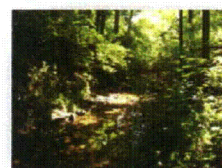


Wetland Functions and Values Assessment



PPL Bell Bend Nuclear Power Plant
Salem Township, Luzerne County, PA
April 2011

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Rev.3

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Introduction and Purpose

Wetland functions and values are the roles that a wetland performs resulting from specific characteristics of the wetland and the wetland's watershed. Functions are self-sustaining properties of a wetland ecosystem that exist in the absence of society without regard to subjective human values (The Highway Methodology Workbook Supplement). Values are the worth, merit, quality, or importance of a wetland to society based on either one or more functions and physical characteristics associated with the wetland (The Highway Methodology Workbook Supplement).

The purpose of the Functions and Values Assessment is to provide a comprehensive description of the functions and values of the wetlands delineated within the proposed Bell Bend Nuclear Power Plant (BBNPP) project boundary. There are approximately 155 acres of delineated wetlands within the BBNPP project boundary. Permanent, temporary, and secondary wetland impacts are proposed as a result of BBNPP construction. The functions and values assessment will aid in determining the wetland functions and values that will be reduced or eliminated as a result of BBNPP construction and operation, and will serve as a tool for identifying appropriate measures to mitigate those impacts.

Survey Procedure

The US Army Corps of Engineers' "The Highway Methodology Workbook Supplement: Wetland Functions and Values – A Descriptive Approach" (US Army Corps of Engineers New England District, September 1999), referred to herein as "The Highway Methodology", was used to evaluate wetland functions and values within the BBNPP project boundary (see Figure 1). This descriptive approach to wetland evaluations uses qualitative characteristics to determine if a wetland is suitable for particular functions and values. A pre-established list of considerations or qualifying criteria based on those outlined in The Highway Methodology served as guidance in determining the suitability of each function and value (refer to Appendix A). Functions and/or values may also be listed as principal if they are an important physical component of a wetland ecosystem and/or are considered of special value to society, from a local, regional, and/or national perspective. The selection of a function or value as principal was based on best professional judgment. The Highway Methodology does not contain any numerical weightings, rankings, or averaging of dissimilar wetland function which can cause bias.

The Highway Methodology evaluates 13 functions and values, listed below. Descriptions of each function and value are outlined in Appendix A.

Functions

Groundwater recharge
Groundwater discharge
Floodflow alteration
Fish habitat
Sediment/toxicant/pathogen retention
Nutrient removal/retention/transformation
Production export
Sediment/shoreline stabilization
Wildlife habitat

Values

Recreation
Educational and scientific value
Uniqueness and heritage
Visual quality and aesthetics
Endangered species habitat

Multiple site visits were necessary to accurately identify the functions and values performed within the BBNPP project boundary. Prior to field work, LandStudies reviewed existing information about the wetlands within the project area. Documents reviewed included the BBNPP Combined Operating License Application (COLA) – Revision 1 (Unistar, 2008), the “Wetlands Delineation Report and Exceptional Value Wetlands Analysis” (Normandeau, 2010), and other ecological reports written by Normandeau Associates and LandStudies, Inc. All reports are listed in the references section. After the review of existing information the first round of field visits was performed in November and December 2009. The second round of field visits was performed in July and September 2010. The purpose of the summer 2010 field work was to understand seasonal wetland characteristics, revisit areas affected by beaver dam removal, as well as evaluate newly delineated wetlands resulting from changes to the BBNPP project boundary. “Wetland Function-Value Evaluation Forms” provided in The Highway Methodology were completed for wetland areas or group of similar wetlands during the 2009 field investigations. Completed function and value evaluation forms are provided in Appendix B. The evaluation forms include general wetland characteristics, document whether each function and value was suitable or not suitable, and reference numbers associated with the list of qualifying criteria in Appendix A.

Wetlands were grouped for evaluation based on similar characteristics including location, hydrology, and vegetation type. In most cases, the numbers used identify each wetland area correspond to the numbering system used in the US Army Corps of Engineers Second Preliminary Jurisdictional Determination Request (Normandeau, November 2010). However, in some situations, the labeling of wetland areas was modified specifically for this report by LandStudies to better represent areas exhibiting similar functions and values.

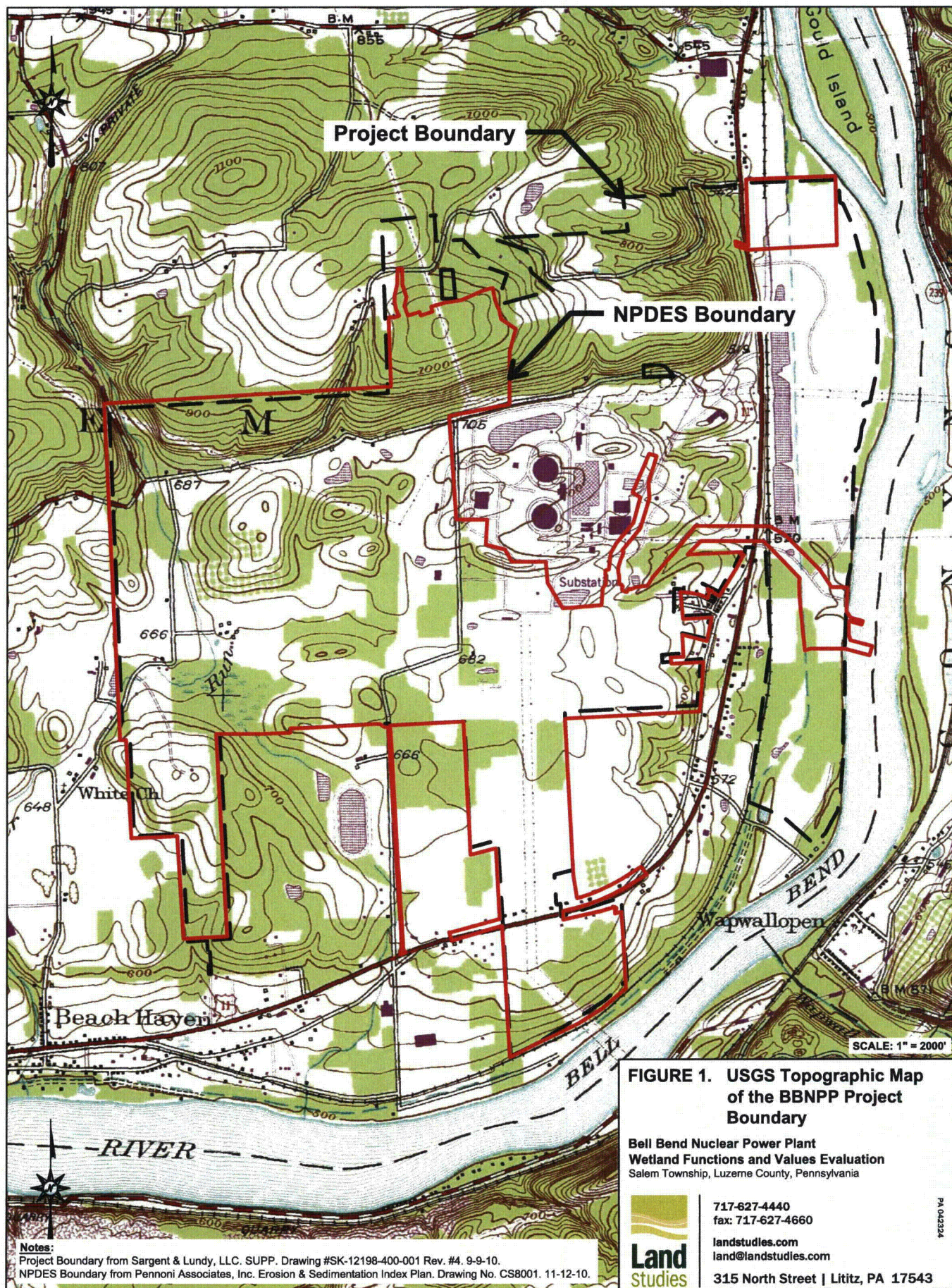


FIGURE 1. USGS Topographic Map of the BBNPP Project Boundary

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Study Area Description

Geology

The BBNPP study area is part of the Appalachian Mountain section of the Valley and Ridge physiographic province, which is characterized by a distinctive series of linear ridges and valleys that are the result of differential erosion of folded sedimentary rocks with varying degrees of resistance to weathering and erosion. Valleys are composed of less resistant rocks such as limestone and shales, whereas ridges and uplands are composed of more resistant rocks, particularly sandstone. The Susquehanna River has incised into and crosses these ridges as it flows generally from north to south, and its numerous tributaries form a trellis drainage network pattern as they flow along the valleys with less resistant rocks.

The underlying bedrock consists of layered sedimentary rocks that are Devonian in age (~416 to 359 million years old). The vast majority of the BBNPP project boundary is underlain by dark-gray silty claystone of the Mahantango Formation (Dmh). Some of the northern-most portions of the BBNPP project boundary are underlain by dark-gray to grayish-black clay shale of the Harrel Formation (Dh) and dark-gray sandstone, siltstone, and shale of the Trimmers Rock Formation (Dtr). Source materials within Walker Run may include any of these formations as well as gray and bluish-gray sandstone, greenish-gray and grayish-red siltstone, grayish-red claystone, and greenish-gray shale from the Irish Valley Member (Dci) of the Catskill Formation.

During the past 2 million years (approximate), the landscape has been modified by cyclical erosion and deposition associated with advancing and retreating ice sheets, up to several kilometers thick in places, that flowed southward from the northern polar regions. The most recent ice advance, known as the Wisconsinan, occurred about 45,000 to 15,000 years ago. The most recent part of this advance is referred to in this region as the Woodfordian, which is responsible for creating the most prominent glacial features in the BBNPP study area and the surrounding region. These features include a northwest-southeast trending Woodfordian terminal moraine complex that consists of boulder, poorly sorted sediment, and Woodfordian glaciofluvial (including kame) terraces along the Susquehanna River that consist of stratified sands and gravels. "Kame terraces are frequently found along the side of a glacial valley and are the deposits of meltwater streams flowing between the ice and the adjacent valley side. These kame terraces tend to look like long flat benches, with a lot of pits on the surface made by kettles. They tend to slope downvalley with gradients similar to the glacier surface along which they formed, and can sometimes be found paired on opposite sides of a valley" (definition provided by www.wikipedia.org). The terminal (end) and ground moraines deposited at the front of and beneath the ice sheet, respectively, are much coarser than the outwash sediments, and also are marked by kettles. Kettles are depressions on the ground surface that resulted from melting of ice blocks within the glacial deposits during deglaciation. After deglaciation, which ended approximately 10,000 yrs ago, the landscape of the BBNPP project boundary was mantled with fresh glacial and near-glacial deposits, which consisted of kame terrace sediments that were deposited along the sides of river valleys adjacent to ice margins, and of various types of till

and outwash that formed at the leading edge of the Woodfordian ice sheet. Drainage was poor as a result of the near-glacial and glacial deposits, which typically consist of sediment that ranges from clay- to boulder-size, and resulted in widespread swampy conditions as streams adjusted to deglacial conditions.

Soils

The following soil description is an excerpt from the “Wetland Delineation and Exceptional Value Wetland Analysis” (Normandeau, 2010). It provides a summary of the soils found within the BBNPP project boundary. Detailed soil descriptions and soil maps are also provided in this report.

“The Natural Resources Conservation Service (NRCS) mapped the majority of the site as upland soils encompassing Chenango gravelly loam, Arnot-Rock outcrop complex, Braceville gravelly loam, Morris very stony silt loam, Oquaga and Lordstown loams, Pope soils, Wayland silt loam, Weikert and Klinesville channery silt loam, Wellsboro very stony silt loam and Wyoming gravelly loam. These soils are classified as somewhat poorly drained to excessively drained and have seasonal high water tables ranging from 6 inches in depth to greater than 72 inches in depth. NRCS information indicates that Chenango and Wyoming soils are unlikely to have inclusions of hydric soil. However, the other six upland soils may potentially have inclusions of hydric soil in areas such as depressions, drainageways and bottomlands.

Hydric soils mapped onsite consist of Atherton silt loam, Holly silt loam, Rexford loam and Wayland silt loam which are classified as somewhat poorly drained to very poorly drained. Consequently, the range for seasonal high water tables in these soils extends from the soil surface to a depth of 18-inches. Atherton and Rexford soils were largely mapped in association with Walker Run and its network of small tributaries in the western section of the site. Rexford soil is also mapped in association with a small stream in the eastern section of the site and in headwaters areas in the southern end of the site. Holly and Wayland soil is mapped exclusively in the Riverlands along the Susquehanna River floodplain.”

Atherton soils have a seasonally high water table near or at the soil surface. These nearly level soils are found primarily in depression in glacial outwash terraces, older stream terraces, and kame-kettle land formations. Atherton soils are poorly or very poorly drained with low runoff potential and ponding water (Soil Survey of Luzerne County, 1981).

Rexford soils are deep, somewhat poorly drained and poorly drained soils located in smooth low-lying concave depressions on glacial outwash terraces. This soil commonly has a fragipan at 15 to 24 inches which slows the downward movement of water. The seasonal high water table is 6 inches to 1 foot (Soil Survey of Luzerne County, 1981).

Holly soils consist of deep very poorly and poorly drained soils formed in the loamy alluvium on floodplains. Permeability is moderate or moderately slow. The seasonal high water table is within a depth of 6 inches of the soil surface (Soil Survey of Luzerne County, 1981).

Wayland soils consist of poorly drained and very poorly drained nearly level soils formed in recent alluvium and located in low areas or slackwater areas on floodplains. The water table is often within 6 inches of the surface and sometimes causes ponding (Soil Survey of Luzerne County, 1981).

Wetlands and Surface Water Bodies

Wetlands within the BBNPP project boundary are associated with two distinct watersheds; Walker Run and the North Branch of the Susquehanna River (NBSR). Confers Lane serves as the divide between the two watersheds within the site.

The majority of wetlands delineated within the Walker Run watershed are contiguous to Walker Run or one of its tributaries. Wetlands are also located adjacent to tributaries to the Susquehanna River. Isolated wetlands, not hydrologically connected to a surface water body are present in both watersheds. These wetlands are primarily topographic depressions. Some wetlands that are contiguous with other wetlands or water bodies may appear isolated on the map because the wetland delineation ended at the BBNPP project boundary. A summary of surface water features (watercourses and ponds) is provided below. Multiple studies were completed by LandStudies and Normandeau to evaluate these surface water bodies. These studies were intended to assess baseline conditions within the surface water bodies of the site and included fish and macroinvertebrate surveys, habitat assessment, geomorphic assessment, substrate embeddedness, water quality testing, and pressure transducer measurements. These studies are listed in the reference section. Surface water features are shown on Figure 3 – Wetland Identification Map.

Walker Run (8, 8A, 8B) is a perennial stream that is listed as a Cold Water Fishery (CWF) by PADEP Chapter 93 Water Quality Standards. It flows southward toward NBSR and west of the BBNPP footprint. Walker Run supports reproducing brown trout populations and has been designated as a wild trout stream by the PFBC; therefore all wetlands in or along the floodplain of Walker Run are exceptional value wetlands (25 Pa. Code § 105.17). Multiple springs, rainfall, and snowmelt influence the stream flow. Walker Run has a drainage area of about 4.1 mi² to the Susquehanna River.

The Eastern Tributary to Walker Run (9, 9A), also referred to as the Unnamed Tributary, flows along the eastern and southern site boundaries of the proposed BBNPP footprint and discharges into Walker Run on the southwest side of the site. The unnamed tributary has a drainage area of about 0.68 mi² and an approximate length of 2.1 miles.

Tributary 2 to Walker Run originates in Wetland 11 or the “teardrop wetland” and flows south into the Unnamed Tributary to Walker Run. It is piped beneath agricultural fields for approximately 560 feet between Wetland 11 and Wetland 12.3.

The Unnamed Tributary to Lake Took-A-While (30) is located south of the BBNPP site; it flows into the NBSR via Lake Took-A-While and the North Branch Canal (NBC). Its drainage area is not part of the Walker Run watershed.

Six ponds exist within the BBNPP project boundary. Johnson's Pond (12A) and the Farm Pond (10A) are spring fed. The Farm Pond outlets into Walker Run and Johnson's Pond outlets to the Eastern Tributary to Walker Run. The Beaver Pond (12B) is on the Eastern Tributary to Walker Run and was created by a beaver dam along an access road. Unnamed Pond 1 (18A) and Unnamed Pond 2 (17A) are isolated ponds east of Confers Lane. The southern end of Lake Took-A-While (35C) is located within the project boundary at the Riverlands and outlets into the NBC at its northern end. A few other surface water features that were delineated as palustrine open water (POW) areas exist within wetlands throughout the project area and are described in the Functions and Values Assessment section of this report.

The NBSR flows from north to south past the Susquehanna Steam Electric Station (SSES), makes a broad 90 degree turn to the west, and flows to the south of the BBNPP site before reaching Berwick, PA. The proposed BBNPP CWS Makeup Water Intake Structure site is approximately 22 miles downstream of Wilkes-Barre, PA and 5 miles upstream of Berwick, PA. The NBSR ultimately receives all surface water and groundwater that drains from the BBNPP site.

The NBC (39, 39B, and 39C) is located within the BBNPP project boundary at Susquehanna Riverlands, east of Route 11. The NBC was historically used within the region for transportation. Two unnamed tributaries feed the canal. One enters at the northern end of the reconstructed section of the NBC and the other flows into Lake Took-A-While which also provides flow to the canal. The Canal Outfall Channel (39A) is a manmade channel formed by overflow and seepage from the canal that discharges into the NBSR.

An ephemeral swale (35A) begins at a pipe culvert under the railroad tracks at the Riverlands. It receives flow draining from Wetland 34 and empties into Wetland 35, which surrounds Lake Took-A-While.

Approximately 630 linear feet of an Unnamed Tributary to the NBC (26) exists within the project boundary. This ephemeral watercourse is a man-made ditch/swale that was likely created in the past to drain existing wetlands for farming. Currently, this watercourse serves as an outlet to Wetland 25. Beyond the project boundary, it ultimately empties into a vast wetland area along the NBC at the Riverlands.

Land Use

The following primary land uses are present within the BBNPP/SSES project boundary include forest (36.7%), agriculture or old field/former agriculture (28.2%), developed (18.6%), wetlands (8.3%), upland scrub/shrub (5.3%), and water (3.0%) (Normandeau, 2010). A significant change of cropland

to fallow fields occurred between the 2009 and 2010 growing season. This land use change affected the suitability of multiple wetlands to perform the sediment/toxicant retention and nutrient removal and retention functions. The conversion to fallow land decreases the potential sources of nutrient and sediments within the wetland's watershed.

Susquehanna Riverlands

Susquehanna Riverlands is a recreational and educational facility owned and operated by PPL located east of Route 11. It encompasses 1,200 acres on both the east and west sides of the Susquehanna River. In addition to diverse ecological habitats, an important historical site is located within the Susquehanna Riverlands. A portion of the Riverlands property is located within the BBNPP project boundary.

Restored and unimproved sections of the historical NBC are located within the BBNPP project boundary. According to the PPL Corporation website, the NBC stretched from Pittston to Northumberland, a distance of 72.5 miles. In use during the period from 1830 to 1900, the canal was 40 feet wide at the top and 4-6 feet deep. The canal boats were 80 feet long and could haul up to 120 tons of cargo, which might include coal, flour, grain or lumber. These were drawn by teams of mules which traveled the tow paths that now form a portion of a walking trail.

The Susquehanna Riverlands has also been identified as an Important Bird Area (IBA) by the Pennsylvania Audubon Society. The IBA program was developed to locate important bird habitat using objective scientific criteria. The IBA designation can then be used by residents, planners, and state and local officials when making land planning and use decisions.

"A Guide to Critical Bird Habitat in Pennsylvania" provides the following information about the 2,500 acre IBA. The Susquehanna Riverlands has many diverse habitat types including cultivated fields, lawns, picnic and other outdoor recreation area, wetlands including marshes, riparian forests and swamps. The NBC provides excellent waterfowl habitat. Densities of some forest-interior or canopy species are fairly high due to extensive forested areas. Oak/hickory forests support good populations of scarlet tanager, ovenbird, worm eating warbler, pin warbler, red eyed vireo, and rose breasted grosbeak. Riparian forests support yellow throated vireo, warbling vireo, and American redstart. Thicket species include golden winged warbler, yellow breasted chat, blue winged warbler and brown thrasher. A total of 217 Bird species have been reported on site and 126 Species have been documented as breeding at the site (A Guide to Critical Bird Habitat in Pennsylvania, Crossley 1999).

The majority of wetlands supporting the values described in the functions and values assessment are located within the Riverlands. The remainder of the BBNPP site has restricted access and therefore the wetlands support few values.

Walker Run Watershed

Reproducing Brown Trout Populations and Exceptional Value Wetlands

Brown trout populations exist within Walker Run. Numerous fish sampling studies (Normandeau 2010, LandStudies 2009, PFBC 2009) revealed that these trout populations are reproducing and therefore Walker Run meets the criteria identified as a wild trout stream in 25 Pa. Code § 57.119(b). Unnamed tributaries to Walker Run are also included in the wild trout stream classification. According to 25 Pa. Code § 105.17, wetlands located in or along the floodplain of a wild trout stream are considered exceptional value wetlands (EV). Therefore most of the wetlands within the Walker Run watershed are considered exceptional value (isolated wetlands are exempt from EV status). Stream habitat evaluations were also performed on Walker Run and its unnamed tributaries. In general, upstream of Beach Grove Road, stream habitat is optimal to near optimal due to adequate shade, low substrate embeddedness, and sufficient riffle areas. The reach downstream of Beach Grove Road has marginal habitat quality attributed to greater substrate embeddedness, greater sediment deposition, fewer riffle areas, channelization, poor bank stability and vegetative protection. Many of these streams and wetland areas were altered by historical land use practices including farming and logging. In addition, topographic alterations due to infrastructure construction altered surface water flow paths and divided wetlands. These land use practices caused stream channelization, stream erosion, and sediment deposition in the stream valleys creating some of the poor habitat characteristics and substrate embeddedness problems documented in the aquatic studies. A 1939 aerial photograph of the BBNPP project boundary is shown in Figure 2.

Beaver Dam Removal

Significant beaver activity was occurring near the confluence of Walker Run and the Eastern Tributary to Walker Run within the BBNPP project boundary. A beaver dam was located immediately downstream of the confluence. The beaver dam caused significant backwater in both Walker Run and the Eastern Tributary contributing to inundation of some of the wetlands. Inundation increased with closer proximity to the beaver dam. These inundated conditions and increased groundwater levels were evident during the November 2009 field investigations. The beavers were relocated in spring 2010 and in April 2010 the beaver dam was removed. The dam removal significantly affected the hydrologic conditions in wetlands 10.1, 10.2, and 10.3. The area was re-assessed during the July 2010 field investigations to account for any functions and values changes resulting from the beaver dam removal. The functions and values described in the report are based on the current condition, with no dam present.

Another beaver dam was located along an existing access road, which created an open water area described in this report as the "Beaver Pond" (12B) within Wetland 12.2. In September 2010, this beaver dam was removed and the pond was drained in order to replace the culvert pipe under the access road. A weir structure will be installed to re-establish the open-water that had existed behind the beaver dam.

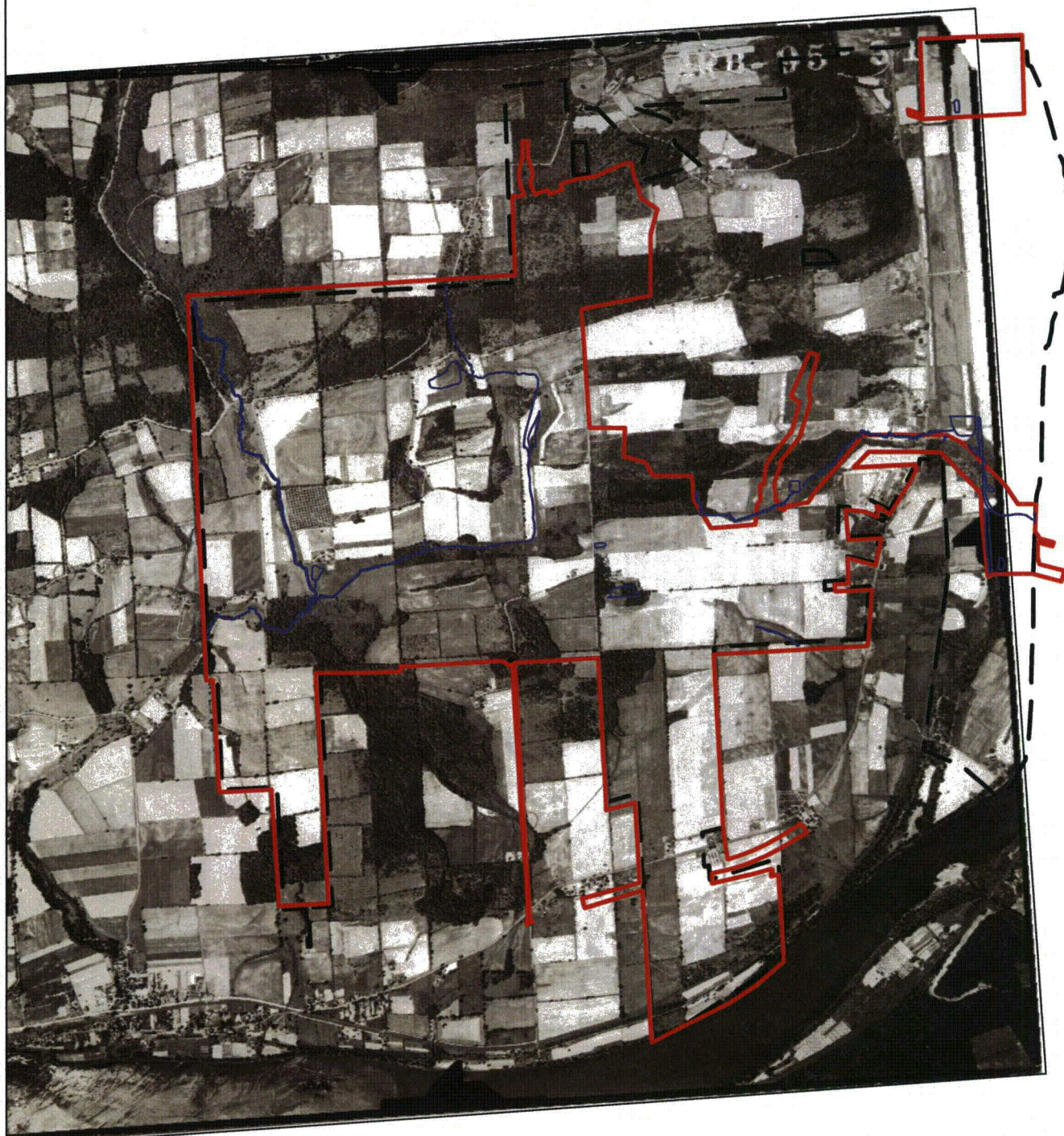
Other Considerations

Threatened and Endangered Species

A federally listed endangered species, the Indiana Bat, is USFWS concern within the BBNPP project boundary. Indiana Bats were not found on-site during bat studies completed by Normandeau (A Field Survey of Terrestrial Fauna, Normandeau 2010); however, multiple bat hibernacula are known to exist near the proposed BBNPP site. Suitable spring, summer, and fall Indiana Bat habitat, including stands of shagbark hickory, has been indentified within the property boundary. This assessment does not evaluate or identify potential Indiana Bat habitat.

Cultural Resources

Cultural resources are associated with the Uniqueness/Heritage wetland value, which was evaluated based on visual assessments during the winter 2009 and summer 2010 field work and not on the detailed cultural resource studies. Cultural resource studies within the BBNPP Project Boundary were completed by GAI Consultants, Inc. (refer to GAI report for detailed cultural resource location information).



SCALE: 1" = 2000'

LEGEND

- Current Stream Location (approx.)
- Project Boundary (approx.)
- NPDES Boundary (approx.)

Notes:

- Project Boundary from Sargent & Lundy, LLC. SUPP. Drawing #SK-12198-400-001 Rev. #4. 9-9-10.
- NPDES Boundary from Pennoni Associates, Inc. Erosion & Sedimentation Index Plan. Drawing No. CS8001. 11-12-10.



FIGURE 2. Aerial Photograph - 1939

SOURCE: www.pennpilot.psu.edu

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Functions and Values Assessment

Characteristics of each evaluated wetland or group of wetlands relating to the 13 functions and values are summarized in this section. Wetlands are identified by the wetland numbers provided in Figure 3 and based on Normandeau Associate's numbering system for the ACOE Jurisdictional Determination. Table 1 provides a concise comparison of each wetland and its associated functions and values. Photos of each wetland are provided in Appendix C.

Wetlands within the Walker Run watershed are described first followed by the North Branch Susquehanna River (NBSR) watershed.

Wetlands determined "not suitable" for a function or value may exhibit some of the qualifying characteristics listed in Appendix A. Functions and values were considered not suitable or not principal for one of the following reasons; (1) the wetland exhibits a minimal number of qualifiers; (2) the wetland exhibits weak qualifiers of the function or value; (3) wetland characteristics indicate the function or value is not occurring or (4) professional judgment based on a comparison of a wetland's characteristics to other evaluated wetlands.



Notes:

- Project Boundary and other data information from Buppert & Lundy, LLC, BSNP, Drawing 850-12198-0000 Rev. 04-10-10.
- NPDES Boundary from Pennsylvania Department of Environmental Protection, Drawing 850-12198-0000 Rev. 04-10-10.
- Wetland, stream, and waterbody locations and identification numbers from Nomenclature Associates, Inc. BBNP USACE Second Preliminary Jurisdiction Determination Mapping, 10-1-10.
- 10.1, 10.2, 10.3, 10.4, 10.5, 10.6, 10.7, 10.8, 10.9, 10.10, 10.11, 10.12, and 10.13 (excluding 10.13) are shown as a reference to the Wetland Functions and Values Evaluation.

Table 1. Functions and Values Summary Table

FUNCTION/VALUE P = Principal, S = Suitable														
Wetland #	Total Acreage	GW Recharge	GW Discharge	Floodflow Alteration	Fish Habitat	Sediment/ Toxlcant Reduction	Nutrient Removal	Production Export	Sediment/ Shoreline Stabilization	Wildlife Habitat	Recreation	Educational/ Scientific Value	Uniqueness/ Heritage	Visual Quality/ Aesthetics
Walker Run Watershed	1, 50	1.62	S		P			P	S	P			S	
	2, 62	0.10												
	3	0.18												
	4,7	4.06	S	S	S			S		P				
	5	0.12		S										
	6, 51, 52	0.84	S		S	S				P				
	10.1	11.43	S		S	S		S	S	P				
	10.2	4.22			S			S		P				
	10.3	25.77	S	S	S	S	S	S		P				
	11	3.63	S	P	S	S		S	S	P				
	12.1, 16	17.48	S	S	S	S		S	S	P				
	12.2	10.31	S	S	S	S			S	P				
	12.3	13.10	S	S	S	S		S	S	P				
	13	0.19												
	15	0.25	S		S	S								
NBSR Watershed	56 - 61	1.64		P	S	S	S	S		S			S	S
	53	1.86	S		S	S	S	S		S				
	54, 55	0.09												
	17	1.58	S		S					S				
	18	6.32			S	S	S			P				
	19	6.13	S	S	S					P				
	20, 21	10.92	S	S	S	S	S		S	P				
	22-24	0.65												
	25	3.75		S		S	S	S	S	P				
	27, 28	1.74	S							S				
	29	0.17						S		S				
	31, 32	3.78	S	P	S	S		S		P				
	33	0.16		S										
	49	0.08			S	S								
Riverlands (NBSR Watershed)	34-36, 40-42, 66-67	9.53			S	S	S	S	S	P	P	P	P	P
	37, 38, 43	4.98			S	S				P	P	S	S	S
	44	6.46	S	S		S				P	P	P	P	P
	45-47	0.96				S	S			S				
	48	0.96	S		S	S	S		S	S	S	S	P	S
	68	6.16	S			S	S			P	P	P	S	S

Walker Run Watershed

Unless otherwise noted, none of the five values occur within the wetlands in the Walker Run watershed because it is private property with no public access. Listed wildlife and vegetation species were based on observations made during the 2009 and 2010 field investigations conducted by LandStudies and/or observations referenced in "A Field Survey of Fish and Aquatic Macroinvertebrates (Normandeau, 2010) and "A Field Survey of Terrestrial Fauna" (Normandeau, 2010).

Wetland 1 and 50 (1.38 and 0.24 acres, respectively)

Description:

This area includes Palustrine Scrub-Shrub (PSS) and Palustrine Forested (PFO) wetlands adjacent to and including the Walker Run watercourse within the BBNPP project boundary north of Beach Grove Road. The area is typical of most high-gradient forested headwater streams. The valley bottom is relatively narrow with steep side slopes. Bedrock is exposed along much of the side slopes, especially on the east side, and along the channel bed. The wetland area west of Walker Run slopes up steeply to Stone Church Road. The valley slope is steep, which creates alternating step-pools and steeper riffles along Walker Run. The areas delineated as wetlands are lower-lying fringe wetland terraces or drainage patterns adjacent to Walker Run. It is likely that the Walker Run stream channel flip-flops back and forth within the valley bottom on a fairly regular basis as a result of debris jams. Many of the delineated wetland boundaries reflect the changing plan form of Walker Run or indicate where observed spring seeps at the base of the side slopes are channelized. Some seeps emerge directly from stratified bedrock layers (shale). Hydrology is provided by close proximity to groundwater, surface water runoff from existing side slopes and stream overflow. The soils are composed of gravels (some as large as cobbles) and sand with a thin accumulation of hydric soils that are high in organic content typical of forested areas. It was difficult to obtain auger samples greater than a few inches.

