Pittenger Dam Removal
In-Lieu Fee Mitigation Plan

In partnership with
Cuyahoga Valley National Park

Cuyahoga Watershed (HUC 04110002)
Summit County, Ohio

View of Pittenger Notched Dam, Cuyahoga Valley National Park, Ohio © Dana Ohman

The Nature Conservancy
Ohio Mitigation In-Lieu Fee Program
6375 Riverside Drive, Suite 100
Dublin, Ohio 43017-5045

June 2019

Ohio Interagency Review Team

TABLE OF CONTENTS

INTRODUCTION 1
MITIGATION OBJECTIVES 1
SITE SELECTION 2
SITE PROTECTION INSTRUMENT 3
BASELINE INFORMATION 4
- HISTORIC LAND USE AND IMPACTS 4
- PHYSIOGRAPHY 5
- TOPOGRAPHY 5
- SOILS 6
- TERRESTRIAL RESOURCES 6
- AQUATIC RESOURCES 6

PROPOSED MITIGATION WORK PLAN 9
- DETERMINATION OF CREDITS 11
- CREDIT LEDGER 12

PERFORMANCE STANDARDS 12
MONITORING REQUIREMENTS 13
- ADAPTIVE MANAGEMENT PLAN 15
- PROPOSED MAINTENANCE PLAN 16
- LONG-TERM MANAGEMENT PLAN 16

CREDIT RELEASE SCHEDULE 17
FINANCIAL ASSURANCES 20
PROPERTY ASSURANCES 21
- PRELIMINARY TITLE REPORT 21
- WATER RIGHTS 21

RESPONSE TO IRT COMMENTS - DRAFT MITIGATION PLAN 21
DEFINITIONS 24
REFERENCES 27
LIST OF ACRONYMS 30

APPENDIX A: Figures 31
APPENDIX B: Site Evaluation Checklist 39
APPENDIX C: Stream Assessment Forms 43
APPENDIX D: Wetland Assessment Forms 55
APPENDIX E: Wetland Determination Forms 77
APPENDIX F: Site Photographs 94
APPENDIX G: Federally Listed Species 110
APPENDIX H: Site Protection 112

LIST OF TABLES

Table 1: Riverine Resources within the Mitigation Site 7
Table 2: Wetland Data for the Mitigaiton Site 9
Table 3: Stream Credit Estimates for the Mitigation Work Plan 12
Table 4: Monitoring Plan and Schedule 15
Table 5: Stream Credit Release Schedule 18

LIST OF FIGURES

Figure 1. Pittenger Dam Removal In-Lieu Fee Mitigation Site Location Map
Figure 2. Pittenger Dam Removal In-Lieu Fee Mitigation Project Vacinity Map
Figure 3. Pittenger Dam Removal In-Lieu Fee Mitigation Soils Map
Figure 4. Pittenger Dam Removal In-Lieu Fee Watershed Map
Figure 5. Pittenger Dam Removal Riverine and Terrestrial Resources Map
Figure 6. Pittenger Dam Removal Wetland and Terrestrial Resources Map
Figure 7. Pittenger Dam Removal In-Lieu Fee Proposed Mitigation Plan Map

INTRODUCTION

The mitigation plan provides an overview of proposed compensatory mitigation activities for the Pittenger Dam Removal In-Lieu Fee (ILF) Mitigation Project within the Cuyahoga watershed (Hydrologic Unit Code (HUC) 04110002) located in Summit County, Ohio (Appendix A, Figure 1). The site is located south of Quick Road and north of Wetmore Road in Boston Township (see adjacent map).

MITIGATION OBJECTIVES

The primary objectives of the Pittenger Dam Removal ILF Mitigation Project include the re-establishment and rehabilitation of streams, associated floodplain wetlands, and stream riparian buffers. Our goal is to institute an ecologically sound, well-developed and feasible restoration plan that would generate in-kind mitigation credits to replace advanced mitigation credits that have been sold in the Cuyahoga River Watershed (HUC 04110002) as compensation for activities authorized by the United States Army Corps of Engineers (USACE) and the Ohio Environmental Protection Agency (Ohio EPA) through the issuance of permits.

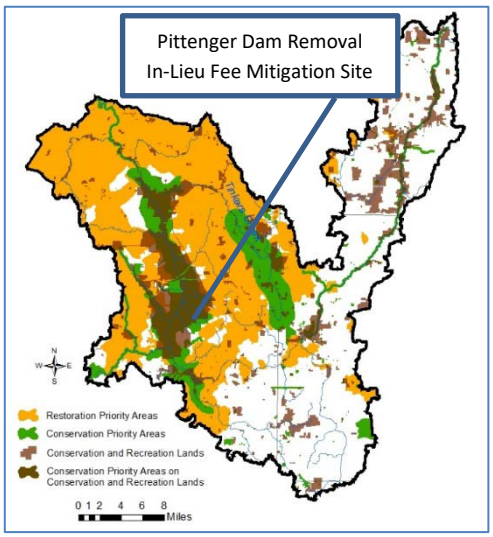
In-Lieu Fee Mitigation Site Location for the Cuyahoga Watershed

The proposed mitigation project will be able to provide an ecological lift to streams in the impacted 8 digit HUC watershed. Additionally, the site will be able to provide sustainable compensatory mitigation with minimal long-term maintenance and active management needs per 33 CFR 332.7(b).

If approved, the Pittenger Dam Removal In-Lieu Fee Mitigation Project will be designed, implemented, and managed to attain the following basic objectives:

- Restore and enhance streams to provide high quality aquatic habitat, improve water quality, regulate watershed hydrology, and attenuate runoff.
- Provide a diverse interspersion of restored habitat features and buffers.
- Provide an endowment for the long-term maintenance of the mitigation site.

CPF priorities for the Cuyahoga Watershed



SITE SELECTION

The objective of the watershed approach as described in the 2008 Compensatory Mitigation Rule "is to maintain and improve the quantity and quality of wetlands and other aquatic resources in watersheds through strategic selection of compensatory mitigation project sites." The Compensation Planning Framework (CPF) is to be used by ILF programs to "select, secure, and implement aquatic resource restoration, establishment, enhancement, and/or preservation activities" as described further in the Preamble to the Compensatory Mitigation for Losses of Aquatic Resources Rule (73 Fed. Reg. 19598 (Apr. 10, 2008).

The CPF developed by The Nature Conservancy (TNC) Ohio Mitigation Program (OMP) is used to establish a science-based conservation approach for setting goals and priorities within each HUC 8 watershed of Ohio. Element 6 of the OMP's CPF outlines the program's watershed approach. The map above shows the project location in relation to the CPF conservation priorities in the watershed.

While the CPF mapping provides a large-scale overview of the watershed and its conservation priorities, it is very important to also assess a potential project based on its specific, on-site characteristics. In order to better apply the CPF to a site-specific location, the OMP Site Evaluation Checklist was developed. Criteria that are assessed through the checklist include: watershed-based priorities, surrounding land use, special ecosystems present, and nearby conservation priorities. Appendix B contains the Site Evaluation and Selection Checklist for the Pittenger Dam Removal Project site.

The proposed Pittenger Dam Removal In-Lieu Fee Mitigation Project scored a 72 out of a possible 100 for the Site Score Metric (Appendix B). The project site met all of the mandatory conditions including permanent protection, in kind mitigation, and it is in the primary service area where credits have been sold. The highlights of the site are:

- located within a CPF priority area
- committed long-term manager identified
- would meet a TMDL strategy

The OMP Site Evaluation Checklist Stream Metric Score for the proposed mitigation site was 75 out of a possible 100 points based on the project's ability to correct adverse impacts caused by an earthen dam that was removed in 2014. The stream metric score received high marks because the cause of impairment is correctable and the restoration potential is high.

Based on the above qualifications, this project is an ecologically preferable option for this watershed.

SITE PROTECTION INSTRUMENT

The proposed project would occur within the Cuyahoga Valley National Park (CVNP) which is owned and operated by the U.S. National Park Service (NPS). As the US Army Corps of Engineers, *Site Protection Instrument Handbook* (2016) states, federal agencies cannot legally encumber federal land with a conservation easement or restrictive covenant. They are however authorized to use other tools to protect and manage compensatory mitigation sites on federal land. For the NPS the long-term protection requirement can be satisfied with a Memorandum of Understanding (MOU) or Conservation Land Use Agreement, together with the Park's Strategic Action Plan. A draft MOU and the CVNP Strategic Action Plan are included in Appendix H. TNC has worked with NPS staff to develop the MOU and it is being provided in this plan for the Interagency Review Team (IRT) review.

All five of the supporting visions of the CVNP Strategic Action Plan are focused on the natural resource protection and restoration of the Cuyahoga River watershed. Additionally, the Plan states that the Park Service is:

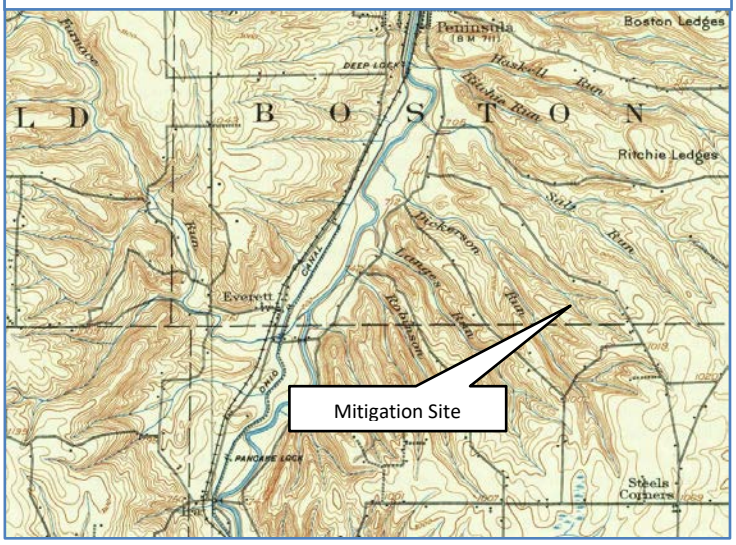
- Actively working with partners to enhance the river and watershed quality, disseminate information, and promote the health of the river; and
- Collaborating with stakeholders to develop plans and implement strategies to improve the resource conditions of the Cuyahoga River Watershed.

With the CVNP Strategic Action Plan and the MOU, CVNP will be specifically committing to the long-term protection of the Pittinger Dam Removal compensatory mitigation site.

BASELINE INFORMATION

HISTORIC LAND USE AND IMPACTS

1:62,500 USGS topographic map (Akron, Ohio; 1905) displaying location of proposed Cuyahoga Valley National Park Pittenger Dam Removal In-Lieu Fee mitigation site

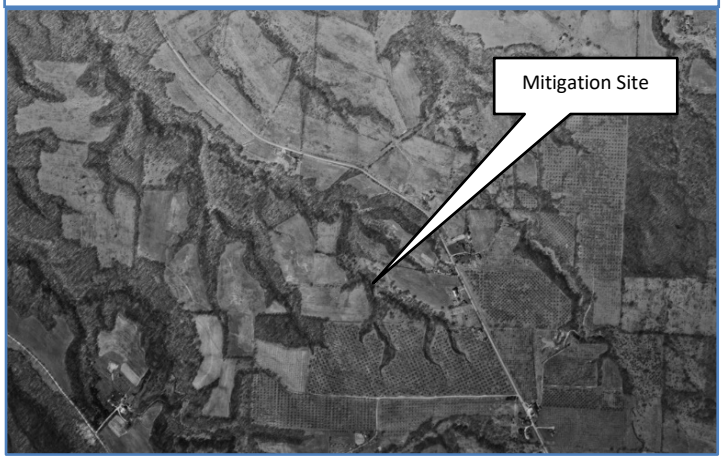


The project area was significantly altered through the creation of an earthen dam, earthen access road, historic cattle grazing, surrounding row crops, and past timber harvesting. The time frame for land alteration activites started in the early 1800's as a result of European settlements and has continued to the present. Through these historical land use activities, the stream has become disconnected from its flood plain due to downcutting and decades of sedimentation having been captured by the dam. This has resulted in a stream that has struggled to regain equilibrium and sections of the stream can no longer access the floodplain. The 1952 aerial photograph, located on the following page, illustrates that a second growth forest has started to become established since the property was incorporated as part of the Cuyahoga Valley National Park.

PHYSIOGRAPHY

The mitigation site is located in north central Summit County (Appendix A, Figure 1). The site lies within the Erie Drift Plain Erie Gorges (61d) Level IV Ecoregion. *"The Erie Gorges ecoregion is a uniquely steep, dissected area along the Chagrin, Cuyahoga, and Grand rivers. Local relief can exceed 500 feet, rock exposures occur, and fluvial erosion rates are high. Originally, mixed mesophytic forests were common on well-drained sites; today, woodland, recreational areas, scattered farms, and housing are dominant."* (Woods, et.al., 2012).

April 16, 1952 USGS aerial photograph of Cuyahoga Valley National Park Pittenger Dam Removal mitigation site showing mostly agricultural land use



The site is located on Late Wisconsinan (Late Woodfordian) ice deposits, approximately 18,000 to 14,000 years old, "Clayey till (Hiram till) occurs as hummocky ridges higher than adjacent terrain" (Ohio Department of Natural Resources-Division of Geological Survey, 2018). The pre-settlement vegetation of the area surrounding the In-Lieu Fee site was primarily mixed mesophytic and mixed oak forests (Gordon, 1966).

Based on information derived from the USGS 2006 National Land Cover Dataset (Homer, et.al., 2015), current land use within 3 miles of the proposed In-Lieu Fee site (Appendix A, Figure 2) is dominated by second growth forest (53.2%) and developed land (31.7%).

TOPOGRAPHY

The mitigation site topography is very steep adjacent to the stream's floodplain, which is gently sloping within the floodplain. The site is located near the mainstem of the Cuyahoga River and within the lower third of the watershed. The lowest section of the project site is the northern portion of the property where Stream 1 leaves the mitigation property. Figures 1 and 4 in Appendix A provide a topographic overview of the site.

SOILS

There are four soil types mapped by the United States Department of Agriculture (USDA) as being present within the study area (Soil Survey Staff, NRCS, accessed 2019). The acreage of each of the mapped soil types and their associated percentage makeup of the site can be found in Appendix A, Figure 3.

None of the soil types present are classified as being hydric, although it is likely that small hydric inclusions may be present that are generally too small to be mapped based on the resolution of the SSURGO (Soil Survey Geographic Database). The four mapped non-hydric soil types present are: Ellsworth silt loam, 2 to 6 percent slopes; Ellsworth silt loam, 6 to 12 percent slopes, moderately eroded; Glenford silt loam, 2 to 6 percent slopes; and Rough broken land, clay and silt.

TERRESTRIAL RESOURCES

Multiple site visits were conducted in the winter of 2018 and spring of 2019 to observe and collect information for a baseline assessment. The identified terrestrial habitat of the study area is second growth upland forest (Appendix A, Figures 5 and 6).

AQUATIC RESOURCES

Watershed

The watershed for this mitigation site is approximately 0.11 square miles in size and is 60.3% forested, 2.5% impervious surface, and has 22.1% of the land developed in an urban capacity (Appendix A, Figure 4). Stream 1, an unnamed tributary to Dickerson Run, is the dominant stream that flows through the mitigation site. Stream 1 flows northwest with it's confluence with Dickerson Run occurring 1.3 miles downstream. Dickerson Run's confluence with the Cuyahoga River occurs at stream mile 30.66 and it is categorized as occurring within the lower Cuyahoga River Watershed and within the Cuyahoga River Area of Concern. The stream flows from the project site and eventually drains into the Cuyahoga River, which is approximately 2.6 miles downstream of the project site. The Riverine Resources section provides more details.

Riverine Resources

Mad Scientist Associates, LLC delineated the waters of the US and evaluated functional assessments for the streams on-site using Ohio EPA's Headwater Habitat Evaluation Index (HHEI) (field forms are in Appendix C). Five streams were observed within the mitigation site (Appendix A, Figure 5). Two of these streams were ephemeral comprising 186 linear feet (lf) and the remaining three streams were intermittent

comprising 2,802 lf. Total linear feet of streams on site was 2,988 feet. The summation of the riverine resources and their respective habitat quality evaluation scores can be found in Table 1.

Table 1. Riverine Resources within the Mitigation Site.

Name	Type	Length (feet)	HHEI Score
Stream 1a	Ephemeral	105	64
Stream 1b	Ephemeral	81	33
Stream 1 (UNT to Dickerson Run)	Intermittent US Confluence with Stream 2	1,051	58
	Intermittent DS Confluence with Stream 2	669	42
Stream 2 (Tributary to Stream 1)	Intermittent	716	51
Stream 3	Intermittent	366	58
	Total	2,988 Linear Feet	

Stream 1a is an ephemeral flow stream with a substrate bottom primarily comprised of silt and sand with lesser contributions from gravel and boulders. The stream has been modified in association with past land uses including a downstream earthen dam. Stream 1a has an average bankfull width of 1.8 meters and received a HHEI score of 64 classifying the stream as a modified Class II Primary Headwater Habitat (PHWH) stream (Table 1 and Appendix A, Figure 5). Current photographs of Stream 1a are in Appendix F.

Stream 1b is an ephemeral flow stream with a substrate bottom primarily composed of silt, sand, and gravel with lesser amounts of cobble and hardpan. The stream has been modified in association with past land uses including an downstream earthen dam. Stream 1b has an average bankfull width of 0.8 meters and received a HHEI score of 33 classifying the stream as a modified Class II PHWH stream (Table 1 and Appendix A, Figure 5). Current photographs of Stream 1b are in Appendix F.

Stream 1 (UNT to Dickerson Run)
Upstream of the confluence with Stream 2, Stream 1 has intermittent flow stream with a substrate primarily comprised of sand, silt, gravel, and cobble. The stream has been modified in association with past land uses including creation of an earthen

access road and an earthen dam to impound upstream waters. This site has an average bankfull width of 2.3 meters in this reach and received a HHEI score of 58 classifying it as a modified Class II PHWH stream (Table 1 and Appendix A, Figure 5). Current photographs of Stream 1 are in Appendix F.

Stream 1 (UNT to Dickerson Run)
Downstream of the confluence with Stream 2, Stream 1 has intermittent flow stream with a substrate primarily comprised of sand, silt, and gravel. The stream has been modified in association with past land uses including creation of an earthen dam to impound water. Stream 1 has an average bankfull width of 1.4 meters in this reach and received a HHEI score of 42 classifying it as a modified Class II PHWH stream (Table 1 and Appendix A, Figure 5). Current photographs of Stream 1 are in Appendix F.

Stream 2 has intermittent flow stream with a substrate bottom primarily comprised of silt, hardpan, woody debris, and sand. The stream has been modified in association with past land uses including creation of an earthen dam to impound water. Stream 2 has an average bankfull width of 1.4 meters and received a HHEI score of 42 classifying it as a modified Class II PHWH stream (Table 1 and Appendix A, Figure 5). Current photographs of Stream 2 are in Appendix F.

Stream 3 has intermittent flow stream with a substrate bottom primarily composed of sand, silt, and gravel with smaller percentages of boulder and cobble. The stream has been modified in association with past land uses including grazing, row cropping, and timber harvesting. Stream 3 has an average bankfull width of 2.55 meters and received a HHEI score of 58 classifying it as a modified Class II PHWH stream (Table 1 and Appendix A, Figure 5). Current photographs of Stream 3 are in Appendix F.

Wetland Resources

MAD Scientist Associates conducted a field visit on March 13th of 2019 to collect wetland determination data. Table 2 provides a summary of the wetland data collected and their associated ORAM data sheets are provided in Appendix D. A total of two wetlands were identified during field investigations (Appendix A, Figure 6). Both wetlands were identified as palustrine emergent wetlands (PEM) comprising a total of 1.65 acres. Photographs of the stream and wetland resources and their locations of where they were taken can be found in Appendix F.

Table 2. Wetland Data for the Mitigation Site.

Wetland Name	Wetland Plant Community	Acres	ORAM Score	ORAM Category
Wetland A	Palustrine Emergent Wetland (PEM)	0.5	49	2
Wetland B	Palustrine Emergent Wetland (PEM)	1.15	39	Modified 2
	Total Acres =	1.65		

Wetland A (0.5 acres) is a depressional PEM wetland. Wetland A was associated with sampling point A-wet (Figure 6, Appendix A). The herbaceous layer for Wetland A was dominated by cursed crowfoot (*Ranunculus sceleratus*), skunk cabbage (*Symplocarpus foetidus*), and sweet woodreed (*Cinna arundinacea*) (Appendix E). Wetland A scored 49 points on ORAM, Table 2, (Appendix D). Photographs and their locations can be found in Appendix F.

Wetland B (1.15 acres) is a depressional PEM wetland. Wetland B was associated with sampling points B1-wet and B2-wet (Figure 6, Appendix A). The herbaceous layer for Wetland B was dominated by hop sedge (Carex lupulina), white grass(Leersia virginica), cursed crowfoot, and sweet woodreed (Appendix E). Wetland B scored 39 points on ORAM, Table 2, (Appendix D). Photographs and their locations can be found in Appendix F.

PROPOSED MITIGATION WORK PLAN

*Note – the distances, acreages, and credits are for planning purposes only. They are expected to change based on IRT comments and the final design.

The Ohio EPA report entitlted "The lower Cuyahoga River total maximum daily load (TMDL)" 2003 listed Dickerson Run in full attainment of Warmwater Habitat (WWH). Despite the overall designation of WWH, the OEPA documented the main causes of impairment within the lower Cuyahoga River Watershed are attributed to organic enrichment, nutrient enrichment, low instream dissolved oxygen, toxicity, sedimentation, and habitat degradation. The impairments of sedimentation and habitat degradation are present on the project site and would be alleviated through the proposed project. Figure 7 in Appendix A provides a map of the proposed stream mitigation work. In particular, the proposed mitigation project would:

- Re-establish and restore 1,933 linear feet (LF) of intermittent streams (Stream 1 and Stream 2) through full-extent channel restoration involving dimension, pattern, profile, and reconnecting the streams to their original floodplain thereby improving water quality and stream ecology (Mitigation Type 1 – Activity Level 1);

- Enhance 468 linear feet (LF) of an intermittent stream, Stream 1, by raising the stream bed and reconnecting the stream to its original floodplain thereby improving water quality and stream ecology (Mitigation Type 1 – Activity Level 4);

Stream 1 (UNT to Dickerson Run)
The major impairments to Stream 1, an intermittent stream, are a result of an earthen dam that was partially removed in 2014 and a former access road that historically contained an undersized culvert which resulted in sediment accumulation. The former acess road was located upstream of the confluence with Stream 2 and the earthen dam was located downstream of the confluence of Stream 2. The dam was partially removed in 2014 by the Cuyahoga Valley National Park.

The partial dam removal has resulted in a highly unstable stream channel. The new channels cutting through this sediment have resulted in extreme instablity, low sinuosity, eroding stream banks, loss of stream gradient, buried large particle sized substrate from accumulation of fines, and immature riffle-pool morphology.

Furthermore, impacts downstream of the former dam have also occurred. These impacts include eroding stream banks and a stream channel that is disconnected from its floodplain as a result of the stream bed downcutting below the dam. The proposed mitigation for Stream 1 will encompass Mitigation Type 1 (Restoration/Enhancement) Activity Level 1 and Activity Level 4.

The proposed Mitigation Type 1 Level 1 plan will include:

- Restoration of streambed elevation to increase stability in the stream profile
- Establishment of lateral connectivity and recontouring existing floodplain to an elevation prior to the dam installation
- Restoration of channel pattern, which will enhance the diversity and morphology of the stream channel
- Removal of lateral walls of earthen dam
- Removal of historical stream crossing
- Floodplain plantings
- Riparian buffer rehabilitation

The proposed Mitigation Type 1 Level 4 plan will include:

- Restoration of streambed elevation to increase stability in the stream profile
- Establishment of lateral connectivity by laying back bank edges
- Restoration of floodplain accessibility and function
- Enhancement of instream habitat through the placement of large wood habitat
- Streambank plantings

Stream 2
Stream 2 is an intermittent stream with substrate that is dominated by silt as a result of a past earthen dam that was breached by the Cuyahoga Valley National Park in 2014. In addition to excess sedimentation, the earthen dam created an unstable stream channel, low sinuosity, eroding stream banks, loss of stream gradient, buried large particle sized substrate from accumulation of fines, and immature riffle-pool morphology. The proposed mitigation for Stream 1 will encompass Mitigation Type 1 (Restoration/Enhancement) Activity Level 1.

The proposed Mitigation Type 1 Level 1 plan will include:

- Restoration of streambed elevation to increase stability in the stream profile
- Establishment of lateral connectivity and recontouring existing floodplain to elevation prior to dam installation
- Restoration of channel pattern, which will enhance the diversity and morphology of the stream channel
- Removal of lateral walls of earthen dam
- Floodplain plantings

Existing Wetlands
The existing wetland acreage on-site is not projected to change and therefore TNC will not seek wetland credits for this project. Even though mitigation credit will not be sought, wetlands will be rehabilitated through the control of invasive plant species, planting of high quality native species, and improvements to their hydrological regimes.

