

DEPT DEP
RECEIVED
FEB 08 2016



PennEast

PennEast Pipeline Company, LLC

PENNEAST PIPELINE PROJECT

Wetland Delineation Report – Pennsylvania

February 3, 2016

Contents

Section	Page
1.0 INTRODUCTION	1-1
1.1 Background.....	1-1
1.2 Methodology.....	1-3
1.2.1 Methodology – Wetlands	1-3
1.2.2 Methodology – Waterbodies	1-5
1.3 Results - Wetlands	1-5
1.3.1 Wetlands – Luzerne County, Pennsylvania.....	1-6
1.3.2 Wetlands – Carbon County, Pennsylvania	1-6
1.3.3 Wetlands – Northampton County, Pennsylvania	1-7
1.3.4 Wetlands – Bucks County, Pennsylvania.....	1-8
1.4 Results – Waterbodies	1-8
1.5 Summary.....	1-9
1.6 Statement of Limitations.....	1-9
1.7 References.....	1-10

Tables

Table 1.3-1 Summary of Field Identified Wetlands Within Pennsylvania	I-1
Table 1.4-1 Summary of Field Identified Waterbodies Within Pennsylvania	I-1

Appendices

Appendix A Figures

Figure 1	Project Location Map
Figure 2	Wetland Delineation Map Index Sheets
Figure 3	Wetland Delineation Maps
Figure 4	USGS Quadrangle Maps

Appendix B Tables

Table B-1	Field Identified Waterbodies - Pennsylvania
Table B-2	Study Area Soils - Pennsylvania
Table B-3	Field Identified Wetlands - Pennsylvania

Appendix C Wetland Data Forms

C-1	Wetland Data Forms – Luzerne County
C-2	Wetland Data Forms – Carbon County
C-3	Wetland Data Forms – Northampton County
C-4	Wetland Data Forms – Bucks County

Appendix D Waterbody Data Forms

D-1	Waterbody Data Forms – Luzerne County
-----	---------------------------------------

- D-2 Waterbody Data Forms – Carbon County
- D-3 Waterbody Data Forms – Northampton County
- D-4 Waterbody Data Forms – Bucks County
- Appendix E Resource Photographs
 - E-1 Resource Photographs – Luzerne County
 - E-2 Resource Photographs – Carbon County
 - E-3 Resource Photographs – Northampton County
 - E-4 Resource Photographs – Bucks County

1.0 INTRODUCTION

This Wetland Delineation Report has been prepared as part of the environmental investigation conducted for the PennEast Pipeline Company, LLC's (PennEast's) PennEast Pipeline Project (Project). PennEast has filed an application for a Certificate of Public Convenience and Necessity to the Federal Energy Regulatory Commission's (FERC's) Office of Energy Projects for authorization of the proposed development of the Project.

The Project consists of the following primary components:

- 114.6-miles of new 36-inch diameter mainline pipeline extending from Dallas Township in Luzerne County, Pennsylvania to Hopewell Township in Mercer County, New Jersey;
- 2.1-miles of new 24-inch diameter lateral near Hellertown, Northampton County, Pennsylvania to transport gas to an interconnection with Columbia Gas Transmission, LLC (Columbia Gas) and UGI Utilities, Inc. (UGI Utilities);
- 1.4-miles of new 36-inch diameter lateral in West Amwell Township, Hunterdon County, New Jersey to transport gas to an interconnection with Algonquin Gas Transmission, LLC (Algonquin) and Texas Eastern Transmission, LP (Texas Eastern);
- One new compressor station in Kidder Township, Carbon County, Pennsylvania; and
- Various associated aboveground facilities including interconnects, meter stations, launchers, receivers, mainline block valves and appurtenances to support the pipeline system.

The purpose of the wetland and waterbody delineation effort was to identify potentially regulated wetlands and waterbodies within the Project area to aid in Project design in avoiding and minimizing disturbances to potentially regulated resources. Construction of the Project will result in activities that have the potential to impact regulated waters, including wetlands, of the Commonwealth of Pennsylvania, State of New Jersey, and the United States. The limit of the environmental investigation is defined by the Study Area. The Study Area encompasses the approximately 114.6-mile-long pipeline right-of-way (ROW), including an approximately 200-foot-wide buffer on both sides of the centerline. Two lateral pipelines are also proposed as part of the Project including the Hellertown Lateral, measuring approximately 2.1-miles in length; and the Lambertville Lateral, measuring approximately 1.4-miles in length. One new compressor station, multiple access roads and various associated aboveground facilities, including interconnects, launchers, receivers, and mainline block valves, are included in the Project.

