tenmile Creek *(WWH) (Partial Attainment)*							
5.9	64.5	21	52.5	6.9	34	green sunfish (22%), bluntnose minnow (18%), bluegill sunfish (14%)	Fair- Good
Headwaters Tenmile Creek *(WWH) (Partial Attainment)*							
9.2	43.0	17	49.0	6.7	31	creek chub (26%), bluntnose minnow (15%), striped shiner (14%)	Fair
Prairie Ditch *(Recommended MWH) (Full Attainment)*							
1.4	16.9	8	27.0	-	28	central mudminnow (75%), redfin pickerel (10%), creek chub (10%)	Fair
0.3	17.3	4	19.0	-	28	central mudminnow (84%), redfin pickerel (12%), yellow bullhead & green sunfish (2%)	Fair

Table 6 below summarizes the aquatic macroinvertebrate community data at the Herr Road site and upstream from the Herr Rd. Site. Understanding the abundance, diversity, and pollution tolerance of existing aquatic macroinvertebrates (bugs) found by Ohio EPA at this sampling location and relating that information to QHEI scores also helps to inform Ohio EPA of causes and sources of impairment. The Herr Rd. sampling site is currently not meeting the WWH standard for ICI score (18, goal is 30).

FIGURE 13: OLANDER PARK LAKE.
PHOTO CREDIT TO THE OLANDER PARK SYSTEM

EXAMPLE

TABLE 6: CRITICAL AREA 1 - MACROINVERTEBRATE COMMUNITY DATA (OHIO EPA, 2015)

Stream/RM	ICI Score -- Narrative	Notes	Predominant Species
Tenmile Creek *(WWH) (Partial Attainment)*			
5.9	18 — Fair Only 2 sensitive taxa	Low Qualitative density	Midges and hydropsychid caddisflies
Headwaters Tenmile Creek *(WWH) (Partial Attainment)*			
9.2	22 — Good 10 sensitive taxa	Moderate Qualitative density	hydropsychid caddisflies, baetid mayflies, midges, flatworms
Prairie Ditch *(Recommended MWH) (Full Attainment)*			
1.4	Fair 1 sensitive taxa	Low Qualitative density	Tolerant to Moderately Tolerant Snails, water boatmen, beetles
0.3	Fair 0 sensitive taxa	Low -Moderate Qualitative density	Snails, water boatmen, midges, sowbugs

3.2.3 Detailed Causes and Associated Sources

The Herr Rd. sampling site is listed as in *Partial Attainment* of the Warmwater Habitat aquatic life use designation. The cause for *Partial Attainment* listing is sedimentation/ siltation with the source being channelization. A review of the data shown in Table 5 helps describe the habitat indicators at sampling sites on Tenmile Creek upstream from the Herr Road Site (in the *Headwaters Tenmile Creek HUC-12* (41000010 03 04)); and from sampling sites in the *Prairie Creek HUC-12* (41000010 03 03) upstream from the Herr Road Site. The data in Table 3 from the Ohio EPA Technical Support Document (Ohio EPA, 2015) reveals a direct link between the significant presence of attributes that have significant influence on the *Partial Attainment* listing at the Herr Rd. site downstream sampling site (i.e., *non-attainment* of QHEI and ICI goals).

These contributing attributes from the adjacent and upstream watersheds (i.e., *Headwaters Tenmile Creek HUC-12* and the *Prairie Creek HUC-12) of Critical Area 1* include:

- Channelization
- Silt and Muck Substrates (Prairie Ditch HUC only)
- Absence of Sinuosity
- Sparse or absence of canopy cover
- Absence of, or shallow (<40 cm) pool depth
- Heavy or Moderate Silt Cover
- Slow Current
- Embedded or absence of Riffles

Projects that address the above described habitat-related attributes (e.g., embeddedness) will have a positive effect in the QHEI scoring index. As the habitat (QHEI) score becomes better, it is expected that the IBI, MIwb and ICI indices scoring will also improve.

Commented [BC17]: *Description: This sub-section should be **10 paragraphs or less** succinctly describing in detail the Causes and associated Sources for one Critical Area included in this NPS-IS plan. This sub-section should be more detailed than section 2.3 and be specific to this Critical Area. Include as many maps, tables, etc. as needed.*
Possible Data Sources: Ohio EPA Technical Support Documents (TSDs), Ohio EPA Total Maximum Daily Load Reports (TMDLs), Ohio EPA Integrated Report, other reliable data and information

EXAMPLE

3.2.4 Outline Goals and Objectives for the Critical Area

FIGURE 14: AGRICULTURAL LAND USE NEAR COMSTOCK DITCH. PHOTO CREDIT TO THE OLANDER PARK SYSTEM.

As explained in detail above, *Critical Area 1* is primarily impaired based upon sedimentation/siltation due to channelization. A secondary source that is closely related to channelization that cannot be discounted in this **Tenmile Creek HUC-12** is hydro-modification. Likewise, management measures/project types that address the hydro-modification sources will also address the silt and sediment cause of impairment. Almost all of *Critical Area 1* is artificially drained. In the absence of edge-of-field conservation practices, this extensively drained row crop landscape contributes high sediment loading during runoff and drainage events. Conversely, in the absence of runoff there will be an absence of baseflow, which can further exacerbate the impacted in-channel conditions. With this sampling site being near the most upstream extent of the **Tenmile Creek HUC-12**, most of the impacts to *Critical Area 1* are being transported downstream from the upstream drainages associated with agricultural land use. In order to address this impact related to siltation and sedimentation, *Critical Area 1* was defined mostly as the riparian areas (75' on either side) along ditches in the *Prairie Creek* and the *Headwaters Tenmile Creek HUC-12s* immediately upstream of the **Tenmile Creek HUC-12.**

Commented [BC18]: *Description: This sub-section should be **15 paragraphs or less** succinctly describing the Goals and Objectives needed to address the nonpoint source pollution impairments for one Critical Area included in this NPS-IS plan. Goals must outline what the overarching need is (i.e. reduce sediment loading by 20%) in order to address a measured parameter/cause (i.e. sedimentation). The Objectives must explain what technical solutions needs to be implemented (i.e. increase bank stabilization) and how much (i.e. install 1500') to reduce or eliminate the associated source. (i.e. sedimentation). The Goals and/or Objectives must include a quantifiable output of what is needed to address the NPS impairment (i.e., sedimentation load reduction of 20%, installation of 1500' of streambank stabilization, achieve 7% of stream corridor length placed into conservation easement). This might be most easily illustrated using a table. In order to reference this information in the Project & Implementation Overview Strategy Table (section 4.1) you are encouraged to develop a numbering system for your Goals, Objectives and related Projects. Include as many images, maps, tables, etc. as needed.*
Possible Data Sources: Ohio EPA Technical Support Documents (TSDs), Ohio EPA Total Maximum Daily Load Reports (TMDLs), Ohio EPA Integrated Report, other reliable data and information

Goals

The overall nonpoint source restoration goals any NPS-IS plan is to improve IBI, MIwb, ICI, and QHEI scores so that the *partial* or *non-attainment* status can achieve full attainment of the designated aquatic life use for that waterbody. The **Tenmile Creek HUC-12** is in *Partial Attainment*. This designation is due to the fish community achieving its criteria, but the macroinvertebrate community is not. It was also noted that the QHEI score for the stream and surrounding habitat were also not achieving their target. Therefore, the remaining goals for *Critical Area 1* of the **Tenmile Creek HUC-12** is to improve ICI and QHEI scores at Herr Road sampling site on Tenmile Creek (RM 5.9) so that the *Partial Attainment* status for this sampling site can be changed to full attainment of the designated WWH aquatic life use. These goals are to specifically:

Goal 1. Achieve IBI score of 28 at Herr Road sampling site on Tenmile Creek (RM 5.9)
- ✓ ACHIEVED: Site currently has a score of 34

Goal 2. Achieve MIwb score of 6.8 at Herr Road sampling site on Tenmile Creek (RM 5.9)
- ✓ ACHIEVED: Site currently has a score of 6.9

Goal 3. Achieve ICI score of 30 at Herr Road sampling site on Tenmile Creek (RM 5.9)
- NOT ACHIEVED: Site currently has a score of 18

Goal 4. Achieve QHEI score of 60 at Herr Road sampling site on Tenmile Creek (RM 5.9)
- NOT ACHIEVED: Site currently has a score of 52.5

Objectives

In order to achieve the overall nonpoint source restoration goal of restoring full attainment to the **Tenmile Creek HUC-12**, the following objectives that address both channelization and hydro-modification sources need to be achieved within *Critical Area 1.* These objectives are the prioritized management measures/practices in *Critical Area 1* and will be the primary objectives as projects are sought out and/or developed to improve the NPS impacts in this Critical Area.

