Nine-Element Nonpoint Source Implementation Strategy (NPS-IS) for Platter Creek HUC-12 (04100005 02 06)

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Version 1.0: Approved: January 16, 2020

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The City of Defiance would like to acknowledge the collaboration of multiple partners in the preparation of this Nonpoint Source Implementation Strategy (NPS-IS) for the **Platter Creek HUC-12**. Thank you to the individuals and organizations that contributed background information, insight into objectives and projects for inclusion in this NPS-IS. Special thanks to Stephanie Singer, The Nature Conservancy, for sharing extensive knowledge of the watershed and Rick Wilson, Ohio Environmental Protection Agency – Division of Surface Water, for guidance throughout the NPS-IS development process**.**

This product or publication was financed in part or totally through a grant from the Ohio Lake Erie Commission and the United States Environmental Protection Agency with Great Lakes Restoration Initiative funds. The contents and views, including any opinions, findings, conclusions or recommendations, contained in this product or publication are those of the authors and have not been subject to any Ohio Lake Erie Commission or United States Environmental Protection Agency peer or administrative review and may not necessarily reflect the views of the Ohio Lake Erie Commission or the United States Environmental Protection Agency and no official endorsement should be inferred.

Acronyms and Abbreviations

The acronyms and abbreviations below are commonly used by organizations working to restore Ohio's watersheds and are found throughout this NPS-IS document.

Numbers	
§319	Section 319 of the Clean Water Act
A	
ACPF	Agricultural Conservation Planning Framework
ALU	Aquatic Life Use
B	
BMP	Best Management Practice
C	
CAFF	Confined Animal Feeding Facility
CAFO	Confined Animal Feeding Operation
CDL	Cropland Data Layer
CRP	Conservation Reserve Program
CSA	Critical Sewage Area
CSO	Combined Sewer Overflow
CTIC	Conservation Technology Information Center
D	
DAP	Domestic Action Plan
DEM	Digital Elevation Model
E	
E. coli	*Eschirichia coli*
ECBP	Eastern Corn Belt Plains Ecoregion
ECHO	Environmental Compliance History Online
EPT	*Ephemeroptera, Trichoptera* and *Plecoptera* – sensitive macroinvertebrate species
EQIP	Environmental Quality Incentives Program
F	
FLS	Federally Listed Species
FSA	Farm Service Agency
G	
GIS	Geographic Information System
GLC	Great Lakes Commission
GLRI	Great Lakes Restoration Initiative
GLWQA	Great Lakes Water Quality Agreement
GPS	Global Positioning System

H

H2Ohio	H2Ohio Initiative (Ohio state funding mechanism for water quality improvement)
HAB	Harmful Algal Bloom
HELP	Huron-Erie Lake Plains Ecoregion
HSTS	Home Sewage Treatment System
HUC	Hydrologic Unit Code

I

IBI	Index of Biotic Integrity
ICI	Invertebrate Community Index
IJC	International Joint Commission

M

MIwb	Modified Index of Well Being
MRBPLG	Maumee River Basin Partnership of Local Governments
MS4	Municipal Separate Storm Sewer System
MTA	Million Tons per Annum
MWH	Modified Warmwater Habitat

N

NPDES	National Pollutant Discharge Elimination System
NPS	Nonpoint Source
NPS-IS	Nonpoint Source-Implementation Strategy
NRCS-USDA	Natural Resources Conservation Service-United States Department of Agriculture

O

ODA	Ohio Department of Agriculture
ODNR	Ohio Department of Natural Resources
OEPA	Ohio Environmental Protection Agency
OLEC	Ohio Lake Erie Commission
OSUE	Ohio State University Extension

P

PAD-US	Protected Areas Database of the United States
ppb	parts per billion

Q

QHEI	Qualitative Habitat Evaluation Index

R

RM	River Mile

S

STEPL	Spreadsheet Tool for Estimating Pollutant Loads
SWCD	Soil and Water Conservation District

T

TMACOG	Toledo Metropolitan Area Council of Governments
TMDL	Total Maximum Daily Load
TSD	Technical Support Document

U

UMWP	Upper Maumee Watershed Partnership
USEPA	United States Environmental Protection Agency
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey

V

VRT	Variable Rate Technology

W

WAP	Watershed Action Plan
WLEB	Western Lake Erie Basin
WQS	Water Quality Standards (Ohio Administrative Code 3745-1)
WRP	Wetland Reserve Program
WWH	Warmwater Habitat
WWTP	Wastewater Treatment Plant

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CHAPTER 1: INTRODUCTION

The **Platter Creek Hydrologic Unit Code (HUC)-12 (04100005 02 06)** is situated in south central Defiance County, Ohio, and contains a watershed of 21.68 square miles (Figure 1). The **Platter Creek HUC-12** wholly contains Platter Creek, an 11.2-mile channelized and maintained stream that enters the Maumee River at approximately river mile (RM) 80.10[1]. The watershed is primarily rural, and land use is dominated by cultivated crop land (~88%). The **Platter Creek HUC-12** has recently been identified as a priority watershed within the Western Lake Erie Basin (WLEB) for watershed planning and nutrient reduction efforts due to the estimated loadings of total phosphorus and dissolved reactive (soluble) phosphorus that flow into the tributaries of the Maumee River and eventually, Lake Erie.

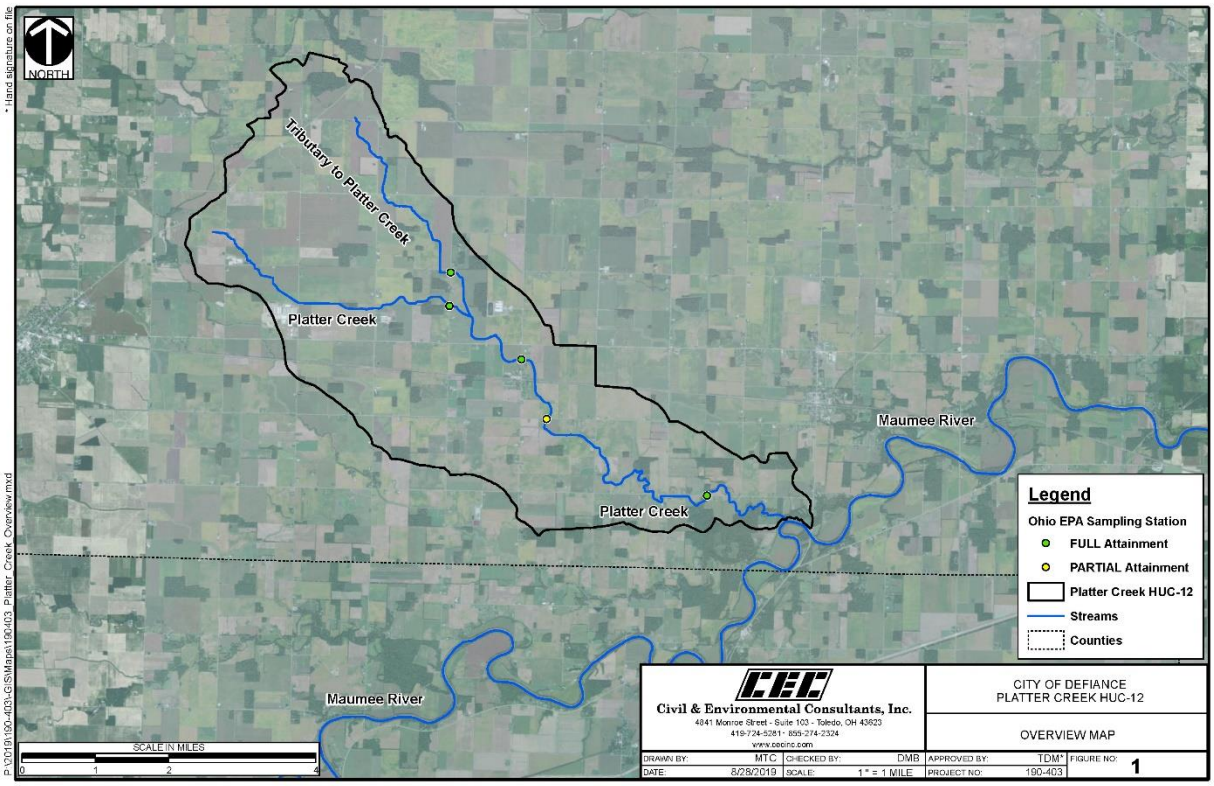


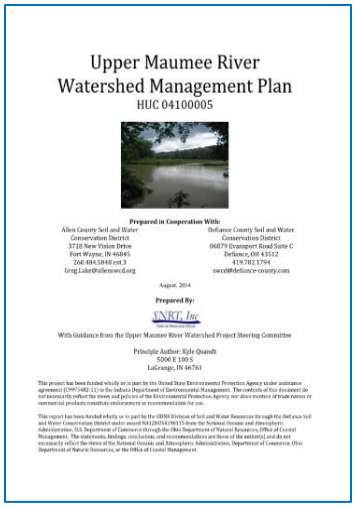
Figure 1: Platter Creek HUC-12 Overview

While watershed plans could be all-inclusive inventories, the US Environmental Protection Agency (USEPA) identified nine critical elements to include in strategic planning documents for impaired waters. To ease implementation of projects addressing nonpoint source (NPS) management and habitat restoration, current federal and state NPS and habitat restoration funding opportunities require strategic watershed plans incorporate these nine key elements, concisely to HUC-12 watersheds. In addition, the development of Nine-Element Nonpoint Source-Implementation Strategies (NPS-IS) is critical to the efforts focused on implementing Ohio's Domestic Action Plan (DAP) to reduce total spring

[1] Historical documents, such as the *Upper Maumee River Watershed Management Plan* (UMWP, 2014), cite Platter Creek is 6.7 miles long; however, recent OEPA sampling in Platter Creek shows sample points extending to almost RM 8.00. The online OEPA River Mile Index (OEPA, 2019b) shows Platter Creek's length is approximately 11.2 miles, which was confirmed with OEPA Division of Surface Water.

nutrient loadings to Lake Erie by 40% by the year 2025, with aspirations to reach a 20% reduction by 2020 (OLEC, 2018). The development of NPS-IS across the entire WLEB will address NPS pollution by accounting for both near-field (within stream/watershed) and far-field (loadings to Lake Erie) effects. The *Platter Creek HUC-12 NPS-IS* is sponsored and developed by the City of Defiance, in collaboration with the Defiance Soil and Water Conservation District (SWCD) under a grant from the Ohio Lake Erie Commission (OLEC).

1.1 Report Background


Upper Maumee River
Watershed Management Plan
HUC 04100005

The Upper Maumee River Watershed Action Plan

The Ohio Environmental Protection Agency (OEPA) has historically supported watershed based planning in many forms (OEPA, 2016). In 1997, OEPA issued guidance for the development of Watershed Action Plans (WAPs), which typically covered larger watersheds (HUC-10 to HUC-8 size). The WAPs included an outline and checklist to ensure USEPA's nine elements were included within each plan. The USEPA issued new guidance in 2013 and concluded Ohio's interpretation for WAP development did not adequately address critical areas, nor did it include an approach that detailed the nine elements at the project level (OEPA, 2016). In response, OEPA developed a new template for watershed planning in the form of a NPS-IS, ensuring NPS pollution is addressed at a finer resolution and that individual projects listed within each plan include each of the nine elements. The first NPS-IS plans were approved in 2017. Over time, these plans have evolved to not only address in-stream (near-field) water quality impairment from NPS pollution, but they also address reductions in nutrient loadings to larger bodies of water (far-field), particularly in the WLEB.

The Upper Maumee Watershed Partnership (UMWP) formed in 2009 due to growing concern over the increasing occurrences and severity of algal blooms and hypoxic zones within the WLEB. Through a grant from the Maumee Valley Resource Conservation and Development Organization, members of the Defiance SWCD Board and staff spearheaded the establishment of a formal steering committee consisting of representation from SWCDs in both Indiana and Ohio, local governments, academia and private citizens and businesses. Together, the steering committee developed the *Upper Maumee River Watershed Management Plan*, which received full endorsement by the state of Ohio in 2014.

In 2018, all subwatersheds within the Ohio portion of the Auglaize HUC-8 (including the Ottawa River, Little Auglaize River and Little Flatrock Creek), the Blanchard HUC-8 (including Eagle Creek), the St. Marys HUC-8 and the **Platter Creek HUC-12** were recommended for designation as a "Watershed in Distress" due to relatively higher concentrations of phosphorus in surface waters contributing to harmful algal bloom (HAB) occurrence in Lake Erie. These waterways were found to have flow-weighted mean concentrations of phosphorus two or more times the phosphorus loading goals set forth by the Great Lakes Water Quality Agreement (GLWQA) and the subsequent DAP developed by the State of Ohio (ODA, 2018). In 2019, the proposal to designate these watersheds as distressed was removed from state consideration. Focus is now on developing NPS-IS for these subwatersheds in preparation for

basin-wide targeted nutrient reduction efforts. The *Platter Creek HUC-12 NPS-IS* serves as an update to the *Upper Maumee River Watershed Management Plan* for just the **Platter Creek HUC-12**, ensuring that the projects needed for implementation of nutrient reduction efforts are eligible for state and federal NPS funding.

Removal of NPS impairments and reduction in overall nutrient loss within the **Platter Creek HUC-12** is crucial to the attainment of aquatic life use (ALU) standards within Platter Creek, as well as reduction in severity, extent and occurrence of HABs within the WLEB. Three of four sampling locations within Platter Creek are in *Full Attainment* of respective ALUs. Platter Creek is in *Partial Attainment* of its Warmwater Habitat (WWH) ALU at one sampling location, mainly due to the effects of low flow alterations, siltation and nutrient enrichment from channelization, row crop agriculture, manure application/runoff and unsewered communities. The Tributary to Platter Creek (at RM 7.66) is in *Full Attainment* of its Modified Warmwater Habitat (MWH) ALU. This NPS-IS will be used to strategically identify and outline key projects that should be implemented within the **Platter Creek HUC-12** to address management of NPS issues that have both near-field and far-field impacts.

1.2 Watershed Profile & History

The WLEB is composed of approximately 7,000,000 acres across the tri-state area of Ohio, Indiana and Michigan (Figure 2). The largest direct tributary to the WLEB is the Maumee River, flowing 137 miles through 18 counties in Indiana and Ohio. The WLEB watershed is broken into several subbasins at the HUC-8 level, including the St. Joseph, St. Marys, Auglaize, Blanchard, Tiffin, Ottawa-Stony, River Raisin, Cedar-Portage, Upper Maumee and Lower Maumee watersheds. The Upper Maumee HUC-8 (04100005) contains the Maumee River from its headwaters in Fort Wayne, where the St. Joseph and St. Marys rivers join, to its most downstream terminus at RM 65.7. Approximately 430 miles of tributaries exist within the Upper Maumee HUC-8 (UMWP, 2014). The HUC-8 can be further divided into two smaller subwatersheds at the HUC-10 level—the *Headwaters Maumee River (04100005 01)* and the *Gordon Creek- Maumee River HUC-10 (04100005 02).*

The *Gordon Creek-Maumee River HUC-10* has a drainage area of 228.8 square miles or 146,450 acres (Figure 3). Approximately 44 miles of the Maumee River are contained within the *Gordon Creek-Maumee River HUC-10* from approximately RM 110.5 in Indiana to RM 65.7, where the Tiffin River joins at the City of Defiance. Land use within the *Gordon Creek-Maumee River HUC-10* is mainly agricultural and rural, and communities within the watershed typically range from a few hundred to a few thousand people (US Census Bureau, 2010). The *Gordon Creek-Maumee River HUC-10* is further divided into eight HUC-12 watersheds, which contain smaller tributaries to the mainstem Maumee, one of which is the **Platter Creek HUC-12**. The **Platter Creek HUC-12** contains Platter Creek, an 11.2-mile long channelized ditch maintained for drainage purposes. The Platter Creek subwatershed is similar in land use setting and characteristics as the overall larger HUC-10 watershed, supporting mostly agricultural land use within the fertile landscape known formerly as the Great Black Swamp.