The Project is located in Dallas, Kingston, West Wyoming, Jenkins, Plains, and Bear Creek Townships, and Wyoming and Laflin Boroughs, Luzerne County; Kidder, Penn Forest, Towamensing, and Lower Towamensing Townships, Carbon County; Lehigh, Moore, East Allen, Upper Nazareth, Lower Nazareth, Bethlehem, Lower Saucon, and Williams Townships, and City of Easton, Northampton County; and Durham Township, and Riegelsville Borough, Bucks County, Pennsylvania (reference Figure 1 in Appendix A). Within New Jersey, the Project is located in Holland, Alexandria, Kingwood, Delaware, and West Amwell Townships, Hunterdon County, and Hopewell Township, Mercer County. The results of the wetland and waterbody delineation effort for Project locations in New Jersey can be found in a separate report entitled, PennEast Pipeline Project Wetland Delineation Report – New Jersey.

The Study Area limits are shown in the figures in Appendix A. The coordinates for the approximate north end of the Project are 41° 20' 45.40" N and 75° 56' 44.83" W, and the coordinates for the approximate south end of the Project are 40° 18' 57.50" N and 74° 46' 8.86" W. This Wetland Delineation Report contains the methodology and results of the wetland and waterbody investigations performed in Pennsylvania.

1.1 Background

The Project is located within the United States Geological Survey (USGS) Kingston, Pittston, Wilkes-Barre East, Pleasant View Summit, Hickory Run, Blakeslee, Pohopoco Mountain, Christmans, Palmerton,

Kunkletown, Catasauqua, Nazareth, Hellertown, and Riegelsville, Pennsylvania 7.5-minute series topographical quadrangles (National Geographic Society, 2013).

The landscape of the Study Area is predominately comprised of forest/woodland including upland and wetland forest or woodland, comprising approximately 53% of the land use types. Other land uses within the Project area include agricultural (38%) consisting of active cropland, pasture, orchards, vineyards, and/or hay fields; open land (8%) comprised of non-forested lands, herbaceous and scrub-shrub wetlands and maintained utility ROW; and industrial/commercial (1%) including electric power or gas utility stations, manufacturing or industrial plants, landfills, mines, quarries, commercial or retail facilities, and roads.

The Project is located within the Upper Susquehanna River, Upper Lehigh River, Middle Lehigh River, Pohopoco Creek, Aquashicola Creek, Lower Lehigh River, Bushkill Creek-Delaware River, Upper Delaware River and Lower Delaware River watersheds (10-digit Hydrologic Unit Code [HUC]).

Within the Study Area, the following waterbodies have Pennsylvania Code, Title 25, Chapter 93 designated protected aquatic life uses of *Cold Water Fishes (CWF)*: Trout Brook and its unnamed tributaries (UNT), UNT to Toby Creek, Abrahams Creek and its UNT, UNT to Susquehanna River, Gardner Creek, Mill Creek and its UNT, Deep Creek and its UNT, White Oak Run and its UNT, Wild Creek/Beltzville Lake and its UNT, Pohopoco Creek, Buckwha Creek and its UNT, Indian Creek, Hokendauqua Creek and its UNT, UNT to Lehigh Coal and Navigation Canal, UNT to Lehigh River, and Bull Run and its UNT. The following waterbodies have designated protected aquatic life uses of *High Quality (HQ)- CWF*: Bear Creek and its UNT, Meadow Run, Little Shades Creek, Shades Creek and its UNT, Stony Run and its UNT, portions of Lehigh River in Luzerne and Carbon Counties, UNT to Black Creek, Mud Run and its UNT, UNT to Hunter Creek, Aquashicola Creek, Monocacy Creek and its UNT, East Branch Monocacy Creek and its UNT, and Frya Run and its UNT. Susquehanna River, portions of Lehigh River in Northampton County, and Delaware River have designated protected aquatic life uses of *Warm Water Fishes (WWF)*. Stony Run, Wild Creek, and UNT to Cooks Creek have designated protected aquatic life uses of *Exceptional Value (EV)* (Commonwealth of Pennsylvania, 2009a). UNT to White Oak Run and UNT to Hunter Creek are both listed by the Pennsylvania Department of Environmental Protection (PADEP) as having an Existing Use Classification that differs from their designated use (PADEP, 2014a). Table B-1 lists each of the waterbodies within the Study Area, along with their existing and designated use classification.

Buckwha Creek, Aquashicola Creek, Indian Creek, Hokendauqua Creek, and UNT to Monocacy Creek are listed by the Pennsylvania Fish and Boat Commission (PFBC) as Approved Trout Waters (PFBC, 2015a). The PFBC lists the following waterbodies as Wild Trout Waters: UNT to Abrahams Creek, Little Shades Creek, Shades Creek and its UNT, portions of Lehigh River in Luzerne and Carbon Counties, UNT to Black Creek, Mud Run and its UNT, Stony Creek, Wild Creek, White Oak Run, Wild Creek/Beltzville Lake, Pohopoco Creek, Buckwha Creek, Aquashicola Creek, Indian Creek, Hokendauqua Creek, UNT to Monocacy Creek, East Branch Monocacy Creek, UNT to Bull Run, and UNT to Cooks Creek (PFBC, 2015b, 2015c, 2015d). Wild Trout Waters may include Wild Trout Waters-Natural Reproduction, Wild Trout Waters, or Class A Wild Trout Streams. Wild Trout Waters-Natural Reproduction stream sections support naturally reproducing populations of trout, but may also be stocked with hatchery trout by PFBC. Wild Trout Waters stream sections are based upon the provision of a wild trout fishing experience in a remote, natural, and unspoiled environment where man's disruptive activities are minimized. Class A Wild Trout Streams stream sections support a population of naturally produced trout of sufficient size and abundance to support a long-term and rewarding sport fishery. Table B-1 lists each of the waterbodies within the Study Area, along with their status related to Wild Trout Waters.