EXAMPLE

Objective 1. Enroll agricultural land adjacent to ditches (listed in Section 3.2.1) into conservation land-retirement conservation programs such as USDA-FSA's CREP and Wetland Reserve retirement.

- Enroll ~360 acres (i.e., 20 ditch miles with 75' setback on each side) in CREP buffer program within the critical area. Forested Riparian Buffer (FOTG-391), Filter Areas/Strips (FOTG-393), or Conservation Cover (FOTG-327)
- Install 10 acres of runoff retention basins/wetlands in *Critical Area 1*. (Enroll land taken out of production into the CREP program). Treat and retain drainage waters from 100 acres in these wetlands and drainage water storage basins.

Objective 2. Install 2-stage ditches to increase access of high flow runoff waters to functional floodplain bench.

- Install 5 miles of 2-stage ditches in *Critical Area 1*. 5 miles represents approximately 10% of total ditch length in *Critical Area 1* (about 50 miles).

FIGURE 15: INCREASE BUFFER WIDTH ALONG DITCHES WHERE THERE EXISTS NO OR VERY THIN RIPARIAN BUFFERS EXIST

Objective 3. Reduce impacts from tile drainage waters and improve base flow conditions through the implementation of drainage water management and installation of drainage water management structures and saturated buffers in enrolled CREP buffers.

- Implement drainage water management (including drainage water management structures and/or saturated buffers) on 1500 acres of row crop land that contributes drainage waters through and beneath the identified riparian areas in *Critical Area 1.*
- Install 60 controlled drainage structures as part of drainage water management system approach in *Critical Area 1.*
- Include saturated buffer component on 30 of the new or retrofitted drainage water management systems *Critical Area 1.*
- Install at least 45,000 feet (8.5 miles) or more of saturated buffer leach lines within CREP buffer areas/strips as part of drainage water management implementation in *Critical Area 1.*

EXAMPLE

Objective 4. Stabilize eroding banks along ditches within the *Critical Area 1.*

- Stabilize 1000 or more linear feet of eroding ditch banks within the *Critical Area 1*.

Objective 5. Reduce the rate and amount of runoff delivery downstream through installation of hydraulic retention basins and wetlands.

- Install 10 acres of runoff and drainage retention basins, or wetlands within *Critical Area 1.*
- Reduce runoff and drainage delivery (rate and amount) from 200 cropland acres through hydraulic detention efforts in the *Critical Area 1 riparian area.*

As these objectives are implemented, water quality monitoring (both project related and regularly scheduled monitoring) will be conducted to determine progress toward meeting the identified goals (i.e., water quality standards). These objectives will be reevaluated and modified if determined to be necessary. For instance; many agricultural BMPs can be "stacked" (a systems approach) that will also incrementally improve the quality and quantity of runoff and drainage waters and in-stream water quality.

When reevaluating, the committee will reference the Ohio EPA Nonpoint Source Management Plan Update (Ohio EPA, 2013), which has a complete listing of all eligible NPS management strategies to consider including:

- Urban Sediment and Nutrient Reduction Strategies;
- Altered Stream and Habitat Restoration Strategies;
- Nonpoint Source Reduction Strategies; and
- High Quality Waters Protection Strategies

3.3 Critical Area 2: Conditions, Goals & Objectives for the Middle Reach of Tenmile Creek HUC-12

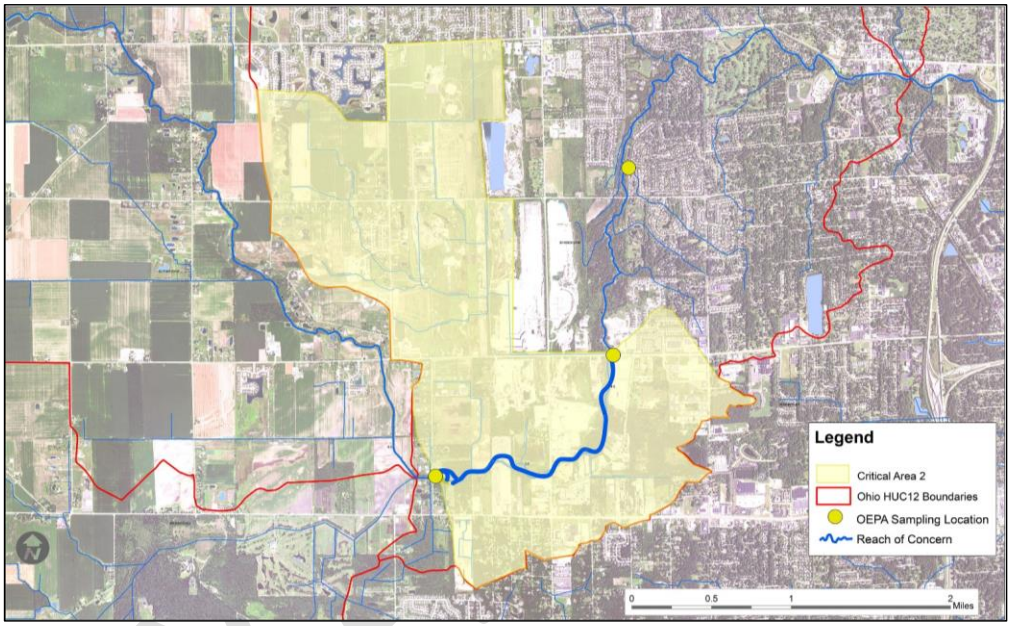
3.3.1 Detailed Characterization

The Tenmile Creek sampling site at River Mile (RM) 2.9 is located at Brint Rd. where Temmile Creek is listed in *Non-Attainment* of the warmwater habitat aquatic life use designation. The cause for the *Non-Attainment* designation is sedimentation/siltation with the source being channelization. The Brint Rd. site is near the middle of the **Tenmile Creek HUC-12**. Because of its central location in the HUC-12, the source of the listed impairment at the Brint Rd. site is most significantly influenced by the attributes of the stream and contributing waterways between Herr Rd. and Brint Rd. and the land use in the watershed contributing to this reach. It is also likely that the upstream riparian areas and tributaries already listed in *Critical Area 1* (see in Section 3.2) are contributing to the *Non-Attainment* at Brint Road.

EXAMPLE

Using the rationale described in the *Handbook for Developing Watershed Plans to Restore and Protect Our Waters* (U.S. Environmental Protection Agency, 2008)(Section 10.3.4): "In general, management practices are implemented immediately adjacent to the waterbody or upland to address the sources of pollutant loads."—*Critical Area 2* (Figure 16) includes the sub-watershed area including the Tenmile Creek riparian corridor that contributes runoff or drainage waters to Tenmile Creek between the Herr Rd. sampling site at RM 5.9 and Brint Rd. site at RM 2.9.

FIGURE 16: TENMILE CREEK HUC-12 CRITICAL AREA 2



3.3.2 Detailed Biological Conditions

Table 7 below summarizes the fish community data at the Brint Road sampling site. Understanding the abundance, diversity, and pollution tolerance of existing fish species found at Ohio EPA sampling locations and relating that information to QHEI scores helps to inform Ohio EPA of causes and sources of impairment. The Brint Rd. sampling site is currently meeting the warmwater habitat standard for IBI score (score 37, goal 28); and is not meeting the warmwater habitat standards for MIwb (score 5.8, goal 6.8). With regard to Habitat, scores for QHEI at the Herr Rd. sampling site are not currently meeting the warmwater habitat standard for QHEI score (score 51.0, goal 60).

TABLE 7: CRITICAL AREA 2 - FISH COMMUNITY AND HABITAT DATA (OHIO EPA, 2015)

Stream/RM	D.A. (mi2)	Total Species	QHEI	MIwB	IBI	Predominant Species (percent of catch)	Narrative Evaluation
Tenmile Creek *(WWH) (NON Attainment)*							
2.9	70.0	15	51.0	5.8	37	green sunfish (38%), striped shiner (20%), redfin pickerel (10%)	Poor-Marginally Good

Table 8 below summarizes the aquatic invertebrate community data at the Brint Road sampling site. Understanding the abundance, diversity, and pollution tolerance of existing aquatic macroinvertebrates (bugs) found at Ohio EPA sampling locations and relating that information to QHEI scores also helps to inform Ohio EPA of causes and sources of impairment. The Brint Rd. sampling site is currently not meeting the warmwater habitat standard for ICI score (score 18, goal 30).

