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

Pike Run HUC-12 (04100008 06 02)
Approved June 24, 2020

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Cover Photo Credit: Blanchard River Upstream from Oak St. Bridge in Ottawa, OH (Martin 2020)

Acknowledgements

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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

ALU	Aquatic Life Use

B

BMP	Best Management Practice

C

CSA	Critical Sewage Area
CTIC	Conservation Tillage Information Center

D

DAP	Domestic Action Plan

E

ECBP	Eastern Corn Belt Plains
EQIP	Environmental Quality Incentives Program

F

FLS	Federally Listed Species

G

GLC	Great Lakes Commission
GLRI	Great Lakes Restoration Initiative
GLWQA	Great Lakes Water Quality Agreement

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
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 Extension

P

PAD-US	Protected Areas Database of the United States

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

USEPA	United States Environmental Protection Agency
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey

W

WAP	Watershed Action Plan
WLEB	Western Lake Erie Basin
WQS	Water Quality Standards (Ohio Administrative Code 3745-1)
WWH	Warmwater Habitat

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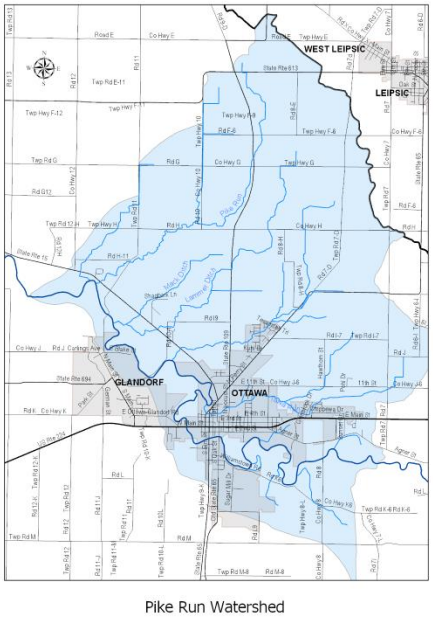
Chapter 1: Introduction

The **Pike Run-Blanchard River HUC-12 (04100008 06 02)** watershed covers 18,327.47 acres or 28.6 square miles (Map 1.1). Most of the land is used for agricultural purposes (Map 1.2). Agriculture land use involves roughly 14,754 acres or 80.5% of the watershed (2018 OEPA). Cropland use is nearly 14,387 acres or 78.5%, while14.5% of the land use in the watershed involves land that has been developed. The Village of Ottawa and the Village of Glandorf both lie within the watershed. Picture 1.1 shows Pike Run upstream from the SR 15 bridge RM 0.1 from the mouth with the Blanchard River.



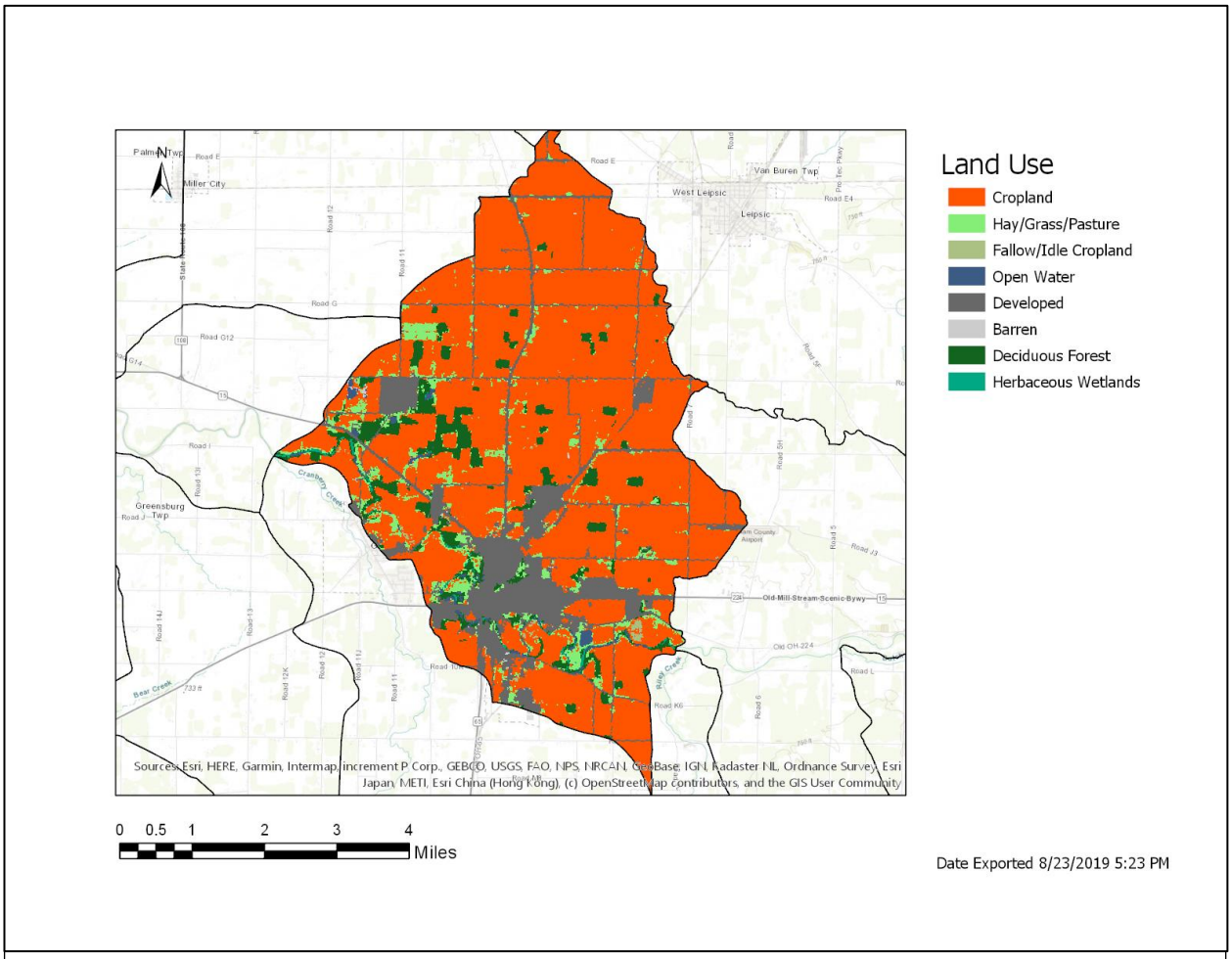
Map 1.1: Pike Run-Blanchard River HUC-12 (04100008 06 02) (Reynolds)

The watershed starts (RM 30.06) east of the Village of Ottawa where the Blanchard River enters the Cranberry Creek HUC-10 watershed (04100008 06) at the mouth of Riley Creek. The Blanchard River flows west along the southern boundary of the Village of Ottawa, and then flows northwest into the Village of Glandorf. The watershed ends at RM 17.30 west of the Village of Ottawa, where Cranberry Creek enters the Blanchard River. There are three main tributaries that flow into the Blanchard River within this watershed. Tawa Run enters the Blanchard River in the Village of Ottawa at RM 22.84 and flows in a southwest-west direction. Mack Ditch flows into Lammers Ditch at RM 0.3 before entering the Blanchard River at RM 19.38. Both ditches flow in a southwestern direction. Pike Run then enters the Blanchard River at RM 18.62, and flows in southwestern direction.

Picture 1.1: Pike Run upstream at SR 15

Map 1.2 on the next page shows the land use for the **Pike Run-Blanchard River HUC-12**. As shown in the map, most of the agricultural land is on the east side of the watershed. Most of the land use on the west side of the watershed involves developed land for the Villages of Glandorf

and Ottawa. The entire **Pike Run-Blanchard River HUC-12** watershed lies within Putnam County.



Map 1.2: Pike Run-Blanchard River HUC-12 Land Use Map (Created in GIS by Elaine Reynolds)

Loadings from the **Pike Run-Blanchard River HUC-12** not only have a near-field effect on the downstream portion of the Blanchard River, but also will have a far-field effect on Lake Erie where the water finally flows.

The federal and state nonpoint source funding opportunities require strategic watershed plans to be written at the HUC-12 watershed level, using the nine key elements in the Guide to Developing Nonpoint Source Implementation Strategic Plans in Ohio developed by the OEPA. The Blanchard River Watershed Partnership (BRWP), with collaboration from local agencies and stakeholders, has started to develop Nine-Element Nonpoint Source Implementation Strategic Plans (NPS-IS plans) for the Blanchard River Watershed. The development of Nine Element Nonpoint Source Implementation Strategies (NPS-IS) is vital to the efforts needed to

meet the goal of Ohio's Domestic Action Plan (DAP) to reduce total spring loadings to Lake Erie by 40%, based on the 2008 loadings, by 2025. The approved NPS-IS Plans will have both near-field (within stream/watershed) and far-field (Lake Erie) effects.

