



EASTERN SYSTEM UPGRADE

RESOURCE REPORT 3 *Fisheries, Vegetation, and Wildlife*

FERC Docket No. CP16-__-000

July 2016

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RESOURCE REPORT 3 -- FISHERIES, WILDLIFE, AND VEGETATION	
Filing Requirement	Location in Environmental Report
<ul style="list-style-type: none"> Describe commercial and recreational warmwater, coldwater, and saltwater fisheries in the affected area and associated significant habitats such as spawning or rearing areas and estuaries. (§ 380.12 (e) (1)) 	Section 3.1, Table 3A-1 and 3A-2 in Appendix 3A
<ul style="list-style-type: none"> Describe terrestrial habitats, including wetlands, typical wildlife habitats, and rare, unique, or otherwise significant habitats that might be affected by the proposed action. Describe typical species that have commercial, recreational, or aesthetic value. (§ 380.12 (e) (2)) 	Sections 3.2 and 3.3, Tables 3A-3 and 3A-5 in Appendix 3A
<ul style="list-style-type: none"> Describe and provide the affected acreage of vegetation cover types that would be affected, including unique ecosystems or communities such as remnant prairie or old-growth forest, or significant individual plants, such as old-growth specimen trees. (§ 380.12 (e) (3)) 	Section 3.2.3 and Table 3A-3 in Appendix 3A Table 8A-2 in Resource Report 8 and Table 2A-7 in Resource Report 2.
<ul style="list-style-type: none"> Describe the impact of construction and operation on aquatic and terrestrial species and their habitats, including the possibility of a major alteration to ecosystems or biodiversity, and any potential impact on state listed endangered or threatened species. Describe the impact of maintenance, clearing and treatment of the project area on fish, wildlife, and vegetation. Surveys may be required to determine specific areas of significant habitats or communities of species of special concern to state or local agencies. (§ 380.12 (e) (4)) 	Sections 3.1.3, 3.2.3, 3.3.2, and 3.3.4
<ul style="list-style-type: none"> Identify all federally listed or proposed endangered or threatened species and critical habitat that potentially occur in the vicinity of the project. Discuss the results of the consultation requirements listed in Sec. 380.13(b) at least through Sec. 380.13(b)(5)(i) and include any written correspondence that resulted from the consultation. The initial application must include the results of any required surveys unless seasonal considerations make this impractical. If species surveys are impractical, there must be field surveys to determine the presence of suitable habitat unless the entire project area is suitable habitat. (§ 380.12 (e) (5)) 	Section 3.4; Table 3A-6 in Appendix 3A Resource Report 1, Appendix 1D
<ul style="list-style-type: none"> Identify all federally listed essential fish habitat (EFH) that potentially occurs in the vicinity of the project. Provide information on all EFH, as identified by the pertinent Federal fishery management plans that may be adversely affected by the project and the results of abbreviated consultations with NMFS, and any resulting EFH assessments. (§ 380.12 (e) (6)) 	Section 3.1 Resource Report 1, Appendix 1D
<ul style="list-style-type: none"> Describe site-specific mitigation measures to minimize impacts on fisheries, wildlife, and vegetation. (§ 380.12 (e) (7)) 	Sections 3.1.3, 3.2.3, and 3.3.4
<ul style="list-style-type: none"> Include copies of correspondence not provided pursuant to paragraph (e)(5) of this section, containing recommendations from appropriate Federal and state fish and wildlife agencies to avoid or limit impact on wildlife, fisheries, and vegetation, and the applicant's response to the recommendations. (§ 380.12 (e) (8)) 	Resource Report 1, Appendix 1D

FERC COMMENTS ON DRAFT RESOURCE REPORT 3	LOCATION OR RESPONSE TO COMMENT
JUNE 10, 2016 COMMENTS	
<u>Resource Report 3 – Fish, Wildlife, and Vegetation</u>	
1. Provide correspondence with NYSDEC regarding fishery construction windows.	Section 3.1.1
2. In section 3.1.3.4, provide documentation of consultation with state and federal agencies regarding design of the waterbody crossing by the planned new permanent access road to the Highland Compressor Station, as available.	Section 3.1.3.4
3. In section 3.2.3, calculate the acreage of impacts on vegetative communities of special concern during Project construction and operation. Describe specific measures that would be implemented to avoid or minimize impacts on sensitive vegetation communities including Chestnut Oak Forest and Hemlock-Northern Hardwood Forest, such as reducing the construction right-of-way width in those areas.	Table 3A-4 and Section 3.2.3.1
4. Describe measures that would be implemented in the event that Millennium encounters a bald eagle nest in the Project area during construction, and discuss Millennium’s intent to implement recommendations by NYSDEC to minimize impacts on wintering bald eagles that may occur in the vicinity of the Neversink River.	Section 3.3.3.2
5. Clarify the discrepancy in the number of waterbodies classified as C(T) and Class C or higher with section 3.1.2.2 and table 3A-2.	Section 3.1.2.2
6. Provide correspondence with the U.S. Fish and Wildlife Service (FWS) regarding timing recommendations for restricting tree-clearing for the protection of migratory birds, when available.	To be provided to FERC as received.
7. Regarding the Phase I Bog Turtle Habitat Survey Report provided in Appendix 3C, clarify Millennium’s intent to conduct surveys where wetland delineation surveys are not complete.	Appendix 3E
8. Discuss additional mitigation measures and survey requirements for federal and state-listed species that have resulted from consultation with FWS and NYSDEC. Provide documentation of updated correspondence and update table 3A-7, as applicable.	Section 3.4, Appendix 1D, and Table 3A-8

LIST OF ACRONYMS AND ABBREVIATIONS

BCR	Bird Conservation Region
BGEPA	Bald and Golden Eagle Protection Act
CFR	Code of Federal Regulations
ECS	Project Environmental Construction Standards
EFH	essential fish habitat
ER	Environmental Report
ESA	Endangered Species Act
FERC or Commission	Federal Energy Regulatory Commission
HDD	horizontal directional drill
Hancock CS	Hancock Compressor Station
Highland CS	Highland Compressor Station
Huguenot M&R	Huguenot Meter Station
IBA	Important Bird Areas
Km	Kilometer
MBTA	Migratory Bird Treaty Act
Millennium	Millennium Pipeline Company, L.L.C.
MP	Milepost
NABCI	U.S. North American Bird Conservation Initiative
NMFS	National Oceanic and Atmospheric Administration-National Marine Fisheries Service
NYCRR	New York Codes, Rules and Regulations
NYNHP	New York Natural Heritage Program
NYSDEC	New York State Department of Environmental Conservation
PFO	Palustrine Forested
Project	Eastern System Upgrade
Ramapo M&R	Ramapo Meter Station
USFWS	U.S. Fish & Wildlife Service
Westtown M&R	Westtown Meter Station
WNS	white-nose syndrome

3.0 FISHERIES, VEGETATION, AND WILDLIFE

Millennium Pipeline Company, L.L.C. (Millennium) is seeking authorization from the Federal Energy Regulatory Commission (FERC or Commission) pursuant to Section 7(c) of the Natural Gas Act to construct, install, operate, and maintain the Eastern System Upgrade (Project). The Project includes construction of approximately 7.8 miles of 30- and 36-inch pipeline loop in Orange County, New York (Huguenot Loop). Millennium proposes to locate a majority of the pipeline loop overlapping with and adjacent to the permanent easement associated with its existing mainline (Millennium Pipeline). Additionally, as part of the Project, Millennium proposes to construct and operate (1) a new compressor station (Highland CS) in Sullivan County, New York, (2) additional horsepower (hp) at the existing Hancock Compressor Station (Hancock CS) in Delaware County, New York, (3) modifications to the existing Ramapo Meter and Regulator Station (Ramapo M&R) in Rockland County, New York, (4) modifications to the existing Wagoner Interconnect in Orange County, New York and (5) additional pipeline appurtenant facilities at the existing Huguenot Meter Station (Huguenot M&R) and Westtown Meter Station (Westtown M&R) in Orange County, New York. Dependent upon receipt of necessary approvals, construction of the Project would be anticipated to commence in the fall of 2017 to meet a target in-service date in September 2018.

The Project consists of the following components and facilities:

- approximately 7.8 miles of new 30- and 36-inch diameter pipeline looping generally overlapping with and adjacent to Millennium's existing pipeline right-of-way in Orange County, New York ;
- construction and operation of a new 22,400 hp compressor station, Highland CS in Sullivan County, New York;
- construction and operation of an additional 22,400 hp at the existing Hancock CS in Delaware County, New York;
- modifications to the Ramapo M&R in Rockland County, New York;
- modifications to the Wagoner Interconnect in Orange County, New York;
- addition of pipeline appurtenant facilities, which includes pigging facilities, at the Huguenot M&R and the Westtown M&R in Orange County, New York; and
- addition of an alternate interconnect to the 16-inch Valley Lateral at milepost (MP) 7.6.

Resource Report 3 details the existing fisheries, wildlife, and vegetation resources present within the Project areas, potential impacts on those resources from construction and operation of the Project and proposed methods to minimize and mitigate potential impacts. Consultations with the U.S. Fish and Wildlife Service (USFWS), the New York State Department of Environmental Conservation (NYSDEC), and the New York Natural Heritage Program (NYNHP) were conducted to determine the presence of federally or state-listed threatened, endangered or candidate species, and/or significant or critical wildlife habitat in the vicinity of the Project facilities (see Appendix 1D of Resource Report 1). Field surveys, including wetland and

waterbody delineations, were conducted on parcels with available survey access from November 2015 through June 2016 within a 300-foot wide survey corridor, in areas with survey permission, to accommodate the construction workspace areas. Rare species habitat evaluations were completed in November 2015 and Spring 2016. Field data collected through June 2016 has been included in this final Environmental Report (ER) filing.

3.1 FISHERY RESOURCES

This section discusses fishery resources and fish species of special concern in the Project areas, assesses potential construction and operational impacts on these resources, and identifies measures proposed to avoid, minimize and/or mitigate for such impacts.

Significant fisheries resources include waterbodies that (1) provide important habitat for foraging, rearing, or spawning of fish species; (2) represent important commercial or recreational fishing areas; or (3) support large populations of commercially or recreationally valuable fish species or species listed for protection at the federal, state, or local level. The Project will not be located near any marine environments or saltwater bodies and, therefore, will not affect anadromous or catadromous species or marine or estuarine habitats. Resource Report 2 contains a detailed characterization of the waterbodies crossed or affected by the Project as listed in Table 2A-4 in Appendix 2A.

3.1.1 Fisheries Classification

Physical data on identified water features were collected in November 2015 and Spring 2016 during the biological and civil engineering field surveys. Desktop data sources, including the National Wetlands Inventory, the National Hydrography Dataset and aerial photography, were utilized on no-access properties to identify potential fishery resources and aquatic habitats. United States Geological Survey 7.5-minute series topographic maps were used to identify waterbody names, tributaries, and flow regimes. Water quality classifications are derived from New York's surface water quality regulations (6 New York Code of Rules and Regulations [NYCRR] Part 701). The name, location, crossing distance, flow regime (perennial, intermittent or ephemeral), and fishery classification of each waterbody in the Project areas are provided in Table 2A-4 of Resource Report 2. Table 3A-1 lists common fish species known to occur in the Project areas.

Warmwater streams and rivers are typically slow-moving bodies of water with soft substrates of sand and silt, and are less oxygenated than coldwater streams and rivers. These waterbodies are not suitable for the propagation of trout, nor are they capable of supporting a stocked trout population. Millennium has consulted with the NYSDEC to determine if the Project crosses any warmwater fisheries (see Resource Appendix 1D of Resource Report 1). The resource review provided by the NYSDEC did not identify any warmwater fisheries crossed by the Project (Gierloff, 2016a and b).

Coldwater fisheries require water temperatures lower than 70 degrees Fahrenheit for growth and reproduction, and usually are associated with waters having high oxygen content. Millennium has submitted a consultation request to the NYSDEC to identify waterbodies crossed by the Project supporting

fishery resources and any in-stream construction timing restrictions for the identified waterbodies (see Appendix 1D of Resource Report 1). The resource review provided by the NYSDEC identified several coldwater fisheries crossed by the Project (Gierloff, 2016a and b). No fishery construction windows have been provided by NYSDEC to date. Millennium will continue to consult with the NYSDEC to determine appropriate impact avoidance, minimization and mitigation measures for waterbodies potentially affected by the Project identified to contain fishery resources.

Waterbodies in New York State are assigned a letter classification that denotes their best use(s). Saline surface waters are given a letter class of S and groundwater resources are given a letter class of G. The letter classifications and associated best uses are described in 6 NYCRR Part 701 and are summarized below:

- Classification AA or A indicates waters used as a source of drinking water.
- Classification B indicates a best usage for swimming and other contact recreation, but not for drinking water.
- Classification C indicates waters supporting fisheries and which are suitable for non-contact activities.
- The lowest classification and standard is D.

Waters with classifications A, B, and C also may have a standard of T (e.g., A(T)), indicating that they may support trout populations, or TS, indicating that they may support trout spawning (NYSDEC, 2012a). Special requirements apply to conserve these waters that support these fisheries resources. Streams and small waterbodies that are designated as C(T) or higher (e.g., C(TS), B, A or AA) are referred to collectively as "protected streams," and are regulated by NYSDEC under its Protection of Waters Program (6 NYCRR Part 608; NYSDEC, 2012a). New York State water quality classification criteria are described further in Section 2.2.4 of Resource Report 2.

Review of the New York State Water Quality Classifications Geographic Information Systems data layer identified Project facilities crossing waterbodies classified as A, B, C, and C(T) (see Table 3A-2). These waterbodies are further discussed in Section 3.1.2. Stream classifications and Project facilities are identified further in Section 3.1.2.2, below.

3.1.2 Fisheries of Special Concern

Information from federal and state agencies was reviewed to determine if the Project would cross any waterbodies containing fisheries of special concern. Waterbodies with fisheries of special concern include those that have fisheries of exceptional recreational value (such as those that support coldwater fisheries), those that provide habitat for protected species, and/or those that are assigned special state fishery management regulations. Waterbodies that may support trout populations or trout spawning are considered "sensitive" fisheries and, therefore, are included in this section as fisheries of special concern.

Millennium consulted with the USFWS, National Marine Fisheries Service (NMFS), and NYSDEC to identify waterbodies that may contain federal or state-listed threatened, endangered, or candidate species

and their habitat as well as essential fish habitat (EFH). A discussion of threatened and endangered species is included in Section 3.4.

3.1.2.1 *Essential Fish Habitat*

The NMFS administers the Magnuson-Stevens Fishery Conservation and Management Act for marine and anadromous species. A consultation letter was sent to the NMFS on January 8, 2016. In a response received on January 21, 2016, the NMFS stated that no EFH has been designated in the Project area (Alvarez, 2016) (see Appendix 1D of Resource Report 1). As a result, no additional consultation is required for the Project.

3.1.2.2 *Trout*

Construction of the Project will temporarily affect waterbodies classified as C(T) streams. Additionally, there are Class C or higher waterbodies crossed by the Huguenot Loop, and crossed by temporary access roads associated with the Huguenot Loop, that may contain trout habitat and/or trout spawning but are not designated as such by the NYSDEC. Class C(T) and Class C waterbodies affected by the Project are identified in Table 3A-2. Correspondence received from NYSDEC to date identified one stream with the potential to contain wild brown trout (*Salmo trutta*) and / or brook trout (*Salvelinus fontinalis*), Stream S-12, Shin Hollow Brook (Gierloff, 2016) (see Appendix 1D of Resource Report 1). The existing permanent access road for the Hancock CS crosses a Class C(T) stream with an existing bridge and culvert. One Class C stream is located within Staging Area 4. A temporary equipment crossing will be installed in this location during construction in accordance with the Project ECS. No other aboveground facilities will affect NYSDEC classified waterbodies. A listing of these waterbodies is provided in Table 3A-2. Millennium will continue to consult with the NYSDEC to determine appropriate impact avoidance, minimization and mitigation measures for waterbodies potentially affected by the Project identified to contain fishery resources. Any correspondence received after submittal of this final ER will be provided to FERC in subsequent filings.