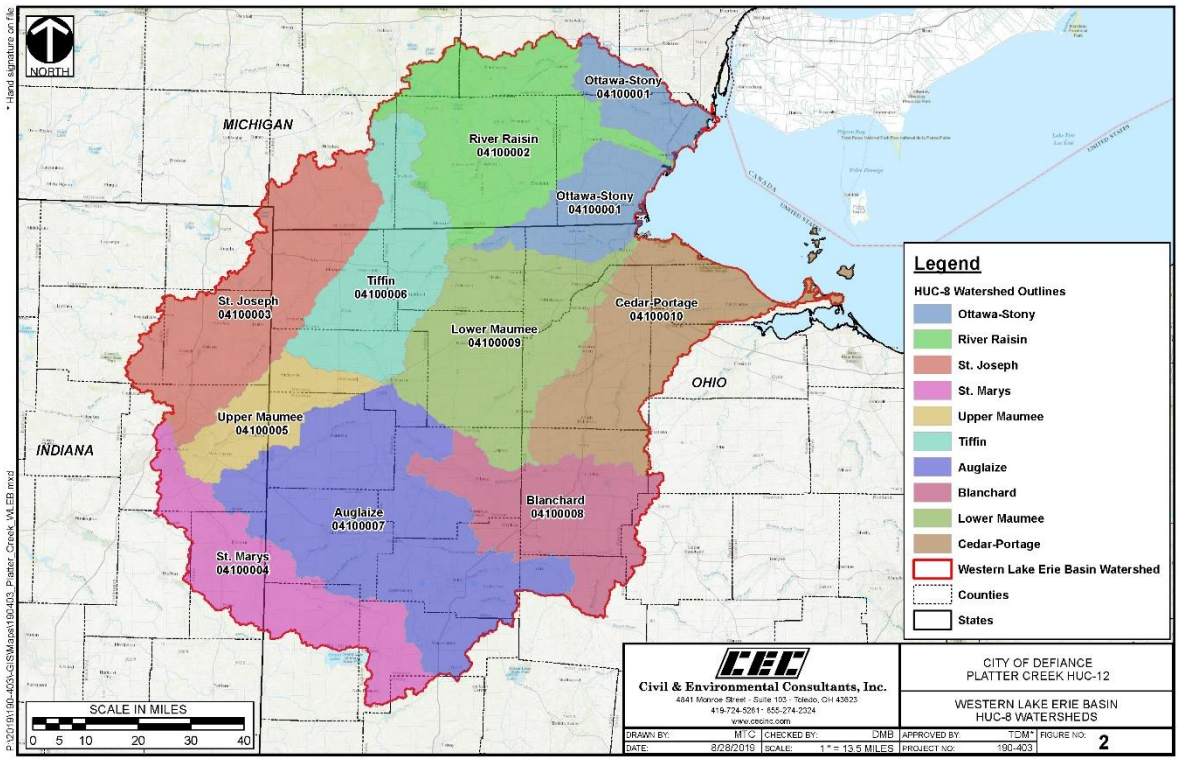


Figure 2: Western Lake Erie Basin Watershed

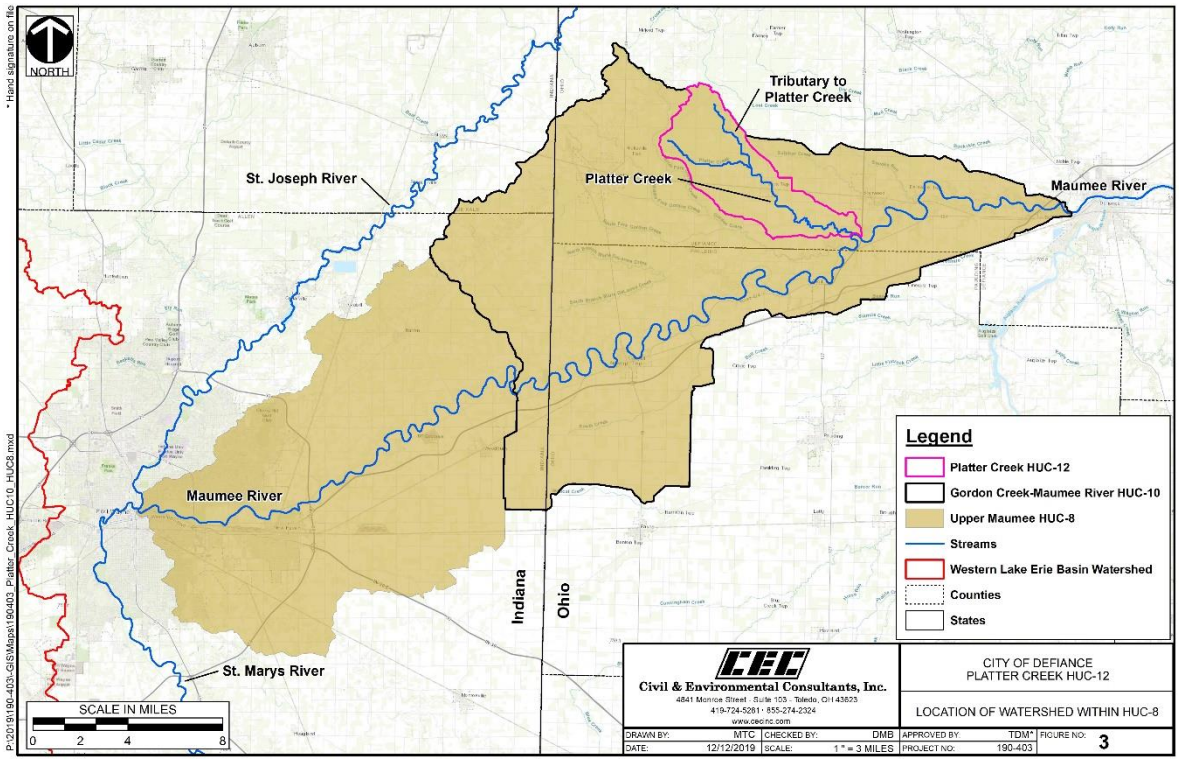


Figure 3: Location of the Platter Creek HUC-12

The Great Black Swamp

Large parts of the Maumee River, Maumee Bay and Lake Erie drainage areas were once covered by the Great Black Swamp, an area approximately 120 miles long by 40 miles wide (Figure 4). This swamp, formed more than 20,000 years ago by retreating glaciers, was dominated by clay-rich soils with low permeability and dense vegetation. The difficulty associated with travel through the dense, swampy, insect-populated terrain left this one of the last areas of Ohio to be developed. In 1859, a law provided for the installation of public ditches, and by 1900, a vast system of ditches had drained the majority of the area to allow crop production on this fertile land. Estimates suggest there are three times as many man-made ditches as there are natural streams (by length) throughout this region. Ditches that do not have adequate buffer space or are in direct contact with farmland provide a means for sediment and nutrient runoff to enter tributaries that flow to Lake Erie. Low permeability soils and a flat landscape result in flooding during average rain events, which accelerates runoff into ditches, resulting in an area that would benefit from floodplain expansion and wetland restoration (Maumee RAP, 2006).

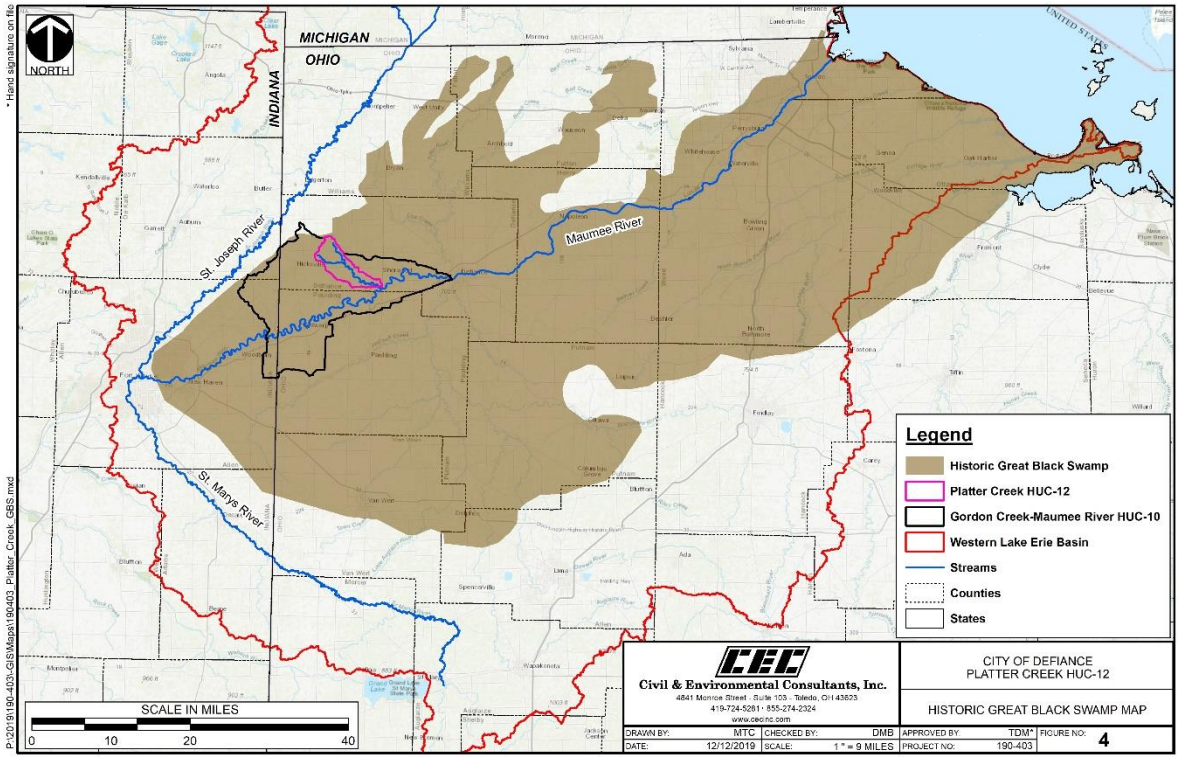


Figure 4: Historic Great Black Swamp

1.3 Public Participation and Involvement

Watershed planning is best accomplished by collaboration and input from a diverse group of entities, including governmental agencies, private businesses, academia, non-profit groups, neighborhood organizations and the public at large. Several watershed groups and governmental collaboratives, such as the UMWP, Tri-State Watershed Alliance, St. Joseph Watershed Initiative and the Maumee River Basin Partnership of Local Governments (MRBPLG) are involved in addressing water quality and nutrient

reduction efforts within the **Platter Creek HUC-12** and the tri-state regional area for the Upper Maumee HUC-8, including contributing watersheds for the St. Joseph and St. Marys rivers.

The City of Defiance is a vibrant and progressive community—the confluence of rich history, small town experiences and innovative opportunities (City of Defiance, 2019). The City's mission is to unite the community through learning, service and culture. The City of Defiance seeks to manage water resources through an integrated approach, leveraging technical and financial resources to simultaneously maximize environmental benefits in their operation and maintenance of the City's wastewater treatment plant (WWTP) and collection system, the implementation of their Combined Sewer Overflow (CSO) Long Term Control Plan and the employment of stormwater reduction efforts developed through the Municipal Separate Storm Sewer System (MS4) program.

The Defiance SWCD protects the land and water of Defiance County by being an innovative leader, assisting and educating the public to make the best choices for conserving and preserving our natural resources (Defiance SWCD, 2019). The Defiance SWCD has six priorities for 2019, including initiatives that promote nutrient and manure management, responsible land use planning and soil health and conservation; implement Conservation Works of Improvement, rural drainage and ditch maintenance projects; preserve forestry, wildlife and woodlands; and educate the public on the benefits of natural resource conservation. Working throughout Defiance County, the Defiance SWCD has implemented several cost-share conservation programs, including nutrient management programs targeted to the Platter Creek watershed.

Both the City of Defiance and Defiance SWCD recognize the importance of a broad, regional approach to water quality to meet goals for source water protection, sustainable recreational opportunities and healthy aquatic communities not only within the mainstem of the Maumee River, but within its upstream tributaries and downstream receiving waterbody, Lake Erie. In 2014, the City of Defiance and Defiance SWCD launched the *Land to Lake* website, announcing an initiative designed to promote community involvement in water resource protection throughout Defiance County. In addition, both entities contribute active leadership to the UMWP, the partnership responsible for the drafting of the *Upper Maumee River Watershed Management Plan*, the original document to which this NPS-IS serves to update.

Chapters 1, 2 and 3 of this NPS-IS were primarily prepared using the *Biological and Water Quality Study of Selected Maumee River Tributaries, 2015-2016, Technical Report AMS/2015-MAUMT-2* (OEPA, 2019a), the *2018 Ohio Integrated Report* (OEPA, 2018a) and the *Upper Maumee River Watershed Management Plan* (UMWP, 2014). Project information for Chapter 4 was compiled by collaborative meetings with organizational stakeholders, community partners and local landowners.

The City of Defiance, the Defiance SWCD and the UMWP held a public meeting regarding NPS-IS development and current state and federal agricultural programs on August 5, 2019 in Sherwood, Ohio to engage area landowners and organizational stakeholders in the planning process. Representatives from the UMWP and approximately ten landowners were in attendance. In addition, the City of Defiance and Defiance SWCD solicited individual input from potential cooperating landowners and

stakeholder organizations working within the **Platter Creek HUC-12**, such as the Defiance County Engineers Office**,** Defiance County Health Department, Defiance College and UMWP, as well as those that work regionally throughout the WLEB, including the Allen (Indiana) SWCD, The Nature Conservancy, The West Central Land Conservancy, Black Swamp Conservancy, the Maumee Valley Conservancy District, the Maumee Watershed Alliance (formerly known as the Tri-State Watershed Alliance), OEPA and the Ohio Department of Natural Resources (ODNR).

Additionally, the Agricultural Conservation Planning Framework (ACPF) tool was developed for Platter Creek. This tool utilizes detailed terrain analysis to determine potential locations for specific in-field best management practices (BMPs). Results of the tool output are discussed in Chapter 3, and output maps will be used as part of ongoing conservation discussions with local landowners.

CHAPTER 2: HUC-12 WATERSHED CHARACTERIZATION AND ASSESSMENT SUMMARY

2.1 Summary of HUC-12 Watershed Characterization

2.1.1 Physical and Natural Features

The **Platter Creek HUC-12** is a tributary watershed within the *Gordon Creek-Maumee River HUC-10*, one of two larger sub-watersheds that collectively form the drainage area for the uppermost half of the mainstem of the Maumee River. The *Gordon Creek- Maumee River HUC-10* is comprised of eight HUC-12 watersheds; this document focuses on the #05 hydrologic unit—the **Platter Creek HUC-12**. The **Platter Creek HUC-12** wholly contains Platter Creek, a small, channelized tributary flowing southeasterly to the Maumee River mainstem at approximately RM 80.10. Platter Creek is approximately 11.2 miles in length and drains an area of 21.68 square miles (13,876 acres). Platter Creek begins at an elevation of 712 ft., and flows to an elevation of 670 ft. at its mouth, for an average fall of 8.5 ft/mile (ODNR, 2001). The majority of Platter Creek's length is under the ditch maintenance program overseen by Defiance SWCD. A small tributary of approximately 4.2 miles (drainage area = 5.46 square miles) enters Platter Creek at RM 7.66 (OEPA, 2019b; USGS, 2019). In total, approximately 32 miles of stream and ditch exist in the subwatershed.

Maintained ditch in the Upper Maumee Watershed (Upper Maumee Watershed Tributaries Report Card, 2014-2015)

The Platter Creek watershed is mostly contained with the Huron-Erie Lake Erie Plains (HELP) ecoregion (Figure 5). This ecoregion is described as "Fine, poorly-drained, water-worked glacial till and lacustrine sediment; also coarser end moraine and beach ridge deposits" (Maumee RAP, 2006). The most northern tip of the Platter Creek watershed falls within the Eastern Corn Belt Plains (ECBP), an ecoregion defined by rolling till plains and local end moraines). Soils within the ECBP are typically loamier and better drained than those in the HELP Ecoregion (USEPA, 2013).

The bedrock of the Upper Maumee watershed is Devonian, dating to approximately 400 million years ago. Shales, dolomite and limestone dominate the bedrock throughout the Upper Maumee. The landscape of the Upper Maumee watershed was influenced by the Wisconsin Glaciation, occurring over 14,000 years ago. Glaciers during this time both flattened hills and filled and dammed rivers to create lakes, including Lake Erie (UMWP, 2014). As these glaciers melted, they deposited rock, dirt and sand. A sequence of deposits, called the Lagro Formation form the surficial geology of the area today. A silt and clay mixture overlies the bedrock at a depth approximately 20 to 100 feet thick and forms the parent materials for the clay-rich soils of the area today (UMWP, 2014).

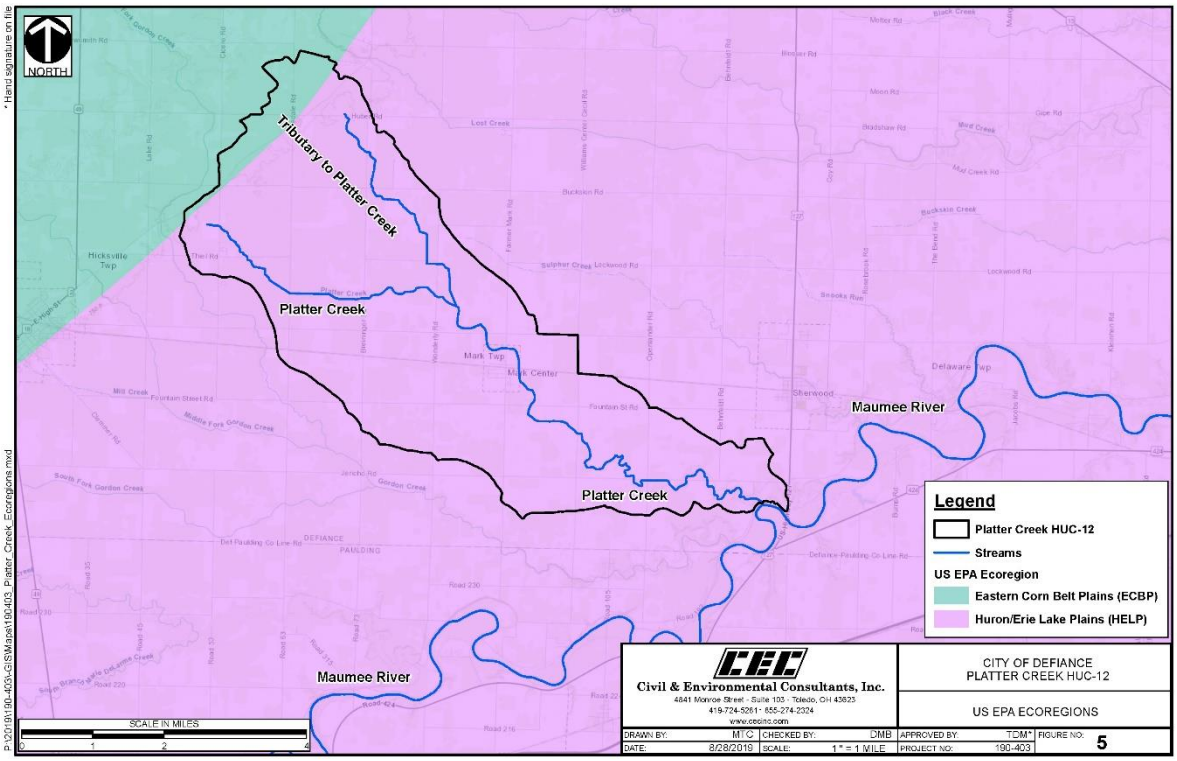


Figure 5: Ecoregions in Platter Creek HUC-12

Soils from twenty-nine series exist in **Platter Creek HUC-12** (Table 1). Over 95% of the **Platter Creek HUC-12** is covered by finer-grained soils that are described as very poorly to somewhat poorly drained (Figure 6). These soils, when drained and managed, are highly productive for agriculture, which is the dominant land use throughout the area. Topography of the area is generally flat, with slopes averaging approximately two percent.