DETERMINATION OF CREDITS

The "Guidelines for Stream Mitigation Banking and In-Lieu Fee Programs in Ohio 1.1" (2014) were utilized to estimate and determine credits for the proposed Pittenger Dam Removal mitigation project. Although the actual credits generated will be based on the as-built and IRT approval, the Guidelines provide general ratios. It is understood that:

Streams

- Mitigation Type 1, Activity Level 1 can generate ratios up to 2:1
- Mitigation Type 1, Activity Level 4 can generate ratios up to 1:1

Table 3 below provides the credit estimates for each of the streams based upon the proposed Mitigation Work Plan (Figure 8, Appendix A).

Table 3: Credit Estimates for Each Stream Section

Name	Stream Flow	Method of Compensation	Activity Level	Linear Feet of Activity	Credit Ratio	Estimated Credits
Stream 1 (UNT Dickerson Run)	Intermittent	Type 1	Level 1	1,319	2:1	2,638
		Type 1	Level 4	468	1:1	468
Stream 2 (UNT Stream 1)	Intermittent	Type 1	Level 1	595	2:1	1,190
					Total Stream Credits	**4,296**

CREDIT LEDGER

The Cuyahoga Watershed (HUC 0410002) currently has 2330 stream credits sold with 1157 stream credits on reserve and 33.4 wetland credits sold with 1.6 wetland credits on reserve.

PERFORMANCE STANDARDS

The long-term goals of this project are to develop and manage a site that contains high quality stream resources and buffers. Per the Guidelines for Stream Mitigation Banking and In-Lieu Fee Programs in Ohio performance standards should be based on specific measurable metrics using standards in current use in Ohio at the time the site is approved.

Streams:

1. Restored stream channels are vertically stable and connected to their floodplains
2. Stream banks are laterally stable showing only insignificant change from the as-built dimensions and the relocated stream channel will be stable, and the stream meets the criteria for a Class II primary headwater stream by the end of the monitoring period.

3. Pebble counts demonstrate appropriate substrate composition
4. Appropriate pool/riffle spacing
5. Biological and habitat standards such as QHEI, IBI, and EPT Taxa may also be appropriate, but can only be developed and proposed once more assessments are performed at the site and the engineering plans are developed.

Riparian Buffer:

1. A minimum of 400 native, live and healthy (disease and pest free) woody plants per acre (of which at least 200 are tree species) must be present at the end of the monitoring period. The reestablished buffer will contain a minimum of 90% relative coverage of native plant species.

2. The re-established buffer will achieve a minimum VIBI-FQ score of 40.

MONITORING REQUIREMENTS

Monitoring is required to determine if the project is meeting its performance standards and if additional measures are necessary to ensure that the compensatory mitigation project is accomplishing its goals (33 CFR §332.6; RGL 08-03). The monitoring will evaluate wetlands, streams, and associated buffers. Monitoring will take place for a period of ten years following construction of the mitigation project, and reports will be submitted annually.

As stated in 33 CFR §332.6(b), USACE's District Engineer, in consultation with the IRT, may reduce or waive the remaining monitoring requirements upon a determination that the compensatory mitigation project has met its performance standards, or extend the monitoring period upon a determination that performance standards have not been met, are not on track to be met, or remediation or adaptive management measures are required.

After construction, an as-built report will be submitted to members of the IRT by December 31st of the year of construction and seeding/planting. Thereafter, monitoring reports will be submitted by December 31st of each monitoring year. The schedule for submitting monitoring reports may be adjusted based on site conditions or to facilitate credit releases. Schedule adjustment requests will be coordinated through the District Engineer in consultation with the IRT and do not require modification of the Plan or ILF Instrument.

A minimum of 11 photograph monitoring stakes will be installed at appropriate locations within the mitigation area following construction. The actual location and number of stakes will be dependent on the as-built conditions. The stakes will be of an ultraviolet (UV), light-resistant polyvinyl chloride (PVC) material and will be identified with unique numbers. Photo documentation of site conditions will be taken at these locations and will include the stake and stake number. Subsequent photographs will be taken in the same area and with the same directions of view.

Wetlands delineations will be conducted in Years 2, 6, and 10 using the protocols in the 1987 *Corps of Engineers Wetlands Delineation Manual* and *Northcentral and Northeast Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Eastern Mountains and Piedmont* (U.S. Army Corps of Engineers 2012), including the use of field forms from the supplement.

Vegetation monitoring protocols will follow the Integrated Wetlands Assessment Program: Part 9: Field Manual for the Vegetation Index of Biotic Integrity for Wetlands v. 1.5 (Mack and Gara, 2015). The Vegetation Index of Biotic Integrity – Floristic Quality (VIBI-FQ) is an intensive assessment methodology developed by Ohio EPA, which is used to monitor the ecological condition of compensatory mitigation sites. Focus plots will be located in the re-established wetlands and riparian buffer areas. VIBI-FQ scores will be calculated using the data gathered from the focus plots. The focus plot(s) will be monitored in Years 4, 6, 8, and 10. In addition to generating VIBI-FQ scores, data collected will be used to calculate percent relative cover of native plants and native perennial hydrophytes, as well as stem counts of woody vegetation.

Monitoring reports will include a narrative that summarizes project conditions; supporting data such as plans, maps and photographs to illustrate project conditions; monitoring results from functional, condition or other assessments that compare the status of the developing project to performance standards; and any recommendations for adaptive management or remedial measures at the project. A summary of the parameters to be monitored is provided in the table on the following page.

Table 4: Monitoring Plan and Schedule

Streams

Monitoring Parameter	Monitoring Methodology	Year										
		0	1	2	3	4	5	6	7	8	9	10
As-Built		X										
Photography	Fixed photo monitoring points	X	X	X	X	X	X	X	X	X	X	X
Cross sections – Depths and flows	Representative elevations	X		X		X						X
Longitudinal profiles	Baseline Elevation Survey	X		X		X						X
Streambank stability	Pfankuch Elevations			X		X		X		X		X
Habitat Assessment	QHEI, HHEI			X		X		X		X		X
Substrate Sampling	Pebble Counts			X		X		X		X		X
Fish Sampling	IBI			X				X				
Macroinvertebrate sampling	EPT			X				X				
Water Chemistry	Select Parameters					X				X		
Report		X	X	X	X	X	X	X	X	X	X	X

Riparian Buffers and Wetlands

Monitoring Parameter	Monitoring Methodology	Year										
		0	1	2	3	4	5	6	7	8	9	10
Vegetation	VIBI-FQ					X		X		X		X
Photography	Fixed photo monitoring points	X	X	X	X	X	X	X	X	X	X	X
Habitat Assessments	Woody stem counts, native species % relative cover, native perennial hydrophytes relative cover					X		X		X		X
Wetland acreage	Delineation			X				X				X
*Birds/amphibians/reptiles	Observational/Detailed			X				X				X

* Additional detailed monitoring of birds, amphibians, and/or reptiles may occur if early observational evidence suggests usage of restored habitat by sensitive species.

ADAPTIVE MANAGEMENT PLAN

In addition to the above monitoring, the active monitoring plan will include an annual inspection form to be filled out and included in the monitoring reports. The information gained from the annual monitoring plan will provide a means of early identification of potential problems with the mitigation project, such as adjacent property encroachment. The success of the project will be evaluated each year during

the monitoring site visits. If the goals of the project are not being achieved or not on a trajectory of being achieved, then appropriate steps will be taken to address these problems. All actions will be conducted in consultation with the USACE and Ohio EPA.

PROPOSED MAINTENANCE PLAN

A thorough mitigation monitoring plan, as described above, is a major component to a maintenance program and adaptive management plan.

In addition to the above monitoring, the active monitoring plan will include an annual inspection form to be filled out and included in the monitoring reports. In the first year following the completion of each phase, a minimum of three site visits will be performed. The annual monitoring and additional site visits will be used to determine the need for corrective actions such as stream bank repair, planting of riparian vegetation, or invasive plant species control. If any corrective actions are necessary, they will be addressed within 6 months.

The information gained from the annual monitoring plan will provide a means of early identification of potential problems with the mitigation project. The success of the project will be evaluated each year during the monitoring site visits. If the goals of the project are not being achieved or not on a trajectory of being achieved, then appropriate steps will be taken to address these problems. All actions will be conducted in consultation with the USACE and Ohio EPA.

These steps may include:

- Additional plantings implemented to ensure attainment of diversity/quality/cover mitigation goals.
- Annual herbicide treatments of invasive and non-native vegetation as needed.

LONG-TERM MANAGEMENT PLAN

As the OMP Instrument states, a long-term management plan must be developed for each ILF mitigation project and included in or by reference in the Mitigation Plan.

The Long-Term Management Plan includes a description of long-term management needs, annual cost estimates for these needs, and provides details regarding the identity of the non-wasting endowment that will be used to meet those needs.

The Long-Term Management Plan shall include, at a minimum, the following provisions:

1. *Maintenance of the condition of structural elements and facilities of the site such as signage, fencing, and roads. The Long-Term Management Plan will include provisions to maintain and repair these improvements as necessary to achieve the objectives of the Mitigation Project and comply with the provisions of the real estate instrument providing protection to the site.*
2. *Improvements developed for restoration purposes such as access roads, berms or water control structures that are no longer needed to facilitate or protect the ecological function of the site may be removed or abandoned if consistent with the terms and conditions of the recorded protection document.*
3. *Allowance of access to the site by the IRT.*

CREDIT RELEASE SCHEDULE

As the project meets certain milestones, the associated credits will be released. These released credits will be used to fulfill any advance credits that have been already provided within the project's service area before any remaining released credits can be sold. The proposed credit release schedule for the Pittenger Dam Removal project is below. Table 5 summarizes the schedule and provides specific credit amounts for each milestone. Monitoring periods may be shortened if performance criteria are met before the end of the monitoring period or extended if not all performance standards have been met.

Table 5: Stream Credit Release Schedule.

Mitigation Milestone	Released Credits		Cumulative Credits
	Percentage	Number of Credits	
Approval of final plans, financial assurances are in place, and the Site Protection Instrument recorded	10%	430	430
Completion of construction and submittal of as-built site drawings	10%	430	860
Completion and inspection of all plantings and the submittal of as-built planting drawings	10%	430	1,290
Submission of 2nd year monitoring report, 2nd year criteria met, and site inspection by the IRT	20%	859	2,149
Submission of 4th year monitoring report, 4th year criteria met, and site inspection by the IRT	15%	644	2,793
Submission of 6th year monitoring report, 6th year criteria met, and site inspection by the IRT	15%	644	3,437
Submission of 8th year monitoring report, 8th year criteria met, and site inspection by the IRT	10%	430	3,867
Submission of 10th year monitoring report, all performance standards met, and site inspection by the IRT	Remaining Credits	429	4,296

Stream Credit Release Criteria:

- Initial Release: 10% of potential credits.
  - Approval of the final detailed stream design and planting plans
  - Financial assurances in place
  - Recording of long-term protection instrument
- Completion of Construction: 10% of potential credits
  - All in-stream construction complete and inspected
  - Submittal of as-built site drawings
- Completion of Planting: 10% of Mitigation Type 1 potential credits
  - All plantings complete and inspected
  - Submittal of as-built planting drawings
- Second Year Monitoring: 20% potential credits
  - Submission of Monitoring Report (must have at least one documented bankfull event)
  - Success evaluated by:
    - All streams showing stability of in-stream pattern, streambanks, profile and dimension, and appropriate benthic substrates as

documented by re-survey of the fixed cross-section and monitoring points;
        - All streams tending toward final performance standards;
        - Riparian Buffer: visual evidence of riparian buffers containing the appropriate target species in composition, diversity and density.
    - Site inspection by the USACE/IRT
- Fourth Year Monitoring: 15% potential credits
    - Submission of Monitoring Report (must have at least one documented bankfull event following second year monitoring)
    - Success evaluated by:
        - All streams showing stability of in-stream pattern, streambanks, profile and dimension, and appropriate benthic substrates as documented by re-survey of the fixed cross-section and monitoring points;
        - All streams tending toward final performance standards;
        - Riparian Buffer: visual evidence of riparian buffers containing a positive trend in target species in composition, diversity and density.
    - Site inspection by USACE/IRT
- Sixth Year Monitoring: 15% of potential credits
    - Submission of Monitoring Report (must have at least two documented bankfull events following second year monitoring)
    - Success evaluated by:
        - All streams showing stability of in-stream pattern, streambanks, profile and dimension, and appropriate benthic substrates as documented by re-survey of the fixed cross-section and monitoring points;
        - All streams tending toward final performance standards;
        - Riparian Buffer: visual evidence of riparian buffers containing a minimum of three years of positive growth of species. Positive trend in target species in composition, diversity and density towards achieving success criteria.
    - Site inspection by USACE/IRT
- Eighth Year Monitoring: 10% of potential credits
    - Submission of Monitoring Report (must have at least two documented bankfull events following second year monitoring)
    - Success evaluated by:
        - All streams showing stability of in-stream pattern, streambanks, profile and dimension, and appropriate benthic substrates as documented by re-survey of the fixed cross-section and monitoring points;
        - All streams tending toward final performance standards;
        - Riparian Buffer: visual evidence of riparian buffers containing a minimum of five years of positive growth of species. Positive trend

in target species in composition, diversity and density towards achieving success criteria.
    - Site inspection by USACE/IRT
- The Final Release of Credits: The final 10% of the total stream credits may be released once the final monitoring report has been submitted and evaluated by the IRT. This final release is contingent on the site meeting all performance goals.

FINANCIAL ASSURANCES

The project will have several financial assurances in place to help ensure a high level of confidence that the mitigation will be successfully completed. The financial assurances will include:

- *Performance Bond*s – The construction contractor will be providing a performance bond, which will ensure the completion of construction activities.

- *Project Contingency Fund* – An amount equal to 5% of the projected construction costs will be set aside and placed into a Project Contingency account. Funds from this subaccount will be used to cover unanticipated costs which may arise during the implementation of the project. Once the Mitigation Site has closed, the funds in this subaccount will be released and will go into the long-term management endowment, if needed, or otherwise will be used on other mitigation projects in the same primary service area.

- *Program Contingency Fund* – 5% of all credit sales are paid into a Program Contingency Fund account. This account can be used to fund unanticipated program or project expenses not covered by the Project Contingency Fund (such as catastrophic events which occur after the project contingency fund has been released). Additionally, the funds can be used for management or maintenance costs after site closure for stream repairs or invasive plant control deemed necessary for project success.

PROPERTY ASSURANCES

PRELIMINARY TITLE REPORT

A preliminary title report has been ordered and it is pending.

WATER RIGHTS

Water rights are intact for the Pittenger Dam Removal Mitigation Site.

RESPONSE TO IRT COMMENTS - DRAFT MITIGATION PLAN

TNC received comments from the US Army Corps of Engineers Buffalo District (Susan L. Baker) dated March 1, 2019. Comments from the Buffalo District are in bold and underlined with follow up from TNC in italics.

TNC Responses to Pittenger Dam Removal Draft Mitigation Plan IRT Comments:

1. **To what extent does the proposed mitigation area contain invasive species? Do the adjacent properties appear to have invasive species?**

   Sediments that accumulated when the area was impounded are now dominated by non-native invasive species, mainly Phragmites australis. As the restoration plan is refined during the IRT approval process, we will further define specific areas of the site which will be targeted for invasive removal and replanting of native species. Most of the areas outside of the former impoundment are forested, with a dominance of native tree species. We do not believe that there is a significant threat of invasive recolonization following restoration from the adjacent lands.

2. **Is there potential for any incompatible or potentially harmful uses to occur on the adjacent lands?**

   Most of the area surrounding the Pittenger Dam Removal Mitigation project are under the control of the US National Park Service. A small portion upstream is privately owned and has been in active agriculture for at least several decades. The project will be designed with these constraints in mind, but we do not expect any additional threats from these upstream properties to negatively affect the project goals.

3. **Are there any encumbrances on the proposed mitigation area (i.e. utility or gas easements)?**

   As part of the development of the mitigation plan for public notice, we will be conducting a full title search of the project site to determine any potential

encumbrances. At this time, we are unaware of any utility or gas easements that would negatively affect the project.

4. **It is recommended that you coordinate early with the Ohio Historic Preservation Office. There is a known archeological site within the proposed mitigation area. Additionally, the site is adjacent to Blackacre Farm owned by the Pittenger Family which could potentially be eligible for listing on the National Register.**

   As part of the development of the mitigation plan for public notice, we will begin the coordination process with the State Historic Preservation Office of Ohio.

5. **Does the site/watershed provide enough hydrology to reestablish the stream channel?**

   Yes, we believe the watershed provides sufficient hydrology to reestablish the stream channel, as the former Pittenger Dam Removal site was impounding an existing natural stream. Over time, significant sediments have been deposited within the former channel. Following dam removal, a new channel is slowly forming, but full restoration is required to remove these sediments and re-construct the channel to allow for the natural flow regime to return to conditions present prior to dam construction.

6. **Is Type 1, Level 1 work appropriate/needed for the entire 2,348 linear feet of on-site stream? What impairments do the on-site streams have and what specific design elements will be implemented to address them? The stream that is reforming within the former dam pool is likely already connected to its floodplain and aerials do not show a lot of incision at this time. Additional information on the functional lift, design, and activity level is needed to support a 2:1 ratio.**

   As we work through project design, stream crediting will be refined to reflect specific activities necessary to restore the stream channel to natural functioning. TNC will only request credit ratios that correspond to the appropriate activity level, which is likely to change as additional research is conducted.

7. **Has wetland developed within the former dam pool? If so, how will this be accounted for in the plan? Conversion of resources and/or loss of wetlands should be considered.**

   Yes, although dominated by invasive species, the former dam pool sediments have resulted in highly degraded wetland habitat. It is anticipated that the full stream restoration will result in equal amounts of wetland within and adjacent to the

newly constructed channel to account for the impacts to the unnatural habitat that has formed on the collected sediments.

DEFINITIONS

Adaptive management means the development of a management strategy that anticipates likely challenges associated with compensatory mitigation projects and provides for the implementation of actions to address those challenges, as well as unforeseen changes to those projects. It requires consideration of the risk, uncertainty, and dynamic nature of compensatory mitigation projects and guides modification of those projects to optimize performance.

Advance credits means any credits of an approved in-lieu fee program that are available for sale prior to being fulfilled in accordance with an approved mitigation project plan. Advance credit sales require an approved in-lieu fee program instrument that meets all applicable requirements, including a specific allocation of advance credits, by service area where applicable.

Buffer means an upland, wetland, and/or riparian area that protects and/or enhances aquatic resource functions associated with wetlands, rivers, streams, lakes, marine, and estuarine systems from disturbances associated with adjacent land uses.

Compensatory mitigation means the restoration (re-establishment or rehabilitation), establishment (creation), enhancement, and/or in certain circumstances preservation of aquatic resources for the purposes of offsetting unavoidable adverse impacts which remain after all appropriate and practicable avoidance and minimization has been achieved.

Compensatory mitigation project means compensatory mitigation implemented by the permittee as a requirement of a Department of Army permit (i.e., permittee-responsible mitigation), or by a mitigation bank or an in-lieu fee program.

Condition means the relative ability of an aquatic resource to support and maintain a community of organisms having a species composition, diversity, and functional organization comparable to reference aquatic resources in the region.

Credit means a unit of measure (e.g., a functional or areal relative measure or other suitable metric) representing the accrual or attainment of aquatic functions at a compensatory mitigation site. The measure of aquatic functions is based on the resources restored, established, enhanced, or preserved.

Establishment (creation) means the manipulation of the physical, chemical, or biological characteristics present to develop an aquatic resource that did not previously exist at an upland site. Establishment results in a gain in aquatic resource area and functions.

Instrument means mitigation banking instrument or in-lieu fee program instrument.

Interagency Review Team (IRT) means an interagency group of federal, tribal, state, and/or local regulatory and resource agency representatives that reviews

documentation for, and advises the district USACE engineer on, the establishment and management of a mitigation bank or an in-lieu fee program.

Performance standards are observable or measurable physical (including hydrological), chemical and/or biological attributes that are used to determine if a compensatory mitigation project meets its objectives.

Preservation means the removal of a threat to, or preventing the decline of, aquatic resources by an action in or near those aquatic resources. This term includes activities commonly associated with the protection and maintenance of aquatic resources through the implementation of appropriate legal and physical mechanisms. Preservation does not result in a gain of aquatic resource area or functions.

Re-establishment means the manipulation of the physical, chemical, or biological characteristics of a site with the goal of returning natural/historic functions to a former aquatic resource. Re-establishment results in rebuilding a former aquatic resource and results in a gain in aquatic resource area and functions.

Reference aquatic resources are a set of aquatic resources that represent the full range of variability exhibited by a regional class of aquatic resources as a result of natural processes and anthropogenic disturbances.

Wetland and Riparian Buffer, for this Instrument, means protective habitat within 50-linear feet (ft) of all restored streams and within 50 meters (164 LF) of re-established or established wetlands receiving credit.

Rehabilitation means the manipulation of the physical, chemical, or biological characteristics of a site with the goal of repairing natural/historic functions to a degraded aquatic resource. Rehabilitation results in a gain in aquatic resource function, but does not result in a gain in aquatic resource area.

Restoration means the manipulation of the physical, chemical, or biological characteristics of a site with the goal of returning natural/historic functions to a former or degraded aquatic resource. For the purpose of tracking net gains in aquatic resource area, restoration is divided into two categories: re-establishment and rehabilitation.

Riparian areas are lands adjacent to streams, rivers, lakes, and estuarine-marine shorelines. Riparian areas provide a variety of ecological functions and services and help improve or maintain local water quality.

Service area means the geographic area within which impacts can be mitigated at a specific mitigation bank or an in-lieu fee program, as designated in its instrument.

Services mean the benefits that human populations receive from functions that occur in ecosystems.

Sponsor means any public or private entity responsible for establishing, and in most

circumstances, operating a mitigation bank or in-lieu fee program.

Watershed means a land area that drains to a common waterway, such as a stream, lake, estuary, wetland, or ultimately the ocean.

Watershed approach means an analytical process for making compensatory mitigation decisions that support the sustainability or improvement of aquatic resources in a watershed. It involves consideration of watershed needs, and how locations and types of compensatory mitigation projects address those needs. A landscape perspective is used to identify the types and locations of compensatory mitigation projects that will benefit the watershed and offset losses of aquatic resource functions and services caused by activities authorized by USACE permits. The watershed approach may involve consideration of landscape scale, historic and potential aquatic resource conditions, past and projected aquatic resource impacts in the watershed, and terrestrial connections between aquatic resources when determining compensatory mitigation requirements for USACE permits.

Watershed plan means a plan developed by federal, tribal, state, and/or local government agencies or appropriate non-governmental organizations, in consultation with relevant stakeholders, for the specific goal of aquatic resource restoration, establishment, enhancement, and preservation. A watershed plan addresses aquatic resource conditions in the watershed, multiple stakeholder interests, and land uses. Watershed plans may also identify priority sites for aquatic resource restoration and protection.

***Definitions Derived from**: US Army Corps of Engineers, 2008. Watershed Approach to Compensatory Mitigation Federal Register – 33 CFR 332.8.*

REFERENCES

Cowardin, L.M., V. Carter, F.C. Golet, and E.T. LaRoe. 1979, reprinted 1992. Classification of wetlands and deepwater habitats of the United States. U.S. Department of the Interior, Fish and Wildlife Service, Washington, DC.

Center for Watershed Protection. 2003. Impacts of Impervious Cover on Aquatic Systems. Ellicott City, MD.

Cleveland Metroparks. 2009. Invasive Plant Management Program (IPMP) for Cleveland Metroparks, Version 1.3. Technical Report 2009/NR-01.

Cuyahoga River Restoration. 2015. Cuyahoga AOC Stage 2 Delisting Implementation Plan Update and Progress Report. Cleveland, OH.

Environmental Laboratory. 1987. Corps of Engineers wetlands delineation manual, Technical Report Y-87-1, U.S. Army Engineer Waterways Experiment Station, Vicksburg, MS.

Gordon, Robert B. 1966. Natural Vegetation of Ohio, at the time of the earliest surveys (map), Ohio Biol. Surv., 1966.

Homer, C.G., Dewitz, J.A., Yang, L., Jin, S., Danielson, P., Xian, G., Coulston, J., Herold, N.D., Wickham, J.D., and Megown, K., 2015, Completion of the 2011 National Land Cover Database for the conterminous United States-Representing a decade of land cover change information. Photogrammetric Engineering and Remote Sensing, v. 81, no. 5, p. 345-354

Mack, John J. 2001. Ohio rapid assessment method for wetlands, version 5.0, Users Manual, scoring forms. Ohio Environmental Protection Agency. Columbus, OH.

Michigan Department of Environmental Quality – Water Resources Division. 2014. A Guide to the Control and Management of Invasive Phragmites, Third Edition. Lansing, MI.

Ohio Department of Natural Resources-Division of Geological Survey. 2018. Quaternary Geology of Ohio (1:250,000). ESRI ArcGIS Online Layer, accessed October, 2018.

Ohio Environmental Protection Agency (Ohio EPA). 2018. State of Ohio, Water Quality Standards. Chapter 3745-1 of the Administrative Code. Ohio Environmental Protection Agency, Division of Surface Water. Columbus, OH.