According to Pennsylvania Code, Title 25, Chapter 105.17 (Section 1, Paragraph iii), wetlands that are located in or along the floodplain of the reach of EV Waters and/or Wild Trout Waters and their tributaries are considered EV Wetlands (Commonwealth of Pennsylvania, 2009a).

According to the 2014 *Pennsylvania Integrated Water Quality Monitoring and Assessment Report*, two waterbodies crossed by the Project in Pennsylvania have water-quality related impairment issues related to siltation (PADEP, 2014b). These waterbodies include the Lehigh River and the East Branch Monocacy Creek. Table B-1 lists each of the waterbodies within the Study Area, along with their status related to siltation impairment.

There are 37 National Wetlands Inventory (NWI) mapped wetlands within the Study Area (Figure 3, Appendix A) (United States Fish and Wildlife Service [USFWS], 2015). These wetlands are classified as palustrine unconsolidated shore, seasonally flooded, excavated (PUSC_x); palustrine emergent phragmites, temporary flooded (PEM5A); palustrine emergent non-persistent, aquatic bed rooted vascular, permanently flooded (PEM2/AB3HB); palustrine scrub-shrub broad-leaved deciduous, temporary flooded (PSS1A); palustrine scrub-shrub broad-leaved deciduous, seasonally flooded (PSS1C); palustrine scrub-shrub broad-leaved deciduous, seasonally flooded/saturated (PSS1E); palustrine scrub-shrub broad-leaved deciduous, broad-leaved evergreen, temporary flooded (PSS1/3BA); palustrine scrub-shrub broad-leaved evergreen, broad-leaved deciduous, seasonally flooded/saturated (PSS3/1E); palustrine forested broad-leaved deciduous, temporary flooded (PFO1A); palustrine forested broad-leaved deciduous, seasonally flooded/saturated (PFO1E); palustrine forested needle-leaved evergreen, seasonally flooded (PFO4C); palustrine forested broad-leaved deciduous, needle-leaved evergreen, temporary flooded (PFO1/4A); palustrine forested broad-leaved deciduous, needle-leaved evergreen, seasonally flooded (PFO1/4C); palustrine forested broad-leaved deciduous, needle-leaved evergreen, seasonally flooded/saturated (PFO1/4E); palustrine forested needle-leaved deciduous, palustrine scrub-shrub broad-leaved deciduous, saturated (PFO2/SS1BA); riverine lower perennial unconsolidated bottom, permanently flooded (R2UBH); riverine upper perennial unconsolidated shore, seasonally flooded (R3USC); riverine upper perennial unconsolidated bottom, permanently flooded (R3UBH); riverine unknown perennial unconsolidated bottom, permanently flooded (R5UBH); lacustrine limnetic unconsolidated bottom, permanently flooded, diked/impounded (L1UBH_h); palustrine unconsolidated bottom, permanently flooded, excavated (PUBH_x); and, palustrine unconsolidated bottom, permanently flooded, diked/impounded (PUBH_h).

Table B-2 in Appendix B contains a comprehensive list of soils map units located within the Study Area and lists their hydric ratings (Natural Resource Conservation Service [NRCS] Web Soil Survey, 2014). Soil map units are depicted in Figure 3 in Appendix A. Appendix C contains the Wetland Datasheets, Appendix D contains the Waterbody Datasheets; and Appendix E contains the Resource Photographs.

1.2 Methodology

This wetland and waterbody investigation was conducted on multiple dates between September 2014 and August 2015. The Study Area was subject to changes due to adjustments to the pipeline alignment and additional temporary work space(s) required. Wetlands and waterbodies were identified and delineated as potentially regulated under the Pennsylvania Clean Streams Law and Dam Safety and Encroachment Act and the federal Clean Water Act (Commonwealth of Pennsylvania, 2009a and 2009b; Clean Water Act of 1972). The location of each identified wetland and/or waterbody was recorded using a high-precision, handheld global positioning system (GPS) receiver. Photographs were taken of each resource.