TABLE 8: CRITICAL AREA 2 - MACROINVERTEBRATE COMMUNITY DATA (OHIO EPA, 2015)

Stream/RM	ICI Score -- Narrative	Notes	Predominant Species
Tenmile Creek *(WWH) (NON Attainment)*			
2.9	18 — Fair Only 2 sensitive taxa	Low Qualitative density	Midges and hydropsychid caddisflies

3.3.3 Detailed Causes and Associated Sources

The Brint Rd. (RM 2.9) sampling site is listed as in *Non-Attainment* of the warmwater habitat aquatic life use designation. The cause for non-attainment listing is sedimentation/siltation with the source being channelization. A review of the data shown in Table 7 helps describe the habitat indicators at sampling sites on Tenmile Creek upstream from the Herr Road sampling site (in the *Headwaters Tenmile Creek HUC-12*); and from sampling sites in the *Prairie Creek HUC-12* upstream from the Herr Road sampling site. The data in Table 3 from the Ohio EPA Technical Support Document reveals a direct link between the significant presence of attributes that have significant influence on the non-attainment listing at the Brint Rd. sampling site (i.e., *non-attainment* of QHEI, MIwb, and ICI goals). (Ohio EPA, 2015)

These are the contributing attributes from the adjacent and upstream watershed—specifically at Herr Rd. (RM 5.9) but also upstream from there (i.e., *Headwaters Tenmile Creek HUC-12* and the *Prairie Creek HUC-12)* to *Critical Area 2.*

- Not Channelized (RM 3.0 and 5.9)
- Boulder/Cobble/Gravel Substrates (RM 3.0 and 5.9)
- Heavy or Moderate Silt Cover (all sites upstream and including RM 5.9)
- Fair to Poor Development (all sites upstream and including RM 5.9)
- Slow Current
- Low Sinuosity (RM 3.0)
- Embeddedness in riffles (RM 5.9)
- Absence of Riffles (RM 3.0)

EXAMPLE

Projects that address the above described habitat-related attributes (e.g., embeddedness) will have a positive effect in the QHEI scoring index. As the habitat (QHEI) score becomes better, it is expected that the IBI, MIwb and ICI indices scoring will also improve.

3.3.4 Outline Goals and Objectives for the Critical Area

As explained in detail above, *Critical Area 2* is primarily impaired based upon sedimentation/siltation due to channelization and surrogate source hydro-modification. Some of the impacts at this sampling location are coming from the upstream reach of Tenmile Creek with additional contributions from the tributaries like Comstock Ditch and Smith Ditch. Impacts are believed to also be coming from the nearby industrial land use (i.e., junk yard, trucking companies, landscape company). These multiple sources are moving this site from the *Partial Attainment* status at RM 5.9 to the *Non-Attainment* status at RM 2.9. Immediately upstream of the sampling location at RM 2.9, there are tree covered areas, however part of the riparian corridor was cleared in 2009 by Sylvania Township to remove log jams and dead Ash trees due to the effects of the Emerald Ash Bore invasion. It was required to repeat this effort, but on a much smaller scale in 2011 and 2014. (Nash, 2016) It is suspected that although this area is helping to mitigate high flows, there may still be stabilization issues causing flow and erosion issues resulting in poor aquatic habitat. *Critical Area 2* was defined as a larger contiguous area to try and address the additional sediment load that is suspected to be coming from the tributary ditches.

Ohio EPA also noted that the sampling site at RM 2.9 had the highest geometric mean dissolved inorganic nitrogen (DIN) concentration among all mainstem sampling sites. This was not high enough to trigger a total maximum daily load analysis, but ammonia should not be detectable in most Ohio streams. Its presence is typically associated with ineffective sewage treatment, livestock waste, an unintended industrial process discharge or as an accidental spill. The routine presence of ammonia in all RM 2.9 samples was rivaled by its frequent detection at tributary locations in co-occurrence with elevated chloride measurements. This may also be minor contributing factor toward meeting use attainment. If unable to reach attainment via traditional nonpoint source methods, this additional factor may need to be considered when trying to restore this portion of the stream.

Goals

The overall nonpoint source restoration goals of any NPS-IS plan is to improve IBI, MIwb, ICI, and QHEI scores so that the *Non-Attainment* status can achieve *Full Attainment* of the designated aquatic life use for that waterbody. The **Tenmile Creek HUC-12** is in *Non-Attainment*. This designation is due to the fish community only achieving one of the two fish criteria, and the macroinvertebrate community not meeting its criteria. It was also noted that the QHEI score for the stream and surrounding habitat was also not achieving the target. Therefore, the remaining goals for *Critical Area 2* of the **Tenmile Creek HUC-12** are to improve MIwb, ICI and QHEI scores at the Brint Road sampling site (RM 2.9) so that the *Non-Attainment* status for this sampling site can be changed to *Full Attainment* of the designated warmwater habitat aquatic life use. These goals are to specifically:

Goal 1. Achieve IBI score of 28 at Brint Road sampling site on Tenmile Creek (RM 2.9)
- ✓ ACHIEVED: Site currently has a score of 37

Goal 2. Achieve MIwb score of 6.8 at Brint Road sampling site on Tenmile Creek (RM 2.9)
- NOT ACHIEVED: Site currently has a score of 5.8

Goal 3. Achieve ICI score of 30 at Brint Road sampling site on Tenmile Creek (RM 2.9)
- NOT ACHIEVED: Site currently has a score of 18

Goal 4. Achieve QHEI score of 60 at Brint Road sampling site on Tenmile Creek (RM 2.9)
- NOT ACHIEVED: Site currently has a score of 51.0

EXAMPLE

Objectives

In order to achieve the overall nonpoint source restoration goal of restoring *Full Attainment* to the **Tenmile Creek HUC-12**, the following objectives need to be achieved within *Critical Area 2. It should also be noted that achievement of the objectives described for Critical Area 1 (upstream) should also show improvement in Critical Area 2.*

Objective 1. Restore stream and riparian corridor to increase access of high flow runoff waters to functional floodplain bench.
- Provide functional terrace floodplain bench along 6400 feet of Tenmile Creek

Objective 2. Restore stream using natural channel design features and principles
- Restore 6400 linear feet of Tenmile Creek between RM 2.9 and RM 5.3.

Objective 3. Restore natural hydrology to former wet-prairie lands.
- Restore 100 acres of wet-prairie

Objective 4. Restore channelized ditches and tributaries to meandering channel.
- Restore 5000 l.f. of tributary ditch within the critical area

Objective 5. Establish forested riparian buffer along impacted or barren stretches of Tenmile Creek and tributaries within the critical area.
- Reestablish 25 acres of forested riparian buffer within the critical area

As these objectives are implemented, water quality monitoring (both project related and regularly scheduled monitoring) will be conducted to determine progress toward meeting the identified goals (i.e., water quality standards). These objectives will be reevaluated and modified if determined to be necessary. For instance; many agricultural BMPs can be "stacked" (a systems approach) that will also incrementally improve the quality and quantity of runoff and drainage waters and in-stream water quality.

When reevaluating, the committee will reference the Ohio EPA Nonpoint Source Management Plan Update (Ohio EPA, 2013), which has a complete listing of all eligible NPS management strategies to consider including:

- Urban Sediment and Nutrient Reduction Strategies;
- Altered Stream and Habitat Restoration Strategies;
- Nonpoint Source Reduction Strategies; and
- High Quality Waters Protection Strategies

EXAMPLE

Chapter 4: Projects and Implementation Strategy

4.1 Overview Tables and Project Sheets for Critical Areas

Below are the projects and evaluation needs believed to be necessary to remove the impairments to the **Tenmile Creek HUC-12** as a result of the identified cause and associated sources of nonpoint source pollution. Because the attainment status is based on biological conditions, it will be necessary to periodically re-evaluate the status of the critical area to determine if the implemented projects are sufficient to achieve restoration. Time is an important factor to consider when measuring project success and overall status. Biological systems in some cases can show response fairly quickly (i.e., one season); others system may take longer (i.e., several seasons, years) to show recovery. There may also be reasons other than nonpoint source pollution for the impairment. Those issues will need to addressed under different initiatives, authorities or programs which may or may not be accomplished by the same implementers addressing the nonpoint source pollution issues.