Ohio Environmental Protection Agency (Ohio EPA). 2017. Support for the Development of Mangement Actions in the Cuyahoga Area of Concern, March 22, 2017. Columbus, OH.

Ohio Environmental Protection Agency (Ohio EPA). 2003. The Lower Cuyahoga River Total Maximum Daily Load (TMDL) report, Final Septemerber 26, 2003. Division of Surface Water, Columbus, OH.

Ohio Environmental Protection Agency (Ohio EPA). 2002. Field Evaluation Manual for Ohio's Primary Headwater Streams, Final Version 1.0 September 2002. Division of Surface Water, Columbus, OH.

Ohio Environmental Protection Agency (Ohioe EPA). 1998. Wetland Ohio water quality rules 3745-1-05, 50, 51, 52, 53, &54 of the administrative code. Columbus OH.

Ohio General Assembly. 2001. Ohio General Assembly website, HB 231 page. https://www.legislature.ohio.gov/. Accessed August 2016.

Ohio Interagency Review Team. 2016. "Guidelines for Stream Mitigation Banking and In-Lieu Fee Programs in Ohio 1.1"

Ohio Interagency Review Team. 2011. "Guidelines for Wetland Mitigation Banking in Ohio."

Reed, R.B., Jr. 1988. National list of plants that occur in wetlands – Ohio. National Wetland Inventory, U.S. Department of the interior, Fish and Wildlife Service. St. Petersburg FL.

U.S. Army Corps of Engineers. 1999. Army Corps of Engineers Standard Operating Procedures for the Regulatory Program.

U.S. Fish and Wildlife Service (USFWS). 2015. County distribution of federally-listed threatened, endangered, proposed, and candidate species. Region 3. Website https://www.fws.gov/midwest/endangered/lists/ohio-cty.html. Accessed March 2017.

Natural Resources Conservation Service. 2015. U.S. Department of Agriculture, Web Soil Survey. http://websoilsurvey.nrcs.usda.gov/. Accessed March 2017.

Soil Survey Staff, Natural Resources Conservation Service, United States Department of Agriculture. Soil Survey Geographic (SSURGO) Database. Available online at https://sdmdataaccess.sc.egov.usda.gov. Accessed [03/18/2019]

U.S. Fish and Wildlife Service. 2012. National Wetland Inventory website. U.S. Dept. of the Interior, Fish and Wildlife Service, Washington, D.C. http://www.fws.gov/wetlands/. Accessed March 2017.

Woods, A.J., J.M. Omernik, C.S. Brockman, T.D. Gerber, W.D. Hosteter, S.H. Azevedo. 2012. Ecoregions of Ohio and Indiana (Shapefile). U.S. EPA Office of Research and Development (ORD) - National Health and Environmental Effects Research Laboratory (NHEERL), Corvalis, Oregon. Vector digital data (ftp://newftp.epa.gov/EPADataCommons/ORD/Ecoregions/oh/oh_eco_l4.zip).

LIST OF ACRONYMS

CPF	Compensation Planning Framework
CVNP	Cuyahoga Valley National Park
HHEI	Headwater Habitat Evaluation Index
HUC	Hydrologic Unit Code
IRT	Interagency Review Team
MOU	Memorandum of Understanding
NPS	National Park Service
NRCS	Natural Resource Conservation Service
NWI	National Wetland Inventory
Ohio EPA	Ohio Environmental Protection Agency
OMP	The Nature Conservancy's Ohio Mitigation Program
ORC	Ohio Revised Code
PEM	Palustrine Emergent Wetland
PFO	Palustrine Forested Wetland
PHWH	Primary Headwater Habitat
PSS	Palustrine Scrub-Shrub Wetland
QHEI	Qualitative Habitat Evaluation Index
TNC	The Nature Conservancy
UNT	Unnamed Tributary
USACE	United States Army Corps of Engineers
VIBI	Vegetation Index of Biotic Integrity

APPENDIX A

Figures

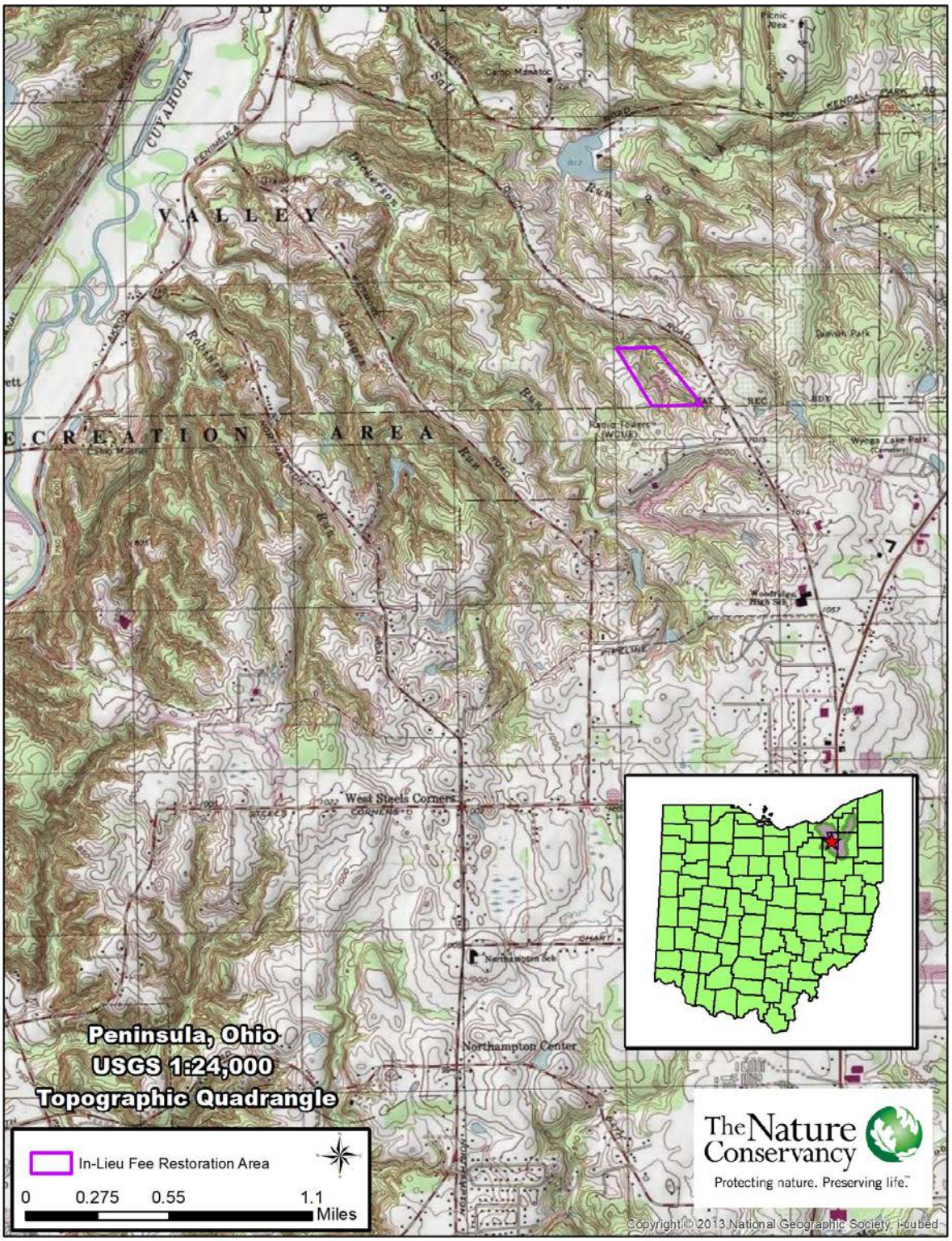


Figure 1. Cuyahoga Valley National Park Pittenger Dam Removal In-Lieu Fee Project Location Map.

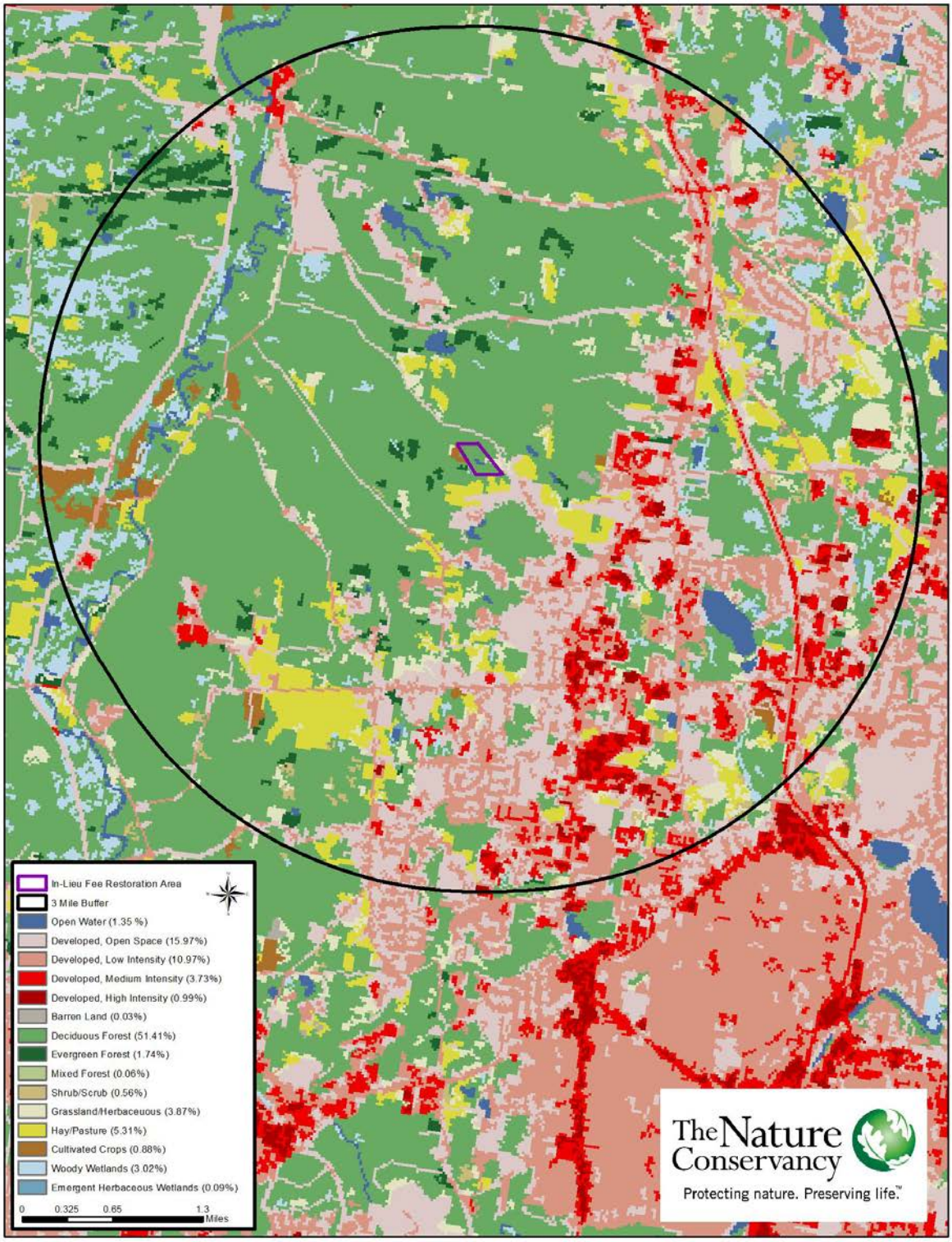


Figure 2. Cuyahoga Valley National Park Pittenger Dam Removal In-Lieu Fee Project Vicinity (3-mile radius) Land Use Map.

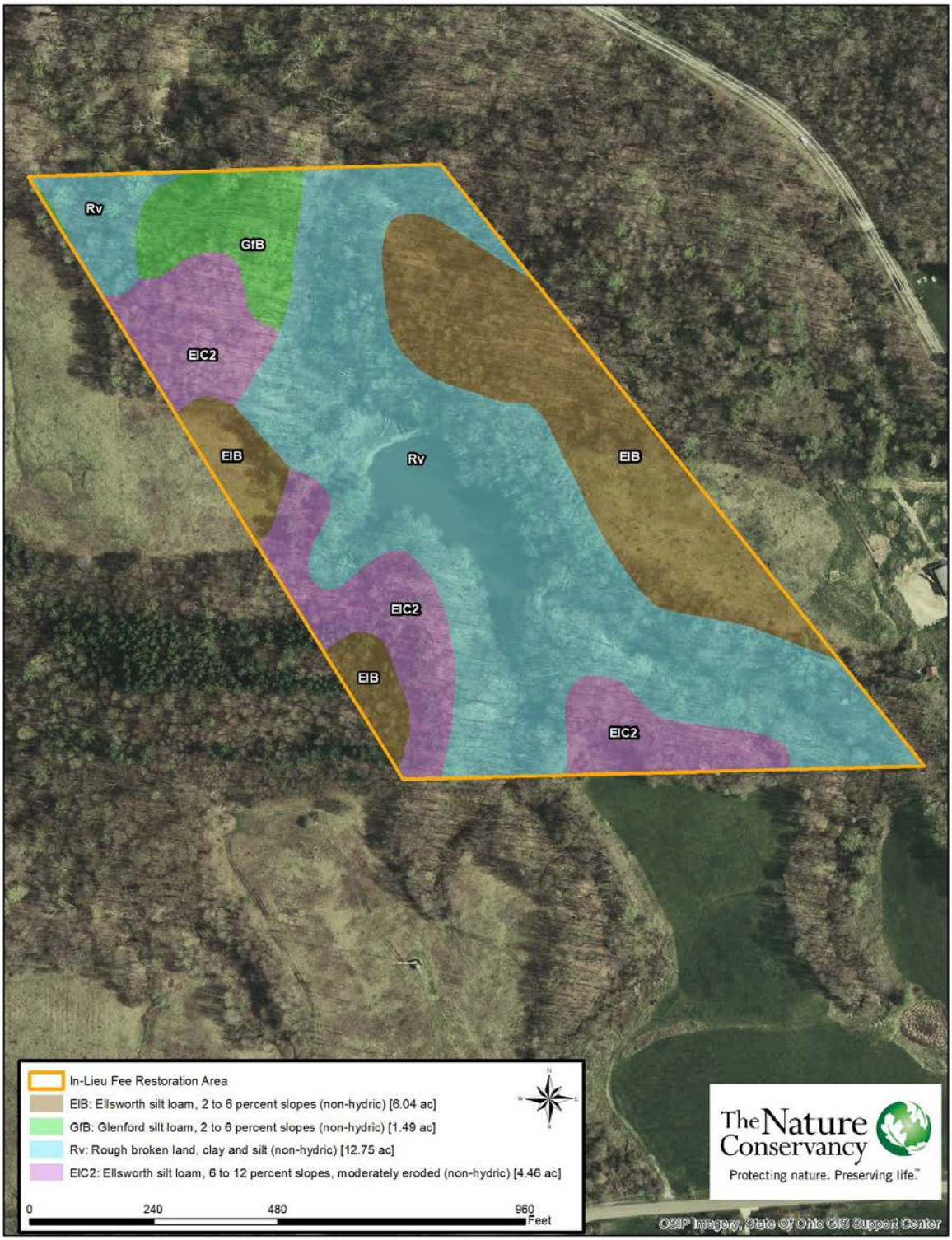


Figure 3. Cuyahoga Valley National Park Pittenger Dam Removal In-Lieu Fee Project Soils Resources Map.

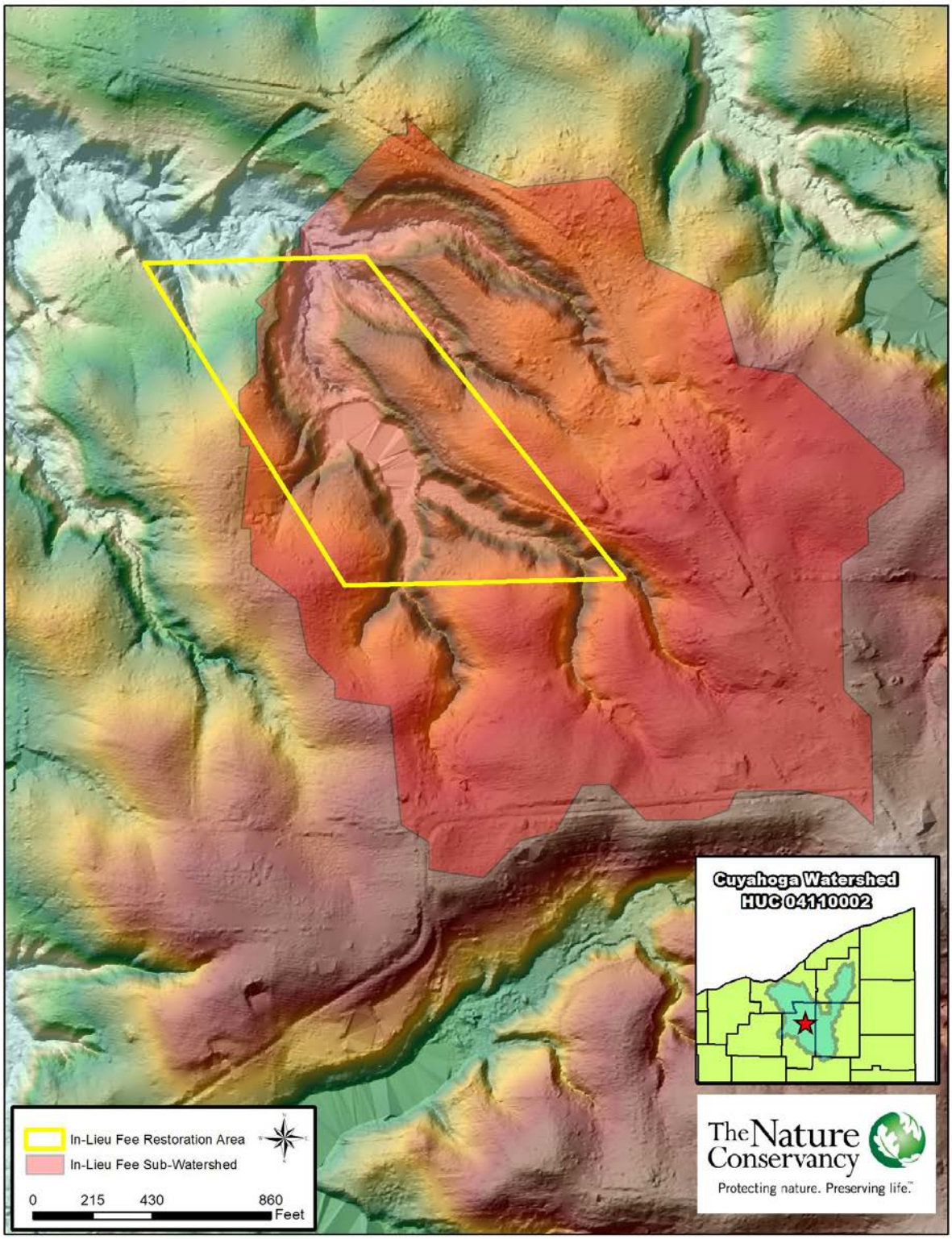


Figure 4. Cuyahoga Valley National Park Pittenger Dam Removal In-Lieu Fee Project Watershed Map.

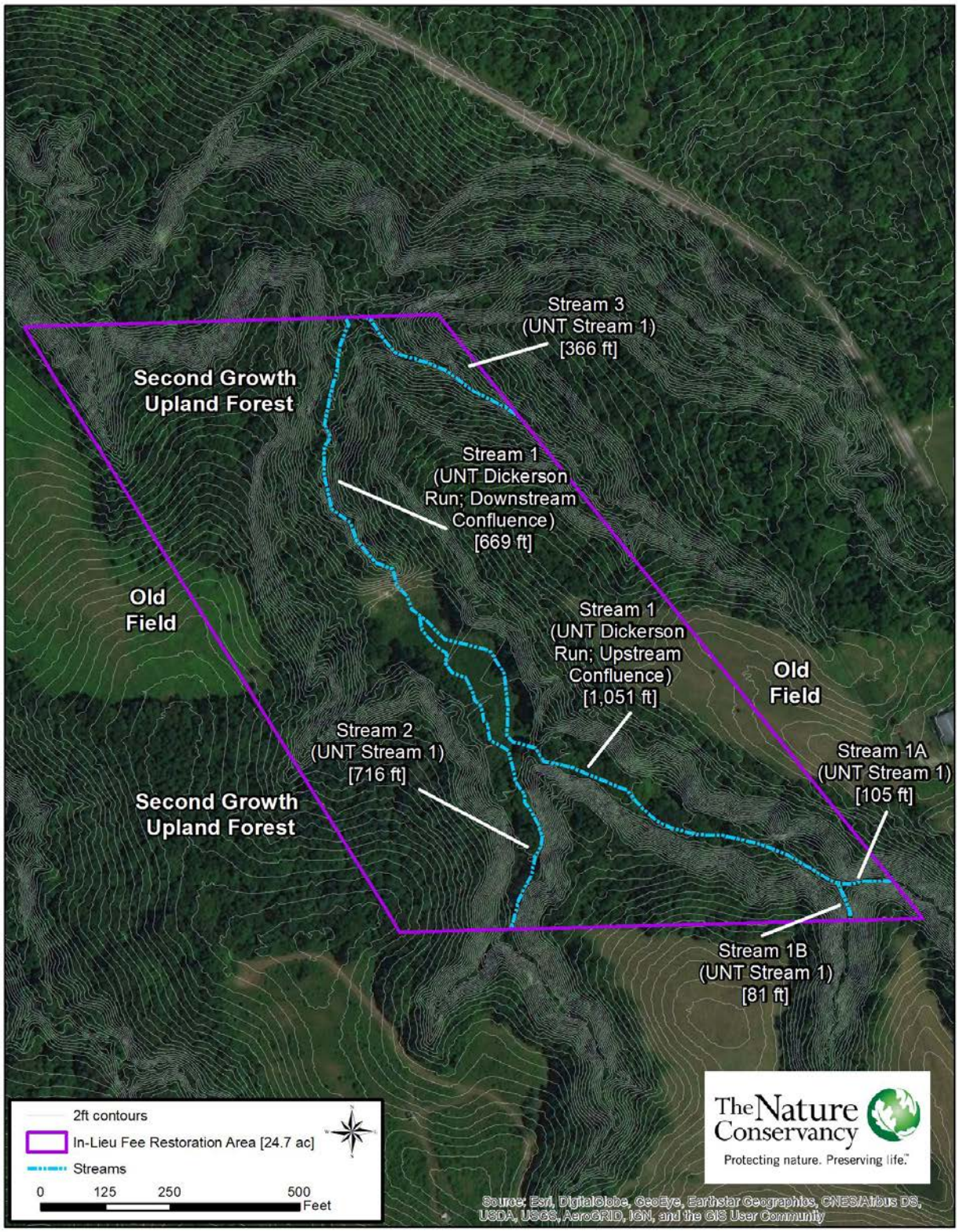


Figure 5. Cuyahoga Valley National Park Pittenger Dam Removal In-Lieu Fee Project Riverine and Terrestrial Resources Map.

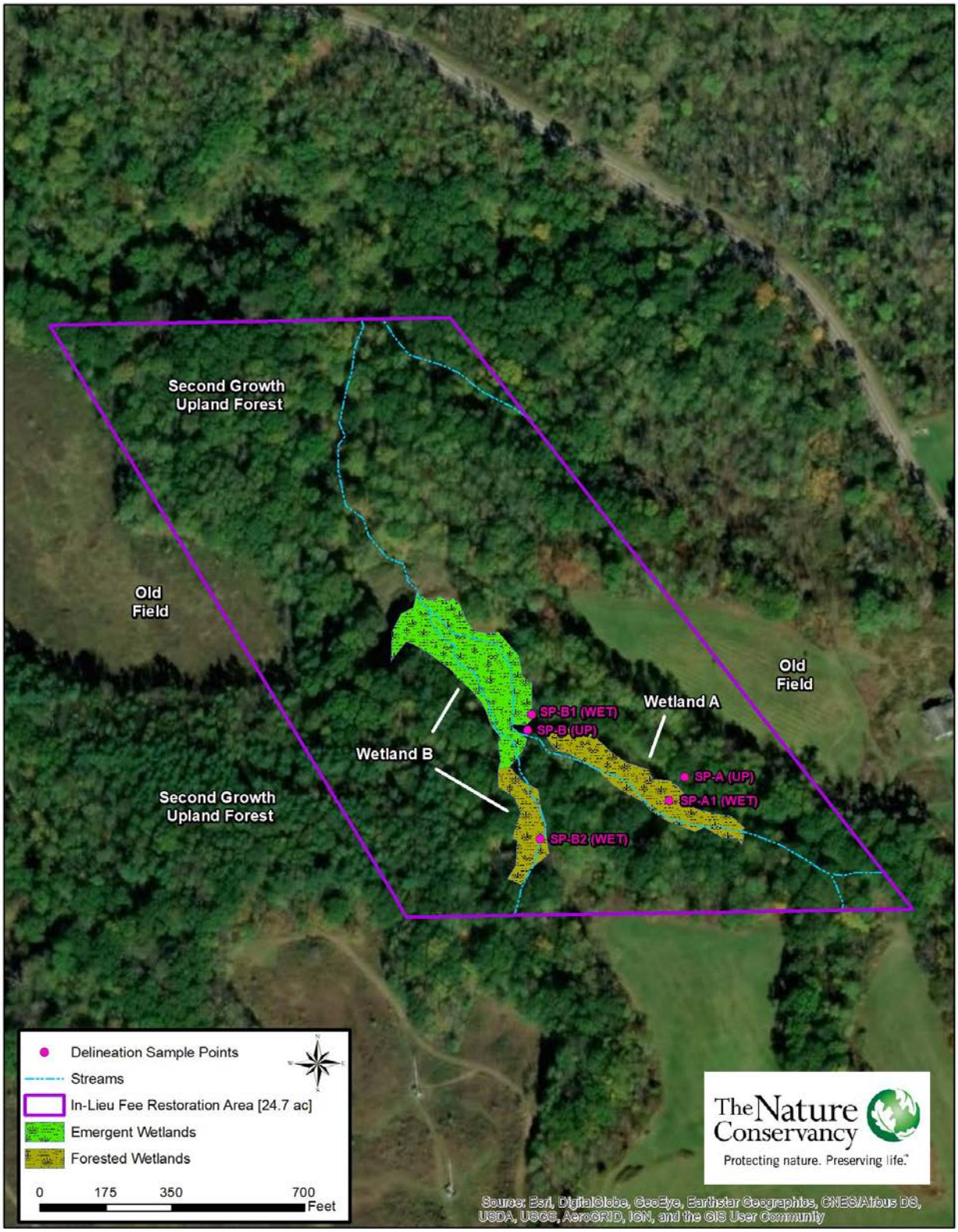


Figure 6. Cuyahoga Valley National Park Pittenger Dam Removal In-Lieu Fee Project Wetland and Terrestrial Resources Map.