Table 1: Soil Series in the Platter Creek HUC-12

Soil Series	Description	Percent Area of HUC-12
Latty	Deep, very poorly drained soils on lake plains	33.9%
Fulton	Deep, somewhat poorly drained soils on lake plains	10.5%
Kibbie	Deep, somewhat poorly drained soils in areas of outwash material of lake plains	8.7%
Colwood	Deep, very poorly drained soils in areas of outwash materials on lake plains	7.7%
Lenawee	Deep, very poorly drained soils on lake plains	6.7%
Toledo	Deep, very poorly drained soils on lake plains	6.0%
Hoytville	Deep, very poorly drained soils on lake plains	4.1%
Nappanee	Deep, somewhat poorly drained soils on lake plains	3.9%
Roselms	Deep, somewhat poorly drained soils on lake plains	3.8%
Haskins	Deep, somewhat poorly drained soils on outwash plains, terraces, low beach ridges, lake plains and moraines	3.3%
Del Ray	Deep, somewhat poorly drained soils on lake plains	2.3%

Soil Series	Description	Percent Area of HUC-12
Paulding	Deep, very poorly drained soils on lake plains	1.8%
Mermill	Deep, very poorly drained soils on stream terraces and outwash plains and near beach ridges of lake plains	1.1%
Tuscola	Deep, moderately well drained soils on stream terraces, outwash plains, deltas and lake plains	1.1%
Millgrove	Deep, very poorly drained soils on stream terraces, outwash plains, and in low lying areas between beach ridges of lake plains	0.9%
Sloan	Deep, very poorly drained soils on flood plains	0.9%
Digby	Deep, somewhat poorly drained soils on beach ridges, outwash plains and stream terraces	0.8%
Oshtemo	Deep, well drained soils on stream terraces, beach ridges and outwash plains	0.6%
Bronson	Deep, moderately well drained soils on beach ridges, stream terraces and outwash plains	0.3%
St. Clair	Deep, moderately well drained and well drained soils along slope breaks of dissected lake plains	0.3%
Belmore	Deep, well drained soils on beach ridges	0.2%
Rimer	Deep, somewhat poorly drained soils on stream terraces and in areas of outwash materials on lake plains	0.2%
Shoals	Deep, somewhat poorly drained soils that are moderately permeable on flood plains	0.2%
Ottokee	Deep, moderately well drained, rapidly permeable soils on beach ridges and outwash plains	0.1%
Rawson	Deep, moderately drained and well drained soils on stream terraces, beach ridges and outwash plains	0.1%
Seward	Deep, moderately well-drained soils on stream terraces and in areas of outwash materials on lake plains	0.1%

(Source: USDA Web Soil Survey, 2019)

The *Upper Maumee River Watershed Management Plan* listed the vast majority of soils within the HUC-8 watershed as hydric, including the entirety of the **Platter Creek HUC-12**. While most land within the **Platter Creek HUC-12** is currently in agricultural production, the presence of hydric soils indicates a strong potential for wetland restoration opportunities. While located within the boundaries of the former Great Black Swamp, very few wetland areas currently exist within the **Platter Creek HUC-12** (Figure 7).

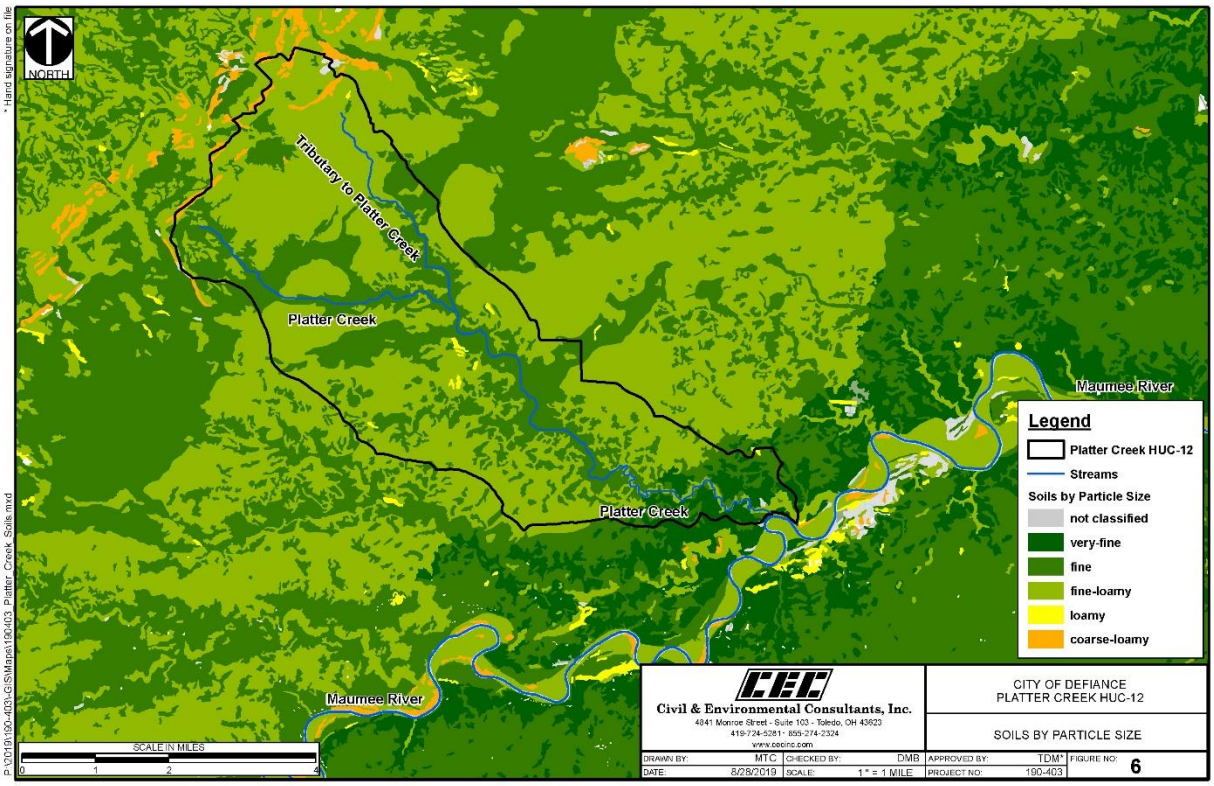


Figure 6: Soils Classified by Particle Size in Platter Creek HUC-12

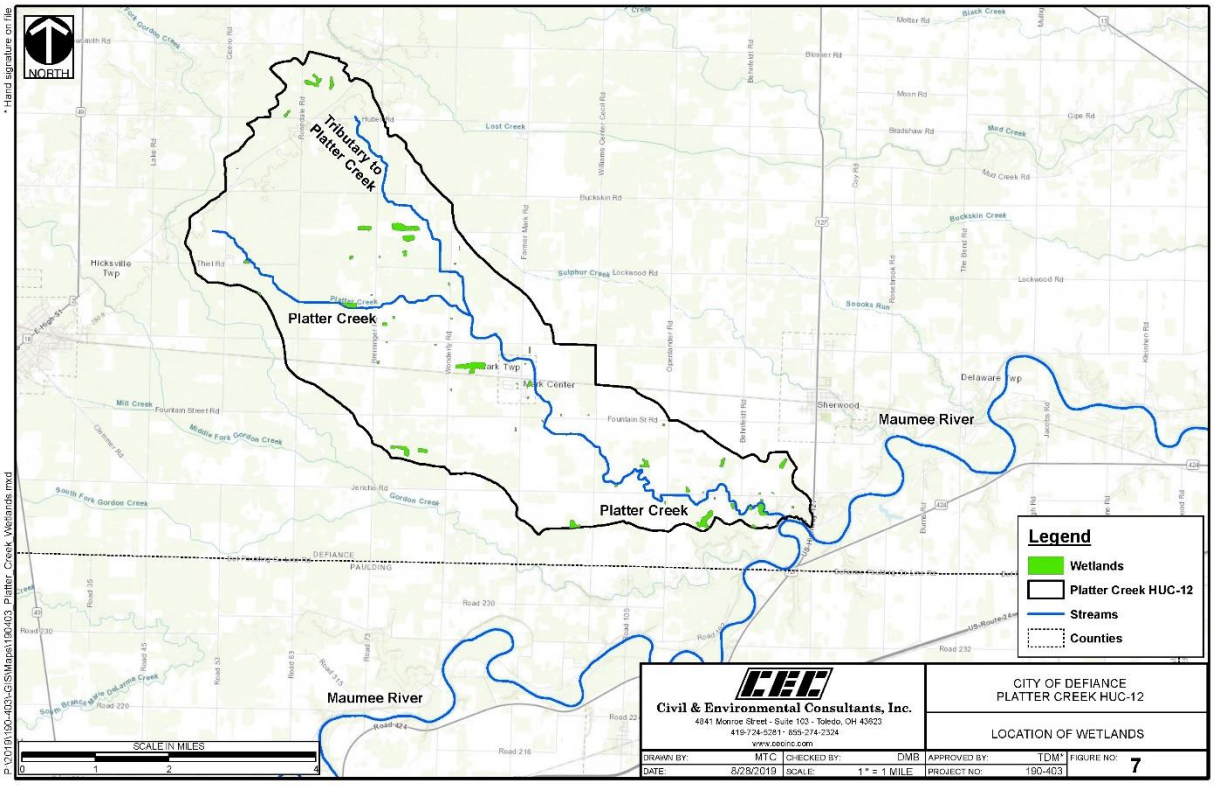


Figure 7: Wetlands Within the Platter Creek HUC-12

In addition, the Natural Resources Conservation Service (NRCS) has designated most of the soils (96.4%) within the Upper Maumee watershed as "very limited" for septic system usage, meaning that the soils are not naturally inclined to properly disperse and absorb liquid sewage effluents in a traditional leach bed system, and modifications to the site or septic system itself in these areas is impractical or impossible (UMWP, 2014). Improper function of home sewage treatment systems (HSTS) has been identified in the **Platter Creek HUC-12**. Sampling performed by OEPA in 2015 revealed high levels of *Escherichia coli (E. coli)* present in Platter Creek within Mark Township, and the agency issued a letter to the Defiance County Commissioners requesting an explanation of how the problem would be addressed (Helberg, 2018a).

The population within the **Platter Creek HUC-12** is sparse, estimated at 733, with 311 housing units (TMACOG, 2018). Residential and business development is clustered within the unincorporated area of Mark Center. In 2018, the Toledo Metropolitan Area Council of Governments (TMACOG) concluded a study of locations and densities of HSTS throughout the WLEB. Within Defiance County, Mark Center was identified as a Critical Sewage Area (CSA), in which larger-scale efforts should be initiated to address failing HSTS and/or potentially establish sewer service.

Currently, one National Pollutant Discharge Elimination System (NPDES) permitted facility is located within the **Platter Creek HUC-12**. Strong Farms, LLC. (Permit 2IK00255*AD) is a Concentrated Animal Feeding Operation (CAFO) that is permitted to discharge feedlot wastewater to Platter Creek. No violations or exceedances are noted in the USEPA Enforcement and Compliance History Online (ECHO) database (USEPA, 2019a). In total, four Confined Animal Feeding Facilities (CAFFs) fall under the purview of the Ohio Department of Agriculture (ODA) within the **Platter Creek HUC-12** (Table 2).

Table 2: Permitted Livestock Counts in the Platter Creek HUC-12

Facility Name	Livestock Type	Animal Units
Strong Farms, LLC	Cattle	3,350
Hillandale Farms	Layers	4,105,728
Greentop Acres, LLC(formerly Vissers Dairy, LLC)	Dairy	1,600
Pheasant Run (G & C Farming)	Swine	7,100

(Source: ODA data presented in the Western Lake Erie Basin Nutrient Source Inventory (NSI), Board of Lucas County Commissioners, 2019)

Specific landmarks and features within this watershed include:

- United States Geological Survey (USGS) Stream Gage #04183979 (mouth of Platter Creek);
- Four ODA permitted livestock operations;
- the unincorporated area of Mark Center, which includes a post office, an appliance center and the United Methodist Church;
- Hicksville Grain elevator; and
- Coffin Trail Bridge, a historic bridge.

2.1.2 Land Use and Protection

Land use within the **Platter Creek HUC-12** is fairly homogenous (Figure 8). The dominant land use activity within the **Platter Creek HUC-12** is cultivated crop production (88%), with wooded wetland areas covering the next largest portion of the watershed (4.5%) (Table 3).

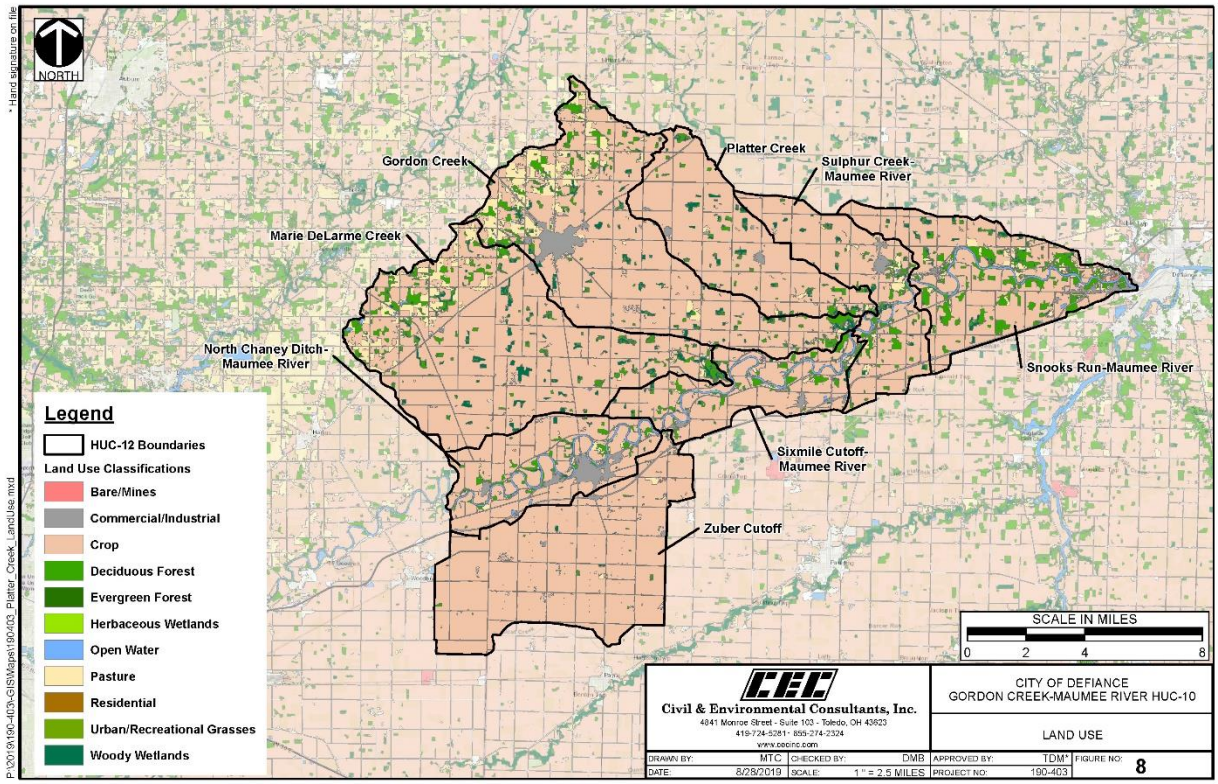


Figure 8: Land Use in the Gordon Creek-Maumee River HUC-10

Table 3: Land Use Classifications in the Platter Creek HUC-12

Land Use	Platter Creek HUC-12 (04100005 02 06)		
	Area (mi^2)	Area (acres)	% Watershed Area
Commercial/Industrial/Transportation	0.02	14.11	0.09%
Crop	19.16	12,259.53	88.38%
Deciduous Forest	0.86	553.52	3.98%
Open Water	<0.01	2.67	0.02%
Pasture	0.38	242.16	1.75%
Residential	0.28	174.26	1.25%
Woody Wetlands	0.98	630.40	4.53%
Total	**21.68**	**13,876.63**	**100.00%**

(Source: Homer, 2015)

No parks or protected lands are listed for this watershed in the USGS Protected Areas Database of the United States (PAD-US). Seven threatened or endangered species, four of which are mussel species, are listed for Defiance County by the US Fish and Wildlife Service (USFWS) (Table 4). Platter Creek is not currently listed in Appendix A of the *Ohio Mussel Survey Protocol*, indicating that mussels may be present, but the Federally Listed Species (FLS) on USFWS's listing are not expected to be found (ODNR, 2018).