For the **Tenmile Creek HUC-12** there are two *Project and Implementation Strategy Overview Tables* (subsection 4.2.1 and 4.3.1). One table for each critical area. Each critical area only has one primary cause and associated source of nonpoint source impairment. If another nonpoint source impairment is identified for one of the existing critical area, it will be explained and added to that critical area's table. If a new impairment is determined that has a different critical area, a new table will be created for that new critical area. The projects described in the *Overview Tables* have been prioritized using the following three step prioritization method:

Priority 1 — Projects that specifically address one or more of the listed *Objectives* for the Critical Area.

Priority 2 — Projects where there is land-owner willingness to engage in projects that are designed to address the cause(s) and source(s) of impairment or where there is an expectation that such potential projects will improve water quality in Tenmile Creek.

Priority 3 — In an effort to generate interest in projects, an information and education campaign will be developed and delivered. Such outreach will engage citizens to spark interest by stakeholders to participate and implement projects like those mentioned in Priority 1 and 2.

Project Summary Sheets (PSS) are in subsection 4.2.2 and 4.3.2. These PSS provide the essential nine elements for short-term and/or next step projects that are in development and/or in need of funding. As projects are implemented and new projects developed these sheets will be updated. Any new PPS created will be submitted to the state of Ohio for funding eligibility verification (i.e., all nine elements are included).

4.2 Critical Area 1: Overview Table and Project Sheet(s) for Upper Reach of Tenmile Creek HUC-12

The information included in the *Critical Area 1 Overview Table* is a condensed overview of all identified projects needed for nonpoint source restoration of the **Tenmile Creek HUC-12** *Critical Area 1*. Project Summary Sheets are included for short term projects or any project that is considering seeking funding in the near future. Only those projects with complete Project Summary Sheets will be considered for state and federal NPS program funding.

4.2.1 Critical Area 1: Project and Implementation Strategy Overview Table

The **Tenmile Creek HUC-12** *Critical Area 1* is based on *Partial Attainment* status of aquatic life use designation at the Herr Rd (RM 5.9) sampling site. The Critical Area 1 Overview Table provides a quick summary of what needs to be done, where, and what problem (cause/source) will be addressed and includes projects at all levels of development (i.e. concept, need funding, in progress). This Overview Table is intended to show a prioritized path toward the restoration of the **Tenmile Creek HUC-12**.

Commented [BC19]: *This Chapter is where the Critical Areas, Goals, Objectives, projects and actions all come together to outline what needs to be done, where, by whom, in what order, and using what strategies outlined in* Ohio's Nonpoint Source Management Plan (Update) *to restore the NPS pollution issues of the watershed(s) included in the NPS-IS plan. The information in sections 4.1 and 4.2 are the dynamic portion of this document. As projects get implemented and new projects are developed the Overview Table and Project Summary Sheets should be updated.]*

Commented [BC20]: *Description: This sub-section should be* ***no more than 5 paragraphs*** *and provide an overview of the types of projects in both Critical Areas as well as general project observations for the watershed(s)/HUC-12 that is included in this NPS-IS plan.*

Commented [BC21]: *Description: This sub-section should be* ***no more than 3 paragraphs*** *and provide an overview of the types of projects in a single Critical Area as well as general project observations for the Critical Area is included in this NPS-IS plan.*

Commented [BC22]: *Description: The length of the table(s) in this sub-section are* ***dependent upon how many projects have been identified*** *to address how many Critical Areas. The information populating the Overview Table is intended to be a condensed overview of all identified projects needed for Critical Area NPS restoration. For short term projects, the information presented in this Overview Table will be a sub-set of the information on the Project Summary Sheets. The table should include at least the potential projects in a single Critical Area or may include all potential projects for all of the Critical Areas of the HUC -12. The goal of the Overview Table is to provide a quick summary of what needs to be done, where, and what problem (cause/source) will be addressed. Projects at all levels of development (i.e. concept, need funding, in progress) can be captured in this Overview Table. This Overview Table is intended to show a prioritized path toward the restoration of the watershed(s)/HUC-12. Details for those projects that are Priority Projects, projects ready to implement, or that are more thoroughly planned, should be provided on the Project Summary Sheets in the next section (Table 4.2).]*
[Possible Data Sources: Public meetings, organizational priorities, previous Watershed Action Plans, other reliable data and information]

EXAMPLE

Critical Area 1: Project Overview Table for *Tenmile Creek HUC-12 (04100001 03 06)*							
Goal	**Objective**	**Project #**	**Project Title** *(EPA Criteria g)*	**Lead Organization** *(criteria d)*	**Time Frame** *(EPA Criteria f)*	**Estimated Cost** *(EPA Criteria d)*	**Potential/Actual Funding Source** *(EPA Criteria d)*
Urban Sediment and Nutrient Reduction Strategies*							
Altered Stream and Habitat Restoration Strategies*							
4	1	1	Century Farm Land Acquisition	unknown	Medium-Long	$700,000	WRRSP, Clean Ohio Fund
3, 4	1, 2, 4	2	Targeted Sediment and runoff control BMPs in Critical Area 1	Lucas SWCD	Short	$500,000	Ohio EPA §319. GLRI, SWIF
3, 4	1, 2, 4, 5	3	2 stage channel on Langenderfer Ditch	Fulton SWCD	Short	$875,000	Ohio EPA §319. GLRI, SWIF
3, 4	1, 3, 5	4	Edge of Field Retention: Practice Stacking Saturation Buffers onto Drainage Water Management in Ten Mile Creek Critical Area #1	Lucas & Fulton SWCD	Medium	$250,000	Ohio EPA §319. GLRI, SWIF
Agricultural Nonpoint Source Reduction Strategies*							
3, 4	1, 2, 4	2	Targeted Sediment and runoff control BMPs in Critical Area 1	Lucas SWCD	Short	$500,000	Ohio EPA §319. GLRI, SWIF
3, 4	1, 2, 4, 5	3	2 stage channel on Langenderfer Ditch	Fulton SWCD	Short	$875,000	Ohio EPA §319. GLRI, SWIF
3, 4	1, 3, 5	4	Edge of Field Retention: Practice Stacking Saturation Buffers onto Drainage Water Management in Ten Mile Creek Critical Area #1	Lucas & Fulton SWCD	Medium	$250,000	Ohio EPA §319. GLRI, SWIF
High Quality Waters Protection Strategies*							
Other NPS Causes and Associated Sources of Impairment							

* (Ohio EPA, 2013)

Commented [BC25]: *The information listed here comes from the Project Summary Sheets Chapter 4.*

Commented [BC27]: *The information listed here comes from the Project Summary Sheets Chapter 4*

Commented [BC28]: *The information listed here comes from the Project Summary Sheets Chapter 4*

Commented [BC23]: *It is recommended that your goals and objectives be numbered or coded for easy reference. The number/code listed here comes from Chapter 3 section 3.x.4.*

Commented [BC24]: *The information listed here comes from the Project Summary Sheets Chapter 4.*

Commented [BC26]: *The information listed here comes from the Project Summary Sheets Chapter 4.*

Commented [BC29]: *The information listed here comes from the Project Summary Sheets Chapter 4.*

4.2.2 Critical Area 1: Project Summary Sheet(s)

The Project Summary Sheets provided below were developed based on the actions or activities needed to restore the Herr Rd (RM 5.9) sampling site to attainment of the aquatic life use designation. These projects are considered next step or priority/short term projects. Medium and longer term projects will mostly like not have a Project Summary Sheet or will not have a complete Project Summary Sheet, as these projects are not ready for implementation. The Project Summary Sheets will be mostly the priority or short term project that are ready to implement, or at least those projects have been more thoroughly planned.