Remnants of a historic mill dam (identified as a saw mill on an 1873 Atlas map of Salem Township) exist near the upper boundary of the BBNPP site. There are several berms associated with dam remnants. Current drainage patterns may indicate the location of a historic millrace, although it is difficult to distinguish between a potential mill race location and simply an abandoned channel. This area was significantly manipulated in the past. However, the watercourse has appeared to achieve a fairly stable geometry in its current condition. The watercourse is well-connected to its floodplain overall (except for a few higher banks that are eroding during high flow events). Walker Run is straighter and becomes more incised as it flows out of the forest and adjacent a mowed residential lot for approximately 200 feet before flowing under an undersized rock bridge culvert on Beach Grove Road. The bridge culvert bottom is constructed of mortared rock, which provides adequate grade control for the upstream reach. The undersized bridge opening (not as undersized as many other road crossings) may act as a constricted outlet during large flow events and cause a temporary backwater effect upstream. However, it is likely that the duration of this backwater is relatively short.

Functions and Values Assessment:

Wildlife habitat is a **principal** function of this wetland. A mature forest is established within this wetland as well as along much of the Walker Run headwaters, which connects large upland forested tracts. Therefore, these wetlands provide ideal habitat for a large range of wildlife from aquatic macroinvertebrates to higher trophic level mammals, birds, amphibians or reptiles. Reptiles and amphibians were identified within and near the wetland during field work conducted by Normandeau (A Field Survey of Terrestrial Fauna, Normandeau 2010). Vegetation density is high with adequate food sources. The plant community structure is diverse because multiple wetland strata (i.e. PSS, PFO) exist; however, overall plant species diversity is minimal. Limiting factors for this function include the small overall size of the wetland and the lack of diversity in plant species.

Production export is a **principal** function of this wetland. The wetland has a high degree of plant productivity, has high potential for insect and animal use due the presence of food sources, and provides a source of economically and commercially used products (timber). The wetlands have permanent outlet to Walker Run. During high flow events, it is likely that this wetland area experiences large flushing events. Furthermore, because Walker Run is relatively well-connected to its floodplain, higher flows more frequently access the floodplain increasing the flushing capability.

Fish habitat is a **principal** function of this wetland; however this function is limited to the perennial Walker Run watercourse only. The reach of Walker Run associated with this wetland is a high gradient headwater stream channel that exhibits characteristics of trout spawning habitat. Results of a spawning gravel survey discussed in the report "Walker Run Surveys: Wild Trout Habitat Assessment – May 2009" by LandStudies revealed that the 3 stream reaches sampled upstream of Beach Grove Road had the best gravels for spawning in terms of quality and availability (3 reaches were also sampled downstream of Beach Grove Road). These reaches also had the most canopy cover. This reach rated suboptimal habitat using EPA's Rapid Bioassessment Protocol (Walker Run Surveys: Wild Trout Habitat Assessment, LandStudies 2009). The stream channel has varying depths including pools and riffles and adequate in-stream cover. The bed material is composed of large gravels, cobbles, and some bedrock, which would provide ideal habitat for aquatic macroinvertebrates. The forested canopy and mid-level shrubs provide an adequate source of food to support aquatic macroinvertebrates and thus fish populations. Three reaches were sampled for fish within the reach of Walker Run associated with Wetland 1 by LandStudies on March 2009 and June 2010. Numerous fish species were collected including creek chub, white suckers, blacknose dace, green sunfish, and brown trout (adult and young of year). Macroinvertebrates were also sampled by LandStudies on April 1, 2009 within the same three reaches. Macroinvertebrate populations revealed good water quality according to the Hilsenhof Biotic Index (HBI). Although none were observed because of the time of year, reptiles and amphibians were identified within and near the wetland during field work completed by Normandeau Associates (A Field Survey of Terrestrial Fauna, Normandeau 2010).

Groundwater discharge is a suitable function of this wetland. Numerous spring seeps were observed along the valley bottom and along the base of the side slopes. The delineated wetlands appear to intersect the water table. All delineated wetlands outlet directly into Walker Run.

Sediment/shoreline stabilization is a suitable function. The delineated wetlands include the Walker Run watercourse and a series of overflow/side channels or channels originating at a spring seep. Dense woody vegetation (trees and shrubs) exists along the watercourse. Most portions of the watercourse and channelized wetlands are relatively stable with low, gradual banks and good opportunity for higher flows to access the floodplain, while a few locations exhibit signs of bank erosion despite the high root density of woody vegetation. Thus, it appears that the vegetation currently present does help to stabilize the banks; however the potential for erosion during larger storm events still is evident. There are minimal sediment sources present upslope and upstream.

Uniqueness/heritage is a suitable value of this wetland area because historical milldam remnants are present on site. Other contributing factors include the presence of mature forest and valuable wildlife habitat. However, there are no primary viewing locations because the area has restricted access, which prevent this wetland area from being fully suitable for this value.

Groundwater recharge is not a suitable function of this wetland. These wetlands include very porous substrate (gravels and cobbles), that appear to intersect the water table making the wetlands suitable for discharge. Furthermore, the overall valley slope is fairly steep, which allows surface water to drain quickly via a series of channelized drainage features. All wetlands drain directly into Walker Run, which serves as the outlet. There may be the occasional opportunity for marginal recharge within the last 200 feet before the Beach Grove Road during large flow events when a backwater condition is created by the undersized bridge opening. However, it is likely that this potential recharge period is very brief.

Floodflow alteration is not a suitable function of this wetland. Except for a few flatter pockets, the valley gradient is too steep to allow adequate flood storage. The wetlands receive stream overflow and overland sheet flow from surrounding upland areas during rain events, but drain quickly into Walker Run. Furthermore, the small size of the cumulative wetlands is a limiting factor in the ability of this wetland to significantly contribute to floodflow alteration.

Sediment/toxicant/pathogen retention is not a suitable function of these wetlands. There is no significant source of sediment currently being introduced into the watershed upstream. Also, there is little opportunity for flood storage and retention. If there was a significant sediment source was being introduced into these wetlands, it would most likely be flushed through the system. No accumulations of sediment were observed within this wetland area.

Nutrient removal/retention/transformation is not a suitable function of these wetlands for many of the same reasons listed above. No known significant sources of nutrients are present in the

upstream watershed. Additionally, this wetland does not provide adequate sediment trapping or flood retention due to the steep valley gradient, direct outlet to Walker Run and overall small size.

Soil type:

RdA – Rexford silt loam, 0 to 3 percent slopes

Wildlife observed:

Deer tracks/buck rub, various songbirds, kingfisher, northern water snake, eastern garter snake, wood turtle, green frog, wood frog, pickerel frog, eastern American toad, redback salamander, northern two-lined salamander, longtail salamander

Vegetation observed:

Eastern hemlock, red maple, elderberry, winterberry, silky dogwood, hickory spp., poison ivy, highbush blueberry, spicebush, witchhazel, jewelweed, skunk cabbage, green briar, bidens spp., sparganium spp.

Wetland 2 and 62 (0.06 and 0.04 acres, respectively)

Description:

Wetland 2 and 62 are small PFO wetlands located north of Beach Grove Road. They are part of a northeast to southwest sloping drainage feature that carries surface water runoff down a steep hillside. The channel and wetlands contain rocky soil with some larger 12- to 18-inch boulders and little vegetation. The channel appears to be actively eroding. Due to its small size, steep grade, and lack of vegetation this wetland does not perform any functions or values. A data sheet was not completed for this wetland.

Functions and Values Assessment:

No wetland functions and values were determined to suitable.

Soil type:

OXF – Oquaga and Lordstown extremely stony silt loam – steep
WmB – Wellsboro very stony silt loam, 3 to 8 percent slopes

Wildlife observed:

None

Vegetation observed:

Multiflora rose, christmas fern, highbush blueberry, hornbeam

Wetland 3 (0.18 acres)

Description:

Wetland 3 is a small PFO wetland located on a sloped forested hillside west of Walker Run and south of Stone Church Road. Its source of hydrology is surface water runoff. The wetland begins as a wide flat channel carrying runoff toward Walker Run. The channel is not densely vegetated but contains roots, leaves and downed trees. The drainage hits a flat bench, likely manmade due to the presence of a stone wall down slope. The bench creates a wider, flat wetland with greater vegetative diversity and density. Flow appears to continue through this wetland and is not detained for long periods of time. This wetland does not supply any functions or values because it is small, on a slope and does not contain very dense or diverse vegetation.

Functions and Values Assessment:

No wetland functions and values were determined to be suitable.

Soil types:

ChC – Chenango gravelly loam, 8 to 15 percent slopes

Wildlife observed:

None

Vegetation observed:

Stiltgrass, sensitive fern, sedge spp., elderberry, red maple

Wetland 4 and 7 (3.16 and 0.90 acres, respectively)

Description:

Wetland 4 is located along Walker Run, beginning just south of the Beach Grove Road bridge crossing and extending to the next bridge crossing at Market Street. Wetland 7 continues downstream of the Market Street bridge and is primarily located on the west side of Walker Run where the topography is less steep. These wetlands are primarily forested; however, some Palustrine Emergent (PEM) wetlands exist in the open field located at the corner of Market Street and Beach Grove Road. Some small scrub/shrub pockets also exist. The source of hydrology is primarily surface water flow and direct precipitation. Most of the soil within this wetland is slow-draining and highly erodible fine-grained sediments that have deposited in the valley bottom and buried larger-sized glacial deposits. Walker Run has down-cut through the fine-grained sediment and subsequently lowered the elevation of the water table. As a result, it is likely that there is minimal interaction between the wetland surface elevation and groundwater due to the current incision of Walker Run throughout this wetland. Most of the wetlands are perched above the water table. There is a small spring located west of Market Street. The discharge from the seep is channelized directly toward Walker Run.

Functions and Values Assessment:

Wildlife habitat is a principal function of this wetland. This wetland is not degraded by human activity. Although Beach Grove Rd. and North Market Street divide the wetlands they are not substantial barriers to wildlife movement. The wetland is part of a larger Walker Run wetland system and is bordered by upland wildlife habitat. There are a variety of food sources available due to the diverse and dense vegetation and classes of vegetation present throughout the wetland. There are islands of upland present within the wetland. This wetland has the ability to host large populations of insects, amphibians, and birds within its boundaries.

Fish habitat is a suitable function of this wetland; however this function is limited to the perennial Walker Run watercourse. Fish, reptiles, and amphibians are present on this site as noted in various studies. This reach rated marginal habitat using EPA's rapid bioassessment protocol (RBP) (Walker Run Surveys: Wild Trout Habitat Assessment, LandStudies 2009). Reproducing brown trout populations are present within this reach. An adequate food source is available to support these populations. The majority of the watercourse within this wetland is forested and adequately shaded with enough flow year-round to support the fish. Monitoring conducted by Normandeau and LandStudies examined the fish and macroinvertebrates within a reach of Walker Run that is associated with this wetland. For both studies the collection point was just south of the Market Street bridge. Normandeau's results showed Ephemeroptera was the dominant group accounting for 33.7% of all organisms with *Baetis* being the most numerous organisms in the group (23.8%). A total of 13 EPT taxa was collected which comprised 60.9% of all organisms (A Field Survey of Fish and Aquatic Macroinvertebrates, Normandeau 2010). These findings indicate acceptable water quality for fish habitat within Walker Run. Also, "Walker Run Surveys: Wild Trout Habitat Assessment" (LandStudies, 2009) states that the macroinvertebrate species collected during are indicators of good water quality according to the HBI. Fish species collected include blacknose dace, creek chub, fallfish, green sunfish, white sucker, brown bullhead, and brown trout.

Production export is a suitable function of this wetland. Production of wildlife food sources and detritus is high. Insects, mammals, amphibians, and reptiles all utilize this area. The wetland exhibits a high diversity of dense vegetation with a variety of plant community structure. The size of the watershed and stream creates the potential for large flushing events to occur during high flows where nutrients are transported downstream.

Groundwater recharge and discharge are suitable functions of this wetland. The major factor encouraging groundwater recharge within the wetland is the flat topography. Water moves slowly through this wetland before reaching Walker Run. Slight depressions also retain water providing isolated pockets of recharge. However, it should be noted that most of the wetlands are perched above the groundwater because the underlying soil drains slowly. It is likely that most of the surface water that accumulates within these wetlands is removed through evapotranspiration rather than groundwater recharge. Some groundwater discharge is occurring on the eastern edge of the wetland along Market Street where a spring emerges and flows into Walker Run via a channelized drainage feature.

Floodflow alteration is a suitable function of this wetland. The wetland is not permanently saturated or ponded. It has wide, flat topography along the stream, with depressions that could hold some surface water runoff. The size of this wetland is not great compared to the watershed area and there is little floodflow storage upslope of this wetland due to steep topography. One limitation is the incised nature of Walker Run. The stream will not overflow its banks except in a large flood event. Therefore the wetland has little effect on reducing the flow or flow velocity already in the stream.

Sediment/shoreline stabilization **is not** a suitable function of this wetland. Although there is dense vegetation including energy absorbing emergents, shrubs, and trees within the wetland, Walker Run has degraded vertically and is continuing to migrate laterally increasing sedimentation downstream. There are 3- to 4-foot high banks along the majority of the watercourse on this site. The existing vegetation provides some bank stabilization, but not enough prevent erosion.

Sediment/toxicant/pathogen retention **is not** a suitable function of this wetland. The banks of Walker Run through this wetland are severely degraded and are a source of sediment pollution during high flows. However, the sediment that is eroded from the banks is typically transported downstream during most high flows because the channel is incised and high flows do not regularly access the floodplain. Therefore, this wetland area, which is on the floodplain, has little opportunity to retain sediments that are eroding from the banks of Walker Run. Significant sources of pollution do not exist upslope of the wetland. However, if there was a source upslope, this wetland does have some qualities such as fine-grained mineral soils, a broad intermittently aerobic wetland edge, and slow water velocities within the wetland that would help retain sediments.

Nutrient removal/retention/transformation **is not** a suitable function of this wetland. Nutrient sources are not present upslope of the wetland. If sources were present this wetland does have some characteristics such as slowly drained mineral soils, dense vegetation for nutrient uptake, and slow water velocities within the wetland.

Soil types:

RdA - Rexford loam, 0 to 3 percent slopes

ChB - Chenango gravelly loam, 3 to 8 percent slopes

Wildlife observed:

Eastern milk snake, wood turtle, green frog, northern gray, tree frog, northern cricket frog, deer, grouse, red squirrel

Vegetation observed:

Red maple, pin oak, spicebush, common winterberry, arrowwood, poison ivy, goldenrod spp., sedge sp., soft rush, New York ironweed, grass spp., peppermint, sensitive fern, japanese knotweed, Canadian clearweed, jewelweed, redtop, skunk cabbage, moneywort

Wetland 5 (0.12 acres)

Description:

This small wetland is entirely PEM and consists of an area immediately surrounding a small groundwater seep located on a slope. The wetland does not provide any significant functions or values other than groundwater discharge. Adjacent land uses include upland field and upland forest.

Functions and Values Assessment:

Groundwater discharge is a suitable function. Discharge fluctuates seasonally. During wetter periods the water diffusely flows towards Market Street otherwise the discharged water is reabsorbed downslope of the wetland.

No other wetland functions and values were determined to be suitable.

Soil type:

ChB - Chenango gravelly loam 3 to 8 percent slope

Wildlife observed:

None

Vegetation Observed:

Goldenrod spp., deer tongue, boneset, arrowleaf tearthumb

Wetland 6, 51, and 52 (0.77, 0.03, and 0.04 acres, respectively)

Description:

This PFO and PEM wetland is located near Walker Run, but is not contiguous to the stream. This is an extremely flat location bordered by North Market Street and upland habitat. The emergent areas include a small depression (Wetland 51) and roadside swale adjacent to North Market Street (Wetland 52). The roadside swale drains into a low-lying wetter emergent and forested area that does not have a permanent outlet (Wetland 6). A steep slope exists east of the wetland. During the non-growing season the emergent area of this wetland stays inundated. During the July 2010 field visit inundation was not present; however, pockets of saturation were present. This wetland contains soil that is poorly drained causing slow infiltration rates. The drastic change in inundation between seasons indicates that this wetland is likely fueled by direct precipitation and surface water runoff in combination with the flat topography and no visible outlet. Higher evapotranspiration rates may also influence and limit prolonged periods of inundation during the growing season.

Functions and Values Assessment:

Wildlife habitat is a **principal** function of this wetland. The wetland is bordered by undeveloped upland wildlife habitat with access to other wetland areas. North Market Street creates a slight habitat barrier however wildlife can easily cross this road to access other wetland and upland areas. Food sources are present within the wetland and nearby. Seasonal inundation creating water and vegetative interspersions occurs. This wetland has the potential to contain large insect and amphibian populations.

Groundwater recharge is a **suitable** function of this wetland. The wetland is flat, does not have a permanent outlet, and there is a significant upland area drains to this wetland. Although the wetland contains poorly drained soils with slow permeability, it is likely this will not totally prevent infiltration. During the growing season plants likely utilize the water before infiltration can occur.

Floodflow alteration is a **suitable** function of this wetland. This wetland receives surface water runoff from surrounding uplands that would otherwise contribute to Walker Run floodflows. This wetland detains runoff until it is infiltrated, evaporated, or used by plants for evapotranspiration. There is no outlet to Walker Run.

Sediment/toxicant/pathogen retention is a **suitable** function of this wetland. This wetland receives and detains runoff from North Market Street. The stagnant water and dense vegetation traps sediment.

Groundwater discharge **is not** a suitable function of this wetland. The drastic seasonal water level fluctuations indicate that precipitation, runoff, and evapotranspiration are more likely to control the hydrology than groundwater discharge.

Fish habitat **is not** a suitable function of this wetland. There is no flowing water or perennial open water environment.

Nutrient removal/retention/transformation **is not** a suitable function of this wetland. The contributing watershed is largely undeveloped and few sources of excess nutrients exist.

Production export **is not** a suitable function of this wetland. Although wildlife food sources grow within this wetland including higher trophic level consumers, this wetland does not contain an outlet and there are no visible signs of export because there are no flushing events.

Sediment/shoreline stabilization **is not** a suitable function of this wetland because there is no flowing water.

Soil types:

RdA – Rexford Loam, 0 to 3 percent slope

Wildlife observed:

None

Vegetation observed:

Red maple, pin oak, spicebush, smartweed, woolgrass, tussock sedge, arrowleaf tearthumb, eleocharis spp., goldenrod spp., silky dogwood, common cinquefoil, white ash, New York ironweed, Canada thistle, mint spp.

Wetland 10.1 (11.43 acres)

Description:

This wetland is an open meadow containing mostly emergent vegetation. Its boundary is Walker Run to the west and the treeline to the south and east. An upland meadow exists to the north. This wetland is unique because hydrologic conditions were significantly affected by a beaver dam. The beaver dam was located on Walker Run, downstream of the confluence with the unnamed tributary. The beaver dam caused significant backwater to inundate the area surrounding the tributary. Inundation increased with proximity to the beaver dam. These inundated conditions and increased groundwater levels were evident during the November 2009 field investigations. The beaver dam was removed in April 2010 and the beavers were relocated, affecting the hydrologic conditions in this wetland. A second field evaluation form was filled out during the July 2010 field investigation to account for any functions and values changes resulting from the beaver dam removal. The functions and values presented here are based on the current condition, with no dam present.

Within this wetland, the Unnamed Tributary to Walker Run channel and Walker Run appear to have been historically straightened and channelized for agricultural use. The 1939 aerial photo (see Figure 2) depicts a straightened channel similar to what is visible today. The wetland adjacent to Walker Run has little vegetation and water interspersion, has a higher grade slope, and is separated from interaction with Walker Run due the incised nature of the stream and degraded banks. The descriptions below focus on the larger portion of the wetland surrounding the unnamed tributary.

Functions and Values Assessment:

Wildlife habitat is a principal function of this wetland. This wetland is adjacent to other habitats, wetland and upland. It provides ideal open-meadow habitat for a large range of wildlife from small insects to higher trophic level mammals, birds, amphibians or reptiles. Reptiles and amphibians were identified within and near the wetland during field work completed by Normandeau (A Field Survey of Terrestrial Fauna, Normandeau 2010). Many songbirds and a pair of pheasants were sighted within the wetland. The tall emergent vegetation provides excellent cover to support diverse bird species and flowering plants used by nectar gathering insects are abundant.

Groundwater recharge is a suitable function of this wetland. The removal of the beaver dam drained the permanently flooded area. The wetland also contains sandy soils, and flat, favorable topography to detain and infiltrate surface water runoff and seasonal high flow from the unnamed tributary.

Floodflow alteration is a suitable function of this wetland because of its flat topography and dense emergent vegetation. This wetland can retain higher volumes of water under flood conditions than in normal or average rainfall conditions. This wetland receives overland flow from surrounding uplands and excess flow from the eastern tributary during rain events. The culvert located at the upstream edge of this emergent wetland creates floodflow storage upstream in Wetland 12.3; however, this reduces the amount of flow this wetland can receive during a storm.

Sediment/shoreline stabilization is a suitable function of this wetland. The low flow velocities due to the flat grade and the high density of vegetation prevent erosion from occurring within the wetland. The floodflow alteration function of this wetland is believed to reduce flow velocities and therefore erosion along Walker Run downstream during most flow events.

Fish habitat is a suitable function of this wetland. Since the beaver dam was removed, the unnamed tributary has become an intermittent stream. When the stream does contain flow it lacks stream feature diversity such as riffles, runs, and pools, spawning areas, and cobble/gravel substrate. Fish were not sampled within the unnamed tributary. This reach rated marginal habitat using EPA's RBP and poor water quality using the HBI. Both assessments were completed prior to beaver dam removal (Supplemental Field Assessments for the Walker Run Watershed, LandStudies 2010). "A Field Survey of Fish and Aquatic Macroinvertebrates" (Normandeau, 2010) examined the fish populations within the farm pond (10A) in wetland 10.1. One creek chub was collected during the first sampling effort and 52 fish were collected during the second with Creek Chub as the dominant species. "The Farm Pond" fish assemblage was not representative of a typical fish community for ponds in Pennsylvania. A majority of the species collected in farm pond including creek chub, white sucker, and blacknose dace normally inhabit streams and rivers and are not found in ponds. It is probable that these fish were washed into Farm Pond during flood events that caused Walker Run to overflow its banks" (A Field Survey of Fish and Aquatic Macroinvertebrates, Normandeau 2010).

Production export is a suitable function of this wetland. Production is believed to be high however opportunities for export are minimal. Wildlife food sources and high levels of detritus are present. There is evidence of wildlife use. During this evaluation a pair of pheasants was disturbed. This habitat should also benefit rodents and birds. It is also believed that higher trophic level consumers could utilize this wetland. Flowering plants used by nectar gathering insects are present. Export of these products from flushing events is minimal due to flat topography, low channel grade, and intermittent channel flow within the unnamed tributary.

Groundwater discharge is not a suitable function of this wetland. During the November 2009 field work the majority of the emergent wetland was inundated. The only non-inundated or saturated areas were located on the fringes of the wetland with higher topography. During the July 2010 field work, post beaver dam removal, the hydrology of the entire area had changed. The unnamed tributary was completely dry downstream of the existing culvert and there were no inundated areas or saturated areas within the wetland. A soil pit dug within the unnamed tributary revealed sandy

soils. Peizometer data indicates that the beaver dam caused the groundwater levels within this wetland to rise, inundating this region.

Sediment/toxicant/pathogen retention **is not** a suitable function of this wetland. There is a minimal source of pollutants contributed from upland land uses.

Nutrient removal/retention/transformation **is not** a suitable function of this wetland. There is minimal source of nutrient contributed to this wetland from upland land uses.

Soil types:

At – Atherton silt loam

ChB – Chenango gravelly loam, 3 to 8 percent slopes

RdA – Rexford loam, 0 to 3 percent slopes

Wildlife observed:

Eastern garter snake , eastern ribbon snake , northern water snake , wood turtle , snapping turtle , eastern painted turtle , northern gray tree frog , eastern american toad , green frog , northern two-lined salamander , black dash butterfly , pair of pheasants

Vegetation observed:

Common rush, poverty rush, blue vervain, carex spp., yellowfruit sedge, soft rush, arrowleaf tear thumb, joe-pye weed, New York ironweed, boneset, bulrush, cut-leaf coneflower, wrinkled goldenrod, flat top goldenrod, Canada goldenrod, giant goldenrod, swamp aster, purple-stem aster, trumpetweed

Wetland 10.2 (4.22 acres)

Description:

This wetland area is located west of Walker Run and south of the access lane. It extends to the treeline just upstream of the confluence with the Eastern Tributary. The large open area adjacent to the stream consists of PEM wetlands and a mix of forested and scrub-shrub wetlands are located closer to North Market Street. Walker Run is incised with 4 feet high vertical banks. Prior to the removal of the beaver dam, the water surface elevation of Walker Run was close to the top of banks. Since the dam was removed, the water elevation has dropped well below the existing top of banks. This wetland was previously farmed and there is a hard, compacted layer approximately 10 inches below the surface which is likely a fragipan caused by plowing or farming with heavy equipment under wet conditions. As a result, most of the wetlands are perched above the existing water table, which is controlled by the water surface elevation of Walker Run. Surface runoff appears to drain slowly towards the treeline along the south end of the wetland area where it accumulates making this area wetter than other parts of the wetland.

Functions and Values Assessment:

Wildlife habitat is a **principal** function of this wetland. Overall, it provides ideal open-meadow habitat for a large range of wildlife from small insects to higher trophic level mammals, birds, amphibians or reptiles. The wetland has dense vegetation with diverse plant community structure (emergent, forested, and scrub-shrub) that is contiguous with other suitable wetland and upland habitat. Wildlife food sources are present within the wetland, adjacent wetlands, and adjacent upland habitats. Flowering plants used by nectar gathering insects are abundant. Animal signs observed include deer tracks and turkey scratches. The wetland is not currently being impacted by human activity.

Fish habitat is a **suitable** function of this wetland; however, the function is limited to the perennial Walker Run watercourse. Fish, reptiles, and amphibians are all known to be present in Walker Run. Shrubby vegetation along the stream banks provides the watercourse with some minimal shade; however no mature trees are present. Fish were sampled in 2009 (Walker Run Surveys: Wild Trout Habitat Assessment, LandStudies 2009) and 2010 at this stream reach. Fish species present include green sunfish, white sucker, creek chub, fallfish, blacknose dace, and brown trout. Seventeen brown trout were collected in 2009 while only one was collected in 2010. This can be attributed to the low water levels caused by beaver dam removal. Prior to removal, backwater created deep pools able to support trout. LandStudies macroinvertebrate sampling indicates good water quality using the HBI, but the scores are very close to falling into the fair range. An evaluation of habitat using EPA RBP indicated marginal habitat (Walker Run Surveys: Wild Trout Habitat Assessment, LandStudies 2009).

Production export is a **suitable** function of this wetland. Production is believed to be high; however, opportunities for export are minimal. Wildlife food sources and high levels of detritus are present and there is evidence of wildlife use.

Sediment/shoreline stabilization **is not** a suitable function of this wetland. High, vertical banks exist along the majority of Walker Run through this site, which prevents flood flows from regularly accessing the floodplain. As a result, many larger flood flows are contained within the incised channel, which makes the banks susceptible to erosion. The existing woody and herbaceous vegetation along the stream will do little to stabilize the banks during these high flow events.

Groundwater discharge **is not** a suitable function for this wetland. There are no field indicators that discharge is occurring.

Groundwater recharge **is not** a suitable function for this wetland. The primary reason is due to the hard fragipan that exists, restricting water from reaching the water table.

Floodflow alteration **is not** a suitable function of this wetland. There is minimal watershed upslope of this wetland. This wetland contains hydric soils which absorb and detain water however the

infiltration rate does not appear to be great. Removal of the beaver dam and the incised nature of Walker Run prevent flood flows from accessing the floodplain on a regular basis.

Sediment/toxicant/pathogen retention **is not** a suitable function. The reach of Walker Run likely receives significant sediment load from eroding streambanks upstream, however the disassociation between the stream channel and the floodplain does not provide the opportunity for sediment retention in the wetlands.

Nutrient removal/removal/transformation **is not** a suitable function due to the lack of potential for sediment trapping described above. Also, there does not appear to be any significant sources of nutrients upslope of the wetland.

Soil types:

BrA – Braceville gravelly loam, 0 to 3 percent slopes

RdA - Rexford loam, 0 to 3 percent slopes

Wildlife observed:

Deer, black dash butterfly, wood turtle, northern gray treefrog, eastern ribbon snake, northern red salamander

Vegetation observed:

Red maple, common winterberry, highbush blueberry, goldenrod spp., sedge spp., mile-a-minute, woolgrass

Wetland 10.3 (25.77 acres)

Description:

This large PFO wetland is also adjacent to wetlands areas 10.1 and 10.2. A large contiguous area of forested uplands and wetlands exist to the south creating excellent wildlife corridors and habitat. The forested wetlands extend southward beyond the limits of the BBNPP project boundary. The topography of the wetland area is very flat through the majority of the wetland complex. Walker Run flows into the wetland at the northwest corner and exits at the southwest corner via a 24" pipe culvert under a farm access road. The pipe is undersized and the access road is raised a few feet above the floodplain elevation. Therefore, the outlet is unconstricted except during large flow events (flows that exceed existing banks) during which there is likely a backwater condition upstream of the culvert crossing. The confluence of Walker Run and its Unnamed Tributary is located at the same approximate location where Walker Run flows into the wetland. Just downstream of the confluence was a beaver dam approximately 6 feet high. This area was significantly influenced by beaver activity prior to beaver dam removal. The beaver dam created a backwater condition that extended upstream along Walker Run and its tributary. The backwater along the tributary exceeded the capacity of the channel, which caused inundation throughout the majority of the wetland complex. Consequently, a network of separate drainage patterns developed throughout the forested wetland

area. These drainage networks were visible but dry during the July 2010 field work due to dam removal and seasonal conditions. The wetland area west of Walker Run remained saturated, indicating that this area was not influenced as much by the beaver dam.

Walker Run is incised throughout this wetland with banks ranging from 2-4 feet in height. Due to the stream's incision, the banks are susceptible to erosion. Hydrology is provided by surface runoff during rain events and occasional stream overflow. Additional hydrology may be provided by seasonal spring seeps. The soils observed appear to be fine-grained silts with a less permeable clay layer near the surface, which are underlain by sands and gravels (underlying stratified drift) that were deposited during glacial retreat. It is likely that the area remains inundated for a long time outside of the growing season when there is little to no evapotranspiration. During the November 2009 field investigation, the average water depth throughout the majority of the wetland area was approximately 8 inches. A series of deeper pockets of water exist at the base of numerous overturned trees which were toppled by wind during a storm in spring 2007. However, there was little to no inundation throughout the same area during the July 2010 field investigation, which can be attributed mostly to the removal of the beaver dam and to a lesser degree, higher evapotranspiration rates.

Functions and Values Assessment:

Wildlife habitat is a principal function of this wetland. The wetland is part of a large forested wetland complex that extends beyond the limits of the BBNPP project boundary. It is also contiguous with Wetland 10.1 and 10.2. A variety of vegetation provides adequate food and cover for a variety of wildlife including higher trophic levels. Birds, insects, and amphibians are all expected to utilize this wetland. Many signs of animal activity were observed including deer tracks/buck rubs, bear scat, and extensive beaver activity. Various songbirds and red-tail hawks were also observed within this wetland area. This wetland area serves as ideal forested wetland habitat as well as a protected corridor for wildlife because the majority of the surrounding upland is undeveloped.

Groundwater recharge is a suitable function of this wetland since beaver dam removal. Removal of the beaver dam lowered the water table reducing saturation and inundation to the east of Walker Run. This area is flat and can store surface runoff; however, infiltration rates may be slow due to a layer of silt and clay near the surface.

Groundwater discharge is potentially a suitable function of this wetland complex. It is unclear if there are existing spring seeps or seasonal high groundwater levels on the west side of the wetland. The soil in this area is a mix of silt, clay and sand.

Floodflow alteration is a suitable function of this wetland. Since the wetland is relatively flat and it is fairly large compared to the size of its watershed, this it provides ample storage of floodwaters from Walker Run and its tributary. The soil appears to be able to store a significant quantity of water; however clay and silt hinder soil infiltration rates. The farm access road and undersized pipe culvert help to further retain floodwaters that are at elevations less than the road invert. This wetland also

contains a high density of vegetation which slows water velocity through the wetland. However, it should be reiterated that due to the incised condition of Walker Run, many flood flows are contained within the channel without accessing the floodplain, which minimizes the opportunity for the wetlands to provide this function except for large flood events.

Fish habitat is a suitable function of this wetland; however it is limited to the perennial Walker Run stream channel. Small fish populations are expected due to the silt bottom, shallow water, and lack of in stream feature including pools and riffles. Fish sampling was completed in fall 2007 and spring and summer 2008 on Walker Run at the downstream wetland boundary (near the farm culvert). A maximum of 151 fish were collected during a single sampling effort and 7 different species. Blacknose dace and creek chub were the dominant species collected (A Field Survey of Fish and Aquatic Macroinvertebrates, Normandeau 2010).