Table 4: Threatened and Endangered Species in Defiance County

Species	Status	Habitat Characteristics
Indiana bat (*Myotis sodalis*)	Endangered	Hibernates in caves and mines and forages in small stream corridors with well-developed riparian woods, as well as upland forests
Northern long-eared bat (*Myotis septentrionalis*)	Threatened	Hibernates in caves and mines and swarms in surrounding wooded areas in autumn; roosts and forages in upland forests during late spring and summer
Copperbelly water snake (*Nerodia erythrogaster neglecta*)	Threatened	Found in wooded and permanently wet areas (oxbows, sloughs, brushy ditches, floodplain woods)
Clubshell (*Pleurobema clava*)	Endangered	Found in coarse sand and gravel areas of runs and riffles within streams and small rivers
Northern riffleshell (*Epioblasma torulosa rangiana*)	Endangered	Found in firm sand of riffle areas in large streams and small rivers, as well as Lake Erie
Rayed bean (*Villosa fabalis*)	Endangered	Mostly found in smaller, headwater creeks, but sometimes in large rivers
White cat's paw pearlymussel (*Epioblasma obliquata perobliqua*)	Endangered	Found in firm sand or gravel riffles in small streams and medium-large rivers

(Source: USFWS, 2018)

Most land within the **Platter Creek HUC-12** is privately owned; therefore, knowledge of conservation practices may be limited. Some conservation practices can be estimated through aggregated program enrollment initiated through local SWCD and Farm Service Agency (FSA) offices, as well as annual crop tillage surveys. Current estimates for several practices of interest throughout the **Platter Creek HUC-12** are provided in Table 5. Future nutrient reduction projects implemented through this NPS-IS and available state and federal programming will be compiled to track progress made towards nutrient reduction and conservation goals across the **Platter Creek HUC-12** and the greater WLEB watershed.

Table 5: Current Conservation Practice Estimates Within the Platter Creek HUC-12

Practice Type	Estimated Acreage Currently Treated/ Number of Structures Installed
Conservation Tillage (no till, strip till, mulch till, reduced till)	10,000[a]
Cover Crops	3,365.9 acres[b]
Controlled Drainage Structures	75 – 150 acres[c]
Grade Stabilization Structure	1 structure installed[c]
Gypsum Application	1,149.3 acres[c]
Nutrient Management (Soil Sampling)	12,500 acres
Nutrient Management (Variable Rate Fertilization)	3,500 acres[d]

(Source: Defiance SWCD, personal communication, December 4, 2019)

NOTES

a Based on average Conservation Technology Information Center (CTIC) tillage survey results from 2016-2017

b Cumulative enrollment from a Section §319 grant program running from 2015-2019; ~800 acres enrolled in just 2019

c Section §319 grant enrollment from 2015-2019

d 214 acres enrolled through the Section §319 grant program running from 2015-2019

2.2 Summary of HUC-12 Biological Trends

The OEPA sampled the **Platter Creek HUC-12** in 2015 and 2016, as documented in the *Biological and Water Quality Study of Selected Maumee River Tributaries, 2015-2016, Technical Report AMS/2015-MAUMT-2* (OEPA, 2019a). This report serves as the Technical Support Document (TSD) for the TMDL study for selected Maumee River Tributaries, which is still under agency preparation. The headwater segment within Platter Creek was recommended to be MWH (upstream of RM 7.66) and verified to be WWH (downstream of RM 7.66). The Tributary to Platter Creek (at RM 7.66) was recommended as a MWH waterway.

A summary of the sample locations and their biological status in the **Platter Creek HUC-12** is provided in Table 6. For reference, water quality standards (WQS) for the HELP Ecoregion are presented in Table 7.

Table 6: Biological Indices Scores for Sites in Platter Creek HUC-12

Platter Creek HUC-12 (04100005 02 06)							
River Mile	**Drainage Area (mi^2)**	**IBI**	**MIwb[a]**	**ICI[b]**	**QHEI**	**Attainment Status**	**Location**
Platter Creek (MWH)							
7.95[H]	4.50[1]	28[1]	N/A	F[1]	22.30[1]	Full[1]	Wonderly Rd.
Platter Creek (WWH)							
6.41[H]	11.91	46	N/A	MG[ns]	42.75	Full	Farmer Mark Rd.
5.4[H]	12.8	[26[ns]]	N/A	[F*]	[26.50]	Partial	Fountain Rd.
1.70[H]	19.96	48	N/A	G	61.00	Full	Jericho Rd. (W Crossing)

Platter Creek HUC-12 (04100005 02 06)							
River Mile	**Drainage Area (mi^2)**	**IBI**	**MIwb[a]**	**ICI[b]**	**QHEI**	**Attainment Status**	**Location**
Tributary to Platter Creek @ RM 7.66 (MWH)							
0.78[H]	5.0	34.0	N/A	F	31.50	Full	Wonderly Rd.

(Source: OEPA, 2019a and OEPA, 2018a)

NOTES

IBI *Index of Biotic Integrity*

a *The Modified Index of Well Being (MIwb) is not applicable to headwater sites (drainage ≤20 mi^2).*

ICI *Invertebrate Community Index*

b *Narrative evaluation used in lieu of ICI (G=Good; MG=Marginally Good; H Fair =High Fair; F=Fair; L Fair=Low Fair; P=Poor; VP=Very Poor).*

QHEI *Qualitative Habitat Evaluation Index*

*** *Significant departure from applicable biocriteria (>4 IBI or ICI units, or >0.5 MIwb units). Underlined scores are in the poor to very poor range.*

H *Headwater sample*

ns *Nonsignificant departure from biocriteria (<4 IBI or ICI units, or <0.5 MIwb units).*

N/A *Not applicable*

1 *Data reported in this table are from the 2018 Ohio Integrated Report and represent average values between sampling events at this location in 2015 and 2016, as detailed in OEPA, 2019a. While the unpublished TSD study lists Platter Creek RM 7.95 as in Partial Attainment, the Integrated Report identifies this site as in Full Attainment of the MWH-C ALU.*

[ ] *Data from 2016.*

Table 7: Water Quality Standards for the Huron-Erie Lake Plains Ecoregion

HELP Ecoregion	MWH Standards[a]			WWH WQS Standards		
	Wading	**Headwater**	**Boat**	**Wading**	**Headwater**	**Boat**
IBI	22	20	20/22	32	28	34
MIwb	5.6	N/A	5.7/5.7	7.3	N/A	8.6
ICI	22	22	22	34	34	34
QHEI[b]	43.5	43.5	43.5	60	60	60

(Source: OEPA, 2013b)

NOTES

WQS *Water quality standards*

a *MWH standards are dependent on type of MWH. MWH-C (due to channelization) is listed first; MWH-I (due to impoundment) is listed second. All MWH streams in this NPS-IS are MWH-C, unless otherwise noted.*

b *QHEI is not criteria included in Ohio WQS; however, it has been shown to be highly correlated with the health of aquatic communities. In general, sites scoring 60 or above support healthy aquatic assemblages indicative of WWH. For modified warmwater habitats, Ohio EPA suggests a score of 43.5 for the support of tolerant aquatic assemblages (Ohio EPA, 2013b).*

N/A *MIwb not applicable to headwaters sampling locations with drainage areas ≤ 20 mi^2.*

Fishes (Modified Index of Well-Being (MIwb] & Index of Biotic Integrity [IBI])

Fish community performance in Platter Creek in 2015 met HELP WWH expectations at all sampling locations (RM 7.95, 6.41, 1.70), scoring well above the threshold of 28 for headwater sites (IBI $\bar{x}$=43, n=3). In 2016, additional sampling was performed to document any lingering effects of a fish kill associated with a leaking manure storage lagoon in July 2015. The 2016 sampling at RM 7.95 and RM 5.4 documented lower results (IBI $\bar{x}$=23, n=2). The lower performance at RM 7.95 was attributed to low flow and intermittent flow conditions that were not present in 2015 (OEPA, 2019a). While continuous flow was observed at RM 5.4 in 2016, lower scores at this location were attributed to effects from the unsewered community of Mark Center that were not apparent during 2015 (OEPA, 2019a). The fish community in the Tributary to Platter Creek (at RM 7.66) performed well, exceeding both MWH and WWH expectations.

Macroinvertebrates (Invertebrate Community Index [ICI])

Macroinvertebrate communities generally performed as expected in 2015. ICI scores ranged from Fair to Good moving downstream along Platter Creek. In 2016, macroinvertebrate communities performed inadequately, ranging from Low Fair at RM 7.95 and Fair at RM 5.4. High numbers of facultative filterers and scrapers were reflective of over-enriched conditions from a multitude of nutrient inputs (OEPA, 2019a). In addition, suboptimal habitat is also contributing to impairment at RM 5.4.

Habitat (via Qualitative Habitat Evaluation Index [QHEI])

Ohio EPA sampling crews documented various water quality and habitat attributes during the QHEI assessment in the summer of 2015-2016 (Table 8). QHEI was measured at RM 7.95, 6.41 and 1.70 in 2015, while RM 7.95 and RM 5.4 were sampled in 2016. Of all four Platter Creek sampling locations, only RM 1.70 reached WWH expectations. Habitat at all other sites did not even achieve MWH expectations. Habitat within the Tributary to Platter Creek (at RM 7.66) also did not achieve MWH expectations. In general, sampling locations were dominated by high- and moderate-influence MWH attributes.

Strong correlations exist between habitat attributes and a stream's ability to support healthy aquatic assemblages (OEPA, 1999). The presence of certain attributes are shown to have a larger negative impact on fish and macroinvertebrate communities. Streams designated as MWH should exhibit no more than six total MWH habitat attributes; additionally, no more than two of those six should be of high-influence (OEPA, 2013b). Streams designated as WWH should exhibit no more than four MWH habitat attributes, with no more than one of high-influence (OEPA, 2013b). No sampling locations within the **Platter Creek HUC-12** met this target, with total MWH attributes ranging from six to twelve among all the sites. The sampling location at RM 1.70 exhibited the best habitat along Platter Creek, with seven high-quality habitat attributes observed.

Table 8: QHEI Matrix with WWH and MWH Attribute Totals for Sites in the Platter Creek HUC-12

Platter Creek HUC-12 (04100005 02 06)																																	
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 Substrate	Silt Free Substrates	Good/Excellent Development	Moderate/High Sinuosity	Extensive/Moderate Cover	Fast Current/Eddies	Low/Normal Embeddedness	Max Depth >40 cm	Low/Normal Embeddedness	WWH Attributes	Channelized/No Recovery	Silt/Muck Substrates	No Sinuosity	Sparse/No Cover	Max Depth <40 cm	High 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	Moderate Influence MWM Attributes
Platter Creek (MWH)																																	
8.0	28.50[a]	5.00									•		1			•	•		2	•	•			•	•	•	•	•	•		•	9
8.0	16.00[b]	5.00											0		•		•	•	3	•	•			•	•	•	•	•	•		•	9
Platter Creek (WWH)																																	
6.4	42.75	2.22									•	•	2	•		•	•		3		•			•	•		•	•	•	•	•	8
5.4	26.50[b]	2.22											0		•	•	•	•	4	•	•			•	•			•	•	•	•	8
1.7	61.00	2.50	•	•		•	•	•			•	•	7				•		1		•			•				•	•	•		5
Tributary to Platter Creek @ RM 7.66 (MWH)																																	
0.8	31.50	4.00									•		1			•	•		2	•	•			•			•	•	•		•	7

(Source: OEPA, 2019a)

NOTES

a Data from 2015; in other data tables, this value was averaged with 2016 values from the same site

b Data from 2016

QHEI Qualitative Habitat Evaluation Index

WWH Warmwater Habitat

MWH Modified Warmwater Habitat

2.3 Summary of HUC-12 Pollution Causes and Associated Sources

As listed in the 2019 *Biological and Water Quality Study of Selected Maumee River Tributaries*, the OEPA has determined that the biological impairments in the **Platter Creek HUC-12** are mainly from low flow alterations, siltation and nutrient enrichment from channelization, row crop agriculture, manure application/runoff and unsewered communities (Table 9).

Table 9: Causes and Sources of Impairments for Sampling Locations in the Platter Creek HUC-12

Platter Creek HUC-12 (04100005 02 06)				
River Mile	**Primary Cause(s)**	**Primary Source(s)**	**Attainment Status**	**Location**
Platter Creek (MWH)				
7.95[H]	--	--	Full[a]	Wonderly Rd.
Platter Creek (WWH)				
6.41[H]	--	--	Full	Farmer Mark Rd.
5.4[H]	Nutrient enrichment; Low flow alterations; Siltation	Row crop agriculture; Manure application and runoff; Unsewered communities; Channelization	Partial	Fountain Rd.
1.70[H]	--	--	Full	Jericho Rd. (W Crossing)
Tributary to Platter Creek @ RM 7.66 (MWH)				
0.78[H]	--	--	Full	Wonderly Rd.

(Source: OEPA, 2019a)

NOTES
H Headwater sample
a The 2018 Ohio Integrated Report lists RM 7.95 as in Full Attainment of the MWH ALU, based upon the 2015 sampling results. In the 2019 TSD Document, RM 7.95 is listed in Partial Attainment, due to low flow conditions from channelization observed in 2016.

The OEPA has estimated spring phosphorus loadings from individual subwatersheds throughout the greater WLEB watershed. These estimates also include a breakdown of estimated loads from contributing sources of NPS pollutants, such as agricultural lands/activities, developed/urban lands, failing HSTS and natural sources (Table 10). Efforts to reduce nutrients from each of these contributing sources will focus on reaching the 40% reduction goal outlined by Annex 4 of the GLWQA and the Ohio DAP.

Table 10: Estimated Spring Nutrient Loadings from Contributing NPS Sources in the Platter Creek HUC-12

	Agricultural Load (lbs)	Developed/Urban Load (lbs)	Natural Load (lbs)	HSTS Load (lbs)	NPS Total (lbs)
Current Estimates*	10,000	310	<100	190	10,600
Target Estimates*	6,000	190	<100	120	6,400

(Source: R. Wilson, personal communication, June 7, 2019)

NOTES
**Estimated using two significant figures*

2.4 Additional Information for Determining Critical Areas and Developing Implementation Strategies

Assessment data from the 2015-2016 TMDL sampling event and data referenced in the 2019 *Biological and Water Quality Study of Selected Maumee River Tributaries, 2015-2016, Technical Report AMS/2015-MAUMT-2* and the *2018 Integrated Report* were used in the development of this NPS-IS (OEPA, 2019a; OEPA, 2018a). Any additional documents and/or studies created by outside organizations that were used as supplemental information to develop this NPS-IS are referenced in Chapter 5 (Works Cited), as appropriate.

CHAPTER 3: CRITICAL AREA CONDITIONS & RESTORATION STRATEGIES

3.1 Overview of Critical Areas

Overall, five sampling sites are located in the **Platter Creek HUC-12**—four within Platter Creek and one within the Tributary to Platter Creek (at RM 7.66). The most upstream site (RM 7.95) within Platter Creek is designated as MWH and is considered in *Full Attainment* of its ALU. Downstream from RM 7.66, Platter Creek is designated as WWH, and two of three sampling locations are in *Full Attainment* of this ALU. The sampling location immediately downstream from the unincorporated area of Mark Center is in *Partial Attainment* due to underperforming macroinvertebrate communities plagued by low flow alterations, siltation and nutrient enrichment caused by channelization, row crop agriculture, manure application/runoff and unsewered communities. The Tributary to Platter Creek (at RM 7.66) is in *Full Attainment* of its MWH designation.

Three critical areas have been identified within the **Platter Creek HUC-12** (Figure 9). Two critical areas were identified to address far-field effects of nutrients in Lake Erie, the end receiving waterbody of drainage from the **Platter Creek HUC-12** (Table 11). Project implementation within these two areas, as well as a third, will contribute to positive effects on impairment at the near-field, in-stream spatial level. Additional critical areas may be developed in subsequent versions of this NPS-IS.