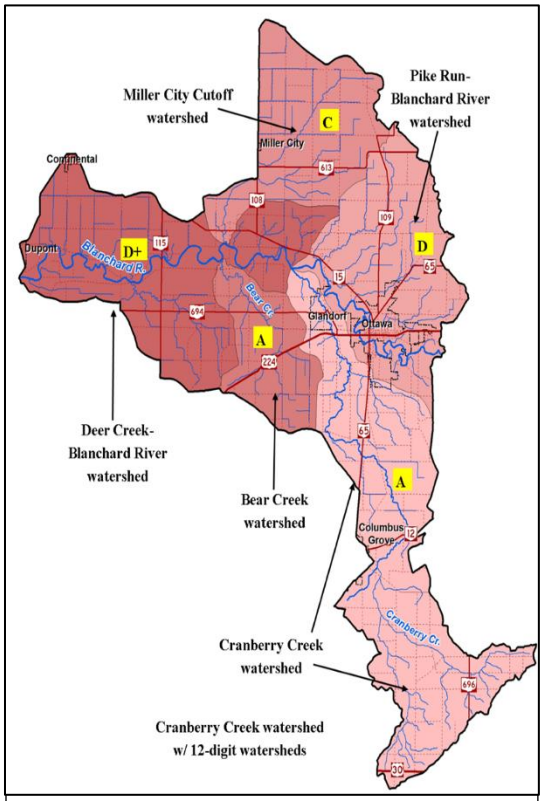
1.1 Report Background

The Blanchard River Watershed Partnership (BRWP) is a community-based volunteer 501(c) (3) organization that seeks to address problems and concerns that affect the health of the Blanchard River Watershed, and educate all citizens about the dynamics of the Blanchard River and its tributaries. The BRWP members and Board of Directors include interested citizens, local government agencies, educators, representatives of industry and other stakeholders who have come together with one goal in mind: to improve and maintain water quality within the watershed. One of the main ways to achieve improved water quality was through the development of watershed action plans (WAP). In June 2011, the BRWP received full endorsement of The Outlet/Lye Creek (HUC 04100008 02) WAP. In November 2012, the BRWP received full endorsement of another WAP for the Riley Creek Watershed (HUC 04100008 04). These two action plans were written at the HUC-10 level. Implementation activities in these two watersheds have been occurring since their endorsement. After the endorsement of these two WAPs, designed to outline the process for restoration activities, the BRWP was able to write or assist with grant writing that resulted in the award of over $11,000,000 in funding.

The focus of the BRWP is now on developing NPS-IS plans for individual HUC-12 watersheds based on their grade in the BRWP 2012 Report Card. This NPS-IS plan is being written for the **Pike Run-Blanchard River HUC-12** to address nonpoint source causes and sources of impairments that have been specifically identified in the watershed. Additionally, this NPS-IS Plan addresses near-field impacts on aquatic community health in the **Pike Run-Blanchard River HUC-12** and the far-field impacts on Lake Erie.

Many of the current federal and state efforts to improve and protect water quality are based upon a watershed approach focusing more on geographic boundaries defined by drainage areas instead of political boundaries. This approach provides a flexible, coordinated framework that aligns public and private efforts with targeted problems in a watershed. The guiding principles of this approach are stakeholder partnerships, a geographic focus, and sound scientific data. It has been shown that involving the public in watershed planning and decision-making generates a high level of support and long-term success. Using a watershed approach ensures the most equitable balancing of environmental protection, economic prosperity, and quality of life issues. We need to keep in mind that we all live upstream and/or downstream in a watershed, and that each individual action has an effect somewhere in that watershed.

Removal of nonpoint source impairments in the **Pike Run-Blanchard River HUC-12** will address nonpoint source impairment and allow for stepwise improvement toward achieving the attainment of water quality standards. In addition, nutrient load reductions achieved through the implementation of projects in this watershed will address the goals to reduce far-field Western Lake Erie Basin (WLEB) load reduction to Lake Erie, as described in the Domestic Action Plan (DAP) for Ohio in accordance with the Annex 4 agreement. This plan does not address any point source issues that are under the direct control of the Ohio EPA.



Map 1.3: HUC-12 watersheds within the Cranberry Creek HUC-10 Watershed

1.2 Watershed Profile and History

The Blanchard River Watershed is identified using the 8-digit Hydrological Unit Code (HUC), 04100008. There are six subwatersheds within the Blanchard River Watershed. Each of these subwatersheds is identified using an HUC-10. The Cranberry Creek watershed HUC-10 is 04100008 06. There are five smaller HUC-12 watersheds located in the Cranberry Creek watershed. Map 1.3 shows the HUC-12 subwatersheds within the Cranberry Creek watershed. The Blanchard River Watershed covers 493,434-acres (771 square miles) and drains into the Auglaize River west of the Village of Dupont in Putnam County. From here, the water flows into the Maumee River at Defiance and eventually into Lake Erie at Toledo. Map 1.4 on page 6 shows the location of the Blanchard River Watershed in the Western Lake Erie Basin (WLEB). Map 1.5 on page 7 shows the location of the **Pike Run-Blanchard River HUC-12** watershed in the Blanchard River Watershed.

Prior to European immigrant settlement in the 1800's, wetlands were common and, based on soil survey information, made up about 42 percent of the watershed. Due to the clearing of swamp forest and the subsequent drainage of the land, most of the wetlands have been artificially drained. Wetlands occurring in cropland currently constitute less than one percent of the watershed, and wooded wetlands constitute about 3.2% of the watershed.

In addition to addressing the impairments in the **Pike Run-Blanchard River HUC-12**, this NPS-IS plan will have a cross benefit to meet phosphorus load reduction goals in the Western Lake Erie Basin described in the Ohio Domestic Action Plan for Ohio in accordance with the Great Lakes Water Quality Agreement - Annex 4.

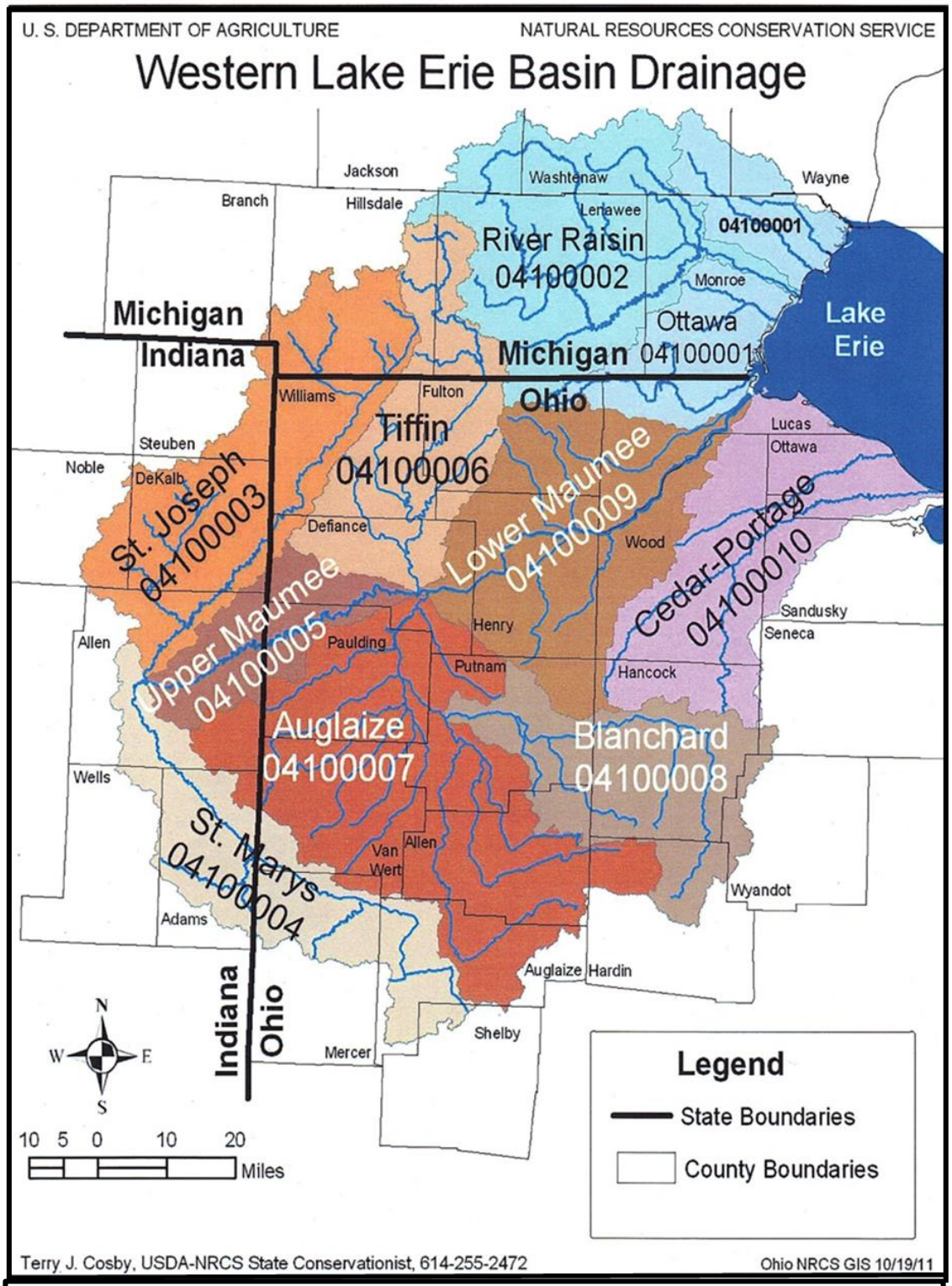
1.3 Public Participation and Involvement

The Blanchard River Watershed Partnership (BRWP) works to engage stakeholders in all activities. The BRWP collaborates with soil and water conservation districts within the Blanchard River Watershed, as well as agencies such as the National Resources Conservation Service (NRCS), the county Farm Bureaus, county Ag Councils, township trustees, school district representatives, universities, the National Center for Water Quality Research (NCWQR), county commissioners, village representatives, mayors, county health departments, landowners, producers, and any other stakeholders who are appropriate for a particular project.