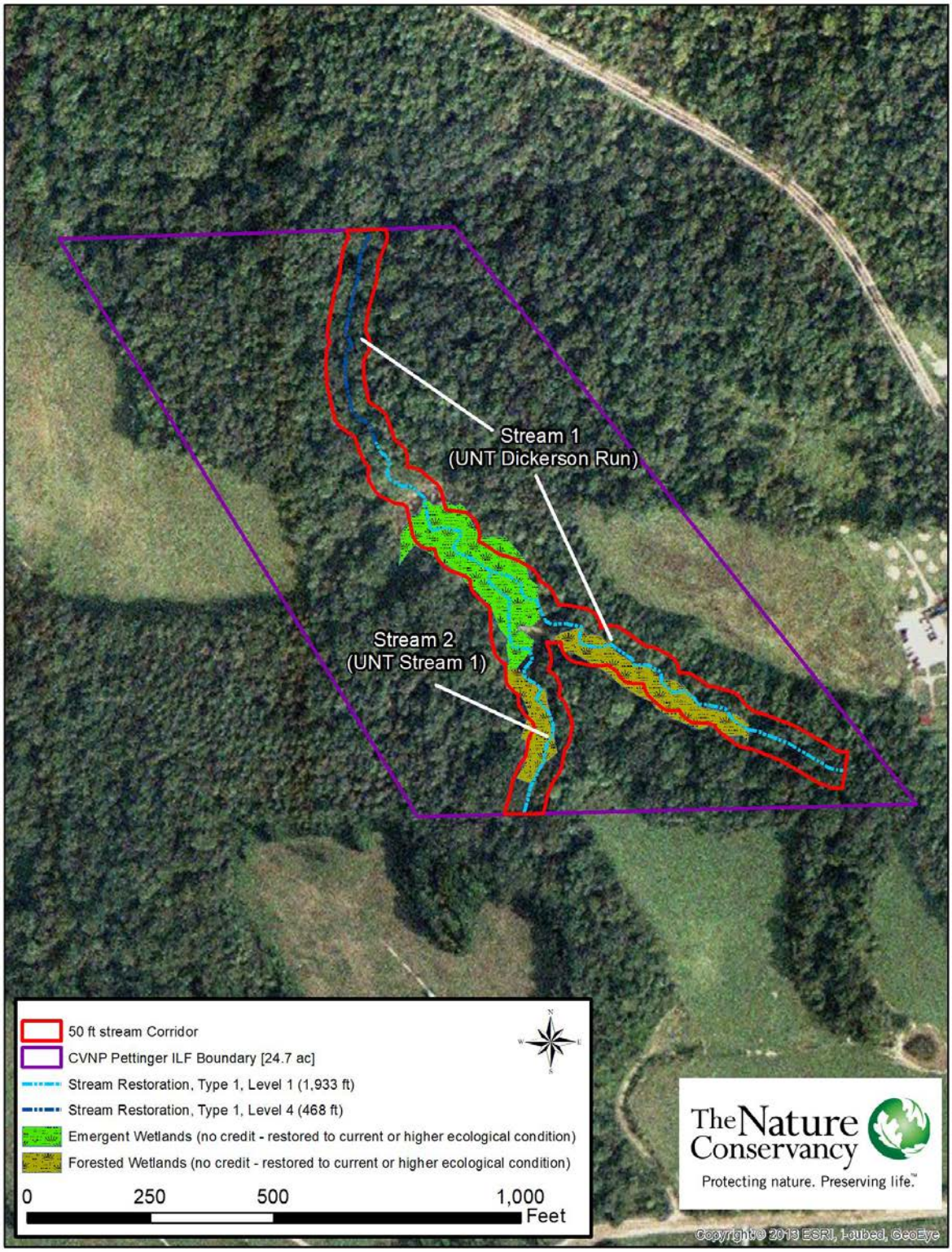


Figure 7. Cuyahoga Valley National Park Pittenger Dam Removal In-Lieu Fee Project Site Restoration Map.

APPENDIX B

Site Evaluation Checklist

TNC ILF Program Site Selection Checklist

Mitigation Site Summary

Site Name	Pittenger Dam Removal
Nominating Entity	Cuyahoga Valley National Park
Watershed (HUC-8)	Cuyahoga (04110002)
County	Summit
City	Cuyahoga Falls
Parcel I.D. /Latitude Longitude	949887005; 949887006; 949888126/ 41.204585, -81.521482
Site Size (ac)	24.7 ac

The following conditions must be met for all projects. If any of the boxes are left unchecked the proposed property is currently not an appropriate OMP project site.

☑ Permanent Protection (The property is currently, or can be, protected in perpetuity)

☑ In Kind Mitigation (The property will provide the same type and amount of resource needed)

☑ Primary Service Area (The property is in a HUC-8 watershed that has OMP funds)

☑ Water resources impacts on the property can be restored on site and are not the result of uncorrectable watershed-scale problems (examples: toxic inputs, combined sewer overflows)

☑ The property is NOT known to have severed mineral rights. Generally, ILF project sites are not acceptable if there is a potential threat of mineral extraction on the property.

	Metric Summary
Site Score	72
Stream Metric Score	75
Wetland Metric Score	NA
Estimated cost of site protection	
Estimated Stream Credits Generated	
Estimated Wetland Credits Generated	
Estimated Complexity of Protection Based on Landowner(s) Interest and number of parcels involved (Low, Medium, High)	Low

Additional Considerations (circle all that apply): flood attenuation, nutrient assimilation, recreation, economic activity, education/public outreach, job creation, scenic enhancements

Other:

Site Comments

The site offers an excellent opportunity to restablish both the original stream bed in the former dam site that has been inundated with sediment and invasives along with elevating the stream bed downstream of the dam that is detached from its original flood plain. Furthermore, there is excellent access for equipment to the site through the existing old road bed.

Program Site Selection Checklist: Site Metrics
Site Name: Pittenger Dam Removal

Site Metrics	Evaluation Parameter	Score
1. Watershed-Based Priorities (Choose all that apply)		
1	Adjacent to restoration project	
1	Included in a Balanced Growth Plan	
2	Within same HUC-12 watershed as impact site(s)	
2	Adjacent/within protected conservation property	2
2	Would meet a TMDL strategy	2
3	Is an existing Watershed Action Plan priority	
4	Within Compensation Planning Framework priority area	4
	Add all that apply SUBTOTAL (Max 15 pts):	8
2. Current Ownership - Level of Support for Conservation		
1	Private property	
3	Private property protected open space	
4	Publicly Owned (but not a Park)	
5	Park District/Conservation Ownership	5
-2	Multiple Ownership (separate parcels)	
-5	Utility easement/Road impact aquatic resources or buffer	
	SUBTOTAL (Max 5 pts):	5
3. Sustainability of Proposed Long-term Protection		
0	Conservation easement purchase	
5	Conservation easement donation	
5	Existing Public land (not protected)	
10	Already protected land	10
10	Fee simple purchase	
	SUBTOTAL (Max 10pts):	10
4. Cost of Property Protection		
0	Cost per Acre is at or below the CAUV average for the county	
10	No cost because already protected or donated easement/covenant	10
10	Potential for a significant, additional funding source(s) for site protection (>25% of total cost)	
-5	Cost per Acre is above the CAUV average for the county	
	SUBTOTAL (Max 10pts):	10
5. Percent of Project Area within 50m from property line, road, utility easement		
0	>90%	
1	90-75%	
3	75-50%	
7	25-50%	
10	<25%	10
	SUBTOTAL (Max 10pts):	10

Site Metrics	Evaluation Parameter	Score
6. Identified Potential Long-term Manager of Property - such entity must have the necessary financial, administrative, and technical capacity		
5	Potential entity identified	
10	Interested entity	
15	Committed entity	15
-2	None	
	SUBTOTAL (Max 5 pts):	15
7. Adjacent/Upstream Property Potential Future Land Use (20 years) (Choose 1 or 2 and average)		
	N/A	
1	suburban high density (multiple subdivisions)	
1	Urban	
1	Industrial	
3	suburban low density (occasional home sites)	
8	Rural /Agricultural	8
10	Unimpacted / Forested	10
-1	Future roads/highway expansion	
	SUBTOTAL (Max 10pts):	9
8. Special Ecosystems Onsite (Choose all that apply)		
Onsite	*If none apply score 0	
1	Designated CWH/EWH/Superior State Waters/Outstanding State Waters	
1	Category 3 wetland	
1	Known Federal or State Listed Species	
1	Known significant wildlife use	1
1	Park or Conservation Area	1
	Add all that apply SUBTOTAL (Max 5 pts):	2
9. Special Ecosystems Adjacent (Check all that apply)		
Adjacent	*If none apply score 0	
3	CWH/EWH/Superior State Waters/Outstanding State Waters	
3	Category 3 wetland	
3	Known Federal or State Listed Species	
3	Known significant wildlife use	3
3	Park or Conservation Area	3
	Add all that apply SUBTOTAL (Max 15 pts):	6
10. Existing Information on Parcel (Choose all that apply		
1	Phase I or equivalent information completed	
1	Delineation completed (Date -) ☐ Approved JD	
1	Biological inventories completed (IBI, ICI, VIBI, AmphIBI)	
1	Habitat inventory completed (QHEI, HHEI, ORAM)	
1	Morphology data	
	Add all that apply SUBTOTAL (Max 15 pts):	0
	SITE METRIC TOTAL SCORE (Max 100 pts)	**75**

TNC ILF Program Site Selection Checklist: Stream Metrics
Site Name: Pittenger Impoundmen

Stream Metrics	Evaluation Parameter	Score
1. Type of Stream Restoration (Select 1 and add Mit. 4 if applicable)		
1	Mitigation Type 4: Additional buffer work beyond 50 foot riparian area	
1	Mitigation Type 2: preservation	
2	Mitigation Type 3: Buffer only Enhancement or re-establishment	
4	Mitigation Type 1: Level 4: Rehabilitation work on streams that directly benefit channel stability, water quality and stream ecology	
5	Mitigation Type 1: Level 3: May include but are not limited to full-extent restoration on all stream types (used for high-gradient streams with limited floodplains)	
7	Mitigation Type 1: Level 2: full-extent channel restoration including re-establishment of new floodplain on perennial or intermittent	
9	Mitigation Type 1: Level 1: full-extent channel restoration including reconnection to original floodplain on perennial or intermittent	9
	Add all that apply SUBTOTAL (Max 10 pts):	9
2. Flow Regime		
1	Ephemeral	
2	Interstitial	
4	Intermittent	4
5	Perennial	
	SUBTOTAL (Max 5 pts):	4
3. Potential Length		
0	<1000	
5	1000-2000	
10	2000-3000	10
15	>3000	
	SUBTOTAL (Max 15pts):	10
4. Drainage Area from furthest downstream point (select 1 per stream)		
2	0-50 acres	
2	20+ sq mi	
4	50-200 acres	
4	10-20 sq mi	
6	200-400 acre	
6	5-10 sq mi	
8	400-640 acres	8
8	3-5 sq mi	
10	1-3 sq mi 2.26mi2	
	SUBTOTAL (Max 10pts):	8
5. Overall Stream and Riparian Condition (choose 1 or 2 and average)		
Restoration		
0	Stable, natural unimpacted	
2	Recovered, modified or channelized, natural	
10	Unrecovered disturbed, modified, or armored	10
15	Unrecovered Channelized/Culverted/Dammed	
	SUBTOTAL (Max 15pts):	10

Stream Metrics	Evaluation Parameter	Score
6. Cause of Impairment (Select 1 or 2 and average)		
0	little to no impairments	
8	impacts partly from correctable channel modifications unrelated to watershed-scale problems	
10	correctable channel modifications within properly functioning watersheds	10
	SUBTOTAL (Max 10 pts):	10
7. Gradient (Select 1 or 2 and average)		
1	high >3.0%	
2	mod. High 1.5-3.0	
3	low<0.5%	
4	moderate 0.8-1.5%	4
5	mod. Low 0.5-0.8%	
	SUBTOTAL (Max 5 pts):	4
8. Biological Restoration Potential (choose all that apply)		
1	Project reach is <1 Rivermile (RM)of 4th order stream or larger	
2	Project reach is in attainment of stream potential (WWH / PHWH)	2
2	Depth of topsoil is greater than 2 inches within the riparian buffer	2
3	Upstream is in attainment of stream potential	
3	Project reach is in Non-attainment of stream potential (WWH / PHWH)	
4	Downstream is in attainment of stream potential	4
-1	Upstream project reach is in Non-attainment of stream potential	
-5	Project reach is upstream of significant humanmade obstruction to fish passage	
-5	Downstream of project reach is in Non-attainment of stream potential	
	SUBTOTAL (Max 15 points):	8
9. Project Complexity		
9.1	***Floodplain Restoration (Select 1 that best describes approach)***	
1	Stabilize stream in place (high gradient stream with no significant floodplain)	
5	Excavate new floodplain	5
7	Need to elevate stream to attach it to historic floodplain	
10	Still attached to historic floodplain	
	Sub-subtotal (Max 10):	5
9.2	***Rank Project Components on scale -1 to 1 (-1 difficult/poor to 1 simplistic/excellent)***	
1 or -1	Good Site access / trucking access / ease of equipment movement	1
1 or -1	Balanced Cut and fill requirements	1
1 or -1	Low amount of fill import needed	1
1 or -1	On-site spoil potential / material available	1
1 or -1	No water diversion / control required during construction	-1
	Sub-subtotal (Max 5):	3
	Metric 9 SUBTOTAL (Max 15 points):	8
	STREAM METRIC TOTAL SCORE (Max 100 pts)	**71.0**

APPENDIX C

Stream Habitat Quality Assessment Field Forms

HHEI (Primary Headwater Habitat Evaluation)

Stream 1a

OhioEPA Primary Headwater Habitat Evaluation Form

HHEI Score (sum of metrics 1, 2, 3) : 64

SITE NAME/LOCATION TNC Pittenger Dam
Stream 1 SITE NUMBER _____ RIVER BASIN Cuyahoga River DRAINAGE AREA (mi²) 0.0181
LENGTH OF STREAM REACH (ft) 200 LAT. 41.203171 LONG. -81.518441 RIVER CODE _____ RIVER MILE —
DATE 3/13/19 SCORER JLO COMMENTS _____

NOTE: Complete All Items On This Form - Refer to "Field Evaluation Manual for Ohio's PHWH Streams" for Instructions

STREAM CHANNEL MODIFICATIONS: ☑ NONE / NATURAL CHANNEL ☐ RECOVERED ☐ RECOVERING ☐ RECENT OR NO RECOVERY

1. SUBSTRATE (Estimate percent of every type of substrate present. Check *ONLY* two predominant substrate *TYPE* boxes (Max of 40). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

TYPE		PERCENT	TYPE		PERCENT
☐ ☐	BLDR SLABS [16 pts]		☑ ☐	SILT [3 pt]	30
☐ ☐	BOULDER (>256 mm) [16 pts]	10	☐ ☐	LEAF PACK/WOODY DEBRIS [3 pts]	
☐ ☐	BEDROCK [16 pt]		☐ ☐	FINE DETRITUS [3 pts]	
☐ ☐	COBBLE (65-256 mm) [12 pts]	20	☐ ☐	CLAY or HARDPAN [0 pt]	
☐ ☐	GRAVEL (2-64 mm) [9 pts]	15	☐ ☐	MUCK [0 pts]	
☐ ☑	SAND (<2 mm) [6 pts]	25	☐ ☐	ARTIFICIAL [3 pts]	

Total of Percentages of Bldr Slabs, Boulder, Cobble, Bedrock 30 (A) 9 (B) 5

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES: **TOTAL NUMBER OF SUBSTRATE TYPES:**

HHEI Metric Points — Substrate Max = 40: 14 (A + B)

2. Maximum Pool Depth ***(Measure the maximum pool depth within the 61 meter (200 ft)*** evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check *ONLY* one box):

- ☐ > 30 centimeters [20 pts]
- ☑ > 22.5 - 30 cm [30 pts]
- ☐ > 10 - 22.5 cm [25 pts]
- ☐ > 5 cm - 10 cm [15 pts]
- ☐ < 5 cm [5 pts]
- ☐ NO WATER OR MOIST CHANNEL [0 pts]

COMMENTS 8.5", 11.5" **MAXIMUM POOL DEPTH (centimeters):** 29.2

Pool Depth Max = 30: 30

3. BANK FULL WIDTH (Measured as the average of 3-4 measurements) **(Check *ONLY* one box):**

- ☐ > 4.0 meters (> 13') [30 pts]
- ☐ > 3.0 m - 4.0 m (> 9' 7" - 13') [25 pts]
- ☑ > 1.5 m - 3.0 m (> 4' 8" - 9' 7") [20 pts]
- ☐ > 1.0 m - 1.5 m (> 3' 3" - 4' 8") [15 pts]
- ☐ ≤ 1.0 m (≤ 3' 3") [5 pts]

COMMENTS 1.5m, 2.6, 1.7, 1.5 widest **AVERAGE BANKFULL WIDTH (meters)** 1.8

Bankfull Width Max=30: 20

This information must also be completed

RIPARIAN ZONE AND FLOODPLAIN QUALITY ☆NOTE: River Left (L) and Right (R) as looking downstream☆

RIPARIAN WIDTH (Per Bank) L	R		FLOODPLAIN QUALITY (Most Predominant per Bank) L	R		L	R	
☑	☑	Wide >10m	☑	☑	Mature Forest, Wetland	☐	☐	Conservation Tillage
☐	☐	Moderate 5-10m	☐	☐	Immature Forest, Shrub or Old Field	☐	☐	Urban or Industrial
☐	☐	Narrow <5m	☐	☐	Residential, Park, New Field	☐	☐	Open Pasture, Row Crop
☐	☐	None	☐	☐	Fenced Pasture	☐	☐	Mining or Construction

COMMENTS _____

FLOW REGIME *(At Time of Evaluation)* (Check *ONLY* one box):

- ☑ Stream Flowing
- ☐ Subsurface flow with isolated pools (Interstitial)
- ☐ Moist Channel, isolated pools, no flow (Intermittent)
- ☐ Dry channel, no water (Ephemeral)

COMMENTS _____

SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check *ONLY* one box):

☐ None	☐ 1.0	☑ 2.0	☐ 3.0
☐ 0.5	☐ 1.5	☐ 2.5	☐ >3

STREAM GRADIENT ESTIMATE

☐ Flat (0.5 ft/100 ft) ☐ Flat to Moderate ☑ Moderate (2 ft/100 ft) ☐ Moderate to Severe ☐ Severe (10 ft/100 ft)

June 20, 2008 Revision **PHWH Form Page - 1**

Erosion, few root mats & wads, tires, log jams & leaf pack

Stream 1a

ADDITIONAL STREAM INFORMATION (This Information Must Also be Completed):

QHEI PERFORMED? - ☐ Yes ☑ No QHEI Score _____ (If Yes, Attach Completed QHEI Form)

DOWNSTREAM DESIGNATED USE(S)

☐ WWH Name: _____ Distance from Evaluated Stream _____

☐ CWH Name: _____ Distance from Evaluated Stream _____

☐ EWH Name: _____ Distance from Evaluated Stream _____

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATION

USGS Quadrangle Name: Peninsula NRCS Soil Map Page: _____ NRCS Soil Map Stream Order _____

County: Summit Township / City: Peninsula

MISCELLANEOUS

Base Flow Conditions? (Y/N): Y Date of last precipitation: 3/10/2019 Quantity: 0.14"

Photograph Information: DSCN 7299 - 7319

Elevated Turbidity? (Y/N): N Canopy (% open): 20

Were samples collected for water chemistry? (Y/N): N (Note lab sample no. or id. and attach results) Lab Number: _____

Field Measures: Temp (°C) — Dissolved Oxygen (mg/l) — pH (S.U.) — Conductivity (µmhos/cm) —

Is the sampling reach representative of the stream (Y/N) Y If not, please explain: _____

Additional comments/description of pollution impacts: None

BIOTIC EVALUATION

Performed? (Y/N): N (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)

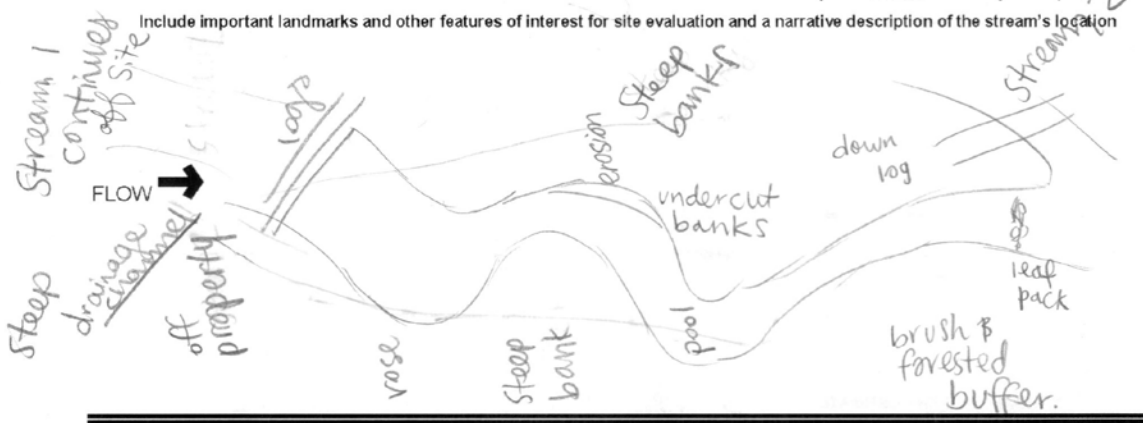
Fish Observed? (Y/N) — Voucher? (Y/N) — Salamanders Observed? (Y/N) — Voucher? (Y/N) —

Frogs or Tadpoles Observed? (Y/N) — Voucher? (Y/N) — Aquatic Macroinvertebrates Observed? (Y/N) — Voucher? (Y/N) —

Comments Regarding Biology: Not sampled for

DRAWING AND NARRATIVE DESCRIPTION OF STREAM REACH (This must be completed):

Include important landmarks and other features of interest for site evaluation and a narrative description of the stream's location



PHWH Form Page - 2

June 20, 2008 Revision

Stream 1b

OhioEPA Primary Headwater Habitat Evaluation Form

HHEI Score (sum of metrics 1, 2, 3) : 33

SITE NAME/LOCATION Pittenger Dam (INC) Stream 2 SITE NUMBER _____ RIVER BASIN Cuyahoga River DRAINAGE AREA (mi²) 0.0355

LENGTH OF STREAM REACH (ft) 150 ft LAT. 41.203106 LONG. -81.513697 RIVER CODE _____ RIVER MILE _____

DATE 3/13/19 SCORER JLB COMMENTS _____

NOTE: Complete All Items On This Form - Refer to "Field Evaluation Manual for Ohio's PHWH Streams" for Instructions

STREAM CHANNEL MODIFICATIONS: ☑ NONE / NATURAL CHANNEL ☐ RECOVERED ☐ RECOVERING ☐ RECENT OR NO RECOVERY

1. **SUBSTRATE (Estimate percent of every type of substrate present.** Check *ONLY* two predominant substrate *TYPE* boxes (Max of 40). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

TYPE		PERCENT	TYPE		PERCENT
☐ ☐	BLDR SLABS [16 pts]		☑ ☐	SILT [3 pt]	10
☐ ☐	BOULDER (>256 mm) [16 pts]		☐ ☐	LEAF PACK/WOODY DEBRIS [3 pts]	
☐ ☐	BEDROCK [16 pt]		☐ ☐	FINE DETRITUS [3 pts]	
☐ ☐	COBBLE (65-256 mm) [12 pts]	10	☐ ☐	CLAY or HARDPAN [0 pt]	5
☐ ☐	GRAVEL (2-64 mm) [9 pts]	15	☐ ☐	MUCK [0 pts]	
☐ ☑	SAND (<2 mm) [6 pts]	20	☐ ☐	ARTIFICIAL [3 pts]	

Total of Percentages of Bldr Slabs, Boulder, Cobble, Bedrock 10 (A) 9 (B) 4

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES: TOTAL NUMBER OF SUBSTRATE TYPES:

HHEI Metric Points — Substrate Max = 40: 13 (A + B)

2. **Maximum Pool Depth** ***(Measure the maximum pool depth within the 61 meter (200 ft)*** evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check *ONLY* one box):

☐ > 30 centimeters [20 pts]
☐ > 22.5 - 30 cm [30 pts]
☐ > 10 - 22.5 cm [25 pts]
☑ > 5 cm - 10 cm [15 pts]
☐ < 5 cm [5 pts]
☐ NO WATER OR MOIST CHANNEL [0 pts]

COMMENTS 3", 3.5" MAXIMUM POOL DEPTH (centimeters): 8.9

Pool Depth Max = 30: 15

3. **BANK FULL WIDTH (Measured as the average of 3-4 measurements)** (Check *ONLY* one box):

☐ > 4.0 meters (> 13') [30 pts]
☐ > 3.0 m - 4.0 m (> 9' 7" - 13') [25 pts]
☐ > 1.5 m - 3.0 m (> 4' 8" - 9' 7") [20 pts]
☐ > 1.0 m - 1.5 m (> 3' 3" - 4' 8") [15 pts]
☑ ≤ 1.0 m (≤ 3' 3") [5 pts]

COMMENTS 0.8m, AVERAGE BANKFULL WIDTH (meters): 0.8

Bankfull Width Max=30: 5

This information must also be completed

RIPARIAN ZONE AND FLOODPLAIN QUALITY ☆NOTE: River Left (L) and Right (R) as looking downstream☆

RIPARIAN WIDTH L R (Per Bank)	FLOODPLAIN QUALITY L R (Most Predominant per Bank)	L R
☑ ☑ Wide >10m	☑ ☑ Mature Forest, Wetland	☐ ☐ Conservation Tillage
☐ ☐ Moderate 5-10m	☐ ☐ Immature Forest, Shrub or Old Field	☐ ☐ Urban or Industrial
☐ ☐ Narrow <5m	☐ ☐ Residential, Park, New Field	☐ ☐ Open Pasture, Row Crop
☐ ☐ None	☐ ☐ Fenced Pasture	☐ ☐ Mining or Construction

COMMENTS _____

FLOW REGIME *(At Time of Evaluation)* (Check *ONLY* one box):

☑ Stream Flowing
☐ Subsurface flow with isolated pools (Interstitial)
☐ Moist Channel, isolated pools, no flow (Intermittent)
☐ Dry channel, no water (Ephemeral)

COMMENTS _____

SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check *ONLY* one box):

☐ None ☐ 1.0 ☐ 2.0 ☐ 3.0
☑ 0.5 ☐ 1.5 ☐ 2.5 ☐ >3

STREAM GRADIENT ESTIMATE

☐ Flat (0.5 ft/100 ft) ☐ Flat to Moderate ☐ Moderate (2 ft/100 ft) ☑ Moderate to Severe ☐ Severe (10 ft/100 ft)

barbed wire end point upstream. drop off 7/19 Stream 1/2 Junction.