3.1.3 **Construction and Operation Impacts on Fisheries**

Impacts on aquatic communities from construction and operation of the Project will depend on the physical characteristics of the streams (e.g., flow, bottom substrate, channel configuration, and gradient), construction technique utilized, time of year proposed for crossing, and presence of game fish and federal- or state-listed species. This section describes potential effects and mitigation that will be implemented to minimize effects on fisheries of concern that could potentially occur in the Project areas.

3.1.3.1 *Pipeline*

Construction impacts on fishery resources may include: (1) direct contact by construction equipment; (2) increased sedimentation, water turbidity, or streambed scour immediately downstream of the construction work area; (3) alteration or removal of aquatic habitat cover; (4) introduction of pollutants; or (5) impingement or entrainment of fish and other biota associated with the use of water pumps at dam-and-pump crossings or for hydrostatic test water withdrawal. Millennium will use the dry waterbody crossing method for intermittent or ephemeral waterbodies where there is no discernable flow within the waterbody

at the time of crossing. Dry-ditch waterbody crossing methods (i.e., dam-and-pump and flume) will be used where trenched construction is proposed across waterbodies with flow at the time of construction. One major waterbody crossing (i.e., greater than 100 feet wide) is proposed. Millennium proposes to use the Horizontal Directional Drill (HDD) construction method to complete the Neversink River crossing (see Section 1.6.1.3 of Resource Report 1). Waterbodies will be crossed according to the methods outlined in Table 2A-4 of Resource Report 2.

Installation of the Huguenot Loop across surface waters will be completed in accordance with the Project Environmental Construction Standards (ECS) (see Appendix 1B of Resource Report 1), which specifies time windows for construction in accordance with FERC and NYSDEC specifications, appropriate additional temporary workspace setbacks, spoil setbacks, equipment bridges, erosion and sedimentation control requirements, and restoration requirements. With the implementation of the Project ECS, no long-term, permanent effects on coldwater fisheries or fisheries of concern are anticipated.

Dam-and-Pump

Where the dam-and-pump crossing technique is used, pump intake hoses will be screened appropriately to prevent the entrainment of fish and minimize the potential for impingement. Fish passage during dam-and-pump crossings will be temporarily restricted during the installation of the pipeline, which typically takes 24 to 48 hours to complete (24 hours to cross the waterbody and 24 hours for restoration). Where waterbodies are used for hydrostatic test water withdrawals, withdrawal intake hoses will be fitted with intake screen devices to prevent the entrainment of fingerlings and small fish during water withdrawal.

HDD

HDD is the other crossing technique that will be used to install portions of the Huguenot Loop under waterbodies, based on site-specific conditions. HDD is a trenchless crossing method that may be used for crossings under roads, railroads, sensitive resources, and waterbodies. The use of HDD can eliminate impacts on water quality from construction activities that would otherwise occur within the waterbody. The length of pipeline that can be installed by HDD depends upon underlying soil and rock conditions, pipe diameters, available technology, and equipment sizes. An HDD may not be appropriate for every site condition encountered based on factors such as subsurface geology and workspace constraints.

The locations where HDDs are proposed are listed in Table 1.6-1 of Resource Report 1. Site-specific plans for the HDDs, including access paths along the path of the drill, are included in Appendix 1C in Resource Report 1. Generally, if the HDD should fail at the proposed location, the HDD entry/exit points will be re-evaluated and relocated to an adjacent area, and the HDD will be attempted again. Millennium will notify all appropriate regulatory agencies and obtain approval to complete the HDD at the new location or to implement the alternate dry-ditch crossing plan should the HDD fail at the second location.

Sedimentation and Turbidity

Increased sedimentation and turbidity from in-stream construction across waterbodies has the potential to adversely affect fishery resources. However, these effects will be minimized by installation and maintenance of sediment and erosion controls throughout construction and until bank restoration and

revegetation is successful, thus limiting effects during the construction phase. Total suspended solid concentrations may increase during construction, but would decrease soon after as the disturbed stream sediments settle.

Removal of trees and other bank vegetation from the edges of waterbodies at the pipeline crossing location may reduce shading of the waterbody, diminish escape cover, and result in locally elevated water temperatures. Elevated water temperatures can, in turn, lead to reductions in levels of dissolved oxygen. This could reduce availability of habitat for certain fish species. To minimize potential effects associated with loss of riparian shade and vegetation cover, clearing of trees and other vegetation will be restricted to only what is necessary to safely construct and operate the pipeline. Once construction is complete, streambeds and banks will be restored in accordance with the Project ECS, and post construction maintenance (or mowing) will be limited to when necessary to facilitate periodic corrosion/leak surveys or to protect the integrity of the pipeline coating.

Spills

Accidental spills of hydrocarbon-based products (e.g., oil, diesel, hydraulic fluids) within the Project construction workspace could affect fisheries in adjacent streams, if present. The effects would depend on the type and quantity of the spill, and the dispersal and attenuation characteristics of the waterbody. To reduce the potential for surface water contamination, Millennium will implement its Spill Prevention and Response Procedures, which include best management practices to minimize the potential for accidental releases and measures that will be implemented to clean up any unanticipated releases (see Appendix 1B of Resource Report 1).

3.1.3.2 Access Roads

Temporary and permanent access roads will be required to facilitate movement of construction equipment and materials to and from the public roadways to the construction right-of-way for the Huguenot Loop. Three Class C waterbodies will be crossed by two temporary access roads (TAR-0005, TAR-0008) for construction of the Huguenot Loop. One Class C waterbody will be crossed by permanent access road PAR-0003. The waterbodies are currently conveyed under the existing roadways by culverts which will not be disturbed during construction of the Huguenot Loop. Board mats may also be used to reinforce existing culverted crossings along the existing access roads. Because no temporary or permanent access roads associated with the Huguenot Loop cross any FERC classified major streams and existing culverted crossings will be utilized, no direct impacts on fisheries are anticipated from modifying existing access roads. Access roads for aboveground facilities are discussed in Section 3.1.3.4. Table 1A-3 of Resource Report 1 provides the access road locations.

3.1.3.3 Pipe / Contractor Yards and Staging Areas

Four pipe / contractor yards and three staging areas have been identified for use during construction of the Project. All of these facilities will be located in upland areas outside of waterbodies, with the exception of Staging Area 4. A perennial stream (S-02) flows northwest to southeast within Staging Area 4. Millennium will install a temporary equipment crossing and erosion controls in accordance with the Project ECS

(Appendix 1B) at stream S-04 within Staging Area 4. Additionally, Millennium will install erosion controls in accordance with the Project ECS (Appendix 1B) at all pipe / contractor yards and staging areas to avoid impacting off-site waterbodies. Therefore, no direct impacts on fishery resources are expected to result from the temporary use of these facilities.

3.1.3.4 Aboveground Facilities

Aboveground facilities proposed to be constructed as part of the Project will consist of the new Highland CS, modifications to the existing Hancock CS, modifications to the existing Ramapo M&R, and the addition of pipeline appurtenant facilities at the existing Wagoner Interconnect, Huguenot M&R, and Westtown M&R. Additional aboveground facilities associated with the Huguenot Loop will consist of a new Pig Launcher / Receiver facility (MP 0.1) and installation of an Alternate Interconnect (MP 7.6) on Millennium's 16-inch Valley Lateral. Modifications to Millennium's existing facilities will be located on Millennium's property within and immediately adjacent to existing facility footprints to the extent practicable. Millennium will install erosion controls in accordance with the Project ECS (see Appendix 1B of Resource Report 1) to avoid impacting adjacent waterbodies during construction of the aboveground facilities. Therefore, no direct impacts on fishery resources are expected to result from the installation and operation of these facilities.

Compressor Stations

Highland CS

No waterbodies were identified within the site of the proposed new Highland CS during field surveys completed through June 2016. The proposed new permanent access road for the Highland CS will cross a minor, intermittent stream (HL-S-01). Millennium will install an open-bottom box or arch culvert to avoid direct impacts on the waterbody. Millennium will consult with applicable state and federal agencies during design and construction of the proposed new crossing to minimize impacts on the resource. NYSDEC and the USACE will review the crossing design through Millennium's Application for a Joint Permit, anticipated to be filed in August 2016. Millennium will address any comments from USACE and NYSDEC on the crossing at that time.

Hancock CS

Millennium will utilize the existing permanent access road to access the proposed modifications to the Hancock CS during construction and operation. The existing permanent access road to the Hancock CS includes an existing culverted stream crossing (HC-S-01). No impact on fisheries resources is anticipated from use of the existing crossing for the proposed Project. Field surveys of the Hancock CS modification areas are complete and one man-made detention pond currently used for stormwater control for the existing station would be affected by the Project. No fisheries resources would be affected by modification of the detention pond.

Meter Stations

Millennium proposes to modify the existing Huguenot M&R, Westtown M&R, and Ramapo M&R Stations as part of the Project. No waterbodies were identified in the areas for construction or operation of the modifications to the Huguenot and Westtown M&R. No waterbodies were identified in the areas for construction or operation of the modifications to the Wagoner Interconnect or Ramapo M&R, including along the existing permanent access roads.

Additional Aboveground Facilities

Field surveys are complete at the Pig Launcher / Receiver (MP 0.1) and Alternate Interconnect (MP 7.6) locations and no waterbodies will be affected by construction or operation of these facilities.

3.2 VEGETATION

This section identifies and discusses the major vegetation cover types crossed by the Project. Characterization of vegetation cover types in the Project areas was completed using information gathered from field surveys conducted through June 2016, recent aerial photographs of the Project areas, the New York Geographic Information Systems land-use data layers, and the natural community classification systems (Edinger et al., 2014). The major cover types in the Project areas were divided into five broad classifications:

- agricultural land;
- upland forest;
- open land (i.e., existing right-of-way, open fields, non-agriculture);
- wetlands (forested and non-forested); and
- other (non-vegetated areas including residential land, commercial/industrial land, existing roadways, and open water).

A comprehensive list of representative plant species found in the Project areas is included in Table 3A-3. Acreages of each vegetative cover type to be temporarily and/or permanently impacted by the Project are included in Table 8A-2 of Resource Report 8 and wetland vegetation acres to be impacted by the Project are further detailed in Table 2A-7 of Resource Report 2.

3.2.1 Existing Vegetation Resources

Upland vegetative communities were classified according to the *Ecological Communities of New York State: Second Edition* (Edinger et al., 2014), which classifies and describes ecological communities representing biological diversity in New York State. Edinger et al., classifies each ecological community as a “variable assemblage of interacting plant and animal populations that share a common environment.” The typical upland forested community types observed in the Project areas are Successional Northern Hardwood Forest, White Pine Northern Hardwood Forest, and Chestnut Oak Forest (variant) community types. These ecological community types are further described below.

The Project areas traverse forested and open upland communities, as well as palustrine forested, scrub-shrub and emergent wetlands. A list of the vegetative cover types and the species identified within them during the environmental surveys is provided in Table 3A-3. Descriptions of the wetland types and their typical vegetative species composition or described below, and Table 2.3-1 of Resource Report 2 summarizes the amount of each wetland type potentially affected by the Project. The Wetland Delineation Report (see Appendix 2C of Resource Report 2) provides information on each wetland identified to date within the Project areas.

A review of the Project areas by the NYNHP has identified five significant natural communities in the vicinity of the Project area, described in Section 3.2.2. Additionally, see Section 3.4 for a discussion of federally and state-listed endangered and threatened plant species.

3.2.1.1 Pipeline Facilities

Upland Forest

Successional Northern Hardwood Forest

The predominant upland forest community type along the Huguenot Loop is Successional Northern Hardwood Forest. This forest type is a hardwood or mixed forest located on sites that have been cleared or otherwise previously disturbed. Characteristic trees and shrubs found in this forest type include a mix of species, such as quaking aspen (*Populus tremuloides*), gray birch (*Betula populifolia*), black cherry (*Prunus serotina*), and red maple (*Acer rubrum*) among others, with lesser amounts of white ash (*Fraxinus americana*), green ash (*Fraxinus pennsylvanica*), and American elm (*Ulmus americana*). This community type is broadly defined and has several regional variants (Edinger et al., 2014).

Open Land

This cover type category covers all non-forested vegetated areas that are not in agricultural production or landscaped. It includes grasslands, successional old fields and shrublands, and maintained utility right-of-ways (mowed roadside/pathway). Vegetation management within the existing right-of-ways support early-successional habitat. Open lands are typically previously disturbed lands that have been cleared for farming, utility construction, or other developments and then abandoned. Grasslands are dominated herbaceous species such as: orchard grass (*Dactylis glomerata*), poverty grass (*Danthonia spicata*), reed canary grass (*Phalaris arundinacea*), and switchgrass (*Panicum virgatum*). Old fields are dominated by grasses and forbs, such as lance-leaved goldenrod (*Solidago graminifolia*), Queen Anne's lace (*Daucus corota*), ragweed (*Ambrosia artemisiifolia*), and rough-stemmed goldenrod (*Solidago rugosa*). Shrublands have at least 50 percent cover of shrubs and saplings, such as autumn olive (*Elaeagnus umbellata*), gray birch, meadowsweet (*Filipendula ulmaria*), multiflora rose (*Rosa multiflora*), and silky dogwood (*Cornus amomum*). Dense areas of shrubby thickets typically are not found in this cover type, except in localized areas (Zimmerman et al., 2012).

Typical species observed in open lands in the Project areas include Queen Anne's lace, red clover (*Trifolium pratense*), fox sedge (*Carex vulpinoidea*) reed canary grass, orchard grass, Kentucky bluegrass (*Poa pratense*), multiflora rose, Canada thistle (*Cirsium arvense*), and ragweed.

Agricultural Land

Agricultural lands include areas used for raising crops, grazing livestock, and tree farms. Agricultural land in the Project areas is used predominantly for hay and corn production (Brower, 2016). Typical species observed on agricultural lands in the Project areas include corn and common reed (*Phragmites australis*).

Wetlands

Wetlands delineated within the survey area were classified according to Cowardin et al. (1979). Identified wetlands were classified as Palustrine Forested (PFO), Palustrine Scrub-Shrub, and Palustrine Emergent. Palustrine systems include all non-tidal wetlands that are dominated by trees, shrubs, persistent emergent plants, emergent mosses, or lichens, as well as all wetlands that occur in tidal areas, where salinity, due to ocean-derived salts, is below 0.5 percent. This system includes ponds and may be situated shoreward of estuaries, lakes, river channels, river floodplains, in isolated catchments, or on slopes (Cowardin et al., 1979). All of the resource areas identified in the Project areas are classified as palustrine systems. Wetland types identified within the Project areas are further discussed in Resource Report 2 as well as the Wetland Delineation Report (see Appendix 2C of Resource Report 2).

Palustrine Forested Wetlands

Palustrine forested wetlands identified along the Huguenot Loop are characterized by woody vegetation that is approximately 20 feet in height or taller and normally include an overstory of trees, an understory of young trees or shrubs, and an herbaceous layer. Shrubs may be present in these areas, but they do not dominate the community. Herbaceous and non-vascular plant covers also are known to occur in these wetlands. The forested wetland canopy species in the Project areas typically are dominated by red maple, green ash, and swamp white oak (*Quercus bicolor*).