1.2.1 Methodology – Wetlands

Prior to field surveys, a desktop survey was completed using GIS, existing PennEast data, site base maps, environmental mapping resources including state wetland mapping, NWI maps, USGS National Hydrology Database (NHD) layers and topographic maps, NRCS County Soil Surveys, and aerial photography-based alignment maps to identify potentially regulated resources. The existing sources used for the desktop investigation included: the USGS Kingston, Pittston, Wilkes-Barre East, Pleasant View Summit, Hickory Run, Blakeslee, Pohopoco Mountain, Christmans, Palmerton, Kunkletown, Catasauqua, Nazareth, Hellertown, and Riegelsville, Pennsylvania 7.5-minute series topographical quadrangles, (National Geographic Society, 2013); the United States Department of Agriculture (USDA) NRCS Soil Survey Geographic (SSURGO) Database for

Luzerne, Carbon, Northampton, and Bucks Counties, Pennsylvania (NRCS, 2014); and the USFWS NWI polygon for Pennsylvania (USFWS, 2015). Table B-3 in Appendix B lists wetlands identified with the Study Area, along with their associated classification and size.

Wetland delineation desktop data review and critical issues analysis provided a basis for initial Project route selection and supported field investigation planning and execution. In Project locations where access has not been available to date, wetland and waterbody features identified through desktop data review have been used for FERC Resource Reports to estimate potential impacts in lieu of actual field survey. However, desktop identified features on non-access properties are not included in Table B-3. They will be added upon completion of field assessment and ground verification of existing conditions.

Where survey access was permitted, a field assessment of existing conditions was completed to provide ground verification of desktop survey findings. Information collected during the desktop review was used in conjunction with the field delineation data to identify regulated areas pursuant to the United States Army Corps of Engineers (USACE) Clean Water Act (Section 404) regulations and the PADEP Dam Safety and Encroachments Act (Pennsylvania Code Title 25, Chapter 105).

Wetland habitats were identified and delineated in the Study Area using the Modified Routine Wetland Delineation Method as described in the USACE's *Wetland Delineation Manual, Technical Report Y-87-1* (Environmental Laboratory, 1987) using wetland criteria detailed in the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Eastern Mountains and Piedmont Region* (Version 2.0), and *Northcentral and Northeast Region* (Version 2.0) (USACE, 2012a and 2012b), as appropriate. During field investigations, data collected for each delineated wetland and adjacent upland sample point included dominant vegetation, soil characteristics, hydrology, and other information necessary to complete the USACE Wetland Determination Data Form (2012a and 2012b).

Wetlands within the Study Area were classified according to the USFWS *Classification of Wetlands and Deepwater Habitats for the United States* (Cowardin et al., 1979). Wetland classifications were based upon vegetation type and dominance and include palustrine emergent (PEM), palustrine scrub-shrub (PSS), palustrine forested (PFO) and palustrine unconsolidated bottom (PUB). PEM wetlands are described as being "dominated by erect, rooted, herbaceous hydrophytes." PSS wetlands are described as "dominated by woody vegetation less than 20 feet (6m) in height." PFO wetlands are described as "dominated by woody vegetation greater than 20 feet (6m) in height," and PUB wetlands are described as "wetland and deep water habitats with at least 25% cover of particles smaller than stones, and a vegetative cover less than 30% (Cowardin et al., 1979)." Dominant vegetation was evaluated on percent aerial cover for the following strata: trees, saplings/shrubs, herbaceous, and woody vines.

In addition to the USFWS *Classification of Wetlands and Deepwater Habitats for the United States* classifications, a category classified as vernal (seasonal) pool was added. For the purposes of this Project, vernal pools are defined based on four distinguishing features: surficial hydrologic isolation, periodic drying, small size and shallow depth, and distinctive biological community (EPA, 2005).

Each plant species was assigned an indicator status based on the *National Wetland Plant List* (Lichvar et al., 2014). The following indicator statuses were assigned: obligate (OBL), facultative wet (FACW), facultative (FAC), facultative upland (FACU), upland (UPL), no status (NS), or not indicated (NI).

At each wetland, a three-inch Dutch-tip auger or shovel was used to excavate soil to a depth of 16-inches below ground surface, or until refusal, for inspection of the soil profile. Soil horizon depths, in inches below ground surface, were measured and recorded. Each distinct horizon in the soil profile was also examined for hue, value, and chroma using a *Munsell Soil Color Chart* (Munsell Color, 2009). In addition, the texture, physical characteristics, and redoximorphic features of each horizon were noted, if present. This information was used to evaluate the indicators of hydric soil conditions that meet USACE criteria.

Once biologists determined that an area met wetland criteria, photos were taken of the wetland, and the boundaries were field-marked with surveyor's tape. A high-precision, handheld, GPS receiver (model GeoXH

handheld, Trimble, Sunnyvale, CA) was used to record the flagged boundaries of each wetland. Data collected were post-processed with the latest version of Trimble GPS Pathfinder Office software, which uses cataloged reference data from base stations and differential correction technology to increase the accuracy of the boundary flag and data point locations. Data points were evaluated using a quality assurance and quality control process. Following any necessary revisions, final files were incorporated into the Project's GIS for mapping and Project design purposes.