June 20, 2008 Revision PHWH Form Page - 1

Stream 1b

ADDITIONAL STREAM INFORMATION (This Information Must Also be Completed):

QHEI PERFORMED? - ☐ Yes ☑ No QHEI Score _____ (If Yes, Attach Completed QHEI Form)

DOWNSTREAM DESIGNATED USE(S)

☐ WWH Name: _____ Distance from Evaluated Stream _____

☐ CWH Name: _____ Distance from Evaluated Stream _____

☐ EWH Name: _____ Distance from Evaluated Stream _____

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATION

USGS Quadrangle Name: Peninsula NRCS Soil Map Page: _____ NRCS Soil Map Stream Order _____

County: Summit Township / City: Peninsula

MISCELLANEOUS

Base Flow Conditions? (Y/N): Y Date of last precipitation: 3/10/2019 Quantity: 0.14"

Photograph Information: DSCN 7321-7324

Elevated Turbidity? (Y/N): N Canopy (% open): 40

Were samples collected for water chemistry? (Y/N): N (Note lab sample no. or id. and attach results) Lab Number: _____

Field Measures: Temp (°C) — Dissolved Oxygen (mg/l) — pH (S.U.) — Conductivity (µmhos/cm) —

Is the sampling reach representative of the stream (Y/N) — If not, please explain: _____

Additional comments/description of pollution impacts: None

BIOTIC EVALUATION

Performed? (Y/N): N (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)

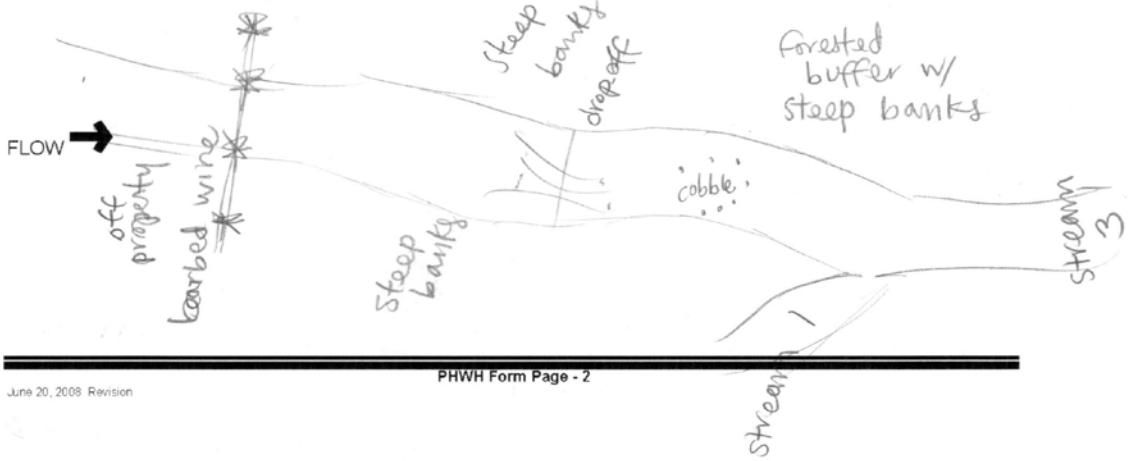
Fish Observed? (Y/N) — Voucher? (Y/N) — Salamanders Observed? (Y/N) — Voucher? (Y/N) —

Frogs or Tadpoles Observed? (Y/N) — Voucher? (Y/N) — Aquatic Macroinvertebrates Observed? (Y/N) — Voucher? (Y/N) —

Comments Regarding Biology: Not sampled for

DRAWING AND NARRATIVE DESCRIPTION OF STREAM REACH (This must be completed):

Include important landmarks and other features of interest for site evaluation and a narrative description of the stream's location



PHWH Form Page - 2

June 20, 2008 Revision

Stream 1 US of Stream 2 Confluence

OhioEPA Primary Headwater Habitat Evaluation Form

HHEI Score (sum of metrics 1, 2, 3) : 58

SITE NAME/LOCATION FNC Pittenger Dam
Stream 3 SITE NUMBER ____ RIVER BASIN Cuyahoga River DRAINAGE AREA (mi²) 0.0398
LENGTH OF STREAM REACH (ft) 200 LAT. 41.203554 LONG. -81.519845 RIVER CODE — RIVER MILE ____
DATE 3/13/19 SCORER JLO COMMENTS ____

NOTE: Complete All Items On This Form - Refer to "Field Evaluation Manual for Ohio's PHWH Streams" for Instructions

STREAM CHANNEL MODIFICATIONS: ☐ NONE / NATURAL CHANNEL ☐ RECOVERED ☑ RECOVERING ☐ RECENT OR NO RECOVERY
Dam recently removed. Hydrology impacted

1. **SUBSTRATE (Estimate percent of every type of substrate present.** Check *ONLY* two predominant substrate *TYPE* boxes (Max of 40). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

TYPE		PERCENT	TYPE		PERCENT
☐ ☐	BLDR SLABS [16 pts]		☐ ☑	SILT [3 pt]	30
☐ ☐	BOULDER (>256 mm) [16 pts]		☐ ☐	LEAF PACK/WOODY DEBRIS [3 pts]	
☐ ☐	BEDROCK [16 pt]		☐ ☐	FINE DETRITUS [3 pts]	
☐ ☐	COBBLE (65-256 mm) [12 pts]	10	☐ ☐	CLAY or HARDPAN [0 pt]	
☐ ☐	GRAVEL (2-64 mm) [9 pts]	20	☐ ☐	MUCK [0 pts]	
☑ ☐	SAND (<2 mm) [6 pts]	35	☐ ☐	ARTIFICIAL [3 pts]	

Total of Percentages of Bldr Slabs, Boulder, Cobble, Bedrock 10 (A) 9 (B) 4

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES: TOTAL NUMBER OF SUBSTRATE TYPES:

HHEI Metric Points — Substrate Max = 40: 13 (A + B)

2. **Maximum Pool Depth** *(Measure the maximum pool depth within the 61 meter (200 ft)* evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check *ONLY* one box):

☐ > 30 centimeters [20 pts]
☐ > 22.5 - 30 cm [30 pts]
☑ > 10 - 22.5 cm [25 pts]
☐ > 5 cm - 10 cm [15 pts]
☐ < 5 cm [5 pts]
☐ NO WATER OR MOIST CHANNEL [0 pts]

COMMENTS 4", 5" MAXIMUM POOL DEPTH (centimeters): 12.7

Pool Depth Max = 30: 25

3. **BANK FULL WIDTH (Measured as the average of 3-4 measurements)** (Check *ONLY* one box):

☐ > 4.0 meters (> 13') [30 pts]
☐ > 3.0 m - 4.0 m (> 9' 7" - 13') [25 pts]
☑ > 1.5 m - 3.0 m (> 4' 8" - 9' 7") [20 pts]
☐ > 1.0 m - 1.5 m (> 3' 3" - 4' 8") [15 pts]
☐ ≤ 1.0 m (≤ 3' 3") [5 pts]

COMMENTS 2.8m, 1.8m, 2.3m AVERAGE BANKFULL WIDTH (meters): 2.3

Bankfull Width Max=30: 20

This information must also be completed

RIPARIAN ZONE AND FLOODPLAIN QUALITY ☆NOTE: River Left (L) and Right (R) as looking downstream☆

RIPARIAN WIDTH L R (Per Bank)	FLOODPLAIN QUALITY L R (Most Predominant per Bank)	L R
☑ ☑ Wide >10m	☑ ☑ Mature Forest, Wetland	☐ ☐ Conservation Tillage
☐ ☐ Moderate 5-10m	☐ ☐ Immature Forest, Shrub or Old Field	☐ ☐ Urban or Industrial
☐ ☐ Narrow <5m	☐ ☐ Residential, Park, New Field	☐ ☐ Open Pasture, Row Crop
☐ ☐ None	☐ ☐ Fenced Pasture	☐ ☐ Mining or Construction

COMMENTS ____

FLOW REGIME *(At Time of Evaluation)* (Check *ONLY* one box):

☑ Stream Flowing
☐ Subsurface flow with isolated pools (Interstitial)
☐ Moist Channel, isolated pools, no flow (Intermittent)
☐ Dry channel, no water (Ephemeral)

COMMENTS ____

SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check *ONLY* one box):

☐ None ☑ 1.0 ☐ 2.0 ☐ 3.0
☐ 0.5 ☐ 1.5 ☐ 2.5 ☐ >3

STREAM GRADIENT ESTIMATE

☑ Flat (0.5 ft/100 ft) ☐ Flat to Moderate ☐ Moderate (2 ft/100 ft) ☐ Moderate to Severe ☐ Severe (10 ft/100 ft)

June 20, 2008 Revision **PHWH Form Page - 1**

eroded, incised channel. 47" max. silty clay there. clay downstream deep pool after log jam downstream by stream 3/4 junction is 14.5" Stream 3 diffuses into wetland.

Stream 1 US of Stream 2 Confluence

ADDITIONAL STREAM INFORMATION (This Information Must Also be Completed):

QHEI PERFORMED? - ☐ Yes ☑ No QHEI Score _____ (If Yes, Attach Completed QHEI Form)

DOWNSTREAM DESIGNATED USE(S)

☐ WWH Name: _____ Distance from Evaluated Stream _____
☐ CWH Name: _____ Distance from Evaluated Stream _____
☐ EWH Name: _____ Distance from Evaluated Stream _____

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATION

USGS Quadrangle Name: Peninsula NRCS Soil Map Page: _____ NRCS Soil Map Stream Order _____

County: Summit Township / City: Peninsula

MISCELLANEOUS

Base Flow Conditions? (Y/N): Y Date of last precipitation: 3/10/2019 Quantity: 0.14"

Photograph Information: DSCN 7326 - 7364

Elevated Turbidity? (Y/N): N Canopy (% open): 50

Were samples collected for water chemistry? (Y/N): N (Note lab sample no. or id. and attach results) Lab Number: _____

Field Measures: Temp (°C) — Dissolved Oxygen (mg/l) — pH (S.U.) — Conductivity (µmhos/cm) —

Is the sampling reach representative of the stream (Y/N) Y If not, please explain: _____

Additional comments/description of pollution impacts: None

BIOTIC EVALUATION

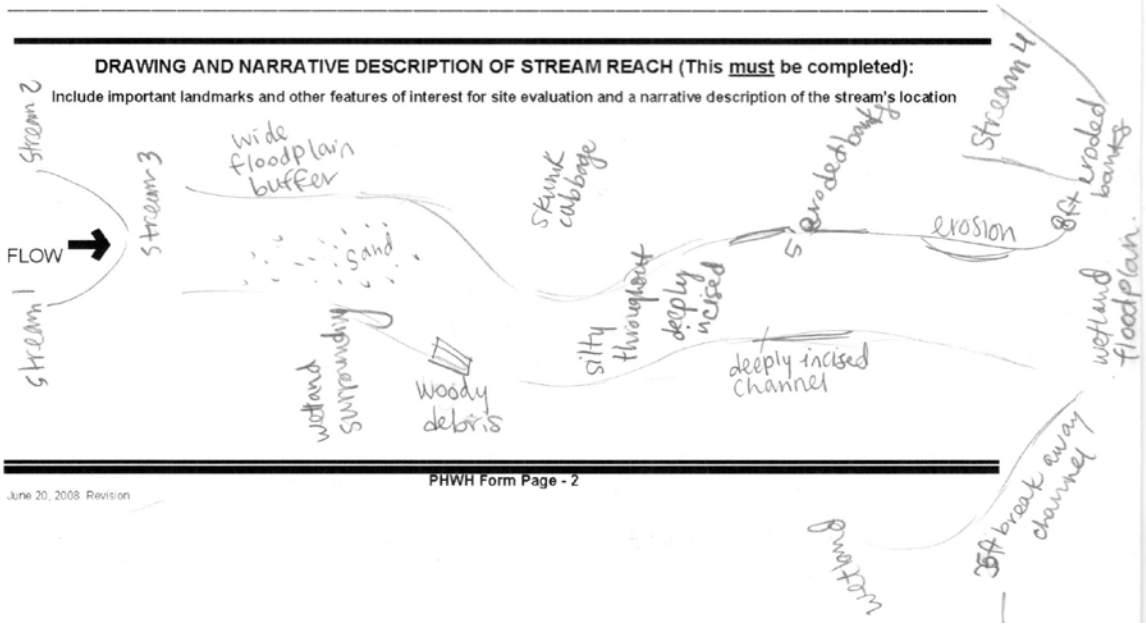
Performed? (Y/N): N (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)

Fish Observed? (Y/N) — Voucher? (Y/N) — Salamanders Observed? (Y/N) — Voucher? (Y/N) —
Frogs or Tadpoles Observed? (Y/N) — Voucher? (Y/N) — Aquatic Macroinvertebrates Observed? (Y/N) — Voucher? (Y/N) —

Comments Regarding Biology: Not sampled for

DRAWING AND NARRATIVE DESCRIPTION OF STREAM REACH (This must be completed):

Include important landmarks and other features of interest for site evaluation and a narrative description of the stream's location



PHWH Form Page - 2

June 20, 2008 Revision

Stream 2

OhioEPA Primary Headwater Habitat Evaluation Form

HHEI Score (sum of metrics 1, 2, 3) : 42

SITE NAME/LOCATION TNC Pittenger Dam
Stream 4 SITE NUMBER _____ RIVER BASIN _____ DRAINAGE AREA (mi²) 0.000309
LENGTH OF STREAM REACH (ft) 200 LAT. 41.203283 LONG. -81.520933 RIVER CODE _____ RIVER MILE _____
DATE 3/13/19 SCORER JLO COMMENTS _____

NOTE: Complete All Items On This Form - Refer to "Field Evaluation Manual for Ohio's PHWH Streams" for Instructions

STREAM CHANNEL ☐ NONE / NATURAL CHANNEL ☐ RECOVERED ☑ RECOVERING ☐ RECENT OR NO RECOVERY
MODIFICATIONS: Dam recently removed; Hydrology impacted.

1. **SUBSTRATE (Estimate percent of every type of substrate present.** Check *ONLY* two predominant substrate *TYPE* boxes (Max of 40). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

TYPE		PERCENT	TYPE		PERCENT
☐☐	BLDR SLABS [16 pts]		☑☐	SILT [3 pt]	65
☐☐	BOULDER (>256 mm) [16 pts]		☐☐	LEAF PACK/WOODY DEBRIS [3 pts]	10
☐☐	BEDROCK [16 pt]		☐☐	FINE DETRITUS [3 pts]	
☐☐	COBBLE (65-256 mm) [12 pts]		☐☑	CLAY or HARDPAN [0 pt]	15
☐☐	GRAVEL (2-64 mm) [9 pts]		☐☐	MUCK [0 pts]	
☐☐	SAND (<2 mm) [6 pts]	10	☐☐	ARTIFICIAL [3 pts]	

Total of Percentages of Bldr Slabs, Boulder, Cobble, Bedrock 0 (A) 3 (B) 4

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES: **TOTAL NUMBER OF SUBSTRATE TYPES:**

HHEI Metric Points
Substrate Max = 40: 7
A + B

2. **Maximum Pool Depth** ***(Measure the maximum pool depth within the 61 meter (200 ft)*** evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check *ONLY* one box):

☑ > 30 centimeters [20 pts]
☐ > 22.5 - 30 cm [30 pts]
☐ > 10 - 22.5 cm [25 pts]
☐ > 5 cm - 10 cm [15 pts]
☐ < 5 cm [5 pts]
☐ NO WATER OR MOIST CHANNEL [0 pts]

COMMENTS 9.5", 11", 14" **MAXIMUM POOL DEPTH (centimeters):** 35.6

Pool Depth Max = 30: 20

3. **BANK FULL WIDTH (Measured as the average of 3-4 measurements)** **(Check *ONLY* one box):**

☐ > 4.0 meters (> 13') [30 pts]
☐ > 3.0 m - 4.0 m (> 9' 7" - 13') [25 pts]
☐ > 1.5 m - 3.0 m (> 4' 8" - 9' 7") [20 pts]
☑ > 1.0 m - 1.5 m (> 3' 3" - 4' 8") [15 pts]
☐ ≤ 1.0 m (≤ 3' 3") [5 pts]

COMMENTS 0.9m, 0.6, 2.7m. **AVERAGE BANKFULL WIDTH (meters)** 1.4

Bankfull Width Max=30: 15

This information must also be completed

RIPARIAN ZONE AND FLOODPLAIN QUALITY ☆NOTE: River Left (L) and Right (R) as looking downstream☆

RIPARIAN WIDTH L	R	(Per Bank)	FLOODPLAIN QUALITY L	R	(Most Predominant per Bank)	L	R	
☑	☑	Wide >10m	☐	☑	Mature Forest, Wetland	☐	☐	Conservation Tillage
☐	☐	Moderate 5-10m	☑	☐	Immature Forest, Shrub or Old Field	☐	☐	Urban or Industrial
☐	☐	Narrow <5m	☐	☐	Residential, Park, New Field	☐	☐	Open Pasture, Row Crop
☐	☐	None	☐	☐	Fenced Pasture	☐	☐	Mining or Construction

COMMENTS _____

FLOW REGIME *(At Time of Evaluation)* (Check *ONLY* one box):

☑ Stream Flowing
☐ Subsurface flow with isolated pools (Interstitial)
☐ Moist Channel, isolated pools, no flow (Intermittent)
☐ Dry channel, no water (Ephemeral)

COMMENTS _____

SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check *ONLY* one box):

☐ None ☑ 1.0 ☐ 2.0 ☐ 3.0
☐ 0.5 ☐ 1.5 ☐ 2.5 ☐ >3

STREAM GRADIENT ESTIMATE

☐ Flat (0.5 ft/100 ft) ☐ Flat to Moderate ☐ Moderate (2 ft/100 ft) ☑ Moderate to Severe ☐ Severe (10 ft/100 ft)

PHWH Form Page - 1

June 20, 2008 Revision

14" natural plunge pool.

Stream 2

ADDITIONAL STREAM INFORMATION (This Information Must Also be Completed):

QHEI PERFORMED? - ☐ Yes ☑ No QHEI Score _____ (If Yes, Attach Completed QHEI Form)

DOWNSTREAM DESIGNATED USE(S)

☐ WWH Name: _____ Distance from Evaluated Stream _____

☐ CWH Name: _____ Distance from Evaluated Stream _____

☐ EWH Name: _____ Distance from Evaluated Stream _____

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATION

USGS Quadrangle Name: Peninsula NRCS Soil Map Page: _____ NRCS Soil Map Stream Order _____

County: Summit Township / City: Peninsula

MISCELLANEOUS

Base Flow Conditions? (Y/N): Y Date of last precipitation: 3/10/19 Quantity: 0.14"

Photograph Information: DSCN 7366 - 7376

Elevated Turbidity? (Y/N): N Canopy (% open): 60

Were samples collected for water chemistry? (Y/N): N (Note lab sample no. or id. and attach results) Lab Number: _____

Field Measures: Temp (°C) – Dissolved Oxygen (mg/l) – pH (S.U.) – Conductivity (µmhos/cm) –

Is the sampling reach representative of the stream (Y/N) Y If not, please explain: _____

Additional comments/description of pollution impacts: None

BIOTIC EVALUATION

Performed? (Y/N): N (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)

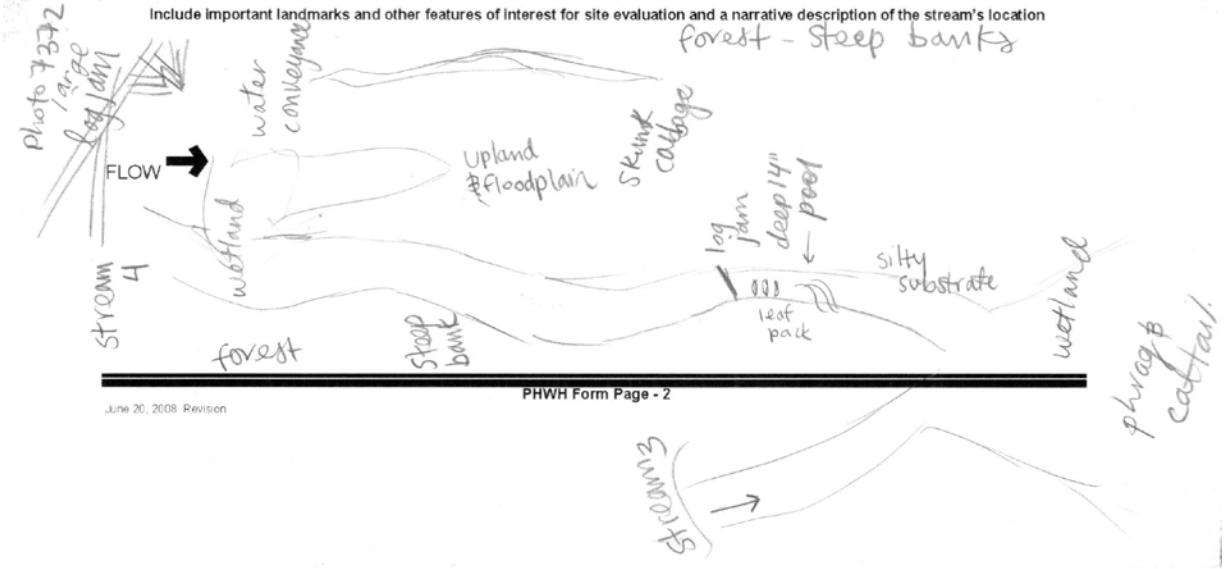
Fish Observed? (Y/N) – Voucher? (Y/N) – Salamanders Observed? (Y/N) – Voucher? (Y/N) –

Frogs or Tadpoles Observed? (Y/N) – Voucher? (Y/N) – Aquatic Macroinvertebrates Observed? (Y/N) – Voucher? (Y/N) –

Comments Regarding Biology: Not sampled, gone

DRAWING AND NARRATIVE DESCRIPTION OF STREAM REACH (This must be completed):

Include important landmarks and other features of interest for site evaluation and a narrative description of the stream's location



PHWH Form Page - 2

June 20, 2008 Revision

Stream 1 DS of Stream 2 Confluence

OhioEPA Primary Headwater Habitat Evaluation Form

HHEI Score (sum of metrics 1, 2, 3) : 51

SITE NAME/LOCATION PNC Pittenger Dam
Stream 7* SITE NUMBER _____ RIVER BASIN Cuyahoga River DRAINAGE AREA (mi²) 0.0834
LENGTH OF STREAM REACH (ft) 400 LAT. 41.205104 LONG. 81.522030 RIVER CODE _____ RIVER MILE _____
DATE 3/13/2019 SCORER JLO COMMENTS *Renamed stream 5 ☆

NOTE: Complete All Items On This Form - Refer to "Field Evaluation Manual for Ohio's PHWH Streams" for Instructions

STREAM CHANNEL ☐ NONE / NATURAL CHANNEL ☐ RECOVERED ☐ RECOVERING ☑ RECENT OR NO RECOVERY
MODIFICATIONS: Dam removed; Very steep banks from erosion & plunge pool.