Palustrine Scrub-Shrub Wetlands

Palustrine scrub-shrub wetlands identified along the Huguenot Loop generally are dominated by woody vegetation less than approximately 20 feet tall. Scrub-shrub land types may represent a successional stage leading to a forested wetland and include shrubs, young trees, and trees or shrubs that are small and/or stunted due to environmental conditions. Shrub swamps are widespread, highly variable communities, with shrub-dominated wetlands that occur on mineral or mucky mineral soils that are either seasonally or temporarily flooded. They typically are found in flat areas in which the water table is at or above the soil surface for most of the year. Common wetland shrub species observed in the Project areas include black willow (*Salix nigra*), red maple, green ash, multiflora rose, silky dogwood, common winterberry (*Ilex verticillata*), and northern spicebush (*Lindera benzoin*).

Palustrine Emergent Wetlands

Palustrine emergent wetlands identified along the Huguenot Loop are characterized by erect, rooted, herbaceous hydrophytes, not including mosses and lichens. These wetlands maintain the same appearance year after year, and are typically dominated by non-woody perennial plants. The vegetation within these wetlands are present for the majority of the growing season. Common emergent wetland species that were identified in the Project areas include reed canary grass, tussock sedge (*Carex stricta*), shallow sedge (*Carex*

lurida), fox sedge, purple loosestrife (*Lythrum salicaria*), white clover (*Trifolium repens*), narrowleaf cattail (*Typha angustifolia*), and common reed.

Other

Non-vegetated areas that will be traversed by the Project include residential land, commercial/industrial land, existing roadways, and open water. These non-vegetated land cover types are discussed further in Resource Report 8.

3.2.1.2 Access Roads

Although public roads and the construction right-of-ways will be used for primary access to the right-of-way during construction of the Huguenot Loop, several temporary access roads will be required during construction of the Project. The temporary access roads will be located within the same generalized vegetation types as the pipeline route. As previously stated, access roads designated for potential temporary and/or permanent use during construction and operation of the Huguenot Loop are provided in Table 1A-3 of Resource Report 1. The majority of the temporary access roads are located through open land, upland forest, and agricultural areas; however other vegetative cover types may also be crossed. Millennium proposes to use existing roads as access roads with minor modifications during construction of the Huguenot Loop. Millennium anticipates that modifications to two existing temporary access roads (TAR-0003 and TAR-0004) will require limited clearing of upland vegetation to accommodate the passage of construction vehicles during construction of the Huguenot Loop. Proposed access road modifications for the Huguenot Loop will not impact any wetland resources. Three new permanent access roads will be required for operation of the Huguenot Loop. The new permanent access roads for the Huguenot Loop will not impact any wetland resources. One new permanent access road (PAR-0001) will require clearing some forested vegetation. Subsequent to construction, temporary access roads will be restored to their pre-construction condition or allowed to remain in place in accordance with individual landowner agreements. Permanent access roads for aboveground facilities are discussed in Section 3.2.1.4, below.

3.2.1.3 Pipe / Contractor Yards and Staging Areas

The pipe / contractor yards and staging areas will be used for equipment, pipe and material storage, as well as temporary field offices and pipe preparation/field assembly areas. The pipe / contractor yards and staging areas identified for use during construction of the Project consist primarily of open land (described above) including areas previously used as pipe / contractor yard and staging for previous projects on the Millennium System. The pipe / contractor yards and staging areas will be restored to previous conditions post-construction and will be graded and seeded where applicable.

3.2.1.4 Aboveground Facilities

Compressor Stations

Highland CS

The site for the Highland CS consists of Appalachian Oak-hickory Forest. This forest typically occurs in well-drained sites, usually on ridgetops, upper slopes, or south- and west-facing slopes (Edinger et al., 2014). Dominant tree species include red oak (*Quercus rubra*), white oak (*Quercus alba*) and black oak (*Quercus velutina*). Lower densities of pignut hickory (*Carya glabra*), shagbark hickory (*Carya ovata*) and sweet pignut hickory (*Carya ovalis*) are usually mixed in with the oaks. Shrubs that commonly occur in this forest type consist of flowering dogwood (*Cornus florida*), hop hornbeam (*Ostrya virginiana*), serviceberry (*Amelanchier arborea*), maple-leaf viburnum (*Viburnum acerifolium*), red raspberry (*Rubus idaeus*) and lowbush blueberry (*Vaccinium angustifolium*). Groundcover plants are also prevalent and include Pennsylvania sedge (*Carex pensylvanica*), wild sarsaparilla (*Aralia nudicaulis*), and tick-trefoil (*Desmodium glutinosum*). Typical tree species observed at the Highland CS site included red oak, blackjack oak, and white oak. The understory consisted of lowbush blueberry, black huckleberry, and mountain laurel.

The White Pine Northern Hardwood Forest community type was identified along the Highland CS permanent access road. This is a mixed forest that occurs on gravelly outwash plains, delta sands, eskers, and dry lake sands in the Adirondacks. Dominant trees are white pine (*Pinus strobus*) and red pine (*P. resinosa*); these are mixed with scattered paper birch (*Betula papyrifera*) and quaking aspen. In some stands there is a mixture of other northern hardwoods and conifers such as yellow birch (*Betula alleghaniensis*), red maple, balsam fir (*Abies balsamea*), and red spruce (*Picea rubens*); these are never common in a pine northern hardwood forest. Characteristic shrubs are blueberries (*Vaccinium angustifolium*, *V. myrtilloides*), sheep laurel (*Kalmia angustifolia*), wild raisin (*Viburnum cassinoides*), and shadbush (*Amelanchier canadensis*). Characteristic herbs are bracken fern (*Pteridium aquilinum*), wintergreen, trailing arbutus (*Epigaea repens*), cow-wheat (*Melampyrum lineare*), Canada mayflower (*Maianthemum canadense*), bunchberry (*Cornus canadensis*), star flower (*Trientalis borealis*), bluebeads (*Clintonia borealis*), painted trillium (*Trillium undulatum*), spreading ricegrass (*Oryzopsis asperifolia*), and Pennsylvania sedge. Mosses and lichens may be common to abundant, especially the mosses *Pleurozium schreberi*, *Brachythecium* spp., and *Dicranum polysetum*. Typical species observed along the access road included white pine, red maple, and sheep laurel. Additionally, an open bottom box or arch culvert will be installed at the crossing of an intermittent stream which is crossed by permanent access road.

Hancock CS

The site for the modifications to the Hancock CS consists of Successional Northern Hardwood Forest, described in Section 3.2.1.1, above. Typical species observed included American elm, white ash, red maple, tulip poplar (*Liriodendron tulipifera*), and American basswood (*Tilia americana*). A large riparian wetland that borders a perennial stream was identified on the site, adjacent to Hungry Hill Road. Millennium proposes to cross this system using the existing permanent access road to the Hancock CS.

Meter Stations

The modifications to and the additional facilities constructed at the existing Wagoner Interconnect, Huguenot M&R, and Westtown M&R sites will occur within existing commercial / industrial lands. No effects on vegetation are anticipated from the construction of or modifications to these facilities.

A portion of the modifications at the Ramapo M&R station will require tree clearing for construction and operation. Tree clearing will be limited to areas abutting the existing industrial station site, and along the existing permanent access road to the station. Based on the amount of tree clearing required (see Resource Report 8) and adjacency to the existing industrial facility, no significant effects on vegetation are anticipated from the construction or operation of the proposed modifications at the Ramapo M&R.

Additional Aboveground Facilities

The Pig Launcher / Receiver (MP 0.1) is located partially within Millennium's existing maintained easement consisting of open land and upland forest. Based on the minor aboveground facilities to be constructed, and the overlap with the existing maintained easement, no significant effects on vegetation are anticipated from the construction or operation of this facility. The Alternate Interconnect located at MP 7.6 will be constructed on open land owned by Millennium, no effects on vegetation are anticipated from the construction or operation of the Alternate Interconnect.

3.2.2 Vegetative Communities of Special Concern

Vegetative communities of special concern include sensitive or protected vegetation types, natural areas, and unique plant communities. Millennium consulted with federal and state resource agencies to determine if any federally or state-listed threatened and endangered plant species (including federal and state species of concern) or their designated communities occur within the Project areas. Correspondence received from the NYNHP identified five significant natural communities, one of which is also listed as rare, known to occur in the vicinity of the Project (Conrad, 2016). The official species list for the Project vicinity generated by the USFWS's Information for Planning and Conservation website did not identify the occurrence of critical habitats within the Project area (see Appendix 1D). Of the five significant natural communities identified by the NYNHP to occur in the vicinity of the Project, Floodplain Forest, Chestnut Oak Forest, and Hemlock-Northern Hardwood Forest were mapped by the NYNHP to occur within the Project area (NYSDEC, 2015). Copies of agency correspondence are included in Appendix 1D of Resource Report 1. The significant vegetated communities identified within the Project area are discussed below and the acreage of impacts on each community type is summarized in Table 3A-4.

3.2.2.1 Floodplain Forest

The NYNHP's review of the Project areas identified a floodplain forest at the location of the Huguenot Loop crossing of the Neversink River (see Table 3A-4). This habitat was classified as a High Quality Occurrence of Rare Community Type by the NYNHP. This Floodplain Forest is a moderate-sized floodplain forest occurring in many patches along the Neversink River in good condition but with an immediate threat of continued Japanese knotweed (*Fallopia japonica*) invasion. The community is located

at the edge of the large, high-quality Shawangunk Ridge greater landscape and along the Neversink River corridor (Conrad, 2016).

This section of the Huguenot Loop will be installed using HDD installation methods. However, a portion of the additional temporary workspace for the HDD located south of the Neversink River will be located within mapped floodplain forest habitat. Post-construction, the additional temporary workspace will be allowed to return to its pre-construction state as forest through natural succession.

3.2.2.2 Chestnut Oak Forest

The NYNHP review of the Project areas identified a High Quality Occurrence of Chestnut Oak Forest immediately adjacent to portions of the Huguenot Loop (see Table 3A-4). The NYNHP characterized this habitat as a large, diverse, matrix-forming forest in good to excellent condition (Conrad, 2016).

3.2.2.3 Hemlock-Northern Hardwood Forest

The NYNHP review of the Project areas identified a High Quality Occurrence of Hemlock-Northern Hardwood Forest immediately adjacent to portions of the Huguenot Loop (see Table 3A-4). The NYNHP characterized this habitat as a large forest dispersed among many patches. Some patches are in very good condition within an excellent landscape context, but others are in moderate condition at the edge of the natural landscape with agriculture and development nearby. The condition is also degraded by the hemlock wooly adelgid (Conrad, 2016).

3.2.3 Vegetation Impacts and Mitigation

3.2.3.1 Construction and Operation Impacts and Mitigation

Pipeline Facilities

The vegetation impacts associated with the construction and operation of the Huguenot Loop can be classified as short-term temporary, long-term temporary or permanent disturbances. Short-term temporary impacts will be associated primarily with the preparation of the construction workspace and access roads, where impacts will last through construction until the subsequent completion of successful restoration. Potential impacts include compaction of soils by construction equipment, trampling/crushing of herbaceous plants, removal of herbaceous and woody plant cover, and removal of root stock. Areas that are already vegetated with grasses or early successional species will be restored after the conclusion of construction activities. Once the vegetation within the short-term temporary disturbance areas has been restored within one to two growing seasons, it will provide forage and habitat for wildlife.

The long-term temporary disturbance areas will be associated primarily with areas where temporary workspace within forested areas will be cleared. These areas will be allowed to revert to their pre-existing conditions; however, they involve slower growing vegetation. The length of recovery time will depend on the sensitivity of the plant communities, the timing and extent of the disturbance, precipitation in the years following construction, and the geographic and topographic locations. Long-term vegetation impacts

associated with operational and maintenance activities will occur primarily within forested wetland and upland forested vegetation types within the new permanent easement for the Huguenot Loop and within new permanent aboveground facility areas.

Impacts on vegetative communities of special concern will be minimized by use of the HDD crossing method in the Floodplain Forest community type, and by co-locating the Huguenot Loop with the existing Millennium Pipeline through the remaining vegetative communities of special concern. Additionally, Millennium will use a typical construction right-of-way width of 125 feet in uplands and 75 feet in wetlands, where practicable, to minimize the amount of land disturbance. Temporary workspace has been added only where necessary to construct through agricultural lands and steep slopes, and for wetland topsoil segregation. Millennium will adhere to the Project ECS and Invasive Species Management Plan in all Project areas to minimize impacts from construction.

Upon the completion of construction, in areas where the Huguenot Loop is co-located with its existing right-of-way, Millennium will routinely maintain an additional 25 feet of permanent easement during operation. In areas where co-location is not possible or the loop deviates from the existing pipeline to facilitate an HDD, Millennium will maintain a 50-foot wide permanent easement during operation of the Huguenot Loop. Full-width vegetation maintenance clearing shall not occur more frequently than once every three years. However, to facilitate periodic corrosion and leak surveys, a corridor not exceeding 10 feet in width centered on the pipeline may be maintained annually in an herbaceous state. Full-width vegetation maintenance clearing will not typically occur between April 15 and August 1 of any year. In wetlands, a 10-foot wide corridor centered on the Huguenot Loop will be maintained in an herbaceous state, and trees greater than 15 feet in height located within 15 feet of the centerline of the Huguenot Loop will be selectively cut in accordance with the Project ECS.

Aboveground Facilities

Impacts on vegetation from the aboveground facilities will include the removal of vegetation during clearing activities and the permanent alteration of vegetation types in areas required for operation of the new facilities. Table 8A-2 of Resource Report 8 identifies the acres of forested vegetation that will be cleared for construction of the new Highland CS, the new Pig Launcher / Receiver at MP 0.1, and modifications to the existing Hancock CS and Ramapo M&R. Table 8A-2 also identifies the acres of forested vegetation that will be permanently converted to industrial use for operation of these facilities. Areas not permanently converted to industrial use will be allowed to revert back to preconstruction conditions following construction. Millennium will implement measures outlined in the Project ECS to ensure successful re-vegetation of the temporary workspace used during construction of the new aboveground facilities.

3.2.3.2 Noxious Weed and Invasive Species Control

In an effort to control the spread of noxious weeds and invasive plant species, Millennium will implement the measures described in the Invasive Species Management Plan included herein as Appendix 3B. For aboveground facilities, vegetation (including noxious weeds) will be cleared prior to use of the site. This clearing will help prevent the spread of weeds. Restoration will be monitored post-construction according

to the Project ECS. Follow-up inspections will be conducted in all disturbed areas, as necessary, to determine the success of revegetation and address landowner concerns. At a minimum, follow-up inspections will be conducted after the first and second, post-construction, growing seasons. If revegetation is unsuccessful, revegetation efforts will continue until the disturbed area is adequately restored. The non-native species identified within the Project during the field surveys completed through June 2016 are provided in Table 3A-5.

3.3 WILDLIFE

This section identifies and discusses the various wildlife species associated with the upland and wetland vegetation cover types affected by the Project and identified in Section 3.2.1. It also identifies designated wildlife habitats, such as wildlife refuges, state forests, wildlife management areas, and sensitive wildlife areas as identified through consultation. The extent of each land cover type and the areas of transition between cover types were established during biological field surveys completed through June 2016.

Game and non-game wildlife species are regulated and protected through various federal laws and regulations. Federal laws include the Fish and Wildlife Conservation Act of 1980 (16 U.S.C §§ 2901-2911), the Fish and Wildlife Coordination Act of 1958 (16 U.S.C. §§ 661-667e), the Bald and Golden Eagle Protection Act (BGEPA) of 1940 (16 U.S.C. §§ 668-668c), and the Migratory Bird Treaty Act (MBTA) of 1918, as amended (16 U.S.C. §§ 703-712). Migratory birds in the Project areas are protected under the MBTA, which was enacted in 1918 and prohibits the taking of migratory birds, eggs, and nests. A discussion of species under jurisdiction of the MBTA is provided in Section 3.3.3.

No significant or sensitive wildlife habitats have been identified to date other than those associated with federally or state-listed species (see Section 3.4).