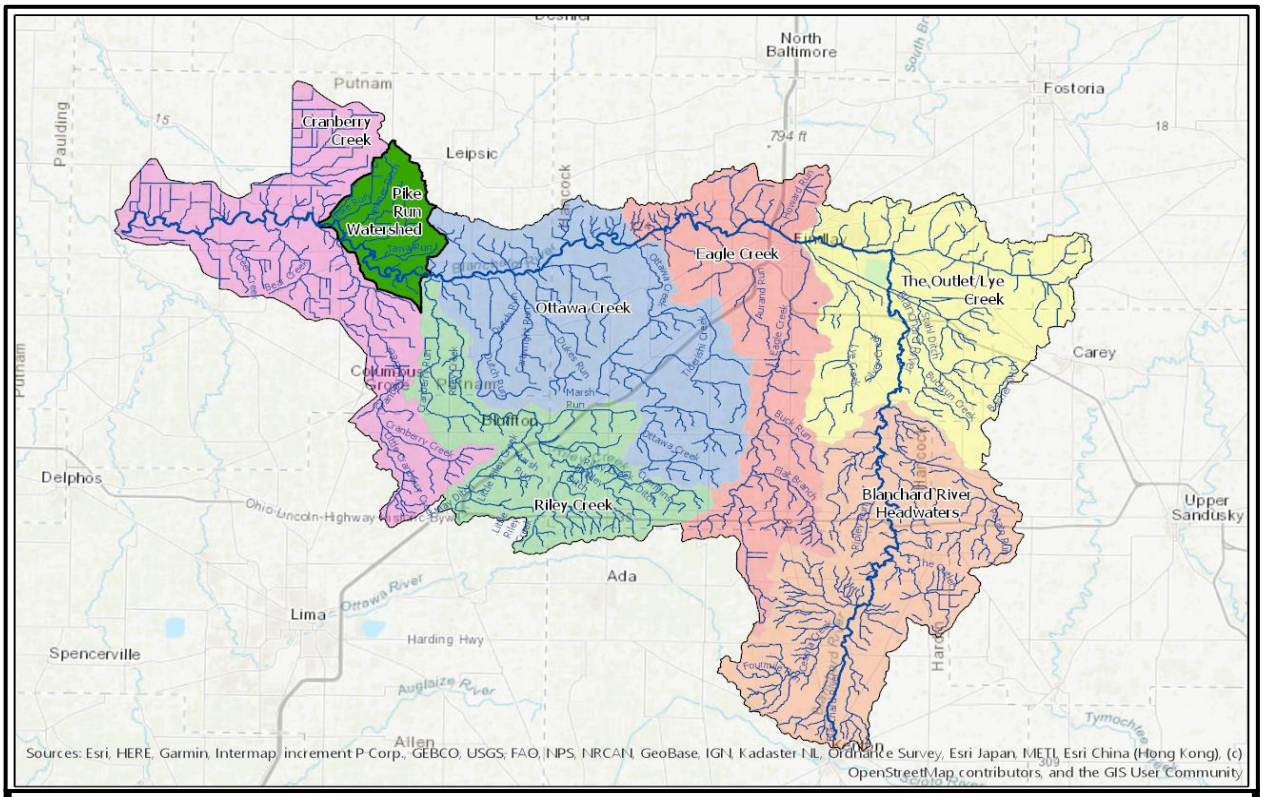
The initial planning process for developing the **Pike Run-Blanchard River HUC- 12** Nine-Element Nonpoint Source Implementation Strategic Plan (NPS-IS plan) was conducted by the BRWP. Partners were contacted to inform them that the BRWP had received funding from the Lake Erie Commission to write an NPS-IS Plan for the **Pike Run-Blanchard River Creek HUC-12**. These partners included the Putnam County Soil & Water Conservation District, the Putnam County Public Health Department, the Putnam County Engineer, the Putnam County Farm Bureau, and the Putnam County Commissioners.

The watershed was scouted by doing a road-by-road observation and inspection of the conditions of the waterways, agricultural fields, and other features that would be useful in developing the **Pike Run-Blanchard River HUC-12** NPS-IS plan. Once initial information was gathered in regards to the background and history of the watershed, partners and stakeholders were asked to contribute their input regarding impairments, critical areas, and appropriate Best Management Practices (BMP's) and projects within the **Pike Run-Blanchard River HUC-12.**

Once the Critical Areas were established and goals, objectives and project sheets for each Critical Area were completed, project sheets were sent to the appropriate agency for review. The final changes and suggestions comprised were included in the plan. The completed plan was then sent to all involved stakeholders for a final review before the plan was submitted to the Ohio Environmental Protection Agency (OEPA).



Map 1.4: Location of the Blanchard River Watershed in the Western Lake Erie Basin (WLEB)



Map 1.5: Location of the Upper Eagle Creek Watershed within the Blanchard River Watershed (Image by Elaine Reynolds)

Chapter 2: Characterization and Assessment Summary

2.1 Summary of Watershed Characterization for the Pike Run-Blanchard River HUC-12

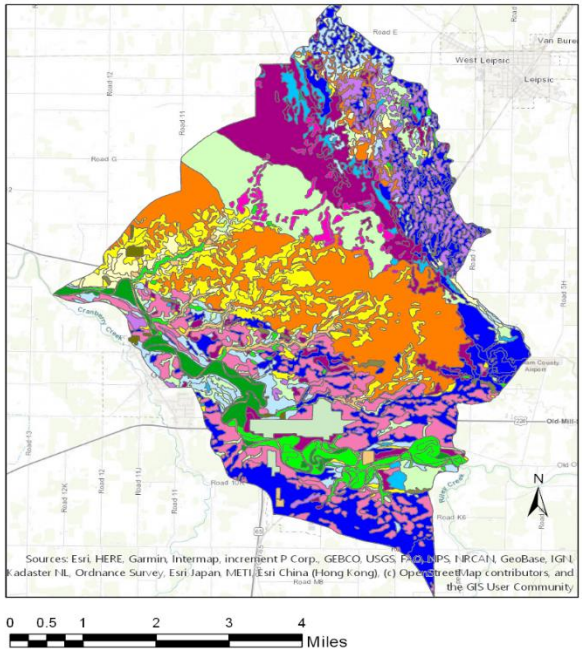
2.1.1 Physical and Natural Features

The **Pike Run-Blanchard River HUC-12** watershed starts at RM 30.06 east of the Village of Ottawa, where the Blanchard River enters the Cranberry Creek HUC-10 (04100008 06) at the mouth of Riley Creek. The Blanchard River flows in a westerly direction toward the Village of Ottawa to RM 17.30, where Cranberry Creek enters the Blanchard River. There are three main tributaries that flow into the Blanchard River in the **Pike Run-Blanchard River HUC-12** watershed. The mouth of Pike Run enters the Blanchard River at RM 18.62, west of the Village of Glandorf. Pike Run then flows in a northeasterly direction for approximately 4.5 miles and drains an area of around 5.5 square miles. Tawa Run enters the Blanchard River at RM 22.84, and flows in an easterly direction from the mouth through the Village of Ottawa. Lammers Ditch enters the river at RM 19.38 and runs in a northerly direction from the mouth north of the Village of Glandorf. All three tributaries drain both urban land and farmland. The entire watershed covers about 28.64 square miles and drains 18,327.47 acres.

Pike Run in the **Pike Run-Blanchard River HUC-12** is under maintenance by the Putnam SWCD based on the Ohio Drainage Law petition and maintenance procedures.

According to the OEPA website, there is only one individual NPDES permit listed for the **Pike Run-Blanchard River HUC-12**. The permit is for the Ottawa Wastewater Treatment Plant (WWTP). The WWTP has an average discharge design flow of 3.0 MGD. The history of compliance for the last three years shows two failures to report DMR on time, and one other identified violation. The OEPA also notes there are two Household Sewage NPDES general permits listed in the **Pike Run-Blanchard River HUC-12** watershed.