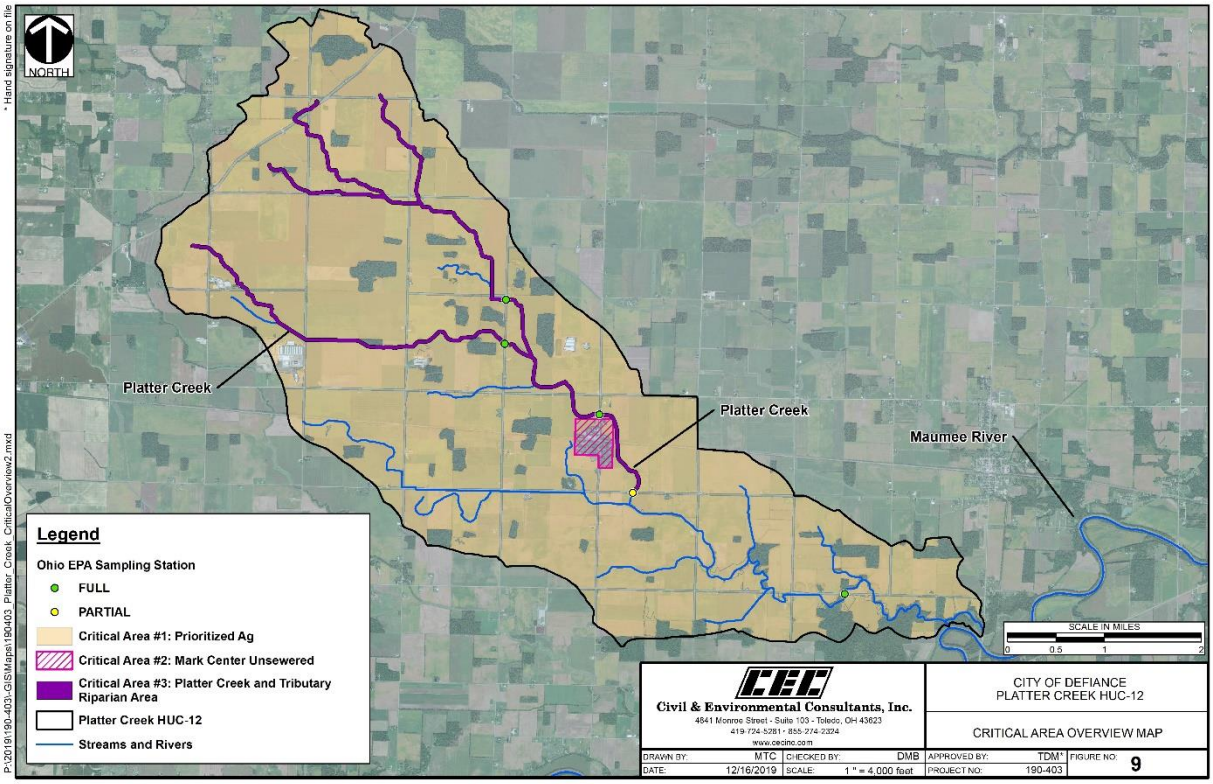


Figure 9: Platter Creek HUC-12 Critical Area Overview

Table 11: Platter Creek HUC-12 Critical Area Descriptions

Critical Area Number	Critical Area Description	Impairments Addressed
1	Nutrient Reduction in Prioritized Agricultural Lands[2]	Far-field (Lake Erie)
2	Nutrient Reduction in Unsewered Areas	Far-field (Lake Erie)
3	Riparian Area (Platter Creek and Tributary to Platter Creek (at RM 7.66))	Near-field (QHEI improvement throughout the streams)

3.2 Critical Area #1: Conditions, Goals & Objectives for Nutrient Reduction in Prioritized Agricultural Lands

3.2.1 Detailed Characterization

Ohio's Nutrient Mass Balance Study (OEPA, 2018b) estimated 88% of the nutrient loadings to Lake Erie via the Maumee River were primarily from nonpoint sources, related to land use activities, with only small contributions from failing HSTS and NPDES permitted facilities. This estimate is consistent with several other studies. Given the dominance of agricultural land use throughout the greater WLEB watershed, the use of BMPs are recommended for agricultural operations to minimize nutrient loss to local waterways and drainage ditches through surface and tile flow. While BMPs are encouraged on all agricultural lands, certain lands are more prone to nutrient loss than others and are prioritized for BMP implementation. *Critical Area #1* contains prioritized agricultural lands throughout the entire **Platter Creek HUC-12** (Figure 10). Implementation of BMPs on prioritized agricultural lands throughout the **Platter Creek HUC-12** may also positively impact in-stream sedimentation and nutrient conditions throughout the subwatershed, particularly at RM 5.4 in Platter Creek, which is in *Partial Attainment* of Ohio WQS.

An ACPF database was assembled for the Platter Creek HUC-12. The Geographic Information System (GIS)-based tool utilizes input data including a high resolution digital elevation model (DEM), the National Cropland Data Layer (CDL), parcel boundary details and detailed soil surveys to identify potential areas for conservation practices. Results from this tool informed the prioritization of critical lands and objective building. The ACPF identified approximately 206 acres of very high-erosion risk fields and approximately 2,220 acres of high-erosion risk fields. Eighty-six percent of these are directly adjacent to the mainstem of Platter Creek. In addition, the tool identified approximately 90 locations that potentially are in need of grassed waterways, and one potential wetland location. Defiance SWCD will utilize the ACPF outputs to focus conservation planning discussions in identified areas.

Of the 12,260 crop acres in the **Platter Creek HUC-12**, prioritized lands are operations that meet one or more of the following criteria:

- Lands directly adjacent to streams or drainage waterways;
- Lands without a current nutrient management plan or current soil test results (<3 years);

[2] Critical area maps utilize the most currently available data at the time of NPS-IS development and may not reflect changes in land use over time.

- Lands with high soil phosphorus levels (>40 ppm Mehlich);
- Lands with recurrent gully erosion; and,
- Lands currently under conventional tillage regimes, broadcast technology and/or underutilizing cover crops.

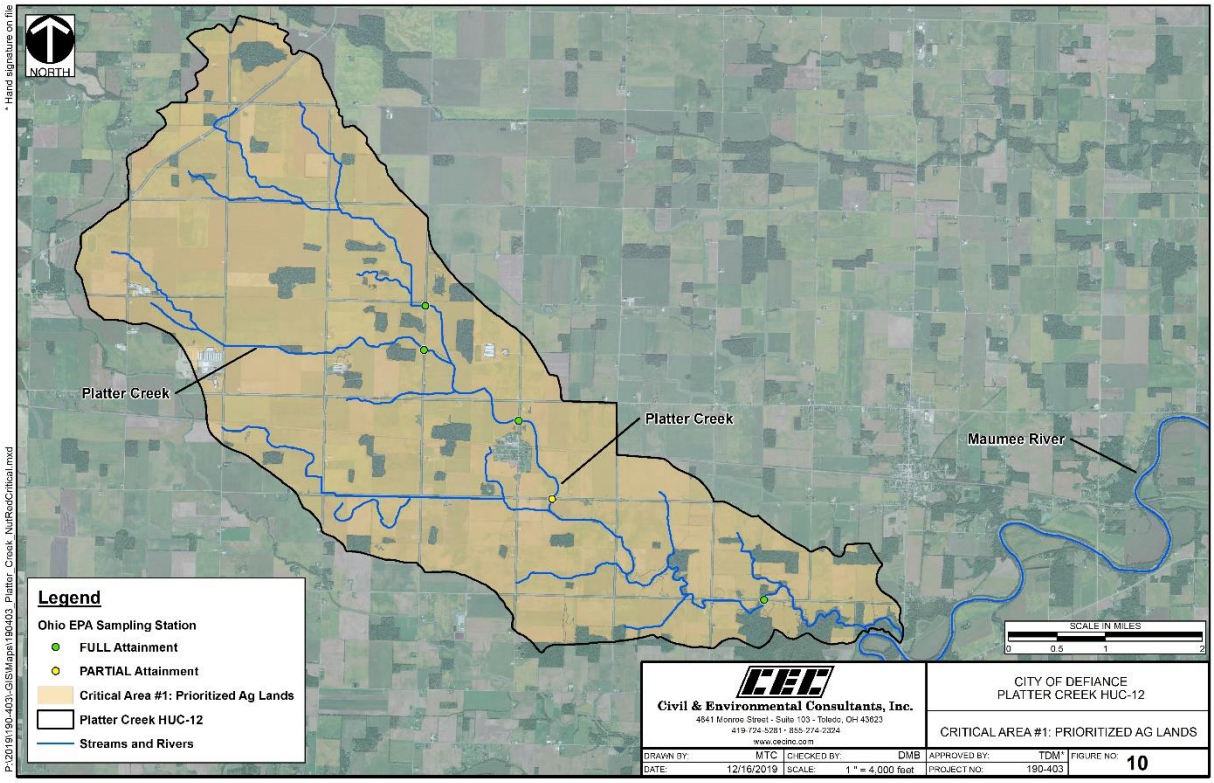


Figure 10: Platter Creek HUC-12 Critical Area #1

3.2.2 Detailed Biological Conditions

Fish community data for the five sampling locations within the **Platter Creek HUC-12** are summarized below (Table 12). Analysis of the abundance, diversity and pollution tolerance of existing fish species found by OEPA at each sampling location, in relation to the corresponding QHEI score, aids in the identification of causes and sources of impairment. The fish communities at each of the five sampling locations reached attainment levels for the WWH WQS for IBI (goal for headwater sites = 28). Only the communities found at RM 5.4 in 2016 marginally reached attainment (IBI=26, within the nonsignificant departure range). In general, fish communities throughout the **Platter Creek HUC-12** were dominated by moderately tolerant to tolerant species. The OEPA documented that fish community performance at RM 5.4 was affected by the upstream unsewered community of Mark Center, and that the habitat score within this reach was low enough that habitat degradation is also limiting aquatic communities (OEPA, 2019a).

Table 12: Critical Area #1 – Fish Community and Habitat Data

Platter Creek HUC-12 (04100005 02 06)							
RM	**Drainage Area (mi^2)**	**Total Species**	**QHEI**	**IBI**	**MIwb[a]**	**Predominant Species (Percent of Catch)**	**Narrative Evaluation**
Platter Creek (MWH)							
7.95[H]	4.50	16	22.30[1]	28	N/A	Fathead minnow (29%), central stoneroller (20%), blackstripe topminnow (10%) [2]	Fair
Platter Creek (WWH)							
6.41[H]	11.91	22	42.75	46	N/A	Central stoneroller (20%), sand shiner (18%), Johnny darter (9%)	Very Good
5.4[H]	12.80	[14]	[26.50]	[26]	N/A	[Bluntnose minnow (30%), fathead minnow (26%), Johnny darter (15%), orangethroat darter (15%)]	Poor (Nonsignificant Departure Range)
1.70[H]	19.96	22	61.00	48	N/A	Sand shiner (53%), bluntnose minnow (9%), redfin shiner (6%)	Very Good
Tributary to Platter Creek (@7.66) (MWH)							
0.78[H]	5.0	12	31.50	34.0	N/A	Fathead minnow (30%), blackstripe topminnow (25%), central stoneroller (14%)	Fair

(Source: OEPA, 2019a)

NOTES
QHEI Qualitative Habitat Evaluation Index
IBI Index of Biotic Integrity
a The Modified Index of Well Being (MIwb) is not applicable to headwater sites (drainage ≤20 mi^2).
H Headwater sample
N/A Not applicable
1 QHEI value is average of habitat score from 2015 and 2016 sampling events.
2 Percentages based upon results from the first sampling pass in 2015.
[ ] Data from 2016.

Characteristics of the aquatic macroinvertebrate communities in the Platter Creek and tributary sampling locations in *Critical Area #1* are summarized below (Table 13). Again, analysis of the abundance, diversity, and pollution tolerance of existing aquatic macroinvertebrates (bugs) found by OEPA at these sampling locations, related to QHEI scores, can aid in the identification of causes and sources of impairment. Macroinvertebrate communities did not meet WWH WQS at RM 5.4. The overabundance of facultative filterers and scrapers is indicative of nutrient enrichment, likely from unsewered communities, manure applications/spills and other inputs. Habitat attributes at this location are likely also affecting the macroinvertebrate communities, as the segment is dominated by MWH high- and moderate-influence characteristics, such as silt/muck substrates, high embeddedness and lack of riffle.

Table 13: Critical Area #1 – Macroinvertebrate Community Data

Platter Creek HUC-12 (04100005 02 06)			
RM	**ICI Score-Narrative**	**Notes (Density of Ql./Qt.)**	**Predominant Species (Tolerance Categories)**
Platter Creek (MWH)			
7.95[H]	N/A -- Fair 0 sensitive taxa	High-Moderate Qualitative density	Midges (*Cricotopus bicinctus*, *Polypedilum illinoense* (T) and *Conchapelopia* sp., *Paratanytarsus* sp. (F)), isopods (F)
Platter Creek (WWH)			
6.41[H]	N/A -- Marginally Good 2 sensitive taxa	High-Moderate Qualitative density	Hydropsychid caddisflies (F, MI), midges (F, T), *Simulium* sp. (F)
5.4[H]	N/A -- [Fair*] [1 sensitive taxa]	[High-Moderate] Qualitative density	[Fingernail clams (*Sphaerium* sp.) (F), flatworms (F), hydroptilid caddisflies (F), Bryozoa (F)]
1.70[H]	N/A -- Good 4 sensitive taxa	Moderate-Low Qualitative density	Hydropsychid caddisflies (F, MI), heptageneid mayflies (F), baetid mayflies (F, MI), *Polypedilum flavum* (F)
Tributary to Platter Creek (@ 7.66) (MWH)			
0.78[H]	N/A -- Fair 0 sensitive taxa	Low Qualitative density	Hydropsychid caddisflies (F), *Callibaetis* sp. mayflies (MT), midges (F, MT, T), *Physella* sp. snails (T)

(Source: Ohio EPA, 2019a)

NOTES

*** *Significant departure from ecoregion biocriteria; poor and very poor results are underlined.*

ns *Nonsignificant departure from ecoregion biocriteria (<4 IBI or ICI units; <0.5 MIwb units).*

a *Narrative evaluation used in lieu of ICI (G=Good; MG=Marginally Good; F=Fair; L Fair=Low Fair; P=Poor; VP=Very Poor).*

H *Headwater sample*

Tolerance Categories: VT=Very Tolerant, T=Tolerant, MT=Moderately Tolerant, F=Facultative, MI=Moderately Intolerant, I=Intolerant.

N/A *Quantitative scores not available.*

-- *No data available.*

[ ] *Data from 2016.*

3.2.3 Detailed Causes and Associated Sources

Three of the four sampling locations (RM 7.95, 6.41, and 1.70) within Platter Creek are in *Full Attainment* of their respective MWH (RM 7.95 only) and WWH designations. One sampling location at RM 5.4 is in *Partial Attainment* of the WWH designation, resulting from high nutrient inputs, siltation and low flow alterations that are related to unsewered communities, manure applications/runoff, row crop activities and channelization. Nutrient enrichment was prevalent across the length of Platter Creek and the Tributary to Platter Creek (at RM 7.66) (Table 14).

Table 14: Seasonal Geometric Mean Values in the Platter Creek HUC-12

Platter Creek HUC-12 (04100005 02 06)		
RM	**Nitrate-Nitrite (mg/L)**	**Total Phosphorus (mg/L)**
Platter Creek (MWH)		
7.95[H]	0.62	**0.31**
Platter Creek (WWH)		
6.41[H]	0.93	**0.27**
5.4[H]	**1.06**	**0.22**
1.70[H]	0.61	0.07
Tributary to Platter Creek at 7.66 (MWH)		
0.78[H]	0.66	**0.2**

(Source: Ohio EPA, 2019a)

NOTES
All sites screened against WWH benchmarks for the appropriate stream size. State benchmarks for the WWH ALU for headwater sites is 0.08 mg/L for total phosphorus and 1.0 mg/L for nitrate-nitrite.
Bolded values are in exceedance of state benchmarks.

From a far-field perspective, agricultural land use activities contribute to excessive nutrient loadings to Lake Erie that result in eutrophication and the formation of HABs. Eutrophication also has an effect within Platter Creek at a near-field perspective. In 2017, an algal bloom was detected in Platter Creek (Crescent News, 2017). Tests indicated the presence of toxins (microcystin) at levels of 0.032 parts per billion (ppb), considerably under the 6 ppb threshold set for recreational public health advisory (Derringer, 2017).

The use of a variety of BMPs on private agricultural lands, at both in-field and edge-of-field locations can help reduce the amount and concentration of nutrient-laden surface runoff and tile drainage. Many BMPs can not only address reduction of nutrients in surface and drainage water, but they can also simultaneously address the loss of sediment from agricultural lands, which contributes to sediment-covered substrates in local waterways. In addition, a reduction of sediment loss to local waterways can also reduce nutrient loss to near-field and far-field waterbodies, as nutrients will also adsorb to sediment particles, potentially becoming dissolved at a later time. The implementation of BMPs on agricultural lands that are prone to sediment and nutrient loss serves as a benefit for both near-field and far-field waterbodies.

3.2.4 Outline Goals and Objectives for the Critical Area

The overarching goal of any NPS-IS is to improve water quality scores or meet nutrient reduction goals in order to remove a waterbody's impairment status. Agricultural land use activities in *Critical Area #1* contribute to far-field impairment through excessive nutrient loss (phosphorus) to local waterways that flow to Lake Erie. Through the GLWQA Annex 4 and the subsequent DAP for the State of Ohio, nutrient target loads have been set for the Maumee River, which is the largest contributing waterbody to the WLEB and is fed directly by Platter Creek. These phosphorus target loads have been set at levels that are 40% lower than the current estimated loadings. Ohio's Nutrient Mass Balance Study has also shown that

a large portion of the nutrient load to Lake Erie occurs during springtime rains (OEPA, 2018b). In addition, efforts to reduce nutrient loss also have a mutual benefit for reduction of sediment to local waterways. While this critical area is focused on nutrient reduction, an ancillary benefit is expected to be seen in the reduction of sediment to Platter Creek and its tributaries overall and a potential improvement to the macroinvertebrate communities at RM 5.4.

Many objectives within the **Platter Creek HUC-12** align with the priorities of the H2Ohio Initiative, a water quality initiative with a focus on phosphorus reduction. This program will provide economic incentives to producers who develop nutrient management plans for their fields and implement effective and cost-efficient BMPs that include: soil testing, variable rate fertilization, subsurface nutrient application, manure incorporation, conservation crop rotation, cover crops, drainage water management structures, two-stage ditch construction, edge of field buffers and headwaters and coastal wetlands that reduce agricultural runoff (H2Ohio, 2019).

Goals

The OEPA has modeled nutrient loadings associated with various land uses and sources within each HUC-12 in the Maumee River Basin, and has set phosphorus reduction goals for each associated source, based upon springtime load estimates. To achieve the desired phosphorus reduction from agricultural land use in the **Platter Creek HUC-12**, the following goal has been established:

Goal 1. Reduce springtime phosphorus loading contributions in *Critical Area #1* to a level at or below 6,000 lbs/year (40% reduction).
NOT ACHIEVED: Current estimated load contribution is 10,000 lbs/year.