3.3.1 Existing Wildlife Habitat Types

The Project will traverse terrestrial and wetland habitats that support a diversity of wildlife species. Vegetative cover is an important environmental component for defining wildlife habitat and wildlife species distribution. Variations in vegetative community types (e.g., deciduous hardwood and conifer are community types within the forested upland vegetation cover type) and other conditions, such as topography and land use disturbance, provide a variety of wildlife habitat conditions. For the purposes of this report, the wildlife habitats along the Huguenot Loop are described regionally and are representative of the vegetative community structure and composition of the terrestrial and wetland habitats present within the Project areas. Major terrestrial and wetland vegetative cover types were mapped during environmental field surveys and through the review of aerial photography of properties where survey access was not granted. The major cover types along the Huguenot Loop were divided into five broad classifications: upland forest, open land (existing right-of-way, open fields, non-agriculture), agricultural, wetlands, and other (including residential, commercial/industrial, existing roadways, and open water), and (forested, scrub-shrub, and emergent). For the purposes of this section, “other” lands, with the exception of open water, were excluded as a wildlife habitat type as these areas typically consist of lands classified as

residential, industrial/commercial, and roadways and, therefore, contain minimal vegetation, food and habitat for wildlife species.

Wildlife species likely to occur in each habitat type were determined by direct observation during field surveys, by consultation with applicable regulatory agencies, and by existing, available, online data. Existing plant communities, as well as aspects of the physical environment (climate, microclimate, hydrology, geology), will influence the wildlife species that are present in a particular habitat. Table 3A-6 lists representative wildlife species within each vegetative cover type.

Environmental field survey data and available resource materials were used to categorize the different wildlife habitat types located within the Project areas. The habitat types identified include upland forest, open uplands, agricultural areas, forested wetlands, scrub-shrub wetlands, emergent wetlands, and open water. The dominant vegetative species identified within these habitats in the Project areas are provided in Table 3A-3.

Agricultural Lands

Agricultural lands include areas actively in use for growing crops, grazing livestock, or tree farms. Although crops generally provide poor to moderate cover habitat, they often provide forage and nesting for a number of species such as bobolinks (*Dolichonyx oryzivorus*), eastern meadowlarks (*Sturnella magna*), wild turkey (*Meleagris gallopavo*), and mourning doves (*Zenaidura macroura*). Pastures also provide grazing habitat for species such as the eastern cottontail (*Sylvagus floridanus*), white-tailed deer (*Odocoileus virginianus*), and woodchuck (*Marmota monax*) (NYSDEC, 2010).

Upland Forest

Upland forests provide cover, food resources, and nesting habitat for a variety of amphibians, birds, invertebrates, mammals, and reptiles. The tree and shrub layers provide food and cover for many bird species and larger mammals such as white-tailed deer. Detritus on the forest floor provides food and cover for invertebrates, amphibians, and reptiles. Smaller mammals such as the eastern chipmunk (*Tamias striatus*), gray squirrel (*Sciurus carolinensis*), and raccoon (*Procyon lotor*) utilize fallen logs for cover and nest cavities (NYSDEC, 2010).

The presence of oak species is an important habitat component of upland forests in the Project areas. Mammals rely directly on oaks which generate seeds and nuts as a food source, while amphibians and invertebrates rely on the soil chemistry of an oak forest. Predatory species such as raptors and coyotes (*Canis latrans*), also are attracted to oak-dominated forests and their edges due to the abundance and diversity of prey species.

A variety of songbirds, including migrants and resident species, utilize upland forest habitat. Many migrants feed on the numerous insects occurring within the forest canopy. Breeding birds use a range of different nest sites, with some species nesting on the forest floor, some in understory vegetation and some in the tree canopy. Characteristic bird species in upland forests include red-bellied woodpecker (*Melanerpes carolinus*), wild turkey, northern flicker (*Sitta carolinensis*), downy woodpecker (*Picoides*

pubescens), black-capped chickadee (*Poecile atricapillus*), yellow warbler (*Setophaga petechia*) and ovenbird (*Seiurus aurocapillus*) (Edinger et al., 2014).

Open Uplands

The early successional habitat types in the Project areas include successional scrub-shrub areas, fields and disturbed and/or maintained areas such as existing utility right-of-ways or other open space areas. Grasslands, old fields, and brushy areas can be utilized as foraging and nesting habitat by mammals and songbirds. Shrublands provide sources of food and nesting sites for various birds, as well as cover for invertebrates, reptiles, and amphibians. Shrublands and grassland habitats are attractive to many wildlife species, because they provide protection, nesting, and food sources. Species such as the eastern cottontail, gray squirrel, opossum (*Didelphis virginiana*), raccoon, and red fox (*Vulpes vulpes*) utilize these types of habitats (NYSDEC, 2010).

Edge habitats, where natural habitats lay adjacent to developed or maintained areas, create other habitat types which are utilized by a distinct group of wildlife. Open lands can be regularly maintained, cleared, or abandoned for the promotion of successional growth habitats. The areas of existing right-of-ways provide corridors that will be utilized by several species to move between habitats. These species may include coyote, eastern cottontail, white-tailed deer and forest edge bird species, such as the American robin (*Turdus migratorius*), brown thrasher (*Toxostoma rufum*), field sparrow (*Spizella pusilla*), and northern cardinal (*Cardinalis cardinalis*) (NYSDEC, 2010).

Wetlands

Forested Wetlands

Forested wetlands can provide a diverse assemblage of vegetation and an abundance of food and water sources for wildlife. These wetlands are important for providing food, shelter, migratory and wintering areas, and breeding areas for wildlife species, including eastern garter snake (*Thamnophis sirtalis*), red-backed salamander (*Plethodon cinereus*), and wood frog (*Rana sylvatica*). Forested wetlands also provide habitat for white-tailed deer, raccoon, mink (*Neovison vison*), beaver (*Castor canadensis*), wood duck (*Aix sponsa*), and great blue heron (*Ardea herodias*) (NYSDEC, 2010).

Scrub-Shrub Wetlands

Scrub-shrub wetlands typically are not as structurally diverse as forested wetlands due to the lack of taller, mature trees. They contain vegetation that is characteristically low and compact. Under normal conditions, the vegetative structure is influenced by surface water inundation or the presence of high groundwater for extended periods of time. Scrub-shrub wetlands may also be maintained by periodic maintenance activities (such as along existing right-of-ways) that remove larger tree species. Scrub-shrub wetlands supply an abundance of food and cover resources for amphibians and mammals, including the American toad (*Bufo americanus*), gray catbird (*Dumetella carolinensis*), white-tailed deer, and muskrat (*Ondatra zibethicus*) (NYSDEC, 2010). The plant species that make up scrub-shrub wetlands can also offer nesting sites for birds. Other representative species found in scrub-shrub wetlands include red-winged blackbird (*Agelaius phoeniceus*), American bullfrog (*Rana catesbeiana*) and the northern green frog (*Rana clamitans*).

Emergent Wetlands

Emergent wetlands are dominated by erect, rooted, herbaceous plants that are used by wildlife closely linked to the aquatic environment. These areas often are associated with areas containing standing water for extended periods of time. These wetlands provide habitat for species, such as wading birds, ducks, and other aquatic and semi-aquatic species. Wildlife use these areas for nesting, feeding, and migratory stopovers. Species found in this habitat type include great blue heron, muskrat and red-winged blackbird (NYSDEC, 2010). Amphibians and reptiles such as the American bullfrog, common snapping turtle (*Chelydra serpentina*) and northern watersnake (*Nerodia sipedon*) are also common in this wetland habitat.

Open Water

Open water includes rivers and streams crossed by the Project. The Neversink River is the only waterbody greater than 100-feet wide that will be crossed by the Project. Open water areas provide habitat for waterfowl and wading birds, along with other aquatic species. Additionally, the dwarf wedgemussel and the brook floater (*Alasmidonta varicose*) have been documented in the Neversink River at the location of the existing Millennium Pipeline crossing by the NYNHP. These federal and state-listed species are discussed in Section 3.4.

3.3.2 Sensitive Habitats

This section reviews sensitive wildlife habitats and lands managed for wildlife that could be affected by the Project. To identify significant and sensitive wildlife habitats, Millennium consulted with the USFWS and NYNHP. No sensitive wildlife habitats, including Wildlife Management Areas, are anticipated to be affected by the Huguenot Loop, aboveground facilities, access roads, staging areas, pipe / contractor yards or staging areas (Conrad, 2016). Review of the Bird Conservation Areas – New York State database (NYSDEC, 2009) did not identify any New York state lands that have been officially designated for their value to bird conservation. However, a review of Audubon Society’s Important Bird Areas (NAS, 2007) identified the Highland CS to be located within an Important Bird Area. No National Wildlife Refuges or National Park Service Wilderness Areas are mapped in the vicinity of the Project areas. The official species list for the Project vicinity generated by the USFWS’s Information for Planning and Conservation website did not identify the occurrence of critical habitats within the Project area (see Appendix 1D).

3.3.3 Migratory Birds

The MBTA, originally passed in 1918, implements the U.S. commitment to four bilateral treaties, or conventions, for the protection of a shared migratory bird resource, protecting more than 800 species of birds. The list of migratory bird species protected by the MBTA appears in Title 50, section 10.13, of the Code of Federal Regulations (CFR) (50 CFR 10.13). The MBTA states that it is unlawful to pursue, hunt, take, capture, kill, possess, sell, purchase, barter, import, export, or transport any migratory bird, or any part, nest, or egg of any such bird, unless authorized under a permit issued by the Secretary of the Interior (16 U.S.C § 703(a)). Take is defined in regulations as to: “pursue, hunt, shoot, wound, kill, trap, capture, or collect, or attempt to pursue, hunt, shoot, wound, kill, trap, capture, or collect” (50 CFR 10.13).

Executive Order 13186 (Issued January 2001) directs federal agencies to enter into a Memorandum of Understanding with USFWS to promote the conservation of migratory bird populations. On March 30, 2011, the USFWS and the FERC entered into a Memorandum of Understanding that focuses on avoiding or minimizing adverse effects on migratory birds and strengthening migratory bird conservation through enhanced collaboration between the USFWS and FERC by identifying areas of cooperation. This voluntary Memorandum of Understanding does not waive legal requirements under any other statutes (e.g., MBTA, Bald and Golden Eagle Protection Act, Endangered Species Act, and Natural Gas Act) and does not authorize the take of migratory birds.

The U.S. North American Bird Conservation Initiative (NABCI) Committee is a forum of government agencies, private organizations, and bird initiatives helping partners across the continent meet their common bird conservation objectives. The species listed as Birds of Conservation Concern by the NABCI are a subset of birds protected under the MBTA and include species, subspecies, and populations of all migratory nongame birds that, without additional conservation actions, are likely to become candidates for listing under the Endangered Species Act of 1973. Bird Conservation Regions (BCR) are the smallest geographic scale endorsed by the NABCI and includes species that are protected under the MBTA (the recent list has been revised to also include non-MBTA-protected species) that represent the USFWS' highest conservation priorities (USFWS, 2008).

The Project will be located within BCR 28, the Appalachian Mountains region (NABCI, 2000). Table 3A-9 lists the Birds of Conservation Concern potentially occurring within the BCR crossed by the Project. Of the 25 bird species listed for BCR 28, only five have documented or confirmed occurrences in the vicinity of the Project areas (NYSDEC, 2008). The NYSDEC 2000-2005 bird inventory identified black-capped chickadee (*Poecile atricapillus*), blue-winged warbler (*Vermivora cyanoptera*), Louisiana waterthrush (*Parkesia motacilla*), prairie warbler (*Setophaga discolor*), and wood thrush (*Hylocichla mustelina*) as species with potential to occur within the Project areas. These species are associated with either deciduous and/or coniferous forested habitats or scrub-shrub habitat, similar to those identified within the Project areas.

To date, no priority or critical habitat for any Birds of Conservation Concern known to occur in BCR 28 has been identified within the Project Areas. However, two bald eagle nests were identified along the Neversink River north of the Project area during the Bald Eagle Nesting Surveys conducted in spring 2016. No eagle nests or potential nest trees were identified within the Highland Compressor Station during the eagle nesting surveys. The findings of the bald eagle survey are further discussed in Section 3.3.3.2.

3.3.3.1 Important Bird Areas

The Important Bird Areas (IBA) Program was launched in 1995 by The Audubon Society (NAS) with the goal of identifying and conserving important bird habitat. This state-based program is administered by local conservation leaders which are allowed to tailor their IBA Programs in a manner that meets their state needs (NAS, 2013). A review of the NAS IBA webviewer identified the Highland CS to be located within the Mongaup Valley Wildlife Management Area IBA. This IBA was listed in the New York 2002 Open Space Conservation Plan as a priority site (NAS, 2013). It is described as a series of reservoirs and streams

flowing from the Mongaup Valley to the Delaware River. Orange and Rockland Utilities discharge warm waters into local reservoirs and rivers which prevents them from freezing during the winter months. The open waters provide a steady food source for wintering bald eagles (*Haliaeetus leucocephalus*) (NAS, 2013). The reservoirs and rivers in this IBA are said to support one of the largest concentrations of wintering bald eagles in the state (NAS, 2013).

Review of the Project Areas by the NYNHP did not identify any known bald eagle occurrences in the vicinity of the Highland CS. The Highland CS is sited adjacent to an existing pipeline right-of-way in a forested area. The nearest large bodies of water are the Toronto Reservoir which is located 2.75 miles to the north, and Lebanon Lake which is located 2.75 miles to the east of the CS. Smaller bodies of water including Sunrise Lake and Wells Pond are located 0.5 miles to the southeast and 1.5 miles to the northwest, respectively. Due to the local habitat and the distance to large bodies of water, construction and operation of the Highland CS is not anticipated to adversely affect bald eagles or their preferred habitat. Additional bald eagle information is provided in the following section.

3.3.3.2 Bald Eagle

Although the bald eagle is no longer a federally listed endangered or threatened species, it is still protected under the BGEPA and the MBTA. Both acts prohibit killing, selling, or harming eagles or their nests. The BGEPA also protects eagles from disturbances that may injure them, decrease their productivity, or cause nest abandonment. Additionally, the bald eagle is state-listed as threatened in New York.

The bald eagle is a large, carnivorous bird with a range that covers virtually all of North America. Preferred habitats consist of areas near waterbodies such as coasts, bays, lakes, rivers, and forested wetlands. Bald eagles are opportunistic feeders and will both hunt and scavenge. They breed throughout New York State and prefer areas with large bodies of water that support high fish populations (NYNHP, 2013). Mixed conifer and hardwood forests and woodlands with large, accessible trees typically are used for roosting and nesting. Bald eagles generally avoid areas with human activities and perch in either deciduous or coniferous trees (NYNHP, 2013). They are long-lived in the wild, often with a life span of over 30 years, and return to within 250 miles of the nesting area where they were fledged each year (NYSDEC, 2016a).

During Bald Eagle Nesting Surveys conducted in May 2016, two nests sites were identified in trees located along the bank of the Neversink River, approximately 0.7 and 1.7 miles north of the proposed pipeline crossing. An adult pair of bald eagles were observed in the vicinity of each nesting site however, neither pair appeared to be attending chicks. The northernmost nest was located approximately 5,000 from the nearest Project workspace and the southernmost nest was located approximately 1,700 from the nearest workspace. The southernmost nest, the closer of the two nest, was located approximately 4,000 feet and not visible from the proposed Huguenot Loop crossing of the Neversink River, well exceeding the minimum distance of 660 feet established by the National Bald Eagle Management Guidelines. Therefore, the construction and operation of the Project is not expected to affect nesting bald eagles. The Bald Eagle Nesting Survey Findings Report (Appendix 3C) will be submitted to state and federal agencies for review and comment concurrent with the filing of this final ER. The Bald Eagle Survey Findings Report (Appendix

3C) is included in Volume III, Privileged and Confidential. Millennium is in consultation with the NYDSEC and USFWS and will submit any additional correspondence or concurrence to FERC as received.