1. **SUBSTRATE** (Estimate percent of every type of substrate present. Check *ONLY* two predominant substrate *TYPE* boxes (Max of 40). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

TYPE		PERCENT	TYPE		PERCENT
☐☐	BLDR SLABS [16 pts]		☐☐	SILT [3 pt]	
☐☐	BOULDER (>256 mm) [16 pts]	8	☐☐	LEAF PACK/WOODY DEBRIS [3 pts]	
☐☐	BEDROCK [16 pt]		☐☐	FINE DETRITUS [3 pts]	
☐☐	COBBLE (65-256 mm) [12 pts]	8	☑☐	CLAY or HARDPAN [0 pt]	60
☐☐	GRAVEL (2-64 mm) [9 pts]	8	☐☐	MUCK [0 pts]	
☐☑	SAND (<2 mm) [6 pts]	16	☐☐	ARTIFICIAL [3 pts]	

Total of Percentages of Bldr Slabs, Boulder, Cobble, Bedrock 16 (A) 6 (B) 5

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES: TOTAL NUMBER OF SUBSTRATE TYPES:

HHEI Metric Points — Substrate Max = 40: 11 (A + B)

2. **Maximum Pool Depth** *(Measure the maximum pool depth within the 61 meter (200 ft)* evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check *ONLY* one box):

☐ > 30 centimeters [20 pts] ☐ > 5 cm - 10 cm [15 pts]
☑ > 22.5 - 30 cm [30 pts] ☐ < 5 cm [5 pts]
☐ > 10 - 22.5 cm [25 pts] ☐ NO WATER OR MOIST CHANNEL [0 pts]

COMMENTS 3", 1.5", 7.5", 9" MAXIMUM POOL DEPTH (centimeters): 229

Pool Depth Max = 30: 30

3. **BANK FULL WIDTH** (Measured as the average of 3-4 measurements) (Check *ONLY* one box):

☐ > 4.0 meters (> 13') [30 pts] ☐ > 1.0 m - 1.5 m (> 3' 3" - 4' 8") [15 pts]
☐ > 3.0 m - 4.0 m (> 9' 7" - 13') [25 pts] ☐ ≤ 1.0 m (≤ 3' 3") [5 pts]
☑ > 1.5 m - 3.0 m (> 4' 8" - 9' 7") [20 pts]

COMMENTS 1.75m, 3m, 2.8m, AVERAGE BANKFULL WIDTH (meters) 2.5

Bankfull Width Max=30: 20

This Information must also be completed

RIPARIAN ZONE AND FLOODPLAIN QUALITY ☆NOTE: River Left (L) and Right (R) as looking downstream☆

RIPARIAN WIDTH (Per Bank) L	R		FLOODPLAIN QUALITY (Most Predominant per Bank) L	R		L	R	
☑	☑	Wide >10m	☑	☑	Mature Forest, Wetland	☐	☐	Conservation Tillage
☐	☐	Moderate 5-10m	☑	☐	Immature Forest, Shrub or Old Field	☐	☐	Urban or Industrial
☐	☐	Narrow <5m	☐	☐	Residential, Park, New Field	☐	☐	Open Pasture, Row Crop
☐	☐	None	☐	☐	Fenced Pasture	☐	☐	Mining or Construction

COMMENTS wetland scrub/shrub upstream, forest downstream

FLOW REGIME *(At Time of Evaluation)* (Check *ONLY* one box):

☑ Stream Flowing ☐ Moist Channel, isolated pools, no flow (Intermittent)
☐ Subsurface flow with isolated pools (Interstitial) ☐ Dry channel, no water (Ephemeral)

COMMENTS

SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check *ONLY* one box):

☐ None ☑ 1.0 ☐ 2.0 ☐ 3.0
☐ 0.5 ☐ 1.5 ☐ 2.5 ☐ >3

STREAM GRADIENT ESTIMATE

☐ Flat (0.5 ft/100 ft) ☐ Flat to Moderate ☐ Moderate (2 ft/100 ft) ☐ Moderate to Severe ☑ Severe (10 ft/100 ft)

15 ft erosion on bank

June 20, 2008 Revision PHWH Form Page - 1

Max depth 16" @ non-natural plunge pool

Stream 1 DS of Stream 2 Confluence

ADDITIONAL STREAM INFORMATION (This Information Must Also be Completed):

QHEI PERFORMED? - ☐ Yes ☑ No QHEI Score _____ (If Yes, Attach Completed QHEI Form)

DOWNSTREAM DESIGNATED USE(S)

☐ WWH Name: _____ Distance from Evaluated Stream _____
☐ CWH Name: _____ Distance from Evaluated Stream _____
☐ EWH Name: _____ Distance from Evaluated Stream _____

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATION

USGS Quadrangle Name: Peninsula NRCS Soil Map Page: _____ NRCS Soil Map Stream Order _____

County: Summit Township / City: Peninsula

MISCELLANEOUS

Base Flow Conditions? (Y/N): Y Date of last precipitation: 3/10/19 Quantity: 0.14"

Photograph Information: DSCN 7412 - 7441

Elevated Turbidity? (Y/N): N Canopy (% open): 50

Were samples collected for water chemistry? (Y/N): N (Note lab sample no. or id. and attach results) Lab Number: _____

Field Measures: Temp (°C) — Dissolved Oxygen (mg/l) — pH (S.U.) — Conductivity (µmhos/cm) —

Is the sampling reach representative of the stream (Y/N) Y If not, please explain: _____

Additional comments/description of pollution impacts: None

BIOTIC EVALUATION

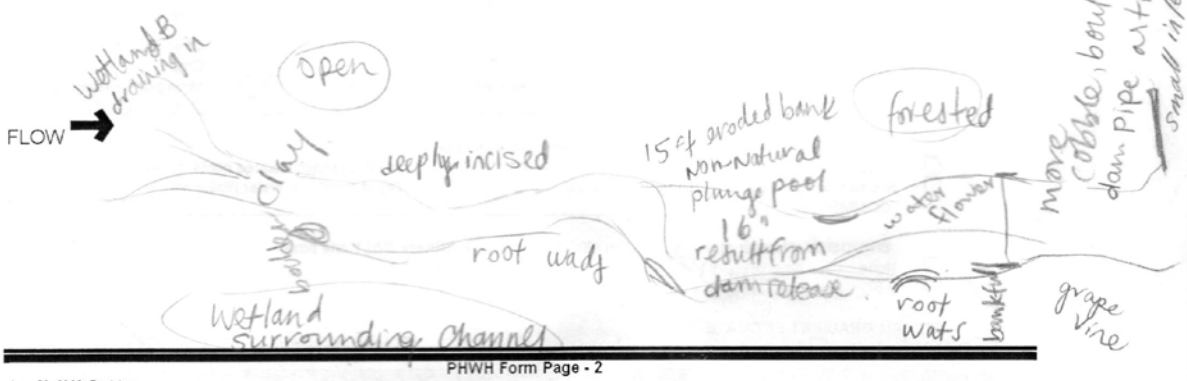
Performed? (Y/N): N (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)

Fish Observed? (Y/N) — Voucher? (Y/N) — Salamanders Observed? (Y/N) — Voucher? (Y/N) —
Frogs or Tadpoles Observed? (Y/N) — Voucher? (Y/N) — Aquatic Macroinvertebrates Observed? (Y/N) — Voucher? (Y/N) —

Comments Regarding Biology: Not sampled for

DRAWING AND NARRATIVE DESCRIPTION OF STREAM REACH (This must be completed):

Include important landmarks and other features of interest for site evaluation and a narrative description of the stream's location



PHWH Form Page - 2

June 20, 2008 Revision

9" deep downstream

Stream 3

OhioEPA Primary Headwater Habitat Evaluation Form

HHEI Score (sum of metrics 1, 2, 3) : 58

SITE NAME/LOCATION TNC Pittenger Dam
Stream 8* SITE NUMBER _____ RIVER BASIN Cuyahoga River DRAINAGE AREA (mi²) 0.089
LENGTH OF STREAM REACH (ft) 200 LAT. 41.20572 LONG. -81.52147 RIVER CODE _____ RIVER MILE _____
DATE 3/13/19 SCORER JLO COMMENTS * Renamed Stream 6

NOTE: Complete All Items On This Form - Refer to "Field Evaluation Manual for Ohio's PHWH Streams" for Instructions

STREAM CHANNEL MODIFICATIONS: ☑ NONE / NATURAL CHANNEL ☐ RECOVERED ☐ RECOVERING ☐ RECENT OR NO RECOVERY

1. SUBSTRATE (Estimate percent of every type of substrate present. Check *ONLY* two predominant substrate *TYPE* boxes (Max of 40). Add total number of significant substrate types found (Max of 8). Final metric score is sum of boxes A & B.

TYPE		PERCENT	TYPE		PERCENT
☐ ☐	BLDR SLABS [16 pts]		☐ ☑	SILT [3 pt]	30
☐ ☐	BOULDER (>256 mm) [16 pts]	10	☐ ☐	LEAF PACK/WOODY DEBRIS [3 pts]	
☐ ☐	BEDROCK [16 pt]		☐ ☐	FINE DETRITUS [3 pts]	
☐ ☐	COBBLE (65-256 mm) [12 pts]	5	☐ ☐	CLAY or HARDPAN [0 pt]	
☐ ☐	GRAVEL (2-64 mm) [9 pts]	15	☐ ☐	MUCK [0 pts]	
☑ ☐	SAND (<2 mm) [6 pts]	30	☐ ☐	ARTIFICIAL [3 pts]	

Total of Percentages of Bldr Slabs, Boulder, Cobble, Bedrock 15 (A) 9 (B) 4

SCORE OF TWO MOST PREDOMINATE SUBSTRATE TYPES: TOTAL NUMBER OF SUBSTRATE TYPES:

HHEI Metric Points

Substrate Max = 40: 13

A + B

2. Maximum Pool Depth ***(Measure the maximum pool depth within the 61 meter (200 ft)*** evaluation reach at the time of evaluation. Avoid plunge pools from road culverts or storm water pipes) (Check *ONLY* one box):

☐ > 30 centimeters [20 pts]
☐ > 22.5 - 30 cm [30 pts]
☑ > 10 - 22.5 cm [25 pts]
☐ > 5 cm - 10 cm [15 pts]
☐ < 5 cm [5 pts]
☐ NO WATER OR MOIST CHANNEL [0 pts]

COMMENTS 5", 4", 6" MAXIMUM POOL DEPTH (centimeters): 152

Pool Depth Max = 30: 25

3. BANK FULL WIDTH (Measured as the average of 3-4 measurements) (Check *ONLY* one box):

☐ > 4.0 meters (> 13') [30 pts]
☐ > 3.0 m - 4.0 m (> 9' 7" - 13') [25 pts]
☑ > 1.5 m - 3.0 m (> 4' 8" - 9' 7") [20 pts]
☐ > 1.0 m - 1.5 m (> 3' 3" - 4' 8") [15 pts]
☐ ≤ 1.0 m (≤ 3' 3") [5 pts]

COMMENTS 3.4m, 1.95m, 2.3m AVERAGE BANKFULL WIDTH (meters) 2.55

Bankfull Width Max=30: 20

This information must also be completed

RIPARIAN ZONE AND FLOODPLAIN QUALITY ☆NOTE: River Left (L) and Right (R) as looking downstream☆

RIPARIAN WIDTH (Per Bank) L R	FLOODPLAIN QUALITY (Most Predominant per Bank) L R	L R
☑ ☑ Wide >10m	☑ ☑ Mature Forest, Wetland	☐ ☐ Conservation Tillage
☐ ☐ Moderate 5-10m	☐ ☐ Immature Forest, Shrub or Old Field	☐ ☐ Urban or Industrial
☐ ☐ Narrow <5m	☐ ☐ Residential, Park, New Field	☐ ☐ Open Pasture, Row Crop
☐ ☐ None	☐ ☐ Fenced Pasture	☐ ☐ Mining or Construction

COMMENTS

FLOW REGIME *(At Time of Evaluation)* (Check *ONLY* one box):

☑ Stream Flowing
☐ Subsurface flow with isolated pools (Interstitial)
☐ Moist Channel, isolated pools, no flow (Intermittent)
☐ Dry channel, no water (Ephemeral)

COMMENTS

SINUOSITY (Number of bends per 61 m (200 ft) of channel) (Check *ONLY* one box):

☐ None ☐ 1.0 ☐ 2.0 ☐ 3.0
☐ 0.5 ☑ 1.5 ☐ 2.5 ☐ >3

STREAM GRADIENT ESTIMATE

☐ Flat (0.5 ft/100 ft) ☐ Flat to Moderate ☑ Moderate (2 ft/100 ft) ☐ Moderate to Severe ☐ Severe (10 ft/100 ft)

PHWH Form Page - 1

June 20, 2008 Revision

Stream 3

ADDITIONAL STREAM INFORMATION (This Information Must Also be Completed):

QHEI PERFORMED? - ☐ Yes ☑ No QHEI Score _____ (If Yes, Attach Completed QHEI Form)

DOWNSTREAM DESIGNATED USE(S)

☐ WWH Name: _____ Distance from Evaluated Stream _____
☐ CWH Name: _____ Distance from Evaluated Stream _____
☐ EWH Name: _____ Distance from Evaluated Stream _____

MAPPING: ATTACH COPIES OF MAPS, INCLUDING THE ENTIRE WATERSHED AREA. CLEARLY MARK THE SITE LOCATION

USGS Quadrangle Name: Peninsula NRCS Soil Map Page: _____ NRCS Soil Map Stream Order _____

County: Summit Township / City: Peninsula

MISCELLANEOUS

Base Flow Conditions? (Y/N): Y Date of last precipitation: 3/10/19 Quantity: 0.14"

Photograph Information: DSCN 7443 - 7454

Elevated Turbidity? (Y/N): N Canopy (% open): 30

Were samples collected for water chemistry? (Y/N): N (Note lab sample no. or id. and attach results) Lab Number: _____

Field Measures: Temp (°C) — Dissolved Oxygen (mg/l) — pH (S.U.) — Conductivity (µmhos/cm) —

Is the sampling reach representative of the stream (Y/N) Y If not, please explain: _____

Additional comments/description of pollution impacts: None

BIOTIC EVALUATION

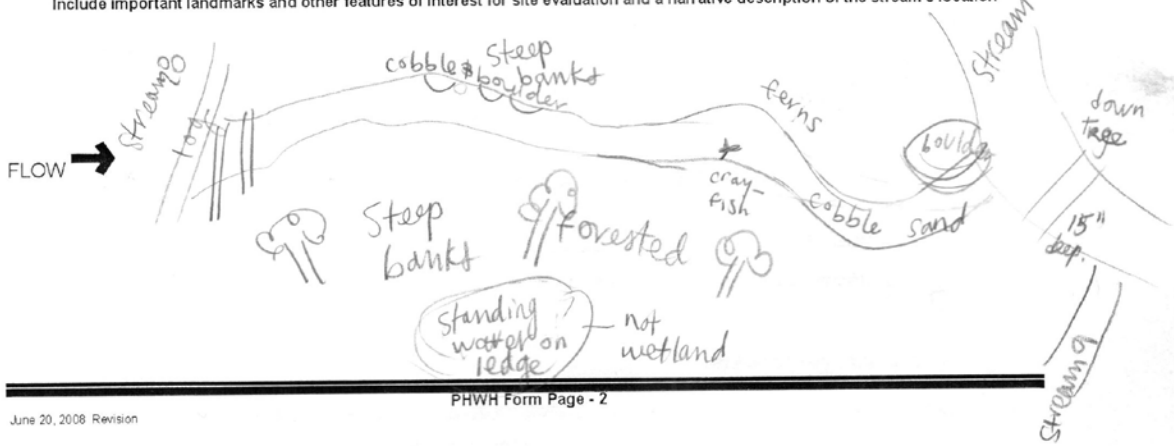
Performed? (Y/N): N (If Yes, Record all observations. Voucher collections optional. NOTE: all voucher samples must be labeled with the site ID number. Include appropriate field data sheets from the Primary Headwater Habitat Assessment Manual)

Fish Observed? (Y/N) — Voucher? (Y/N) — Salamanders Observed? (Y/N) — Voucher? (Y/N) —
Frogs or Tadpoles Observed? (Y/N) — Voucher? (Y/N) — Aquatic Macroinvertebrates Observed? (Y/N) Y Voucher? (Y/N) N

Comments Regarding Biology: Water strider, crayfish (not a rusty)

DRAWING AND NARRATIVE DESCRIPTION OF STREAM REACH (This must be completed):

Include important landmarks and other features of interest for site evaluation and a narrative description of the stream's location



PHWH Form Page - 2

June 20, 2008 Revision

APPENDIX D

Wetland Habitat Quality Assessment Field Forms

ORAM (Ohio Rapid Assessment Method for Wetlands)

Background Information

Name: Jim Palus, Jenna Odegard, Zach Bollheimer, Jackie Kopechek	
Date: 3/13/2019	
Affiliation: MAD Scientist & Associates	
Address: 253 North State Street, Suite 101 Westerville, Ohio 43081	
Phone Number: (614) 818-9156	
e-mail address: jim@madscientistassociates.net	
Name of Wetland: WETLAND A	
Vegetation Communit(ies): Emergent	
HGM Class(es): Depressional	
Location of Wetland: include map, address, north arrow, landmarks, distances, roads, etc.	
Lat/Long or UTM Coordinate WGS 84: 41.203604	-81.519931
USGS Quad Name	Peninsula
County	Summit
Township	Boston
Section and Subsection	T4N R11W
Hydrologic Unit Code	OH41100020405
Site Visit	3/13/2019
National Wetland Inventory Map	Not listed
Ohio Wetland Inventory Map	-------
Soil Survey	
Delineation report/map	Yes

Name of Wetland:	WETLAND A
Wetland Size (acres, hectares):	0.5 acres

Sketch: Include north arrow, relationship with other surface waters, vegetation zones, etc.

Comments, Narrative Discussion, Justification of Category Changes:

Wetland A is an emergent wetland located in a floodplain area at base of surrounding hills. The canopy consists of American beech (Fagus grandifolia), tulip poplar (Liriodendron tulipifera), and red oak (Quercus rubra). The understory comprises of spicebush (Lindera benzoin) with Christmas fern (Polystichum acrostichoides) as the dominant emergent forest floor cover. Surface water, high water table, saturation, water-stained leaves, and hydrogen sulfide odor were the primary hydrological indicators. Hydrogen sulfide was observed within the soil of the plot, characterizing the soil as hydric. The wetland scored moderate in hydrology with precipitation, seasonal/intermittent surface water, and a recovered hydrologic regime. No apparent substrate disturbance was observed and the habitat alteration is recovering. Overall, the habitat development is moderately good. No ORAM-listed invasive plants were observed. Microtopography presented moderate coarse woody debris and standing dead >25 cm dbh.

Final score : 49	**Category:** Category 2

2

WETLAND A

Scoring Boundary Worksheet

INSTRUCTIONS. The initial step in completing the ORAM is to identify the "scoring boundaries" of the wetland being rated. In many instances this determination will be relatively easy and the scoring boundaries will coincide with the "jurisdictional boundaries." For example, the scoring boundary of an isolated cattail marsh located in the middle of a farm field will likely be the same as that wetland's jurisdictional boundaries. In other instances, however, the scoring boundary will not be as easily determined. Wetlands that are small or isolated from other surface waters often form large contiguous areas or heterogeneous complexes of wetland and upland. In separating wetlands for scoring purposes, the hydrologic regime of the wetland is the main criterion that should be used. Boundaries between contiguous or connected wetlands should be established where the volume, flow, or velocity of water moving through the wetland changes significantly. *Areas with a high degree of hydrologic interaction should be scored as a single wetland.* In determining a wetland's scoring boundaries, use the guidelines in the ORAM Manual Section 5.0. In certain instances, it may be difficult to establish the scoring boundary for the wetland being rated. These problem situations include wetlands that form a patchwork on the landscape, wetlands divided by artificial boundaries like property fences, roads, or railroad embankments, wetlands that are contiguous with streams, lakes, or rivers, and estuarine or coastal wetlands. These situations are discussed below, however, it is recommended that Rater contact Ohio EPA, Division of Surface Water, 401/Wetlands Section if there are additional questions or a need for further clarification of the appropriate scoring boundaries of a particular wetland.

#	Steps in properly establishing scoring boundaries	done?	not applicable
Step 1	Identify the wetland area of interest. This may be the site of a proposed impact, a reference site, conservation site, etc.	✓	
Step 2	Identify the locations where there is physical evidence that hydrology changes rapidly. Such evidence includes both natural and human-induced changes including, constrictions caused by berms or dikes, points where the water velocity changes rapidly at rapids or falls, points where significant inflows occur at the confluence of rivers, or other factors that may restrict hydrologic interaction between the wetlands or parts of a single wetland.	✓	
Step 3	Delineate the boundary of the wetland to be rated such that all areas of interest that are contiguous to and within the areas where the hydrology does not change significantly, i.e. areas that have a high degree of hydrologic interaction are included within the scoring boundary.	✓	
Step 4	Determine if artificial boundaries, such as property lines, state lines, roads, railroad embankments, etc., are present. These should not be used to establish scoring boundaries unless they coincide with areas where the hydrologic regime changes.	✓	
Step 5	In all instances, the Rater may enlarge the minimum scoring boundaries discussed here to score together wetlands that could be scored separately.		✓
Step 6	Consult ORAM Manual Section 5.0 for how to establish scoring boundaries for wetlands that form a patchwork on the landscape, divided by artificial boundaries, contiguous to streams, lakes or rivers, or for dual classifications.		✓

End of Scoring Boundary Determination. Begin Narrative Rating on next page.

3

WETLAND A

Narrative Rating

INSTRUCTIONS. Answer each of the following questions. Questions 1, 2, 3 and 4 should be answered based on information obtained from the site visit or the literature *and* by submitting a Data Services Request to the Ohio Department of Natural Resources, Division of Natural Areas and Preserves, Natural Heritage Data Services, 1889 Fountain Square Court, Building F-1, Columbus, Ohio 43224, 614-265-6453 (phone), 614-265-3096 (fax), http://www.dnr.state.oh.us/dnap . The remaining questions are designed to be answered primarily by the results of the site visit. Refer to the User's Manual for descriptions of these wetland types. Note: "Critical habitat" is legally defined in the Endangered Species Act and is the geographic area containing physical or biological features essential to the conservation of a listed species or as an area that may require special management considerations or protection. The Rater should contact the Region 3 Headquarters or the Columbus Ecological Services Office for updates as to whether critical habitat has been designated for other federally listed threatened or endangered species. "Documented" means the wetland is listed in the appropriate State of Ohio database.