1.2.2 Methodology – Waterbodies

Waterbodies include any natural or artificial stream, river, or drainage with perceptible flow at the time of crossing and other permanent waterbodies such as ponds and lakes. To identify and delineate watercourses, an on-site evaluation was performed based on whether the feature exhibited typical watercourse characteristics such as a defined streambed and streambanks, an exclusion of terrestrial vegetation, hydrologically-sorted substrate material, and the presence of an ordinary high water mark. These waterbodies were identified and classified as regulated under the Clean Water Act of 1972 as Waters of the United States. In Pennsylvania, waterbodies were further evaluated under Pennsylvania Code, Title 25, Chapter 105 as Regulated Waters of this Commonwealth (Commonwealth of Pennsylvania, 2009b).

Watercourse types include perennial, intermittent, and ephemeral. Watercourse type determinations were made based on channel definition (i.e., having a defined bed and bank) and by determination of stream flow using geomorphic, hydrological and biological indicators. Per guidance from the PADEP, the North Carolina Division of Water Quality (NCDWQ) (2005) identification methods were used as guidelines (Mackowski, personal comm., 2012). Perennial streams are described in the NCDWQ methods as a “well-defined channel that contains water year round during a year of normal rainfall with the aquatic bed located below the water table for most of the year.” Intermittent streams are defined as “a well-defined channel that contains water for only part of the year, typically during winter and spring when the aquatic bed is below the water table.” Ephemeral streams are described as “a feature that carries only stormwater in direct response to precipitation with water flowing only during and shortly after large precipitation events.” FERC's Wetland and Waterbody Construction and Mitigation Procedures (2013) further classifies waterbodies as being minor, including all waterbodies less than or equal to 10 feet wide at the water's edge at the time of crossing; intermediate, which includes all waterbodies greater than 10 feet wide but less than or equal to 100 feet wide at the water's edge at the time of crossing; or major, which includes all waterbodies greater than 100 feet wide at the water's edge at the time of crossing. The extent of each waterbody was recorded with a GPS unit and photographs were taken of each waterbody.

1.3 Results - Wetlands

A total of 153 wetlands were identified and delineated within the Study Area in Pennsylvania (Table 1.3-1). In instances where a wetland complex had multiple cover classifications, each cover classification has been listed as a separate occurrence, even though it is part of the same complex. A total of 134.8 acres of wetlands were identified within the Study Area in Pennsylvania, including 17.9 acres of PEM wetlands, 41.2 acres of PSS wetlands, 74.5 acres of PFO wetlands, 1.0 acres of PUB wetlands and 0.2 acres of vernal pools. Ninety-two of the wetlands identified within the Study Area are considered EV due to their proximity to wild trout streams and/or EV streams. Locations of the identified wetlands within the Study Area are depicted on Figure 3 in Appendix A. Data forms for the individual wetlands and waterbodies are included in Appendix C and Appendix D, respectively. Photographs of these resources are included in Appendix E. Typical wetland vegetation, soil characteristics, and hydrology identified within the identified wetlands resources are discussed below.

**Table 1.3-1
Summary of Field Identified Wetlands within Pennsylvania**

County	PEM	PSS	PFO	PUB	Vernal Pools	Total Wetlands
Luzerne	35	19	19	2	0	75
Carbon	19	15	20	1	1	56
Northampton	12	0	6	0	3	21
Bucks	0	0	1	0	0	1
Total	66	34	46	3	4	153

1.3.1 Wetlands – Luzerne County, Pennsylvania

A total of 75 wetlands were located and identified within the Study Area in Luzerne County, Pennsylvania. Of the 75 wetlands in Luzerne County, there were 35 PEM wetlands, 19 PSS wetlands, 19 PFO wetlands, and 2 PUB wetlands. No vernal pools were identified within the Study Area in Luzerne County. The landform/geomorphic settings of these wetlands included hillside seep/springs and closed topographic depressions/isolated systems. Refer to Table B-3 in Appendix B for classifications and sizes of the field-identified wetlands. These wetlands are summarized by county in Table 1.3-1.

Vegetation

The most common dominant tree species identified within PFO wetlands in Luzerne County consisted of red maple (*Acer rubrum*), gray birch (*Betula populifolia*), and eastern hemlock (*Tsuga canadensis*). The most common dominant shrub species identified within PSS wetlands in Luzerne County consisted of white meadowsweet (*Spiraea alba*) and highbush blueberry (*Vaccinium corymbosum*). The most common dominant herbaceous species identified within PEM wetlands consisted of wrinkle-leaf goldenrod (*Solidago rugosa*), cinnamon fern (*Osmundastrum cinnamomeum*) and fringed sedge (*Carex crinita*).

Soils

Wetland soils varied by wetland, but some generalizations can be made. The most common matrix hue was 10YR with low chroma (≤ 2) and values between 4 and 6 with redox concentrations. Depleted Matrix (F3) was the most common hydric soil indicator observed. The most common soil texture observed was silt loam.