In the event that Millennium encounters a bald eagle nest in the Project area during construction, Millennium would coordinate with the USFWS to confirm the distance of avoidance buffers to implement from the USFWS Recommendations for Avoiding Disturbance at Nesting Sites (May 2007). The recommendations include a 660-foot buffer if there is no similar activity within one mile of the nest and if the activity will be visible from the nest. The recommendations also include buffer distances depending on visibility of the nest, the presence of similar construction activity within one mile from the nest, and timing relative to the breeding season. Millennium would consult with the USFWS for concurrence regarding any protective measures implemented before proceeding with construction in the vicinity of the identified nest.

3.3.4 Impacts and Mitigation

3.3.4.1 Wildlife Habitat

General, temporary, construction-related impacts on wildlife species will be associated with habitat disturbance and human activities (primarily noise and vehicle traffic), while permanent impacts are those associated with the conversion of forest habitats to open or scrub-shrub areas due to construction and maintenance of the permanent easement. Indirect impacts on wildlife include those associated with increased human activity and noise. Construction-related noise impacts, specifically, will be localized and temporary. Operation-related noise impacts will be minimized through the use of components designed to reduce noise emissions and noise mitigation techniques. No adverse effects on wildlife due to noise is anticipated.

Construction of the Project likely will result in the temporary displacement of or stress on animals in areas adjacent to construction and cause movement of some wildlife away from the Project areas. Stress on wildlife could affect general health, reproduction, and viability of young, depending on the sensitivity of a particular species, season of the year, and other factors. Other temporary impacts on wildlife species include those from pipeline trenching activities and associated spoil piles, which could result in a short-term barrier to movement to some species. During clearing and grading activities, more mobile wildlife species (e.g., larger birds, mammals, and reptiles) will be able to avoid the construction area, and many are expected to leave the area during construction. Habitat recovery will occur through natural processes, aided by the use of the impact minimization and restoration measures outlined in the Project ECS.

Direct and long-term impacts on wildlife habitat resulting from construction and operation of the Project will include the clearing of riparian areas, forested areas, uplands, and wetlands required for temporary workspace, a new permanent easement, and new aboveground facilities. Based on current design, approximately 89 percent of the total length of the new Huguenot Loop will be constructed adjacent to and overlapping the permanent easement associated with the existing Millennium Pipeline and the Highland CS will be constructed in close proximity to the existing Millennium Pipeline. Siting these facilities in this manner minimizes the removal of vegetation and habitat fragmentation associated with the Project. The direct removal of vegetation has the potential to reduce the amount of available cover, food resources, and

habitat. Habitat fragmentation is an effect of vegetation removal and occurs when larger areas of habitat are reduced and/or split into smaller non-contiguous areas by development. Besides the direct loss of habitat, habitat fragmentation can also cause change in habitat vegetation composition (which could include the introduction of noxious and/or invasive species).

It is not anticipated that wildlife populations that utilize the Project areas will be permanently adversely affected by the Project. While temporary impacts on cover, food, and water sources may occur, none of the species located within the Project areas are specialized in such a way that construction of the Project will inhibit the overall fitness or health of the populations as a whole. Where new aboveground facilities are proposed, areas adjacent to the aboveground facility sites will provide similar and ample habitats for any wildlife displaced temporarily during construction or permanently during operation of the new facilities.

In wetlands, vegetation maintenance over the full width of the permanent easement is prohibited pursuant to the FERC's (2013) *Wetland and Waterbody Construction and Mitigation Procedures*. However, to facilitate periodic pipeline corrosion/leak surveys, a corridor centered on the pipeline up to 10 feet wide will be maintained annually in an herbaceous state within wetlands. In addition, trees that are located within 15 feet of the pipeline, on either side, that are greater than 15 feet in height may be selectively cut and removed from the right-of-way. Trees and shrubs that become reestablished beyond 15 feet of the pipeline, on either side, will not be disturbed. Vegetation maintenance practices on the construction right-of-way adjacent to waterbodies will consist of maintaining a 25 foot wide riparian strip along the waterbody, as measured from the mean high water mark. This riparian strip will be allowed to revegetate permanently with native woody plant species.

Following construction, areas cleared for temporary workspace will be allowed to revert to preconstruction conditions and provide additional, early successional habitat to wildlife species. These areas will not be maintained after construction and will revert to forested habitat over time. Permanent loss of trees will occur within the areas required for operation of the new aboveground facilities and within the permanent easement that will be maintained by mowing and periodic tree removal. These maintained right-of-ways can provide travel corridors and edge habitat along forested areas for some species.

Millennium will minimize impacts on wildlife habitats to the greatest extent practicable. Temporary disturbance in these areas may affect migrating species, such as warblers. However, while individuals may vacate an area during construction and may expend extra energy finding an alternate location, impacts on migrating species are expected to be minimal overall, since individuals/flocks will pass over areas under active construction and move to an area more suitable for feeding or resting. The individuals/flocks will be able to utilize the area again in subsequent seasons after construction completion. Overall disturbance to these areas will be minimized by adhering to the Project ECS.

3.3.4.2 Effects on Migratory Birds and Mitigation

As stated above, approximately 89 percent of the total length of the new Huguenot Loop will be constructed adjacent to and overlapping the permanent easement associated with the existing Millennium Pipeline and

the Highland CS will be constructed in close proximity to the existing Millennium Pipeline. Constructing the facilities in these areas will limit effects on vegetation by reducing land use change and tree clearing activities associated with the construction of the Project. Impacts on vegetation during construction and operation of the Project are listed on Table 8A-2 of Resource Report 8.

Construction activities that occur during the bird nesting season (generally April 1 to August 31) could result in direct and indirect impacts on bird species. Examples of potential effects include habitat loss, disruption of foraging adults, and abandonment or destruction of active nests. The Project may have a short-term impact on migratory bird species that may nest in or near the construction areas. However, to minimize effects on migratory birds during the construction of the Project, the following measures have been incorporated into the Project design:

- Clearing will be conducted to avoid the peak nesting season in accordance with USFWS consultation.
- The new Huguenot Loop will be co-located with existing right-of-way for 89 percent of its total length.
- The typical construction right-of-way width for installation of the new Huguenot Loop will be limited and range between 125 feet in upland areas and 75 feet in wetland areas. ATWS is limited to areas where additional space is needed for wetland topsoil segregation, steep slope construction, at road and railroad crossings, and at HDD entry and exit sites. The typical construction right-of-way has also been reduced in some locations to minimize impacts on residences (see Resource Report 1).
- Millennium will use HDDs to cross under certain waterbodies and associated forested riparian habitats in conjunction with these crossings, to minimize or eliminate impacts (e.g., habitat fragmentation) on migratory birds that utilize riparian habitat (see Resource Report 2).
- Millennium has proposed to reduce the construction right-of-way to a maximum of 75 feet in width in wetlands, to the extent practicable, to minimize construction related impacts (see Resource Report 2).
- Construction activities will be confined to the Project designated construction work areas and the pipe/contractor yards and staging areas. These areas will be staked and marked prior to clearing and the markings will be maintained throughout construction.
- Millennium will require all personnel working on the Project to attend environmental training sessions. This training will focus on implementation of best management practices contained in the Project Compliance and Mitigation Plans in Appendix 1B. This training will include instructions on construction work area limits, permit requirements, and other mitigation measures.
- The Project construction work areas will be stabilized to protect soil resources and aid in returning disturbed areas back to preconstruction conditions.

In addition to these measures, Millennium will conduct routine vegetation maintenance within the permanent easement at a frequency necessary to maintain the 10 foot wide corridor in an herbaceous state; however, mowing and clearing activities will not occur between April 15 and August 1 of any year to minimize effects to ground nesting birds. In wetlands, Millennium will not conduct vegetation maintenance over the full width of the permanent easement and will allow a riparian strip of at least 25 feet wide as measured from the waterbody's mean high water mark to permanently revegetate. However, to facilitate periodic pipeline corrosion/leak surveys in these areas, a corridor centered on the pipeline and up to 10 feet wide may be maintained in an herbaceous state. In addition, trees and shrubs that are located within 15 feet of the pipeline that have roots that could compromise the integrity of the pipeline coating may be cut and removed from the right-of-way. Project effects on migratory birds are expected to be short-term and further minimized by clearing outside of the active breeding season and siting the Project within edge forest thereby avoiding fragmentation of large, contiguous blocks of forest. All tree clearing activities will occur between October 1 and March 31, within the USFWS's standard Indiana bat (*Myotis sodalis*) seasonal tree clearing window discussed in Section 3.4.1.2, below.

3.4 THREATENED, ENDANGERED, AND CANDIDATE SPECIES

The Endangered Species Act (ESA) of 1973 protects fish, wildlife, plants and invertebrates that are federally listed as threatened and endangered, as well as species-specific critical habitat. A federally-listed endangered species is one that is in danger of extinction throughout all or a significant portion of its range. A federally listed threatened species is likely to become endangered in the foreseeable future throughout all or a significant portion of its range. "Critical habitat" is defined as specific areas both within and outside the geographic area occupied by a species on which are found those physical and biological features essential to its conservation.

Millennium has conducted informal consultations with the USFWS and NMFS, as well as the New York State agencies charged with managing state-listed rare, threatened, endangered, or special concern species. Based on the information received from these agencies, Millennium has identified areas of the Project where the potential exists for occurrence of federally and/or state-listed species. Any additional or continued correspondence with the USFWS and state agencies relative to listed species after the filing of this final ER will be provided to FERC in a supplemental submittal. Information contained in the agency consultation letters and biological survey reports completed as of the date of this resource report is summarized below.

Baseline environmental surveys to identify potential protected species habitat were completed in November 2015 and April and June 2016, in association with the wetland and waterbodies delineations. Additional surveys were conducted in May and June 2016 to identify the presence / absence of protected species within areas identified as potential habitat during the initial surveys. Mussel surveys and small-whorled pogonia (*Isotria medeoloides*) surveys will be completed in July and August 2016. Findings reports for the Phase I Habitat Surveys and Phase II Presence / Absence Surveys that have been completed through June 2016 are included in Appendices 3C through 3G. Results of the surveys are summarized in the following sections.

3.4.1 Federally Listed Species

Section 7 of the ESA (16 U.S.C § 1536) requires each federal agency to ensure that any action authorized, funded, or carried out by the agency does not jeopardize the continued existence of federally listed threatened or endangered species or result in the destruction or adverse modification of the designated critical habitat for any federally listed threatened or endangered species. The Commission, as the lead agency in the review of the Project, is required to consult with the USFWS to determine whether federally listed species, species proposed for listing, or their designated critical habitat may occur in the Project areas and to determine the Project's potential effects on these species and critical habitats. However, in accordance with Section 380.13(b) of FERC's regulations, the Project sponsor is designated as FERC's non-federal representative for purposes of informal consultation with the USFWS. Results of this consultation are presented in the following sections.

A consultation letter regarding federally listed and proposed endangered or threatened species was sent to the NMFS, as they administer the ESA for marine species. The NMFS stated that no threatened or endangered species under its jurisdiction are expected to be in the Project areas (Alvarez, 2016) and that no further consultations with that agency is required under Section 7 of the ESA. The New York Field Office of the USFWS issued a response stating that federally listed species under their jurisdiction may occur in the vicinity of the Project areas. The identified federally listed species are provided in Table 3A-7. Millennium will continue to consult with the USFWS regarding the results of species-specific surveys and federally listed species within the Project areas.

Continued consultation with the USFWS New York Field Office will occur prior to Project construction to ensure that no impacts on federally listed species will occur in the vicinity of the Project facilities.

3.4.1.1 Plants

Small whorled pogonia (*Isotria medeoloides*)

The small whorled pogonia is a federally listed threatened species and was assumed to be extirpated in New York State until a small population was found in Schunnemunk State Park in Orange County in 2010 (Adamovic, 2014). The Schunnemunk State Park location is more than 15 miles from the nearest Project facility. Populations are typically small, with populations rarely exceeding 20 plants (USFWS, 2016a).

These plants grow in older hardwood stands of beech, birch, maple, oak and hickory that have an open understory. It prefers acidic soils with a thick layer of dead leaves, often on slopes near small streams (USFWS, 2016a). The small whorled pogonia prefers Arnot Complex Soils. Based on desktop analysis (NRCS, 2016), Arnot Complex soils are present in one of the Project areas, along approximate MP 1.7 to MP 2.5 on the Huguenot Loop. Millennium will complete presence / absence surveys for the small whorled pogonia within suitable habitat in the Project areas in July 2016. The findings of the surveys will be provided to state and federal agencies for review and comment when complete. Millennium is in consultation with the USFWS and NYSDEC and will submit any additional correspondence or concurrence to FERC as received.

3.4.1.2 Mammals

Indiana bat (*Myotis sodalis*)

The Indiana bat is a federally listed and New York State listed endangered species. Across the species' range, the population (as recorded from counts in hibernacula) has declined dramatically since the late 1950s. In 1960, the Indiana bat population was estimated at more than 800,000 individuals. The most current total available as of August 2015, reflects surveys completed in early 2015, estimates the population at 523,636 individuals, apparently rebounding moderately from a population low in 2001 of 451,554 (USFWS, 2016b). There are 15 known hibernacula located in eight counties in New York (USFWS, 2007). Additionally, summer occurrence records, both maternity and non-maternity, are located in 10 counties, including eight maternity colony records in Orange County (USFWS, 2007). Given the sensitive nature of endangered species records, the exact locations of both hibernacula and summer occurrence records are unknown. However, correspondence from the NYNHP indicated that a summer roost has been documented within one mile of the Westtown M&R (Conrad, 2016).

The Indiana bat population decline between 2007 and 2011 was pronounced in the northeastern United States, where a nearly 70 percent decrease was documented. Much of this decline is thought to be the result of an ailment called white-nose syndrome (WNS). Bats suffering from WNS were first observed in New York in the winter of 2006-2007, and affected bats have now been observed in 26 states and 5 Canadian Provinces (USFWS, 2015b). In New York, WNS is known or suspected in 21 counties (USFWS, 2015b). Prior to the discovery of WNS, New York Indiana bat populations were increasing, reaching a maximum of 52,779 individuals in 2007 (USFWS, 2015b). The most recent census of Indiana bat hibernating populations documented 15,564 individuals in New York, representing an approximate 70.5 percent decline within the state since 2007 (USFWS, 2016b).

Indiana bats require specific habitat conditions during hibernation and for summer roosting and foraging. Hibernation habitat consists of caves or mine shafts that provide a narrow range of climatic conditions. Occupied hibernacula have stable temperatures typically below 10 degrees Celsius, above freezing, and generally from 3 to 7.2 degrees Celsius (Tuttle and Kennedy, 1999). Warmer temperatures may increase metabolic rates and cause fat depletion during hibernation (Richter et al., 1993). Relative humidity for occupied hibernacula is typically between 70 and 100 percent (Hall, 1962; Humphrey, 1978, LaVal et al., 1977; Tuttle and Kennedy, 1999). Preferred hibernacula also have noticeable airflow (Henshaw, 1965).

Summer maternity habitat was originally thought to consist of mature trees in riparian or floodplain forest adjacent to small-to-medium-sized streams (Cope et al., 1974; Humphrey et al., 1977). However, recent studies have revealed that upland forest provides important maternity, roosting, and foraging habitat (Gardner et al., 1991a). Maternity roosts are often found under exfoliating bark or in crevices of trees with exposure to direct sunlight. Average diameter at breast height of roost trees ranges from 23 centimeters (9 inches) to 58.4 centimeters (23 inches) (Callahan et al., 1997; Gardner et al., 1991b). Snags (standing dead trees) are most commonly used, but some maternity colonies have been found in live trees. Snags providing suitable habitat for roosting Indiana bats are ephemeral. Maternity colonies often use numerous (10 to 20) roost trees, including one to three primary roosts which are used by many adult females and young, and alternate roost trees which support fewer individuals and are used intermittently (Callahan et al., 1997).