Commented [BC30]: *Description: In addition to creating the rest of this NPS-IS plan, a Project Summary Sheet **MUST** be created for each project that is being proposed for NPS funding from US EPA and/or Ohio EPA. Most of the essential elements of a Nine Element Plan are included on these Project Summary Sheets. If a Project Summary Sheet has not been created for a project, then a Nine-Element Plan is not complete for that project; and thus, it is not eligible for some US EPA/Ohio EPA funding opportunities. Possible Data Sources: Public meetings, organizational priorities, previous Watershed Action Plans, other reliable data and information*

Critical Area 1: Project 2		
Nine Element Criteria	**Information needed**	**Explanation**
n/a	Title	Langenderfer Ditch 2-Stage Channel @ Central and SR 295
criteria d	Project Lead Organization & Partners	Lucas County SWCD
criteria c	HUC-12 & Critical Area	Prairie Creek (HUC# 41000010 03 03) Riparian areas *Note: Project will not eligible until Prairie Creek NPS-IS plan is approved (should cross reference this plan)*
criteria c	Location of Project	Langenderfer Ditch between West Central Ave (Toledo-Angola Rd.) and S.R. 296. (41°40'13"N, 83°50'20"W)
n/a	Which strategy is being addressed by this project?	Altered Stream and Habitat Restoration Strategy Agricultural Nonpoint Source Reduction Strategy
criteria f	Time Frame	Short (1-3 Years)
criteria g	Short Description	Construct ~1400 feet of 2-stage channel in Langenderfer Ditch
criteria g	Project Narrative	Langenderfer Ditch is an incised channel with a denuded riparian area at this project location. This project will reconstruct the approximately 1400 linear feet of the channel using 2-stage ditch principles. An improved riparian habitat buffer— planted with native grasses, shrubs and trees will also be provided here.
criteria d	Estimated Total cost	$200,000
criteria d	Possible Funding Source	Ohio EPA §319, GLRI, WRRSP
criteria a	Identified Causes and Sources	Cause: Sedimentation/Siltation Source: Channelization

Critical Area 1: Project 2		
criteria b & h	Part 1: How much improvement is needed to remove the NPS impairment associated with this Critical Area?	With the goal being: to raise or maintain or increase IBI score above 28 (currently 34), to raise or maintain or increase MIwb score above 6.8 (currently 6.9) raise the ICI score (from 18 to 30), and raise QHEI score (from 52.5 to 60) at Herr Rd Sampling Site on Tenmile Creek (RM 5.9) One reasonable objective includes the retrofit of at least 5 miles of incised channels to 2-stage Ditches to increase access of high flow runoff waters to functional floodplain bench. 5 miles of 2-stage ditches in the critical area represents ~10% of total ditch length in the critical area).
	Part 2: How much of the needed improvement for the whole Critical Area is estimated to be accomplished by this project?	5.3 % of the 5-mile objective will be met. (i.e., 1400 l.f. of 26,400 l.f.) Goals: There is recognition that there is lag time associated with nonpoint source -related projects and measured stream response. With respect to the *goals* in critical area 2, the main driver is QHEI. Current data shows that the stream in Critical area 1 is at 52.5—which is 7.5 points below the attainment index score of 60. It is expected that this project will cause an incremental increase the QHEI scoring by 1 point (or 13% progress toward the goal); with similar percentage gains for IBI, ICI, and MIwb index scores.
	Part 3: Load reduced?	Estimated: 55 Tons Sediment/Year, 55#P/year and 110#N/year
criteria i	How will the effectiveness of this project in addressing the NPS impairment be measured?	Staff from the OEPA-DSW Ecological Assessment Unit will perform both pre and post project monitoring. In addition, the Herr Rd. Sampling site will also be monitored (as part of the State's ongoing surface water monitoring program cycle) to determine progress (through IBI, ICI, and QHEI) from partial attainment to full attainment.
criteria e	Information and Education	This project will be promoted with project signage, press releases, newsletter articles, and excavation industry (i.e., OLICA) training opportunity as an important demonstration project to agricultural land owners who own property along these critical area ditches.

Critical Area 1: Project 3		
Nine Element Criteria	**Information needed**	**Explanation**
n/a	Title	Langenderfer Ditch 2-Stage Channel and Runoff Basin @ SR 295 and Bancroft Street
criteria d	Project Lead Organization & Partners	Lucas County SWCD
criteria c	HUC-12 & Critical Area	Prairie Creek (HUC# 41000010 03 03) Riparian areas *Note: Project will not eligible until Prairie Creek NPS-IS plan is approved (should cross reference this plan)*
criteria c	Location of Project	Langenderfer Ditch between West Central Ave (Toledo-Angola Rd.) and S.R. 296
n/a	Which strategy is being addressed by this project?	Altered Stream and Habitat Restoration Strategy Agricultural Nonpoint Source Reduction Strategy
Criteria f	Time Frame	Short (1-3 Years)
criteria g	Short Description	Construct ~4500 feet of 2-stage channel in Langenderfer Ditch
criteria g	Project Narrative	Langenderfer Ditch is an incised channel with a denuded riparian area at this project location. This project will reconstruct the approximately 4500 linear feet of the channel using 2-stage ditch principles. This will include elimination of a 90° bend in the ditch that is a known source of sediment. In addition, 2 smaller branches that enter Langenderfer Ditch at in this project area will be modified near their confluence with Langenderfer Ditch to become ~5.0 acres of wetlands (or otherwise runoff detention basins). These basins will settle sediment, and provide habitat. This improved riparian habitat buffer (both along the 2-stage channel and the runoff wetlands) will be planted with native grasses, shrubs and trees.
criteria d	Estimated Total cost	$875,000 *Depending upon funding availability, this project could be broken into 2 or more phases.
criteria d	Possible Funding Source	Ohio EPA §319, GLRI, WRRSP
criteria a	Identified Causes and Sources	Cause: Sedimentation/Siltation Source: Channelization

Critical Area 1: Project 3		
criteria b & h	Part 1: How much improvement is needed to remove the NPS impairment associated with this Critical Area?	With the goal being: to raise or maintain or increase IBI score above 28 (currently 34), to raise or maintain or increase MIwb score above 6.8 (currently 6.9) raise the ICI score (from 18 to 30), and raise QHEI score (from 52.5 to 60) at Herr Rd Sampling Site on Tenmile Creek (RM 5.9) One reasonable objective includes the retrofit of at least 5 miles of incised channels to 2-stage Ditches to increase access of high flow runoff waters to functional floodplain bench. 5 miles of 2-stage ditches in the critical area represents ~10% of total ditch length (i.e., 50 miles) in the critical area). Another objective includes runoff reduction (from drainage area of 200 acres) through installation of at least 10 acres' hydraulic retention basins and wetlands in the critical area.
	Part 2: How much of the needed improvement for the whole Critical Area is *estimated* to be accomplished by this project?	For 2-stage channel construction: ~17% % of the 5-mile objective will be met. (i.e., 4500 l.f. of 26,400 l.f.) For hydraulic retention: 50% (5 acres of the 10-acre objective) will be met. 55% (retention of ~110 acres' cropland runoff of 200 acres' objective) Goals: There is recognition that there is lag time associated with nonpoint source -related projects and measured stream response. With respect to the *goals* in critical area 2, the main driver is QHEI. Current data shows that the stream in Critical area 2 is at 52.5—which is 7.5 points below the attainment index score of 60. It is expected that this project will cause an incremental increase the QHEI scoring by 1 point (or 13% progress toward the goal); with similar percentage gains for IBI, ICI, and MIwb index scores.
	Part 3: Load reduced?	Estimated: 179 Tons Sediment/Year, 179#P/year, and 358#N/year
criteria i	How will the effectiveness of this project in addressing the NPS impairment be measured?	Staff from the OEPA-DSW Ecological Assessment Unit will perform both pre and post project monitoring. In addition, the Herr Rd. Sampling site will also be monitored (as part of the State's ongoing surface water monitoring program cycle) to determine progress (through IBI, ICI, and QHEI) from partial attainment to full attainment
criteria e	Information and Education	This project will be promoted with project signage, press releases, newsletter articles, and excavation industry (i.e., OLICA) training opportunity as an important demonstration project to agricultural land owners who own property along these critical area ditches.