Objectives

In order to make substantive progress toward the achievement of the springtime phosphorus load reduction goal of 4,000 lbs for the **Platter Creek HUC-12**, effort must commence on more widespread implementation, according to the following objectives within *Critical Area #1.*

Objective 1: Plant cover crops on at least 40% of croplands (~4,900 acres) annually, resulting in plantings of at least 4,100 additional acres[3].

Objective 2: Reduce erosion and nutrient loss through the installation of grassed waterways that receive/treat surface water from at least 2,700 acres.

Objective 3: Reduce nutrient loss from subsurface tile drainage through the installation of drainage water management structures that drain at least 2,400 acres.

[3] Cover crop plantings not dependent upon grant funding.

Objective 4: Implement nutrient management planning (soil testing and variable rate fertilization) on at least 3,000 additional acres[4].

Objective 5: Implement subsurface fertilizer application on at least 350 acres annually that currently do not utilize the technology.

Objective 6: Create, enhance and/or restore at least 120 acres of wetlands for treatment of agricultural runoff and/or nutrient reduction purposes from 3,000 total agricultural acres.

These objectives will be directed towards implementation on prioritized agricultural lands and are estimated to reach the phosphorus spring load reduction goal (Table 15). Additional conservation activities within the **Platter Creek HUC-12**, both on priority and secondary lands, may also make incremental progress towards phosphorus reduction goals. The implementation of BMPs included in these objectives, as well as BMPs implemented through federal and state programs and other voluntary efforts will be tracked to monitor progress towards phosphorus reduction goals within the watershed.

Table 15: Estimated Nutrient Loading Reductions from Each Objective

Objective Number	Best Management Practice	Total Acreage Treated	Estimated Annual Phosphorus Load Reduction (lbs)	Estimated Spring Phosphorus Load Reduction (lbs)
1	Cover Crops	4,100	480	310
2	Grassed Waterways[a]	2,700	710	460
3	Drainage Water Management Structures	2,400	1,030	670
4	Nutrient Management (Planning and Implementation)[b]	3,000	1,660	1,080
5	Subsurface Application	350	130	90
6	Wetlands[c]	3,000[d]	1,570	100
TOTAL		**15,550***	**5,580**	**2,710**

(Source Model: Spreadsheet Tool for Estimating Pollutant Loads (STEPL), Version 4.4 (USEPA, 2019b))

NOTES

a Grassed Waterways phosphorus reduction efficiency estimated from values listed in OSUE, 2018.

b Nutrient Management consists of "managing the amount (rate), source, placement (method of application) and timing of plant nutrients and soil amendments to budget, supply and conserve nutrients for plant production; to minimize agricultural nonpoint source pollution of surface and groundwater resources; to properly utilize manure or organic byproducts as a plant nutrient source; to protect air quality by reducing odors, nitrogen emissions (ammonia, oxides of nitrogen) and the formation of atmospheric particulates; and/or to maintain or improve the physical, chemical and biological condition of soil," as defined by the STEPL guidance documents (Tetra Tech, 2018).

c Phosphorus load reduction for wetlands was calculated using the estimated 5-year average cropland nutrient yield in the Maumee River watershed from 2013-2017 (1.05 lbs/acre phosphorus), provided by Heidelberg University National Center for Water Quality Research.

[4] Current estimates indicate variable rate fertilization occurs on approximately 25% of cultivated cropland in Defiance County.

d *If drainage water is routed through restored/created wetlands, it is assumed a 50% reduction in phosphorus from total nutrient yield for the drainage area, with a 25:1 ratio of drainage area to receiving wetland. For this objective of 120 wetland acres, total drainage area is 3,000 acres.*

* *Total acreage treated exceeds number of agricultural land acres. More than one BMP may be implemented within fields.*

The stakeholders of the **Platter Creek HUC-12** recognize a gap between the total estimated springtime phosphorus reduction realized from these objectives and the stated phosphorus reduction goal. Stakeholders in this watershed acknowledge that additional and/or altered objectives may be needed in future versions of this NPS-IS, but underscore the exigence in beginning to implement projects that incrementally make progress towards achieving the aforementioned objectives as soon as possible. The objectives, as written, are reflective of what stakeholders gage as reasonable and implementable in the **Platter Creek HUC-12** incrementally, over time.

Water quality monitoring is an integral part of the project implementation process. Both project-specific and routinely scheduled monitoring will be conducted to determine progress towards meeting the goals (i.e., water quality standards and nutrient reduction targets). Through an adaptive management process, the aforementioned objectives will be reevaluated and modified as necessary. Objectives may be added to make further progress towards attainment or reduction goals, or altered, as a systems approach of multiple BMPs can accelerate the improvement of water quality conditions. The *Nonpoint Source Management Plan Update* (OEPA, 2013a) will be utilized as a reevaluation tool for its 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 Nutrient Reduction from HSTS in Unsewered Areas

3.3.1 Detailed Characterization

Ohio's Nutrient Mass Balance Study (OEPA, 2018b) estimated a small percentage (4%) of the nutrient loadings to Lake Erie via the Maumee River were from contributions from failing HSTS. This estimate is consistent with estimates from several other studies. The OEPA has modeled nutrient loadings associated with various land uses and sources within each HUC-12 in the Maumee River Basin, and has set phosphorus reduction goals for each associated source, including failing or inefficient HSTS, based upon springtime load estimates. *Critical Area #2* contains the unsewered community of Mark Center, an unincorporated area within Mark Township (Figure 11).

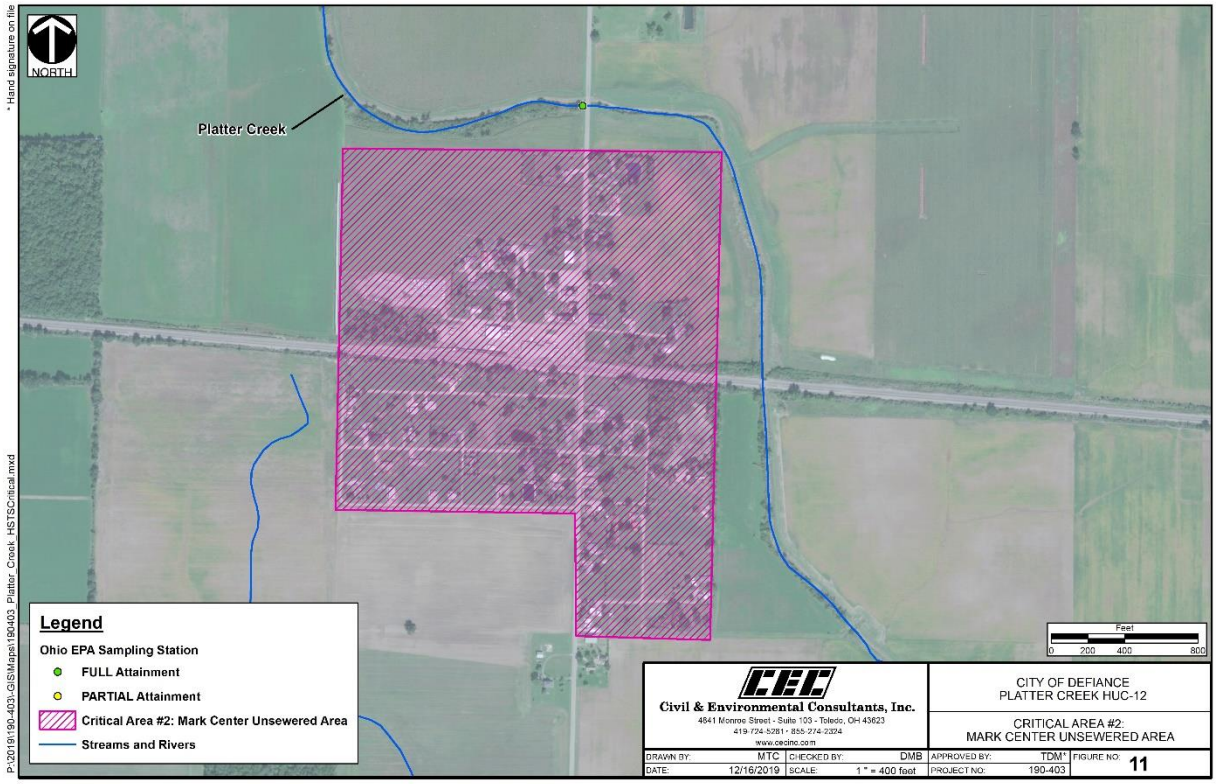


Figure 11: Platter Creek HUC-12 Critical Area #2

The unincorporated community of Mark Center covers approximately 105 acres of residential and commercial properties. Platter Creek flows along the northern and eastern boundaries of the unincorporated area. TMACOG estimates that at least 45 residences and business operations are unsewered within this community (TMACOG, 2018).

3.3.2 Detailed Biological Conditions

Fish community data for the closest upstream and downstream sampling stations to Mark Center (RM 6.41 and RM 5.4) are summarized below (Table 16). Analysis of the abundance, diversity and pollution tolerance of existing fish species found by OEPA at each sampling location, in relation to the corresponding QHEI score, aids in the identification of causes and sources of impairment. The fish community upstream of Mark Center (RM 6.41) performed well above expectations; however, fish communities downstream of Mark Center (RM 5.4) were negatively impacted by effects from the unsewered community (OEPA, 2019a). The IBI score at RM 5.4 was substantially lower than scores throughout Platter Creek, and the community was dominated by tolerant species.

Table 16: Critical Area #2– Fish Community and Habitat Data

Platter Creek HUC-12 (04100005 02 06)							
RM	**Drainage Area (mi^2)**	**Total Species**	**QHEI**	**IBI**	**MIwb[a]**	**Predominant Species (Percent of Catch)**	**Narrative Evaluation**
Platter Creek (WWH)							
6.41^H	11.91	22	42.75	46	N/A	Central stoneroller (20%), sand shiner (18%), Johnny darter (9%)	Very Good
5.4^H	12.80	[14]	[26.50]	[26]	N/A	[Bluntnose minnow (30%), fathead minnow (26%), Johnny darter (15%), orangethroat darter (15%)]	Poor (Nonsignificant Departure Range)

(Source: OEPA, 2019a)

NOTES
QHEI Qualitative Habitat Evaluation Index
IBI Index of Biotic Integrity
a The Modified Index of Well Being (MIwb) is not applicable to headwater sites (drainage ≤20 mi^2).
H Headwater sample
N/A Not applicable
[ ] Data from 2016

Characteristics of the aquatic macroinvertebrate communities for the closest upstream and downstream sampling stations to Mark Center (RM 6.41 and RM 5.4) are summarized below (Table 17). Again, analysis of the abundance, diversity, and pollution tolerance of existing aquatic macroinvertebrates (bugs) found by OEPA at these sampling locations, related to QHEI scores, can aid in the identification of causes and sources of impairment. Macroinvertebrate communities did not meet WWH WQS at RM 5.4. The overabundance of facultative filterers and scrapers is indicative of nutrient enrichment, likely from unsewered communities, manure applications/spills and other inputs. Habitat attributes at this location are likely also affecting the macroinvertebrate communities, as the segment is dominated by MWH high- and moderate-influence characteristics, such as silt/muck substrates, high embeddedness and lack of riffle.

Table 17: Critical Area #2 – Macroinvertebrate Community Data

Platter Creek HUC-12 (04100005 02 06)			
RM	**ICI Score-Narrative**	**Notes (Density of Ql./Qt.)**	**Predominant Species (Tolerance Categories)**
Platter Creek (WWH)			
6.41^H	N/A -- Marginally Good 2 sensitive taxa	High-Moderate Qualitative density	Hydropsychid caddisflies (F, MI), midges (F, T), *Simulium* sp. (F)
5.4^H	N/A -- [Fair*] [1 sensitive taxa]	[High-Moderate] Qualitative density	[Fingernail clams (*Sphaerium* sp.) (F), flatworms (F), hydroptilid caddisflies (F), Bryozoa (F)]

(Source: Ohio EPA, 2019a)

NOTES
** Significant departure from ecoregion biocriteria; poor and very poor results are underlined.*
ns Nonsignificant departure from ecoregion biocriteria (<4 IBI or ICI units; <0.5 MIwb units).

a *Narrative evaluation used in lieu of ICI (G=Good; MG=Marginally Good; F=Fair; L Fair=Low Fair; P=Poor; VP=Very Poor).*

H *Headwater sample*

Tolerance Categories: VT=Very Tolerant, T=Tolerant, MT=Moderately Tolerant, F=Facultative, MI=Moderately Intolerant, I=Intolerant.

N/A *Quantitative scores not available.*

-- *No data available.*

[ ] *Data from 2016.*

3.3.3 Detailed Causes and Associated Sources

The sampling location at RM 5.4 is in *Partial Attainment* of the WWH designation, resulting from high nutrient inputs, siltation and low flow alterations that are related to unsewered communities, manure applications/runoff, row crop activities and channelization. Nutrient enrichment was prevalent throughout the **Platter Creek HUC-12**.

In 2015, the OEPA conducted sampling along the northern edge of Mark Center and found elevated levels of *E. coli*, citing a public health nuisance and requesting information on how the county would address the issue (Helberg, 2018a). Three options were presented to the Defiance County Commissioners to address the problem. These solutions included 1) sewer installation with expanded treatment lagoons; 2) sewer installation extensions to Sherwood's treatment lagoons; or 3) operation and maintenance of existing septic tanks (Helberg, 2018b). Citing expense as a primary driver, Mark Township trustees were in support of the third option.

In 2018, TMACOG identified the unincorporated area of Mark Center as a CSA, an area of dense housing/business units within an unsewered area. Sanitary sewer improvements or efforts undertaken to repair failing or inefficient HSTS within CSAs will not only prevent the distribution of human waste into the environment, but would also help contribute to progress on meeting overall WLEB nutrient reduction goals set by the GLWQA and Ohio's DAP.

3.3.4 Outline Goals and Objectives for the Critical Area

The overarching goal of any NPS-IS is to improve water quality scores or meet nutrient reduction goals in order to remove a waterbody's impairment status. Elimination of HSTS nutrient contributions should be addressed to reduce the amount of fecal materials and nutrients introduced to the environment and local waterways. In order to meet the 40% overall nutrient reduction goals of the Ohio DAP, reductions in nutrient contributions from failing HSTS should also be considered. Using current estimates from the OEPA Division of Surface Water, springtime phosphorus load contributions from HSTS should be no more than 120 lbs/year. Current springtime load estimates are 190 lbs/year, resulting in the need of an overall reduction by 70 lbs/year.

Goals

The OEPA has modeled nutrient loadings associated with various land uses and sources within each HUC-12 in the Maumee River Basin, and has set phosphorus reduction goals for each associated source,

based upon springtime load estimates. To achieve the desired phosphorus reduction from HSTS in the **Platter Creek HUC-12**, the following goal has been established:

Goal 1. Reduce springtime phosphorus loading contributions in *Critical Area #2* to a level at or below 120 lbs/year (40% reduction).
NOT ACHIEVED: Current springtime load contribution is estimated to be 190 lbs/year.

TMACOG's HSTS study (2018) estimated the annual phosphorus load from the entire **Platter Creek HUC-12** to be 0.20 metric tons per annum (MTA), with a total unsewered household count of 286. Using these numbers, an average household's yearly total phosphorus contribution in this watershed is 0.0007 MTA, equivalent to 1.54 lbs per year within the **Platter Creek HUC-12**. Using TMACOG's estimate of at least 45 households in the unincorporated area of Mark Center, phosphorus loads could be reduced by approximately 70 lbs annually, of which 46 lbs is attributed to the springtime load. In order to reach the springtime reduction goal of 70 lbs, an additional 16 homes with failing HSTS would need to be replaced. Sanitary sewer connection to isolated or sparsely populated areas is not likely.

Objectives

In order to make substantive progress toward the achievement of the springtime phosphorus load reduction goal of 70 lbs for the **Platter Creek HUC-12**, effort must commence on more widespread implementation, according to the following objectives within *Critical Area #2.*

Objective 1: Reduce HSTS contributions through replacement efforts for at least 45 households or sanitary sewer infrastructure in the unincorporated area of Mark Center.

Objective 2: Reduce HSTS contributions through replacement efforts for at least 16 households outside of the identified CSA in Mark Center.

Water quality monitoring is an integral part of the project implementation process. Both project-specific and routinely scheduled monitoring will be conducted to determine progress towards meeting the goals (i.e., water quality standards and nutrient reduction targets). Through an adaptive management process, the aforementioned objectives will be reevaluated and modified as necessary. Objectives may be added to make further progress towards attainment or reduction goals, or altered, as a systems approach of multiple BMPs can accelerate the improvement of water quality conditions. The *Nonpoint Source Management Plan Update* (OEPA, 2013a) will be utilized as a reevaluation tool, as well as other state and federal agency resources for its listing of all eligible NPS management and nutrient reduction 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.

3.4 Critical Area #3: Conditions, Goals & Objectives for Platter Creek and Tributary Riparian Areas

3.4.1 Detailed Characterization

The *Upper Maumee River Watershed Management Plan* identified riparian buffer widths within the **Platter Creek HUC-12**. Most of Platter Creek upstream from Mark Center (~RM 5.4) was estimated to have a riparian corridor width of 60 feet or less. *Critical Area #3* includes approximately 71,000 linear feet of Platter Creek and the Tributary to Platter Creek (at RM 7.66) and a 50-foot riparian buffer on each side of the waterways (Figure 12).