#	Question	Circle one	
1	**Critical Habitat.** Is the wetland in a township, section, or subsection of a United States Geological Survey 7.5 minute Quadrangle that has been designated by the U.S. Fish and Wildlife Service as "critical habitat" for any threatened or endangered plant or animal species? Note: as of January 1, 2001, of the federally listed endangered or threatened species which can be found in Ohio, the Indiana Bat has had critical habitat designated (50 CFR 17.95(a)) and the piping plover has had critical habitat proposed (65 FR 41812 July 6, 2000).	YES Wetland should be evaluated for possible Category 3 status Go to Question 2	NO Go to Question 2
2	**Threatened or Endangered Species.** Is the wetland known to contain an individual of, or documented occurrences of federal or state-listed threatened or endangered plant or animal species?	YES Wetland is a Category 3 wetland. Go to Question 3	NO Go to Question 3
3	**Documented High Quality Wetland.** Is the wetland on record in Natural Heritage Database as a high quality wetland?	YES Wetland is a Category 3 wetland Go to Question 4	NO Go to Question 4
4	**Significant Breeding or Concentration Area.** Does the wetland contain documented regionally significant breeding or nonbreeding waterfowl, neotropical songbird, or shorebird concentration areas?	YES Wetland is a Category 3 wetland Go to Question 5	NO Go to Question 5
5	**Category 1 Wetlands.** Is the wetland less than 0.5 hectares (1 acre) in size and **hydrologically isolated** and either 1) comprised of vegetation that is dominated (greater than eighty per cent areal cover) by *Phalaris arundinacea, Lythrum salicaria,* or *Phragmites australis*, or 2) an acidic pond created or excavated on mined lands that has little or no vegetation?	YES Wetland is a Category 1 wetland Go to Question 6	NO Go to Question 6
6	**Bogs.** Is the wetland a peat-accumulating wetland that 1) has no significant inflows or outflows, 2) supports acidophilic mosses, particularly *Sphagnum* spp., 3) the acidophilic mosses have >30% cover, 4) at least one species from Table 1 is present, and 5) the cover of invasive species (see Table 1) is <25%?	YES Wetland is a Category 3 wetland Go to Question 7	NO Go to Question 7
7	**Fens.** Is the wetland a carbon accumulating (peat, muck) wetland that is saturated during most of the year, primarily by a discharge of free flowing, mineral rich, ground water with a circumneutral ph (5.5-9.0) and with one or more plant species listed in Table 1 and the cover of invasive species listed in Table 1 is <25%?	YES Wetland is a Category 3 wetland Go to Question 8a	NO Go to Question 8a
8a	**"Old Growth Forest."** Is the wetland a forested wetland and is the forest characterized by, but not limited to, the following characteristics: overstory canopy trees of great age (exceeding at least 50% of a projected maximum attainable age for a species); little or no evidence of human-caused understory disturbance during the past 80 to 100 years; an all-aged structure and multilayered canopies; aggregations of canopy trees interspersed with canopy gaps; and significant numbers of standing dead snags and downed logs?	YES Wetland is a Category 3 wetland. Go to Question 8b	NO Go to Question 8b

4

WETLAND A

8b	**Mature forested wetlands**. Is the wetland a forested wetland with 50% or more of the cover of upper forest canopy consisting of deciduous trees with large diameters at breast height (dbh), generally diameters greater than 45cm (17.7in) dbh?	YES Wetland should be evaluated for possible Category 3 status. Go to Question 9a	NO Go to Question 9a
9a	**Lake Erie coastal and tributary wetlands.** Is the wetland located at an elevation less than 575 feet on the USGS map, adjacent to this elevation, or along a tributary to Lake Erie that is accessible to fish?	YES Go to Question 9b	NO Go to Question 10
9b	Does the wetland's hydrology result from measures designed to prevent erosion and the loss of aquatic plants, i.e. the wetland is partially hydrologically restricted from Lake Erie due to lakeward or landward dikes or other hydrological controls?	YES Wetland should be evaluated for possible Category 3 status Go to Question 10	NO Go to Question 9c
9c	Are Lake Erie water levels the wetland's primary hydrological influence, i.e. the wetland is hydrologically unrestricted (no lakeward or upland border alterations), or the wetland can be characterized as an "estuarine" wetland with lake and river influenced hydrology. These include sandbar deposition wetlands, estuarine wetlands, river mouth wetlands, or those dominated by submersed aquatic vegetation.	YES Go to Question 9d	NO Go to Question 10
9d	Does the wetland have a predominance of native species within its vegetation communities, although non-native or disturbance tolerant native species can also be present?	YES Wetland is a Category 3 wetland Go to Question 10	NO Go to Question 9e
9e	Does the wetland have a predominance of non-native or disturbance tolerant native plant species within its vegetation communities?	YES Wetland should be evaluated for possible Category 3 status Go to Question 10	NO Go to Question 10
10	**Lake Plain Sand Prairies (Oak Openings)** Is the wetland located in Lucas, Fulton, Henry, or Wood Counties and can the wetland be characterized by the following description: the wetland has a sandy substrate with interspersed organic matter, a water table often within several inches of the surface, and often with a dominance of the gramineous vegetation listed in Table 1 (woody species may also be present). The Ohio Department of Natural Resources Division of Natural Areas and Preserves can provide assistance in confirming this type of wetland and its quality.	YES Wetland is a Category 3 wetland. Go to Question 11	NO Go to Question 11
11	**Relict Wet Prairies**. Is the wetland a relict wet prairie community dominated by some or all of the species in Table 1. Extensive prairies were formerly located in the Darby Plains (Madison and Union Counties), Sandusky Plains (Wyandot, Crawford, and Marion Counties), northwest Ohio (e.g. Erie, Huron, Lucas, Wood Counties), and portions of western Ohio Counties (e.g. Darke, Mercer, Miami, Montgomery, Van Wert etc.).	YES Wetland should be evaluated for possible Category 3 status Complete Quantitative Rating	NO Complete Quantitative Rating

5

Table 1. Characteristic plant species.

invasive/exotic spp	fen species	bog species	0ak Opening species	wet prairie species
Lythrum salicaria	*Zygadenus elegans var. glaucus*	*Calla palustris*	*Carex cryptolepis*	*Calamagrostis canadensis*
Myriophyllum spicatum	*Cacalia plantaginea*	*Carex atlantica var. capillacea*	*Carex lasiocarpa*	*Calamogrostis stricta*
Najas minor	*Carex flava*	*Carex echinata*	*Carex stricta*	*Carex atherodes*
Phalaris arundinacea	*Carex sterilis*	*Carex oligosperma*	*Cladium mariscoides*	*Carex buxbaumii*
Phragmites australis	*Carex stricta*	*Carex trisperma*	*Calamagrostis stricta*	*Carex pellita*
Potamogeton crispus	*Deschampsia caespitosa*	*Chamaedaphne calyculata*	*Calamagrostis canadensis*	*Carex sartwellii*
Ranunculus ficaria	*Eleocharis rostellata*	*Decodon verticillatus*	*Quercus palustris*	*Gentiana andrewsii*
Rhamnus frangula	*Eriophorum viridicarinatum*	*Eriophorum virginicum*		*Helianthus grosseserratus*
Typha angustifolia	*Gentianopsis spp.*	*Larix laricina*		*Liatris spicata*
Typha xglauca	*Lobelia kalmii*	*Nemopanthus mucronatus*		*Lysimachia quadriflora*
	Parnassia glauca	*Schechzeria palustris*		*Lythrum alatum*
	Potentilla fruticosa	*Sphagnum spp.*		*Pycnanthemum virginianum*
	Rhamnus alnifolia	*Vaccinium macrocarpon*		*Silphium terebinthinaceum*
	Rhynchospora capillacea	*Vaccinium corymbosum*		*Sorghastrum nutans*
	Salix candida	*Vaccinium oxycoccos*		*Spartina pectinata*
	Salix myricoides	*Woodwardia virginica*		*Solidago riddellii*
	Salix serissima	*Xyris difformis*		
	Solidago ohioensis			
	Tofieldia glutinosa			
	Triglochin maritimum			
	Triglochin palustre			

End of Narrative Rating. Begin Quantitative Rating on next page.

ORAM v. 5.0 Field Form Quantitative Rating

Site: Pittenger Dam, Wetland A	**Rater(s):** ZB and JP	**Date:** 3/13/2019

WETLAND A

2	2
max 6 pts.	subtotal

Metric 1. Wetland Area (size).

Select one size class and assign score.

- [ ] >50 acres (>20.2ha) (6 pts)
- [ ] 25 to <50 acres (10.1 to <20.2ha) (5 pts)
- [ ] 10 to <25 acres (4 to <10.1ha) (4 pts)
- [ ] 3 to <10 acres (1.2 to <4ha) (3 pts)
- [✓] 0.3 to <3 acres (0.12 to <1.2ha) (2pts)
- [ ] 0.1 to <0.3 acres (0.04 to <0.12ha) (1 pt)
- [ ] <0.1 acres (0.04ha) (0 pts)

12	14
max 14 pts.	subtotal

Metric 2. Upland buffers and surrounding land use.

2a. Calculate average buffer width. Select only one and assign score. Do not double check.

- [✓] WIDE. Buffers average 50m (164ft) or more around wetland perimeter (7)
- [ ] MEDIUM. Buffers average 25m to <50m (82 to <164ft) around wetland perimeter (4)
- [ ] NARROW. Buffers average 10m to <25m (32ft to <82ft) around wetland perimeter (1)
- [ ] VERY NARROW. Buffers average <10m (<32ft) around wetland perimeter (0)

2b. Intensity of surrounding land use. Select one or double check and average.

- [ ] VERY LOW. 2nd growth or older forest, prairie, savannah, wildlife area, etc. (7)
- [✓] LOW. Old field (>10 years), shrub land, young second growth forest. (5)
- [ ] MODERATELY HIGH. Residential, fenced pasture, park, conservation tillage, new fallow field. (3)
- [ ] HIGH. Urban, industrial, open pasture, row cropping, mining, construction. (1)

19	33
max 30 pts.	subtotal

Metric 3. Hydrology.

3a. Sources of Water. Score all that apply.

- [ ] High pH groundwater (5)
- [✓] Other groundwater (3)
- [✓] Precipitation (1)
- [✓] Seasonal/Intermittent surface water (3)
- [ ] Perennial surface water (lake or stream) (5)

3b. Connectivity. Score all that apply.

- [ ] 100 year floodplain (1)
- [✓] Between stream/lake and other human use (1)
- [ ] Part of wetland/upland (e.g. forest), complex (1)
- [ ] Part of riparian or upland corridor (1)

3c. Maximum water depth. Select only one and assign score.

- [ ] >0.7 (27.6in) (3)
- [ ] 0.4 to 0.7m (15.7 to 27.6in) (2)
- [✓] <0.4m (<15.7in) (1)

3d. Duration inundation/saturation. Score one or dbl check.

- [ ] Semi- to permanently inundated/saturated (4)
- [✓] Regularly inundated/saturated (3)
- [ ] Seasonally inundated (2)
- [ ] Seasonally saturated in upper 30cm (12in) (1)

3e. Modifications to natural hydrologic regime. Score one or double check and average.

- [ ] None or none apparent (12)
- [✓] Recovered (7)
- [ ] Recovering (3)
- [ ] Recent or no recovery (1)

Check all disturbances observed

- [ ] ditch
- [ ] tile
- [✓] dike
- [ ] weir
- [ ] stormwater input
- [ ] point source (nonstormwater)
- [ ] filling/grading
- [ ] road bed/RR track
- [ ] dredging
- [ ] other_____

7	40
max 20 pts.	subtotal

Metric 4. Habitat Alteration and Development.

4a. Substrate disturbance. Score one or double check and average.

- [ ] None or none apparent (4)
- [ ] Recovered (3)
- [ ] Recovering (2)
- [✓] Recent or no recovery (1)

4b. Habitat development. Select only one and assign score.

- [ ] Excellent (7)
- [ ] Very good (6)
- [ ] Good (5)
- [ ] Moderately good (4)
- [✓] Fair (3)
- [ ] Poor to fair (2)
- [ ] Poor (1)

4c. Habitat alteration. Score one or double check and average.

- [ ] None or none apparent (9)
- [ ] Recovered (6)
- [✓] Recovering (3)
- [ ] Recent or no recovery (1)

Check all disturbances observed

- [ ] mowing
- [ ] grazing
- [✓] clearcutting
- [ ] selective cutting
- [ ] woody debris removal
- [ ] toxic pollutants*
- [ ] shrub/sapling removal
- [ ] herbaceous/aquatic bed removal
- [ ] sedimentation
- [ ] dredging
- [ ] farming
- [ ] nutrient enrichment

*possible, not confirmed through review of chemical data

40
subtotal this page

last revised 1 February 2001 jjm

7

ORAM v. 5.0 Field Form Quantitative Rating

Site: Pittenger Dam, Wetland A	**Rater(s):** ZB and JP	**Date:** 3/13/2019

40
subtotal first page

Metric 5. Special Wetlands.

WETLAND A

0 (max 10 pts.) | 40 (subtotal)

Check all that apply and score as indicated.

- [ ] Bog (10)
- [ ] Fen (10)
- [ ] Old growth forest (10)
- [ ] Mature forested wetland (5)
- [ ] Lake Erie coastal/tributary wetland-unrestricted hydrology (10)
- [ ] Lake Erie coastal/tributary wetland-restricted hydrology (5)
- [ ] Lake Plain Sand Prairies (Oak Openings) (10)
- [ ] Relict Wet Prairies (10)
- [ ] Known occurrence state/federal threatened or endangered species (10)
- [ ] Significant migratory songbird/water fowl habitat or usage (10)
- [ ] Category 1 Wetland. See Question 1 Qualitative Rating (-10)

Metric 6. Plant communities, interspersion, microtopography.

9 (max 20 pts.) | 49 (subtotal)

6a. Wetland Vegetation Communities.
Score all present using 0 to 3 scale.

- [ ] Aquatic bed
- [3] Emergent
- [0] Shrub
- [ ] Forest
- [ ] Mudflats
- [ ] Open water
- [ ] Other_____

6b. horizontal (plan view) Interspersion.
Select only one.

- [ ] High (5)
- [ ] Moderately high(4)
- [ ] Moderate (3)
- [ ] Moderately low (2)
- [✓] Low (1)
- [ ] None (0)

6c. Coverage of invasive plants. Refer to Table 1 ORAM long form for list. Add or deduct points for coverage

- [ ] Extensive >75% cover (-5)
- [ ] Moderate 25-75% cover (-3)
- [ ] Sparse 5-25% cover (-1)
- [ ] Nearly absent <5% cover (0)
- [✓] Absent (1)

6d. Microtopography.
Score all present using 0 to 3 scale.

- [0] Vegetated hummucks/tussucks
- [2] Coarse woody debris >15cm (6in)
- [2] Standing dead >25cm (10in) dbh
- [0] Amphibian breeding pools

Vegetation Community Cover Scale

0	Absent or comprises <0.1ha (0.2471 acres) contiguous area
1	Present and either comprises small part of wetland's vegetation and is of moderate quality, or comprises a significant part but is of low quality
2	Present and either comprises significant part of wetland's vegetation and is of moderate quality or comprises a small part and is of high quality
3	Present and comprises significant part, or more, of wetland's vegetation and is of high quality

Narrative Description of Vegetation Quality

low	Low spp diversity and/or predominance of nonnative or disturbance tolerant native species
mod	Native spp are dominant component of the vegetation, although nonnative and/or disturbance tolerant native spp can also be present, and species diversity moderate to moderately high, but generally w/o presence of rare threatened or endangered spp
high	A predominance of native species, with nonnative spp and/or disturbance tolerant native spp absent or virtually absent, and high spp diversity and often, but not always, the presence of rare, threatened, or endangered spp

Mudflat and Open Water Class Quality

0	Absent <0.1ha (0.247 acres)
1	Low 0.1 to <1ha (0.247 to 2.47 acres)
2	Moderate 1 to <4ha (2.47 to 9.88 acres)
3	High 4ha (9.88 acres) or more

Microtopography Cover Scale

0	Absent
1	Present very small amounts or if more common of marginal quality
2	Present in moderate amounts, but not of highest quality or in small amounts of highest quality
3	Present in moderate or greater amounts and of highest quality

49

End of Quantitative Rating. Complete Categorization Worksheets.

8

WETLAND A

ORAM Summary Worksheet

		circle answer or insert score	Result
Narrative Rating	Question 1 Critical Habitat	YES (NO)	If yes, Category 3.
	Question 2. Threatened or Endangered Species	YES (NO)	If yes, Category 3.
	Question 3. High Quality Natural Wetland	YES (NO)	If yes, Category 3.
	Question 4. Significant bird habitat	YES (NO)	If yes, Category 3.
	Question 5. Category 1 Wetlands	YES (NO)	If yes, Category 1.
	Question 6. Bogs	YES (NO)	If yes, Category 3.
	Question 7. Fens	YES (NO)	If yes, Category 3.
	Question 8a. Old Growth Forest	YES (NO)	If yes, Category 3.
	Question 8b. Mature Forested Wetland	YES (NO)	If yes, evaluate for Category 3; may also be 1 or 2.
	Question 9b. Lake Erie Wetlands - Restricted	YES (NO)	If yes, evaluate for Category 3; may also be 1 or 2.
	Question 9d. Lake Erie Wetlands – Unrestricted with native plants	YES (NO)	If yes, Category 3
	Question 9e. Lake Erie Wetlands - Unrestricted with invasive plants	YES (NO)	If yes, evaluate for Category 3; may also be 1 or 2.
	Question 10. Oak Openings	YES (NO)	If yes, Category 3
	Question 11. Relict Wet Prairies	YES (NO)	If yes, evaluate for Category 3; may also be 1 or 2.
Quantitative Rating	Metric 1. Size	2	
	Metric 2. Buffers and surrounding land use	12	
	Metric 3. Hydrology	19	
	Metric 4. Habitat	7	
	Metric 5. Special Wetland Communities	0	
	Metric 6. Plant communities, interspersion, microtopography	9	
	TOTAL SCORE	49	Category based on score breakpoints Category 2

Complete Wetland Categorization Worksheet.

9

WETLAND A Wetland Categorization Worksheet

Choices	Circle one		Evaluation of Categorization Result of ORAM
Did you answer "Yes" to any of the following questions: Narrative Rating Nos. 2, 3, 4, 6, 7, 8a, 9d, 10	YES Wetland is categorized as a Category 3 wetland	NO	Is quantitative rating score *less* than the Category 2 scoring threshold (*excluding* gray zone)? If yes, reevaluate the category of the wetland using the narrative criteria in OAC Rule 3745-1-54(C) and biological and/or functional assessments to determine if the wetland has been over-categorized by the ORAM
Did you answer "Yes" to any of the following questions: Narrative Rating Nos. 1, 8b, 9b, 9e, 11	YES Wetland should be evaluated for possible Category 3 status	NO	Evaluate the wetland using the 1) narrative criteria in OAC Rule 3745-1-54(C) and 2) the quantitative rating score. If the wetland is determined to be a Category 3 wetland using either of these, it should be categorized as a Category 3 wetland. Detailed biological and/or functional assessments may also be used to determine the wetland's category.
Did you answer "Yes" to Narrative Rating No. 5	YES Wetland is categorized as a Category 1 wetland	NO	Is quantitative rating score *greater* than the Category 2 scoring threshold (*including* any gray zone)? If yes, reevaluate the category of the wetland using the narrative criteria in OAC Rule 3745-1-54(C) and biological and/or functional assessments to determine if the wetland has been under-categorized by the ORAM
Does the quantitative score fall within the scoring range of a Category 1, 2, or 3 wetland?	YES Wetland is assigned to the appropriate category based on the scoring range	NO	If the score of the wetland is located within the scoring range for a particular category, the wetland should be assigned to that category. In all instances however, the narrative criteria described in OAC Rule 3745-1-54(C) can be used to clarify or change a categorization based on a quantitative score.
Does the quantitative score fall with the *"gray zone"* for Category 1 or 2 or Category 2 or 3 wetlands?	YES Wetland is assigned to the higher of the two categories or assigned to a category based on detailed assessments and the narrative criteria	NO	Rater has the option of assigning the wetland to the higher of the two categories or to assign a category based on the results of a nonrapid wetland assessment method, e.g. functional assessment, biological assessment, etc, and a consideration of the narrative criteria in OAC rule 3745-1-54(C).
Does the wetland otherwise exhibit *moderate OR superior* hydrologic OR habitat, OR recreational functions AND the wetland was *not* categorized as a Category 2 wetland (in the case of moderate functions) or a Category 3 wetland (in the case of superior functions) by this method?	YES Wetland was undercategorized by this method. A written justification for recategorization should be provided on Background Information Form	NO Wetland is assigned to category as determined by the ORAM.	A wetland may be undercategorized using this method, but still exhibit one or more superior functions, e.g. a wetland's biotic communities may be degraded by human activities, but the wetland may still exhibit superior hydrologic functions because of its type, landscape position, size, local or regional significance, etc. In this circumstance, the narrative criteria in OAC Rule 3745-1-54(C)(2) and (3) are controlling, and the under-categorization should be corrected. A written justification with supporting reasons or information for this determination should be provided.

Final Category

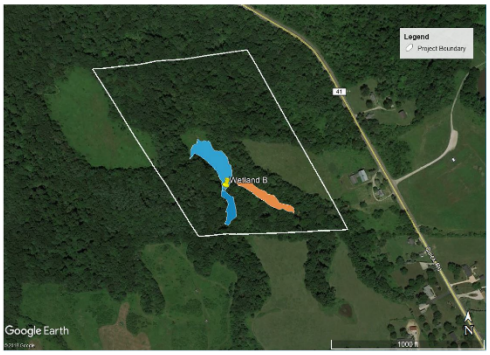
Choose one	Category 1	Category 2	Category 3

End of Ohio Rapid Assessment Method for Wetlands.

10

Background Information

Name: Jim Palus, Jenna Odegard, Zach Bollheimer, Jackie Kopechek	
Date: 3/13/2019	
Affiliation: MAD Scientist & Associates	
Address: 253 North State Street, Suite 101 Westerville, Ohio 43081	
Phone Number: (614) 818-9156	
e-mail address: jim@madscientistassociates.net	
Name of Wetland: WETLAND B	
Vegetation Communit(ies): Emergent	
HGM Class(es): Depressional	
Location of Wetland: include map, address, north arrow, landmarks, distances, roads, etc.	

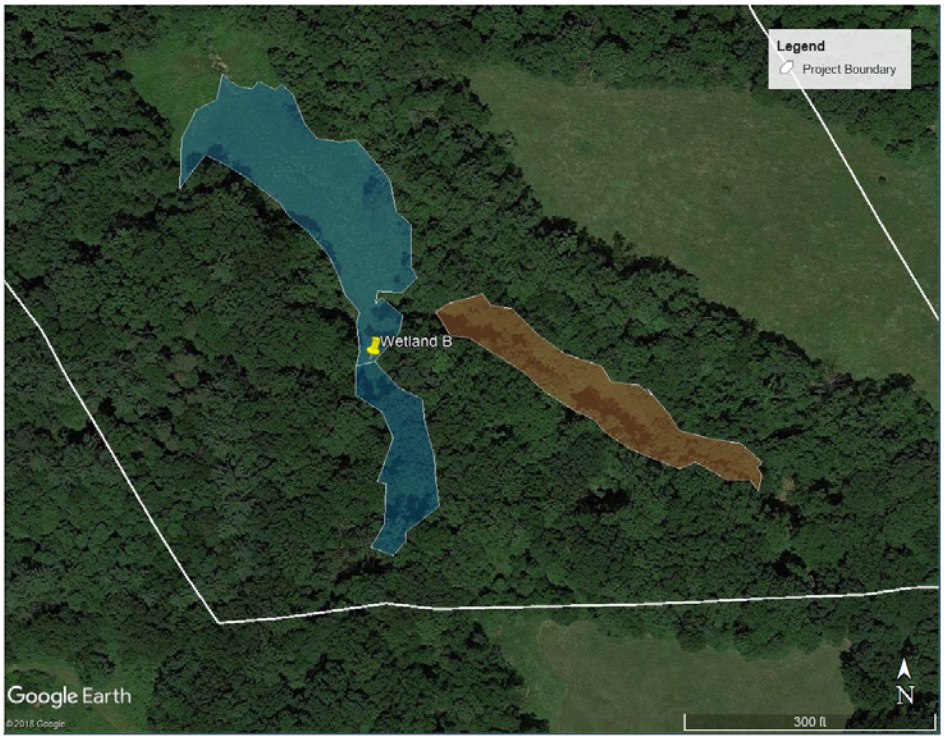


Lat/Long or UTM Coordinate WGS 84: 41.203776	-81.521113
USGS Quad Name	Peninsula
County	Summit
Township	Boston
Section and Subsection	T4N R11W
Hydrologic Unit Code	OH41100020405
Site Visit	3/13/2019
National Wetland Inventory Map	Not listed
Ohio Wetland Inventory Map	-------
Soil Survey	
Delineation report/map	Yes

1

Name of Wetland:	WETLAND B
Wetland Size (acres, hectares):	1.15 acres

Sketch: Include north arrow, relationship with other surface waters, vegetation zones, etc.



Comments, Narrative Discussion, Justification of Category Changes:

Wetland B is an emergent wetland with whitegrass (Leersia virginica) and hop sedge (Carex lupulina) as the dominant vegetation in the northern portion of the wetland. In the southern section of the wetland, cursed buttercup (Ranunculus sceleratus) and sweet woodreed (Cinna arundinacea) were prevalent. Surface water, high water table, saturation, sediment deposits, and drift deposits were the primary hydrological indicators. Redox depressions and redox dark surface were observed within the soil of the plot, characterizing the soil as hydric. The wetland has wide buffers and low intensity of surrounding land use. Hydrology was moderate with precipitation and seasonal/intermittent surface water sources and a recent recovery to the natural hydrologic regime observed. The wetland appears to be have had a recent recovery from substrate and habitat disturbance from heavy sedimentation and erosion. Overall, habitat development is fair. ORAM-listed invasive plants were moderate, yet the microtopography was moderate in coarse woody debris and standing dead.