The entire watershed lies within the Huron-Erie Lake Plains (HELP) ecoregion. A HELP ecoregion is characterized by a broad, fertile, nearly flat ***plain*** punctuated by relic sand dunes, beach ridges, and end moraines. (USGS). The soil classification data for the **Pike Run-Blanchard River HUC-12** can be found on the next page in Map 2.1.



Map 2.1: Classification of Soil Types within the Pike Run-Blanchard River HUC-12 (Reynolds)

There are 73 different soil types within the **Pike Run-Blanchard River HUC-12**. Nearly 50% of the soils come from four separate soil series. The series are described as follows:

1. Paulding Series (2,840 acres) – The Paulding Series consists of very deep, poorly drained soils which consist of moderately deep or deep to dense clayey lacustrine material. These soils form in clayey glaciolacustrine deposits. They occur on lake plains and till-floored lake plains.
2. Toledo Series (2,603 acres) – The Toledo Series consists of very deep, poorly drained soils formed in clayey glaciolacustrine sediments. These soils occur on lake plains and have a slope which ranges from 0 – 2%.
3. Fulton Series (3,000 acres) – The Fulton Series consists of very deep, somewhat poorly drained soils which occur on lake plains. They are formed in clayey glaciolacustrine sediments and have a slope ranging from 0 - 6%.
4. Hoytville Series (1,200 acres) – The Hoytville Series consists of very deep, poorly drained soils that are deep or very deep to dense till. They are formed in clayey till and occur on wave-worked till plains, nearshore zones, and water-lain moraines, with a slope ranging from 0 – 1% (USDS, NRCS).

2.1.2 Land Use and Protection

As shown in Table 2.1, 78.50% of the **Pike Run-Blanchard River HUC-12** is used for agricultural cropland. As with most of the agricultural area in the Blanchard River Watershed, corn and soybeans are the two dominant crops being grown (USDA 2015). Approximately 2,657.48 acres (14.5% of the watershed) are being used for residential, retail, and manufacturing areas.

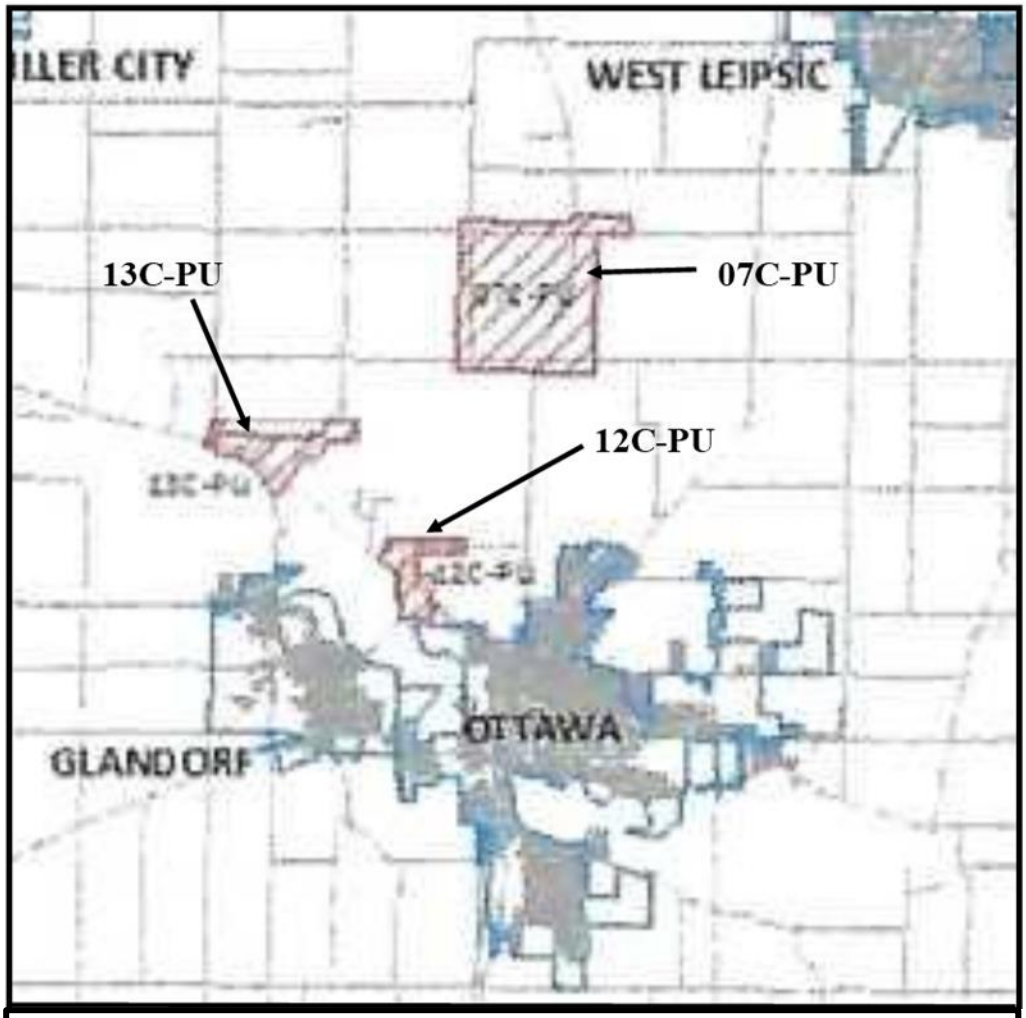
Table 2.1: Land Use in the Pike Run-Blanchard River HUC-12

Land Use	Miles^2	Acres	% of Watershed
Cropland	22.48	14,387.07	78.50%
Deciduous Forest	1.15	733.10	4.00%
Developed	4.15	2,657.48	14.50%
Pasture/Grassland	0.57	366.55	2.00%
Other	0.29	183.27	1.00%
Total	**28.64**	**18,327.47**	**100.00%**

The main transportation corridor in the watershed includes State Route 224, which runs in an east-west direction through the watershed. State Route 15 piggy-backs on State Route 224 from Findlay west to Ottawa before running to the northwest towards Defiance. State Route 65 runs in a north-south direction through the watershed. The only railroad track in the watershed runs in a northerly direction through the center of the Village of Ottawa. These transportation corridors present areas of potential stormwater pollution from normal spills and droppings.

There are three public parks in the Village of Ottawa and one park in the Village of Glandorf. Additionally, the Ottawa Glandorf School District is in the Village of Ottawa.

The population in the **Pike Run-Blanchard River HUC-12** is estimated to be 3,407 with 422 housing units, as reported in the 2018 Plan Maintenance and Targeted Water Quality Planning - Toledo Metropolitan Area Council of Governments (TMACOG) 2018 Report. The report also identified three Critical Sewage Areas in the watershed. Map 2.2 on the next page shows the location of these three areas. Table 2.2 on the next page summarizes the three areas.



Map 2.2: Critical Sewage Areas in the Pike Run-Blanchard River HUC-12 (TMACOG)

Table 2.2: Critical Sewage Areas in the Pike Run-Blanchard River HUC-12

Location	ID Number	Description
New Cleveland	07C-PU	>50 homes, businesses
State Route 15 / CR I-9	12C-PU	>55 homes, businesses
State Route 15 / CR 11	13C-PU	>45 homes, campground

Source: 208 Plan Maintenance and Targeted Water Quality Planning - Toledo Metropolitan Area Council of Governments (TMACOG) 2018 Report

2.2 Summary of Pike Run-Blanchard River HUC-12 Biological Trends

The **Pike Run-Blanchard HUC-12** was sampled starting in 2005 and reported in 2007 and 2009 as a part of the Ohio EPA's *2007 Technical Support Data Report* and the *2009 Total Maximum Daily Load Report* (TMDL*)* respectively. The data found in these two reports was used extensively in preparation of the **Pike Run-Blanchard River Creek HUC-12** NPS-IS Plan. The habitat and biological data presented in this plan are from these reports collectively.

Table 2.3 below summarizes the causes and sources of impairment to the biological community in the **Pike Run-Blanchard River HUC-12**, based on the 2018 Ohio Integrated Water Quality Report.

Table 2.3: Causes and Sources of Impairment in the Pike Run-Blanchard River HUC-12

Causes	Sources
• Organic enrichment (sewage) biological indicators • Sedimentation/siltation • Ammonia (total) • Oxygen (dissolved) • Phosphorous (total)	• Agriculture Practices – crop production with subsurface drainage • Channelization • Municipal point source discharge

2.2.1 Sediment and stream habitat

There was **no** Characterization of Sediment study done in the **Pike Run-Blanchard River HUC-12** watershed during the 2005 TMDL study.

2.2.2 Macroinvertebrates (Invertebrate Community Index [ICI])

According to the 2009 TMDL report and the 2018 OEPA Integrated Water Quality Report, the macroinvertebrate community in the **Pike Run-Blanchard River HUC-12** reflects an impaired aquatic resource.