Production export is a suitable function of this wetland. This wetland is highly productive due to the dense, diverse vegetation, and potential wildlife use. Wildlife food sources and high levels of detritus are present. It is likely that higher trophic level consumers utilize this wetland. Potential bear tracks were seen during the summer field visit. Flowering plants used by nectar gathering insects are present. Due to flat topography and the incised nature of Walker Run flushing events are rare within this wetland.

Sediment/toxicant/pathogen retention is a suitable function of this wetland. Potential exists for sediments to be stored within this wetland due to its large size, flat topography, and dense woody vegetation. However, there is little opportunity for this wetland to provide this function because upstream streambank erosion is the most significant source of sediment in the watershed. Also, the incised condition of Walker Run prevents sediment laden water to access the floodplain during most flood events. Additional sediment may enter the wetland from adjacent farm fields to the east.

Nutrient removal/retention/transformation is a suitable function of this wetland for many of the same reasons as its suitability for sediment/toxicant retention. This wetland has flat topography and surface water is retained for long periods of time, especially outside of the growing season. Runoff from cropland to the east could provide a source of nutrients.

Sediment/shoreline stabilization is not a suitable function of this wetland. High, vertical banks exist along the majority of Walker Run through this site, which prevents flood flows from regularly accessing the floodplain. As a result, many larger flood flows are contained within the incised channel, which makes the banks susceptible to erosion. Even though there is an abundance of woody vegetation along the stream, it will do little to stabilize the banks during these high flow events.

Soil types:

At – Atherton silt loam

BrA – Braceville gravelly loam, 0 to 3 percent slopes

RdA – Rexford loam, 0 to 3 percent slopes
RdB – Rexford loam, 3 to 8 percent slopes

Wildlife observed:

Deer tracks, bear tracks, various songbirds, red-tail hawk, significant beaver activity, green heron, northern gray treefrog, red spotted newt, northern watersnake, eastern garter snake, wood frog, northern cricket frog

Vegetation observed:

Pin oak, red maple, shagbark hickory, arrowwood, bristly dewberry, highbush blueberry, winterberry, spicebush, cinnamon fern, hay scented fern, sensitive fern, jewelweed, skunk cabbage, sweet woodreed, rare clubmoss

Wetland 11 (3.63 acres)

Description:

This teardrop-shaped wetland is entirely PFO. Wetland hydrology is supported by multiple groundwater seeps that form Unnamed Tributary 2 to the north. Additional hydrology is provided by groundwater seeps at the base of the wooded slope west of Unnamed Tributary 2. Historic land uses such as farming and dams are believed to have caused large amounts of sediment to be deposited in this valley bottom. The remains of an earthen dam are evident in the upper region of the wetland. The thick layer of sediment created by these historical practices is exposed throughout the lower portion of the wetland where headcuts have migrated up the valley approximately 300 feet from the southern end of the wetland and branch apart into 3 separate headcuts with subsurface flow emerging at the base of each (see Photo 31 in Appendix C). The downcutting has left the stream incised with high vertical banks composed mostly of fine silts and sands, which are subjected to erosion during rain events. As a result, the stream does not access its floodplain regularly in this lower portion of Wetland 11 and the stream's incision has likely caused the water table of the adjacent floodplain to drop in elevation to match the current bed elevation, which is essentially reducing the wetland's interaction with groundwater over time. As a result, the wetlands adjacent to the stream in the lower portion of Wetland 11 are fairly well-drained as indicated by the lack of saturated and inundation observed during the field investigations. It is unclear what caused the headcuts and how fast they are migrating up-valley. The instability observed in the downstream end of the wetland is a sharp contrast from conditions observed above the headcuts where the stream has low, stable banks and is relatively well-connected to an active floodplain. The water table is much closer to the surface, which causes the adjacent wetlands to be more saturated throughout the year. Approximately 50 feet upstream of the active headcuts, the surface flow appears to infiltrate underground and becomes subsurface flow until discharging as surface flow again at the base of each headcut. At the southernmost end of the wetland, Unnamed Tributary 2 enters a pipe that conveys stream flow underground for approximately 600 feet before daylighting on the other side of a fallow cropfield. This pipe serves as a constricted outlet in high flow events until the stream overflows into a grass waterway that was constructed through the cultivated fields. The piped water

returns to channelized flow in Wetland 12.3 before emptying into the Unnamed Tributary of Walker Run.

Functions and Values Assessment:

Groundwater discharge is a **principal** function of this wetland. There are multiple seeps which contribute flow to the Unnamed Tributary 2. This stream was flowing during the July 2010 field visit when much of the Eastern Tributary was dry. It assumed the quality of this water is high due to the groundwater source and lack of sediment and excessive nutrients in the upstream watershed.

Wildlife habitat is a **principal** function of this wetland. This wetland serves as ideal forested wetland habitat as well as a protected corridor for wildlife. Surrounding upland areas are also undeveloped excellent wildlife habitat. Dense woody vegetation provides adequate food and cover for a variety of wildlife including higher trophic level consumers. The groundwater seeps likely provide a freshwater source throughout the winter months when other water sources may be frozen.

Groundwater recharge is a **suitable** function. The wetland is not permanently flooded and is located in a slightly sloped valley bottom with depressions that may hold water. However, Unnamed Tributary 2 acts as an outlet and limits the wetland's ability to hold and infiltrate water. The Soil Survey of Luzerne County indicates well drained soils in this area, some with rapid permeability, which may increase infiltration rates and recharge in some areas.

Floodflow alteration is a **suitable** function of this wetland. The upstream, stable portions of the drainage feature have low banks that are easily accessed during higher flow events. Depressions within the wetland may also help store overland runoff and the constricted outlet may pond water during small storm events reducing peak flows on a small scale downstream. This wetland also contains a high density of vegetation throughout the wetland and some vegetation and water interspersed in the upper, stable portion of the drainage network. Below the headcuts, water in the channel is not slowed by vegetation or a low easy accessible floodplain. However, it should be noted that this wetland is located in the upper portions of the watershed and may not receive large flood events.

Fish habitat is a **suitable** function due to the wetland and streamside vegetation and availability of macroinvertebrates for food; however the stream size and lack of diverse stream habitat (i.e. riffles and pools) would likely limit fish populations larger than the occasional minnow or dace. The pipe also serves as a control structure that would prevent fish movement. Fish were not sampled on Unnamed Tributary 2. Macroinvertebrate sampling revealed fair to poor water quality based on the HBI (Supplemental Field Assessments for the Walker Run Watershed, LandStudies 2010).

Production export is a **suitable** function. A high density of vegetation is present, however plant diversity in this wetland is still considered to be low. Food sources for mammals, insects, and stream macroinvertebrates are present. Evidence of wildlife use includes deer tracks and turkey scratches. It is likely wildlife frequently utilize this wetland. Nutrients are exported from this wetland

via leaf matter broken down by macroinvertebrates. Flushing events may occur within the wetland but are impeded by the constricted outlet.

Sediment/shoreline stabilization is a suitable function. Upstream of the headcuts there is dense and adequate woody and emergent vegetation to stabilize the wetland and spring channel during rain events. Below the headcut the current wetland vegetation is not enough to stabilize bank erosion and the wetland is actually contributing to the amount of sediment in the stream.

Sediment/toxicant/pathogen retention **is not** a suitable function of this wetland. There is not a significant source of sediment or pollutants in the watershed. Also, the wetland is located in the upper portions of the watershed and should not receive many high flow events that would flush sediment and toxicants into the wetland.

Nutrient removal/retention/transformation **is not** a suitable function. There are few sources of excess nutrients in the upstream watershed.

Soil types:

WyF – Wyoming gravelly loam, 25 to 60 percent slopes

O1B – Oquaga and Lordstown channery silt loams, 3 to 8 percent slopes

Wildlife observed:

Green frog, redback salamander, little brown bat, northern long-eared bat, big brown bat, deer tracks, turkey scratches

Vegetation observed:

Red maple, spicebush, jewelweed, soft-stem bulrush, skunk cabbage, green briar, green bulrush

Wetland 12.1 (13.97 acres) & Wetland 16 (3.51 acres)

Description:

Wetlands 12.1 and 16 are primarily PFO with some PSS and PEM areas. Despite being separated by Confers Lane, the wetlands still retain similar characteristics and are therefore grouped together. It is likely that these wetlands were hydrologically connected in the past before they were dissected by Confers Lane, which now serves as drainage divide. Because of the historic connection, Wetland 16 is considered to be hydrologically connected to Wetland 12.1 and therefore also “exceptional value”.

Wetland 12.1 surrounds the north/south reach of the Eastern Tributary. The stream serves as an outlet for the wetland. The wetland has flat topography and the source of hydrology appears to be overland flow and spring upwellings when the groundwater table is high. Two channels created by surface water runoff from the “West Building” parking lot and from Confers Lane join within the wetland and then flow to the Eastern Tributary as it begins to flow in an east-west direction. The Eastern Tributary has been artificially channelized (ditched) throughout the north-south section,

especially behind the “West Building” where berms have been built on either side of the stream. The berms appear to be side-cast from digging out the channel.

Both wetlands were inundated during winter and spring with drier conditions during the summer months due to higher evapotranspiration rates. During the November 2009 field visit the majority of the wetlands were saturated or inundated. During the July 2010 field visit, both wetlands exhibited significantly drier conditions. There was no flow in the tributary or any of the channelized areas discussed above. A wetter section containing some skunk cabbage was present in the southeastern region of Wetland 12.1, however no inundated areas were observed. Wetland 16 remained wetter than Wetland 12.1 due to the lack of an outlet. The long “tail” part of Wetland 16 that makes a 90-degree bend to the east is an extremely flat manmade channel formed between the elevated switchyard and a natural bedrock formation.

Functions and Values Assessment:

Wildlife habitat is a **principal** function of this wetland. Except for Confers Lane, these wetland areas are not degraded by current human activity despite having been historically impacted. The PPL “West Building” and the switchyard are located adjacent to these wetlands; however, there is adequate adjacent upland and wetland area to provide wildlife corridors for movement. Diverse vegetation and plant community structure provide a food source for a variety of wildlife. Seasonal inundation provides habitat that should support large populations of amphibians, insects, and birds.

Groundwater recharge is a **suitable** function of this wetland. The topography, lack of standing water, and constricted outlet are some characteristics that encourage recharge in this area. However, Normandeau has noted some spring upwellings in this wetland during times of year with a high water table. High evapotranspiration levels may also limit recharge during the growing season.

Groundwater discharge is a **suitable** function of this wetland. Groundwater discharge has been noted by Normandeau during spring. The Atherton soil series has a seasonally high water table at or near the surface. Normandeau and LandStudies water quality testing revealed high conductivity levels within the Eastern Tributary which could indicate groundwater discharge into the stream.

Production export is a **suitable** function. There are sufficient wildlife food sources, dense vegetation, and detritus development. Flushing events with low water velocities may occur within the wetland during storm events.

Floodflow alteration is a **suitable** function. These wetlands are contiguous to other wetlands and therefore represent a large area within the watershed. The flat topography slows and collects overland flow during rain events and there is high density of vegetation, which further slows water velocity through each wetland area. Wetland 12.1 includes two drainages receiving surface runoff from the “West Building” parking lot and from Confers Lane. Wetland 16 receives surface runoff from the adjacent switchyard on the east. However, much of the north-south reach of the Eastern

Tributary and the channelized “tail” portion of Wetland 16 are entrenched, which prevents flood flows from accessing the adjacent floodplain on a regular basis.

Fish habitat is a suitable function of this wetland. The unnamed tributary has intermittent stream flow throughout this reach and is dry during the summer months. When the stream does contain flow it lacks stream feature diversity such as riffles, runs, and pools, spawning areas, and cobble/gravel substrate. Fish were not sampled within the unnamed tributary. A reach just downstream of the beaver pond rated suboptimal habitat using EPA RBP and the macroinvertebrate community indicated fair water quality using the HBI (Supplemental Field Assessments for the Walker Run Watershed, LandStudies 2010).

Sediment/toxicant/pathogen retention is a suitable function of this wetland because these wetlands receive stormwater runoff from Confers Lane, the West Building parking lot, and the switchyard, which may contain pollutants. Although there are outlets within the wetland, the slow moving water and dense vegetation provides opportunity for treating stormwater within the wetland rather than washing directly into the Eastern Tributary to Walker Run. However, there is no significant source of sediment being introduced into these wetland areas.

Sediment/shoreline stabilization is a suitable function of this wetland. The wetland is wide and flat with dense vegetation that will withstand flood events. Erosion currently occurring along the Eastern Tributary is due to historical alteration and ditching of the channel.

Nutrient removal/retention/transformation is not a function of this wetland. There is sufficient vegetation present to utilize any excess nutrients that may enter the wetland; however, there is little to no potential for these wetlands to provide this function because there is not a significant source of nutrients in the surrounding watershed.

Soil types:

At – Atherton silt loam

RdB – Rexford loam, 3 to 8 percent slopes

Wildlife observed:

Deer tracks, eastern painted turtle, snapping turtle, pickerel frog, northern gray treefrog, green frog

Vegetation observed:

Multiflora rose, sedge spp., skunk cabbage, highbush blueberry, spicebush, cattails, elderberry, swamp white oak, red maple, black gum, pin oak, yellow poplar, sensitive fern, silky dogwood, arrowwood

Wetland 12.2 (10.31 Acres)

Description:

This wetland complex includes PEM, PSS, and PFO wetland classes and includes the area between “Johnson Pond” (12A) south of Beach Grove Road and the downstream end of the “Beaver Pond” (12B). The area also includes two drainage features originating from culvert pipes under Beach Grove Road. Johnson Pond outlets into the western drainage feature. The convergence of these drainage features creates a more defined channel where Unnamed Tributary to Walker Run begins. The wetland complex includes a swath of fringe wetlands along each side of the watercourse. Steeper side slopes confine the wetlands to the relatively narrow valley bottom. The land on top of the northern and eastern side slopes appears to be artificially elevated because it is comprised of a large accumulation of fill material (likely generated during the development of the existing power plant facility) on which rests an existing switchyard. The southern and western side slopes are defined by the natural terrain created by underlying geology. Numerous spring seeps were observed at the base of the side slopes – some seeps follow small channels before flowing into the watercourse. The watercourse and adjoining wetlands trend west to east before turning abruptly (90 degrees) to trend north to south. Other than the open water associated with Johnson Pond, it is mostly PFO with some PSS until approximately 300’ upstream of the sharp bend where it then changes to predominantly PEM. The PEM portion of the wetland area correlates with the upstream limits of the backwater condition created by the Beaver Pond. Additional hydrology is provided by surface runoff during rain events. For most of its length, the watercourse is well-connected to its adjacent floodplain. However, some bank erosion was observed in the upper forested portion. Evidence of human disturbances was observed in the upper portion where a stone wall (old property line) and an abandoned bridge crossing exist. The beaver dam at the downstream end of the pond was built along an existing access road used for accessing existing transmission lines owned by PPL electric utilities. At the time of the field investigations, the dam created a shallow pond that extends upstream approximately 450 feet. The grade was relatively flat through much of the valley bottom and there was a high degree of vegetation and water interspersed within close proximity of the beaver pond. A man-made ditch exists along the west boundary of the beaver pond and empties into the Eastern Tributary downstream of the access road; however it does not appear to convey normal flows as the invert is higher than the beaver pond water surface. It is unclear as to what purpose this side channel serves. In September 2010, the beaver dam was removed and the pond was drained in order to replace the culvert pipe under the access road. A weir structure is to be installed to re-establish the open-water that had existed behind the beaver dam.

Functions and Values Assessment:

Wildlife habitat is a **principal** function of this wetland. Although it appears that this wetland has been impacted by human activities associated with the development of the existing power plant facilities (i.e. switchyard and stockpile area adjacent to the wetland), the wetland area has been relatively undisturbed in recent years. The majority of the uplands surrounding these wetlands are undeveloped and good wildlife habitat. The wetland area is composed of a variety of cover types including forest, scrub-shrub, herbaceous, and open water. The forested portions are contiguous with a larger forested area that extends beyond the limits of the owner controlled area. A variety of

vegetation provides adequate food for wildlife. Birds, insects, and amphibians are all expected to utilize this wetland. Deer tracks and buck rubs, various songbirds, signs of coyote, red-tailed hawks, and extensive beaver activity were all observed within this wetland complex. It was determined that wildlife habitat is a principal function due to the overall large size wetland area, diversity of vegetation, and undeveloped surroundings.

Groundwater discharge is a suitable function of this wetland. Several spring seeps were observed along the bases of the adjacent hillsides. Furthermore, it is likely that the water table is relatively close the surface throughout the rest of the wetland due to the backwater created by the beaver dam and access road.

Floodflow alteration is a suitable function. The wetland is relatively flat, located high in the watershed, and is large compared to the size of its watershed. This wetland provides good headwater storage despite potentially slow infiltration rates. The floodflow storage helps to limit the amount of surface runoff directly accessing the watercourse. This wetland also contains a high density of vegetation which decreases flow velocities through the wetland. It should be noted that the low stream gradient, which improves floodflow storage or conveyance, is a direct result of the existing beaver dam. If the dam or the access road were to be removed, significant downcutting could occur and reduce this wetland's floodflow alteration function.

Fish habitat is a suitable function of this wetland. However the majority of this function is reserved to Johnson Pond and the Beaver Pond. Normandeau sampled fish in Johnson Pond in 2007 and 2008. The most fish caught at one sampling effort was 240 fish representing 3 species. Bluegill was the dominant species collected during both sampling efforts. The most fish caught during one sampling effort in the Beaver Pond was 165 representing 5 species. Brown bullhead was the dominant species collected. The reach of the Eastern Tributary associated with this wetland has intermittent flow during the dry summer months.

Groundwater recharge is a suitable function of this wetland. Other than the two ponds, the wetland area is not permanently flooded. It is relatively flat and likely retains surface runoff for long periods of time. In addition to overland runoff, the wetland relies on hydrology from close proximity to the water table, which was raised by the beaver dam. However, during the growing season, it is likely that are large amount of surface water is lost to evapotranspiration rather than infiltration (groundwater recharge).

Sediment/toxicant/pathogen retention is a suitable function of this wetland. Dense woody and herbaceous vegetation and relatively flat topography causes water to move slowly (diffusely) within the wetland. There is a defined outlet; however it is constricted by the beaver dam and access road. Water drains from the pond through a pipe culvert under the access road. During the field investigation, water from the beaver pond was also observed to be flowing over/through the low points of the beaver dam and across the access road. This is likely to be a common occurrence following rain events. It may also indicate that the drain pipe is clogged. The impoundment provides

suitable sediment and toxicant retention; however, there is little opportunity to provide this function because there are few sources of pollutants within the upslope watershed.

Sediment/shoreline stabilization is a suitable function of this wetland. A high density of herbaceous and woody vegetation is present. There are two distinct ponds within the wetland, both with stable banks. The Eastern Tributary has a relatively low gradient through the majority of the wetland. Although some erosion was observed at the beginning of the Eastern Tributary within this wetland area, dense vegetation appears to be stabilizing the banks. It is important to reiterate that if the beaver dam or the road were to be removed, it is likely that significant downcutting would occur thereby lowering this function.

Nutrient removal/retention/transformation **is not** a suitable function of this wetland because there is no significant source of nutrients entering the wetland.

Production export **is not** a suitable function of this wetland area. This wetland is highly productive due to the dense, diverse vegetation, and potential wildlife use. However, because of its flat topography and the presence of the beaver dam and pond, very little export is occurring – or if it is occurring, it is too slow to be of significance.

Soil types:

RdB – Rexford loam, 3 to 8 percent slopes

ASF - Arnot rock outcrop complex - steep

WeB – Weikert and Klinesville channery silt loam, 3 to 8 percent slopes

At – Atherton silt loam

Wildlife observed:

Deer, deer tracks/buck rub, red-tail hawk, beaver activity, coyote scat, various songbirds (blue jay, cardinal), bull frog, green frog, spring peeper, northern gray treefrog, redback salamander, northern red salamander, eastern painted turtle, eastern box turtle, snapping turtle, northern watersnake, eastern gartersnake, northern brown snake, long dash butterfly

Vegetation observed:

Multiflora rose, skunk cabbage, highbush blueberry, spicebush, red maple, sedge spp., soft rush, sensitive fern, cinnamon fern, New York ironweed

Wetland 12.3 (13.10 acres)

Description:

This wetland is associated with the forested east/west reach of the Eastern Tributary to Walker Run. There is minimal bank erosion and the stream has a flat grade and a sand/silt bottom. The stream is fairly well connected to the wetland. The wetland has flat topography and the source of hydrology appears to be overland flow as well as stream overflow and a seasonally high groundwater table.

The confluence with the Unnamed Tributary 2 is located within the wetland, which provides additional hydrology. The stream flows through a culvert pipe underneath a farm access road at the western-most end, which serves as the main outlet for the wetland area. During higher flows, the culvert creates backwater conditions as well as scouring and sedimentation in the channel upstream of the culvert. During the July 2010 field investigation, the Eastern Tributary was dry until the confluence with Unnamed Tributary 2, indicating that the spring flows in Wetland 11 may contribute significant hydrology to the Eastern Tributary.

Functions and Values Assessment:

Wildlife habitat is a **principal** function of this wetland. The wetland is not currently being degraded by human activity. It has low water velocities and the surrounding upland is undeveloped providing additional wildlife habitat and corridors. This wetland is contiguous with other wetland systems and includes a watercourse. Wildlife food sources are present within the wetland, adjacent wetlands, and adjacent upland habitats. The wetland has dense vegetation with diverse plant community structure. Emergent, forested, and scrub-shrub areas exist within wetland boundaries. Animal signs observed include deer tracks. This wetland is also expected to support bird, insect, reptile, and amphibian populations.

Groundwater recharge is a **suitable** function of this wetland. The topography, lack of standing water, and constricted outlet (during high flows) are some characteristics that encourage recharge in this area. However, Normandeau has noted some spring upwellings in this wetland during times of year with a high water table.

Groundwater discharge is a **suitable** function of this wetland because of a seasonally high water table. Normandeau's water quality testing revealed high conductivity levels within the Eastern Tributary, which may indicate groundwater discharge into the stream.

Floodflow alteration is a **suitable** function of this wetland. The area is not permanently flooded or saturated. It can hold and infiltrate some surface runoff from surrounding upland areas. Throughout the majority of these wetlands, low stream banks allow flood flows to access the floodplain and overflow into the surrounding wetlands, which provides significant flood storage.

Production export is a **suitable** function of this wetland. Wildlife food sources and high levels of detritus are present. Dense vegetation exhibiting diversity in plant community structure is present. Export of these products likely occurs during storm events when flows increase.

Sediment/shoreline stabilization is a **suitable** function of this wetland. The wetland is wide and flat, bordering both sides of the Eastern Tributary. The stream banks are relatively low allowing flood flows to access the floodplain regularly. Dense vegetation further contributes to bank stabilization.

Fish habitat is a **suitable** function of this wetland due to the wetland and streamside vegetation, and availability of macroinvertebrates for food. However, during the July 2010 field investigation the

Eastern Tributary did not contain water upstream of the confluence of the Unnamed Tributary 2. The channel was also dry downstream of the culvert pipe, making much the Eastern Tributary within Wetland 12.3 seasonally isolated from Walker Run preventing fish passage. Normandeau sampled fish within this reach in November 2007 and again in April and July 2008. The maximum number of fish collected during one sampling effort was 92 while the least was 50. Creek chub were the dominant species collected (Normandeau 2008). Fish populations of this size are unlikely to still exist within this reach. This reach rated marginal habitat using EPA's RBP and fair water quality based on macroinvertebrate populations and the HBI (Supplemental Field Assessments for the Walker Run Watershed, LandStudies 2010).

Sediment/toxicant/pathogen retention is a suitable function for this wetland. There is little source of sediment in the surrounding upland areas. Although there are outlets within the wetland, the flat topography and dense vegetation provides the potential for treating overland runoff from adjacent agricultural fields within the wetland rather than washing directly into the Eastern Tributary. However, the agricultural fields are no longer farmed, which will reduce the potential for sediment to access Wetland 12.3 in the future and limit the opportunity for this wetland area to perform this function.

Nutrient removal/retention/transformation **is not** a suitable function of this wetland. There are few sources of nutrients in the surrounding uplands now that cropland has turned fallow.

Soil types:

At – Atherton silt loam, gray subsoil variant

RdB – Rexford loam, 3 to 8 percent slopes

Wildlife observed:

Deer tracks, eastern garter snake

Vegetation observed:

Green ash, red maple, shagbark hickory, pin oak, red oak, white oak, swamp white oak, black gum, white ash, elderberry, spirea, winterberry, silky dogwood, spice bush, bristly blackberry, bristly dewberry, arrowwood

Wetland 13 (0.16 acres)

Description:

This wetland is an extremely small, isolated PEM pocket located on top of the fill pile adjacent to Wetland 12.2. It was likely created by poor grading of the fill pile. It was determined that this wetland does not provide any functions or values. A separate field sheet was not completed.

Functions and Values Assessment:

No wetland functions and values were determined to be suitable.

Wetland 15 (0.25 acres)

Description:

This wetland is a small man-made stormwater swale located just north of the West Building parking lot that collects surface runoff during precipitation events. This small swale is allowed to grow naturally and supports hydrophytic vegetation. It outlets into a culvert under the access road to the West Building and then follows a grass swale before entering Wetland 12.1. The swale has deep, well drained gravelly soils. Due to its small size and the fact that it is a manmade stormwater facility, this wetland performs few functions and values other than collecting, temporarily detaining, and treating stormwater from the adjacent parking lot and West Building rooftop.

Functions and Values Assessment:

Groundwater recharge is a suitable function. Although this wetland has a culvert outlet, the stormwater swale contains a flatter grade, which may allow the well drained soils to infiltrate water.

Sediment/toxicant/pathogen retention is a suitable function of this wetland. The wetland is likely effective at removing pollutants from stormwater runoff from the adjacent parking lot.

Floodflow alteration is a suitable function. Impervious surfaces (West Building and parking lot) are located with this wetland's watershed. This wetland is meant to collect stormwater and will hold increased volumes of water during large storm events due to a constricted culvert outlet.

Groundwater discharge **is not** a suitable function. There are no indications that groundwater discharge is occurring.

Fish habitat **is not** a suitable function of this wetland. Perennial streams or open water habitats are not present.

Nutrient removal/retention/transformation **is not** a suitable function of this wetland. There are few sources of nutrients in the upslope watershed.

Sediment/shoreline stabilization **is not** a suitable function. No water bodies exist in the vicinity.

Production export **is not** a suitable function of this wetland. There are no significant wildlife food sources or plant diversity within the stormwater facility.

Wildlife habitat **is not** a suitable function of this wetland due to its small size, nearby human influences, and lack of diverse vegetation and vegetative community structure.

Soil types:

RdB – Rexford silt loam, 3 – 8 percent slopes

Wildlife observed:

None

Vegetation observed:

Cattail, woolgrass, purple loosestrife, reed canary grass, goldenrod spp.

Wetlands 56 - 61 (1.64 acres total)

Description:

This area includes PEM and PFO wetland pockets within Walker Run's floodplain. It is located west of wetland 10.3 and east of the North Market Street bridge crossing. A series of spring seeps in the PEM areas and a day-lighted agricultural drain tile in the PFO area provide most of the hydrology. Additional sources of hydrology include close proximity to the water table, surface runoff, and occasional stream overflow. Portions of the PEM wetlands have been mowed on a regular basis during dry conditions. The wetlands are directly adjacent to Walker Run, which is slightly incised. It appears that there is no active downcutting; however, lateral erosion is occurring in some locations. All wetlands eventually outlet directly into Walker Run. Walker Run flows out of the BBNPP project boundary through an undersized bridge opening under Market Street. Therefore, the outlet is unconstricted except during large flow events (flows that exceed existing banks) when there is a backwater condition behind the bridge opening. Most of the wetlands are relatively small.

Functions and Values Assessment:

Groundwater discharge is a **principal** function of the wetlands in this area. Most of the hydrology of all delineated wetlands is provided by spring seeps that were observed along the valley bottom and along the base of the side slopes. Remains of an old spring house exist near the existing residence. The delineated wetlands appear to intersect or are in close proximity to the water table. All delineated wetlands outlet into Walker Run.

Fish habitat is a **suitable** function of this wetland, which is limited to the perennial Walker Run watercourse only. During a fish sampling study in June 2010 the following fish were collected within this reach of Walker Run; tessellated darters, fallfish, brown bullhead, white suckers, black nose dace, green sunfish, creek chub, and 1 brown trout. Black nose dace were the dominant fish collected. There is varying depth with some in-stream vegetation, and some overhead vegetative cover. The stream bed is composed of primarily boulders, cobbles and silt with small amount of gravels and sand. The cobble is covered by silt deposits. This reach rated marginal (almost suboptimal) habitat using the EPA RBP protocol during field studies completed Summer 2010.

Wildlife habitat is a **suitable** function of this wetland area despite being impacted by human disturbances fairly often. The majority of the upland surrounding these wetlands is undeveloped and also good wildlife habitat. Other very high quality wetlands are located in close proximity (immediately upstream). The site provides some overland access for wildlife. A variety of vegetation provides adequate food for wildlife and two distinct wetland classes exist. Birds, insects, and

amphibians are all expected to utilize this wetland. Deer tracks were also observed within these wetlands. Despite this wetland area's suitability for wildlife habitat, it was determined that wildlife habitat is not principal due to the small wetland size, close proximity to a human residence, and mowing that occurs in approximately half the wetlands.

Floodflow alteration is a suitable function of this wetland. However, there is limited opportunity to provide this function. The wetlands receive stream overflow and overland sheet flow from surrounding upland areas during rain events, but drain into Walker Run. Because the channel is slightly incised, there is limited connectivity between the stream and its floodplain. Flows that do exceed the existing bank elevation may be attenuated; however, it is likely that this does not occur regularly. The small size of the cumulative wetlands is a limiting factor in the ability of this wetland to significantly contribute to floodflow alteration.

Sediment/toxicant/pathogen retention is a suitable function of these wetlands but there is limited opportunity to provide this function. The PFO area at the southeast corner of the site may receive some sedimentation from adjacent farm fields that slope towards the site. No other significant sources of sediment appear to be introduced into the watershed upstream except through stream bank erosion. Most sediments originating upstream are stored in the channel upstream or this wetland. Much of this reach is incised. During high flows bank erosion may introduce some quantities of sediment into the channel, but because of this incision, much of the sediment coming into the site is most likely flushed through, except during very high flow events. No accumulations of sediment were observed within this wetland area.

Nutrient removal/retention/transformation is a suitable function of these wetlands for many of the same reasons listed above. This wetland area has the potential to retain nutrients only during very large flow events due to the incised condition of the Walker Run channel. Furthermore, the wetlands in this area outlet directly into Walker Run and comprise a relatively small cumulative size.

Production export is a suitable function of this wetland area. The wetland has a high degree of plant productivity and has the potential for insect and animal use due the presence of food sources. All wetlands have permanent outlets to Walker Run. During high flow events, it is likely that this wetland area experiences some flushing events. However, this would only apply during higher flows (those that exceed the existing bank elevations) because Walker Run is slightly incised and relatively disassociated with its floodplain.

Uniqueness/heritage is a suitable value of this wetland area. The major reason for this suitability involves the presence of spring house remnants and a historic rock walls (property lines). The site is also highly visible to those who walk, bike, or drive along North Market Street. The area is on private property owned by PPL and has restricted access, which prevents this wetland area from being fully suitable for this value.

Visual quality/aesthetics is a suitable function for this wetland area for no other reason than the site is highly visible from Market Street. Therefore, the aesthetic quality of the wetland area can be appreciated by people walking or driving along Market Street. The wetlands have a variety of flowering plants, are absent of trash and debris, and provide suitable wildlife habitat. However, the area is on private property owned by PPL and has restricted access.

Groundwater recharge is not a suitable function of this wetland area. The elevations of the delineated wetlands appear to intersect the water table making the suitable for discharge. Surface water is temporarily stored in flatter sections; however, it drains directly into Walker Run along with discharge from several springs along the existing floodplain. All wetlands drain directly into Walker Run, which serves as the outlet. There may be the occasional opportunity for recharge within the last 200 feet of stream before North Market Street during higher flow events when a backwater condition is created by the undersized bridge opening, but it is likely that this potential recharge period is very brief.

Sediment/shoreline stabilization is not a suitable function. There is limited woody vegetation (trees and shrubs) that exists along the watercourse (mostly along the upstream-most portion). Much of the watercourse is slightly incised and lateral erosion is occurring, which indicates that except in localized places, the existing vegetation is not providing adequate bank stabilization. There is a high potential for bank erosion during larger storm events.

Soil types:

RdB – Rexford loam, 3 to 8 percent slopes

At – Atherton silt loam

BrA – Braceville gravelly loam, 0 to 3 percent slopes

Wildlife observed:

Deer tracks, songbirds (various)

Vegetation observed:

Green ash, red maple, pin oak, hickory (shagbark), spicebush, winterberry, skunk cabbage, jewelweed, tall buttercup, grass spp., goldenrod spp., soft rush, sedge spp., soft-stem bulrush, bur-reed, cattail, blue vervain, purple-leaved willow herb, Japanese bristlegrass

Wetland 53 (1.86 Acres)

Description:

This area includes PEM and PFO wetland within Walker Run's floodplain west of North Market Street and directly downstream of Wetlands 56-61 and the Market Street Bridge. An unnamed tributary enters Walker Run within this wetland. The unnamed tributary flows through agricultural land and feeds an on-line pond before discharging into Walker Run. Additional sources of hydrology include close proximity to the water table, surface runoff, and occasional stream overflow. Walker Run is incised throughout this reach with banks averaging 1 to 3 feet high. It appears that there is little

active downcutting; however, lateral erosion and significant sediment deposition is occurring within the stream.