Hydrology

The most common primary indicators of hydrology observed within the identified wetlands in Luzerne County were High Water Table (A2), Saturation (A3), and Oxidized Rhizospheres on Living Roots (C3). The most common secondary indicators observed were Drainage Patterns (B10) and FAC-Neutral Test (D5). The primary sources of hydrology differed between wetland types. Groundwater and surface water runoff collection were the primary sources of hydrology observed.

1.3.2 Wetlands – Carbon County, Pennsylvania

A total of 56 wetlands were located and identified within the Study Area in Carbon County, Pennsylvania. Of the 56 wetlands, there were 19 PEM wetlands, 15 PSS wetlands, 20 PFO wetlands, one PUB wetland, and one vernal pool. The landform/geomorphic settings of these wetlands included hillside seep/springs and closed topographic depressions/isolated systems. Refer to Table B-3 in Appendix B for classifications and sizes of the field-identified wetlands. These wetlands are summarized by county in Table 1.3-1.

Vegetation

The most common dominant tree species identified within the PFO wetlands in Carbon county consisted of red maple, yellow birch (*Betula alleghaniensis*), and black tupelo (*Nyssa sylvatica*). The most common dominant shrub species identified within the PSS wetlands consisted of silky dogwood (*Cornus amomum*) and highbush blueberry. The most common dominant herbaceous species identified within the PEM wetlands consisted of Japanese stilt grass (*Microstegium vimineum*), reed canary grass (*Phalaris arundinacea*), and spotted touch-me-not (*Impatiens capensis*).

Soils

Wetland soils varied by wetland, but some generalizations can be made. The most common matrix hue was 10YR with low chroma (≤ 2) and values between 4 and 6 with redox concentrations. Depleted Matrix (F3) was the most common hydric soil indicator observed. The most common soil texture identified was silt loam.

Hydrology

The most common primary indicators of hydrology observed within the identified wetlands in Carbon County were High Water Table (A2), Saturation (A3), and Oxidized Rhizospheres on Living Roots (C3). The most common secondary indicators observed were Drainage Patterns (B10) and FAC-Neutral Test (D5). The primary sources of hydrology differed between wetland types. Groundwater and surface water runoff collection were the primary sources of hydrology observed.

1.3.3 Wetlands – Northampton County, Pennsylvania

A total of 21 wetlands were located and identified within the Study Area in Northampton County, Pennsylvania. Of the 21 wetlands in Northampton County, there were 12 PEM wetlands, six PFO wetlands, and three vernal pools. No PSS or PUB wetlands were identified during field surveys within the Study Area. The landform/geomorphic settings of these wetlands included hillside seep/springs and closed topographic depressions/isolated systems. Refer to Table B-3 in Appendix B for classifications and sizes of the field-identified wetlands. These wetlands are summarized by county in Table 1.3-1.

Vegetation

The most common dominant tree species identified within the PFO wetlands in Northampton county consisted of red maple (*Acer rubrum*) and green ash (*Fraxinus pennsylvanica*). The most common dominant herbaceous species identified consisted of skunk-cabbage (*Symplocarpus foetidus*), sensitive fern (*Onoclea sensibilis*), and spotted touch-me-not (*Impatiens capensis*).

Soils

Wetland soils varied by wetland, but some generalizations can be made. The most common matrix hue was 10YR with low chroma (≤ 2) and values between 4 and 6 with redox concentrations. Depleted Matrix (F3) was the most common hydric soil indicator observed. The most common soil texture was silt loam.

Hydrology

The most common primary indicators of hydrology observed within the identified wetlands were High Water Table (A2), Saturation (A3), and Oxidized Rhizospheres on Living Roots (C3). The most common secondary indicators observed were Drainage Patterns (B10) and FAC-Neutral Test (D5). The primary sources of hydrology differed between wetland types. Groundwater and surface water runoff collection were the primary sources of hydrology observed.

1.3.4 Wetlands – Bucks County, Pennsylvania

One wetland was identified within the Study Area in Bucks County, Pennsylvania. This wetland is a PFO wetland. Refer to Table B-3 in Appendix B for classification and size of this field-identified wetland. This wetland is summarized by county in Table 1.3-1.

Vegetation

The dominant tree species identified within the PFO wetland in Bucks County consisted of silver maple (*Acer saccharinum*).

Soils

The most common matrix hue was 10YR with low chroma (≤ 2) and values between 4 and 6 with redox concentrations. Depleted Matrix (F3) was the most common hydric soil indicator observed. The most common soil texture was silt loam.

Hydrology

The primary indicators of hydrology observed within the identified wetland were High Water Table (A2), Saturation (A3), and Oxidized Rhizospheres on Living Roots (C3). The secondary indicators observed were Drainage Patterns (B10) and FAC-Neutral Test (D5). Groundwater and surface water runoff collection were the primary sources of hydrology observed.