Females are philopatric and often use the same roosts in successive summers if the trees remain standing and retain exfoliating bark (Callahan et al., 1997; Gumbert et al., 2002; Gardner et al., 1991b; Kurta and Murray, 2002). If the primary roost tree is destroyed, surviving members of the maternity colony may move to one of the alternate roosts. A maternity colony may use several roosts up to 3.7 kilometers (km) (2.3 miles) apart (Kurta and Murray, 2002).

Adult male and non-reproductive female Indiana bats roost separately from maternity colonies and often use several different roost trees in an area from night to night (Gardner et al., 1991b; Rommé et al., 1995). They have also been documented using caves, mines, and artificial roost structures (Butchkoski and Hassinger, 2002; Salyers et al., 1996; Wilhide et al., 1998).

Millennium submitted an Indiana Bat Acoustic Survey Study Plan (Appendix 3D) to state and federal agencies for review and comment on May 12, 2016. The study plan was approved by the USFWS on May 18, 2016 (Niver, 2016) and acoustic surveys for the Project were subsequently completed. The Indiana Bat Acoustic Survey Findings Report (Appendix 3D) will be provided to state and federal agencies for review and comment concurrent with the filing of this final ER. A total of four survey sites along the Huguenot Loop recorded Indiana Bat calls during the 18-night survey. No Indiana Bat calls were recorded during the 18-night survey at the Ramapo M&R. In addition to the survey locations, a known Indiana bat occurrence buffer has been provided to TRC by the NYSDEC, extending east from the Greenville/Minisink town line, encompassing the eastern portion of the Huguenot Loop. No surveys were conducted in known occurrence buffers. Millennium will continue its consultation with the USFWS and NYSDEC regarding the Indiana Bat and associated tree clearing timing restrictions. Millennium will provide the FERC with the USFWS's determination when it is received.

The USFWS requires seasonal tree clearing restrictions to minimize potential adverse effects to Indiana bats (USFWS, 2009). The USFWS's October 15 - March 31 clearing window (USFWS, 2009) is standard across the range of the Indiana bat, though some states use different dates. As Millennium will only conduct tree clearing during the clearing window; salvage of potential roost trees is not anticipated. Additionally, Millennium has taken measures to minimize the loss of potential bat habitat by locating the Project facilities adjacent to, overlapping or in close proximity to Millennium's existing pipeline right-of-way.

Northern long-eared bat (*Myotis septentrionalis*)

The northern long-eared bat was listed as threatened under the ESA in April 2015. Currently, no definitive population estimate across the range of the northern long-eared bat exists. While recorded opportunistically during biannual counts of Indiana bat hibernacula, no effort has been made to systematically enumerate the species population across the range. However, drastic declines have been observed in the eastern portion of the species range. Turner et al. (2011) compared the most recent pre-WNS hibernacula counts to the most recent post-WNS counts for six cavernicolous bat species from 30 hibernacula in five states including New York. The northern long-eared bats experienced a 98 percent decline in these hibernacula. The USFWS conducted a similar analysis using data from 12 additional hibernacula in three additional states. The combined overall decline in hibernation count data from these eight states is approximately 99 percent (Federal Register, 2015).

Northern long-eared bats exhibit an annual cycle that includes winter hibernation, spring staging, spring migration, summer birth of young, fall migration, and fall swarming and mating. Hibernacula are generally large caves or mines with large passages and entrances (Raesly and Gates, 1987), cool, stable temperatures between 0-9 degrees Celsius (Brack, 2007; Caceres and Pybus, 1997; Raesly and Gates, 1987) with high humidity and no air currents (Caceres and Pybus, 1997; Fitch and Shump, 1979; Raesly and Gates, 1987; Van Zyll de Jong, 1985). Northern long-eared bats are often overlooked during hibernacula counts due to their propensity for roosting singly or in small groups in crevices and cracks in cave or mine walls with only the nose and ears exposed (Barbour and Davis, 1969; Caceres and Pybus, 1997; Caire et al., 1979; Griffin, 1940; Van Zyll de Jong, 1985; Whitaker and Mumford, 2009). Similar to Indiana bats, events that interrupt hibernation and result in increased metabolic rates during periods of arousal pose a substantial risk to hibernating northern long-eared bats (Thomas, 1995; Thomas et al., 1990).

From approximately mid-May through mid-August, northern long-eared bats occupy summer habitat. Reproductively active females form maternity colonies consisting of 30-60 individuals (Foster and Kurta, 1999; Lacki and Schwienjohann, 2001; Menzel et al., 2002; Perry and Thill, 2007; Sasse and Perkins, 1996) and give birth to a single pup each year (Barbour and Davis, 1969). Northern long-eared bats appear to be somewhat opportunistic in roost selection and have been documented roosting under bark and in cavities or crevices of both live and dead trees (Foster and Kurta, 1999; Owens et al., 2005; Perry and Thill, 2007; Sasse and Perkins, 1996), as well as anthropogenic structures (Amelon and Burhans, 2006; Barbour and Davis, 1969; Cope and Humphrey, 1972; Mumford and Cope, 1964; Timpone et al., 2010; Whitaker and Mumford, 2009).

Northern long-eared bats exhibit a high degree of roost-switching, typically every 2 to 3 days (Carter and Feldhamer, 2005; Foster and Kurta, 1999; Owen et al., 2002; Timpone et al., 2010). Suitable summer habitat not only includes roosting habitat, but also foraging habitat. Most foraging occurs from 1 to 3 meters off the ground, between the understory and canopy (Nagorson and Brigham, 1993), with a preference for forested hillsides and ridges over riparian areas (Brack and Whitaker, 2001; LaVal et al., 1977), though foraging has been documented along roads and over water and forest clearings (Van Zyll de Jong, 1985). Mean travel distances from occupied roosts to foraging areas range from 0.6 to 1.7 km (.37 to 1.1 miles), with a range of 0.07 to 4.8 km (0.04 to 3.0 miles) (Sasse and Perkins, 1996; Timpone et al., 2010).

The USFWS's Final 4(d) Rule for northern long-eared bats took effect on February 14, 2016. Under the new rule, surveys for northern-long eared bats are not required. However, the rule requires that project proponents complete a natural heritage program search to determine if hibernacula or maternity roost trees are located within the proposed project area. If no records exist or the records are located outside of the established buffer zone then no further consultation is required (50 CFR Part 17). Should the project be located within the established buffer zone, additional agency consultation is required. Since no northern long-eared bat records were provided during consultations with the NYSDEC or the NYNHP, it is assumed that no hibernacula or maternity roost trees have been documented near the Project areas.

3.4.1.3 Reptiles and Amphibians

Bog Turtle (*Clemmys muhlenbergii*)

The bog turtle is a federally listed threatened species and is a New York State-listed endangered species. The bog turtle's northeastern population is limited to scattered locations in Connecticut, Delaware, Maryland, Massachusetts, New Jersey, New York, and Pennsylvania (Klemens, 2001). The preferred habitat for this species is slow-moving water with deep muck soils and tussock-forming herbaceous vegetation (NYSDEC, 2016c).

In New York State, this vegetation largely consists of sedges (*Carex* spp.) or sphagnum moss which both require generally open areas. Their cold-blooded nature requires the bog turtle to bask out in the sunlight in these open areas. They have a very specific habitat climate which includes ample sunlight, high humidity, high evaporation rates, and perennial saturation. For this species to become active, the air and water temperature must exceed 50 degrees Fahrenheit (NYSDEC, 2015b). Although the Project areas are largely comprised of upland forest, agricultural land, and open upland habitat, wetlands were identified during field surveys completed through June 2016. Based on correspondence with the USFWS, Millennium conducted a Phase I Survey of the Project areas in November 2015 and April and June 2016 to determine the presence/absence of bog turtle habitat. The Phase I Bog Turtle Survey Report was submitted to federal and state agencies in March 2016, and May 2016 (Addendum, see Appendix 3E) for review and comment. The Phase I Bog Turtle Habitat Survey Report (Revised July 2016) (Appendix 3E) will be submitted to the USFWS and NYSDEC concurrent with the filing of this final ER. The USFWS determined that a Phase II Bog Turtle Presence/Absence Survey was required at nine wetlands determined contain potentially suitable bog turtle habitat within the Project areas. Millennium conducted Phase II Surveys at the identified wetlands in spring 2016, during the appropriate weather conditions. No bog turtles were observed during the surveys. The Phase II Bog Turtle Presence/Absence Survey Report (Appendix 3F) is included in Volume III, Privileged and Confidential and will be submitted to the USFWS and NYSDEC concurrent with the filing of this final ER.

3.4.1.4 Mussels

Dwarf wedgemussel (*Alasmidonta heterodon*)

The dwarf wedgemussel is a federally and New York State-listed endangered species. This particular mussel is found at 17 different sites in seven drainages along the Atlantic Coast (NYSDEC, 2016c). These mussels prefer slow moving waters from small brooks to large rivers. The substrate of these rivers can be comprised of silt to sand and gravel which can be in relatively small patches in a cobble-boulder river bottom. In New York, the extent of this species is limited to four waterbodies including a short reach of the lower Neversink River, Basher Kill, the upper Delaware River, and Webatuck Creek (NYNHP, 2013). The lower Neversink River population is known to contain one of the largest populations with an estimated 20,000 individuals (Strayer et al., 1996). When first discovered in 1990, the population was estimated at 80,000 individuals, but the population has been in decline due to its vulnerability to a myriad of stressors that affect aquatic systems (Strayer et al., 1996). Millennium will conduct a freshwater mussel and habitat assessment in an approximate 1.5-acre area of the Neversink River (S-16) upstream and downstream of the

proposed HDD crossing. Surveys are planned to be completed in August 2016, pending receipt of the required “License to Collect and Possess” and “Endangered and Threatened Species License from NYSDEC. Millennium will continue to consult with the applicable agencies to avoid or minimize potential impacts on listed mussel species, and survey results will be provided to FERC and other applicable resource agencies when complete. The pipeline crossing of the Neversink River will be completed using HDD installation method; therefore, no impacts on dwarf wedge mussels are anticipated.

3.4.2 State-Listed Species

In addition to federal law, New York has passed laws to protect state-threatened and endangered species. State-listed species are protected under 6 NYCRR Part 182, which is administered by the NYSDEC. There were seven state-listed threatened and endangered or species of special concern identified by the NYSDEC to potentially occur in the vicinity of the Project areas. These species are provided in Table 3A-7. Millennium will continue to consult with the NYSDEC regarding the results of species-specific surveys and state-listed species within the Project areas. A discussion of the state-listed threatened and endangered species is provided below.

3.4.2.1 Aquatic Species

The aquatic species potentially occurring within the Project areas include dwarf wedge mussel, brook floater (*Alasmidonta varicose*) and alewife floater (*Anodonta implicata*) (Conrad, 2016). Each of these species have been documented in the Neversink River, including at the location of the Millennium Pipeline crossing. The brook floater has also been documented in the Mahwah River southeast of the Ramapo M&R. Millennium will conduct a freshwater mussel and habitat assessment in an approximate 1.5-acre area of the Neversink River (S-16) upstream and downstream of the proposed HDD crossing. Surveys are planned to be completed in August 2016, pending receipt of the required “License to Collect and Possess” and “Endangered and Threatened Species License from NYSDEC. Millennium will continue to consult with the applicable agencies to avoid or minimize potential impacts on listed mussel species, and survey results will be provided to FERC and other applicable resource agencies when complete. Due to the fact that HDD installation methods will be used to install the pipeline crossing of the Neversink River impacts on protected mussels are not anticipated in this location.

3.4.2.2 Birds

No actively nesting bald eagles were observed during the nesting surveys completed during spring 2016. However, two nests were identified in trees along the bank of the Neversink River. Both of these nests were located greater than 660 feet, the minimum distance, from the nearest Project workspace (see Section 3.3.3.2). The construction and operation of the Project is not expected to affect bald eagles. The Bald Eagle Survey Findings Report (Appendix 3C) is included in Volume III, Privileged and Confidential and will be submitted to the NYSDEC concurrent with the filing of this final ER.

3.4.2.3 Insects

Two insects, the dusky dancer (*Argia translate*) and inland barrens buckmoth (*Hemileuca maia maia*), were identified by the NYSDEC to potentially occur in the vicinity of the Project areas. The dusky dancer is a dragonfly that is classified by the NYNHP as critically imperiled. The dancer has been documented near the Mahwah River, approximately 0.33 miles south of the Ramapo M&R. The inland barrens buckmoth is listed by the NYSDEC as a species of special concern. It has been documented within the Red Cedar Rocky Summit vegetated community 0.13 miles south of the Neversink River crossing location. Neither of these insects have been documented to occur within the Project areas, therefore it is anticipated that they will not be affected by the Project.

3.4.2.4 Mammals

The nearest known Indiana bat summer roost location was identified within one mile of the Westtown M&R (Conrad, 2016), and the closest known hibernacula was identified approximately 17 miles of the meter station (Masi, 2016). Millennium currently proposes to conduct clearing activities from October 15 to March 31, as no hibernacula for either species are known in the vicinity of the Project, based on NYNHP review. Additionally, Millennium has taken measures to minimize the loss of potential bat habitat by locating the Huguenot Loop adjacent to and overlapping Millennium's existing pipeline right-of-way for approximately 89 percent of its total length, locating the Highland CS in close proximity to the Millennium's existing pipeline right-of-way and by proposing modifications within and adjacent to existing aboveground facilities to the extent practicable.

3.4.2.5 Reptiles and Amphibians

The timber rattlesnake (*Croatus horridus*) has been documented in the vicinity of the Project areas, including; hibernacula and foraging area within 0.4 mile of the Ramapo M&R; within one mile of the Highland CS site; within 1.25 miles of the Huguenot M&R, Pipeyard 1, and the nearby Millennium Pipeline; and within 1.25 miles of the Hancock CS (NYNHP, 2016). These snakes are normally found in deciduous forests in rugged terrain. They are known to migrate up to 2.5 miles from their den during the summer (NYSDEC, 2016d). Timber rattlesnake presence / absence surveys were completed within identified potentially suitable habitat within the Project areas during spring 2016. No timber rattlesnake dens were identified within the Project areas however, two dens were identified approximately 900 feet from a segment of the Huguenot Loop and the Ramapo M&R, respectively. The Project is not expected to impact identified rattlesnake dens or critical habitat. The Timber Rattlesnake Presence/Absence Survey Report (Appendix 3G) (June 2016) is included in Volume III, Privileged and Confidential and will be submitted to the NYSDEC concurrent with the filing of this final ER. Millennium will submit any additional correspondence or concurrence to FERC as received.

3.4.3 Impacts and Mitigation

The Project is not expected to impact protected species or their critical habitats, based on the protected species surveys complete through June 2016. All of the species and habitat surveys completed to date are included in Appendix 3 in Volume III, Privileged and Confidential. Surveys for the small-whorled pogonia

will be conducted in July 2016 and a freshwater mussel and habitat assessment will be completed in an approximate 1.5-acre area of the Neversink River (S-16) upstream and downstream of the proposed HDD crossing in August 2016. Millennium will continue to consult with the applicable agencies to avoid or minimize potential impacts to listed species, and survey results will be provided to FERC and other applicable resource agencies when complete. Any concurrence or additional correspondence from the USFWS and NYSDEC received after submittal of this final ER will be provided to FERC in a supplemental submittal.

Millennium will adhere to applicable work restriction periods in locations identified to contain listed or protected species. Millennium will also implement the Project ECS, and other construction and restoration plans included in Appendix 1B, to avoid and minimize effects on listed species and their critical habitats potentially caused by the Project.

Millennium is continuing consultations with applicable regulatory agencies to identify species of concern and appropriate minimization, conservation, and avoidance measures. Copies of agency correspondence are included in Appendix 1D.