Table 2.4 on the following page summarizes the macroinvertebrate data collected during the 2005 TMDL study. As shown in Table 2.4, the three sites studied on the Blanchard River have a Quality EPT score which reflects good conditions, while the site on Pike Run reflects poor conditions.

Table 2.4: Macroinvertebrate Data Results for the Pike Run-Blanchard River HUC-12				
River Mile (drainage area mi^2)	**# Qualitative Taxa**	**Total Taxa**	**ICI[b]**	**Quality EPT**
Blanchard River RM 28.90 at Co. Rd. 8	42	42	nr	16
Blanchard River RM 22.50 upstream of Ottawa WWTS	25	25	nr	13
Blanchard River RM 21.70	24	24	42	10
Pike Run RM 0.70	14	14	nr	0

Source: 2005 TMDL Study

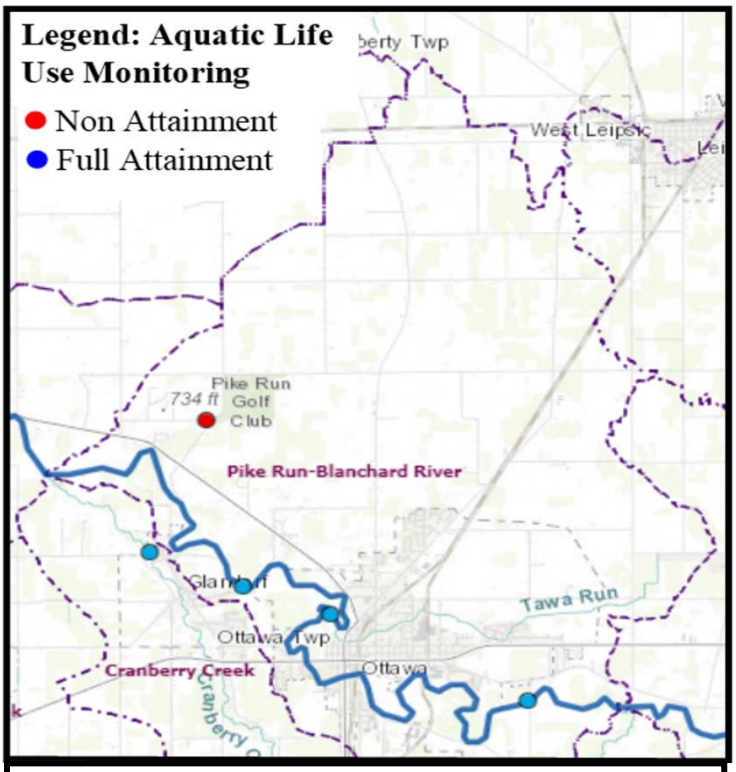
b - A narrative evaluation of the qualitative sample based on attributes such as community composition, EPT taxa richness, and number of sensitivity taxa were used when quantitative data were not available or considered unreliable due to current velocities less than 0.3 fps flowing over artificial substrates.

ns – Nonsignificant departure from biocriteria (≤4 IBI or ICI units, or ≤0.5 units)

* - Indicates significant departure from the applicable biocriteria (>4 IBI or ICI units, or >0.5 Mlwb Units. Underlined scores are in the Poor or Very Poor range.

2.2.3 Habitat (via Qualitative Habitat Evaluation Index [QHEI]

The OEPA sampling teams collected data related to water quality and habitat characteristics during the 2005 study. There were four sites studied in the **Pike Run-Blanchard River HUC-12**; three of which were along the Blanchard River, and a fourth site which was on Pike Run. The three sites on the Blanchard River were in full attainment, while the site on Pike Run was in non-attainment. All four sites were located within the HELP ecoregion. Map 2.3 on the next page shows the location and attainment status for each site, and Table 2.5 on page 15 provides a summary of the Aquatic Assessment Score for the **Pike Run-Blanchard River HUC-12**. With an QHEI score of 51 at both the Pike Run site and the Blanchard River site at RM 21.70, one of the goals in restoring the water quality of the **Pike Run-Blanchard River HUC-12** will be to raise the QHEI score to at least 60 at both sites.



Map 2.3: Location and Attainment Status of Selected Pike-Run Blanchard River HUC-12 Sites (2018 Ohio Integrated Water Quality Report)

Table 2.5 Summary of Aquatic Assessment Score for the Pike Run-Blanchard River HUC-12							
RM (Drainage Area(mi^2))	**IBI***	**Mlwb[a]**	**ICI[b]**	**Status[c]**	**QHEI**	**Causes**	**Sources**
Pike Run RM 0.70 (5.1)	28*	nr	P*	Non	51	Organic enrichment/DO, ammonia, nutrients, siltation	Package plant WWTP, channelization, crop production
Blanchard River RM 28.90 at Co. Rd. 8 (684)	38	9.7	VG	Full	60		
Blanchard River RM 22.50 Upstream of Ottawa WTTP (627)	36	9.1	MG^{ns}	Full	62		
Blanchard River RM 21.70 (638)	34	9.1	42	Full	51		

* - Significant departure from applicable biocriteria (> 4 IBI or ICI units, or > 0.5 Mlwb).
a - Mlwb is applicable to headwater streams with drainage area ≤ 20 mi^2.
b - A narrative evaluation of the qualitative sample based on attributes such as community composition, EPT taxa richness and number of sensitive taxa was used when qualitative data were not available or considered unreliable due to current velocities less than 0.3 fps flowing artificial substrate.
c – Attainment status based on a single organism group is parenthetically expressed.
ns – Nonsignificant departure from biocriteria (≤ 4 IBI or ICI units, or > 0.5 Mlwb).

Table 2.6 Summary of Fish Population – Pike Run-Blanchard River HUC-12							
River / Stream	**River Mile**	**Number Species**	**Tolerance to Pollution by Species**				
			T	**MT**	**M**	**MI**	**I**
Blanchard River (nr)	27.70	30	9	3	10	3	1
Blanchard River (627)	23.00	23	9	2	1	3	1
Blanchard River at TR I-9 (nr)	21.10	25	7	5	6	3	2
Pike Run (nr)	0.70	13	9	2	0	0	0

T – tolerant; MT – moderately tolerant; M – intermediate; MI – moderately intolerant; I - intolerant

2.2.4 Fishes (Modified Index of Well Being [Mlwb] & Index Biotic Integrity [IBI]

The fish population study was conducted at 3 sites on the Blanchard River during August and October of 2005 as a part of the TMDL Study. The site on Pike Run was studied only once in September 2005. Table 2.6 above summarizes the results of the study based on their tolerance to pollution. The sites at RM 23.0 and on Pike Run (RM 0.70) shows the largest percent of species were either tolerant or moderately tolerant to pollution. The sites on the Blanchard River at RM 23.0 and RM 21.10 shows the largest percent of species were between Tolerant to Moderate for pollution.

2.3 Summary of NPS Pollution Causes and Associates Sources for the Upper Eagle Creek HUC-12

The 2018 Integrated Water Quality Monitoring and Assessment Report published by the Ohio EPA reported that the aquatic life use impairments in the **Pike Run-Blanchard River HUC-12** were organic enrichment (sewage) biological indicators, sedimentation/siltation, total ammonia, dissolved oxygen, and total phosphorus. The listed sources for the impairments were municipal point source discharges, channelization, and crop production with subsurface drainage. The watershed was designated as WWH.

The TMDL report indicates that Recreational Use Attainment in the watershed is impaired due to bacteria. The Village of Ottawa uses the Blanchard River as its source of drinking water.

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, natural sources, and failing HSTS (Table 2.7). 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 2.7: Estimated Spring Nutrient Loadings from Contributing NPS Sources in the Pike Run-Blanchard River HUC-12

	Agricultural Load (lbs)	Developed/Urban Load (lbs)	Natural Load (lbs)	HSTS Load (lbs)	NPS Total (lbs)
Current Estimates*	12,000	1.200	100	860	14,000
Target Estimates*	7,200	720	<60	516	8,400
(Source: Draft DAP 2.0) **Estimated using two significant figures*					

Chapter 3: Critical Area Conditions & Restoration Strategies

3.1 Overview of Critical Areas

During the TMDL Study conducted by the OEPA in 2005, there were four sites studied in the **Pike Run-Blanchard River HUC-12** watershed. The three sites on the Blanchard River reached ***Full Attainment*** levels for a WWH set by the EPA, although the site at RM 21.20 only had a QHEI score of 51. The site on Pike Run at RM 0.70 was in ***non-attainment***. According to the 2018 Ohio Water Quality Integrated Report, the causes and sources of impairment are shown in Table 3.1 below. ***NOTE:*** the source of impairment from municipal point source discharge is not a ***nonpoint source*** and will not be addressed in this NPS-IS Plan. The remaining two sources listed are the result of agricultural activities in the watershed. As a result, there will only be one identified critical area.