1.4 Results – Waterbodies

A total of 182 waterbodies were identified within the Study Area in Pennsylvania. Watercourses, a subdivision of waterbodies, were classified by flow regime as follows: 68 perennial (PER), 51 intermittent (INT), and 37 ephemeral (EPH) watercourses. The remaining waterbodies identified include six ponds, two lakes (Beltzville Lake), one canal (Delaware Canal), and seventeen ditches. Table B-3 in Appendix B contains the local name, flow regime, top of bank width, overall depth, Chapter 93 Designated/Existing Use Classification, and PFBC trout water classifications of waterbodies identified within the Study Area in Pennsylvania. Locations of the identified waterbodies are depicted in Figure 3 of Appendix A. Data forms for the individual waterbodies are included in Appendix D. Waterbodies are summarized by county in Table 1.4-1.

**Table 1.4-1
Summary of Field Identified Waterbodies within Pennsylvania**

County	Watercourses			Pond	Lake	Canal	Ditch	Total
	Perennial	Intermittent	Ephemeral					
Luzerne	33	22	19	4	0	0	6	84
Carbon	21	14	7	0	2	0	6	50
Northampton	13	15	9	2	0	0	5	44
Bucks	1	0	2	0	0	1	0	4
Total	68	51	37	6	2	1	17	182

These waters also include intermittent or perennial streams in Pennsylvania that have PADEP designated classifications of WWF, CWF, HQ-CWF, and EV waters (Commonwealth of Pennsylvania, 2009b). Some of these water features are designated as Wild Trout Waters, Approved Trout Waters, or Trout Stocked Streams (Pennsylvania Code 2015; PFBC 2015a-b). Wild Trout Waters include those streams with naturally reproducing trout populations and Class A trout streams. There are no Wilderness Trout Streams within the Project's Study Area.

Detailed waterbody information is provided on individual waterbody data forms in Appendix D. Photographs of each waterbody are provided in Appendix E.

1.5 Summary

Environmental investigations were conducted on multiple dates between September 2014 and December 2015 for the Project. Field surveys were performed within Dallas, Kingston, West Wyoming, Jenkins, Plains, and Bear Creek Townships, and Wyoming and Laflin Borough in Luzerne County; Kidder, Penn Forest, Towamensing, and Lower Towamensing Townships in Carbon County; Lehigh, Moore, East Allen, Upper Nazareth, Lower Nazareth, Bethlehem, Lower Saucon, and Williams Townships, and the City of Easton in Northampton County; and Durham Township and Riegelsville Borough in Bucks County, Pennsylvania. These field efforts resulted in the delineation of 175 wetlands and 188 waterbodies within the Study Area of the PennEast Project. The results of this investigation will be utilized during the final design of the Project to minimize impacts to wetlands and waterbodies.

1.6 Statement of Limitations

- This investigation was limited to the Study Area depicted in Figure 3 of Appendix A. No information is provided regarding the presence or absence of regulated wetlands and streams outside of the Study Area.
- This investigation was conducted on the dates indicated herein. Human-induced or natural changes at within the Study Area may occur after submittal of this Wetland Delineation Report resulting in changes to the presence and extent of regulated wetlands and waterbodies.

1.7 References

- Barbour, M.T., J. Gerritsen, B.D. Snyder, and J.B. Stribling. 1999. Rapid Bioassessment Protocols for Use in Streams and Wadeable Rivers; Periphyton, Benthic Macroinvertebrates and Fish, Second Edition. EPA 841-B-99-002. United States Environmental Protection Agency; Office of Water; Washington District of Columbia.
- Clean Water Act of 1972, 33 U.S.C. § 1251 et seq. (2002). Accessed at <http://epw.senate.gov/water.pdf> on September 3, 2015.
- Commonwealth of Pennsylvania. 2009a. The Pennsylvania Code, Title 25: Environmental Protection. Chapter 93: Water Quality Standards, Section 93.9, Designated Water Uses and Water Quality Criteria. Accessed at <http://www.pacode.com/secure/data/025/chapter105/chap105toc.html> on September 3, 2015.
- Commonwealth of Pennsylvania. 2009b. The Pennsylvania Code, Title 25: Environmental Protection. Chapter 105: Dam Safety and Waterway Management. Accessed at <http://www.pacode.com/secure/data/025/chapter105/chap105toc.html> on September 3, 2015.
- Cowardin, L.M., Charter, V., Golet, F.C., LaRoe, E.T. 1979. Classification of Wetlands and Deepwater Habitats of the United States, Report No. FWS/OBL-97/31. United States Department of the Interior, Fish and Wildlife Service, Washington, District of Columbia.
- Environmental Laboratory. 1987a. Corps of Engineers Wetlands Delineation Manual, Technical Report U-87-1. United States Army Engineer Waterways Experiment Station, Vicksburg, Mississippi.
- Lichvar, R.W., M. Buterwick, N.C. Melvin, and W.N. Kirchner. 2014. The National Wetland Plant List. 2014 Update of Wetland Ratings. *Phytoneuron* 2014-41: 1-42.
- Munsell Color. 2009. Munsell Soil-Color Charts. X-rite, Grand Rapids, Michigan.
- Natural Resources Conservation Service (NRCS). 2014. Soil Survey Geographic (SSURGO) Database for Luzerne (Survey Area: Version 6), Carbon (Survey Area: Version 11), Northampton (Survey Area: Version 5), and Bucks (Survey Area: Version 9), Counties, Pennsylvania. Accessed at <http://websoilsurvey.nrcs.usda.gov/app/HomePage.htm> on September 3, 2015.
- Pennsylvania Department of Conservation and Natural Resources (PADCNR), Bureau of Topographic and Geologic Survey. 2005 and 2008. PAMAP Program I-Cubed Pennsylvania 2010. Accessed at <http://www.pasda.psu.edu> on September 3, 2015.
- Pennsylvania Department of Environmental Protection (PADEP). 2014a. Pennsylvania Statewide Existing Use Classifications. Last Revised September 23, 2014. Accessed at http://www.portal.state.pa.us/portal/server.pt/community/water_quality_standards/10556/statewide_existing_use_classifications/553974 on September 3, 2015.
- Pennsylvania Department of Environmental Protection (PADEP). 2014b. 2014 Pennsylvania Integrated Water Quality Monitoring and Assessment Report. Accessed at http://www.depweb.state.pa.us/portal/server.pt/community/water_quality_standards/10556/draft_integrated_water_quality_report_-_2014/1702856 on September 3, 2015.
- Pennsylvania Fish and Boat Commission (PFBC). 2015a. PA Fish and Boat Commission, Approved Trout Streams, January 2015. Accessed at <http://www.fish.state.pa.us/troutstreams.htm>, http://www.pasda.psu.edu/uci/MetadataDisplay.aspx?entry=PASDA&file=Approved_Trout_Waters201501.xml&dataset=963 on September 3, 2015.
- PFBC. 2015b. Pennsylvania Fish and Boat Commission, Wild Trout Waters, Natural Reproduction, January 2015. Accessed at http://fishandboat.com/trout_repro.htm on September 3, 2015.