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APPENDIX 3A

Supplemental Tables

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TABLE 3A-1
Representative Fish Species that May Occur in the
Project Areas

Common Name	Scientific Name
Brown Bullhead	<i>Ameiurus nebulosus</i>
White Perch	<i>Morone americana</i>
Chain Pickerel	<i>Esox niger</i>
Blue Gill	<i>Lepomis macrochirus</i>
Largemouth Bass	<i>Micropterus salmoides</i>
Pumpkinseed	<i>Lepomis gibbosus</i>
Rock Bass	<i>Ambloplites rupestris</i>
Smallmouth Bass	<i>Micropterus dolomieu</i>
Brook Trout	<i>Salvelinus fontinalis</i>
Brown Trout	<i>Salmo trutta</i>
Lake Trout	<i>Salvelinus namaychush</i>
Rainbow Trout	<i>Oncorhynchus mykiss</i>
Carp	<i>Cyprinus carpio</i>
Slimy Sculpin	<i>Cottus cognatus</i>

**TABLE 3A-2
Potential Sensitive Fisheries Crossed by the Eastern System Upgrade**

Facility / Waterbody ID	Waterbody Name	Approximate MP	Town	Quadrangle	Flow Type	Crossing Length (feet)	FERC Class ^{a/}	Water Quality Standard ^{b/}	Fishery Classification ^{c/}	State Fishery Construction Window ^{d/}	NYSDEC Protected Waterbody (Yes or No) ^{e/}	Crossing Method ^{f/}
Huguenot Loop												
S-18 g/	Unnamed Tributary to Neversink River	0.4	Deerpark	Port Jervis North	Perennial	<3	Minor	C(T)	[TBD]	[TBD]	Yes	Mat or Bridge
S-16	Neversink River	0.7	Deerpark	Port Jervis North	Perennial	365	Major	B	Coldwater	N/A	Yes	HDD
S-14	Shin Hollow Brook	1.7	Deerpark	Otisville	Perennial	<3	Minor	C(T)	Coldwater	[TBD]	Yes	Conventional bore
S-12	Shin Hollow Brook	2.5	Greenville	Otisville	Perennial	<3	Minor	C(T)	Potential wild brown and brook trout	[TBD]	Yes	Flume or dam and pump
S-10	Unnamed Tributary to Shawangunk Kill	3.1	Greenville	Otisville	Perennial	<3	Minor	A	Coldwater	[TBD]	Yes	HDD
S-09	Unnamed Tributary to Shawangunk Kill	3.2	Greenville	Otisville	Perennial	<3	Minor	A	Coldwater	[TBD]	Yes	HDD
S-07	Unnamed Tributary to Rutgers Creek	4.6	Greenville	Otisville	Perennial	30	Intermediate	C	Coldwater	N/A	No	HDD
S-05	Unnamed Tributary to Rutgers Creek	6.3	Minisink	Unionville	Intermittent	<3	Minor	C	Coldwater	[TBD]	No	Dry waterbody, Dam and Pump, or Flume
S-03	Rutgers Creek	7.3	Minisink	Unionville	Perennial	45	Intermediate	C(T)	Coldwater	[TBD]	Yes	Flume or dam and pump
S-01	Unnamed Tributary to Rutgers Creek	7.7	Minisink	Unionville	Perennial	17	Intermediate	C	Coldwater	[TBD]	No	Flume or dam and pump
Aboveground Facilities												
Highland CS												
None Affected												
Hancock CS												
Wagoner Interconnect												
None Affected												
Huguenot M&R												
None Affected												

**TABLE 3A-2
Potential Sensitive Fisheries Crossed by the Eastern System Upgrade**

Facility / Waterbody ID	Waterbody Name	Approximate MP	Town	Quadrangle	Flow Type	Crossing Length (feet)	FERC Class <u>a/</u>	Water Quality Standard <u>b/</u>	Fishery Classification <u>c/</u>	State Fishery Construction Window <u>d/</u>	NYSDEC Protected Waterbody (Yes or No) <u>e/</u>	Crossing Method <u>f/</u>
Westtown M&R												
None Affected												
Ramapo M&R												
None Affected												
Additional Aboveground Facilities												
Pig Launcher/ Receiver (MP 0.1)		None Affected										
Alternate Interconnect (MP 7.6)		None Affected										
Cathodic Protection Ground Bed		None Affected										
Pipe/Contractor Yards and Staging Areas												
S-02	Unmapped Tributary to Rutgers Creek	Staging Area 4	Minisink	Unionville	Perennial	<3	Minor	C	Coldwater	[TBD]	No	Equipment crossing and erosion controls
Access Roads												
S-08	Unnamed Tributary to Rutgers Creek	TAR-0005	Greenville	Otisville	Perennial	Culvert	Minor	C	Coldwater	[TBD]	No	Use existing culvert
WB-04	Unnamed Tributary to Rutgers Creek	TAR-0006	Greenville	Unionville	PUB	0	N/A	C	None	[TBD]	No	Install erosion controls / water withdrawal location
S-01	Unnamed Tributary to Rutgers Creek	TAR-0008	Minisink	Unionville	Perennial	Culvert	Minor	C	Coldwater	[TBD]	No	Use existing culvert
WB-01	Unnamed Tributary to Rutgers Creek	TAR-0008	Minisink	Unionville	Lake/Pond	Culvert	Minor	C	Coldwater	[TBD]	No	Use existing culvert
HC-S-01	Unnamed Tributary to Pea Brook	Hancock CS PAR	Hancock	Fishs Eddy	Perennial	12	Intermediate	C(T)	Coldwater	[TBD]	Yes	Use existing permanent crossing
S-23	Unnamed Tributary to Rutgers Creek	PAR-0003	Minisink	Unionville	Intermittent	<3	Minor	C	Coldwater	[TBD]	No	Use existing culvert

**TABLE 3A-2
Potential Sensitive Fisheries Crossed by the Eastern System Upgrade**

Facility / Waterbody ID	Waterbody Name	Approximate MP	Town	Quadrangle	Flow Type	Crossing Length (feet)	FERC Class <u>a/</u>	Water Quality Standard <u>b/</u>	Fishery Classification <u>c/</u>	State Fishery Construction Window <u>d/</u>	NYSDEC Protected Waterbody (Yes or No) <u>e/</u>	Crossing Method <u>f/</u>
<p>NOTES: N/A = Not Applicable Crossing Length of zero (0) feet indicates that the waterbody crosses the construction right-of-way space but does not cross the pipeline itself. HDD = Horizontal Directional Drill. <u>a/</u> Minor (≤ 10 feet); Intermediate ($>10 - \leq 100$ feet); Major (>100 feet). <u>b/</u> Source – Gierloff 2016b and Water Quality Classifications – NYS (NYSDEC) 2010. http://gis.ny.gov/gisdata/metadata/nysdec.wtrcls.xml. <u>c/</u> Source - Gierloff 2016a and 2016b (see Appendix 1D of Resource Report 1). <u>d/</u> To be determined in consultation with NYSDEC <u>e/</u> Source - Water Quality Classifications – NYS (NYSDEC) 2010. http://gis.ny.gov/gisdata/metadata/nysdec.wtrcls.xml. <u>f/</u> Where trenched crossings are proposed, a dry crossing method will be implemented (i.e., dam and pump or flume) where there is discernable flow at the time of crossing. <u>g/</u> located in the ATWS for the Neversink River HDD string.</p>												

**TABLE 3A-3
Vegetation Community Types and Representative Plant
Species Identified in the Survey Corridor**

Common Name	Scientific Name
<i>Upland Forests</i> a/	
<i>Successional Northern Hardwoods</i>	
American elm	<i>Ulmus americana</i>
red maple	<i>Acer rubrum</i>
eastern hemlock	<i>Tsuga canadensis</i>
black cherry	<i>Prunus serotina</i>
eastern white pine	<i>Pinus strobus</i>
white ash	<i>Fraxinus americana</i>
black birch	<i>Betula lenta</i>
shagbark hickory	<i>Carya ovata</i>
American beech	<i>Fagus grandifolia</i>
common winterberry	<i>Ilex verticillata</i>
northern spicebush	<i>Lindera benzoin</i>
<i>Appalachian Oak Forest</i>	
White oak	<i>Quercus alba</i>
red oak	<i>Quercus rubra</i>
black oak	<i>Quercus velutina</i>
red maple	<i>Acer rubrum</i>
lowbush blueberry	<i>Vaccinium pallidum</i>
black huckleberry	<i>Gaylussacia baccata</i>
<i>Hemlock-Northern Hardwood Forest</i>	
eastern hemlock	<i>Tsuga canadensis</i>
red maple	<i>Acer rubrum</i>
sugar maple	<i>Acer saccharum</i>
black birch	<i>Betula lenta</i>
red oak	<i>Quercus rubra</i>
maple-leaf viburnum	<i>Viburnum acerifolium</i>
witch hazel	<i>Hammamelis virginiana</i>
mountain laurel	<i>Kalmia latifolia</i>
lowbush blueberry	<i>Vaccinium pallidum</i>
Open Lands	
<i>Open Land and Mowed Roadside/Pathway</i>	
annual ragweed	<i>Ambrosia artemisifolia</i>
fox sedge	<i>Carex vulpinoidea</i>
Canada thistle	<i>Cirsium arvense</i>
red clover	<i>Trifolium pratense</i>
orchard grass	<i>Dactylis glomerata</i>
Kentucky bluegrass	<i>Poa pratense</i>
reed canarygrass	<i>Phalaris arundinacea</i>
Queen Anne's lace	<i>Daucus carota</i>
<i>Agricultural Lands</i>	
corn	<i>Zea mays</i>

**TABLE 3A-3
Vegetation Community Types and Representative Plant
Species Identified in the Survey Corridor**

Common Name	Scientific Name
common reed	<i>Setaria pumila</i>
Wetlands ^{b/}	
Palustrine Forested Wetlands	
red maple	<i>Acer rubrum</i>
pin oak	<i>Quercus palustris</i>
green ash	<i>Fraxinus pennsylvanica</i>
American elm	<i>Ulmus americana</i>
swamp white oak	<i>Quercus bicolor</i>
white ash	<i>Fraxinus americana</i>
northern spicebush	<i>Lindera benzoin</i>
northern winterberry	<i>Ilex verticillata</i>
tussuck sedge	<i>Carex stricta</i>
arrowwood	<i>Viburnum dentatum</i>
multiflora rose	<i>Rosa multiflora</i>
lowbush blueberry	<i>Vaccinium augustifolium</i>
Palustrine Scrub-Shrub Wetlands	
arrowwood	<i>Viburnum dentatum</i>
white meadowsweet	<i>Spiraea alba</i>
black willow	<i>Salix nigra</i>
red maple	<i>Acer rubrum</i>
green ash	<i>Fraxinus pennsylvanica</i>
silky dogwood	<i>Cornus amomum</i>
northern spicebush	<i>Lindera benzoin</i>
common winterberry	<i>Ilex verticillata</i>
multiflora rose	<i>Rosa multiflora</i>
tussuck sedge	<i>Carex stricta</i>
awlfruit sedge	<i>Carex stipata</i>
reed canary grass	<i>Phalaris arundinacea</i>
Palustrine Emergent Wetlands	
reed canary grass	<i>Phalaris arundinacea</i>
shallow sedge	<i>Carex lurida</i>
common rush	<i>Juncus effusus</i>
narrowleaf cattail	<i>Typha angustifolia</i>
American sweet flag	<i>Acorus americanus</i>
purple loosestrife	<i>Lythrum salicaria</i>
fox sedge	<i>Carex vulpinoidea</i>
white clover	<i>Trifolium repens</i>
common reed	<i>Phragmites australis</i>
^{a/} Edinger et al 2014	
^{b/} Cowardin et al 1979	

**TABLE 3A-4
Vegetated Communities of Special Concern Affected
within the Project Area (Acres)**

Natural Community Type	Construction ^{a/}		Operation	
	Within Existing Easement	Outside Existing Easement _{b/}	Within Existing Easement	Outside Existing Easement _{b/}
<i>Huguenot Loop</i>				
Floodplain Forest	--	--	--	--
Chestnut Oak Forest	--	10.70	--	1.49
Hemlock Northern Hardwood Forest	--	4.58	--	1.22
<i>Access Roads</i>				
Hemlock Northern Hardwood Forest	--	0.13	--	--
Project Total	--	15.41	--	2.71
Notes: ^{a/} Construction and operation acres excluding area between HDD entry and exit points, which will be limited to hand clearing only for a maximum 2-3 foot wide footpath. _{b/} Includes the new permanent easement for the Huguenot Loop.				

**TABLE 3A-5
Non-Native Vegetative Species Identified in the Survey Corridor**

Common Name	Scientific Name
Canada thistle	<i>Cirsium arvense</i>
common buckthorn	<i>Rhamnus cathartica</i>
common reed	<i>Phragmites australis</i>
garlic mustard	<i>Alliaria petiolate</i>
Japanese barberry	<i>Berberis thunbergii</i>
Japanese stiltgrass	<i>Microsegium vimineum</i>
multiflora rose	<i>Rosa multiflora</i>
mugwort	<i>Atremesia vulgaris</i>
purple loosestrife	<i>Lythrum salicaria</i>
tatarian honeysuckle	<i>Lonicera tatarica</i>

**TABLE 3A-6
Common Wildlife Species Occurring in Habitat Types in the Project Areas**

Common Name	Scientific Name	Terrestrial			Wetland			Aquatic
		Upland Forest	Open Lands	Agriculture	PFO	PSS	PEM	Open Water
Fish								
Brown Bullhead	<i>Ameiurus nebulosus</i>	--	--	--	--	--	--	X
White Perch	<i>Morone americana</i>	--	--	--	--	--	--	X
Chain Pickerel	<i>Esox niger</i>	--	--	--	--	--	--	X
Blue Gill	<i>Lepomis macrochirus</i>	--	--	--	--	--	--	X
Pumpkinseed	<i>Lepomis gibbosus</i>	--	--	--	--	--	--	X
Smallmouth Bass	<i>Micropterus dolomieu</i>	--	--	--	--	--	--	X
Brook Trout	<i>Salveninus fontinalis</i>	--	--	--	--	--	--	X
Brown Trout	<i>Salmo trutta</i>	--	--	--	--	--	--	X
Lake Trout	<i>Salvelinus namaychush</i>	--	--	--	--	--	--	X
Rainbow Trout	<i>Oncorhynchus mykiss</i>	--	--	--	--	--	--	X
Carp	<i>Cyprinus carpio</i>	--	--	--	--	--	--	X
Slimy Sculpin	<i>Cottus cognatus</i>	--	--	--	--	--	--	X
Reptiles and Amphibians								
American bullfrog	<i>Rana catesbiana</i>	--	--	--	--	--	X	--
American toad	<i>Bufo americanus</i>	--	--	--	--	X	--	--
Eastern box turtle	<i>Terrapene c. carolina</i>	X	--	--	--	--	--	--
Eastern garter snake	<i>Thamnophis sirtalis</i>	--	--	--	--	--	X	--
Eastern racer	<i>Coluber constrictor</i>	X	--	--	--	--	--	--
Red backed salamander	<i>Plethodon cinereus</i>	--	--	--	X	--	X	--
Red spotted newt	<i>Notophthalmus v. viridescens</i>	X	--	--	--	--	--	--
Snapping turtle	<i>Chelydra serpentina</i>	--	--	--	--	--	X	--
Mammals								
Beaver	<i>Castor canadensis</i>	--	--	--	X	--	X	--