Table 3.1: Causes and Sources of Impairment in the Upper Eagle Creek HUC-12 Watershed

Causes of Impairment	Sources of Impairment
1. Low flow alteration 2. Organic Enrichment (sewage) biological indicators 3. Nutrient / eutrophication biological indicators 4. Total phosphorus	1. Crop production with subsurface drainage 2. Channelization

Critical Area 1 will be identified within the **Pike Run-Blanchard River HUC-12 Watershed** as the area of cropland. Cropland production with subsurface drainage involves 78.5% of the watershed, or 14,387.07 acres. The nutrient loadings in this critical area will address far-field effects of nutrients in Lake Erie, due to the fact that water from Pike Run eventually flows into Lake Erie by way of the Maumee River in Toledo. Additionally, implementation of Best Management Practices (BMPs) in the watershed will also benefit the near-field effects at the sampling sites in the watershed.

The OEPA has estimated spring phosphorus loadings from HUC-12 watersheds in the Blanchard River Watershed and throughout the Western Lake Erie Basin (WLEB) watershed. Table 3.2 on the next page summarizes these loadings from contributing sources of NPS pollutants. Efforts to reduce nutrient loadings from each of these sources will be based on the goal of reaching the 40% reduction outlined by Annex 4 of the GLWQA and the Ohio DAP.

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

Agricultural Lands

3.2.1 Detailed Characterization

Several studies, including the Ohio's Nutrient Mass Balance Study (OEPA, 2018c), estimated that nearly 88% of the nutrient loadings to Lake Erie from the Maumee River were primarily from land use activities. According to the OEPA and the NRCS, 69 – 71% of land use is cropland. With the dominance of agricultural land use throughout the WLEB watershed, it is only logical to focus on the use of BMPs on agricultural operations to reduce the nutrient loading to local waterways and drainage ditches through surface and tile flow. Although BMPs would be beneficial on all cropland, the focus will be on cropland that is located within 500 feet of any waterway. This area will be Priority Area 1. Priority Area 2 will include all the remaining land in the watershed. Map 3.1 on the next page shows the locations of the two priority areas.

Table 3.2: Pike Run-Blanchard River HUC-12 Critical Area 1 Descriptions

Critical Area Number	Critical Area Description	Impairments Addressed
1	Nutrient Reduction in Prioritized Agricultural Lands	Near-field benefits in the Cranberry Creek HUC-10, with additional far-field benefits (Lake Erie)

Of the 14,387.07 acres of cropland in the **Pike Run-Blanchard River HUC-12**, the hierarchy of priority with be based on the following criteria:

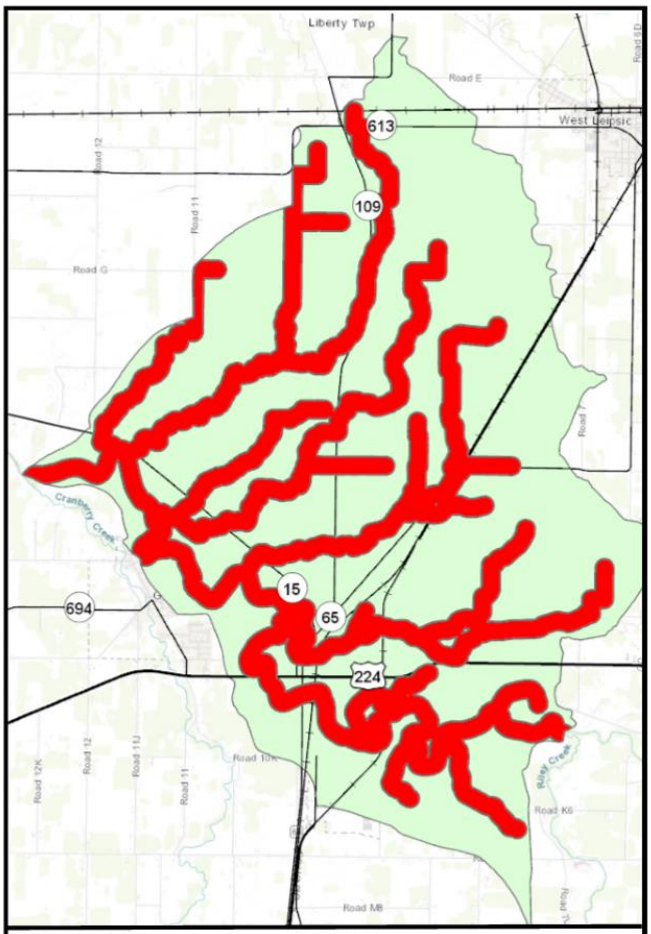
Critical Area 1a: Cropland located upstream of Pike Run RM. 0.7

- Lands within 500 feet of a stream or drainage waterway;
- Lands with high soil phosphorus levels (>40 ppm Mehlich);
- Lands without a current (<3 years) nutrient management plan; and
- Lands currently not using conservation tillage techniques and/or cover crops.

Critical Area 1b: remaining cropland in Pike Run watershed

- Lands within 500 feet of a stream or drainage waterway;
- Lands with high soil phosphorus levels (>40 ppm Mehlich);
- Lands without a current (<3 years) nutrient management plan; and
- Lands currently not using conservation tillage techniques and/or cover crops.

From a far-field perspective, crop production in the watershed is responsible for contributing excessive phosphorus loading to Lake Erie, which results in eutrophication and HABs. The use of a specific group of Best Management Practices (BMPs) on private agricultural lands can help to reduce the amount and concentration of phosphorus loading from both surface and tile runoff. Additionally, the suggested BMPs in this NPS-IS plan will help reduce sediment and nitrate/nitrite loadings, and will therefore benefit the near-field waterways.



Map 3.1: Priority Areas in Critical Area 1

3.2.2 Outline Goals and Objectives for Critical Area 1

The main goal of any NPS-IS Plan is to improve the water quality scores and/or the nutrient reduction goals in order to raise the water quality scores to reach attainment for the HUC-12 watershed. Critical Area 1 goals will focus on reduction of the excessive phosphorus loading from the agricultural fields which is contributing to the far-field impairment to the local waterways that flow to Lake Erie. The GLWQA Annex 4 and the DAP for the state of Ohio have set target loads for the Maumee River, which is fed by water from the Blanchard River by way of

the Auglaize River. The target loads have been set at a level that is 40% lower than the average load measured at the Waterville site on the Maumee River in 2008. The Ohio Nutrient Mass Balance Study has shown that most of the nutrient load to Lake Erie occurs during the springtime rains (OEPA, 2018c). While this critical area is focused on the loss of phosphorus, a mutual benefit of reducing sediment and nitrate/nitrites in the **Pike Run-Blanchard River HUC-12** should result as well.

The objectives proposed within the **Pike Run-Blanchard River HUC-12** NPS-IS Plan align with the priorities of the H2Ohio initiative; a water quality initiative seeking to reduce phosphorus. H2Ohio will provide cost-share incentives to producers who develop nutrient management plans and implement cost-efficient and effective BMPs that include: soil testing, variable rate (precision) fertilization, subsurface nutrient application, manure incorporation, cover crops, conservation crop rotation, water controlled structures, two-stage ditches, edge of field buffers, and headwaters and coastal wetlands that reduce agricultural runoff (H2Ohio, 2019).

Goals for Critical Area 1:

The OEPA has set phosphorus reduction goals for each associated source, based on springtime load estimates. To achieve the desired phosphorus reduction from agricultural land use in the **Pike Run-Blanchard River HUC-12**, the following goals have been created:

Goal 1: Reduce springtime phosphorus loading in Critical Area 1 to 7,200 lbs./yr. or below (40% reduction).
NOT ACHIEVED: Current estimated load contribution is 12,000 lbs./yr.

Goal 2: Raise the QHEI score at RM 21.70 on the Blanchard River to at least 60.
NOT ACIEVED: QHEI score reported in the TMDL 2009 Report was 51.

Goal 3: Raise the QHEI score at RM 0.07 on Pike Run to at least 60.
NOT ACIEVED: QHEI scorer reported in the TMDL 2009 Report was 51.

Objectives for Critical Area 1:

In order to improve the water quality enough to reach the goal of reducing springtime phosphorus loading by 4,800 lbs./yr. for the **Pike Run-Blanchard River HUC-12**, establishment of BMPs following the hierarchy proposed for Critical Area 1 will need to be followed. Establishing these BMPs should have both near-field and far-field effects in the WLEB. The following objectives proposed are:

Objective 1: Reduce soil and nutrient loss through the installation of grassed waterways that treat surface water from at least 500 acres.

Objective 2: Implement nutrient management plans on at least 2,000 acres.

Objective 3: Establish cover crops on at least 4,000 acres annually.

Objective 4: Establish conservation tillage on at least 4,000 acres annually.

Objective 5: Install phosphorus filters to treat at least 500 acres of cropland.