Critical Area 1: Project 4		
Nine Element Criteria	**Information needed**	**Explanation**
n/a	Title	Edge of Field Retention: Practice Stacking Saturation Buffers onto Drainage Water Management in Ten Mile Creek Critical Area 1
criteria d	Project Lead Organization & Partners	Lucas and Fulton County SWCD
criteria c	HUC-12 & Critical Area	Prairie Creek (HUC# 41000010 03 03) and Headwaters Tenmile Creek (HUC# 41000010 03 04) Riparian areas *Note: Project will not eligible until Prairie Creek NPS-IS plan and or Headwater Tenmile Creek is approved (These 9-Element NPS-IS plan should cross reference this section of this plan)*
criteria c	Location of Project	Interested landowners with subsurface drainage infrastructure that outlet(s) into the ditches in the riparian areas within the entirety of this Critical area
n/a	Which strategy is being addressed by this project?	Altered Stream and Habitat Restoration Strategy Agricultural Nonpoint Source Reduction Strategy
criteria f	Time Frame	Medium (3-7 years).
criteria g	Short Description	Install or retrofit at least 20 Drainage Water Management control structures—with saturated buffer systems AND at least with 30,000 l.f. of saturation tile (within the riparian buffer) (This is an average of 1500 l.f. of riparian buffer saturation tile per system).
criteria g	Project Narrative	Drainage water retention helps to reduce the rate and amount of field discharge, and allows for more sustained base flow to headwater tributaries. Because virtually all the crop land in these watersheds is underlain with subsurface tile, there is a great opportunity to install drainage water management systems that include the saturated buffer component. DWM is also funded through NRCS programs, however, the wrinkle for this project is that it includes saturated buffers, which are not currently fundable through NRCS in Ohio.
criteria d	Estimated Total cost	$250,000
criteria d	Possible Funding Source	Ohio EPA §319, GLRI, WRRSP
criteria a	Identified Causes and Sources	Cause: Sedimentation/Siltation Source: Channelization

Critical Area 1: Project 4		
criteria b & h	Part 1: How much improvement is needed to remove the NPS impairment associated with this Critical Area?	With the goal being: to raise or maintain or increase IBI score above 28 (currently 34), to raise or maintain or increase MIwb score above 6.8 (currently 6.9) raise the ICI score (from 18 to 30), and raise QHEI score (from 52.5 to 60) at Herr Rd Sampling Site on Tenmile Creek (RM 5.9) The need to reduce impacts from tile drainage waters, and improve base flow conditions through the implementation of drainage water management and installation of drainage water management structures and saturated buffers in enrolled CREP buffers was considered. Potential participants will be encouraged to attend a meeting to learn about this project and can sign up through a simple enrollment process at either Fulton or Lucas SWCD. Some reasoned objectives include: (1) Implementation of drainage water management (including drainage water management structures and/or saturated buffers) on at least 1500 acres of row crop land that contributes drainage waters through and beneath the identified riparian critical areas; (2) Installation of 60 or more controlled drainage structures as part of drainage water management system approach in the critical areas; (3) Including saturated buffer component on at least 30 of the new or retrofitted drainage water management systems; and (4) Installing at least 45,000 feet (8.5 miles) or more of saturated buffer leach lines within CREP buffer areas/strips as part of drainage water management implementation.
	Part 2: How much of the needed improvement for the whole Critical Area is estimated to be accomplished by this project?	For DWM: 33% (20 the 60) DWM systems installation goal will be met 33% for (500 of 1500) acres of drainage water managed 67% (20 the 30) DWM systems w/ Saturated Buffer component installation goal will be met 55% (retention of ~110 acres' cropland runoff of 200 acres' objective) 67% (30,000 of 45,000 linear feet) of saturated buffer leaching tile installed. Goals: There is recognition that there is lag time associated with nonpoint source -related projects and measured stream response. With respect to the *goals* in critical area 2, the main driver is QHEI. Current data shows that the stream in Critical area 2 is at 52.5—which is 7.5 points below the attainment index score of 60. It is expected that this project will cause an incremental increase the QHEI scoring by 1 point (or 11% progress toward the goal); with similar percentage gains for IBI, ICI, and MIwb index scores.
	Part 3: Load Reduced?	Estimated: 200 Tons Sediment/Year, 225#P/year, and 3000#N/year
criteria i	How will the effectiveness of this project in addressing the NPS impairment be measured?	Staff from the OEPA-DSW Ecological Assessment Unit will perform both pre and post project monitoring. In addition, the Herr Rd. Sampling site will also be monitored (as part of the State's ongoing surface water monitoring program cycle) to determine progress (through IBI, ICI, and QHEI) from partial attainment to full attainment

Critical Area 1: Project 4		
criteria e	Information and Education	This project will be promoted with project signage, press releases, newsletter articles, and excavation industry (i.e., OLICA) training opportunity as an important demonstration project to agricultural land owners who own property along these critical area ditches.

EXAMPLE

4.3 Critical Area 2: Overview Table and Project Sheet(s) for Middle Reach of Tenmile Creek HUC-12

The information included in the Critical Area 2 Overview Table is a condensed overview of all identified projects needed for nonpoint source restoration of the **Tenmile Creek HUC-12** *Critical Area 2*. Project Summary Sheets are included for short term projects or any project that is considering seeking funding in the near future. Only those projects with complete Project Summary Sheets will be considered for state and federal nonpoint source program funding.

4.3.1 Critical Area 2: Project and Implementation Strategy Overview Table

The **Tenmile Creek HUC-12** *Critical Area 2* is based on *Non-Attainment* status of aquatic life use designation at the Brint Rd (RM 2.9) sampling site. The Critical Area 2 Overview Table provides a quick summary of what needs to be done, where, and what problem (cause/source) will be addressed and includes projects at all levels of development (i.e. concept, need funding, in progress). This Overview Table is intended to show a prioritized path toward the restoration of the **Tenmile Creek HUC-12**.

EXAMPLE

Critical Area 2: Project Overview Table for *Tenmile Creek HUC-12 (04100001 03 06)*							
Goal	**Objective**	**Project #**	**Project Title** *(EPA Criteria g)*	**Lead Organization** *(criteria d)*	**Time Frame** *(EPA Criteria f)*	**Estimated Cost** *(EPA Criteria d)*	**Potential/Actual Funding Source** *(EPA Criteria d)*
Urban Sediment and Nutrient Reduction Strategies*							
Altered Stream and Habitat Restoration Strategies*							
1, 2, 3, 4	1, 2, 5	1	Tenmile Creek Flood Mitigation and Stream and Riparian Corridor Restoration Project	Lucas Co Engineers Office	Short term	Total cost $1,200,000 Seeking Grant for $200,000	NFWF
1, 2, 3, 4	3	2	Tallgrass Prairie and Wet Meadow Installation	The Olander Park System	FUNDED/ ongoing	$56,000	TOPS, Lake Erie Protection Fund, ODNR-NatureWorks
1, 2, 3, 4	4, 5	3	Sylvan Prairie Park Smith Ditch Restoration	The Olander Park System	Short term	$56,000	Ohio EPA 319
1, 2, 3, 4	4, 5	4	Comstock Ditch Demonstration Project	The Olander Park System	Medium term	$13,000	ODNR-NatureWorks
Agricultural Nonpoint Source Reduction Strategies*							
High Quality Waters Protection Strategies*							
Other NPS Causes and Associated Sources of Impairment							

* (Ohio EPA, 2013)

EXAMPLE

4.3.2 Critical Area 2: Project Summary Sheet(s)

The Project Summary Sheets provided below were developed based on the actions or activities needed to restore the Brint Rd (RM 2.9) sampling site to attainment of the aquatic life use designation. These projects are considered next step or priority/short term projects. Medium and longer term projects will mostly like not have a Project Summary Sheet or will not have a complete Project Summary Sheet, as these projects are not ready for implementation. The Project Summary Sheets will be mostly the priority or short term project that are ready to implement, or at least those projects have been more thoroughly planned.

Critical Area 2: Project 1		
Nine Element Criteria	**Information needed**	**Explanation**
n/a	Title	Tenmile Creek Flood Mitigation and Stream and Riparian Corridor Restoration Project
criteria d	Project Lead Organization & Partners	LEAD: Lucas Co Engineers Office PARTNER:
criteria c	HUC-12 & Critical Area	Tenmile Creek HUC-12 Critical Area 2
criteria c	Location of Project	Near Herr Rd, Sylvania Township, Lucas County, Ohio Between RM 24.7 and RM 26.3
n/a	Which Ohio NPS strategy is being addressed by this project?	Altered Stream and Habitat Restoration Strategies
criteria f	Time Frame	8/2016 to 9/2018
criteria g	Short Description	Once constructed, the project will enhance the quality of in-stream and riparian habitat and reduce sediment and phosphorus loads into Tenmile Creek within Critical Area 2.
criteria g	Project Narrative	This project will improve in-stream and riparian habitat quality along Tenmile Creek within Critical Area 2. This will be achieved by: creating approximately 8.5 acres of terraced floodplain that will provide 2,500 acre-feet of storage capacity adjacent to main channel; removing log jams that are impeding flow and causing erosion along the stream bank; and installing various in-stream features such as rock riffles, j-hooks, overhanging bank structures, bendway weirs and scour boulders to promote the efficient transport of bed load downstream, stabilize the stream channel and banks, and increase the quality of habitat for fish and macroinvertebrates. Once constructed, the project will enhance the quality of in-stream and riparian habitat and reduce sediment and phosphorus loads into Tenmile Creek.
criteria d	Estimated Total cost	$1,400,000 ($200,000 grant with $1,200,000 matching)