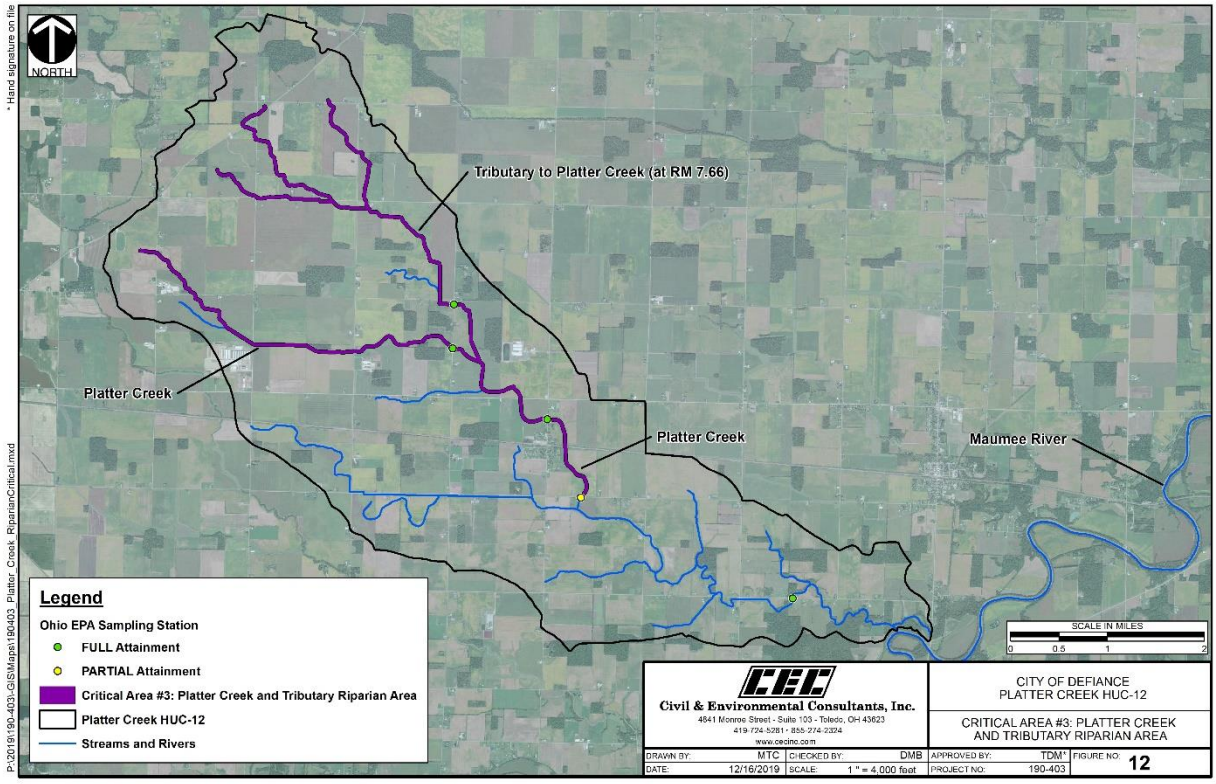


Figure 12: Platter Creek HUC-12 Critical Area #3

Sampling locations in the upper reaches of Platter Creek and the Tributary to Platter Creek (at RM 7.66) indicated very low QHEI scores for both MWH and WWH streams. While most aquatic communities are reaching WQS, the habitat scores are at a range low enough that habitat may be factored into impairment at RM 5.4, and stress related to degraded habitat features may threaten attainment in the future, especially if continued nutrient stress throughout the watershed continues. Using the rationale described in the *Handbook for Developing Watershed Plans to Restore and Protect Our Waters* (USEPA, 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 #3* includes the riparian and in-stream segment of Platter Creek from its headwaters to ~RM 6.0, as well as the entire length of the Tributary to Platter Creek (at RM 7.66). Based upon the length of the two streams within these described segments, and a 50-foot buffer width on each side, the potential for restoration of approximately 160 acres of riparian corridor exists in *Critical Area #3*.

3.4.2 Detailed Biological Conditions

Fish community data for the sampling locations within the **Platter Creek HUC-12** in *Critical Area #3* are summarized below (Table 18). Analysis of the abundance, diversity and pollution tolerance of existing fish species found by OEPA at each sampling location, in relation to the corresponding QHEI score, aids in the identification of causes and sources of impairment. The fish communities at each of the four sampling locations reached attainment levels for the WWH WQS for IBI (goal for headwater sites = 28), even in the MWH segments of Platter Creek and the Tributary to Platter Creek. Only the communities found at RM 5.4 in 2016 marginally reached attainment (IBI=26, within the nonsignificant departure range). In general, fish communities throughout the **Platter Creek HUC-12** were dominated by moderately tolerant to tolerant species. The OEPA documented that fish community performance at RM 5.4 was affected by the upstream unsewered community of Mark Center, and that the habitat score within this reach was low enough that habitat degradation is also limiting aquatic communities (OEPA, 2019a).

Table 18: Critical Area #3 – Fish Community and Habitat Data

Platter Creek HUC-12 (04100005 02 06)							
RM	**Drainage Area (mi^2)**	**Total Species**	**QHEI**	**IBI**	**MIwb[a]**	**Predominant Species (Percent of Catch)**	**Narrative Evaluation**
Platter Creek (MWH)							
7.95[H]	4.50	16	22.30[1]	28.0	N/A	Fathead minnow (29%), central stoneroller (20%), blackstripe topminnow (10%) [2]	Fair
Platter Creek (WWH)							
6.41[H]	11.91	22	42.75	46	N/A	Central stoneroller (20%), sand shiner (18%), Johnny darter (9%)	Very Good
5.4[H]	12.80	[14]	[26.50]	[26]	N/A	[Bluntnose minnow (30%), fathead minnow (26%), Johnny darter (15%), orangethroat darter (15%)]	Poor (Nonsignificant Departure Range)
Tributary to Platter Creek (7.66) (MWH)							
0.78[H]	5.0	12	31.50	34.0	N/A	Fathead minnow (30%), blackstripe topminnow (25%), central stoneroller (14%)	Fair

(Source: OEPA, 2019a)

NOTES
QHEI Qualitative Habitat Evaluation Index
IBI Index of Biotic Integrity
a The Modified Index of Well Being (MIwb) is not applicable to headwater sites (drainage ≤20 mi^2).
H Headwater sample
N/A Not applicable
1 QHEI value is average of habitat score from 2015 and 2016 sampling events.
2 Percentages based upon results from the first sampling pass in 2015.
[ ] Data from 2016.

Characteristics of the aquatic macroinvertebrate communities in Platter Creek and the Tributary to Platter Creek (at RM 7.66) sampling locations in *Critical Area #3* are summarized below (Table 19). Again, analysis of the abundance, diversity, and pollution tolerance of existing aquatic macroinvertebrates (bugs) found by OEPA at these sampling locations, related to QHEI scores, can aid in the identification of causes and sources of impairment. Low numbers of *Ephemeroptera, Trichoptera* and *Plecoptera* (EPT) taxa were found throughout the **Platter Creek HUC-12**, ranging from two to ten among the sites. Macroinvertebrate communities did not meet WWH WQS at RM 5.4. The overabundance of facultative filterers and scrapers is indicative of nutrient enrichment, likely from unsewered communities, manure applications/spills and other inputs. Habitat attributes at this location are likely also affecting the macroinvertebrate communities, as the segment is dominated by MWH high- and moderate-influence characteristics, such as silt/muck substrates, high embeddedness and lack of riffle.

Table 19: Critical Area #3 – Macroinvertebrate Community Data

Platter Creek HUC-12 (04100005 02 06)			
RM	**ICI Score-Narrative**	**Notes (Density of Ql./Qt.)**	**Predominant Species (Tolerance Categories)**
Platter Creek (MWH)			
7.95^{H}	N/A -- Fair 0 sensitive taxa	High-Moderate Qualitative density	Midges (*Cricotopus bicinctus*, *Polypedilum illinoense* (T) and *Conchapelopia* sp., *Paratanytarsus* sp. (F)), isopods (F)
Platter Creek (WWH)			
6.41^{H}	N/A -- Marginally Good 2 sensitive taxa	High-Moderate Qualitative density	Hydropsychid caddisflies (F, MI), midges (F, T), *Simulium* sp. (F)
5.4^{H}	N/A -- [Fair*] [1 sensitive taxa]	[High-Moderate] Qualitative density	[Fingernail clams (*Sphaerium* sp.) (F), flatworms (F), hydroptilid caddisflies (F), Bryozoa (F)]
Tributary to Platter Creek (7.66) (MWH)			
0.78^{H}	N/A -- Fair 0 sensitive taxa	Low Qualitative density	Hydropsychid caddisflies (F), *Callibaetis* sp. mayflies (MT), midges (F, MT, T), *Physella* sp. snails (T)

(Source: Ohio EPA, 2019a)

NOTES

*** *Significant departure from ecoregion biocriteria; poor and very poor results are underlined.*

ns *Nonsignificant departure from ecoregion biocriteria (<4 IBI or ICI units; <0.5 MIwb units).*

a *Narrative evaluation used in lieu of ICI (G=Good; MG=Marginally Good; F=Fair; L Fair=Low Fair; P=Poor; VP=Very Poor).*

H *Headwater sample*

Tolerance Categories: VT=Very Tolerant, T=Tolerant, MT=Moderately Tolerant, F=Facultative, MI=Moderately Intolerant, I=Intolerant.

N/A *Quantitative scores not available.*

-- *No data available.*

[ ] *Data from 2016.*

3.4.3 Detailed Causes and Associated Sources

The data summarized previously in Table 8 (p.17) reveal a direct link between the presence of attributes in the watershed that have moderate to high influence on the aquatic communities throughout Platter

Creek and the Tributary to Platter Creek (at RM 7.66) in *Critical Area #3*. These contributing attributes in *Critical Area #3* include:

- Silt/Muck Substrates
- Recovering Channelization/No Sinuosity
- Heavy/Moderate Silt Cover
- Fair/Poor Development
- Slow Current
- High Overall Embeddedness
- Lack of Riffle

Habitat, as scored by the QHEI, is not a WQS; however, habitat is highly correlated with the performance of aquatic communities. In general, sites that score at least 60 (or 55 for headwaters streams) are successful at supporting WWH aquatic assemblages. For MWH segments, QHEI scores of 43.5 are expected to support corresponding aquatic communities. The habitat scores for sites within *Critical Area #3* for the **Platter Creek HUC-12** are lower than these expected thresholds. Projects that address the above described habitat-related attributes (e.g., channelization, vegetative cover, etc.) will have a positive effect in the QHEI scoring index. As the habitat score (QHEI) becomes better, IBI and ICI index scores are also expected to improve.

3.4.4 Outline Goals and Objectives for the Critical Area

The aquatic communities in *Critical Area #3* are primarily impaired from habitat effects of siltation and low flow alterations, sourced from channelization. Additional effects from nutrient enrichment are addressed in *Critical Area #1* and *Critical Area #2*. The overarching NPS restoration goal of any NPS-IS is to improve IBI, MIwb, ICI, and QHEI scores so that a *Partial* or *Non-Attainment* status can achieve *Full Attainment* of the designated ALU for that waterbody. The sampling location at RM 5.4 is in *Partial Attainment* of the designated WWH ALU, due to poor macroinvertebrate scores. Improvement of the in-stream and riparian corridor in segments throughout the headwaters of Platter Creek and the Tributary to Platter Creek (at RM 7.66), particularly near RM 5.4, will help improve stream health and reach/maintain attainment throughout the watershed.

The remaining goals for *Critical Area #3* of the **Platter Creek HUC-12** are to improve the habitat scores at the sampling locations so that the *Partial Attainment* status for this sampling site can be changed to *Full Attainment* for the designated WWH aquatic life use. These goals are to specifically:

Goal 1. Achieve QHEI score at or above 43.5 at the Wonderly Rd. sampling site in Platter Creek (RM 7.95).
NOT ACHIEVED: Site currently has a score of 22.30.

Goal 2. Achieve QHEI score at or above 55 at the Farmer Mark Rd. sampling site in Platter Creek (RM 6.41).
NOT ACHIEVED: Site currently has a score of 42.75.

Goal 3. Achieve QHEI score at or above 55 at the Fountain Rd. sampling site in Platter Creek (RM 5.4).
NOT ACHIEVED: Site currently has a score of 26.50.

Goal 4. Achieve QHEI score at or above 43.5 at the Wonderly Rd. sampling site in the Tributary to Platter Creek (at RM 7.66) (RM 0.78).
NOT ACHIEVED: Site currently has a score of 31.50.

Objectives

The driving impairment throughout Platter Creek and its tributaries is related to nutrient enrichment, with habitat effects. The implementation of these objectives, coupled with implementation in *Critical Area #1* and *Critical Area #2*, will help ameliorate impairment from these two causes throughout the waterways in the **Platter Creek HUC-12**. In order to achieve the overall NPS restoration goal of restoring *Full Attainment* to the **Platter Creek HUC-12**, the following objectives need to be achieved within *Critical Area #3.*

Objective 1: Restore in-stream and riparian habitat along impacted or barren stretches of Platter Creek and the Tributary to Platter Creek (at RM 7.66) within *Critical Area #3* (at least 50 feet each side) by establishing and enhancing at least 8 acres of riparian habitat[5].

Objective 2: Create, enhance and/or restore floodplain/riparian wetlands for habitat restoration and/or sediment attenuation on at least 4 acres.

Water quality monitoring is an integral part of the project implementation process. Both project-specific and routinely scheduled monitoring will be conducted to determine progress towards meeting the goals (i.e., water quality standards and nutrient reduction targets). Through an adaptive management process, the aforementioned objectives will be reevaluated and modified as necessary. Objectives may be added to make further progress towards attainment or reduction goals, or altered, as a systems approach of multiple BMPs can accelerate the improvement of water quality conditions. The *Nonpoint Source Management Plan Update* (OEPA, 2013a) will be utilized as a reevaluation tool for its 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.

[5] The restoration of riparian habitat within Platter Creek will be challenging, as most of the stream and its Unnamed Tributary are under routine ditch maintenance. Stakeholders recognize a need for restorative actions in strategic places; however, objectives are set low to realistically reflect the anticipated amount of land available for restoration.

CHAPTER 4: PROJECTS AND IMPLEMENTATION STRATEGY

Projects and evaluation needs identified for the **Platter Creek HUC-12** are based upon identified causes and associated sources of NPS pollution. Over time, these critical areas will need to be reevaluated to determine progress towards meeting restoration, attainment and nutrient reduction goals. Time is an important variable in measuring project success and overall status when using biological indices as a measurement tool. Some biological systems may show fairly quick response (i.e., one season), while others may take several seasons or years to show progress towards recovery. In addition, reasons for the impairment other than those associated with NPS sources may arise. Those issues will need to be addressed under different initiatives, authorities or programs that may or may not be accomplished by the same implementers addressing the NPS issues.

Implementation of practices described in this NPS-IS will also contribute to nutrient load reduction (specifically the 40% reduction in phosphorus load) to protect and restore use attainment in Lake Erie. Nutrient load reduction efforts are consistent with the Lake Erie Collaborative Agreement through the International Joint Commission (IJC) and Ohio's DAP (OLEC, 2018).

For the **Platter Creek HUC-12** there are three *Project and Implementation Strategy Overview Tables* (subsection 4.1, 4.2 and 4.3). Future versions of this NPS-IS may include subsequent sections as more critical areas are refined and more projects become developed to meet the requisite objectives within a critical area. The projects described in the *Overview Table* 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 the **Platter Creek HUC-12**.

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 subsections following the *Project and Implementation Strategy Overview Tables;* these 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 PSS created will be submitted to the state of Ohio for funding eligibility verification (i.e., all nine elements are included).

4.1 Critical Area #1 Project and Implementation Strategy Overview Table

Table 20: Platter Creek HUC-12 (04100005 02 06) — Critical Area #1							
Goal	**Objective**	**Project #**	**Project Title (EPA Criteria g)**	**Lead Organization (EPA 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							
Agricultural Nonpoint Source Reduction Strategies							
1	1	1	Agricultural BMPs – Cover Crops	Defiance SWCD	Short (1-3 yrs)	$82,500	H2Ohio, GLC, NRCS-USDA CRP, EQIP
1	2	2	Agricultural BMPs – Grassed Waterways	Defiance SWCD	Short (1-3 yrs)	$33,000	Ohio EPA §319, GLRI, H2Ohio, GLC, NRCS-USDA CRP,EQIP
1	3	3	Agricultural BMPs –Drainage Water Management Structures	Defiance SWCD	Short (1-3 yrs)	$11,000	Ohio EPA §319, GLRI, H2Ohio, GLC, NRCS-USDA CRP, EQIP
1	4	4	Agricultural BMPs – Nutrient Management (Soil Testing and Variable Rate Technology (VRT) Implementation)	Defiance SWCD	Short (1-3 yrs)	$9,100	Ohio EPA §319, GLRI, H2Ohio, GLC, NRCS-USDA CRP, EQIP
1	5	5	Agricultural BMPs – Subsurface Injection (Equipment and Implementation)	Defiance SWCD	Short (1-3 yrs)	$300,000	GLRI, H2Ohio, GLC
High Quality Waters Protection Strategies							
Other NPS Causes and Associated Sources of Impairment							

4.1.1 Project Summary Sheet(s)

The Project Summary Sheets provided below were developed based on the actions or activities needed to achieve nutrient reduction targets in the **Platter Creek HUC-12**. These projects are considered next step or priority/short term projects and are considerably ready to implement. Medium and longer-term projects will not have a Project Summary Sheet, as these projects are not ready for implementation or need more thorough planning.