Table 3.3: Estimated Nutrient Loading Reduction from Each Objective

Objective Number	Best Management Practice	Total Acreage Treated	Estimated Annual Phosphorus Load Reduction (lbs)	Estimated Spring Phosphorus Load Reduction (lbs)
1	Grassed Waterway	500	245	102
2	Nutrient Management Plans	4,000	4,400	1,830
3	Cover Crops	6,000	2,400	1,000
4	Conservation Tillage	6,000	4,200	1,747
5	Phosphorus Filters	500	190	80
6	Water Controlled Structure	200	250	104
Total		**16,200***	**4,863**	**4,863**

Objective 6: Install water-controlled drainage structures to manage water runoff through the tile on 200 acres. (10 structures installed, averaging 20 acres of drainage per structure).

These objectives will be implemented following the prioritized hierarchy outlined above to reduce the springtime phosphorus loadings in the **Pike Run-Blanchard River HUC-12** to reach the 40% reduction goal. The implementation of the BMPs presented in these objectives, along with BMPs implemented through other state programs, federal programs, and voluntary efforts will be tracked to monitor progress towards reaching the phosphorus reduction goals.

Chapter 4: Critical Area Conditions & Restoration Strategies

4.1 Projects and Implementation Strategy Overview Table(s) (Overview Table)

As noted in Chapter 2, **Pike Run-Blanchard River HUC-12** impairments are mainly due to agriculture activities in the watershed. This chapter will discuss the projects and evaluations required to restore the watershed as much as possible.

On the following pages are the projects and guidelines believed to be needed to improve the conditions in the **Pike Run-Blanchard River HUC - 12 watershed**. These projects will allow for the nutrient reduction goals of the TMDL Study to be met for the springtime phosphorus loadings recommended by the OEPA. It will be necessary to periodically reevaluate the status of the critical areas to determine if the projects are reaching the goals for the 40% reduction of phosphorus in the Ohio DAP, and the water quality score for QHEI outlined in the TMDL Report.

There is only one Critical Area identified in the **Pike Run-Blanchard River HUC-12**. Project and Implementation Strategy Overview Tables have been created for this area (subsections 4.2 and 4.3). Project Summary Sheets (PSS) provide the nine elements adopted by the OEPA for the projects that have been developed that are short term (1-3 years). Any longer-term projects will have a project summary sheet created and sent to the OEPA for approval when the project becomes short term. If during implementation additional problems are identified, additional tables/projects will be developed. Any new PSS will be submitted to the OEPA for verification and funding eligibility.

4.1.1 Project Summary Sheet(s)

Table 4.1 on the next page summarizes the Project and Implementation Strategy Overview Table for Critical Area 1. The table summarizes the projects needed for restoration of the nonpoint source impairments identified in the TMDL Report and the 2018 Ohio Integrated Water Quality Report for the **Pike Run-Blanchard River HUC-12**. Only the projects listed in the Project Summary Sheets will be eligible for state and federal funding.

4.1 Critical Area 1 Project and Implementation Strategy Overview Tables

Table 4.1: Critical Area 1 – Project Overview Table for the Pike Run-Blanchard River-HUC-12 (04100008 06 02)							
Goal	**Objectives**	**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 Nutrition Reduction Strategies							
Altered Stream and Habitat Restoration Strategies							
Agricultural Nonpoint Source Reduction Strategies							
1, 2, 3	1	1	Install grassed waterways	Putnam SWCD	Short Term (1-3 years)	$20,000	OEPA 319, H2Ohio, GLC, NRCS-USDA, GLRI
1, 2, 3	2	2	Create Nutrient Management Plans	Putnam SWCD	Short Term (1-3 years)	$1.220,000	H2Ohio, GLC, NRCS-USDA, GLRI
1, 2, 3	3	3	Establish Cover crops	Putnam SWCD	Short Term (1-3 years)	$300,000	OEPA 319, H2Ohio, GLC, NRCS-USDA, GLRI
1, 2, 3	4	4	Establish Conservation Tillage	Putnam SWCD	Short Term (1-3 years)	$120,000	OEPA 319, H2Ohio, GLC, NRCS-USDA, GLRI
1, 2, 3	5	5	Install Phosphorus Filters	Putnam SWCD	Short Term (1-3 years)	$50-80,000	OEPA 319, H2Ohio, GLC, NRCS-USDA, GLRI
1, 2, 3	6	6	Install Water Control Drainage Structures	Putnam SWCD	Short Term (1-3 years)	$50,000	OEPA 319, H2Ohio, GLC, NRCS-USDA, GLRI
High Quality Water Production Strategies							
Other NPS Causes and Associated Sources of Impairment							

4.2 Project Summary Sheet Critical Area 1

Table 4.2: Project Summary Sheet Critical Area 1 Project 1: Grassed Waterways		
Nine Element Criteria	**Information needed**	**Explanation**
n/a	**Title**	Establishing Grassed Waterways to reduce phosphorus loading
criteria d	**Project Lead Organization & Partners**	Putnam SWCD NRCS, USDA, BRWP
criteria c	**HUC-12 and Critical Area**	Pike Run-Blanchard River HUC-12 (04100008 06 02) – Critical Area 1
criteria c	**Location of Project**	Around Ottawa, OH on cropland
n/a	**Which strategy is being addressed by this project?**	Agricultural Nonpoint Source Reduction
criteria f	**Time Frame**	Short term (1-3 years)
criteria g	**Short Description**	Over the course of three years, 500 acres minimum of grassed waterways will be installed. During the first year, 150 acres of grassed waterways will be installed. During the second year, an additional 150 acres of grassed waterways will be installed. In the third year, a minimum of 50 acres of grassed waterways will be installed.
criteria g	**Project Narrative**	The lead organizations will work with local landowners who have expressed interest in installing grassed waterways on their cropland fields that show gully erosion from surface runoff during rain or snow melting events. The grassed waterways will be designed by the organization in charge to receive/treat surface water runoff. The installed grassed waterways will treat at least 500 acres of cropland.
criteria d	**Estimated Total Cost**	$20,000
criteria d	**Possible Funding Source(s)**	OEPA 319, H2Ohio, GLC, NRCS-USDA, GLRI
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?**	To meet the goal of reducing springtime phosphorus loading by 40%, as recommended by the Ohio DAP, a reduction of 4,800 pounds per year would be required.

Table 4.2: Project Summary Sheet Critical Area 1 Project 1: Grassed Waterways cont.		
Nine Element Criteria	**Information needed**	**Explanation**
	Part 3: Load Reduced?	Estimated annual reduction: 245 pounds of phosphorus and 7,564 pounds Nitrogen
criteria i	**How will the effectiveness of this project in addressing the NPS impairment be measured?**	It is unrealistic to monitor load reduction from individual agricultural practices. Several organizations, such as the OEPA, NCWQR, USGE, and NOAA, are conducting monitoring throughout the WLEB. The Putnam SWCD will conduct follow-up activities, when necessary, to document nutrient loadings.
criteria e	**Information and Education**	Project information will be shared by the Putnam SWCD and the BRWP at their annual meeting and in their newsletter to inform stakeholders of progress and accomplishments. The information will also be available on their websites and Facebook pages.
	Part 2: How much of the needed improvement for the whole Critical Area is estimated to be accomplished by this project?	Installing grassed waterways to treat at least 500 acres should reduce springtime phosphorus loading by 245 pounds per year or 5.1%

Table 4.3: Project Summary Sheet Critical Area 1 Project 2: Nutrient Management Plans		
Nine Element Criteria	**Information needed**	**Explanation**
n/a	**Title**	Nutrient Management Plans
criteria d	**Project Lead Organization & Partners**	Putnam SWCD, NRCS, USDA, BRWP
criteria c	**HUC-12 and Critical Area**	Pike Run-Blanchard River HUC-12 (04100008 06 02) – Critical Area 1
criteria c	**Location of Project**	Southwest of Arlington, OH on cropland
n/a	**Which strategy is being addressed by this project?**	Agricultural Nonpoint Source Reduction
criteria f	**Time Frame**	Short term (1-3 years)
criteria g	**Short Description**	Create nutrient management plans
criteria g	**Project Narrative**	The TMDL Report for the Blanchard River watershed states that the Pike Run-Blanchard River HUC-12 impairments are related to the agricultural uses in growing crops. The lead organizations will work with local landowners to create nutrient management plans for fields that total 2,000 acres in the prioritized areas. The plans will use soil testing (1st & 3rd year), precision fertilization, cover crops, and conservation tillage over a three-year period to meet the load reduction goals. The goal of the project is to involve at least 4,000 acres that will reduce the loading of spring phosphorus by an estimated 1,830 pounds per year.
criteria d	**Estimated Total Cost**	$1,220,000

Table 4.3: Project Summary Sheet Critical Area 1 Project 2: Nutrient Management Plans cont.		
Nine Element Criteria	**Information needed**	**Explanation**
criteria d	**Possible Funding Source(s)**	H2Ohio, GLC, NRCS-USDA, GLRI
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?**	To meet the goal of reducing springtime phosphorus loading by 40%, as recommended by the Ohio DAP, a reduction of 4,800 pounds per year would be required.
	Part 2: How much of the needed improvement for the whole Critical Area is estimated to be accomplished by this project?	Implementing nutrient management plans to treat 4,000 acres should reduce spring phosphorus loading by 1,830 pounds, which would be 38.1% of the goal.
	Part 3: Load Reduced?	Estimated annual reduction: 4,400 pounds of phosphorus and 141,900 pounds Nitrogen
criteria i	**How will the effectiveness of this project in addressing the NPS impairment be measured?**	It is unrealistic to monitor load reduction from individual agricultural practices. Several organizations, such as the OEPA, NCWQR, USGE, and NOAA, are conducting monitoring throughout the WLEB. The Putnam SWCD will conduct follow-up activities, when necessary, to document nutrient loadings.
criteria e	**Information and Education**	Project information will be shared by the Putnam SWCD and the BRWP at their annual meeting and in their newsletter to inform stakeholders of progress and accomplishments. The information will also be available on their websites and Facebook pages.