Final score : 39	**Category:**	Modified 2

2

WETLAND B

Scoring Boundary Worksheet

INSTRUCTIONS. The initial step in completing the ORAM is to identify the "scoring boundaries" of the wetland being rated. In many instances this determination will be relatively easy and the scoring boundaries will coincide with the "jurisdictional boundaries." For example, the scoring boundary of an isolated cattail marsh located in the middle of a farm field will likely be the same as that wetland's jurisdictional boundaries. In other instances, however, the scoring boundary will not be as easily determined. Wetlands that are small or isolated from other surface waters often form large contiguous areas or heterogeneous complexes of wetland and upland. In separating wetlands for scoring purposes, the hydrologic regime of the wetland is the main criterion that should be used. Boundaries between contiguous or connected wetlands should be established where the volume, flow, or velocity of water moving through the wetland changes significantly. *Areas with a high degree of hydrologic interaction should be scored as a single wetland.* In determining a wetland's scoring boundaries, use the guidelines in the ORAM Manual Section 5.0. In certain instances, it may be difficult to establish the scoring boundary for the wetland being rated. These problem situations include wetlands that form a patchwork on the landscape, wetlands divided by artificial boundaries like property fences, roads, or railroad embankments, wetlands that are contiguous with streams, lakes, or rivers, and estuarine or coastal wetlands. These situations are discussed below, however, it is recommended that Rater contact Ohio EPA, Division of Surface Water, 401/Wetlands Section if there are additional questions or a need for further clarification of the appropriate scoring boundaries of a particular wetland.

#	Steps in properly establishing scoring boundaries	done?	not applicable
Step 1	Identify the wetland area of interest. This may be the site of a proposed impact, a reference site, conservation site, etc.	✓	
Step 2	Identify the locations where there is physical evidence that hydrology changes rapidly. Such evidence includes both natural and human-induced changes including, constrictions caused by berms or dikes, points where the water velocity changes rapidly at rapids or falls, points where significant inflows occur at the confluence of rivers, or other factors that may restrict hydrologic interaction between the wetlands or parts of a single wetland.	✓	
Step 3	Delineate the boundary of the wetland to be rated such that all areas of interest that are contiguous to and within the areas where the hydrology does not change significantly, i.e. areas that have a high degree of hydrologic interaction are included within the scoring boundary.	✓	
Step 4	Determine if artificial boundaries, such as property lines, state lines, roads, railroad embankments, etc., are present. These should not be used to establish scoring boundaries unless they coincide with areas where the hydrologic regime changes.	✓	
Step 5	In all instances, the Rater may enlarge the minimum scoring boundaries discussed here to score together wetlands that could be scored separately.		✓
Step 6	Consult ORAM Manual Section 5.0 for how to establish scoring boundaries for wetlands that form a patchwork on the landscape, divided by artificial boundaries, contiguous to streams, lakes or rivers, or for dual classifications.		✓

End of Scoring Boundary Determination. Begin Narrative Rating on next page.

3

WETLAND B

Narrative Rating

INSTRUCTIONS. Answer each of the following questions. Questions 1, 2, 3 and 4 should be answered based on information obtained from the site visit or the literature *and* by submitting a Data Services Request to the Ohio Department of Natural Resources, Division of Natural Areas and Preserves, Natural Heritage Data Services, 1889 Fountain Square Court, Building F-1, Columbus, Ohio 43224, 614-265-6453 (phone), 614-265-3096 (fax), http://www.dnr.state.oh.us/dnap . The remaining questions are designed to be answered primarily by the results of the site visit. Refer to the User's Manual for descriptions of these wetland types. Note: "Critical habitat" is legally defined in the Endangered Species Act and is the geographic area containing physical or biological features essential to the conservation of a listed species or as an area that may require special management considerations or protection. The Rater should contact the Region 3 Headquarters or the Columbus Ecological Services Office for updates as to whether critical habitat has been designated for other federally listed threatened or endangered species. "Documented" means the wetland is listed in the appropriate State of Ohio database.

#	Question	Circle one	
1	**Critical Habitat.** Is the wetland in a township, section, or subsection of a United States Geological Survey 7.5 minute Quadrangle that has been designated by the U.S. Fish and Wildlife Service as "critical habitat" for any threatened or endangered plant or animal species? Note: as of January 1, 2001, of the federally listed endangered or threatened species which can be found in Ohio, the Indiana Bat has had critical habitat designated (50 CFR 17.95(a)) and the piping plover has had critical habitat proposed (65 FR 41812 July 6, 2000).	YES Wetland should be evaluated for possible Category 3 status Go to Question 2	(NO) Go to Question 2
2	**Threatened or Endangered Species.** Is the wetland known to contain an individual of, or documented occurrences of federal or state-listed threatened or endangered plant or animal species?	YES Wetland is a Category 3 wetland. Go to Question 3	(NO) Go to Question 3
3	**Documented High Quality Wetland.** Is the wetland on record in Natural Heritage Database as a high quality wetland?	YES Wetland is a Category 3 wetland Go to Question 4	(NO) Go to Question 4
4	**Significant Breeding or Concentration Area.** Does the wetland contain documented regionally significant breeding or nonbreeding waterfowl, neotropical songbird, or shorebird concentration areas?	YES Wetland is a Category 3 wetland Go to Question 5	(NO) Go to Question 5
5	**Category 1 Wetlands.** Is the wetland less than 0.5 hectares (1 acre) in size and **hydrologically isolated** and either 1) comprised of vegetation that is dominated (greater than eighty per cent areal cover) by *Phalaris arundinacea, Lythrum salicaria,* or *Phragmites australis*, or 2) an acidic pond created or excavated on mined lands that has little or no vegetation?	YES Wetland is a Category 1 wetland Go to Question 6	(NO) Go to Question 6
6	**Bogs.** Is the wetland a peat-accumulating wetland that 1) has no significant inflows or outflows, 2) supports acidophilic mosses, particularly *Sphagnum* spp., 3) the acidophilic mosses have >30% cover, 4) at least one species from Table 1 is present, and 5) the cover of invasive species (see Table 1) is <25%?	YES Wetland is a Category 3 wetland Go to Question 7	(NO) Go to Question 7
7	**Fens.** Is the wetland a carbon accumulating (peat, muck) wetland that is saturated during most of the year, primarily by a discharge of free flowing, mineral rich, ground water with a circumneutral ph (5.5-9.0) and with one or more plant species listed in Table 1 and the cover of invasive species listed in Table 1 is <25%?	YES Wetland is a Category 3 wetland Go to Question 8a	(NO) Go to Question 8a
8a	**"Old Growth Forest."** Is the wetland a forested wetland and is the forest characterized by, but not limited to, the following characteristics: overstory canopy trees of great age (exceeding at least 50% of a projected maximum attainable age for a species); little or no evidence of human-caused understory disturbance during the past 80 to 100 years; an all-aged structure and multilayered canopies; aggregations of canopy trees interspersed with canopy gaps; and significant numbers of standing dead snags and downed logs?	YES Wetland is a Category 3 wetland. Go to Question 8b	(NO) Go to Question 8b

4

WETLAND B

8b	**Mature forested wetlands**. Is the wetland a forested wetland with 50% or more of the cover of upper forest canopy consisting of deciduous trees with large diameters at breast height (dbh), generally diameters greater than 45cm (17.7in) dbh?	YES Wetland should be evaluated for possible Category 3 status. Go to Question 9a	NO Go to Question 9a
9a	**Lake Erie coastal and tributary wetlands**. Is the wetland located at an elevation less than 575 feet on the USGS map, adjacent to this elevation, or along a tributary to Lake Erie that is accessible to fish?	YES Go to Question 9b	NO Go to Question 10
9b	Does the wetland's hydrology result from measures designed to prevent erosion and the loss of aquatic plants, i.e. the wetland is partially hydrologically restricted from Lake Erie due to lakeward or landward dikes or other hydrological controls?	YES Wetland should be evaluated for possible Category 3 status Go to Question 10	NO Go to Question 9c
9c	Are Lake Erie water levels the wetland's primary hydrological influence, i.e. the wetland is hydrologically unrestricted (no lakeward or upland border alterations), or the wetland can be characterized as an "estuarine" wetland with lake and river influenced hydrology. These include sandbar deposition wetlands, estuarine wetlands, river mouth wetlands, or those dominated by submersed aquatic vegetation.	YES Go to Question 9d	NO Go to Question 10
9d	Does the wetland have a predominance of native species within its vegetation communities, although non-native or disturbance tolerant native species can also be present?	YES Wetland is a Category 3 wetland Go to Question 10	NO Go to Question 9e
9e	Does the wetland have a predominance of non-native or disturbance tolerant native plant species within its vegetation communities?	YES Wetland should be evaluated for possible Category 3 status Go to Question 10	NO Go to Question 10
10	**Lake Plain Sand Prairies (Oak Openings)** Is the wetland located in Lucas, Fulton, Henry, or Wood Counties and can the wetland be characterized by the following description: the wetland has a sandy substrate with interspersed organic matter, a water table often within several inches of the surface, and often with a dominance of the gramineous vegetation listed in Table 1 (woody species may also be present). The Ohio Department of Natural Resources Division of Natural Areas and Preserves can provide assistance in confirming this type of wetland and its quality.	YES Wetland is a Category 3 wetland. Go to Question 11	NO Go to Question 11
11	**Relict Wet Prairies**. Is the wetland a relict wet prairie community dominated by some or all of the species in Table 1. Extensive prairies were formerly located in the Darby Plains (Madison and Union Counties), Sandusky Plains (Wyandot, Crawford, and Marion Counties), northwest Ohio (e.g. Erie, Huron, Lucas, Wood Counties), and portions of western Ohio Counties (e.g. Darke, Mercer, Miami, Montgomery, Van Wert etc.).	YES Wetland should be evaluated for possible Category 3 status Complete Quantitative Rating	NO Complete Quantitative Rating

5

Table 1. Characteristic plant species.

invasive/exotic spp	fen species	bog species	0ak Opening species	wet prairie species
Lythrum salicaria	*Zygadenus elegans var. glaucus*	*Calla palustris*	*Carex cryptolepis*	*Calamagrostis canadensis*
Myriophyllum spicatum	*Cacalia plantaginea*	*Carex atlantica var. capillacea*	*Carex lasiocarpa*	*Calamogrostis stricta*
Najas minor	*Carex flava*	*Carex echinata*	*Carex stricta*	*Carex atherodes*
Phalaris arundinacea	*Carex sterilis*	*Carex oligosperma*	*Cladium mariscoides*	*Carex buxbaumii*
Phragmites australis	*Carex stricta*	*Carex trisperma*	*Calamagrostis stricta*	*Carex pellita*
Potamogeton crispus	*Deschampsia caespitosa*	*Chamaedaphne calyculata*	*Calamagrostis canadensis*	*Carex sartwellii*
Ranunculus ficaria	*Eleocharis rostellata*	*Decodon verticillatus*	*Quercus palustris*	*Gentiana andrewsii*
Rhamnus frangula	*Eriophorum viridicarinatum*	*Eriophorum virginicum*		*Helianthus grosseserratus*
Typha angustifolia	*Gentianopsis spp.*	*Larix laricina*		*Liatris spicata*
Typha xglauca	*Lobelia kalmii*	*Nemopanthus mucronatus*		*Lysimachia quadriflora*
	Parnassia glauca	*Schechzeria palustris*		*Lythrum alatum*
	Potentilla fruticosa	*Sphagnum spp.*		*Pycnanthemum virginianum*
	Rhamnus alnifolia	*Vaccinium macrocarpon*		*Silphium terebinthinaceum*
	Rhynchospora capillacea	*Vaccinium corymbosum*		*Sorghastrum nutans*
	Salix candida	*Vaccinium oxycoccos*		*Spartina pectinata*
	Salix myricoides	*Woodwardia virginica*		*Solidago riddellii*
	Salix serissima	*Xyris difformis*		
	Solidago ohioensis			
	Tofieldia glutinosa			
	Triglochin maritimum			
	Triglochin palustre			

End of Narrative Rating. Begin Quantitative Rating on next page.

6

ORAM v. 5.0 Field Form Quantitative Rating

Site: Pittenger Dam, Wetland X	Rater(s): ZB and JP	Date: 3/13/2019

WETLAND B

max 6 pts.	subtotal
2	2

Metric 1. Wetland Area (size).

Select one size class and assign score.

- [ ] >50 acres (>20.2ha) (6 pts)
- [ ] 25 to <50 acres (10.1 to <20.2ha) (5 pts)
- [ ] 10 to <25 acres (4 to <10.1ha) (4 pts)
- [ ] 3 to <10 acres (1.2 to <4ha) (3 pts)
- [x] 0.3 to <3 acres (0.12 to <1.2ha) (2pts)
- [ ] 0.1 to <0.3 acres (0.04 to <0.12ha) (1 pt)
- [ ] <0.1 acres (0.04ha) (0 pts)

max 14 pts.	subtotal
12	14

Metric 2. Upland buffers and surrounding land use.

2a. Calculate average buffer width. Select only one and assign score. Do not double check.

- [x] WIDE. Buffers average 50m (164ft) or more around wetland perimeter (7)
- [ ] MEDIUM. Buffers average 25m to <50m (82 to <164ft) around wetland perimeter (4)
- [ ] NARROW. Buffers average 10m to <25m (32ft to <82ft) around wetland perimeter (1)
- [ ] VERY NARROW. Buffers average <10m (<32ft) around wetland perimeter (0)

2b. Intensity of surrounding land use. Select one or double check and average.

- [ ] VERY LOW. 2nd growth or older forest, prairie, savannah, wildlife area, etc. (7)
- [x] LOW. Old field (>10 years), shrub land, young second growth forest. (5)
- [ ] MODERATELY HIGH. Residential, fenced pasture, park, conservation tillage, new fallow field. (3)
- [ ] HIGH. Urban, industrial, open pasture, row cropping, mining, construction. (1)

max 30 pts.	subtotal
14	28

Metric 3. Hydrology.

3a. Sources of Water. Score all that apply.

- [ ] High pH groundwater (5)
- [x] Other groundwater (3)
- [x] Precipitation (1)
- [x] Seasonal/Intermittent surface water (3)
- [ ] Perennial surface water (lake or stream) (5)

3b. Connectivity. Score all that apply.

- [ ] 100 year floodplain (1)
- [x] Between stream/lake and other human use (1)
- [ ] Part of wetland/upland (e.g. forest), complex (1)
- [ ] Part of riparian or upland corridor (1)

3c. Maximum water depth. Select only one and assign score.

- [ ] >0.7 (27.6in) (3)
- [ ] 0.4 to 0.7m (15.7 to 27.6in) (2)
- [x] <0.4m (<15.7in) (1)

3d. Duration inundation/saturation. Score one or dbl check.

- [x] Semi- to permanently inundated/saturated (4)
- [ ] Regularly inundated/saturated (3)
- [ ] Seasonally inundated (2)
- [ ] Seasonally saturated in upper 30cm (12in) (1)

3e. Modifications to natural hydrologic regime. Score one or double check and average.

- [ ] None or none apparent (12)
- [ ] Recovered (7)
- [ ] Recovering (3)
- [x] Recent or no recovery (1)

Check all disturbances observed

- [ ] ditch
- [ ] tile
- [x] dike
- [ ] weir
- [ ] stormwater input
- [ ] point source (nonstormwater)
- [ ] filling/grading
- [ ] road bed/RR track
- [ ] dredging
- [ ] other_____

max 20 pts.	subtotal
5	33

Metric 4. Habitat Alteration and Development.

4a. Substrate disturbance. Score one or double check and average.

- [ ] None or none apparent (4)
- [ ] Recovered (3)
- [ ] Recovering (2)
- [x] Recent or no recovery (1)

4b. Habitat development. Select only one and assign score.

- [ ] Excellent (7)
- [ ] Very good (6)
- [ ] Good (5)
- [ ] Moderately good (4)
- [x] Fair (3)
- [ ] Poor to fair (2)
- [ ] Poor (1)

4c. Habitat alteration. Score one or double check and average.

- [ ] None or none apparent (9)
- [ ] Recovered (6)
- [ ] Recovering (3)
- [x] Recent or no recovery (1)

Check all disturbances observed

- [ ] mowing
- [ ] grazing
- [ ] clearcutting
- [ ] selective cutting
- [ ] woody debris removal
- [ ] toxic pollutants*
- [x] shrub/sapling removal
- [ ] herbaceous/aquatic bed removal
- [ ] sedimentation
- [ ] dredging
- [ ] farming
- [ ] nutrient enrichment

*possible, not confirmed through review of chemical data

subtotal this page
33

last revised 1 February 2001 jjm

7

ORAM v. 5.0 Field Form Quantitative Rating

Site: Pittenger Dam, Wetland X	**Rater(s):** ZB and JP	**Date:** 3/13/2019

33
subtotal first page

0	33
max 10 pts.	subtotal

Metric 5. Special Wetlands.

WETLAND B

Check all that apply and score as indicated.

- [ ] Bog (10)
- [ ] Fen (10)
- [ ] Old growth forest (10)
- [ ] Mature forested wetland (5)
- [ ] Lake Erie coastal/tributary wetland-unrestricted hydrology (10)
- [ ] Lake Erie coastal/tributary wetland-restricted hydrology (5)
- [ ] Lake Plain Sand Prairies (Oak Openings) (10)
- [ ] Relict Wet Prairies (10)
- [ ] Known occurrence state/federal threatened or endangered species (10)
- [ ] Significant migratory songbird/water fowl habitat or usage (10)
- [ ] Category 1 Wetland. See Question 1 Qualitative Rating (-10)

6	39
max 20 pts.	subtotal

Metric 6. Plant communities, interspersion, microtopography.

6a. Wetland Vegetation Communities.
Score all present using 0 to 3 scale.

- [ ] Aquatic bed
- [2] Emergent
- [ ] Shrub
- [ ] Forest
- [ ] Mudflats
- [ ] Open water
- [ ] Other_____

6b. horizontal (plan view) Interspersion.
Select only one.

- [ ] High (5)
- [ ] Moderately high(4)
- [ ] Moderate (3)
- [✓] Moderately low (2)
- [ ] Low (1)
- [ ] None (0)

6c. Coverage of invasive plants. Refer to Table 1 ORAM long form for list. Add or deduct points for coverage

- [ ] Extensive >75% cover (-5)
- [✓] Moderate 25-75% cover (-3)
- [ ] Sparse 5-25% cover (-1)
- [ ] Nearly absent <5% cover (0)
- [ ] Absent (1)

6d. Microtopography.
Score all present using 0 to 3 scale.

- [1] Vegetated hummucks/tussucks
- [2] Coarse woody debris >15cm (6in)
- [2] Standing dead >25cm (10in) dbh
- [0] Amphibian breeding pools

Vegetation Community Cover Scale

0	Absent or comprises <0.1ha (0.2471 acres) contiguous area
1	Present and either comprises small part of wetland's vegetation and is of moderate quality, or comprises a significant part but is of low quality
2	Present and either comprises significant part of wetland's vegetation and is of moderate quality or comprises a small part and is of high quality
3	Present and comprises significant part, or more, of wetland's vegetation and is of high quality

Narrative Description of Vegetation Quality

low	Low spp diversity and/or predominance of nonnative or disturbance tolerant native species
mod	Native spp are dominant component of the vegetation, although nonnative and/or disturbance tolerant native spp can also be present, and species diversity moderate to moderately high, but generally w/o presence of rare threatened or endangered spp
high	A predominance of native species, with nonnative spp and/or disturbance tolerant native spp absent or virtually absent, and high spp diversity and often, but not always, the presence of rare, threatened, or endangered spp

Mudflat and Open Water Class Quality

0	Absent <0.1ha (0.247 acres)
1	Low 0.1 to <1ha (0.247 to 2.47 acres)
2	Moderate 1 to <4ha (2.47 to 9.88 acres)
3	High 4ha (9.88 acres) or more

Microtopography Cover Scale

0	Absent
1	Present very small amounts or if more common of marginal quality
2	Present in moderate amounts, but not of highest quality or in small amounts of highest quality
3	Present in moderate or greater amounts and of highest quality

39

End of Quantitative Rating. Complete Categorization Worksheets.

8

WETLAND B

ORAM Summary Worksheet

		circle answer or insert score	Result
Narrative Rating	Question 1 Critical Habitat	YES (NO)	If yes, Category 3.
	Question 2. Threatened or Endangered Species	YES (NO)	If yes, Category 3.
	Question 3. High Quality Natural Wetland	YES (NO)	If yes, Category 3.
	Question 4. Significant bird habitat	YES (NO)	If yes, Category 3.
	Question 5. Category 1 Wetlands	YES (NO)	If yes, Category 1.
	Question 6. Bogs	YES (NO)	If yes, Category 3.
	Question 7. Fens	YES (NO)	If yes, Category 3.
	Question 8a. Old Growth Forest	YES (NO)	If yes, Category 3.
	Question 8b. Mature Forested Wetland	YES (NO)	If yes, evaluate for Category 3; may also be 1 or 2.
	Question 9b. Lake Erie Wetlands - Restricted	YES (NO)	If yes, evaluate for Category 3; may also be 1 or 2.
	Question 9d. Lake Erie Wetlands – Unrestricted with native plants	YES (NO)	If yes, Category 3
	Question 9e. Lake Erie Wetlands - Unrestricted with invasive plants	YES (NO)	If yes, evaluate for Category 3; may also be 1 or 2.
	Question 10. Oak Openings	YES (NO)	If yes, Category 3
	Question 11. Relict Wet Prairies	YES (NO)	If yes, evaluate for Category 3; may also be 1 or 2.
Quantitative Rating	Metric 1. Size	2	
	Metric 2. Buffers and surrounding land use	12	
	Metric 3. Hydrology	14	
	Metric 4. Habitat	5	
	Metric 5. Special Wetland Communities	0	
	Metric 6. Plant communities, interspersion, microtopography	6	
	TOTAL SCORE	39	Category based on score breakpoints Modified 2

Complete Wetland Categorization Worksheet.

9

WETLAND B Wetland Categorization Worksheet

Choices	Circle one		Evaluation of Categorization Result of ORAM
Did you answer "Yes" to any of the following questions: Narrative Rating Nos. 2, 3, 4, 6, 7, 8a, 9d, 10	YES Wetland is categorized as a Category 3 wetland	NO	Is quantitative rating score *less* than the Category 2 scoring threshold (*excluding* gray zone)? If yes, reevaluate the category of the wetland using the narrative criteria in OAC Rule 3745-1-54(C) and biological and/or functional assessments to determine if the wetland has been over-categorized by the ORAM
Did you answer "Yes" to any of the following questions: Narrative Rating Nos. 1, 8b, 9b, 9e, 11	YES Wetland should be evaluated for possible Category 3 status	NO	Evaluate the wetland using the 1) narrative criteria in OAC Rule 3745-1-54(C) and 2) the quantitative rating score. If the wetland is determined to be a Category 3 wetland using either of these, it should be categorized as a Category 3 wetland. Detailed biological and/or functional assessments may also be used to determine the wetland's category.
Did you answer "Yes" to Narrative Rating No. 5	YES Wetland is categorized as a Category 1 wetland	NO	Is quantitative rating score *greater* than the Category 2 scoring threshold (*including* any gray zone)? If yes, reevaluate the category of the wetland using the narrative criteria in OAC Rule 3745-1-54(C) and biological and/or functional assessments to determine if the wetland has been under-categorized by the ORAM
Does the quantitative score fall within the scoring range of a Category 1, 2, or 3 wetland?	YES Wetland is assigned to the appropriate category based on the scoring range	NO	If the score of the wetland is located within the scoring range for a particular category, the wetland should be assigned to that category. In all instances however, the narrative criteria described in OAC Rule 3745-1-54(C) can be used to clarify or change a categorization based on a quantitative score.
Does the quantitative score fall with the *"gray zone"* for Category 1 or 2 or Category 2 or 3 wetlands?	YES Wetland is assigned to the higher of the two categories or assigned to a category based on detailed assessments and the narrative criteria	NO	Rater has the option of assigning the wetland to the higher of the two categories or to assign a category based on the results of a nonrapid wetland assessment method, e.g. functional assessment, biological assessment, etc, and a consideration of the narrative criteria in OAC rule 3745-1-54(C).
Does the wetland otherwise exhibit *moderate OR superior* hydrologic OR habitat, OR recreational functions AND the wetland was *not* categorized as a Category 2 wetland (in the case of moderate functions) or a Category 3 wetland (in the case of superior functions) by this method?	YES Wetland was undercategorized by this method. A written justification for recategorization should be provided on Background Information Form	NO Wetland is assigned to category as determined by the ORAM.	A wetland may be undercategorized using this method, but still exhibit one or more superior functions, e.g. a wetland's biotic communities may be degraded by human activities, but the wetland may still exhibit superior hydrologic functions because of its type, landscape position, size, local or regional significance, etc. In this circumstance, the narrative criteria in OAC Rule 3745-1-54(C)(2) and (3) are controlling, and the under-categorization should be corrected. A written justification with supporting reasons or information for this determination should be provided.

Final Category

Choose one	Category 1	Category 2	Category 3

End of Ohio Rapid Assessment Method for Wetlands.

10