Functions and Values Assessment:

Wildlife habitat is a suitable function of this wetland. The wetland is part of a larger Walker Run wetland system. Although this wetland is separated from Wetland 51 by North Market Street this does not create an impassible wildlife barrier. There are a variety of food sources available due to the diverse and dense vegetation and classes of vegetation present throughout the wetland. This wetland has the ability to host large populations of insects, amphibians, and birds within its boundaries. Wildlife habitat was not given a principal rating due to its close proximity to residences and an agricultural farmstead, although some of the surrounding agricultural areas are upland wildlife habitat.

Groundwater recharge is a suitable function of this wetland. The wetland consists of a floodplain with flat topography and depressions that can hold surface water runoff and floodflows when Walker Run or the unnamed tributary exceeds their banks. This will only happen during larger rain events due to the incised nature of Walker Run. The soils within this wetland are loam with some sand and are likely to infiltrate water.

Fish habitat is a suitable function of this wetland; however this function is limited to the perennial Walker Run watercourse only. Walker Run has perennial flow within the reach, even during the dry summer and fall of 2010. Fish sampling, habitat, and water quality assessments were not completed within this reach, however, limited riffle and pool habitat, as well as sediment deposition is expected to affect the fish species inhabiting this reach. Few, if any trout would be expected within this reach based habitat characteristics and fish sampling results by Normandeau Associates and LandStudies on nearby reaches.

Production export is a suitable function of this wetland. The wetland has a high degree of plant productivity and diverse plant community structure. Insects and animals are expected to use this wetland including higher trophic level consumers. During high flow events surface water runoff or out of bank flow from Walker Run likely causes some wetland flushing.

Floodflow alteration is a suitable function of this wetland. There is limited opportunity to provide this function because the topography slopes towards Walker Run which provides an outlet. The stream channel is slightly incised, limiting the connectivity between the stream and its floodplain. Flows that exceed the existing bank elevation may be attenuated due to the flat topography and depressions within the wetland.

Sediment/toxicant/pathogen retention is a suitable function of these wetlands but there is limited opportunity to provide this function. Sources of sediment within the watershed include streambank erosion and the upslope agricultural land. The flat topography and dense vegetation may filter some pollutants from surface water runoff. Much of the sediment in Walker Run is likely flushed through or

deposited within the stream channel except during high flow events that can access the floodplain. No accumulations of sediment were observed within this wetland.

Nutrient removal/retention/transformation is a suitable function of these wetlands for many of the same reasons listed above. This wetland area has the potential to retain nutrients only during very large flow events due to the incised condition of the Walker Run channel. Furthermore, the wetlands in this area outlet directly into Walker Run with few pockets that may collect and retain water. There is diverse and adequate vegetation to utilize nutrient retained in the wetland.

Sediment/shoreline stabilization is not a suitable function of this wetland. Although there is dense vegetation including energy absorbing emergents, shrubs, and trees within the wetland, Walker Run has degraded vertically and is continuing to migrate laterally increasing sedimentation downstream. There are 1- to 3-foot high banks along the majority of the watercourse on this site. The existing vegetation provides some bank stabilization, but not enough prevent erosion.

Groundwater discharge is not a suitable function. No springs or seeps were observed or are expected to be found. The wetlands are also not permanently flooded or saturated.

Soil types:

RdB – Rexford loam, 3 to 8 percent slopes

Wildlife observed:

Deer activity

Vegetation observed:

Red maple, jewelweed, swamp white oak, goldenrod spp., softrush, arrowleaf tearthumb, joe-pye weed, white pine, blue lobelia, sensitive fern, silky dogwood, spicebush, deer tongue, stiltgrass, green ash, eastern cottonwood, common winterberry, multiflora rose, arrowwood, skunk cabbage, poison ivy, sensitive fern, jack in the pulpit, eastern hemlock, highbush blueberry, cattails

Wetland 54 and 55 (0.05 and 0.04 acres, respectively)

Description:

These isolated small wetlands are located on a steeper slope east of North Market Street. Wetland 54 is located in a drainage channel that carries surface water runoff down the slope and under North Market Street. Wetland 55 is located in a depression in a mowed hay field. The water table in wetland 55 is likely perched. These wetlands do not perform any functions or values due to their small size, lack of diversity, and human disturbances. Separate field data sheets were not completed for these wetlands.

Functions and Values Assessment:

No wetland functions and values were determined to be suitable.

Soil types:

ChC - Chenango Gravelly Loam, 8 to 15 percent slopes

Wildlife observed:

None

Vegetation Observed:

Arrowwood, spicebush, multiflora rose, red maple, jewelweed, silky dogwood, panicled aster, soft rush, red clover, dandelion

Susquehanna Watershed

Wetland 17 (1.58 acres)

Description:

This wetland is an isolated depression consisting of PFO, PSS, and POW wetlands. The POW area is also referred to as Unnamed Pond 2 (17A). Unnamed Pond 2 is shallow and seasonal, becoming a grassy, emergent area during the summer months. The soils within this wetland consist of a sand/clay mix that is able to hold water. Hydrology is fueled by surface runoff that is retained due to the lack of a defined outlet. The pond was completely dry during the July 2010 field investigation.

Functions and Values Assessment:

Wildlife habitat is a **suitable** function of this wetland. Other wetlands are located in close proximity and overland access for wildlife is available. A variety of vegetation provides adequate food for wildlife. In addition, a mix of marsh and wooded swamp is present with high vegetation and water interspersed provides diverse wildlife habitat. Birds and insects are expected to utilize this wetland. Buck rubs were also sighted within this wetland. The majority of the upland surrounding these wetlands is also good wildlife habitat; however, barriers are created by an existing switchyard and the presence of Confers Lane, which are located nearby. This wetland area was not given a principal rating for this reason.

Floodflow alteration is a **suitable** function of these wetlands. Direct precipitation as well as surface runoff from surrounding uplands collects in this wetland. Water is retained in the wetland until it infiltrates, evaporates, or is used by plants through evapotranspiration. Not all areas of the wetland are permanently flooded, saturated, or ponded allowing additional water to infiltrate. The storage potential of this wetland area limits the amount of stormwater accessing nearby streams.

Groundwater recharge is a **suitable** function of this wetland. Important recharge characteristics include the lack of an outlet and flat topography. However, the soil is a mix of sand and clay, which appears to hold water and likely causes slow infiltration rates. Plant evapotranspiration and soil types may limit the amount of recharge occurring.

Sediment/toxicant/pathogen retention **is not** a suitable function of this wetland area. The watershed for this wetland is extremely small and there is not a significant source of sediment or pollutants. If a source did exist, this wetland would provide this function primarily because this wetland is an isolated depression.

Nutrient retention/removal/transformation **is not** a suitable function of the southern because there is not a nutrient source within this wetland's small watershed. If a source existed this wetland would provide this function primarily because it is an isolated depression with seasonal inundation and dense vegetation.

Groundwater discharge **is not** a suitable function. Water levels within the wetland are likely controlled by precipitation, infiltration, and evapotranspiration.

Fish habitat **is not** a suitable function of this wetland. The open water habitat is seasonal and cannot support fish populations.

Production export **is not** a suitable function for this wetland. This wetland is highly productive due to the dense, diverse vegetation, and potential wildlife use. However, because the wetland area is an isolated depression and does not have an outlet, no export is occurring.

Sediment/shoreline stabilization **is not** a suitable function of this wetland. This function is not applicable because the wetland is not located on a stream or water body prone to erosion.

Soil types:

RdA – Rexford loam, 0 to 3 percent slopes

Wildlife observed:

Eastern garter snake, green frog, red-spotted newt

Vegetation observed:

red maple, pin oak, black cherry, white ash, gray dogwood, white avens, multiflora rose, silky dogwood, meadowsweet, sedge spp., reed canary grass

Wetland 18 (6.32 acres)

Description:

This wetland is an isolated depression consisting of PFO, PSS, PEM, and POW. The POW area is also referred to as Unnamed Pond 1 (18A). Unnamed Pond 1 is a manmade impoundment that appears to be inundated year-round, likely interacting with the groundwater. The wetland adjacent to the POW area is excellent wetland habitat. Even during the July 2010 field visit, when evapotranspiration rates were very high, the majority of the wetland was saturated or inundated with very mucky soils. A wide diversity of vegetation was also present. During the July 2010 field investigation, seepage was observed along the berm that impounds the pond, which provides much of the hydrology to the wetland area south of the pond. Additional hydrology is provided surface runoff and groundwater discharge. Poorly drained soils allow the wetland to retain water for long periods of time.

Functions and Values Assessment:

Wildlife habitat is a **principal** function of this wetland. This wetland is not degraded by human activity or development. The majority of the upland surrounding these wetlands is wildlife habitat. Other wetlands are located in close proximity and overland access for wildlife is available. A large diversity of vegetation provides adequate food for wildlife. Plant community structure is diverse. A large degree of vegetation and water interspersation is present and provides habitats for diverse wildlife

inhabitation. Birds, insects, and amphibians are all expected to utilize this wetland. Frogs, turtle tracks, and many songbirds were sighted during the July 2010 field investigation. Buck rubs were also sighted within this wetland during the fall 2009 field investigation.

Nutrient retention/removal/transformation is a suitable function of this wetland due to the cropland located upslope. This wetland is large compared to the small watershed draining into the topographic depression. Nutrients washing in from surrounding agricultural fields can be used by the dense vegetation. There is no outlet to this wetland.

Sediment/toxicant/pathogen retention is a suitable function of these wetlands. These wetlands are depressional and will trap any sediments or nutrients that enter. The pond also provides deepwater habitat to settle out sediment. Another important factor is the lack of an outlet. Any sediment brought into the wetland by overland flow will not leave. The soils found in this wetland were deep. Some of the top layers may be topsoil washed in from the surrounding cropland. The dense vegetation and high degree of vegetation and water interspersed are also ideal conditions for trapping sediments.

Floodflow alteration is a suitable function. Direct precipitation and surface runoff from surrounding uplands collect in this wetland. Water is retained in the wetland until it infiltrates, evaporates, or is used by plants through evapotranspiration. Although frequently inundated and saturated, this wetland can hold additional water during storm events. The storage potential of this wetland area limits the amount of stormwater accessing nearby streams.

Groundwater discharge is not a suitable function of this wetland. This wetland area appears to intersect the groundwater and is stable with regard to seasonal water fluctuations (even during dry summer stretches) remaining saturated and inundated throughout the year. This wetland area is a depression within the surrounding landscape and appears to retain any water that is at the surface without any outlet. Water is either reabsorbed along the slightly higher perimeter of the wetland or is lost through evapotranspiration. However, evapotranspiration does not seem to drastically affect water levels. The Atherton soil series is present in this wetland which has a water table at or near the soil surface during wet periods.

Groundwater recharge is not a suitable function of this wetland because the wetland is permanently flooded and demonstrates signs of groundwater discharge.

Fish habitat is not a suitable function of this wetland. Although some qualifying criteria do occur in this wetland, fish sampling was conducted by Normandeau and no fish were found in this pond (Normandeau 2010). The open water present within this wetland likely freezes solid during cold winters.

Production export is not a suitable function because this wetland is an isolated depression. It is a highly productive area but no flushing events occur.

Sediment/shoreline stabilization **is not** suitable function of this wetland. This function does not apply because the open water area is small and there is no stream or other flowing water.

Soil types:

At – Atherton silt loam

Wildlife observed:

Eastern painted turtle, eastern garter snake, pickerel frog, green frog, wood frog, northern gray treefrog, red-spotted newt, turtle tracks

Vegetation observed:

Red maple, pin oak, black gum, silky dogwood, spicebush, arrowwood, highbush blueberry, winterberry, nepalese browntop, sweet woodreed, gray dogwood, multiflora rose, russian olive, meadowsweet, sensible fern, sedge spp., pussy willow, cattail, redtop, common rush, New York ironweed, woolgrass

Wetland 19 (6.13 acres)

Description:

This area is a forested wetland south of Confers Lane, which is the drainage divide between the Walker Run and Susquehanna River watersheds. The wetland gently slopes towards and is contiguous with wetland 20, although a portion lies outside the BBNPP project boundary. The wetland is bordered by forested uplands to the west and a fallow farm field to the east. This wetland area is large compared to the size of its watershed. Hydrology is provided by surface runoff during rain events and a seasonally high water table. The soils observed appear to be fine-grained silts and sands with a less permeable clay layer. Rexford soil series characteristically contains a fragipan and poorly drained soils. As a result, infiltration rates appear to be very slow. The grade is relatively flat through much of the wetland. During the December 2009 field visit, the majority of this wetland was inundated. It is likely that the area remains inundated for a long time outside of the growing season when there is little to no evapotranspiration occurring. Water drains slowly toward the center of the wetland area to an undefined swale that drains southeast towards Wetland 20. A series of deeper pockets exist at the base of numerous overturned trees. There is a slight observable indication of diffuse flow, but there is no distinct channelization or erosion.

Functions and Values Assessment:

Wildlife habitat is a **principal** function of this wetland area. It appears, based on analysis of historic mapping, that this wetland has not been significantly impacted by human activities. The majority of the upland surrounding these wetlands is either undeveloped or also good wildlife habitat. It is part of a rather large forested wetland complex that extends to Wetland 20 and includes the area between, which is outside the limits of the BBNPP boundary. A variety of vegetation provides adequate food for wildlife. Birds, insects, and amphibians are all expected to utilize this wetland.

Deer tracks and buck rubs were observed within these wetlands. It was determined that wildlife habitat is a principal function due to the overall large size wetland area and undeveloped surroundings.

Floodflow alteration is a suitable function of this wetland. The wetland receives surface water runoff that it can store due to its relatively flat topography and large size. This wetland provides adequate headwater storage despite poor infiltration rates. Runoff storage helps to slow the amount of surface runoff accessing the watercourse within Wetland #20. This wetland also contains a high density of vegetation which detains slows water velocity through the wetland.

Groundwater recharge and discharge are suitable functions of this wetland. This wetland is more likely to be affected by surface water runoff and precipitation (due to poorly drained soils and slow permeability) however seasonal groundwater interaction may take place. The drastic changes in water levels between the seasons indicate that evapotranspiration significantly affects water levels. During the growing season the poorly drained soils allow the vegetation to utilize water before recharge can occur. During the winter and spring months the seasonally high water table creates more of a discharge situation than a recharge situation.

Sediment/shoreline stabilization is not a suitable function of this wetland area. Although, a high density of herbaceous and woody (shrub) vegetation is present, these wetlands are not associated with a watercourse or water body.

Fish habitat is not a suitable function of this wetland. The wetland does not contain open water areas and is not associated with a perennial watercourse.

Sediment/toxicant/pathogen retention is not a suitable function of this wetland. This wetland would perform this function due the dense woody vegetation and relatively flat topography causing the water to move slowly (diffusely) within the wetland allowing sediment to settle out. However, there is no significant source of sediment located upslope since previously farmed fields are now fallow.

Nutrient removal/retention/transformation is not a suitable function of this wetland because there is no source of nutrients upslope. The previously farmed adjacent land is no long in production.

Production export is not a suitable function of this wetland area. The limiting factor is the lack of a defined outlet and isolation from other water bodies. This wetland is highly productive due to the dense, diverse vegetation, and potential wildlife use. However, because of its flat topography and location in the watershed, no export is occurring – or if it is occurring, it is too slow to be of significance.

Soil types:

RdA – Rexford loam, 0 to 3 percent slopes

Wildlife observed:

Deer tracks/buck rub, squirrel, red-tail hawk

Vegetation observed:

Multiflora rose, skunk cabbage, highbush blueberry, spicebush, red maple, hornbeam, hickory (shagbark), cinnamon fern, sensitive fern, bristly blackberry, jewelweed

Wetland 20 and 21 (10.76 and 0.16 acres, respectively)

Description:

The majority of this wetland is a large expanse of flat seasonally inundated forest. A defined drainage feature forms in the southern end of the wetland. It appears that this feature begins where the grade increases downslope of seasonally ponded water. The stream is fed by water from this wetland as well as drainage beginning in wetland 19. The large forested wetland receives some runoff from cropland upslope as well. Upland forest also borders this wetland. During the December 2009 field visit, the soil was saturated to a depth up to one foot with a deeper layer of gray sandy soil or clay. Some areas contained a dense fragipan while others did not. The Rexford soil series constitutes the majority of this wetland. This type of soil is known to contain a fragipan but also have a seasonally high water table with seepage above the fragipan. These soils are also poorly drained to very poorly drained. The drainage feature has relatively low banks and high flows probably access the wetland during large rain events. Wetland 21 is a small wetland separated from Wetland 20 by a farm lane.

Functions and Values Assessment:

Wildlife habitat is a **principal** function of this wetland. The wetland is not degraded by human activity or fragmented. This wetland is contiguous with adequate upland wildlife habitat and there is overland access to other wetlands. Adequate food is present to support a variety of insect, bird, and amphibian populations. There is high plant species diversity and diversity in plant community structure.

Floodflow alteration is a **suitable** function for this wetland. It is large in size and extremely flat. The wetland can hold substantial quantities of water during rain events. Water may flow slowly and diffusely through the wetland to the drainage feature that forms towards the southern end. Dense vegetation is present throughout this wetland.

Sediment/toxicant/pathogen retention is a **suitable** function of this wetland. Cropland located upslope provides a potential sediment source. Pollutants entering the wetland will be trapped by slow moving water and deepwater habitats. The wetland has a long water retention time. Dense vegetation also provides opportunity to trap sediment.

Nutrient removal/retention/transformation is a **suitable** function. Potential sources of nutrients are present due to the cropland upslope. Dense vegetation is adequate to utilize excess nutrients

entering the wetland from the cropland upslope. Water moves slowly and diffusely throughout the wetland.

Sediment/shoreline stabilization is a suitable function of this wetland. A wider wetland borders the drainage feature that forms in the southern area of the wetland. Although bank erosion is occurring along portions of this feature, the wetland contains dense vegetation which helps reduce erosion from high flows.

Groundwater recharge and discharge are suitable functions of this wetland. This wetland is more likely to be affected by surface water runoff and precipitation (due to poorly drained soils and slow permeability) however seasonal groundwater interaction may take place. The drastic changes in water levels between the seasons indicate that evapotranspiration significantly affects water levels. During the growing season the poorly drained soils allow the vegetation to utilize water before recharge can occur. During the winter and spring months the seasonally high water table creates more of a discharge situation than a recharge situation.

Fish habitat is not a suitable function of this wetland. The wetland does not contain open water areas and is not associated with a perennial watercourse.

Production export is not a suitable function of this wetland. Although this is a highly productive area flushing events do not occur due to the flat topography, dense vegetation, and diffuse flow.

Soil types:

BrB – Braceville gravelly loam, 3 to 8 percent slopes

RdA – Rexford loam, 3 to 8 percent slopes

Wildlife observed:

Deer

Vegetation observed:

Green ash, red maple, black gum, green ash, swamp white oak, American beech, pin oak, spice bush, winterberry, arrowwood, jewelweed, willow herb, canadian clearweed, skunk cabbage, cinnamon fern, roundleaf greenbriar, halberd-leaved tear thumb

Wetlands 22, 23, 24 (0.11, 0.02, 0.52 acres, respectively)

Description:

These wetlands are very small pockets located under the transmissions lines adjacent to Wetland 20 that collect and temporarily retain surface runoff. Vegetation underneath the transmission lines is routinely maintained and the wetland flagging was no longer visible. These wetlands are extremely small and continuously disturbed. They do not perform any significant functions or values. No wildlife was observed and vegetation was recently disturbed.

Functions and Values Assessment:

No wetland functions and values were determined to be suitable.

Wetland 25 (3.75 acres)

Description:

This PEM wetland is located south of an abandoned quarry and east of Wetland 18. Although wetland 18 seems to be a totally isolated depression, contours reveal that the eastern edge of Wetland 18 does slope gradually to the west towards this wetland. The construction of the transmission lines may have altered the original topography of this area, dividing these two wetlands. Besides surface runoff, the hydrology of this wetland is provided by spring seeps discharging from the steep slope adjacent to the wetland. Water drains towards a channelized ditch through the center of the wetland. This ditch does serve as an outlet during rain events and higher flow but does not continuously flow. Historic aerial photos reveal that this wetland was previously farmed. The channelized ditch within the wetland may have been an attempt to drain cropland (see Figure 2).

Functions and Values Assessment:

Wildlife habitat is a **principal** function of this wetland. The wetland is not degraded by human activity or fragmented. This wetland is contiguous with adequate upland wildlife habitat and there is overland access to other wetlands. Adequate food is present to support a variety of insect, bird, and amphibian populations. There is vegetative community diversity as well as plant species diversity.

Groundwater discharge is a **suitable** function of this wetland. Multiple groundwater seeps emerge from the steep hill located on the southwest side of the wetland and form a channelized drainage feature. The 1939 aerial photograph shows that the majority of this wetland was farmed with a drainage ditch running through the cropland. The channelized ditch through this wetland may also be an indicator of groundwater discharge. The farmers may have created this ditch in an effort to drain the cropland. This ditch serves as an unrestricted outlet for the wetland.

Production export is a **suitable** function of this wetland. Wildlife food sources and diverse plant species are present within the wetland. The wetland is likely used by higher trophic level consumers as well as insects and other wildlife. A lack of large flushing events limits the ability of this wetland to perform this function; however, the wetland is highly productive and used by wildlife.

Sediment/toxicant/pathogen retention is a **suitable** function because a small portion of the wetland's watershed is farmed. The dense vegetation and flat topography can trap sediments but compared to other wetlands water is retained for less time.

Nutrient removal/retention/transformation is a suitable function of this wetland. The wetland has dense emergent vegetation that has the potential to absorb nutrients; however, a channelized outlet drains the wetland quickly, which creates a shorter retention time.

Sediment/shoreline stabilization is a suitable function of this wetland. The wider wetland and dense vegetation bordering the channelized flow is stable and the channelized flow is not eroding.

Groundwater recharge is not a suitable function of this wetland.

Floodflow alteration is not a suitable function of this wetland. The dense emergent vegetation and absorbent soil does retain some overland flow; however, the watershed above this wetland is small and the wetland contains an outlet.

Fish habitat is not suitable function of the wetland. A perennial watercourse is not associated with this wetland.

Soil types:

BrB – Braceville gravelly loam, 3 to 8 percent slopes

RdB – Rexford loam, 3 to 8 percent slopes

OIB – Oquaga and Lordstown channery silt loam, 3 to 8 percent slopes

OID – Oquaga and Lordstown channery silt loam, 15 to 25 percent slopes

Wildlife observed:

Deer

Vegetation observed:

Goldenrod spp., New York ironweed, sensitive fern, autumn olive, green bulrush, willow herb, black willow, woolgrass

Wetlands 27 and 28 (0.52 and 1.22 acres, respectively)

Description:

This area includes two similar wetlands (27 and 28) that are in close proximity to each other. Both wetlands are located west of Old Berwick Pike slightly upslope from a residential property and downslope from an agricultural field (fallow in 2010). An existing quarry is located upslope of the agricultural fields. Both wetlands are slightly lower-lying than the surrounding land and consist of mostly PEM with some PSS wetlands. Wetter areas exist in the center of Wetland 27 (indicated by a greater dominance of cattail) and at the far southeast corner of Wetland 28 (influenced by topography). It is undetermined whether the inundation observed in the wetter areas is groundwater discharge or simply retained surface water resulting from poorly drained soils. It appears that this wetland area had been significantly disturbed by recent human activity as is indicated by the presence of recent excavation, spoil piles, unsorted heterogeneous soil characteristics, and the

presence of vegetative species typical of wasteland. Sandy soil was observed near the surface in some areas (especially within Wetland 27), which may indicate good infiltration and a clay layer was observed in other locations (mostly within Wetland 28), which may hinder infiltration. Berms (spoil piles) exist between the wetlands and the adjacent residential lawn to the east creating a restricted outlet. However, water does overflow from Wetland 28 into the adjacent residential lawn where it is diverted by a grassed swale into Wetland 29. Otherwise, it appears that the collected/stored surface water either infiltrates or is recycled through evapotranspiration. A man-made well exists in a portion of the Wetland 27. A few invasive or undesirable vegetative species including Russian olive, multiflora rose, and cattail have a dominant presence within these wetlands.

Functions and Values Assessment:

Wildlife habitat is a suitable function of this wetland despite fairly recent human disturbances. The majority of the upland surrounding these wetlands is either undeveloped or also good wildlife habitat. Other wetlands are not located in close proximity; however, there is overland access for wildlife available. A variety of vegetation provides adequate food for wildlife and two distinct wetland classes (PEM and PSS) exist. Birds, insects, and amphibians are all expected to utilize this wetland. Deer tracks were observed within these wetlands.

Groundwater recharge is a suitable function of this wetland area. As mentioned in the description, some areas appear to have more porous sandy soil, while other areas have an underlying clay layer. Thus, groundwater recharge may be occurring where the sandy soils dominate. This suitability of this function is also supported by the lack of a defined outlet and favorable topography.

Groundwater discharge is not a suitable function. It is unlikely that any spring seeps or other discharges are occurring within this wetland.

Sediment/toxicant/pathogen retention is not a suitable function of this wetland. Active cropland existed immediately upslope of this wetland area in 2009, however this along with much of the cropland within the BBNPP property boundary was fallow in 2010 and will likely remain so in the future.

Nutrient retention/removal/transformation is not a suitable function of this wetland for the same reasons why sediment/toxicant/pathogen retention is not a suitable function.

Floodflow alteration is not a suitable function of this wetland. Although these two wetland pockets are able to collect and store overland runoff, their size is too small to alter flood flows.

Fish habitat is not a suitable function of this wetland. The wetlands are not permanently flooded nor are they associated with a watercourse or other water body.

Production export **is not** a suitable function of this wetland. This wetland is highly productive due to the dense, diverse vegetation, and potential wildlife use. However, there is no direct outlet from these wetlands and both are isolated from other water bodies, leaving little opportunity for export.

Sediment/shoreline stabilization **is not** a suitable function of this wetland. Although, a high density of herbaceous and woody (shrub) vegetation is present, these wetlands are not associated with a watercourse or water body.

Soil types:

ChB – Channery silt loam, 3 to 8 percent slopes

Wildlife observed:

Songbirds (various), Deer tracks

Vegetation observed:

Russian olive, black willow, multiflora rose, silky dogwood, goldenrod (giant), goldenrod (Canada), New York ironweed, cattail, soft rush, blue vervain, sensitive fern, purple-leaved willow herb, blue vervain, sedge spp.

Wetland 29 (0.17 acres)

Description:

This forested wetland is located downslope of Wetlands 27 and 28 and includes channelized drainage feature that conveys surface runoff. Much of the water conveyed by this wetland is overflow from Wetland 28, which is diverted grassed swale/berm into Wetland 29. The steep slope has caused significant erosion and downcutting within the channel. The channel outlets to a culvert pipe underneath Bell Bend Road, where the BBNPP project boundary (and wetland delineation) ends. Due to the small size and steepness, this wetland it performs few functions and values.

Functions and Values Assessment:

Wildlife habitat is a **suitable** function of this wetland. Its small size and close proximity to residential homes are limiting factors. However, it is surrounded by upland forest and does connect to undeveloped land to the west. Birds, insects, and amphibians are all expected to utilize this wetland.

Production export is a **suitable** function of this wetland. This wetland is located on a forested slope and includes an actively eroding channel that receives flushing events.

No other wetland functions and values were determined to be suitable.

Soil types:

WyD – Wyoming gravelly loam, 15 to 25 percent slopes

Wildlife observed:

None

Vegetation observed:

Red Maple, spicebush, jewelweed, multiflora rose

Wetland 31 and 32 (0.15 and 3.63 acres, respectively)

Description:

This wetland is located southeast of the SSES near the existing stormwater detention basin. It includes a wide area of PFO adjacent to the Unnamed Tributary to Lake Took-A-While, and multiple groundwater seeps at the base of a slope below a maintenance area for SSES. The springs within the wetland are perennial; however water quantity is likely to fluctuate seasonally. The wetlands surrounding the channelized seeps are narrow. The Unnamed Tributary to Lake Took-A-While is severely degraded through the entire length of this wetland area with 3- to 4-foot high vertical banks that are susceptible to erosion. The degradation of the channel is directly related to its disassociation with an active floodplain. Flood flows do not regularly access the floodplain (and adjacent wetlands). Instead, they are typically contained within the banks of the channel due its incision, which leads to high shear stresses on the banks and subsequent bank erosion. An exceptionally degraded section is located directly below the discharge associated with an existing stormwater pond outflow. Most of the groundwater seeps empty directly into degraded channels that also appear to be experiencing moderate to high levels of bed and bank erosion. Primary vegetation includes red maple, spicebush and skunk cabbage. The upland land uses immediately adjacent to the wetland are fallow farmland, upland forest and SSES facilities. Wetland 31 is a small scrub-shrub wetland area dominated by alders and groundwater seeps adjacent to the existing stormwater detention basin.

Functions and Values Assessment:

Wildlife habitat is a **principal** function of this wetland. This wetland is contiguous with other wildlife habitat. Diversity within plant community structure (PFO and PSS) exists within the wetland as well as high vegetation density, which provides an adequate food source. The groundwater seeps provide a freshwater source throughout the winter months when other water sources may be frozen. Birds, insects, amphibians, and mammals (including higher trophic levels) are all expected to utilize this wetland. Deer tracks were observed within these wetlands.

Groundwater discharge is a **principal** function of this wetland. The sloped topography, seeps, and spring head support this function. Although no water quality testing was completed, groundwater is assumed to be cooler in temperature and higher quality. There is no visible evidence of water degradation from upslope land uses.

Production export is a suitable function of this wetland. The wetland contains a high density of vegetation including a variety of tree and shrub species, which provide adequate food sources for mammals, insects, and aquatic macroinvertebrates. Nutrients are exported from this wetland via leaf matter in the spring during flushing events.

Sediment/toxicant/pathogen retention is a suitable function of this wetland. Potential sediment or toxicant sources may be located higher in the watershed (i.e. SSES facility and/or adjacent farmland). Dense vegetation and flat topography reduces the velocity of overland flow through the wetland providing better opportunity for retention. Cropland was not farmed in 2010 reducing this wetland's ability to perform this function.

Groundwater recharge is a suitable function of this wetland. The wetland includes a wide flat forested floodplain with dense vegetation, which stores water long enough to infiltrate. However, slow infiltration rates are likely to exist due to the poorly drained soil.

Floodflow alteration is a suitable function of this wetland. The area is not permanently flooded or saturated and is a large area with flat topography and dense vegetation, which would help to retain water and minimize flood flows. However, the opportunity for this wetland to provide this function is limited due to the vertical degradation of Unnamed Tributary to Lake Took-A-While, which limits stream flood flows from accessing the floodplain.

Fish habitat is a suitable function of this wetland. The springs provide perennial stream flow. Upstream towards the stormwater pond flow is intermittent and this function is less suitable. Fish sampling was not conducted on this Unnamed Tributary to Lake Took-A-While; however, the size and lack of stream features is not conducive to supporting large or diverse fish populations.

Nutrient removal/retention/transformation is not a suitable function of this wetland. There are no notable sources of nutrients in the upslope watershed since adjacent agricultural land is no longer being farmed.

Sediment/shoreline stabilization is not a suitable function of this wetland. There is a high density of root mass associated with the trees and shrubs along the watercourse. However, this vegetation is doing very little at stabilizing the eroding stream banks. Many of the large trees along the banks have been or are currently being undermined.

Soil types:

BrB = Braceville gravelly loam, 3 to 8 percent slopes

RdB = Rexford loam, 0 to 3 percent slopes

WyD = Wyoming gravelly loam, 15-25 percent slopes

Wildlife observed:

Bullfrog, deer tracks, Northern dusky salamander, Northern two-line salamander, Redback salamander, Northern slimy salamander

Vegetation observed:

Red maple, river birch, black willow, spicebush, white ash, black cherry, alder, bitternut hickory, multiflora rose, skunk cabbage, giant goldenrod, flat-top goldenrod, cinnamon fern, garlic mustard, Red Maple, Yellow Birch, Northern Spicebush, Jewelweed, Skunk cabbage, Moneywort

Wetland 33 (0.16 Acres)

Description:

This PFO wetland is a small hillside depression with red maple and dense multiflora rose. This wetland is a small groundwater discharge point. The soil type is channery silt loam, 8 to 15 percent slopes. Due to this wetland's small size and location it does not perform any functions or values other than groundwater discharge. A data sheet was not completed for this wetland. No wildlife was noted during the field visit.

Functions and Values Assessment:

Groundwater discharge is a suitable function of this wetland. This wetland is a small groundwater discharge point on a hillside. The discharged water appears to be re-absorbed immediately downslope of the wetland.

No other wetland functions and values were determined to be suitable.

Wetland 49A, 49B, and 49C (0.02, 0.04, and 0.02 acres, respectively)

Description:

These small wetland pockets are emergent wetlands. The hydrology is solely influenced by stormwater runoff from the SSES switchyard. Multiple culverts discharge surface water runoff from SSES into grassy areas that slope towards wetland 49B. The wetland is a low spot in bowl-shaped grassy area. The "bowl" contains steep side slopes. Wetland 49B has a culvert outlet that discharges water into wetland 49C. Wetland 49C is a designed stormwater detention basin, the sides are rip-rap with multiple inlets and an outlet which transports water under the SSES driveway and into a narrow channel located between the switchyard and the SSES parking area. Wetland 49A is a small, isolated depression at the top of the hill, located adjacent to the switchyard fence. The dominant vegetation is cattails. This wetland contains gravelly soils (likely resulting from fill). These wetlands and surrounding uplands are manmade areas created during the grading and construction of SSES and the switchyard and power plant.