Table 21: Critical Area #1 – Project #1		
Nine Element Criteria	**Information needed**	**Explanation**
n/a	**Title**	Agricultural BMPs – Cover Crops
criteria d	**Project Lead Organization & Partners**	Defiance Soil and Water Conservation District
criteria c	**HUC-12 and Critical Area**	Platter Creek HUC-12 (04100005 02 06) – Critical Area #1
criteria c	**Location of Project**	Private landowners – exact location not disclosed
n/a	**Which strategy is being addressed by this project?**	Agricultural Nonpoint Source Reduction
criteria f	**Time Frame**	Short (1-3 years)
criteria g	**Short Description**	Administer cost-share program for cover crop plantings.
criteria g	**Project Narrative**	Defiance SWCD will administer a cost-share program to local landowners in prioritized agricultural lands to plant cover crops on at least 2,500 acres annually. Landowners will enroll no less than 10 acres minimally, and the maximum amount enrolled by one operation will not exceed 400 acres. Cost-share will pay out at $30 per acre. This project summary sheet may be combined with other project summary sheets to form a singular project, which could be delivered as a program, according to funding source, timing considerations and identification of landowner needs.
criteria d	**Estimated Total cost**	$82,500
criteria d	**Possible Funding Source**	H2Ohio, GLC, NRCS-USDA CRP, EQIP
criteria a	**Identified Causes and Sources**	Cause: Nutrient loadings, leading to far-field impacts Source: Agricultural land use activities

Table 21: Critical Area #1 – Project #1		
Nine Element Criteria	**Information needed**	**Explanation**
criteria b & h	**Part 1: How much improvement is needed to remove the NPS impairment for the whole Critical Area?**	Objective #1: Plant cover crops on at least 40% of croplands (~4,900 acres) annually, resulting in plantings of at least 4,100 additional acres.
	Part 2: How much of the needed improvement for the whole Critical Area is estimated to be accomplished by this project?	Objective #1: Plant cover crops on at least 40% of croplands (~4,900 acres) annually, resulting in plantings of at least 2,500 of 4,100 additional acres (61%). Goals: The overall goal in *Critical Area #1* is to reduce estimated total spring phosphorus loads. Current estimates indicate 10,000 lbs. of phosphorus in the spring load is attributed to agricultural land use activities. In order to meet the GLWQA nutrient reduction goals, spring loadings must be reduced by 40%, or 4,000 lbs. It is expected that this project will cause a decrease in spring phosphorus loadings by 190 lbs, or 4.8%.
	Part 3: Load Reduced?	Estimated annual reduction: 3,227 #N/year; 292 #P/year; 63 tons sediment/year
criteria i	**How will the effectiveness of this project in addressing the NPS impairment be measured?**	It is generally unrealistic to monitor load reduction from individual agricultural practices; however, ambient monitoring is conducted throughout the WLEB by organizations such as OEPA, NOAA, and Heidelberg University. These entities will continue long term monitoring on various tributaries in the Maumee basin to track load reduction trends. In addition, Defiance SWCD will conduct follow-up activities, as deemed necessary, to document cover crop planting.
criteria e	**Information and Education**	Project information will be shared at the Defiance SWCD annual meeting and at applicable field days. Project highlights will also be shared on social media and/or Defiance SWCD's website.

Table 22: Critical Area #1 – Project #2		
Nine Element Criteria	**Information needed**	**Explanation**
n/a	**Title**	Agricultural BMPs – Grassed Waterways
criteria d	**Project Lead Organization & Partners**	Defiance Soil and Water Conservation District
criteria c	**HUC-12 and Critical Area**	Platter Creek HUC-12 (04100005 02 06) – *Critical Area #1*
criteria c	**Location of Project**	Private landowners – exact location not disclosed
n/a	**Which strategy is being addressed by this project?**	Agricultural Nonpoint Source Reduction
criteria f	**Time Frame**	Short (1-3 years)
criteria g	**Short Description**	Administer cost-share program for installation and/or rehabilitation of grassed waterways.
criteria g	**Project Narrative**	Defiance SWCD will administer a cost-share program to local landowners in prioritized agricultural lands to install new or rehabilitate failing grassed waterways in areas of gully erosion. This project aims to install at least five grassed waterways, with an average watershed of 44 acres for a total goal of treating surface flow from 220 acres. An average grassed waterway cost-share is estimated to be $7,500. This project summary sheet may be combined with other project summary sheets to form a singular project, which could be delivered as a program, according to funding source, timing considerations and identification of landowner needs.
criteria d	**Estimated Total cost**	$42,000
criteria d	**Possible Funding Source**	Ohio EPA §319, GLRI, H2Ohio, GLC, NRCS-USDA CRP, EQIP
criteria a	**Identified Causes and Sources**	Cause: Nutrient loadings, leading to far-field impacts Source: Agricultural land use activities
criteria b & h	**Part 1: How much improvement is needed to remove the NPS impairment for the whole Critical Area?**	Objective #2: Reduce erosion and nutrient loss through the installation of grassed waterways that receive/treat surface water from least 2,700 acres.

Table 22: Critical Area #1 – Project #2		
Nine Element Criteria	**Information needed**	**Explanation**
	Part 2: How much of the needed improvement for the whole Critical Area is estimated to be accomplished by this project?	Objective #2: Reduce erosion and nutrient loss through the installation of grassed waterways that receive/treat surface water from least 220 of 2,700 acres (8.1%). Goals: The overall goal in *Critical Area #1* is to reduce estimated total spring phosphorus loads. Current estimates indicate 10,000 lbs. of phosphorus in the spring load is attributed to agricultural land use activities. In order to meet the GLWQA nutrient reduction goals, spring loadings must be reduced by 40%, or 4,000 lbs. It is expected that this project will cause a decrease in spring phosphorus loadings by 38 lbs, or 1.0%.
	Part 3: Load Reduced?	Estimated annual reduction: 251 #N/year; 58 #P/year; 36 tons sediment/year
criteria i	**How will the effectiveness of this project in addressing the NPS impairment be measured?**	It is generally unrealistic to monitor load reduction from individual agricultural practices; however, ambient monitoring is conducted throughout the WLEB by organizations such as OEPA, NOAA, and Heidelberg University. These entities will continue long term monitoring on various tributaries in the Maumee basin to track load reduction trends. In addition, Defiance SWCD will conduct follow-up activities, as deemed necessary, to ensure proper design and installation of grassed waterways.
criteria e	**Information and Education**	Project information will be shared at the Defiance SWCD annual meeting and at applicable field days. Project highlights will also be shared on social media and/or Defiance SWCD's website.

Table 23: Critical Area #1 – Project #3		
Nine Element Criteria	**Information needed**	**Explanation**
n/a	**Title**	Agricultural BMPs – Drainage Water Management Structures
criteria d	**Project Lead Organization & Partners**	Defiance Soil and Water Conservation District
criteria c	**HUC-12 and Critical Area**	Platter Creek HUC-12 (04100005 02 06) – *Critical Area #1*
criteria c	**Location of Project**	Private landowners – exact location not disclosed
n/a	**Which strategy is being addressed by this project?**	Agricultural Nonpoint Source Reduction
criteria f	**Time Frame**	Short (1-3 years)
criteria g	**Short Description**	Administer cost-share program for installation of drainage water management structures.
criteria g	**Project Narrative**	Defiance SWCD will administer a cost-share program to local landowners in prioritized agricultural lands to install drainage water management structures. Drainage water management structures will be installed in tiles that drain at least 15 acres and will pay out at $2,000 per structure. The goal of this project is to install at least five drainage water management structures. This project summary sheet may be combined with other project summary sheets to form a singular project, which could be delivered as a program, according to funding source, timing considerations and identification of landowner needs.
criteria d	**Estimated Total cost**	$11,000
criteria d	**Possible Funding Source**	Ohio EPA §319, GLRI, H2Ohio, GLC, NRCS-USDA CRP, EQIP
criteria a	**Identified Causes and Sources**	Cause: Nutrient loadings, leading to far-field impacts Source: Agricultural land use activities
criteria b & h	**Part 1: How much improvement is needed to remove the NPS impairment for the whole Critical Area?**	Objective #3: Reduce nutrient loss from subsurface tile drainage through the installation of drainage water management structures that drain at least 2,400 acres.

Table 23: Critical Area #1 – Project #3		
Nine Element Criteria	**Information needed**	**Explanation**
	Part 2: How much of the needed improvement for the whole Critical Area is estimated to be accomplished by this project?	Objective #3: Reduce nutrient loss from subsurface tile drainage through the installation of drainage water management structures and/or saturated buffers that drain at least 75 acres of 2,400 acres (3.1%). Goals: The overall goal in *Critical Area #1* is to reduce estimated total spring phosphorus loads. Current estimates indicate 10,000 lbs. of phosphorus in the spring load is attributed to agricultural land use activities. In order to meet the GLWQA nutrient reduction goals, spring loadings must be reduced by 40%, or 4,000 lbs. It is expected that this project will cause a decrease in spring phosphorus loadings by 114 lbs, or 2.9%.
	Part 3: Load Reduced?	Estimated annual reduction: 176 #N/year; 32 #P/year; sediment reduction not applicable
criteria i	**How will the effectiveness of this project in addressing the NPS impairment be measured?**	It is generally unrealistic to monitor load reduction from individual agricultural practices; however, ambient monitoring is conducted throughout the WLEB by organizations such as OEPA, NOAA, and Heidelberg University. These entities will continue long term monitoring on various tributaries in the Maumee basin to track load reduction trends. In addition, Defiance SWCD will conduct follow-up activities, as deemed necessary, to document proper design and installation of drainage water management structures.
criteria e	**Information and Education**	Project information will be shared at the Defiance SWCD annual meeting and at applicable field days. Project highlights will also be shared on social media and/or Defiance SWCD's website.

Table 24: Critical Area #1 – Project #4		
Nine Element Criteria	**Information needed**	**Explanation**
n/a	**Title**	Agricultural BMPs – Nutrient Management (Soil Testing and Variable Rate Technology (VRT) Implementation)
criteria d	**Project Lead Organization & Partners**	Defiance Soil and Water Conservation District
criteria c	**HUC-12 and Critical Area**	Platter Creek HUC-12 (04100005 02 06) – *Critical Area #1*
criteria c	**Location of Project**	Private landowners – exact location not disclosed
n/a	**Which strategy is being addressed by this project?**	Agricultural Nonpoint Source Reduction
criteria f	**Time Frame**	Short (1-3 years)
criteria g	**Short Description**	Cost-share program to implement soil testing and VRT
criteria g	**Project Narrative**	Defiance SWCD will administer a cost-share program to local landowners in prioritized agricultural lands for implementation of soil testing and VRT. This project has a goal to enroll at least 250 acres for soil testing and VRT application. Soil testing will pay $9 per acre, with a maximum of 25 acres per field. VRT cost-share will be $24 per acre. This project summary sheet may be combined with other project summary sheets to form a singular project, which could be delivered as a program, according to funding source, timing considerations and identification of landowner needs.
criteria d	**Estimated Total cost**	$9,100
criteria d	**Possible Funding Source**	Ohio EPA §319, GLRI, H2Ohio, GLC, NRCS-USDA CRP, EQIP
criteria a	**Identified Causes and Sources**	Cause: Nutrient loadings, leading to far-field impacts Source: Agricultural land use activities
criteria b & h	**Part 1: How much improvement is needed to remove the NPS impairment for the whole Critical Area?**	Objective #4: Implement nutrient management planning (soil testing and variable rate fertilization) on at least 3,000 additional acres.

Table 24: Critical Area #1 – Project #4		
Nine Element Criteria	**Information needed**	**Explanation**
	Part 2: How much of the needed improvement for the whole Critical Area is estimated to be accomplished by this project?	Objective #4: Implement nutrient management planning (soil testing and variable rate fertilization) on at least 250 of 3,000 additional acres (8.3%). Goals: The overall goal in *Critical Area #1* is to reduce estimated total spring phosphorus loads. Current estimates indicate 10,000 lbs. of phosphorus in the spring load is attributed to agricultural land use activities. In order to meet the GLWQA nutrient reduction goals, spring loadings must be reduced by 40%, or 4,000 lbs. It is expected that this project will cause a decrease in spring phosphorus loadings by 88 lbs, or 2.2%.
	Part 3: Load Reduced?	Estimated annual reduction: 233 #N/year; 136 #P/year; sediment reduction not applicable
criteria i	**How will the effectiveness of this project in addressing the NPS impairment be measured?**	It is generally unrealistic to monitor load reduction from individual agricultural practices; however, ambient monitoring is conducted throughout the WLEB by organizations such as OEPA, NOAA, and Heidelberg University. These entities will continue long term monitoring on various tributaries in the Maumee basin to track load reduction trends. In addition, Defiance SWCD will conduct follow-up activities, as deemed necessary, to document implementation of soil testing and VRT application.
criteria e	**Information and Education**	Project information will be shared at the Defiance SWCD annual meeting and at applicable field days. Project highlights will also be shared on social media and/or Defiance SWCD's website.

Table 25: Critical Area #1 – Project #5		
Nine Element Criteria	**Information needed**	**Explanation**
n/a	**Title**	Agricultural BMPs – Subsurface Injection (Equipment and Implementation)
criteria d	**Project Lead Organization & Partners**	Defiance Soil and Water Conservation District
criteria c	**HUC-12 and Critical Area**	Platter Creek HUC-12 (04100005 02 06) – *Critical Area #1*
criteria c	**Location of Project**	Private landowners – exact location not disclosed
n/a	**Which strategy is being addressed by this project?**	Agricultural Nonpoint Source Reduction
criteria f	**Time Frame**	Short (1-3 years)
criteria g	**Short Description**	Purchase subsurface injection toolbar, Global Positioning System (GPS) guidance and tractor and provide injection services to watershed landowners
criteria g	**Project Narrative**	Defiance SWCD will purchase a subsurface injection toolbar, the necessary GPS guidance equipment and a tractor that will be used to provide subsurface fertilization services to watershed landowners. Defiance SWCD would provide this service to landowners in the Platter Creek HUC-12 on at least 350 acres annually, for an expected lifetime of at least five years before maintenance and/or updates would be required. The equipment would also be available for use in other watersheds within Defiance County; however, Platter Creek landowners would be prioritized. This project summary sheet may be combined with other project summary sheets to form a singular project, which could be delivered as a program, according to funding source, timing considerations and identification of landowner needs.
criteria d	**Estimated Total cost**	$300,000
criteria d	**Possible Funding Source**	GLRI, H2Ohio, GLC
criteria a	**Identified Causes and Sources**	Cause: Nutrient loadings, leading to far-field impacts Source: Agricultural land use activities
criteria b & h	**Part 1: How much improvement is needed to remove the NPS impairment for the whole Critical Area?**	Objective #5: Implement subsurface fertilizer application on at least 350 acres annually that currently do not utilize the technology.

Table 25: Critical Area #1 – Project #5		
Nine Element Criteria	**Information needed**	**Explanation**
	Part 2: How much of the needed improvement for the whole Critical Area is estimated to be accomplished by this project?	Objective #5: Implement subsurface fertilizer application on at least 350 of 350 acres annually that currently do not utilize the technology (100%). Goals: The overall goal in *Critical Area #1* is to reduce estimated total spring phosphorus loads. Current estimates indicate 10,000 lbs. of phosphorus in the spring load is attributed to agricultural land use activities. In order to meet the GLWQA nutrient reduction goals, spring loadings must be reduced by 40%, or 4,000 lbs. It is expected that this project will cause a decrease in spring phosphorus loadings by 85 lbs, or 2.1%.
	Part 3: Load Reduced?	Estimated annual reduction: 264 #N/year; 131 #P/year; sediment reduction not applicable
criteria i	**How will the effectiveness of this project in addressing the NPS impairment be measured?**	It is generally unrealistic to monitor load reduction from individual agricultural practices; however, ambient monitoring is conducted throughout the WLEB by organizations such as OEPA, NOAA, and Heidelberg University. These entities will continue long term monitoring on various tributaries in the Maumee basin to track load reduction trends. In addition, Defiance SWCD will coordinate and run equipment for subsurface application.
criteria e	**Information and Education**	Project information will be shared at the Defiance SWCD annual meeting and at applicable field days. Project highlights will also be shared on social media and/or Defiance SWCD's website.

4.2 Critical Area #2 Project and Implementation Strategy Overview Table

Table 26: Platter Creek HUC-12 (04100004 03 01) — Critical Area #2							
Goal	**Objective**	**Project #**	**Project Title (EPA Criteria g)**	**Lead Organization (EPA 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							
Agricultural Nonpoint Source Reduction Strategies							
High Quality Waters Protection Strategies							
Other NPS Causes and Associated Sources of Impairment							
1	1	-	HSTS Replacement in Mark Center	TBD	TBD	TBD	TBD

At this time, no short-term projects have been identified for *Critical Area #2*; therefore, no Project Summary Sheets are included.

4.3 Critical Area #3 Project and Implementation Strategy Overview Table

Table 27: Platter Creek HUC-12 (04100004 03 01) — Critical Area #3							
Goal	**Objective**	**Project #**	**Project Title (EPA Criteria g)**	**Lead Organization (EPA 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	1	--	Riparian Restoration	TBD	TBD	TBD	TBD
Agricultural Nonpoint Source Reduction Strategies							
High Quality Waters Protection Strategies							
Other NPS Causes and Associated Sources of Impairment							

At this time, no short-term projects have been identified for *Critical Area #3*; therefore, no Project Summary Sheets are included.

CHAPTER 5: WORKS CITED

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