Table 4.4: Project Summary Sheet Critical Area 1 Project 3: Conservation Tillage		
Nine Element Criteria	**Information needed**	**Explanation**
n/a	**Title**	Establishing Conservation Tillage
criteria d	**Project Lead Organization & Partners**	Putnam SWCD, NRCS, USDA, BRWP
criteria c	**HUC-12 and Critical Area**	Pike Run-Blanchard HUC-12 (04100008 06 02) – Critical Area 1
criteria c	**Location of Project**	Around Ottawa, OH on cropland
n/a	**Which strategy is being addressed by this project?**	Agricultural Nonpoint Source Reduction
criteria f	**Time Frame**	Short Term (1-3 years)
criteria g	**Short Description**	Enroll 6,000 acres in conservation tillage. 2,000 acres of cropland will be enrolled in conservation tillage per year over the course of a three-year period.
criteria g	**Project Narrative**	The lead organizations will work will local landowners to establish conservation tillage on cropland that is not enrolled under a nutrient management plan. Conservation tillage leaves the crop residue on the field before and after planting the next crop, thus keeping the soil in place and helping to prevent nutrients from being lost from the field. This is very useful in reducing nutrient loading. 2,000 acres will be enrolled in conservation tillage per year.
criteria d	**Estimated Total Cost**	$120,000
criteria d	**Possible Funding Source**	OEPA 319, H2Ohio, GLC, GLRI, NRCS-USDA CRP
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?**	To meet the goal of reducing springtime phosphorus loading by 40%, as recommended by the Ohio DAP, a reduction of 4,800 pounds per year would be required.
	Part 2: How much of the needed improvement for the whole Critical Area is estimated to be accomplished by this project?	By establishing conservation tillage on 6,000 acres, there will be an estimated reduction of 1,747 pounds on spring phosphorus loading, or 36.4% of the spring reduction goal of 4,800 pounds per year.

Table 4.4: Project Summary Sheet Critical Area 1 Project 3: Conservation Tillage cont.		
Nine Element Criteria	**Information needed**	**Explanation**
criteria b & h	**Part 3: Load Reduced?**	Estimated annual reduction: 4,200 pounds of phosphorus and 76,200 pounds Nitrogen
criteria i	**How will the effectiveness of this project in addressing the NPS impairment be measured?**	It is unrealistic to monitor load reduction from individual agricultural practices. Several organizations, such as the OEPA, NCWQR, USGE, and NOAA, are conducting monitoring throughout the WLEB. The Putnam SWCD will conduct follow-up activities, when necessary, to document nutrient loadings.
criteria e	**Information and Education**	Project information will be shared by the Putnam SWCD and the BRWP at their annual meeting and in their newsletter to inform stakeholders of progress and accomplishments. The information will also be available on their websites and Facebook pages.

Table 4.5: Project Summary Critical Area 1 Project 4: Phosphorus Filter		
Nine Element Criteria	**Information needed**	**Explanation**
n/a	**Title**	Installing Phosphorus Filters
criteria d	**Project Lead Organization & Partners**	Putnam SWCD, NRCS, USDA, BRWP
criteria c	**HUC-12 and Critical Area**	Pike Run-Blanchard River HUC-12 (04100008 06 02) – Critical Area 1
criteria c	**Location of Project**	Around Ottawa, OH on cropland
n/a	**Which strategy is being addressed by this project?**	Agricultural Nonpoint Source Reduction
criteria g	**Short Description**	Install at least four phosphorus filters on tile or in a waterway to treat water flowing from at least 500 acres of cropland.
criteria g	**Project Narrative**	The BRWP in partnership with the lead organizations, will work with local landowners who are interested in installing phosphorus filters on tile or in a waterway on their property, to treat water flowing from cropland. Landowners with cropland closest to Pike Run and its main tributaries will be prioritized. These phosphorus filters will be installed over the course of 1-3 years. Runoff from the cropland with installed filters will be tested by the BRWP to monitor phosphorus levels. 500 acres of cropland will be treated per year

Table 4.6: Project Summary Critical Area 1 Project 5: Phosphorus Filter cont.		
Nine Element Criteria	**Information needed**	**Explanation**
criteria d	**Estimated Total Cost**	$50,000 – $80,000
criteria d	**Possible Funding Source**	OEPA 319, H2Ohio, GLC, GLRI, NRCS-USDA CRP
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?**	To meet the goal of reducing springtime phosphorus loading by 40%, as recommended by the Ohio DAP, would require a reduction of 4,800 pounds per year.
	Part 2: How much of the needed improvement for the whole Critical Area is estimated to be accomplished by this project?	By installing phosphorus filters to treat at least 500 acres, there will be an estimated 80-pound reduction on spring phosphorus loading, or 1.7% of the spring reduction goal of 4,800 pounds per year.
	Part 3: Load Reduced?	Estimated annual reduction: 190 pounds of phosphorus
criteria i	**How will the effectiveness of this project in addressing the NPS impairment be measured?**	It is unrealistic to monitor load reduction from individual agricultural practices. Several organizations, such as the OEPA, NCWQR, USGE, and NOAA are conducting monitoring throughout the WLEB. The Putnam SWCD will conduct follow-up activities, when necessary, to document nutrient loadings.
criteria e	**Information and Education**	Project information will be shared by the Putnam SWCD and the BRWP at their annual meeting and in their newsletter to inform stakeholders of progress and accomplishments. The information will also be available on their websites and Facebook pages.

Table 4.7: Project Summary Critical Area 1 Project 6: Water Controlled Structure		
Nine Element Criteria	**Information needed**	**Explanation**
n/a	**Title**	Installing Water Controlled Structures
criteria d	**Project Lead Organization & Partners**	Putnam SWCD, NRCS, USDA, BRWP
criteria c	**HUC-12 and Critical Area**	Pike Run-Blanchard River HUC-12 (04100008 06 02) – Critical Area 1
criteria c	**Location of Project**	Around Ottawa, OH on cropland
n/a	**Which strategy is being addressed by this project?**	Agricultural Nonpoint Source Reduction
criteria g	**Short Description**	Install a maximum of 20 Water-Controlled Drainage Structures to manage water runoff through the tile on 200 acres of cropland.
criteria g	**Project Narrative**	The BRWP will work with landowners who are interested in installing water-controlled drainage structures on their cropland. H2Ohio is looking for a minimum of 10 acres to be managed by each structure. This means that if 200 acres are to be managed, a maximum of 20 structures will need to be installed.
criteria d	**Estimated Total Cost**	$50,000
criteria d	**Possible Funding Source**	OEPA 319, H2Ohio, GLC, GLRI, NRCS-USDA CRP
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?**	To meet the goal of reducing springtime phosphorus loading by 40%, as recommended by the Ohio DAP, a reduction of 4,800 pounds per year would be required.
	Part 2: How much of the needed improvement for the whole Critical Area is estimated to be accomplished by this project?	By installing phosphorus filters to treat at least 200 acres, there will be an estimated 48-pound reduction on spring phosphorus loading, or 1.0% of the spring reduction goal of 4,800 pounds per year.
	Part 3: Load Reduced?	Estimated annual reduction: 190 pounds of phosphorus
criteria i	**How will the effectiveness of this project in addressing the NPS impairment be measured?**	It is unrealistic to monitor load reduction from individual agricultural practices. Several organizations, such as the OEPA, NCWQR, USGE, and NOAA, are conducting monitoring throughout the WLEB. The Putnam SWCD will conduct follow-up activities, when necessary, to document nutrient loadings.

Table 4.7: Project Summary Critical Area 1 Project 6: Water Controlled Structure Cont.		
Nine Element Criteria	**Information needed**	**Explanation**
criteria e	**Information and Education**	Project information will be shared by the Putnam SWCD and the BRWP at their annual meeting and in their newsletter to inform stakeholders of progress and accomplishments. The information will also be available on their websites and Facebook pages.

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