Functions and Values Assessment :

Sediment/toxicant/pathogen retention is a **suitable** function. These wetland areas are stormwater BMPs that are designed to detain and treat stormwater runoff from the adjacent switchyard, which may contain pollutants.

Floodflow alteration is a **suitable** function. As stormwater BMPs, these wetland areas are designed to detain stormwater runoff from the adjacent switchyard during rain events. However, these wetlands are small and do not detain significant amounts of water. Therefore, it is likely that these wetlands do little to significantly alter flood flows in streams downslope.

Groundwater recharge and discharge **are not** suitable functions. These wetlands are manmade and constructed on fill. Water remains perched on the surface rather than infiltrate into the groundwater. There are no signs of any groundwater discharge.

Fish habitat **is not** a suitable function of these wetlands. These wetlands do not support perennial open water conditions.

Nutrient removal/retention/transformation **is not** a suitable function because there are minimal sources of nutrients within the watershed and due to the reasons described under the sediment and toxicant retention function.

Production export **is not** a suitable function. These wetlands produce minimal wildlife food sources (there is not a great diversity of vegetation present in the wetlands and plant productivity is not great). Minimal wildlife usage is expected because of the close proximity of these wetlands to SSES, switchyard, and parking areas.

Sediment/shoreline stabilization **is not** a suitable function. These wetlands are not associated with a stream or pond.

Wildlife habitat **is not** a suitable function. These wetlands are extremely small and the surrounding uplands are developed. These wetlands are a habitat island with few corridors connecting them to other wetlands or natural upland areas. The vegetative species and community structure are not diverse.

Soil types:

OpD = Oquaga and Lordstown extremely stony silt loams, 8 to 25 percent slopes

Wildlife observed:

None

Vegetation observed:

Russian olive, grass spp., sedge spp., goldenrod spp., cattail, milkweed

Susquehanna Riverlands

Wetlands 34-36 (3.55 acres total), Wetlands 40-42 (5.98 acres total), and Wetlands 66-67 (0.37 acres total)

Description:

These wetlands are located north of the main road to the existing SSES intake structure. They include depressions and low-lying areas created by manmade berms and barriers such as walking trails and access roads. Many of the depressions intersect the groundwater table causing permanent or semi-permanent inundation. In Wetlands 40-42 (including 40A and 42A) channelized flow develops, which combines to form a small channel that flows directly into the Susquehanna River. Wetland 35 (including 35B) is a fringe wetland along Lake Took-a-While (35C). Wetland 34 and Wetland 36 are separated from other wetlands by existing manmade barriers. Invasive and/or undesirable species such as cattails and purple loosestrife were observed within most of these wetland areas. These wetlands have a small watershed as most upslope areas drain directly into Lake Took-a-While or the NBC.

Functions and Values Assessment:

Wildlife habitat is a **principal** function of these wetlands. Although the wetlands are divided by walking trails and roads, they are still extremely close in proximity and wildlife can easily travel between wetlands. In addition to accessing other wetland areas, wildlife have access to pockets of upland wildlife habitat within and adjacent to the wetlands. There is a high degree of vegetation interspersed with water, which results in areas of deep marsh and wooded swamp. Vegetative species and plant community structure is diverse. These wetlands have the potential to contain a high population of insects, amphibians, and birds, although it is unlikely that they are utilized by higher trophic level mammals due to greater human presence. Wildlife enhancement is occurring within these areas. The Riverlands recreation area is also part of a designated Audubon "Important Bird Area".

Recreation is a **principal** value of these wetlands. They are part of a recreation area and walking trails are located adjacent to the wetlands. The wetland provides valuable wildlife habitat, good visual aesthetics, and has a watercourse associated with it. Furthermore, public parking is available and it is located in close proximity to Berwick, which is a more populated area.

Educational/scientific value is a **principal** value of these wetlands based upon its accessibility, wildlife habitat and viewing opportunities, proximity to Berwick and other communities, access to Lake Took-a-While, and handicap access. It is part of designated recreation area that is intended to be of educational value.

Uniqueness/heritage is a **principal** value of these wetlands. Items that set this wetland apart from others include its proximity the canal system, potential use as an education site, and the variety of wetland classes (PEM, PFO, and PSS) visible from walking trails or viewing areas.

Visual quality/aesthetics is a principal value because of the viewing location from the walking trail, diversity of vegetative species including flowering plants, undeveloped surrounding land use, value as wildlife habitat, and easy accessibility.

Sediment/shoreline stabilization is a suitable function of these wetlands. Dense herbaceous and woody vegetation exists along the edges of open water or channels within these wetlands. Some erosion was observed within the downstream reaches of the small channel that flows into the Susquehanna River.

Fish habitat is a suitable function of these wetlands. It is likely that fish exist in some of the open water areas and small channels formed by groundwater seeps. These areas have abundant cover and no artificial control structures. An adequate food source is expected to be present. These watercourses are fairly small and although they have perennial flow, the volume of water in the stream may limit fish population growth. However, good fish habitat is expected to exist within Lake Took-a-While and the NBC.

Sediment/toxicant/pathogen retention is a suitable function of these wetlands. These wetlands exhibit long water retention times, areas of open or impounded water, and broad wetland edge. However, the watershed size is small size and there is no known source of sediments, toxicants, or pathogens. The wetland most suitable to this function is Wetland 35 which receives streamflow from the Unnamed Tributary to Lake Took-A-While (30).

Nutrient removal/retention/transformation is a suitable function of these wetlands for the same reasons that sediment/toxicant/pathogen retention is a minimally suitable function.

Production export is a suitable function of these wetlands. The wetlands are productive however minimal export is occurring due to a small watershed size and limited flushing events.

Groundwater discharge is not a suitable function of these wetlands. Many of these wetlands intersect the water table causing them to be permanently inundated. However, there is no defined outlet for surface water.

Groundwater recharge is not occurring in these wetlands. Most wetlands are exhibiting signs of discharge and have an outlet.

Floodflow alteration is not a suitable function. These wetlands include depressions and flat areas that have flood storage potential; however, due to the size of the watershed these wetlands do not receive much water other than direct precipitation and stormwater runoff from the small sections of road surfaces immediately adjacent to the wetlands. The watersheds are small due to walkways, roads, and Lake Took-A-While.

Soil types:

Ps – Pope soils

Ho – Holly silt loam

ChC – Chenango gravelly loam, 8 to 15 percent slopes

Wildlife observed:

Eastern painted turtle, green frog

Vegetation observed:

Spring beauty, skunk cabbage, spicebush, black gum, green ash, red maple, arrowleaf tearthumb, cattail, purple loosestrife, reed canary grass, alder, silky dogwood, soft rush, elderberry

Wetland 37, 38, and 43 (0.31, 1.25, and 3.42 acres, respectively)

Description:

These wetlands are primarily PEM with a small POW area (43A) in Wetland 43 and a PFO area in Wetland 38. The majority of these wetlands have been impacted by either walking trail construction, the access road to the intake structure, or the Canal Outfall Channel (COC) (39A). Wetland 43 and 37 are underlain by an impervious layer composed of very tightly compacted soil, clay, or gravel layer (possibly fill material) 6-12 inches deep. Direct precipitation and poorly drained soils contribute to the hydrology of these wetlands. Due to the flat topography and impermeable layer, evaporation and evapotranspiration are assumed to be removing water from the wetland, although water drains slowly toward the COC. A shallow inundated area (43A) exists within Wetland 43 with high vegetation and water interspersed. This area is inundated most of the year, but was dry during September 2010. The wetland is considerably drier to the south, towards the NBSR. Wetland 43 has little effect on the COC since the channel is deeply incised. The water table in this area is assumed to be fairly low because of the incised stream condition. Wetland 38 (including 38A) is a narrow, low-lying strip of land along the existing walking path that collects surface runoff from adjacent woodland. A depression where surface water collects was inundated with approximately 3 inches of water during the July field visit. Invasive species are present throughout each of these wetlands including purple loosestrife, mile-a-minute, multiflora rose, and cattail, which is typical of impacted areas.

Functions and Values Assessment:

Wildlife habitat is a **principal** function of these wetlands. Although these wetlands are impacted by human activities they still provide valuable wildlife habitat. They are connected to other wetland systems or bordered by upland wildlife habitat. Trails and roads do not provide a barrier to wildlife movement. Food sources are present. Plant density and available cover are high. This wetland has the potential to contain large insect populations as well as amphibian and avian populations. The Audubon Society has designated the Riverlands an Important Bird Area (IBA).

Educational/scientific value is a principal value of these wetlands based upon its accessibility, wildlife habitat and viewing opportunities, and proximity to Berwick and other communities.

Recreation is a principal value because these wetlands are visible from the intake structure access road or walking trails and is located within the Riverlands recreation area.

Fish habitat is a suitable function of these wetlands, but is limited to the COC. The channel begins at the canal weir, which artificially controls water levels and empties directly into the NBSR. The outfall channel has intermittent flow. During the July 2010 field visit, no flow was present. Stagnant water was sitting directly below the weir and had an oily appearance. Normandeau evaluated fish species within the channel during April 2010. The fish species were comprised of warm water fish characteristic of both lentic and lotic systems. A total of 160 fish representing 12 species were collected. Golden shiner was the most abundant species comprising 27% of the total catch (A Field Survey of Fish and Aquatic Macroinvertebrates, Normandeau 2010). The stream was evaluated for habitat in 2009 and was rated marginal habitat using the EPA rapid bioassessment protocol (Supplemental Field Assessments for PPL Riverlands, LandStudies 2010). The macroinvertebrate analysis using the HBI revealed fair to poor water quality (Supplemental Field Assessments for PPL Riverlands, LandStudies 2010).

Floodflow alteration is a suitable function of these wetlands. A portion of these wetlands are within the floodplain of the NBSR and could provide flood conveyance and storage during large occasional flood events. These wetlands also collect and temporarily store stormwater runoff; however, the wetlands adjacent to the COC do little to decrease flood flows as the channel is severely incised.

Uniqueness/heritage is a suitable value of these wetlands because of their proximity to the NBC.

Visual quality/aesthetics is a suitable value. These wetlands have primary viewing locations from walking trains and the intake structure access road. There are multiple wetland classes visible and the wetland is dominated by flowering plants, which provides visual aesthetics. There was no trash or debris in the wetland at the time of the field visits.

Groundwater recharge and discharge are not suitable functions. The compacted clay layer in Wetland 43 prevents recharge from occurring. Surface water either evaporates or is used by plants for evapotranspiration. There were also no signs of groundwater discharge occurring except where the open water area potentially intersects the groundwater table.

Sediment/toxicant/pathogen retention is not a suitable function. These wetlands have the potential to provide this function due to the presence of an aerobic wetland edge, a high degree of vegetation and water interspersion, and a relatively flat topography. However, there is little opportunity to provide this function due to the small watershed size and lack of a sediment/toxicant/pathogen source.

Nutrient removal/retention/transformation is not a suitable function. These wetlands have the potential to provide this function due to slowly-drained fine mineral soils, areas of saturation and ponded water, and dense vegetation for nutrient uptake. However, there is little opportunity to provide this function due to the small watershed size and lack of a nutrient source.

Production export is not a suitable function. These wetlands do not have a defined outlet where organic matter can be flushed from the system. The forested wetland adjacent to the stream will contribute detritus and organic matter to the stream, but the water control structure at the canal and small watershed size are not conducive to flushing events. There is a high density of vegetation serving as a wildlife food source although it should be noted that a significant amount of vegetation is non-native. Although the wetland appears to be productive, little export is occurring.

Sediment/shoreline stabilization is not a suitable function for this wetland. The wetland adjacent to the COC is characterized by steep banks forming a narrow, incised channel. The channel erosion happened in the past and the channel no longer appears to be downcutting or laterally eroding. Flow in the channel is artificially controlled by the weir and is typically minimal.

Soil types:

Ho – Holly silt loam

Ps – Pope soils

Wildlife observed:

Green frog, snapping turtle, eastern painted turtle

Vegetation observed:

Purple loosestrife, reed canary grass, teasel, soft rush, goldenrod spp., mile-a-minute, multiflora rose, cattail, red maple, black gum, spicebush, skunk cabbage, sensitive fern, cinnamon fern, false nettle

Wetland 44 (6.46 acres), North Branch Canal

Description:

This wetland is primarily PFO wetland with some emergent areas. An access road/trail exists along the west and south sides of the wetland. A large raised area, likely an old fill pile exists between the wetland and the NBSR to the east. The north boundary of the wetland is defined by the COC (39A). The NBC (39C) flows north to south dividing the wetland. The conditions of this wetland change significantly with the seasons. During the December 2009 field investigation, the majority of the wetland was inundated (44A) or saturated creating a forested swamp. During the July 2010 field visits, previously inundated areas were saturated and many of the remaining areas were no longer saturated, which probably correlates to high evapotranspiration rates. However, water stained leaves and channels where the water typically lays were visible. The topography of this wetland is extremely flat, but the majority of the area drains slowly towards the COC. During the December

2009 field visit, channelized flow existed at the northern end of the wetland, which emptied into the discharge channel. However, the majority of the wetland retains water for long periods of time and exhibits diffuse flow with high interspersed vegetation and water. Hydrology is provided by direct precipitation, occasional stream overflow from the canal, and close proximity to groundwater.

Functions and Values Assessment:

Wildlife habitat is a **principal** function. This wetland is large in size and is contiguous with other wetlands and upland wildlife habitat areas. Dense and diverse vegetation provides wildlife food sources. The plant community is diverse as well as the plant community structure. This wetland also has high interspersed vegetation and open water including shallow marsh and wooded swamp. This wetland has the potential to contain large insect, amphibian, and bird populations, as well as higher trophic level consumers. This wetland is intended to serve as a protected wildlife area. The Audubon Society has designated the Riverlands an Important Bird Area (IBA) and numerous bird boxes (for waterfowl) exist along the NBC.

Recreation is a **principal** value of this wetland. It is part of the Riverlands recreation area, which provides access paths for hiking directly adjacent to the wetland with the potential to walk within the wetland if desired. The wetland is valuable wildlife habitat, is of high visual quality, is accessible from a public parking area, and is in relatively close proximity to Berwick.

Educational/scientific value is a **principal** value of this wetland based upon its accessibility, wildlife habitat and viewing opportunities, proximity to Berwick and other communities, and handicap access.

Uniqueness/heritage is a **principal** value of this wetland. Items that set this wetland apart from others include its proximity to the canal system, potential use as an educational site, and the variety of wetland classes visible.

Visual quality/aesthetics is a **principal** value because of the accessible viewing locations from the walking trail, diversity of vegetative species including flowering plants, undeveloped surrounding land use, and excellent value as wildlife habitat.

Groundwater recharge and discharge are **suitable** functions of this wetland area. However, these functions are seasonally influenced based on the degree of inundation and saturation observed during the December 2009 and July 2010 field investigations. A seasonally high groundwater level is likely present. Significant inundation during the non-growing season and a lack of inundation during the growing season indicates that evapotranspiration is also a significant influence on hydrology. A hard, compact soil layer exists approximately 18-24 inches deep. This could potentially serve as a barrier between the surface and groundwater limiting recharge or discharge. The Holly soil series is described as poorly drained to very poorly drained with moderate to moderately slow permeability.

Fish habitat is a suitable function of this wetland but is limited to the NBC only. The canal is permanently flooded, relatively deep, and is known to contain fish. Normandeau sample 3 locations on the NBC for fish in 2010. A total of 59 fish representing 7 different species were collected. Bluegill and green sunfish were the dominant species (A Field Survey of Fish and Aquatic Macroinvertebrates, Normandeau 2010).

Floodflow alteration is not a suitable function of this wetland. This wetland retains water due to its flat topography, dense vegetation, and the slow movement of water through the wetland. Thus, the wetland has the capability to provide some flood storage if the NBC were to overflow or if the NBSR experienced a large flood event. However, the small size of the wetland compared to the watershed would be of little significance in providing this function.

Sediment/toxicant/pathogen retention is not a suitable function of this wetland because no sources of these pollutants exist within this wetland's watershed.

Nutrient removal/retention/transformation is not a suitable function of this wetland. There is no source of excess nutrients within this wetland's watershed because of its small size.

Production export is not a suitable function of this wetland. The wetlands have dense vegetation with a diverse plant community structure. Many of the plants can be used a food source. Although production is occurring at a high level throughout the wetland there are limited areas that receive flushing export events. The COCis the only area that may receive a flushing event based on the water control level of the canal.

Sediment/shoreline stabilization is not a suitable function of this wetland. There is little flowing water within the wetland therefore this function is not applicable.

Soil types:

Ho – Holly silt loam

Ps – Pope soils

Wildlife observed:

Deer, Ducks, Red Spotted Newt, Redback salamander, Northern gray treefrog, Green frog, Eastern painted turtle, Snapping turtle

Vegetation observed:

Cattail, phragmites australis, nepalese browntop, sensible fern, silver maple, green ash, slippery elm, river birch, spice bush, poison ivy, sedge spp., cinnamon fern, red maple, black gum, arrowwood, skunk cabbage, false nettle, silky dogwood, reed canary grass, purple loostrife, common rush, goldenrod spp., soft-stem bulrush, New York ironweed, joe-pye weed, cut leaf coneflower, boneset, purplestem aster

Wetland 45, 46, and 47 (0.42, 0.21, 0.33 acres, respectively)

Description:

This area includes three wetlands at the far northeast corner of the BBNPP project boundary near the PPL Riverlands Information Center. Wetlands 45, 46, and 47 have similar characteristics. They are located in flat, forested areas adjacent to active crop fields with hydrology provided by surface runoff. In addition to the agricultural runoff, runoff from a portion of the Riverlands recreation park appears to drain underneath a road and down a ditch in the field border before entering Wetland 47. These soils were deep, loamy, and somewhat sticky. The soils were only saturated at the surface and an impermeable layer does not exist. Although rainfall occurred within 24 hours of the winter field visit there was no ponded water. The wetlands appeared to have a higher infiltration rate than many of the other wetlands examined within the BBNPP project boundary. These wetlands do not perform any values because they are small and are located adjacent to cropland rather than walking trails with primary viewing areas.

Functions and Values Assessment:

Wildlife habitat is a **suitable** function of these wetlands. Although these wetlands are small in size the adjacent upland areas undeveloped and create wildlife corridors. There is also overland access to additional wetland areas. Food sources are present both within and in adjacent upland areas.

Sediment/toxicant/pathogen retention is a **suitable** function. The active cropland upslope is a potential source of excess sediment, although the fields appear to be no-tilled and are extremely flat. There is no open water habitat; however vegetation causes slow water movement and sheet flow through the wetland. The wetlands are also located directly adjacent to the cropland boundary.

Nutrient removal/retention/transformation is a **suitable** function. The active cropland upslope is a potential source of nutrients. There is no open water habitat, however flat topography and dense vegetation causes sheet flow through the wetlands. Although small, the wetlands are located directly adjacent to the cropland boundary serving as a small buffer.

Groundwater recharge and discharge **are not** suitable functions. These wetland have inlets and outlets and did not show signs of variable water levels.

Floodflow alteration **is not** a suitable function. These wetlands are flat with dense vegetation and diffuse flow; however water appears to sheet flow through the wetland and is not detained for significant periods of time. The watershed contributing to these wetlands is also small with few impervious surfaces.

Fish habitat **is not** a suitable function. There are no watercourses present within these wetlands

Production export **is not** a suitable function of this wetland. This wetland has average productivity and wildlife food sources however flushing events are unlikely to occur do to flat topography and lack of a watercourse.

Sediment/shoreline stabilization **is not** a suitable function. There are no watercourses present.

Wetland 48 (0.96 acres)

Description:

Wetland 48 is a PFO wetland located adjacent to the upstream-most end of the restored NBC (39) and includes wetlands associated with a small intermittent stream feeding the canal. This small stream drains a relatively large watershed, the majority of which is located west of Route 11. The stream enters BBNPP project boundary through a railroad track culvert crossing. Two distinct channels form separated by a 3+ foot berm. During the December 2009 field visit, one channel was wet while the other had flowing water. During the July 2010 field visit, both channels were dry. The stream bends 90-degrees south, ending at the NBC. This portion of the wetland is extremely flat. The soils, especially along the canal, appear to consist of deep deposits of silt caused by the slow moving canal water. Agriculture is the primary adjacent land use.

Functions and Values Assessment:

Uniqueness/heritage is a **principal** value. Contributing factors include the suitability as a recreation and educational site. The Riverlands has been identified as an IBA by Audubon international. The canal system also contributes to the uniqueness of the wetland system.

Floodflow alteration is a **suitable** function. The canal wetland receives water from the intermittent stream. The streams drainage area extends west of Route 11. The culvert at the canal crossing provides a constricted outlet capable of causing backwater conditions in the flat adjacent wetlands. The wetlands associated with the east/west portion of the intermittent stream do not provide this function because of the channelized nature of the stream and the narrow wetland width directly within the channel.

Fish habitat is a **suitable** function; however, it is limited to the canal area and intermittent stream only. The watercourse associated with the canal is permanently flooded and the watercourse seems to be perennial. Food is available to support fish populations. The slow moving stagnant water, small stream size and lack of stream features likely limit the species diversity and population size of fish in the canal and its tributary. Normandeau sampled 3 locations on the NBC for fish in 2010. A total of 59 fish representing 7 different species were collected. Bluegill and green sunfish were the dominant species (A Field Survey of Fish and Aquatic Macroinvertebrates, Normandeau 2010).

Sediment/toxicant/pathogen retention is a **suitable** function for the majority of these wetlands. The cropland provides a source of potential sediments and toxicants in the watershed above the wetland. The flat topography promotes sediment trapping and the wetlands directly adjacent to the canal had

thick sediment deposits. Limiting factors include the canal outlet, the channelized stream reach, and the small wetland size.

Nutrient removal/retention/transformation is a suitable function for the majority of these wetlands for many of the same reasons listed above. Nutrient sources are present as well as the potential for nutrient trapping and utilization by vegetation. Fine grained mineral soils are present with the ability to hold water. Water moves slowly through the wetlands (except within the channelized stream).

Sediment/shoreline stabilization is a suitable function of the wetland. The potential for sediment sources are present upslope and upstream of the canal wetland. The east/west portion of stream has channelized flow. The vegetation currently present helps stabilize the banks; however the potential for erosion during larger storm events still is evident throughout this reach. The north/south reach does not have a significant bank between the wetland and the stream. Dense vegetation is present along the banks and within the remainder of the wetland which helps to stabilize the wetland and stream and prevents erosion from flows received from the east/west reach of the tributary.

Wildlife habitat is a suitable function of this wetland. The wetlands are in a natural state, with substantial upland and wetland habitat adjacent to their borders. Plant vegetation density is high with adequate food sources. The wetland has the potential to support various wildlife populations such as birds, insects, and amphibians. The plant community structure is diverse. Limiting factor for this function is the small size of the wetland and the lack of diversity in plant species. Bird boxes were present near the canal for wildlife enhancement purposes.

Recreation is a suitable value of this wetland. The wetlands are part of a recreation area. This area has parking areas and is within a short drive of the town of Berwick. Two of the wetlands are located adjacent to walking trails. The small wetland size is a limiting factor.

Educational/scientific value is a suitable value of this wetland due to its location within the Riverlands recreation area. The Riverlands area is currently used for educational programs. This area is within a short drive of Berwick. Access to the site is monitored and controlled. Parking is available, including enough space for school buses. The wetland is easily accessible either from the road or walking trails. The limiting factor is the size of the wetland.

Visual quality/aesthetics is a suitable value of the canal wetland. The wetland has a variety of flowing plants, the surrounding land use is undeveloped, and it is absent of trash and debris. The wetland is easily accessible for viewing.

Groundwater recharge is a suitable function of the canal wetland. The culvert at the canal provides a constricted outlet. During higher flow events the culvert could cause backwater and infiltration upstream. None of the wetlands appeared to be permanently flooded, except within the canal

channel. The flat topography retained some water, and the soils, although not gravelly or sandy, appeared to be well drained.

Groundwater discharge **is not** a suitable function of this wetland. All wetlands had an inlet and there were no signs of discharge present. The canal wetland is associated with the canal which could potentially have some groundwater interaction.

Production export **is not** a suitable function. The wetland has a high degree of plant productivity, has the potential for insect and animal use due to the presence of food sources, as well as economically and commercially used products (timber). However, this wetland has minimal opportunity for export. The canal has a culvert outlet; however, the stagnant water is unlikely to export much organic matter or nutrients downstream.

Soil types:

Ps - Pope soils

Wildlife observed:

Deer tracks, songbirds (various)

Vegetation observed:

River birch, green ash, red maple, silky dogwood, sassafras, poison ivy, goldenrod spp., garlic mustard, wild garlic, elderberry, tussock sedge, raspberry, spicebush, jewelweed

Wetland 68 (6.16 Acres)

Description:

An access road/walking trail divides this wetland from Wetland 44B to the east and also forms the wetland boundary to the south. These trails as well as railroad tracks to the west create manmade barriers limiting flow into and out of the wetland. This wetland contains similar characteristics to Wetland 44 (including 44B) but is significantly drier with less vegetative diversity. This wetland is entirely PFO and has few shrubs or emergent vegetation. The wetland slopes towards the east. At the downslope side of the wetland water marks on trees indicate a fluctuating water level where water tends to pond. The soils were more loam than clay and likely infiltrate water. Surrounding land uses include forested wetland, upland field, and some residential/commercial facilities along Route 11.

Wetland Functions and Values Assessment:

Recreation is a **principal** value of this wetland. It is part of the Riverlands recreation area, which provides access paths for hiking directly adjacent to the wetland with the potential to walk within the wetland if desired. The wetland is valuable wildlife habitat, is of high visual quality, is accessible from a public parking area, and is in relatively close proximity to Berwick.

Educational/scientific value is a principal value of this wetland based upon its accessibility, wildlife habitat and viewing opportunities, proximity to Berwick and other communities, and handicap access.

Uniqueness/heritage is a principal value of this wetland. Items that set this wetland apart from others include its proximity to the canal system, potential use as an educational site, and the variety of wetland classes visible.

Visual quality/aesthetics is a principal value because of the accessible viewing locations from the walking trail, diversity of vegetative species including flowering plants, undeveloped surrounding land use, and excellent value as wildlife habitat.

Groundwater recharge is a suitable function of this wetland. Fluctuating water levels, flat topography, and constricted outlets indicate that water is detained within this wetland. Soils are able to infiltrate water and have less clay content than Wetland 44.

Sediment/toxicant/pathogen retention is a suitable function of this wetland. Limited flow appears to be entering the wetland from upslope reducing the sources of sediment to the wetland. However characteristics of this wetland including flat topography, diffuse flow, occasional ponded water, and constricted outlets indicate that the wetland would perform this function. Visible sediment deposits were not present in the wetland.

Nutrient removal/retention/transformation is a suitable function of this wetland. There are few nutrient sources upslope due to the limited watershed size. However vegetation is present to attenuate excess nutrients. Diffuse flow of surface water runoff through the wetland could also allow for nutrient uptake.

Groundwater discharge is not a suitable function of this wetland. No indications of discharge were present.

Floodflow alteration is not a suitable function of this wetland. This wetland's watershed is limited due to manmade barriers upslope. Although it could detain some floodflows the topography of the surrounding area provides little opportunity for the wetland to perform this function. The wetland is also not associated with a watercourse and does not have a high density of vegetation.

Fish habitat is not a suitable function of this wetland. Perennial watercourses are not present.

Production export is not a suitable function of this wetland. Some production export characteristics are present such as wildlife food sources, wildlife usage including higher trophic level consumers, and detritus development. However, the wetlands do not have diverse vegetation or plant community structure and few export or flushing events occur.

Sediment/shoreline stabilization **is not** a suitable wetland function. This wetland does not contain any open water or watercourses.

Soil types:

Ps – Pope soils

Wildlife observed:

Deer activity

Vegetation observed:

Riverbirch, red maple, hornbeam, sensitive fern, multiflora rose

Wetlands Not Evaluated for Functions and Values

Wetland 14 (0.58 acres)

This wetland was not evaluated for functions and values because it is an existing stormwater facility.

Wetland 63, 64, and 65 (0.003, 0.01, and 0.02 acres, respectively)

These wetlands were added to the project area after the functions and values fieldwork was completed, therefore, they were not evaluated. There are no proposed impacts to these wetlands.

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APPENDIX A
Functions and Values Assessment Criteria

BBNPP Functions and Values Assessment Criteria – Highway Methodology

The following list of considerations/qualifiers is based on those outlined in Appendix A of “The Highway Methodology Workbook Supplement: Wetland Functions and Values – A Descriptive Approach” (US Army Corps of Engineers New England District, September 1999). The list has been modified by categorizing the considerations/ qualifiers based on “occurrence” or “no occurrence”.

GROUNDWATER RECHARGE — This function considers the potential for a wetland to serve as a groundwater recharge area. It refers to the fundamental interaction between wetlands and aquifers, regardless of the size or importance.

CONSIDERATIONS/QUALIFIERS:

Occurrence

1. Permanent inlet, no outlet
2. Not permanently flooded
3. Favorable topography
4. Impervious watershed
5. Located upslope of dam
6. Karst region
7. Gravel or sandy soils present in or adjacent to the wetland
8. Fragipan does not exist
9. Wetland underlain by stratified drift
Stratified Drift: Sediments deposited by glacial meltwater that are sorted and layered; a major subdivision of glacial drift that includes river, lake, and marine deposits
10. Public or private wells occur downstream of the wetland or the potential for wells exists downstream
11. Signs of groundwater recharge are present or piezometers data demonstrates recharge
12. Wetland is associated with a perennial or intermittent watercourse but lacks a defined outlet or contains a constricted outlet.
13. Wetland shows signs of variable water levels

No Occurrence

14. Fringe or isolated wetland
15. Impervious underlying strata, fragipan
16. Fine soil material
17. Outlets are present
18. Indicators of groundwater discharge (i.e. springs, water temperature)
19. Piezometer data demonstrates discharge.
20. Wetland is associated with a perennial or intermittent watercourse and has an outlet to the watercourse

GROUNDWATER DISCHARGE — This function considers the potential for a wetland to serve as a groundwater discharge area. It refers to the fundamental interaction between wetlands and aquifers, regardless of the size or importance.

CONSIDERATIONS/QUALIFIERS:

Occurrence

1. No inlet, permanent outlet
2. Favorable topography
3. Stable with regard to seasonal water-level fluctuations
4. Wetland is associated with a perennial or intermittent watercourse
5. Quality of water associated with the wetland is high

6. Signs of groundwater discharge are present (springs and seeps)
7. Water temperature suggests it is a discharge site
8. Piezometer data demonstrates discharge

No Occurrence

9. Non-permanently flooded wetlands
10. Wetland is associated with a watercourse, but lacks a defined outlet or contains a constricted outlet

FLOODFLOW ALTERATION (Storage & Desynchronization) — This function considers the effectiveness of the wetland in reducing flood damage by water retention for prolonged periods following precipitation events and the gradual release of floodwaters. It adds to the stability of the wetland ecological system or its buffering characteristics and provides social or economic value relative to erosion and/or flood prone areas.

CONSIDERATIONS/QUALIFIERS:

Occurrence

1. No permanent outlet
2. Not permanently flooded, saturated, or ponded
3. Area of this wetland is large relative to its watershed.
4. Effective flood storage is small or non-existent upslope of or above the wetland.
5. Wetland watershed contains a high percent of impervious surfaces.
6. Wetland contains hydric soils which are able to absorb and detain water, high infiltration rate
7. Wetland exists in a relatively flat area that has flood storage potential.
8. Wetland has an intermittent outlet, ponded water, or signs are present of variable water level.
9. During flood events, this wetland can retain higher volumes of water than under normal or average rainfall conditions.
10. Wetland receives and retains overland or sheet flow runoff from surrounding uplands.
11. In the event of a large storm, this wetland may receive and detain excessive flood water from a nearby watercourse.
12. Valuable properties, structures, or resources are located in or near the floodplain downstream from the wetland.
13. The watershed has a history of economic loss due to flooding.
14. This wetland is associated with one or more watercourses.
15. This wetland watercourse is sinuous or diffuse, low flow velocity
16. This wetland outlet is constricted or no outlet.
17. Channel flow velocity is affected by this wetland.
18. Land uses downstream are protected by this wetland.
19. This wetland contains a high density of vegetation.

No Occurrence

20. Permanent hydroperiod (permanently flooded)
21. Fringe/island situation or outlet not constricted
22. Channels not sinuous and do not contain woody vegetation
23. Instream vegetation/water interspersation not great
24. Wetland located in upper portion of watershed

FISH AND SHELLFISH HABITAT (Freshwater) — This function considers the effectiveness of seasonal or permanent watercourses associated with the wetland in question for fish and shellfish habitat.

CONSIDERATIONS/QUALIFIERS:

Occurrence

Lacustrine considerations:

1. Inlet and outlet
2. Not dominated by sandy bottom
3. Permanently flooded
4. Shallow area and diverse, abundant cover
5. Depth diversity
6. No artificial control structures
7. Size of this wetland is able to support large fish/shellfish populations.
8. Wetland has sufficient size and depth in open water areas so as not to freeze solid and retains some open water during winter
9. Spawning areas are present (submerged vegetation or gravel beds)
10. Food is available to fish/shellfish populations within this wetland
11. Fish, reptiles and amphibians are present
12. Forest land is dominant in the watershed above this wetland.