- PFBC. 2015c. Pennsylvania Fish and Boat Commission, Wild Trout Waters. Accessed at <http://fishandboat.com/wild98.htm> on September 3, 2015.
- PFBC. 2015d. Pennsylvania Fish and Boat Commission, Class A Waters, December 2013. Accessed at <http://fishandboat.com/classa.pdf> on September 3, 2015.
- Seamless Digital Raster Graphic-N.P.S. Natural Physical Map & U.S.G.S Topographic Map 2009, National Geographic Society, i-cubed USGS Quadrangles: Kingston, Pittston, Wilkes-Barre East, Pleasant View Summit, Hickory Run, Blakeslee, Pohopoco Mountain, Christmans, Palmerton, Kunkletown, Catasauqua, Nazareth, Hellertown, and Riegelsville, Pennsylvania.
- The Pennsylvania State University (PSU). 2007. PAMAP Program Land Cover for Pennsylvania, 2005. Penn State University, University Park, Pennsylvania. Accessed at <ftp://www.pasda.psu.edu/pub/pasda/orser> on September 3, 2015.
- United States Army Corps of Engineers (USACE). 2014. National Wetland Plant List, Version 3.2. Accessed at http://wetland_plants.usace.army.mil/ on September 3, 2015.
- USACE. 2012a. Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Eastern Mountains and Piedmont Region (Version 2.0), ed. J. S. Wakeley, R. W. Lichvar, C. V. Noble, and J. F. Berkowitz. ERDC/EL TR-12-9. Vicksburg, Mississippi: United States Army Engineer Research and Development Center.
- USACE. 2012b. Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Northcentral and Northeast (Version 2.0), ed. J. S. Wakeley, R. W. Lichvar, C. V. Noble, and J. F. Berkowitz. ERDC/EL TR-12-1. Vicksburg, MS: U.S. Army Engineer Research and Development Center.
- United States Department of Agriculture (USDA) Farm Service Agency (FSA) Aerial Photography Field Office. 2008-2010. National Agricultural Imagery Program (1-meter resolution). USDA FSA Aerial Photography Field Office, Salt Lake City, Utah. Accessed at <http://www.pasda.psu.edu/data/naip/> on September 3, 2015.
- U.S. Environmental Protection Agency (EPA). 2005. Brown, L.J. and R.E. Jung. 2005. *An introduction to Mid-Atlantic Seasonal Pools*, EPA/903/B-05/001. U.S. Environmental Protection Agency, Mid-Atlantic Integrated Assessment, Ft. Meade, Maryland.
- United States Fish and Wildlife Service (USFWS). 2015. National Wetlands Inventory. United States Department of the Interior, Fish and Wildlife Service, Washington, District of Columbia. Accessed at <http://www.fws.gov/wetlands/> on September 3, 2015.
- United States Geological Survey (USGS). 2015. Pennsylvania StreamStats. Accessed at <http://water.usgs.gov/osw/streamstats/pennsylvania.html> on September 3, 2015.

APPENDICES

Appendix A
Figures