Critical Area 2: Project 1		
criteria d	Possible Funding Source	NFWF
criteria a	Identified Causes and Sources	CAUSE: Sedimentation/Siltation SOURCE: Channelization
criteria b & h	Part 1: How much improvement is needed to remove the NPS impairment for the whole Critical Area?	With the goal being: to raise or maintain or increase IBI score above 28 (currently 37), to raise MIwb score above 6.8 (currently 5.8) raise the ICI score (from 18 to 30), and raise QHEI score (from 51.0 to 60) at the Brint Rd. Sampling Site on Tenmile Creek (RM 2.9) One reasonable objective included direct riparian corridor (floodplain) and stream improvements along 6400 linear feet of Tenmile Creek. (See Critical Area Objectives 1 and 2). Another Objective (#5) is to Establish 25 acres of forested riparian buffer along barren or impacted streatches of Tenmile Creek within this critical area.
	Part 2: How much of the needed improvement for the whole Critical Area is *estimated* to be accomplished by this project?	Plans are in development to do this work between Ottawa RM 24.7 and RM 26.3 (i.e., between Tenmile RM 4.66 and RM 6.26). It is possible this will be done in phases, but the complete project as a whole will meet both objectives 1 and 2. Objective 1 = (100%) Objective 2 = (100%) Objective 5: The redevelopment ant planting of the floodplain with restore ~6.2 acres' riparian buffer or ~25% of the 25-acre objective. Goals: There is recognition that there is lag time associated with nonpoint source -related projects and measured stream response. With respect to the *goals* in critical area 2, the main driver is QHEI. Current data shows that the stream in Critical area 2 is at 51—which is 9 points below the attainment index score of 60. It is expected that this project will cause an incremental increase the QHEI scoring by 1 point (or 11% progress toward the goal); with similar percentage gains for IBI, ICI, and MIwb index scores.
	Part 3: Load Reduced?	Estimated: 218Tons Sediment/Year, 218#P/year and 435#N/year
criteria i	How will the effectiveness of this project in addressing the NPS impairment be measured?	Staff from the OEPA-DSW Ecological Assessment Unit will perform both pre and post project monitoring. In addition, the Herr Rd. Sampling site will also be monitored (as part of the State's ongoing surface water monitoring program cycle) to determine progress (through IBI, ICI, and QHEI) from partial attainment to full attainment.
criteria e	Information and Education	The Lucas County Engineers office will partner with Lucas SWCD to develop outreach materials, and tours of this site. It is envisioned that local high schools will monitor the site as part of their environmental science curriculum.

Critical Area 2: Project 2		
Nine Element Criteria	**Information needed**	**Explanation**
n/a	Title	Tallgrass Prairie and Wet Meadow Installation
criteria d	Project Lead Organization & Partners	LEAD: The Olander Park System PARTNERS: Partners for Clean Streams, Lucas Co Engineers Office, Lucas SWCD, Sandusky Co Park District
criteria c	HUC-12 & Critical Area	Tenmile Creek HUC-12 Critical Area 2
criteria c	Location of Project	8601 Brint Road Sylvania Township, Ohio
n/a	Which strategy is being addressed by this project?	Altered Stream and Habitat Restoration Strategies
Criteria f	Time Frame	FUNDED/ongoing since 2009
criteria g	Short Description	Sylvan Prairie Park (SPP) in Sylvania Township is the site of Tallgrass Prairie and Wet Meadow installations
criteria g	Project Narrative	Sylvan Prairie Park (SPP) in Sylvania Township is the site of ongoing Tallgrass Prairie and Wet Meadow installations. SPP is in the Tenmile Creek/Ottawa River Watershed, with three ditches that flow through the park and into Tenmile Creek. Much of SPP is floodplain, and before 2009, much of it was farmed and the rest was old field. In Spring 2009, The Olander Park System (TOPS) planted 61 acres of Tallgrass Prairie and 18 acres of Wet Meadow, using funds from NatureWorks and TOPS budget. In Spring 2010, TOPS planted 6 acres of Tallgrass Prairie at SPP with our own funds. In Fall 2011, TOPS restored 18 more acres of Wet Meadow with $15,000 from Lake Erie Protection Fund and 12 more acres of Tallgrass Prairie with our own funds. To restore a more natural hydrology to the now 36 acres of restored Wet Meadows, we crushed and back-filled field tile drop inlets and outlet pipes in 2012 and again in 2015. TOPS staff manages the restored habitats annually by controlling invasive plants, adding more native plants, mowing and even burning. The now 79 acres of Tallgrass Prairie and 36 acres of wet meadow are maturing into a native plant community that can support native wildlife and critical ecosystem functions like water filtration, pollution reduction, and flood control.
criteria d	Estimated Total cost	$56,000
criteria d	Possible Funding Source	ODNR-NatureWorks, Lake Erie Protection Fund
criteria a	Identified Causes and Sources	CAUSE: Sedimentation/Siltation SOURCE: Channelization

Critical Area 2: Project 2		
criteria b & h	Part 1: How much improvement is needed to remove the NPS impairment for the whole Critical Area?	With the goal being: to raise or maintain or increase IBI score above 28 (currently 37), to raise MIwb score above 6.8 (currently 5.8) raise the ICI score (from 18 to 30), and raise QHEI score (from 51.0 to 60) at the Brint Rd. Sampling Site on Tenmile Creek (RM 2.9): One reasonable objective (Objective 3) included the restoration of natural hydrology of at least 100 acres of former wet-prairie lands.
	Part 2: How much of the needed improvement for the whole Critical Area is *estimated* to be accomplished by this project?	This project outlines 36 acres of restored wet prairie — <u>or 36% of the wet prairie area outlined Objective 3</u> Goals: There is recognition that there is lag time associated with nonpoint source -related projects and measured stream response. With respect to the *goals* in critical area 2, the main driver is QHEI. Current data shows that the stream in Critical area 2 is at 51—which is 9 points below the attainment index score of 60. It is expected that this project will cause an incremental increase the QHEI scoring by 1 point (or 11% progress toward the goal); with similar percentage gains for IBI, ICI, and MIwb index scores.
	Part 3: Load Reduced?	Estimated: 36 Tons Sediment/Year, 36#P/year and 300#N/year
criteria i	How will the effectiveness of this project in addressing the NPS impairment be measured?	Staff from the OEPA-DSW Ecological Assessment Unit will perform both pre and post project monitoring. In addition, the Herr Rd. Sampling site will also be monitored (as part of the State's ongoing surface water monitoring program cycle) to determine progress (through IBI, ICI, and QHEI) from partial attainment to full attainment.
criteria e	Information and Education	The Olander Parks System has a robust outreach and education program (including brochures, nature walks, website articles, etc.) developed and programs that provide access to students and community members to enjoy and learn from these reclaimed prairie acres.