Palustrine Considerations

13. Any of the above
 14. If forested, flow present throughout
 15. Erect vegetation interspersed with open water
- STOP HERE IF THIS WETLAND IS NOT ASSOCIATED WITH A WATERCOURSE
16. Wetland is part of a larger, contiguous watercourse.
 17. Stream width (bank to bank) is more than 50 feet.
 18. Quality of the watercourse associated with this wetland is able to support healthy fish/shellfish populations.
 19. Streamside vegetation provides shade for the watercourse.
 20. Barrier(s) to anadromous fish (such as dams, including beaver dams, waterfalls, road crossing) are absent from the stream reach associated with this wetland.
 21. Evidence of fish is present.
 22. Wetland is stocked with fish.
 23. The watercourse is perennial.
 24. Man-made streams are absent.
 25. Water velocities are not too excessive for fish usage.
 26. Defined stream channel is present.

No Occurrence

27. Farmed or tilled
28. No surface water or significant open water present
29. Acidic condition
30. Potentially toxic input without outlet

SEDIMENT/TOXICANT/PATHOGEN RETENTION — This function reduces or prevents degradation of water quality. It relates to the effectiveness of the wetland as a trap for sediments, toxicants, or pathogens in runoff water from surrounding uplands or upstream eroding wetland areas.

CONSIDERATIONS/QUALIFIERS:

Occurrence

1. Potential sources of excess sediment or toxicants are in the watershed above the wetland.
2. Opportunity for sediment trapping by slow moving water or deepwater habitat are present in this wetland.
3. Fine grained mineral or organic soils are present.
4. Long duration water retention time is present in this wetland.
5. Public or private water sources occur downstream.
6. The wetland edge is broad and intermittently aerobic.
7. The wetland is known to have existed for more than 50 years.
8. Drainage ditches have not been constructed in the wetland.

STOP HERE IF WETLAND IS NOT ASSOCIATED WITH A WATERCOURSE.

10. Wetland is associated with an intermittent or perennial stream or a lake.
11. Channelized flows have visible velocity decreases in the wetland.
12. Effective floodwater storage in wetland is occurring. Areas of impounded open water are present.
13. No indicators of erosive forces are present. No high water velocities are present.
14. Diffuse water flows are present in the wetland.
15. Wetland has a high degree of water and vegetation interspersion.
16. Dense vegetation provides opportunity for sediment trapping and/or signs of sediment accumulation by dense vegetation is present.
17. No outlet
18. Physical evidence of accretion
19. Free or artificial channelization and soil tillage
20. Other

No Occurrence

21. Unconstricted or permanent outlet
22. Channelized
23. High velocity
24. Not sheltered
25. No vegetation and bedrock or cobble-gravel substrates

NUTRIENT REMOVAL/RETENTION/TRANSFORMATION — This function considers the effectiveness of the wetland as a trap for nutrients in runoff water from surrounding uplands or contiguous wetlands and the ability of the wetland to process these nutrients into other forms or trophic levels. One aspect of this function is to prevent ill effects of nutrients entering aquifers or surface waters such as ponds, lakes, streams, rivers, or estuaries.

CONSIDERATIONS/QUALIFIERS:

Occurrence

1. Wetland is large relative to the size of its watershed.
2. Deep water or open water habitat exists.
3. Overall potential for sediment trapping exists in the wetland.
4. Potential sources of excess nutrients are present in the watershed above the wetland.
5. Wetland saturated for most of the season. Ponded water is present in the wetland.
6. Deep organic/sediment deposits are present.

7. Slowly drained fine grained mineral or organic soils are present.
8. Dense vegetation is present.
9. Emergent vegetation and/or dense woody stems are dominant.
10. Opportunity for nutrient attenuation exists.
11. Vegetation diversity/abundance sufficient to utilize nutrients.

STOP HERE IF WETLAND IS NOT ASSOCIATED WITH A WATERCOURSE.

12. Waterflow through this wetland is diffuse.
13. Water retention/detention time in this wetland is increased by constricted outlet or thick vegetation.
14. Water moves slowly through this wetland.
15. Other

No Occurrence

16. No woody or floating leaved vegetation
17. Direct alteration
18. High Velocity, Gradient present, channelized flows
19. No potential or known nutrient sources exist upstream/upslope of wetland
20. Permanent or unconstricted outlet present
21. Low vegetative densities

PRODUCTION EXPORT (Nutrient) — This function evaluates the effectiveness of the wetland to produce food or usable products for humans or other living organisms.

CONSIDERATIONS/QUALIFIERS:

Occurrence

1. Wildlife food sources grow within this wetland.
2. Detritus development is present within this wetland
3. Economically or commercially used products found in this wetland.
4. Evidence of wildlife use found within this wetland.
5. Higher trophic level consumers are utilizing this wetland.
6. Fish or shellfish develop or occur in this wetland.
7. High vegetation density is present.
8. Wetland exhibits high degree of plant community structure/species diversity.
9. High aquatic vegetative diversity/abundance is present.
10. Nutrients exported in wetland watercourses (permanent outlet present).
11. "Flushing" of relatively large amounts of organic plant material occurs from this wetland.
12. Wetland contains flowering plants that are used by nectar-gathering insects.
13. Indications of export are present.
14. Potential for expansive flooding and flushing of organic matter
15. Large watershed
16. High plant productivity
17. Significant areas of erect or submerged vegetation present

No Occurrence

18. No permanent or intermittent outlets
19. Low vegetative densities
20. High production levels occurring, however no visible signs of export (assumes export is attenuated)
21. Wetland does not receive flushing events
22. No open water habitats (pond – open water area without vegetation)

SEDIMENT/ShORELINE STABILIZATION — This function considers the effectiveness of a wetland to stabilize streambanks and shorelines against erosion.

CONSIDERATIONS/QUALIFIERS:

Occurrence

1. Potential sediment sources are present up-slope.
2. Potential sediment sources are present upstream.
3. No distinct shoreline or bank is evident between the waterbody and the wetland or upland.
4. Wide wetland (>10') borders watercourse, lake, or pond.
5. High flow velocities in the wetland.
6. The watershed is of sufficient size to produce channelized flow.
7. Open water fetch is present.
8. Boating activity is present.
9. Dense vegetation is bordering watercourse, lake, or pond.
10. High percentage of energy-absorbing emergents and/or shrubs border a watercourse, lake, or pond.
11. Vegetation is comprised of large trees and shrubs that withstand major flood events or erosive incidents and stabilize the shoreline on a large scale (feet).
12. Vegetation is comprised of a dense resilient herbaceous layer that stabilizes sediments and the shoreline on a small scale (inches) during minor flood events or potentially erosive events.

No Occurrence

13. Indications of erosion or siltation are present.
14. No flowing water
15. A distinct step between the open waterbody or stream and the adjacent land exists (i.e., sharp bank) with dense roots throughout.
16. No open water wider than 100 feet
17. No eroding areas abutting the wetland
18. No erect or submerged vegetation or rubble
19. Topographical gradient is present in wetland.

WILDLIFE HABITAT — This function considers the effectiveness of the wetland to provide habitat for various types and populations of animals typically associated with wetlands and the wetland edge. Both resident and/or migrating species must be considered. Species lists of observed and potential animals should be included in the wetland assessment report.

CONSIDERATIONS/QUALIFIERS:

Occurrence

1. Wetland is not degraded by human activity or fragmented by development
2. Wetland greater than 5 acres
3. Low water velocities
4. Water quality of the watercourse, pond, or lake associated with this wetland is high
5. Upland surrounding this wetland is undeveloped.
6. More than 40% of this wetland edge is bordered by upland wildlife habitat (e.g., brushland, woodland, active farmland, or idle land) at least 500 feet in width.
7. Wetland is contiguous with other wetland systems connected by a watercourse or lake.
8. Wildlife overland access to other wetlands is present.
9. Wildlife food sources are within this wetland or are nearby.
10. Wetland exhibits a high degree of interspersed vegetation classes and/or open water.
11. Two or more islands or inclusions of upland within the wetland are present.
12. Dominant wetland class includes deep or shallow marsh or wooded swamp.

13. More than three acres of shallow permanent open water (less than 6.6 feet deep), including streams in or adjacent to wetland, are present.
14. Density of the wetland vegetation is high.
15. Wetland exhibits a high degree of plant species diversity.
16. Wetland exhibits a high degree of diversity in plant community structure (e.g., tree/shrub/vine/grasses/mosses)
17. Plant/animal indicator species are present. (List species for project)
18. Animal signs observed (tracks, scats, nesting areas, etc.)
19. Seasonal uses vary for wildlife and wetland appears to support varied population diversity/abundance during different seasons.
20. Wetland contains or has potential to contain a high population of insects.
21. Wetland contains or has potential to contain large amphibian populations.
22. Wetland has a high avian utilization or its potential.
23. Indications of less disturbance-tolerant species are present.
24. Signs of wildlife habitat enhancement are present (birdhouses, nesting boxes, food sources, etc.).

No Occurrence

25. Less than 5 acres, no cover adjacent to wetland,
26. Human disturbances
27. Low vegetation interspersed
28. Bedrock, rubble or cobble-gravel
29. Potential pollutant/toxicant sources observed
30. Upland surrounding wetland is disturbed by development

RECREATION (Consumptive and Non-Consumptive) — This value considers the suitability of the wetland and associated watercourses to provide recreational opportunities such as hiking, canoeing, boating, fishing, hunting, and other active or passive recreational activities.

Consumptive opportunities consume or diminish the plants, animals, or other resources that are intrinsic to the wetland. Non-consumptive opportunities do not consume or diminish these resources of the wetland.

CONSIDERATIONS/QUALIFIERS:

Occurrence

1. Wetland is part of a recreation area, park, forest, or refuge.
2. Fishing is available within or from the wetland.
3. Hunting is permitted in the wetland.
4. Hiking occurs or has potential to occur within the wetland.
5. Wetland is a valuable wildlife habitat. (must be principle)
6. The watercourse, pond, or lake associated with the wetland is unpolluted.
7. High visual/aesthetic quality of this potential recreation site.
8. Access to water is available at this potential recreation site for boating, canoeing, or fishing.
9. The watercourse associated with this wetland is wide and deep enough to accommodate canoeing and/or non-powered boating.
10. Off-road public parking available at the potential recreation site.
11. Accessibility and travel ease is present at this site.
12. The wetland is within a short drive or safe walk from highly populated public and private areas.

No Occurrence

13. Privately owned and posted, access limited
14. Potential pollutant/toxicant sources observed
15. Upland areas are disturbed
16. Small wetland size
17. No significant open water areas which would contain game species of fish

EDUCATIONAL/SCIENTIFIC VALUE — This value considers the suitability of the wetland as a site for an “outdoor classroom” or as a location for scientific study or research.

CONSIDERATIONS/QUALIFIERS:

Occurrence

1. Wetland contains or is known to contain threatened, rare, or endangered species.
2. Little or no disturbance is occurring in this wetland.
3. Potential educational site contains a diversity of wetland classes which are accessible or potentially accessible.
4. Potential educational site is undisturbed and natural.
5. Wetland is considered to be a valuable wildlife habitat. (must be principle)
6. Wetland is located within a nature preserve or wildlife management area.
7. Signs of wildlife habitat enhancement present (bird houses, nesting boxes, food sources, etc.).
8. Off-road parking at potential educational site suitable for school bus access in or near wetland.
9. Potential educational site is within safe walking distance or a short drive to schools.
10. Potential educational site is within safe walking distance to other plant communities.
11. Direct access to perennial stream at potential educational site is available.
12. Direct access to pond or lake at potential educational site is available.
13. No known safety hazards exist within the potential educational site.
14. Public access to the potential educational site is controlled.
15. Handicap accessibility is available.
16. Site is currently used for educational or scientific purposes.

UNIQUENESS/HERITAGE — This value considers the effectiveness of the wetland or its associated waterbodies to provide certain special values. These may include archaeological sites, critical habitat for endangered species, its overall health and appearance, its role in the ecological system of the area, its relative importance as a typical wetland class for this geographic location. These functions are clearly valuable wetland attributes relative to aspects of public health, recreation, and habitat diversity.

CONSIDERATIONS/QUALIFIERS:

Occurrence

1. Upland surrounding wetland is primarily urban.
2. Upland surrounding wetland is developing rapidly.
3. More than 3 acres of shallow permanent open water (less than 6.6 feet deep), including streams, occur in wetlands.
4. Three or more wetland classes are present.
5. Deep and/or shallow marsh or wooded swamp dominate.
6. High degree of interspersed vegetation and/or open water occur in this wetland.
7. Well-vegetated stream corridor (15 feet on each side of the stream) occurs in this wetland.
8. Potential educational site is within a short drive or a safe walk from schools.
9. Off-road parking at potential educational site is suitable for school buses.
10. No known safety hazards exist within this potential educational site.

11. Direct access to perennial stream or lake exists at potential educational site.
12. Two or more wetland classes are visible from primary viewing locations.
13. Low-growing wetlands (marshes, scrub-shrub, bogs, open water) are visible from primary viewing locations.
14. Half an acre of open water or 200 feet of stream is visible from the primary viewing locations.
15. Large area of wetland is dominated by flowering plants or plants that turn vibrant colors in different seasons.
16. General appearance of the wetland visible from primary viewing locations is unpolluted and/or undisturbed.
17. Overall view of the wetland is available from the surrounding upland.
18. Quality of the water associated with the wetland is high.
19. Opportunities for wildlife observations are available.
20. Historical buildings are found within the wetland.
21. Presence of pond or pond site and remains of a dam occur within the wetland.
22. Wetland is within 50 yards of the nearest perennial watercourse.
23. Visible stone or earthen foundations, berms, dams, standing structures, or associated features occur within the wetland.
24. Wetland contains critical habitat for a state- or federally-listed threatened or endangered species.
25. Wetland is known to be a study site for scientific research.
26. Wetland is a natural landmark or recognized by the state natural heritage inventory authority as an exemplary natural community.
27. Wetland has local significance because it serves several functional values.(must be principle)
28. Wetland has local significance because it has biological, geological, or other features that are locally rare or unique.
29. Wetland is known to contain an important archaeological site.
30. Wetland is hydrologically connected to a state or federally designated scenic river.
31. Wetland is located in an area experiencing a high wetland loss rate.
32. Wetland is considered to be a valuable wildlife habitat. (must be principle)
33. Wetland is located within a nature preserve or wildlife management area.
34. Signs of wildlife habitat enhancement present (bird houses, nesting boxes, food sources, etc.).
35. Public accessibility is available.

No Occurrence

36. Visible signs of pollutants/toxicants present
37. Human disturbances
38. Habitat for T&E species not present
39. No critical or unique habitats
40. Access limited

VISUAL QUALITY/AESTHETICS — This value considers the visual and aesthetic quality or usefulness of the wetland.

CONSIDERATIONS/QUALIFIERS:

Occurrence

1. Multiple wetland classes are visible from primary viewing locations.
2. Emergent marsh and/or open water are visible from primary viewing locations.
3. A diversity of vegetative species is visible from primary viewing locations.
4. Wetland is dominated by flowering plants or plants that turn vibrant colors in different seasons.
5. Land use surrounding the wetland is undeveloped as seen from primary viewing locations.

6. Visible surrounding land use form contrasts with wetland.
7. Wetland views absent of trash, debris, and signs of disturbance.
8. Wetland is considered to be a valuable wildlife habitat. (must be principle)
9. Wetland is easily accessed.
10. Low noise level at primary viewing locations.
11. Unpleasant odors absent at primary viewing locations.
12. Relatively unobstructed sight line exists through wetland.

No Occurrence

13. No visible significance or viewshed present
14. Wetland disturbed due to man induced activities

ENDANGERED SPECIES HABITAT — This value considers the suitability of the wetland to support threatened or endangered species.

CONSIDERATIONS/QUALIFIERS:

Occurrence

1. Wetland contains or is known to contain threatened or endangered species
2. Wetland contains critical habitat for a state or federally listed threatened or endangered species

APPENDIX B

Functions and Values Evaluation Forms

NOTE:















Data entered in field evaluation forms may not be completely consistent with the results presented in the report due to additional information and interpretation gathered from other available studies and data.

B, RU

low 30's, overcast, windy
4:00 pm

Wetland Function-Value Evaluation Form

Total area of wetland 1.38 Human made? No Is wetland part of a wildlife corridor? Yes or a "habitat island"?Adjacent land use forested uplands to north, west, east
residential to south Distance to nearest roadway or other development ~ 60'Dominant wetland systems present PFO = 100% Contiguous undeveloped buffer zone present YesIs the wetland a separate hydraulic system? No If not, where does the wetland lie in the drainage basin? high, middleHow many tributaries contribute to the wetland? 1 Wildlife & vegetation diversity/abundance (see attached list)Wetland I.D. # 1
Latitude 41.09347 Longitude -76.170841Prepared by: LSI Date 12-10-09Wetland Impact:
Type _____ Area _____Evaluation based on:
Office _____ Field ☒Corps manual wetland delineation
completed? Y ☒ N _____














Function/Value	Suitability Y N	Rationale (Reference #)*	Principal Function(s)/Value(s)	Comments
 Groundwater Recharge/Discharge	<input checked="" type="checkbox"/>	2, 3, 4, 5, 6, 7, 9, 10, 11, 14, 19, 21, 23, 24, 25, 26, 27, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100	*portions are favorable, *Gringe	
 Floodflow Alteration	<input checked="" type="checkbox"/>	2, 3, 4, 5, 6, 7, 9, 10, 11, 14, 19, 21, 23, 24, 25, 26, 27, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100	*likely	
 Fish and Shellfish Habitat	<input checked="" type="checkbox"/>	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100	*minimal flood storage	
 Sediment/Toxicant Retention	<input checked="" type="checkbox"/>	2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100		
 Nutrient Removal	<input checked="" type="checkbox"/>	2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100		
 Production Export	<input checked="" type="checkbox"/>	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100		
 Sediment/Shoreline Stabilization	<input checked="" type="checkbox"/>	2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100	*from banks *portions *some portions	
 Wildlife Habitat	<input checked="" type="checkbox"/>	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100	*likely	
 Recreation	<input checked="" type="checkbox"/>	5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100	*not a potential recreation; restricted access	
 Educational/Scientific Value	<input checked="" type="checkbox"/>	2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100		
 Uniqueness/Heritage	<input checked="" type="checkbox"/>	7, 15, 18, 19, 21, 22, 23, 27, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100	*no primary viewing locations *likely *only from road *suitable because of historic dam remnants	
 Visual Quality/Aesthetics	<input checked="" type="checkbox"/>	4, 7, 8		*no primary viewing locations
 Endangered Species Habitat	<input checked="" type="checkbox"/>			
 Other				

Notes: - Forested wetlands along Walker Run north of Beech Grove Rd. * Refer to backup list of numbered considerations.

BU. + K.S.

Wetland Function-Value Evaluation Form

Total area of wetland 4-3.16^{ac} Human made? No Is wetland part of a wildlife corridor? Yes or a "habitat island"? _____Adjacent land use upland meadow (east) Distance to nearest roadway or other development 0'
upland forest (west)Dominant wetland systems present PEM, PFO Contiguous undeveloped buffer zone present Yes (west)
No (east - road)Is the wetland a separate hydraulic system? No If not, where does the wetland lie in the drainage basin? midHow many tributaries contribute to the wetland? 1 Wildlife & vegetation diversity/abundance (see attached list)Wetland I.D. 4 and 7
Latitude 41.09132 Longitude -76.17076Prepared by: LSE Date 12-2-09Wetland Impact:
Type PFO + PEM Area _____Evaluation based on:
Office _____ Field ✓Corps manual wetland delineation
completed? Y ✓ N _____

Function/Value	Suitability		Rationale (Reference #)*	Principal Function(s)/Value(s)	Comments
	Y	N			
 Groundwater Recharge/Discharge	X		2, 3, 8, 15, 17, 18, 20		* see notes • very minimal suitability (favorable topography)
 Floodflow Alteration	X		2, 3, 4, 6, 9 2, 4, 7, 8, 10, 11, 14, 19 21		* no spring seep • very minimal suitability other than spring * based on rain events (temp. ponding likely) * entrenched conditions minimally suitable
 Fish and Shellfish Habitat	X		10, 11, 12, 19, 20, 21, 23, 24 25, 26 R.uncircled all 20		
 Sediment/Toxicant Retention		X	4, 7, 8, 9, 10, 19, 21, 22 *		* refers to watercourse not adjacent wetlands
 Nutrient Removal		X	6, 7, 8, 9, 11, 19, 21, 22		* legacy sediments * referring to channel
 Production Export	X		1, 2, 3, 4, 5, 6, 7, 8, 10, 11, 12, 13, 14, 15, 16, 23		* watercourse
 Sediment/Shoreline Stabilization		X	2, 4, 6, 9, 10, 13, 15, 16		* does not function at high level very minimal suitability
 Wildlife Habitat	X		1, 3, 4, 5, 6, 7, 8, 9, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 24, 25	X	* only disturbed in moved portion
 Recreation		X	5, 6, 13, 14, 17		
 Educational/Scientific Value		X	2, 5		
 Uniqueness/Heritage		X	4, 7, 15, 17, 19, 22, 32, 33, 34, 35, 40		* moving location only
 Visual Quality/Aesthetics		X	4, 7, 8, 13, 14 *		* moved location only
 ES Endangered Species Habitat		X			
Other					

Notes:














* Refer to backup list of numbered considerations.

4.7

Wetland Function-Value Evaluation Form

Total area of wetland 0.12 Human made? N Is wetland part of a wildlife corridor? yes or a "habitat island"? No
 Adjacent land use upland fallow field, forest Distance to nearest roadway or other development ~200'
 Dominant wetland systems present PEM Contiguous undeveloped buffer zone present yes
 Is the wetland a separate hydraulic system? yes If not, where does the wetland lie in the drainage basin? _____
 How many tributaries contribute to the wetland? N/A Wildlife & vegetation diversity/abundance (see attached list)

Wetland I.D. 5
 Latitude 41.09043 Longitude -76.168316
 Prepared by: KS Date 6/30
 Wetland Impact:
 Type _____ Area _____
 Evaluation based on:
 Office _____ Field X
 Corps manual wetland delineation completed? Y X N _____

Function/Value	Suitability		Rationale (Reference #)*	Principal Function(s)/Value(s)	Comments
	Y	N			
 Groundwater Recharge/Discharge	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	2, 3, 7, 8, (18) 1, 2, 3, 4, 9,		
 Floodflow Alteration		<input checked="" type="checkbox"/>	2, 4, (21),		
 Fish and Shellfish Habitat		<input checked="" type="checkbox"/>	(28)		
 Sediment/Toxicant Retention		<input checked="" type="checkbox"/>	1, (21)		
 Nutrient Removal		<input checked="" type="checkbox"/>	4, (20) 8,		
 Production Export		<input checked="" type="checkbox"/>	1, 2, 4, 5, 7, 12, 13, (22)		
 Sediment/Shoreline Stabilization		<input checked="" type="checkbox"/>			Not applicable - isolated wetland No adjacent water body
 Wildlife Habitat		<input checked="" type="checkbox"/>	1, 5, 6, 8, 9, 14, 18, 20,		
 Recreation		<input checked="" type="checkbox"/>	4, 13, (16), (17)		
 Educational/Scientific Value		<input checked="" type="checkbox"/>	2		
 Uniqueness/Heritage		<input checked="" type="checkbox"/>	15,		
 Visual Quality/Aesthetics		<input checked="" type="checkbox"/>	4, 7,		
 ES Endangered Species Habitat		<input checked="" type="checkbox"/>			
Other					

Notes:

* Refer to backup list of numbered considerations.

Wetland Function-Value Evaluation Form

Total area of wetland 0.7 ac Human made? No Is wetland part of a wildlife corridor? yes or a "habitat island"? _____

Adjacent land use N. market St, Upland forest, Walker Run Distance to nearest roadway or other development ~10'

Dominant wetland systems present PFO Contiguous undeveloped buffer zone present No

Is the wetland a separate hydraulic system? yes If not, where does the wetland lie in the drainage basin? _____

How many tributaries contribute to the wetland? 0 Wildlife & vegetation diversity/abundance (see attached list)

Wetland I.D. 6

Latitude 41.08928 Longitude -76.169451

Prepared by: KS Date 6/26

Wetland Impact:

Type _____ Area _____

Evaluation based on:

Office X Field X

Corps manual wetland delineation completed? Y X N _____

Function/Value	Suitability Y N	Rationale (Reference #)*	Principal Function(s)/Value(s)	Comments
Groundwater Recharge/Discharge	X	1, 2, 8, 14		
Floodflow Alteration	X	1, 2, 4, 7, 8, 9, 10, 12 16, 17, 19		12-minimal, need very high water
Fish and Shellfish Habitat		(28)		
Sediment/Toxicant Retention	X	1, 2, 5,		1- Road runoff No sig. sources
Nutrient Removal		X 2		2- seasonal/ No sig. sources
Production Export		X 1, 2, 3, 4, 5, 7, 8, 12, (13) (14)		No flushing / No outlet
Sediment/Shoreline Stabilization		X (14)		
Wildlife Habitat	X	1, 5, 3, 6, 8, 9, 14, 16, 20, 21, (25)	X	1- Road only 25-less than 5 ac, cover is present
Recreation		X 5, (13), (16), (17)		
Educational/Scientific Value		X 5, 6, 17, (29), (10)		6- seasonal visible from N. market St.
Uniqueness/Heritage		X		
Visual Quality/Aesthetics		X		
ES Endangered Species Habitat		X		
Other				














Notes:

* Refer to backup list of numbered considerations.

Wetland Function-Value Evaluation Form JULY 2010

Total area of wetland 10.94 Human made? NO Is wetland part of a wildlife corridor? YES or a "habitat island"? no
 Adjacent land use Forested wetland, old farm field Distance to nearest roadway or other development ~200'
 Dominant wetland systems present PEM Contiguous undeveloped buffer zone present YES
 Is the wetland a separate hydraulic system? NO If not, where does the wetland lie in the drainage basin? lower UNT
 How many tributaries contribute to the wetland? 1 Wildlife & vegetation diversity/abundance (see attached list)

Wetland I.D. 10.1
 Latitude 41,08517 Longitude -76,165031
 Prepared by: KS Date 7-12-2010
 Wetland Impact:
 Type _____ Area _____
 Evaluation based on:
 Office _____ Field X
 Corps manual wetland delineation completed? Y X N _____

Function/Value	Suitability Y N	Rationale (Reference #)*	Principal Function(s)/Value(s)	Comments
 Groundwater Recharge/Discharge	X	2, 3, 7, 8, 9, 11, 20		Stratified drift?, percolation data Sandy Soils
 Floodflow Alteration	X	2, 4, 9 2, 6, 7, 9, 10, 11, 14, 17, 19, (20, 22)		Not Sinuous
 Fish and Shellfish Habitat	X-	(28)		Intermittent stream -totally dry - summer seasonally suitable
 Sediment/Toxicant Retention	X			No source - cropland fallow
 Nutrient Removal	X			No source - cropland fallow
 Production Export	X	1, 2, 4, 5, 7, 8, 10, 12, 13, 15, 16, (21), (23)		10 - minimal
 Sediment/Shoreline Stabilization	X	1, 2, 4, 6, 9, 10, 12, (13) (10), (18)		1 - ? 14 - seasonal
 Wildlife Habitat	X	1, 2, 3, 5, 6, 7, 8, 9, 14, 15, 18, 19, 20, 22, 23? (27)	X	
 Recreation	X	5, 6, (13), (17)		
 Educational/Scientific Value	X	2, 5		
 Uniqueness/Heritage	X	7, 13, 15, 22, 32, 38, 40		13 - Road Not many principal functions & values anymore
 Visual Quality/Aesthetics	X			
 ES Endangered Species Habitat	X			
Other				

Notes:

* Refer to backup list of numbered considerations.

B.U. + KS

DPDZ + DPCZ (Normandeau)

Wetland Function-Value Evaluation Form -

Total area of wetland 14.78 ^{10,94} Human made? No Is wetland part of a wildlife corridor? Yes or a "habitat island"?

Adjacent land use old farm fields (south + north) Distance to nearest roadway or other development ~200'
forested wetlands (southwest + east)

Dominant wetland systems present PEM Contiguous undeveloped buffer zone present Yes

Is the wetland a separate hydraulic system? No If not, where does the wetland lie in the drainage basin? directly ups of confluence w/ Walker Run

How many tributaries contribute to the wetland? 1 Wildlife & vegetation diversity/abundance (see attached list)
refer to fauna + macro report

Wetland I.D. # 10.1
 Latitude 41,08517 Longitude 76,165031
 Prepared by: LSE Date 11-18-09
 Wetland Impact:
 Type PEM Area 18.10? (TBD)
 Evaluation based on:
 Office _____ Field ✓
 Corps manual wetland delineation completed? Y ✓ N _____

Function/Value	Suitability		Rationale (Reference #)*	Principal Function(s)/Value(s)	Comments
	Y	N			
Groundwater Recharge/Discharge	X	X	2, 3, 5, 8, 16, 17, 18, 20	X	*edges *beaver dam
Floodflow Alteration	X		2, 3, 4, 5, 6, 7, 9*	X	*edges
Fish and Shellfish Habitat	X		2, 3, 4, 6, 7, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 23, 24, 25	X	*edges *good storage w/s (not necessarily upslope); *low infiltration rate *restricted by beaver dam
Sediment/Toxicant Retention	X		1, 2, 3, 4, 5, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 19, 21, 22*	X	*inundated south only; ? need to be researched
Nutrient Removal	X		3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 18	X	*not very
Production Export	X		1, 2, 4, 5, 6, 7, 8, 10, 12, 15, 16, 17, 20, 21, 22		- very, very minimal minimal suitability
Sediment/Shoreline Stabilization	X		1, 2, 3, 4, 6, 9, 10, 12	X	
Wildlife Habitat	X		1, 2, 3, 4, 5, 6, 7, 8, 9, 14, 15, 17, 18, 19, 20, 21, 22, 23	X	
Recreation		X	5, 6, 13, 17		
Educational/Scientific Value		X	2, 5		
Uniqueness/Heritage	X		6, 7, 15, 17, 18, 19, 22, 27, 32, 33, 34		good suitability in terms of overall health and appearance, ecology but not accessible
Visual Quality/Aesthetics	X		4, 6, 7, 8, 12, 13		minimal suitability due to limited access
ES Endangered Species Habitat		X			
Other					

Notes:

* Refer to backup list of numbered considerations.

10.1

B.U. + K.S.

DPJ1 (Normandeau)

Wetland Function-Value Evaluation Form

Total area of wetland 4,220 Human made? No Is wetland part of a wildlife corridor? Yes or a "habitat island"? _____Adjacent land use ag fields (corn) to west north Distance to nearest roadway or other development ~200'Dominant wetland systems present PEM = 60%
PFO = 30%
PSS = 10% Contiguous undeveloped buffer zone present YesIs the wetland a separate hydraulic system? No If not, where does the wetland lie in the drainage basin? middleHow many tributaries contribute to the wetland? 1 Wildlife & vegetation diversity/abundance (see attached list)Wetland I.D. #10,2Latitude 41.08533 Longitude -76.1167420Prepared by: LSI Date 12-2-09Wetland Impact:
Type PFO + PEM Area _____

Evaluation based on:

Office _____ Field ✓Corps manual wetland delineation
completed? Y ✓ N _____

Function/Value	Suitability Y N	Rationale (Reference #)*	Principal Function(s)/Value(s)	Comments
Groundwater Recharge/Discharge	<input checked="" type="checkbox"/>	2, 3, 5, 8, 12, 13, 16, 17, 20		* beaver dam? possibly * constricted by beaver dam? possibly
Floodflow Alteration	<input checked="" type="checkbox"/>	2, 3, 4, 9, 10 2, 4, 7, 6, 7, 10, 11, 14, 15, 16, 19, 11, 12		* likely not high infiltration ? large events * low water velocity * fringe - marginal suitability
Fish and Shellfish Habitat	<input checked="" type="checkbox"/>	10, 11, 12, 15, 16, 18, 19, 21, 23, 24, 25, 26		* no watercourse, * minimal
Sediment/Toxicant Retention	<input checked="" type="checkbox"/>	1, 2, 4, 7, 9, 10, 13, 16, 18, 11, 9, 22		* w/in channel only * refer to watercourse only * Not suitable - 2010 field visit
Nutrient Removal	<input checked="" type="checkbox"/>	3, 4, 7, 8, 9, 10, 11, 13, 14		* channel + small area at south end opportunity exists but nutrient source is minimal * Not suitable - 2010 field visit
Production Export	<input checked="" type="checkbox"/>	1, 2, 4, 5, 6, 7, 8, 12, 14, 15, 16, 19, 22		? if beaver dam fails turkey scratches
Sediment/Shoreline Stabilization	<input checked="" type="checkbox"/>	1, 2, 4, 6, 9, 10, 13, 15, 19		Not Suitable 2010 visit
Wildlife Habitat	<input checked="" type="checkbox"/>	1, 3, 5, 6, 7, 8, 9, 14, 15, 16, 18, 19, 20, 22	<input checked="" type="checkbox"/>	* not in majority of PEM portion suitability but need to think more on if it is principal
Recreation	<input checked="" type="checkbox"/>	5, 6, 13, 17		
Educational/Scientific Value	<input checked="" type="checkbox"/>	2, 5		
Uniqueness/Heritage	<input checked="" type="checkbox"/>	4, 7, 15, 17, 22, 32, 33, 35, 40		
Visual Quality/Aesthetics	<input checked="" type="checkbox"/>	4, 7, 8, 13		
ES Endangered Species Habitat	<input checked="" type="checkbox"/>			
Other				

Notes:

* Refer to backup list of numbered considerations.

10.2

B.R.U

32° windy, overcast

12:00 pm - 2:00 pm

Wetland Function-Value Evaluation Form

Total area of wetland 25.8 Human made? No Is wetland part of a wildlife corridor? yes or a "habitat island"? _____Adjacent land use active farm (corn) fields to east
forested uplands to south Distance to nearest roadway or other development ~350'Dominant wetland systems present PFO Contiguous undeveloped buffer zone present yesIs the wetland a separate hydraulic system? No If not, where does the wetland lie in the drainage basin? middleHow many tributaries contribute to the wetland? 2 Wildlife & vegetation diversity/abundance (see attached list)Wetland I.D. 10.3Latitude 41.08387 Longitude -76.166254Prepared by: LSC Date 12-10-09Wetland Impact:
Type _____ Area _____

Evaluation based on:

Office _____ Field ☒Corps manual wetland delineation
completed? Y ☒ N _____

animals:

deer tracks
various
songbirds
red-tail hawk
beaver activity

Function/Value	Suitability Y N	Rationale (Reference #)*	Principal Function(s)/Value(s)	Comments
Groundwater Recharge/Discharge	X	3, 5*, 8, (14)*, (16), (17), (19), (20)	* upslope + downslope of beaver dam	* fringe * not suitable because it is permanently flooded
Floodflow Alteration	X	2, 3, 4, 5*, 6, 7, (10)	* retain water	* provides good floodflow storage because of beaver dam
Fish and Shellfish Habitat	X	(1, 2, 3, 4, 5, 6, 8*) 10, 11, 14, 15, 16, 18*, 19, 20*, 21, 23, 24, 25, 26	* some areas especially right behind beaver dam	* only at uppermost portion of wetland b/c beaver dam
Sediment/Toxicant Retention	X	1, 2, 4*, 5, 7, 8, 9, 10, 11, 12, 13*, 14, 15*, 16, 18*, 19,	* except for watercourse below beaver dam (incised)	* mostly organic material
Nutrient Removal	X	1, 2*, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14	* only immediately up of beaver dam	
Production Export	X	1, 2, 3, 4, 5, 6, 7, 8, 12, 15, 16, 17, (20), (21)	* suitable but very minimal opportunity b/c of constricted outlet	
Sediment/Shoreline Stabilization	X	1, 2, 4, 6, 9, 10, 11, (13)*, (15)*, (16), (17)*, (19)*	* past downcutting of channel below beaver dam / silty bottom	* d/s of beaver dam (watercourse) * not current * very minimal
Wildlife Habitat	X	1, 2, 3, 4*, 5, 6, 7, 8, 9, 10, 12, 13, 14, 15, 16, 18, 19, 20, 21, 22,	X	
Recreation	X	5, 6, (13)		* restricted access / no potential recreation
Educational/Scientific Value	X	2, 5,		
Uniqueness/Heritage	X	3, 5, 6, 7, 15, 18*, 22, 23*, 27, 32, (38), (40)		- no primary viewing locations * stone wall / abnormally high
Visual Quality/Aesthetics	X	4, 6, 7, 8		- no primary viewing locations * unique high quality wetland (wooded swamp) ^{changed to, not suitable}
ES Endangered Species Habitat	X			
Other				

Notes: - Large forested wetland near beaver dam (wooded swamp)

- permanently flooded by beaver dam(s) - active
- outlets into Walker Run by way of series of channels
- constricted outlet is existing farm access road (barr) with unimproved d/s

* Refer to backup list of numbered considerations.

10.3

BU, KS, JK, MS, KM.

teardrop wetland

Wetland Function-Value Evaluation Form

Total area of wetland 3.63 Human made? No Is wetland part of a wildlife corridor? Yes or a "habitat island"?Adjacent land use corn (south); forested uplands (east + west) Distance to nearest roadway or other development 830'Dominant wetland systems present PFO Contiguous undeveloped buffer zone present YesIs the wetland a separate hydraulic system? No If not, where does the wetland lie in the drainage basin? headwatersHow many tributaries contribute to the wetland? 1 Wildlife & vegetation diversity/abundance (see attached list) refer to other reportsWetland I.D. #11
Latitude 41.08931 Longitude -76.161803Prepared by: LSI Date 11-18-09Wetland Impact:
Type PFO (perm.) Area 3.78? (TBD)

Evaluation based on:

Office _____ Field ☒Corps manual wetland delineation
completed? Y ☒ N _____

Function/Value	Suitability Y N	Rationale (Reference #)*	Principal Function(s)/Value(s)	Comments
Groundwater Recharge/Discharge	<input checked="" type="checkbox"/>	2, 3, 5*, 7, 8, 9*, 11, 12*, 13, 16	<input checked="" type="checkbox"/>	* upper portion * defined drainage (not watercourse) (7, 18, 20)
Floodflow Alteration	<input checked="" type="checkbox"/>	1, 2, 4, 5, 6, 7, 9, 10, 14*, 15, 16*, 17-18*, 19, (23), (24)	<input checked="" type="checkbox"/>	* lower portion, * Walker Run, * only restricted during small events b/c of outlet rice
Fish and Shellfish Habitat	<input checked="" type="checkbox"/>	10, 11, 12, 14, 16*, 18, 19, 26, (28)		* hydro. connect. to E. trib of Walker Run provides better water quality to Walker Run
Sediment/Toxicant Retention	<input checked="" type="checkbox"/>	2, 4, 7, 8, 9, 10, 11, 14*, 15*, 16, 19, (2), (22)		* floodplain area
Nutrient Removal	<input checked="" type="checkbox"/>	1, 3, 5*, 7*, 8, 9, 10*, 11, 12*, 14, 18, (19), (20)		* stable floodplain portions * upper portion * minimal * upper stable portions suitable but does not opportunity of nutrients No source of nutrients is up slope watershed
Production Export	<input checked="" type="checkbox"/>	1, 2, 3, 4, 5, 7, 8*, 10*, 12*, 13, 16, 17*, (22)		* limited diversity * headcut * scrubby * upper stable portion
Sediment/Shoreline Stabilization	<input checked="" type="checkbox"/>	2, 3*, 4, 6, 9, 12*, (13), (32), (17), (19)		* upstream of headcut * upstream of headcut * below headcut (13, 15) * above headcut - suitable based on whether ups or dls of headcut
Wildlife Habitat	<input checked="" type="checkbox"/>	1, 3, 4, 5, 6, 7*, 8, 9, 14, 16, 17*, 18, 19, 20, 21, 22, 23*, (27)	<input checked="" type="checkbox"/>	* piped but connected to Walker Run drainage * refer to fauna + macro reports. ? refer to fauna + macro report
Recreation	<input checked="" type="checkbox"/>	5, 6, (3), (7)		
Educational/Scientific Value	<input checked="" type="checkbox"/>	2, 5		
Uniqueness/Heritage	<input checked="" type="checkbox"/>	7, 15, 18, 21*, 23*, 32, (38), (39), (40)		* dam
Visual Quality/Aesthetics	<input checked="" type="checkbox"/>	4, 7, 8, (13), (14)*		* specify (historical)
ES Endangered Species Habitat	<input checked="" type="checkbox"/>			
Other				

Notes: Field sheet completed in wider portion of teardrop wetland
Just upstream of existing headcut

* Refer to backup list of numbered considerations.

Wetland Function-Value Evaluation Form

MS, KH - South of west building
12.1 - 14.54 ac
Total area of wetland 16 - 3.51 ac. Human made? No Is wetland part of a wildlife corridor? yes or a "habitat island"? NO
Adjacent land use industrial, farmland Distance to nearest roadway or other development 25yds
Dominant wetland systems present PFO Contiguous undeveloped buffer zone present No - confers Ln
Is the wetland a separate hydraulic system? No If not, where does the wetland lie in the drainage basin? middle
How many tributaries contribute to the wetland? 2 Wildlife & vegetation diversity/abundance (see attached list)

Wetland I.D. 12.1 and 16
Latitude 41.08709 Longitude -76.153202
Prepared by: MT Date 12-10-09
Wetland Impact:
Type _____ Area _____
Evaluation based on:
Office _____ Field X
Corps manual wetland delineation completed? Y X N _____

Function/Value	Suitability Y N	Rationale (Reference #)*	Principal Function(s)/Value(s)	Comments
Groundwater Recharge/Discharge	<input checked="" type="checkbox"/>	1, 3, 8, 12, 13, 14, 19, 20	<u>see Notes</u>	
Floodflow Alteration	<input checked="" type="checkbox"/>	2, 3, 4, 6, 7, 8, 9, 10, 11, 14, 17, 19, 20, 21, 22, 23, 24	<u>see Notes, 20* Partic me,</u>	
Fish and Shellfish Habitat	<input checked="" type="checkbox"/>	1, 2, 4, 6, 10, 11, 12, 14, 15, 16, 18, 19, 20, 23, 24, 25, 26	<u>intermittent stream - minimally suitable</u>	
Sediment/Toxicant Retention	<input checked="" type="checkbox"/>	2, 4, 5, 6, 7, 8, 10, 12, 13, 14, 15, 16, 19, 20		
Nutrient Removal	<input checked="" type="checkbox"/>	1, 3, 7, 8, 9, 10, 11, 12, 13, 14, 17, 18, 19, 20	<u>No nutrient source upslope of wetlands</u>	
Production Export	<input checked="" type="checkbox"/>	1, 2, 3, 4, 5, 6, 7, 8, 10, 12, 13, 14, 15, 16, 17, 20		
Sediment/Shoreline Stabilization	<input checked="" type="checkbox"/>	3, 4, 6, 9, 11, 12, 13, 15, 16		
Wildlife Habitat	<input checked="" type="checkbox"/>	1, 2, 3, 5, 6, 7, 8, 9, 10, 12, 14, 15, 16, 18, 19, 20, 21, 22	<input checked="" type="checkbox"/>	
Recreation	<input checked="" type="checkbox"/>	5, 6, 13, 17		
Educational/Scientific Value	<input checked="" type="checkbox"/>	2, 5,		
Uniqueness/Heritage	<input checked="" type="checkbox"/>	5, 6, 7, 15, 16, 32, 40		
Visual Quality/Aesthetics	<input checked="" type="checkbox"/>	4, 5, 7, 8, 12, 13		<u>13 - no viewshed</u>
ES Endangered Species Habitat				
Other				

Notes:

* Refer to backup list of numbered considerations.

12.1

BRD.
temp. 32°
windy, overcast

9:00 am

K

Wetland Function-Value Evaluation Form

Total area of wetland 7.61 Human made? No Is wetland part of a wildlife corridor? Yes or a "habitat island"? _____

Adjacent land use open fill area to north
switchyard to east
forested upland to west Distance to nearest roadway or other development 10' closest location

Dominant wetland systems present PEM = 50 PSS = 10% Contiguous undeveloped buffer zone present Yes

PFO = 30 OW = 5%
Is the wetland a separate hydraulic system? No If not, where does the wetland lie in the drainage basin? middle

How many tributaries contribute to the wetland? 2-3 Wildlife & vegetation diversity/abundance (see attached list)

Wetland I.D. 12.2

Latitude 41.09273 Longitude -86.155728

Prepared by: LSE Date 12-10-09

Wetland Impact:
Type _____ Area _____

Evaluation based on:

Office _____ Field ✓

Corps manual wetland delineation
completed? Y ✓ N _____

Function/Value	Suitability Y N	Rationale (Reference #)*	Principal Function(s)/Value(s)	Comments
Groundwater Recharge/Discharge	<u>X</u>	<u>2*, 3, 5*, 8, 12*, 14*, 16, 17, 18, 20</u>	<u>*everywhere but ponds</u>	<u>*beaver dam *beaver dam is restricted *fringe</u>
Floodflow Alteration	<u>X</u>	<u>2, 3, 4, 6, 7, 9*, 10</u>	<u>*everywhere but ponds</u>	<u>*beaver dam *portions of watercourse</u>
Fish and Shellfish Habitat	<u>X</u>	<u>2*, 4, 6, 7, 8*, 9, 10, 11, 14, 15, 16*, 19, 23*</u>	<u>*upstream of backwater is incised</u>	<u>*beaver pond only *beaver pond only *Johnson Pond only</u>
Sediment/Toxicant Retention	<u>X</u>	<u>(1, 2, 3, 4*, 5*, 6*, 7*, 8*)</u> <u>10, 11, 12, 15*, 16, 18, 19, 20, 21, 22, 23, 24, 25, 26</u>	<u>*Johnson Pond only (ponds only)</u>	<u>*some areas near beaver pond *Johnson Pond may be stocked</u>
Nutrient Removal	<u>X</u>	<u>2, 4, 5, 7, 8*, 10, 11, 12, 14*, 15*, 18*, 19*</u>	<u>*willing beaver pond *portions</u>	<u>*suitable but little opportunity</u>
Production Export	<u>X</u>	<u>2*, 3, 5, 6*, 7, 8, 9, 11, 12*</u> <u>13*, 19</u>	<u>*ponds only *in ponds only *near beaver pond</u>	<u>*suitable but little opportunity - No source</u>
Sediment/Shoreline Stabilization	<u>X</u>	<u>1, 2, 4, 5, 6, 7, 8, 12, 15, 16, 17*</u> <u>(20, 21)</u>	<u>*near beaver pond only</u>	<u>*suitable but little opportunity b/c everything would collect in beaver pond</u>
Wildlife Habitat	<u>X</u>	<u>2*, 4, 6, 9, 10, 11*, 12*, 13, 15*, 16*, 19*, 23*</u>	<u>*eroding banks *minimal *minimal *upstream of backwater from beaver pond</u>	<u>*everywhere but ponds *minimal gradient *suitable but minimal opportunity</u>
Recreation	<u>X</u>	<u>1, 2*, 3, 5, 6, 7, 8, 9, 10, 13*, 14, 15, 16, 18, 19, 20, 21, 22, 5, 6, 13</u>	<u>*very suitable (excellent) habitat</u>	<u>*restricted access</u>
Educational/Scientific Value	<u>X</u>	<u>2, 5,</u>	<u>*restricted access</u>	
Uniqueness/Heritage	<u>X</u>	<u>3*, 4, 6*, 7, 15, 17, 21, 22, 23*, 32, 38, 39, 40</u>	<u>*near beaver pond only *old rock piles that were property lines</u>	<u>*minimally suitable but not opportunity (viewing locations)</u>
Visual Quality/Aesthetics	<u>X</u>	<u>4, 6, 7, 8, 12</u>	<u>*suitable but no opportunity</u>	
ES Endangered Species Habitat	<u>X</u>			
Other				

Notes: - narrow confined valley (artificially) on north and east by Sill * Refer to backup list of numbered considerations.
and naturally on south & west by forested hillside (shale)
- includes Johnson pond and beaver pond
- beaver dam is under above existing area and winter is over Poudre road (concrete - C beaver dam is frozen) 12.2

JK, MS

DPAZ
DPB2 (NORMANDEAU)

Wetland Function-Value Evaluation Form

Total area of wetland 12.53^{ac} Human made? NO Is wetland part of a wildlife corridor? yes or a "habitat island"? N/AAdjacent land use Active Farmland (North & South)
FORESTED (EAST), Emergent Wetland (W) Distance to nearest roadway or other development ~800'Dominant wetland systems present PFO Contiguous undeveloped buffer zone present YESIs the wetland a separate hydraulic system? NO If not, where does the wetland lie in the drainage basin? MIDDLEHow many tributaries contribute to the wetland? 2 Wildlife & vegetation diversity/abundance (see attached list)Wetland I.D. 12.3Latitude 41.08628 Longitude -76.158607Prepared by: LSI Date 11-18-09

Wetland Impact:

Type PFO Area 2.65 ? (TBD)

Evaluation based on:

Office _____ Field ☒Corps manual wetland delineation
completed? Y ☒ N _____

Function/Value	Suitability Y N	Rationale (Reference #)*	Principal Function(s)/Value(s)	Comments
Groundwater Recharge/Discharge	<input checked="" type="checkbox"/>	<u>2, 3, 5, 10, 13, 16, 17, 18, 20</u>	<u>*SEE COMMENTS</u>	
Floodflow Alteration	<input checked="" type="checkbox"/>	<u>4, 5, 6, 7, 9</u>	<u>*SEE OTHER REPORTS ABOUT SPRING DISCHARGE *</u>	
Fish and Shellfish Habitat	<input checked="" type="checkbox"/>	<u>2, 3, 4, 6, 7, 8, 9, 10, 11, 14, 15, 16</u> <u>17, 18, 19, 23, 25</u>	<u>*SEE COMMENTS</u>	
Sediment/Toxicant Retention	<input checked="" type="checkbox"/>	<u>1, 2, 6, 10, 11, 12, 14, 16, 18</u> <u>19, 20, 21, 23, 24, 25, 26, 28</u>	<u>*SEE COMMENTS</u> <u>*SUITABLE - BUT LOW WATER VOLUME FOR FISH/COMMUNITY</u>	
Nutrient Removal	<input checked="" type="checkbox"/>	<u>1, 2, 4, 7, 8, 9, 10, 11, 13, 16</u> <u>19, 21, 22</u>	<u>*SEE NOTES</u> <u>No source cropland fallow in Summer 2010</u>	
Production Export	<input checked="" type="checkbox"/>	<u>1, 3, 4, 6, 7, 8, 9, 10, 11, 12, 13</u> <u>14, 15, 16, 17, 18, 19, 20, 21, 22, 23</u>	<u>*SEE NOTES</u> <u>GOOD POTENTIAL W/ TOPOGRAPHY</u>	
Sediment/Shoreline Stabilization	<input checked="" type="checkbox"/>	<u>20, 22</u> <u>1, 2, 4, 6, 9, 10, 11, 13, 15</u>	<u>*SUITABLE EXPORTATION, OPPORTUNITY FOR FLWTHING,</u> <u>*SEE NOTES</u>	
Wildlife Habitat	<input checked="" type="checkbox"/>	<u>1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 13</u> <u>14, 15, 16, 17, 18, 19, 20, 21, 22, 23</u>	<u>*SEE NOTES</u>	
Recreation	<input checked="" type="checkbox"/>	<u>5, 6, 13, 17</u>		
Educational/Scientific Value	<input checked="" type="checkbox"/>	<u>2, 5</u>		
Uniqueness/Heritage	<input checked="" type="checkbox"/>	<u>7, 15, 18, 22, 27, 32</u> <u>33, 34, 40</u>	<u>SEE NOTES</u>	
Visual Quality/Aesthetics	<input checked="" type="checkbox"/>	<u>4, 7, 8, 16</u>		
ES Endangered Species Habitat	<input checked="" type="checkbox"/>			
Other				

Notes:














* Refer to backup list of numbered considerations.

12.3

Wetland Function-Value Evaluation Form

Total area of wetland 0.25 Human made? yes Is wetland part of a wildlife corridor? somewhat or a "habitat island"? _____
 Adjacent land use parking lot, building, field Distance to nearest roadway or other development ~75ft
 Dominant wetland systems present PEM Contiguous undeveloped buffer zone present No
 Is the wetland a separate hydraulic system? No If not, where does the wetland lie in the drainage basin? Mid
 How many tributaries contribute to the wetland? 0 Wildlife & vegetation diversity/abundance (see attached list)

Wetland I.D. 15
 Latitude 41.08888 Longitude -76.153749
 Prepared by: KS Date 6/26/2010
 Wetland Impact:
 Type _____ Area _____
 Evaluation based on:
 Office _____ Field ☒
 Corps manual wetland delineation completed? Y ☒ N _____

Function/Value	Suitability Y N		Rationale (Reference #)*	Principal Function(s)/Value(s)	Comments
 Groundwater Recharge/Discharge	X	X	24, 7, 8, ⑦		
 Floodflow Alteration	X		2, 6, 9, 10, 16		
 Fish and Shellfish Habitat		X			No open water
 Sediment/Toxicant Retention		X	1		
 Nutrient Removal		X	13, ⑩, ⑪		13- high flows (1/2 precip event)
 Production Export		X	1, 12, ⑫		
 Sediment/Shoreline Stabilization		X			No flowing water or open water
 Wildlife Habitat		X	6, 8, 25, 26, 30		
 Recreation		X			
 Educational/Scientific Value		X			
 Uniqueness/Heritage		X			
 Visual Quality/Aesthetics		X			
 ES Endangered Species Habitat		X			
Other					













Notes:

* Refer to backup list of numbered considerations.

KS - July 2010

Wetland Function-Value Evaluation Form

Total area of wetland 1.58 ac Human made? yes? Is wetland part of a wildlife corridor? y or a "habitat island"? NoAdjacent land use field, switchyard, PFO Distance to nearest roadway or other development 25'Dominant wetland systems present PSS, PFO, POW Contiguous undeveloped buffer zone present yIs the wetland a separate hydraulic system? y If not, where does the wetland lie in the drainage basin? —How many tributaries contribute to the wetland? 0 Wildlife & vegetation diversity/abundance (see attached list)Wetland I.D. 17
Latitude 41.08646 Longitude -76.152195Prepared by: KS Date 6/26/2010Wetland Impact:
Type _____ Area _____Evaluation based on:
Office _____ Field ✓Corps manual wetland delineation
completed? Y ✓ N _____

Function/Value	Suitability Y N	Rationale (Reference #)*	Principal Function(s)/Value(s)	Comments
 Groundwater Recharge/Discharge	X	1, 2, 3, 8, 9, 13, (14), (16)		
 Floodflow Alteration	X	1, 2, 3, 6, 7, 8, 9, 10, 16, 19		
 Fish and Shellfish Habitat	X	(25)		Seasonal open water
 Sediment/Toxicant Retention	X			
 Nutrient Removal	X			
 Production Export	X	1, 2, 3, 4, 5, 7, 12, 16, (18), (20), (22), (23)		No flushing events, fairly productive 22 - Seasonal
 Sediment/Shoreline Stabilization	X	(13), (14), (16), (17), 6		
 Wildlife Habitat	X	1, 3, 6, 8, 9, 10, 12, 14, 15, 18, 19, 20, 22, (25), (16), (30)		10 - seasonal, 12 - seasonal
 Recreation	X	5, 6, (3), (16), (17)		
 Educational/Scientific Value	X	2, 5		
 Uniqueness/Heritage	X	6, 15, 40		6 - Seasonal
 Visual Quality/Aesthetics	X	4, 7, 13		
ES Endangered Species Habitat	X			
Other				

Notes:

* Refer to backup list of numbered considerations.

KA Isolated Ponds

Wetland Function-Value Evaluation Form

Total area of wetland 6.32 ac Human made? yes Is wetland part of a wildlife corridor? yes or a "habitat island"? _____Adjacent land use grassland, cropland, upland forest Distance to nearest roadway or other development 140 ftDominant wetland systems present PFO, PEM, PSS, POW Contiguous undeveloped buffer zone present yesIs the wetland a separate hydraulic system? yes If not, where does the wetland lie in the drainage basin? _____How many tributaries contribute to the wetland? None Wildlife & vegetation diversity/abundance (see attached list)Wetland I.D. 18
Latitude 41.08426 Longitude -76.151564Prepared by KS Date 12-10-09Wetland Impact:
Type _____ Area _____Evaluation based on:
Office _____ Field ✓Corps manual wetland delineation
completed? Y X N

Function/Value	Suitability Y N	Rationale (Reference #)*	Principal Function(s)/Value(s)	Comments
Groundwater Recharge/Discharge	X	1, 3, 8, 14 2, 3, 6		14 - isolated
Floodflow Alteration	X	1, 2, 3, 7, 9, 10, 16, 19		
Fish and Shellfish Habitat	X	2, 3, 4, 6, 10, 15,		check macro fish and Rizzo report
Sediment/Toxicant Retention	X	1, 2, 4, 5, 7, 12, 13, 15, 16, 17, 18?, 19		Principle ranking applies to southern wetland - there is more opportunity due to surrounding land use.
Nutrient Removal	X	1, 2, 3, 4, 5, 7, 8, 10, 11, 19		principle for southern NL
Production Export	X	1, 2, 3, 4, 5, 7, 7, 8, 12, 16, 17, 18, 20		
Sediment/Shoreline Stabilization	X	1, 3, 4, 6, 9, 10, 11?, 12?, (14)		veg. is protecting the pond although topography is so flat erosion would be expected
Wildlife Habitat	X	1, 2, 3, 5, 6, 8, 9, 10, 12, 13, 14, 15, 16, 18, 19, 20, 21, 22, 25	X	5 - switchyard
Recreation	X	5, 6, 13, 17		
Educational/Scientific Value	X	2, 5,		
Uniqueness/Heritage	X	4, 5, 6, 15, 27?, 32 38, 40		12 - visible from road 19 - from road
Visual Quality/Aesthetics	X	4, 7, 8, 13,		would be suitable if road qualifies as a primary viewing location
ES Endangered Species Habitat	X			
Other				

Notes:

* Refer to backup list of numbered considerations.

12

BRU.

30°, windy, mostly cloudy

3:00 pm

DPIZ > Normandeau
DAH 2

Wetland Function-Value Evaluation Form

Total area of wetland 6.13 Human made? No Is wetland part of a wildlife corridor? yes or a "habitat island"? _____Adjacent land use corn fields to east
forested uplands to west Distance to nearest roadway or other development 30 feetDominant wetland systems present PFO = 100% Contiguous undeveloped buffer zone present yesIs the wetland a separate hydraulic system? No If not, where does the wetland lie in the drainage basin? upperHow many tributaries contribute to the wetland? 1 Wildlife & vegetation diversity/abundance (see attached list)Wetland I.D. 19Latitude 41.08331 Longitude -76.155829Prepared by: LSE Date 12-10-09

Wetland Impact:

Type _____ Area _____

Evaluation based on:

Office _____ Field ☒Corps manual wetland delineation
completed? Y ☒ N _____

Function/Value	Suitability Y N	Rationale (Reference #)*	Principal Function(s)/Value(s)	Comments
▼ Groundwater Recharge/Discharge	<input checked="" type="checkbox"/>	2, 3, 13, (14), (5), (6), (17)	*thick * clay layer	minimally suitable because of impervious layer
~ Floodflow Alteration	<input checked="" type="checkbox"/>	1, 2, 3, (5) 3, 4, 6, 7, 8, 10, 19, (21), (24) 6*	* minimal suitability * collects stormwater only, no defined water course * no outlet	
🐟 Fish and Shellfish Habitat	<input checked="" type="checkbox"/>	11*, 12, 14*, 15*	* reptiles + amphibians likely (none observed) * at time of evaluation	
🌿 Sediment/Toxicant Retention	<input checked="" type="checkbox"/>	1, 2, 4, 5*, 7, 8, 9, 11	* inundated not necessarily open water * no watercourse * in winter especially when evapotranspiration is minimal * some suitability	
🌳 Nutrient Removal	<input checked="" type="checkbox"/>	1, 3, 4, 5*, 6*, 7, 8, 9, 10*, 11	* likely * organic deposits * minimal, * some suitability	
➡ Production Export	<input checked="" type="checkbox"/>	1, 2, 3, 4, 5, 7, 8, 16, 17, (18), (22), (21), (22)		
🌊 Sediment/Shoreline Stabilization	<input checked="" type="checkbox"/>	1, 6, (17), (19), (16)	* very minimal gradient * no watercourse	
🦋 Wildlife Habitat	<input checked="" type="checkbox"/>	1, 3, 5, 6, 8, 9, 12*, 14, 15, 16, 18, 20, 21*, 22, 19	* wooded swamp; most likely much drier during growing season when evapotranspiration rates are higher * likely	
⛴ Recreation	<input checked="" type="checkbox"/>	5, 6, (13), (17)	* not a potential recreation site * restricted access	
🏠 Educational/Scientific Value	<input checked="" type="checkbox"/>	2, 5		
★ Uniqueness/Heritage	<input checked="" type="checkbox"/>	5*, 6, 15, 19*, 32, (38), (3), (40)	* wooded swamp * from road only * no watercourse; no primary viewing locations	
👁 Visual Quality/Aesthetics	<input checked="" type="checkbox"/>	4, 6, 7, 8	* no primary viewing locations - minimally suitable	
ES Endangered Species Habitat	<input checked="" type="checkbox"/>			
Other				

Notes: forested wetland along Coners Road - wetland continues beyond limits of OCA. * Refer to backup list of numbered considerations.

Wetland Function-Value Evaluation Form

PFO - Furthest WL to the SE

Total area of wetland 10.76 Human made? No Is wetland part of a wildlife corridor? yes or a "habitat island"?

Adjacent land use upland forest, cropland Distance to nearest roadway or other development

Dominant wetland systems present PFO Contiguous undeveloped buffer zone present yes

Is the wetland a separate hydraulic system? No If not, where does the wetland lie in the drainage basin?

How many tributaries contribute to the wetland? 0 headwaters Wildlife & vegetation diversity/abundance (see attached list)

Wetland I.D. 20

Latitude 41.0852 Longitude -76.52283

Prepared by: KS Date 12-10-09

Wetland Impact:
Type _____ Area _____

Evaluation based on:
Office _____ Field ☒

Corps manual wetland delineation completed? Y ☒ N _____

Function/Value	Suitability Y N	Rationale (Reference #)*	Principal Function(s)/Value(s)	Comments
Groundwater Recharge/Discharge	X	3, 12, 7, 20		12- large wetland, outlet is at southern end 7- Sandy soils at approx 1.0'
Floodflow Alteration	X	2, 3, 4, 6 2, 3, 6, 7, 8, 9, 10, 11, 14, 15, 17, 19, 20		2- some areas in northern part of the WL, 6- see notes
Fish and Shellfish Habitat	X	1, 2, 3, 4, 10, 11, 15, 16, 18, 19, 21, 23, 24, 25, 26		- watercourse @ Southern edge of WL - Seasonal flow July 2010
Sediment/Toxicant Retention	X	1, 2, 4, 5, 7, 8, 10, 12, 13, 14, 15, 16, 19, 21		19- there are 2 small pockets of WL located in the cropland
Nutrient Removal	X	1, 2, 3, 4, 5, 7, 8, 9, 10, 11, 12, 13, 14, 20		13- thick veg. 20- some parts of WL
Production Export	X	1, 2, 3, 4, 5, 6, 7, 8, 10, 11, 12, 13, 16, 17		fringe wetland along the stream slow/diffuse/seasonal flow - no flushing events
Sediment/Shoreline Stabilization	X	1, 4, 6, 9, 10, 11, 13, 15, 16,		15- streambanks (in spots) - same 15
Wildlife Habitat	X	1, 2, 3, 5, 6, 8, 9, 10, 12, 14, 15, 16, 18, 19, 20, 21, 22, 25?	X	
Recreation	X	5, 6, 13.		
Educational/Scientific Value	X	2, 5,		
Uniqueness/Heritage	X	5, 6, 7, 15, 16, 22, 27? 29, 32, 38, 39, 40		No primary viewing location
Visual Quality/Aesthetics	X	4, 7, 8, 10, 11, 13,		No viewing areas
ES Endangered Species Habitat	X			
Other				

Notes:

* Refer to backup list of numbered considerations.

Wetland Function-Value Evaluation Form

South of SSES, East of isolated wetland

Total area of wetland 3.75 Human made? No Is wetland part of a wildlife corridor? yes or a "habitat island"?

Adjacent land use cropland, quarry? Distance to nearest roadway or other development 1000' - SSES

Dominant wetland systems present PEM Contiguous undeveloped buffer zone present yes - cropland

Is the wetland a separate hydraulic system? No If not, where does the wetland lie in the drainage basin? upper

How many tributaries contribute to the wetland? 0 Wildlife & vegetation diversity/abundance (see attached list)
tributary begins in WL

Wetland I.D. 25
Latitude 41.08411 Longitude -76.146490

Prepared by: KH Date 12/13/09

Wetland Impact:
Type Area

Evaluation based on:
Office Field X

Corps manual wetland delineation
completed? Y X N

Function/Value	Suitability Y N	Rationale (Reference #)*	Principal Function(s)/Value(s)	Comments
Groundwater Recharge/Discharge	<input checked="" type="checkbox"/>	2, 3, 8, 10?, 14, 16, 17, 18, 20 2, 3?, 4, 6, 9	<input checked="" type="checkbox"/> 14 - some fringe groundwater seeps from channelized flow in 2 areas of wetland	
Floodflow Alteration	<input checked="" type="checkbox"/>	3, 2?, 7, 8, 9, 10, 11, 14, 19 20, 21, 22, 24	<input checked="" type="checkbox"/> 2 - WL edges, 10, minimal, 11 - minimal 20 - some areas are ponded, 21 - some fringe	
Fish and Shellfish Habitat	<input checked="" type="checkbox"/>	10, 11, 16, 18, 21?, 23? 24, 25, 26, 28	16 - WL forms the watercourse 15 STREAM PERENNIAL, 28 - Seasonal water?	
Sediment/Toxicant Retention	<input checked="" type="checkbox"/>	1, 2, 4, 7, 8?, 9?, 10, 14, 15, 16, 19, 21	14 - some areas where springs emerge VERY MINIMAL	
Nutrient Removal	<input checked="" type="checkbox"/>	1, 3, 4, 5?, 7, 8, 9, 10, 11, 12, 13, 20	4 - minimal, 5 - maybe some areas 12, 13 - some areas MINIMAL	
Production Export	<input checked="" type="checkbox"/>	1, 2, 4, 5, 6, 7, 8, 10, 12, 13, 16	6 - minimal some export, probably not large flushing events	
Sediment/Shoreline Stabilization	<input checked="" type="checkbox"/>	1, 4, 6, 9, 11, 12, 13, 15	13 - from previous channelization	
Wildlife Habitat	<input checked="" type="checkbox"/>	1, 2, 3, 5, 6, 7, 8, 9, 14, 15, 16, 18, 19, 20, 21, 22, 25	<input checked="" type="checkbox"/> 7 - possibly, runs off the property - no delineation	
Recreation	<input checked="" type="checkbox"/>	5, 6, 13, 16, 17		
Educational/Scientific Value	<input checked="" type="checkbox"/>	2, 5		
Uniqueness/Heritage	<input checked="" type="checkbox"/>	7, 15, 16, 17, 22, 32 38, 39, 40		
Visual Quality/Aesthetics	<input checked="" type="checkbox"/>	6, 7, 8, 12		
ES Endangered Species Habitat	<input checked="" type="checkbox"/>			
Other				

Notes:

* Refer to backup list of numbered considerations.