Critical Area 2: Project 3		
Nine Element Criteria	**Information needed**	**Explanation**
n/a	Title	Sylvan Prairie Park Smith Ditch Restoration
criteria d	Project Lead Organization & Partners	LEAD: The Olander Park System PARTNERS: Lucas Co Engineers Office, Lucas SWCD
criteria c	HUC-12 & Critical Area	Tenmile Creek HUC-12 Critical Area 2
criteria c	Location of Project	8601 Brint Road Sylvania Township, Ohio
n/a	Which strategy is being addressed by this project?	Altered Stream and Habitat Restoration Strategies
criteria f	Time Frame	Short
criteria g	Short Description	Sylvan Prairie Park (SPP) Smith Ditch Restoration will utilized a self-forming channel design. The overwide channel will allow the establishment of a meandering stream and functional floodplain as well as additional storm water storage.
criteria g	Project Narrative	The construction phase will restore almost 3,000 linear feet of stream in Sylvan Prairie Park. The restoration plan will utilize a self-forming channel design. The overwide channel would allow the establishment of a meandering stream and functional floodplain as well as additional storm water storage. Additionally, the banks and a 100-ft wide riparian zone will be planted with native seeds, plants and shrubs to further improve riparian conditions and increase diversity.
criteria d	Estimated Total cost	$56,000
criteria d	Possible Funding Source	ODNR-NatureWorks, Lake Erie Protection Fund
criteria a	Identified Causes and Sources	CAUSE: Sedimentation/Siltation SOURCE: Channelization

Critical Area 2: Project 3		
criteria b & h	Part 1: How much improvement is needed to remove the NPS impairment for the whole Critical Area?	With the goal being: to raise or maintain or increase IBI score above 28 (currently 37), to raise MIwb score above 6.8 (currently 5.8) raise the ICI score (from 18 to 30), and raise QHEI score (from 51.0 to 60) at the Brint Rd. Sampling Site on Tenmile Creek (RM 2.9): One reasonable objective (Objective 4) included the restoration of 5000 linear feet of ditch to a meandering channel. Another objective (Objective #5) is to Establish 25 acres of forested riparian buffer along barren or impacted stretches of Tenmile Creek within this critical area.
	Part 2: How much of the needed improvement for the whole Critical Area is *estimated* to be accomplished by this project?	*Objective 4: This 3000 linear foot project is 60% of the 5000-foot objective.* *Objective 5: 3000' * 100 '= ~6.9 acres. 6.9 acres is 27% of the 25-acre objective.* Goals: There is recognition that there is lag time associated with nonpoint source -related projects and measured stream response. With respect to the *goals* in critical area 2, the main driver is QHEI. Current data shows that the stream in Critical area 2 is at 51—which is 9 points below the attainment index score of 60. It is expected that this project will cause an incremental increase the QHEI scoring by 2 points (or ~20 % progress toward the goal); with similar percentage gains for IBI, ICI, and MIwb index scores.
	Part 3: Load Reduced?	Estimated: 170Tons Sediment/Year, 170#P/year and 340#N/year
criteria i	How will the effectiveness of this project in addressing the NPS impairment be measured?	Staff from the OEPA-DSW Ecological Assessment Unit will perform both pre and post project monitoring. In addition, the Herr Rd. Sampling site will also be monitored (as part of the State's ongoing surface water monitoring program cycle) to determine progress (through IBI, ICI, and QHEI) from partial attainment to full attainment.
criteria e	Information and Education	The Olander Park System has a robust outreach and education program (including brochures, nature walks, website articles, etc.) developed and programs that provide access to students and community members to enjoy and learn from improved stream corridor systems.

Critical Area 2: Project 4		
Nine Element Criteria	**Information needed**	**Explanation**
n/a	Title	Comstock Ditch Demonstration Project
criteria d	Project Lead Organization & Partners	LEAD: The Olander Park System PARTNERS: Lucas Co Engineers Office, Lucas SWCD
criteria c	HUC-12 & Critical Area	Tenmile Creek HUC-12 Critical Area 2
criteria c	Location of Project	8601 Brint Road Sylvania Township, Ohio
n/a	Which strategy is being addressed by this project?	Altered Stream and Habitat Restoration Strategies
criteria f	Time Frame	Medium term
criteria g	Short Description	This project will include overwide channel construction on Comstock Ditch at Sylvan Prairie Park in Sylvania and will result in 250 linear feet (1.24 acres) of stream restoration.
criteria g	Project Narrative	TOPS will partner with Lucas Soil & Water Conservation District and Lucas County Engineers for this project for this demonstration of overwide ditches. Comstock Ditch flows through an agricultural and suburban landscape and into Tenmile Creek. 1,480 linear feet of Comstock Ditch flows through Sylvan Prairie Park in Sylvania Township. 250 linear feet of the ditch will be converted from a traditional trapezoidal ditch with a 6-foot wide base, to an overwide ditch with a 12-foot wide base and 2:1 slope banks. This small demonstration project plans to increase meander, sediment deposition and nutrient uptake. Native trees, shrubs, forbs and grasses will be planted in 1.24 acres of riparian zone around the stream restoration.
criteria d	Estimated Total cost	$13,000
criteria d	Possible Funding Source	ODNR-NatureWorks, Ohio EPA 319
criteria a	Identified Causes and Sources	CAUSE: Sedimentation/Siltation SOURCE: Channelization

Critical Area 2: Project 4		
criteria b & h	Part 1: How much improvement is needed to remove the NPS impairment for the whole Critical Area?	With the goal being: to raise or maintain or increase IBI score above 28 (currently 37), to raise MIwb score above 6.8 (currently 5.8) raise the ICI score (from 18 to 30), and raise QHEI score (from 51.0 to 60) at the Brint Rd. Sampling Site on Tenmile Creek (RM 2.9): One reasonable objective (Objective 4) included the restoration of 5000 linear feet of ditch to a meandering channel. Another objective (Objective #5) is to Establish 25 acres of forested riparian buffer along barren or impacted stretches of Tenmile Creek within this critical area.
	Part 2: How much of the needed improvement for the whole Critical Area is *estimated* to be accomplished by this project?	*Objective 4: This 250 linear foot project is 5% of the 5000-foot objective.* *Objective 5: 1.24 acres is 5% of the 25-acre objective.* Goals: There is recognition that there is lag time associated with nonpoint source -related projects and measured stream response. With respect to the *goals* in critical area 2, the main driver is QHEI. Current data shows that the stream in Critical area 2 is at 51—which is 9 points below the attainment index score of 60. It is expected that this project will cause an incremental increase the QHEI scoring by 0.5 point (or ~5% progress toward the goal); with similar percentage gains for IBI, ICI, and MIwb index scores.
	Part 3: Load Reduced?	Estimated: 9 Tons Sediment/Year, 9#P/year and 17#N/year
criteria i	How will the effectiveness of this project in addressing the NPS impairment be measured?	Staff from the OEPA-DSW Ecological Assessment Unit will perform both pre and post project monitoring. In addition, the Herr Rd. Sampling site will also be monitored (as part of the State's ongoing surface water monitoring program cycle) to determine progress (through IBI, ICI, and QHEI) from partial attainment to full attainment.
criteria e	Information and Education	The Olander Park System has a robust outreach and education program (including brochures, nature walks, website articles, etc.) developed and programs that provide access to students and community members to enjoy and learn from improved stream corridor systems.

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EXAMPLE

Appendices

EXAMPLE

Appendix A: Acronyms and Abbreviations

The acronyms and abbreviations below are commonly used by organizations working to restore Ohio's watersheds; many of which are included in this NPS-IS plan.

A

AOC	Area of Concern

B

BMP	Best Management Practice
BOD	Biochemical Oxygen Demand

C

CSO	Combined Sewer Overflow

D

DELT	Deformities, Eroded Fins, Lesions, and Tumors
DNR	Department of Natural Resources

E

EOLP	Erie-Ontario Lake Plain Ecoregion
EWH	Exceptional Warmwater Habitat

G

GIS	Geographical Information System

H

HELP	Huron-Erie Lake Plain Ecoregion
Hg	Mercury
HUC	Hydrologic Unit Code

I

IBI	Index of Biotic Integrity
ICI	Invertebrate Community Index

L

LRW	Limited Resource Water

M

Mg/l	Milligrams per Liter
MGD	Million Gallons per Day
MIwb	Modified Index of Well Being
MWH	Modified Warmwater Habitat

N

NPDES	National Pollutant Discharge Elimination System

EXAMPLE

O

ODA	Ohio Department of Agriculture
ODNR	Ohio Department of Natural Resources
ODH	Ohio Department of Health
OEPA	Ohio Environmental Protection Agency

P

PAH	Polycyclic Aromatic Hydrocarbons
PCB	Polychlorinated Biphenyls

Q

QHEI	Qualitative Habitat Evaluation Index

R

RAP	Remedial Action Plan

S

SSO	Sanitary Sewer Overflow
SWCD	Soil and Water Conservation District

T

TMDL	Total Maximum Daily Load Limits
TSD	Technical Support Document

U

µg/kg	Micrograms per Kilogram
USACE	United States Army Corps of Engineers
USDA	United States Department of Agriculture
USEPA	United States Environmental Protection Agency
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
USPC	United States Policy Committee

V

VAP	Voluntary Action Program

W

WAP	Watershed Action Plan
WBP	Watershed Based Plan
WC	Watershed Characterization
WQ	Water Quality
WQS	Water Quality Standards (Ohio Administrative Code 3745-1)
WRAS	Watershed Restoration Action Strategy
WWH	Warmwater Habitat
WWTP	Wastewater Treatment Plant

EXAMPLE

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