BRU.

low 30's, overcast, windy

3:30 pm

27-052

Wetland Function-Value Evaluation Form

Total area of wetland 28-1.22 Human made? No Is wetland part of a wildlife corridor? yes or a "habitat island"? _____

Adjacent land use corn fields to west Distance to nearest roadway or other development ~250'
quarry to south
residential to east

Dominant wetland systems present PEM = 70% Contiguous undeveloped buffer zone present yes
PSS = 30%

Is the wetland a separate hydraulic system? yes If not, where does the wetland lie in the drainage basin? N/A

How many tributaries contribute to the wetland? 0 Wildlife & vegetation diversity/abundance (see attached list)

Wetland I.D. 27 and 28

Latitude 41.08522 Longitude -76.141230

Prepared by: LSE Date 12-10-09

Wetland Impact:
Type _____ Area _____

Evaluation based on:
Office _____ Field ☒

Corps manual wetland delineation
completed? Y ☒ N _____

Function/Value	Suitability Y N	Rationale (Reference #)*	Principal Function(s)/Value(s)	Comments
Groundwater Recharge/Discharge	X	2, 3, 7, 8, 10, (14), (16), (19)*		*well exists within wetland *possibly *suitable b/c sandy soils
Floodflow Alteration	X	2, 3, 6, (9)		*possibly *may be occurring but unlikely although there is a we
Fish and Shellfish Habitat	X	11*		*flat, storage potential but overall very small • potential to store overland flow but small (minimal opportunity) *reptiles + amphibians likely (not observed) • not associated with watercourse
Sediment/Toxicant Retention	X	1, 4, 5, 7, 9		
Nutrient Removal	X	3, 4*, 5*, 7*, 8, 9, 10, 11		*corn fields *likely *portions
Production Export	X	1, 2, 4, 5, 7, 8, 12, 16, (18), (20) (21), (22)		*high production but no outlet or opportunity
Sediment/Shoreline Stabilization	X	1, 6, (14), (16), (17), (19)*		• not associated with watercourse or waterbody *minimal gradient
Wildlife Habitat	X	3, 5, 6, 8, 9, 14, 15, 18, 19, 20, 21, 22		• suitable but small overall size limits opportunity (not principal)
Recreation	X	(13), (16), (17)		• not a potential recreation site (restricted access)
Educational/Scientific Value	X	2		
Uniqueness/Heritage	X	15, 17, 23*, (28), (29), (40)		• no primary viewing locations *well is located in wetland
Visual Quality/Aesthetics	X	4, 7, 12, (13), (14)		• no primary viewing locations
ES Endangered Species Habitat	X			
Other				

Notes: - PEM pockets near quarry along Old Berwick Pike adjacent to corn fields
- collect runoff; when overflow occurs, it accesses a grassed swale on adjacent residential lawn
*Refer to backup list of numbered considerations.

BRU, KS, JK, MS, KM

DPZ6 (Normandeau)

Wetland Function-Value Evaluation Form

Total area of wetland _____ Human made? No Is wetland part of a wildlife corridor? yes or a "habitat island"? N/AAdjacent land use Industrial, undeveloped upland woods, Distance to nearest roadway or other development (1500')Dominant wetland systems present PSS Contiguous undeveloped buffer zone present NoIs the wetland a separate hydraulic system? No If not, where does the wetland lie in the drainage basin? middle

How many tributaries contribute to the wetland? _____ Wildlife & vegetation diversity/abundance (see attached list)

(network of seepages at base of willside)Cross-ref. w/ terr. + aquatic reportsWetland I.D. 31 and 32 - Spring Seeps

Latitude _____ Longitude _____

Prepared by: LSE Date 11-17-09Wetland Impact:
Type N/A Area N/A

Evaluation based on:

Office _____ Field ✓Corps manual wetland delineation completed? Y ✓ N _____No
No

Function/Value	Suitability Y N	Rationale (Reference #)*	Principal Function(s)/Value(s)	Comments
Groundwater Recharge/Discharge	X	4, 7, 9, (14), (17), (18), (20)	X	
Floodflow Alteration	X	1, 2, 3, 4, 5, 6, 7 4, 6, 14, 19, (20), (21), (23), (24) - + - + + + + +	X	stronger no occurrence qualifiers
Fish and Shellfish Habitat	X	9, 10, 11, 16, 19, 23, 24, 25, 26		not principal - provides minimal stream habitat (diversity such as riffle-pool sequence)
Sediment/Toxicant Retention	X	4, 8, 9, 10, 13, 14, 15, 19 (21), (22), (23)		suitable but occurs at minimal level (based on size of wetland at higher gradient)
Nutrient Removal	X	5, 8, 9, 10, 11, 12, 14 (18), (19), (20)		"
Production Export	X	1, 2, 3, 4, 5, 7, 10, 12, 13, 16, 17, (21), (22)		highly suitable
Sediment/Shoreline Stabilization	X	1, 3, 4, 6*, 9, 10, 12 (16), (19)		*see notes
Wildlife Habitat	X	1, 4, 6, 7, 8, 9, 11, 14, 16, 17, 18, 19, 20, 21, 22, 23	X	*see fauna report (26), (28)* only in channelized portion (20)
Recreation	X	5, 6, 7, (13), (15), (16), (17)		private property, not open to public
Educational/Scientific Value	X	2, 4, 5		non-accessible area, privately-owned
Uniqueness/Heritage	X	7, 18, 22, 23, 27, 32, (30), (39), (40)		
Visual Quality/Aesthetics	X	7, 8, 11, (13)		
ES Endangered Species Habitat	X			refer to Federally/state listed documents
Other				

Notes:

* Refer to backup list of numbered considerations.

BU, JK, KE, MS, KM

DP 22 (Normandeau)

Wetland Function-Value Evaluation Form

Total area of wetland 3.20 Human made? No Is wetland part of a wildlife corridor? Yes or a "habitat island"? N/AAdjacent land use fallow fields (south), active farmland (west) Distance to nearest roadway or other development ~500'

Forested (north) power plant to north east

Dominant wetland systems present PFO Contiguous undeveloped buffer zone present YesIs the wetland a separate hydraulic system? No If not, where does the wetland lie in the drainage basin? middleHow many tributaries contribute to the wetland? N/A Wildlife & vegetation diversity/abundance (see attached list)
over land flow, refer to habitat reportsWetland I.D. 32
Latitude _____ Longitude _____
Prepared by: LSI Date 11-17-09
Wetland Impact:
Type PFO Area 3.20 ? (TBD)Evaluation based on:
Office _____ Field ☒
Corps manual wetland delineation
completed? Y ☒ N _____

Function/Value	Suitability Y N	Rationale (Reference #)*	Principal Function(s)/Value(s)	Comments
Groundwater Recharge/Discharge	<input checked="" type="checkbox"/>	2, 3, 7, 8, 9, 12, 16	* 712" ; suitable but not principal	
Floodflow Alteration	<input checked="" type="checkbox"/>	2, 4, 6, 7, 9, 10, 11, 14, 19	* see notes	
Fish and Shellfish Habitat	<input checked="" type="checkbox"/>	1, 2, 4, 6, 7, 10, 11, 14, 19	* = marginal (could be effective but no opportunity)	
Sediment/Toxicant Retention	<input checked="" type="checkbox"/>	16, 18, 19, 23, 24, 25, 26	13 = none of above * = contributes food to watercourse	
Nutrient Removal	<input checked="" type="checkbox"/>	1, 4, 7, 8, 9, 10, 13, 16, 17, 19, 24	* no defined outlet	
Production Export	<input checked="" type="checkbox"/>	3, 4, 8, 9, 10, 11, 14	Very minimal suitability	
Sediment/Shoreline Stabilization	<input checked="" type="checkbox"/>	1, 2, 3, 4, 5, 7, 8, 12, 13, 16, 18, 21, 22	20 - no defined outlet (need explanation)	
Wildlife Habitat	<input checked="" type="checkbox"/>	1, 4, 6, 9, 11, 13, 14, 15	some suitability	
Recreation	<input checked="" type="checkbox"/>	1, 3, 5, 6, 7, 8, 9, 14, 16, 17, 18, 19, 20, 21, 22, 23, 27	* limited diversity	
Educational/Scientific Value	<input checked="" type="checkbox"/>	5, 6, 13, 17	very minimal suitability	
Uniqueness/Heritage	<input checked="" type="checkbox"/>	2, 5	* see notes	
Visual Quality/Aesthetics	<input checked="" type="checkbox"/>	7, 15, 17, 22, 32, 39, 40	very minimal suitability (does not function at high level)	
ES Endangered Species Habitat	<input checked="" type="checkbox"/>	4, 8, 13, 14	* see sheet #1	
Other			* refer to fauna report (?)	

Notes: (#) indicates "no occurrence"

* Refer to backup list of numbered considerations.

B.U + K.S.

DP SS 2 (B) > Normandeau
DP MM 2 (E)

Wetland Function-Value Evaluation Form

Total area of wetland 3,060 Human made? Yes Is wetland part of a wildlife corridor? Yes or a "habitat island"? _____Adjacent land use Lake Trout Aquaria to east
Intake facility to south Distance to nearest roadway or other development ~ 0 ftDominant wetland systems present PEM 10% PSS 30% PFO 60% Contiguous undeveloped buffer zone present YesIs the wetland a separate hydraulic system? No If not, where does the wetland lie in the drainage basin? it is basinHow many tributaries contribute to the wetland? 0 Wildlife & vegetation diversity/abundance (see attached list)Wetland I.D. 34-36, 40-42
Latitude 41.08962 Longitude -76.134313Prepared by: LST Date 12-5-09Wetland Impact:
Type N/A Area _____

Evaluation based on:

Office _____ Field ☒Corps manual wetland delineation
completed? Y ☒ N _____

Function/Value	Suitability Y N	Rationale (Reference #)*	Principal Function(s)/Value(s)	Comments
Groundwater Recharge/Discharge	X	2*, 3, 12* (14) (16) (17) (18) (20)	*certain portions, *some areas (C, D, E)	
Floodflow Alteration	X	1, 2, 3, 4, 6, 7, 9* 3, 6*, 7, 8*, 9, 14*, 19 (20) (21) (23)	*some areas *not high infiltration *just ponded water *just C, D, E	
Fish and Shellfish Habitat	X	(2, 3, 4, 5, 6) 10, 11, (16*, 19, 20, 21, 23, 24*, 25, 26)	(ponded areas only) *just C, D, E? unsure (applies only to C, D, E) - marginally suitable only for C, D, E.	
Sediment/Toxicant Retention	X-	4, 5, 7*, 10*, 12*, 13, 14, (21)	*some locations *just C, D, E *only at ponded areas - suitable but no opportunity	
Nutrient Removal	X-	1, 2*, 5, 7, 8, 9, 11, 12, 13, 14 (19) (20)	*some areas - suitable but no opportunity	
Production Export	X-	1, 2, 4, 5, 6, 7, 8, 12, 16, 17* (20) (21)	*only near ponded areas - suitable but no or little opportunity	
Sediment/Shoreline Stabilization	X	4, 6, 9, 10, (15) (16) (17) (19)		
Wildlife Habitat	X	1, 3, 5, 6, 7, 8, 9, 10, 11, 12* 14, 15, 16, 18, 19, 20, 21, 22, 24	X *some locations near ponded areas	
Recreation	X	1, 2*, 4, 5, 6, 7*, 8*, 10, 11, 12	X *only A *only A and fishing	
Educational/Scientific Value	X	2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16	X	
Uniqueness/Heritage	X	4, 5*, 6*, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 19, 22, 27, 32, 33, 34 (35) (36) (37)	X *some areas near ponding *some areas near ponding	
Visual Quality/Aesthetics	X	1, 2, 3, 4, 5, 7, 8, 9, 10, 11, 12	X	
ES Endangered Species Habitat	X			
Other				- presence of invasives is a negative (multiflora rose, cottails, purple loosestrife)

Notes: - wetland areas broken down into A, B, C, D, E

- all northeast of access road

* Refer to backup list of numbered considerations.

34-36, 40-42

- rain night before
B.U. & K.S.

DPFF1 (drier) > Normandeau
DPFF2 (wetter)

Wetland Function-Value Evaluation Form

Total area of wetland 4.64 Human made? yes? Is wetland part of a wildlife corridor? yes or a "habitat island"? _____

Adjacent land use intake infrastructure (east)
PFO wetlands (west) Distance to nearest roadway or other development 30'
river (south)

Dominant wetland systems present PEM 90% Contiguous undeveloped buffer zone present yes (west)
PFO/PSS 10% no (east)

Is the wetland a separate hydraulic system? yes If not, where does the wetland lie in the drainage basin? _____

How many tributaries contribute to the wetland? 1 Wildlife & vegetation diversity/abundance (see attached list)

Wetland I.D. 37, 38, 43

Latitude 41.08715 Longitude -76.133299

Prepared by: LSI Date 12-3-09

Wetland Impact:
Type PEM Area _____

Evaluation based on:

Office _____ Field ☒

Corps manual wetland delineation
completed? Y ☒ N _____

Function/Value	Suitability Y N	Rationale (Reference #)*	Principal Function(s)/Value(s)	Comments
Groundwater Recharge/Discharge	<input checked="" type="checkbox"/>	1, 2, 3, 12, (4)*, (5)+, (6), (8)*	* except for pond * fringe * by pond only	
Floodflow Alteration	<input checked="" type="checkbox"/>	2, 3, 4, 6, (9), (10) 1, 2, 3, 4, 6*, 7, 8*, 14, 16, 19, (22)*, (23)	* only by pond * only by pond * except by pond * not a high infiltration rate - upper 6" max * only by pond * not serious but does have woody vegetation	
Fish and Shellfish Habitat	<input checked="" type="checkbox"/>	(2, 3, 4, 5, 6), 10, 11, 15, 18, 19 21, 22, 25, 26	(pond area only) very marginally suitable (size is limiting factor)	
Sediment/Toxicant Retention	<input checked="" type="checkbox"/>	4, 5*, 7, 9, 10, 15*, 17, 19	no source of sediment * seasonally affected * by pond area only * some portions especially by pond - no opportunity	
Nutrient Removal	<input checked="" type="checkbox"/>	1, 2, 5*, 7, 8, 9, 11 (17)*, (19)+	* only at pond * only at pond * likely that site was altered (fill) - no opportunity	
Production Export	<input checked="" type="checkbox"/>	1, 2, 4, 5, 6*, 7, 10*, 12, 16, (18), (20), (21)	* maybe in pond * very minimal	
Sediment/Shoreline Stabilization	<input checked="" type="checkbox"/>	4, 9, 10, 11, 12, (13)*, (14), (15) (17), (19)*	* watercourse only (appears to be done down channel) * subtle changes in microtopography	
Wildlife Habitat	<input checked="" type="checkbox"/>	2, 3, 7, 8, 9, 14, 18, 19, 20, 21, 22, (30)*	* check * only to east (pump station)	
Recreation	<input checked="" type="checkbox"/>	1, 4, 6, 7*, 10, 11, 12, (17)	* yes but no invasive spp. marginally suitable	
Educational/Scientific Value	<input checked="" type="checkbox"/>	2, 3, 6, 8, 9, 10, 11, 12, 13, 14, 15, 16	* not as suitable as other wetlands sites	
Uniqueness/Heritage	<input checked="" type="checkbox"/>	6*, 7, 8, 9, 10, 11, 12, 13, 15, 16, 17, 19, 21*, 22, 33, 35, (38), (39)	* only by pond * only pond	
Visual Quality/Aesthetics	<input checked="" type="checkbox"/>	1, 2, 4, 7, 9, 10, 11, 12	* presence of purple loosestrife	
ES Endangered Species Habitat	<input checked="" type="checkbox"/>			
Other				- presence of invasive spp. is a negative

Notes:

* Refer to backup list of numbered considerations.

Not suitable

BU. + K.S.

DPKK2 (PEM)
DPKK3 (PFO) > Normandean

Wetland Function-Value Evaluation Form

Total area of wetland 4.07 Human made? No Is wetland part of a wildlife corridor? yes or a "habitat island"?Adjacent land use upland meadow to south (fill material)
past PEM wetlands to west
PFO + forested uplands to north Distance to nearest roadway or other development ~10 ftDominant wetland systems present PFO = 90%
PEM = 10% Contiguous undeveloped buffer zone present yesIs the wetland a separate hydraulic system? No If not, where does the wetland lie in the drainage basin? lowerHow many tributaries contribute to the wetland? 0 Wildlife & vegetation diversity/abundance (see attached list)Wetland I.D. 44
Latitude 41.08609 Longitude -76.133349
Prepared by: LSE Date 12-3-09
Wetland Impact:
Type N/A Area _____
Evaluation based on:
Office _____ Field ☒
Corps manual wetland delineation
completed? Y ☒ N _____

Function/Value	Suitability Y N	Rationale (Reference #)*	Principal Function(s)/Value(s)	Comments
Groundwater Recharge/Discharge	<input checked="" type="checkbox"/>	3, 12, 14, 15, 16, 17, 18, 20		*portions near stream *some fringe? undetermined
Floodflow Alteration	<input checked="" type="checkbox"/>	1, 2, 4, 6, 7, 9, 10		? undetermined
Fish and Shellfish Habitat	<input checked="" type="checkbox"/>	2, 3, 6, 7, 8, 9, 10, 14, 19, 21		*not necessarily high infiltration rate *only during very large events *minimal
Sediment/Toxicant Retention	<input checked="" type="checkbox"/>	1, 2, 3, 6, 7, 10, 11, 12, 13, 16, 18, 19, 21, 23, 25, 26		(canal only) → JULY 2010 VISIT - No flow canal + stream may be suitable, not wetland
Nutrient Removal	<input checked="" type="checkbox"/>	2, 4, 5, 7, 8, 9, 10, 11, 12, 13, 14, 15, 19, 22		*canal *canal *very small portions suitable but no opportunity > No Source
Production Export	<input checked="" type="checkbox"/>	1, 2, 3, 4, 5, 6, 7, 8, 12, 16, 17, 20, 21		*canal suitable but no opportunity
Sediment/Shoreline Stabilization	<input checked="" type="checkbox"/>	4, 6, 9, 10, 11, 12, 15, 16, 17, 19		*small pockets (watercourse only) *watercourse *microtopography
Wildlife Habitat	<input checked="" type="checkbox"/>	1, 2, 3, 5, 6, 7, 8, 9, 10, 12, 14, 15, 16, 18, 19, 20, 21, 22, 24		- red squirrel - deer signs - grouse - many birds
Recreation	<input checked="" type="checkbox"/>	1, 4, 5, 6, 7, 10, 11, 12, 17		
Educational/Scientific Value	<input checked="" type="checkbox"/>	2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16		
Uniqueness/Heritage	<input checked="" type="checkbox"/>	4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 19, 22, 23, 27, 32, 33, 34, 35, 36		*canal
Visual Quality/Aesthetics	<input checked="" type="checkbox"/>	1, 2, 3, 4, 5, 7, 8, 9, 10, 11		- some invasives (phragmites, purple loosestrife, cattails)
ES Endangered Species Habitat	<input checked="" type="checkbox"/>			
Other				

Notes: All Riverlands west of access road (except for site # 8) and trib. that originates at canal dam *Refer to backup list of numbered considerations.

44, 44!

MS, KH

DPXXI, DPXX2-Normandean

Wetland Function-Value Evaluation Form

Total area of wetland 1.85 Yes-old canal Area NO-Rest Human made? ↑ Is wetland part of a wildlife corridor? Yes or a "habitat island"? NO

Adjacent land use Farmland, Riverland Park Distance to nearest roadway or other development 200yds.

Dominant wetland systems present PFO Contiguous undeveloped buffer zone present yes

Is the wetland a separate hydraulic system? old canal - NO Other Areas Yes If not, where does the wetland lie in the drainage basin? _____

How many tributaries contribute to the wetland? 1 Wildlife & vegetation diversity/abundance (see attached list)

Wetland I.D. 45-48

Latitude 41.08619 Longitude -76.133349

Prepared by: MS Date 12-10-09

Wetland Impact:
Type _____ Area _____

Evaluation based on:
Office _____ Field X

Corps manual wetland delineation completed? Y X N _____

Function/Value	Suitability		Rationale (Reference #)*	Principal Function(s)/Value(s)	Comments
	Y	N			
Groundwater Recharge/Discharge	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	See Attached Sheet		
Floodflow Alteration	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	2, 3A, 4A, 9, 18, 2, 4, 6, 7, 8, 10, 11A, 14A, 16A, 19, 20, 23, 25, 26A, 28B	8-minimally,	
Fish and Shellfish Habitat	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	1A, 2, 3A, 6, 10A, 11, 16, 19A, 19, 20, 23, 25, 26A, 28B	11-see report	Suitability for old canal area
Sediment/Toxicant Retention	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	1, 2, 4, 5B, 7, 8, 9, 10A, 12A, 13, 16, 17B, 18A, 19, 22A		
Nutrient Removal	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	3, 4, 5A, 6A, 7, 8, 10, 11, 13A, 14B	7* see survey	
Production Export	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	1, 2, 3, 4, 5, 6, 7, 8, 10A, 12, 13A, 16, 20, 21, 22	6* minimal, 8-yes for structure,	
Sediment/Shoreline Stabilization	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	1, 2A, 3, 4, 5, 6, 9, 10, 11, 12, 13, 14B, 15, 16		
Wildlife Habitat	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	1, 3, 6, 7, 8, 9, 10, 14, 16, 17, 19, 20, 21, 22, 24, 27	17* see report	
Recreation	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	1, 4, 5, 6, 10, 11, 12, 13, 16		
Educational/Scientific Value	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15		
Uniqueness/Heritage	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	7, 8, 9, 10, 11, 15, 16, 19, 22, 27, 28, 32, 33, 34, 35, 38, 39, 40		
Visual Quality/Aesthetics	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	4, 5, 6, 7, 8, 9A, 10, 11, 14		
ES Endangered Species Habitat	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		*see report 34	
Other					

Notes:

* Refer to backup list of numbered considerations.

45-48

Wetland Function-Value Evaluation Form

Total area of wetland _____ Human made? Y Is wetland part of a wildlife corridor? N or a "habitat island"? Y

Adjacent land use _____ Distance to nearest roadway or other development 0-20 ft

Dominant wetland systems present PEM Contiguous undeveloped buffer zone present No

Is the wetland a separate hydraulic system? No? If not, where does the wetland lie in the drainage basin? Top

How many tributaries contribute to the wetland? 0 Wildlife & vegetation diversity/abundance (see attached list)

Wetland I.D. 49A-C

Latitude _____ Longitude _____

Prepared by: _____ Date _____














Wetland Impact:

Type _____ Area _____

Evaluation based on:

Office _____ Field _____

Corps manual wetland delineation completed? Y _____ N _____

Function/Value	Suitability Y N	Rationale (Reference #)*	Principal Function(s)/Value(s)	Comments
 Groundwater Recharge/Discharge	<input checked="" type="checkbox"/>	2, 4, 7, (14), (15), (17)	7-fill	
 Floodflow Alteration		4?, 5, 10, 16,	5- SSES, 16-pipes - constricted outlet	unique situation - not a natural area, 49C has most floodflow
 Fish and Shellfish Habitat	<input checked="" type="checkbox"/>	(28)	not permanently flooded, no open water	alt. potential b/c it is a basin
 Sediment/Toxicant Retention	<input checked="" type="checkbox"/>	1, (25)	gravelly/silty substrates - fill	49C most potential
 Nutrient Removal	<input checked="" type="checkbox"/>	8, 9, 13?, (17), (19)	49C most potential	
 Production Export	<input checked="" type="checkbox"/>	1, 7, 10	-10-pipes to channel, minimal	any qualifying criteria not as were minimal
 Sediment/Shoreline Stabilization	<input checked="" type="checkbox"/>	5 12	-flushing occurs, not a lot of plant material	49C-rip rap banks, No erosion 49A, 49B flowing to only during events
 Wildlife Habitat	<input checked="" type="checkbox"/>	7, 8, 9,	7-minimal, pipe under road to WC which flows to SW pond	any as are minimally applicable
 Recreation	<input checked="" type="checkbox"/>			
 Educational/Scientific Value	<input checked="" type="checkbox"/>			
 Uniqueness/Heritage	<input checked="" type="checkbox"/>			
 Visual Quality/Aesthetics	<input checked="" type="checkbox"/>			
 ES Endangered Species Habitat	<input checked="" type="checkbox"/>			
Other				

Notes:

* Refer to backup list of numbered considerations.

49A, 49B, 49C

BRU

low 30's, overcast, windy

see LSI wet del. report

#21

Wetland Function-Value Evaluation Form

Total area of wetland _____ Human made? No Is wetland part of a wildlife corridor? Yes or a "habitat island"? _____

Adjacent land use agricultural to north + south Distance to nearest roadway or other development (beaver)

Dominant wetland systems present PEM = 70% PFO = 30% Contiguous undeveloped buffer zone present Yes

Is the wetland a separate hydraulic system? No If not, where does the wetland lie in the drainage basin? middle

How many tributaries contribute to the wetland? 1 Wildlife & vegetation diversity/abundance (see attached list)

Wetland I.D. New ST 56-61

Latitude _____ Longitude _____

Prepared by: LSF Date 12-10-09

Wetland Impact:
Type _____ Area _____

Evaluation based on:
Office _____ Field ☒

Corps manual wetland delineation completed? Y ☒ N _____

Function/Value	Suitability Y N	Rationale (Reference #)*	Principal Function(s)/Value(s)	Comments
Groundwater Recharge/Discharge	X	2, 3, 8, (14), (16), (17), (18), (20)	*except for ow pocket in woods *Ginge	
Floodflow Alteration	X	2, 3, 4, 5*, 6, 7, (9)	*likely *except for ow pocket in woods	
Fish and Shellfish Habitat	X	2*, 6, 7, 9*, 10, 11, 14, 15*, (9*) (21) (23)	*except for ow pocket in woods *only flood events that access flood plain	
Sediment/Toxicant Retention	X	10, 11, 12, 15*, 16, 18, 19, 21 23 25 26 (28)	*fairly serious *portions *minimally suitable - little opportunity (incision)	
Nutrient Removal	X	1, 4, 5*, 7, 8, 10, 13*, 19, (21)	*only in ow pocket + a few locations in the channel (burreed)	
Production Export	X	3*, 4, 5*, 7, 8, 9, 11, 12*, 13*	*minimal surface water	
Sediment/Shoreline Stabilization	X	1, 2, 3*, 6, 9, 10, 12, (3*) (5)	*portions, *high vertical banks existing water run	
Wildlife Habitat	X	1, 3, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 18, 19, 20, 21, 22	- minimal suitability - little opportunity	
Recreation	X	6, (13), (16)	*very minimal *portions *portions *during very high flows	
Educational/Scientific Value	X	2	- suitable but little opportunity	
Uniqueness/Heritage	X	7, 12, 14, 15, 16, 17, 18*, 19, 22, 23*, (30) (31) (40)	*except for ow pocket in woods	
Visual Quality/Aesthetics	X	3, 4, 5, 7, 10, 11, 12, (14)*	*suitable especially during large flow events	
Endangered Species Habitat	X		*portions	
Other			- minimal suitability	

Notes: Wetland areas on existing farm downstream of beaver dam and surrounded by Market Road
- Mostly PEM w/ a pocket of PFO (permanently flooded)
- watercourse is slightly incised so floodplain is disconnected

* Refer to backup list of numbered considerations.
- undersized bridge culvert serves as a restricted outlet during high flows
- spring seeps along base of hillsides

Wetland Function-Value Evaluation Form

Total area of wetland _____ Human made? No Is wetland part of a wildlife corridor? yes or a "habitat island"? _____

Adjacent land use upland forest / RR track / access Distance to nearest roadway or other development 0'

road and additional forested wetland

Dominant wetland systems present PFO Contiguous undeveloped buffer zone present yes w/ "small" breaks

Is the wetland a separate hydraulic system? No If not, where does the wetland lie in the drainage basin? lower

How many tributaries contribute to the wetland? 0 Wildlife & vegetation diversity/abundance (see attached list)

Wetland I.D. NRW 50-68

Latitude 41.08633 Longitude -76.134764

Prepared by: KS Date 9/9/10

Wetland Impact:

Type _____ Area _____

Evaluation based on:

Office _____ Field ✓

Corps manual wetland delineation

completed? Y ✓ N _____

Function/Value	Suitability Y N	Rationale (Reference #)*	Principal Function(s)/Value(s)	Comments
Groundwater Recharge/Discharge	X	2, 3, 4, 8, 13		4 - minimal, slow infiltration rates, constricted outlet more well drained than wetland 44, 13 - water marks
Floodflow Alteration		1, 2, 6, 8, 10, 7		2 - retains water, 7 - flat w/ barriers / constricted outlet - does not contain dense vegetation, small watershed
Fish and Shellfish Habitat		X		No perennial watercourse
Sediment/Toxicant Retention	X	4, 5, 12, 13, 14,		5 - seasonal, 12 - seasonal, not dense vegetation - few deposits
Nutrient Removal	X	4, 7, 11, 13, 14, 19		constricted outlet, little sed. entering wetland - minimal suitability
Production Export		1, 2, 3, 4, 5, 12, (18), (19), 21, 22		2 - seasonal, 3 - minimal, 4 - minimal 19 - few sources 3 - timber
Sediment/Shoreline Stabilization		X		No watercourse
Wildlife Habitat	X	1, 2, 3, 5, 8, 9, 10, 21, 27	X	5 - majority, 10 - seasonal
Recreation	X	1, 4, 7, 10, 11, 12, (17)	X	
Educational/Scientific Value	X	3, 4, 6, 8, 9, 10, 13, 14, 15, 16	X	3 - if you include adjacent wetland areas
Uniqueness/Heritage	X	8, 9, 10, 16, 17, 19, 33, 35		part of large, important wetland complex w/ public access
Visual Quality/Aesthetics	X	5, 7, 9, 10, 11, 12		
ES Endangered Species Habitat		X		
Other				

Notes:

* Refer to backup list of numbered considerations.

West of Market St

Wetland Function-Value Evaluation Form

Total area of wetland _____ Human made? N Is wetland part of a wildlife corridor? Y or a "habitat island"? _____Adjacent land use residential market St Distance to nearest roadway or other development 10 ftDominant wetland systems present _____ Contiguous undeveloped buffer zone present No - market StIs the wetland a separate hydraulic system? N If not, where does the wetland lie in the drainage basin? middleHow many tributaries contribute to the wetland? 1 trib Wildlife & vegetation diversity/abundance (see attached list)

+WR













Wetland I.D. New 52 53Latitude 41.08406 Longitude -76.171676Prepared by: KS Date 9-9-10

Wetland Impact:

Type _____ Area _____

Evaluation based on:

Office _____ Field ✓Corps manual wetland delineation completed? Y ✓ N _____

Function/Value	Suitability Y N	Rationale (Reference #)*	Principal Function(s)/Value(s)	Comments
 Groundwater Recharge/Discharge	<u>X</u>	<u>2, 3, 7, 8, 12, 13, 17, 20</u>	<u>Sandy</u>	
 Floodflow Alteration	<u>X-</u>	<u>2, 4, 6, 7, 8, 10, 14, 15, 17, 19, 21, 23</u>	<u>ponded water likely during wet conditions</u>	
Fish and Shellfish Habitat	<u>X</u>	<u>1, 2, 3, 4, 6, 10, 11, 16, 18, 19, 20, 21, 23, 24, 25, 26</u>	<u>3- watercourse</u>	
 Sediment/Toxicant Retention	<u>X-</u>	<u>7, 8, 9, 12, 16, 19, 21</u>	<u>minimal sed. source, could impound water, stream erosion</u>	
 Nutrient Removal	<u>X-</u>	<u>8, 9, 10, 11, 12, 19</u>	<u>minimal nutrient source if it had flow</u>	
 Production Export	<u>X</u>	<u>1, 2, 3, 4, 5, 10, 7, 8, 10, 11, 12, 13, 14, 16, 17</u>	<u>15?</u>	
 Sediment/Shoreline Stabilization	<u>X</u>	<u>2, 4, 6, 9, 11, 13, 15</u>		
 Wildlife Habitat	<u>X</u>	<u>3, 5, 6, 7, 8, 9, 14, 15, 16, 18, 19, 20, 21, 25, 26, 27, 30</u>	<u>5- house / road</u>	<u>minimal development</u>
 Recreation	<u>X</u>			
 Educational/Scientific Value	<u>X</u>			
 Uniqueness/Heritage	<u>X</u>			
 Visual Quality/Aesthetics	<u>X</u>			
 ES Endangered Species Habitat	<u>X</u>			
Other				

Notes:

* Refer to backup list of numbered considerations.