**TABLE 3A-6
Common Wildlife Species Occurring in Habitat Types in the Project Areas**

Common Name	Scientific Name	Terrestrial			Wetland			Aquatic
		Upland Forest	Open Lands	Agriculture	PFO	PSS	PEM	Open Water
Black Bear	<i>Ursus americanus</i>	X	--	--	--	X	--	--
Coyote	<i>Canis latrans</i>	--	X	--	--	--	--	--
Eastern Chipmunk	<i>Tamias striatus</i>	X	--	--	--	--	--	--
Eastern Cottontail	<i>Sylvilagus floridanus</i>	--	X	X	--	X	--	--
Gray Fox	<i>Urocyon cinereoargenteus</i>	--	X	--	--	--	--	--
Gray Squirrel	<i>Sciurus carolinensis</i>	--	X	--	--	--	--	--
Muskrat	<i>Ondatra zibethicus</i>	--	--	--	X	X	X	--
Opossum	<i>Didelphis virginiana</i>	--	X	--	--	--	--	--
Raccoon	<i>Procyon lotor</i>	X	X	--	--	--	--	--
Red Fox	<i>Vulpes vulpes</i>	X	X	--	--	--	--	--
Star Nose Mole	<i>Condylura cristata</i>	--	--	--	X	--	X	--
White-tailed deer	<i>Oedicoileus virginianus</i>	X	X	X	--	X	--	--
Woodchuck	<i>Marmota monax</i>	--	--	X	--	--	--	--
Birds								
American Robin	<i>Turdus migratorius</i>	--	X	--	--	--	--	--
Bobolinks	<i>Dolichonyx oryzivorus</i>	--	--	X	--	--	--	--
Brown Thrasher	<i>Toxostoma rufum</i>	--	X	--	--	--	--	--
Eastern Meadowlarks	<i>Sturnella magna</i>	--	--	X	--	--	--	--
European Starlings	<i>Sturnus vulgaris</i>	--	--	X	--	--	--	--
Field Sparrow	<i>Spizella pusilla</i>	--	X	--	--	--	--	--
Gray Catbird	<i>Dumetella carolinensis</i>	--	--	--	--	X	--	--
Great Blue Heron	<i>Ardea herodias</i>	--	--	--	--	--	X	--
Mourning Doves	<i>Zenaidura macroura</i>	--	--	X	--	--	--	--
Northern Cardinal	<i>Cardinalis cardinalis</i>	--	X	--	--	--	--	--
Red-Tailed Hawk	<i>Buteo jamaicensis</i>	--	X	--	--	--	--	--

**TABLE 3A-6
Common Wildlife Species Occurring in Habitat Types in the Project Areas**

Common Name	Scientific Name	Terrestrial			Wetland			Aquatic
		Upland Forest	Open Lands	Agriculture	PFO	PSS	PEM	Open Water
Red-winged Blackbird	<i>Agelaius phoeniceus</i>	--	--	--	--	X	X	--
Sharp-Shinned Hawk	<i>Accipiter striatus</i>	X	--	--	--	--	--	--
Wild Turkey	<i>Meleagris gallopavo</i>	--	--	--	X	--	--	--
Wood Duck	<i>Aix sponsa</i>	--	--	--	X	--	--	X

**TABLE 3A-7
Federally and State-Listed Threatened and Endangered Species Potentially Present Within the
Project Areas**

Classification	Common Name	Scientific Name	Status	Anticipated Impact
Federal				
Mussel	Dwarf Wedgemussel	<i>Alasmidonta heterodon</i>	Endangered	None
Flowering Plant	Small Whorled Pogonia	<i>Isotria medeoloides</i>	Threatened	TBD
Mammals	Indiana Bat	<i>Myotis sodalis</i>	Endangered	TBD
	Northern Long-Eared Bat	<i>Myotis septentrionalis</i>	Threatened	TBD
Reptile	Bog Turtle	<i>Clemmys muhlenbergii</i>	Threatened	TBD
State				
Mussels	Dwarf Wedgemussel	<i>Alasmidonta heterodon</i>	Endangered	None
	Brook Floater	<i>Alasmidonta varicosa</i>	Threatened	None
	Alewife Floater	<i>Anodonta implicata</i>	CI	None
Bird	Bald Eagle	<i>Haliaeetus leucocephalus</i>	Threatened	None
Insects	Dusky Dancer	<i>Argia translata</i>	CI	None
	Inland Barrens Buckmoth	<i>Hemileuca maia maia</i>	SC	None
Mammal	Indiana Bat	<i>Myotis sodalis</i>	Endangered	TBD
Reptile	Timber Rattlesnake	<i>Crotalus horridus</i>	Threatened	TBD
SC = Special Concern; CI = Critically Imperiled Source: USFWS Official Species Lists (see Appendix 1D) and Conrad, 2016.				

**TABLE 3A-8
Summary and Status of Pending Surveys**

Species	Survey Date	Report Submittal Date
Bog Turtle	Millennium completed Phase 1 Habitat Surveys of the Project areas in June 2016. Millennium completed Phase II Presence / Absence Surveys in locations where potential habitat was been identified in June 2016.	Phase I Report submitted March 2016 and May 2016 (Addendum). A Revised Phase I Habitat Survey Report and the Phase II Presence / Absence Survey Report to be submitted concurrent with the filing of this final ER.
Small Whorled Pogonia	To be completed in July 2016	To be submitted in August 2016.
Indiana Bat	Acoustic survey completed May 2016	To be submitted concurrent with the filing of this final ER.
Mussels	To be completed in August 2016	To be submitted in August-September 2016.
Timber Rattlesnake	Presence / Absence surveys completed June 2016	To be submitted concurrent with the filing of this final ER.
Bald Eagle	Presence / Absence surveys completed May 2016	To be submitted concurrent with the filing of this final ER.

**TABLE 3A-9
Birds of Conservation Concern Potentially Occurring in BCR 28**

Common Name	Scientific Name	Occurrences	Habitat*
Bald Eagle (b)	<i>Haliaeetus leucocephalus</i>	N/A	--
Bewick's Wren	<i>Thryomanes bewickii</i>	N/A	--
Black-capped Chickadee	<i>Poecile atricapillus</i>	Confirmed	Deciduous Forests
Blue-winged Warbler	<i>Vermivora cyanoptera</i>	Confirmed	Shrubland and old fields
Canada Warbler	<i>Cardellina canadensis</i>	N/A	--
Cerulean Warbler	<i>Setophaga cerulea</i>	N/A	--
Golden-winged Warbler	<i>Vermivora chrysoptera</i>	N/A	--
Henslow's Sparrow	<i>Ammodramus henslowii</i>	N/A	--
Kentucky Warbler	<i>Geothlypis formosa</i>	N/A	--
Loggerhead Shrike	<i>Lanius ludovicianus</i>	N/A	--
Louisiana Waterthrush	<i>Parkesia motacilla</i>	Confirmed	Deciduous Forests - Near flat water
Northern Saw-whet Owl	<i>Aegolius acadicus</i>	N/A	--
Olive-sided Flycatcher	<i>Contopus cooperi</i>	N/A	--
Peregrine Falcon (b)	<i>Falco peregrinus</i>	N/A	--
Prairie Warbler	<i>Setophaga discolor</i>	Confirmed	Scrubby fields and forests
Red Crossbill	<i>Loxia curvirostra</i>	N/A	--
Red-headed Woodpecker	<i>Melanerpes erythrocephalus</i>	N/A	--
Rusty Blackbird (nb)	<i>Euphagus carolinus</i>	N/A	--
Sedge Wren (nb)	<i>Cistothorus platensis</i>	N/A	--
Swainson's Warbler	<i>Limnothlypis swainsonii</i>	N/A	--
Upland Sandpiper	<i>Bartramia longicauda</i>	N/A	--
Whip-poor-will	<i>Antrostomus vociferus</i>	N/A	--
Wood Thrush	<i>Hylocichla mustelina</i>	Confirmed	Deciduous and Coniferous Forests
Worm-eating Warbler	<i>Helmitheros vermivorum</i>	N/A	--

*Habitat listed for confirmed occurrences in Bird Conservation Region ("BCR") 28.

b = Breeding; nb = Non-breeding

Source: NYSDEC Breeding Bird Atlas 2000-2005, Eastern and South New York

APPENDIX 3B

Invasive Species Management Plan



EASTERN SYSTEM UPGRADE

INVASIVE SPECIES MANAGEMENT PLAN

July 2016

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LIST OF ACRONYMS

APHIS	Animal and Plant Health Inspection Service
ECS	Project Environmental Construction Standards
FERC or Commission	Federal Energy Regulatory Commission
Hancock CS	Hancock Compressor Station
Highland CS	Highland Compressor Station
hp	horsepower
Huguenot M&R	Huguenot Meter Station
ISMP	Invasive Species Management Plan
Millennium	Millennium Pipeline Company, L.L.C.
MP	milepost
NYSDEC	New York State Department of Environmental Conservation
Project	Eastern System Upgrade
Ramapo M&R	Ramapo Meter Station
TRC	TRC Environmental Corporation
USDA	United States Department of Agriculture
Westtown M&R	Westtown Meter Station

1.0 INTRODUCTION

Millennium Pipeline Company, L.L.C. (Millennium) is seeking authorization from the Federal Energy Regulatory Commission (FERC or Commission) pursuant to Section 7(c) of the Natural Gas Act to construct, install, operate, and maintain the Eastern System Upgrade (Project). The Project includes construction of approximately 7.8 miles of 30- and 36-inch pipeline loop in Orange County, New York (Huguenot Loop). Millennium proposes to locate a majority of the pipeline loop overlapping with and adjacent to the permanent easement associated with its existing mainline (Millennium Pipeline). Additionally, as part of the Project, Millennium proposes to construct and operate (1) a new compressor station (Highland CS) in Sullivan County, New York, (2) additional horsepower (hp) at the existing Hancock Compressor Station (Hancock CS) in Delaware County, New York, (3) modifications to the existing Ramapo Meter and Regulator Station (Ramapo M&R) in Rockland County, New York, (4) modifications to the existing Wagoner Interconnect in Orange County, New York, and (5) additional pipeline appurtenant facilities at the existing Huguenot Meter Station (Huguenot M&R) and Westtown Meter Station (Westtown M&R) in Orange County, New York. Dependent upon receipt of necessary approvals, construction of the Project would be anticipated to commence in the Fall of 2017 to meet a target in-service date in September 2018.

Millennium has developed this Invasive Species Management Plan (ISMP) to be implemented during the construction and operation of the Project to control the spread of foreign and invasive species in the Project areas. The Project facilities are summarized in the table below.

2.0 PROJECT OVERVIEW

The Project includes a new pipeline loop, a new compressor station, and modifications to one existing compressor station and three existing meter stations. The Project consists of the following components and facilities:

- approximately 7.8 miles of new 30- and 36-inch diameter pipeline looping generally overlapping with and adjacent to Millennium's existing pipeline right-of-way in Orange County, New York ;
- construction and operation of a new 22,400 hp compressor station, Highland CS in Sullivan County, New York;
- construction and operation of an additional 22,400 hp at the existing Hancock CS in Delaware County, New York;
- modifications to the Ramapo M&R in Rockland County, New York;
- modifications to the Wagoner Interconnect in Orange County, New York;
- addition of pipeline appurtenant facilities, which includes pigging facilities, at the Huguenot M&R and the Westtown M&R in Orange County, New York; and
- addition of an alternate interconnect to the 16-inch Valley Lateral at milepost (MP) 7.6.

3.0 REGULATORY BACKGROUND

The New York State Department of Environmental Conservation (NYSDEC) defines invasive species as those species which are non-native to the ecosystem under consideration and whose introduction causes, or is likely to cause, economic or environmental harm or harm to human health (NYSDEC, 2014). Invasive species outcompete native species, diminish biological diversity, alter community structure and can change natural ecosystem processes (NYSDEC, 2014).

New York State regulates invasive species under 6 New York Codes, Rules and Regulations Part 575 *Invasive Species Regulations*. These regulations list prohibited and regulated invasive species in New York State. These species lists were developed using the species assessment and listing process outlined by the NYSDEC in its 2010 report “A Regulatory System for Non-Native Species,” which involves a rapid assessment to determine if the species warrants listing, followed by a socio-economic assessment and review by the Invasive Species Advisory Committee and Council. These lists are continually being updated. The most current list of prohibited and regulated invasive species was adopted on September 10, 2014. Regulated invasive species are invasive species which cannot be knowingly introduced into a free-living state, although these species may be possessed, sold, bought, propagated and transported (NYSDEC, 2014). Large to small patches and/or monocultural stands of regulated invasive species were identified within the survey areas of the Project during field surveys.

Prohibited invasive species are those which cannot be sold, imported, purchased, transported, introduced or propagated by any person (NYSDEC, 2014). Field surveys conducted through June 2016 identified the presence of ten (10) prohibited invasive plant species within the Project survey corridor. These species include Canadian thistle (*Cirsium arvense*), common buckthorn (*Rhamnus cathartica*), common reed (*Phragmites australis*), Japanese stilt grass (*Microsteigium vimineum*), garlic mustard (*Alliaria petiolata*), Japanese barberry (*Berberis thunbergii*), mugwort (*Artemisia vulgaris*), multiflora rose (*Rosa multiflora*), purple loosestrife (*Lythrum salicaria*), and tartarian honeysuckle (*Lonicera tartarica*). Japanese stilt grass was the invasive plant species most commonly observed during field surveys, and was typically encountered within moist regions of the existing pipeline easement parallel to the proposed Huguenot Loop. Purple loosestrife and multiflora rose were also common within the survey areas of the Project, but were typically observed as individual specimens or small populations. The proposed aboveground facilities were not observed to contain significant populations of invasive plant species. Prohibited invasive species observed at the proposed aboveground facility sites included a small population of Japanese stilt grass within the survey area for the proposed modifications to the existing Hancock CS.

4.0 INVASIVE SPECIES

Although no prohibited invasive terrestrial invertebrates were observed during field surveys conducted through June 2016, all four of the Project area counties are located within a United States Department of Agriculture (USDA) Animal and Plant Health Inspection Service (APHIS) Quarantine Area for the emerald ash borer (*Agilus planipennis*). Three of the Project area counties (Delaware, Sullivan, and Orange Counties) are located within a USDA APHIS Quarantine Area for the pine shoot beetle (*Tomicus*

piniperda). One additional terrestrial invertebrate, the hemlock woolly adelgid (*Adelges tsugae*), is listed as a prohibited invasive species in New York and is present in all four Project area counties. No tree diseases of concern were identified in the vicinity of the proposed Project facilities.

This plan focuses on controlling the potential spread of the identified listed invasive species during Project construction, particularly within wetland habitats identified along the Huguenot Loop. The listed invasive species identified within the Project survey corridor are further described below.

4.1 Terrestrial Plants

Canadian thistle (*Cirsium arvense*)

Canadian thistle is a perennial and persistent spreading weed, most common in pastures. This plant reaches two (2) to six (6) feet in height and is best defined by its unique leaves which are alternate, simple, and oblong to lanceolate. Additionally, these leaves are irregularly lobed and develop into triangular indentations with spiny margins. The upper sides of mature leaves are dark green and hairless, while the lower surface is light green in color and may be hairless. Purple or pink flowers are present from June through August (Cornell, 1997). Canadian thistle is most commonly found in agricultural areas and disturbed sites, including sites that are undergoing restoration (CISEH, 2015). It is most commonly located on the edges of wet habitats (i.e., wetlands and stream banks) and is therefore important to watch for in riparian areas (CISEG, 2015). This species easily crowds out native species and reduces crop yields (USDA, 2015).

Common eradication methods include: shading through rapid closure of vegetative gaps and herbicide application which affect the root system (Ross, 2015).

Common buckthorn (*Rhamnus cathartica*)

Common, or European, buckthorn is a small deciduous tree or large shrub that can grow upwards of 6 meters in height and is found in lightly shaded areas. This plant is tolerant of many soil types from well-drained sand to clay. It has dull green oval or egg shaped leaves and is easily identified by the small thorns at the tip of its branches. The fruit or berries are small and are a dark purplish or black in color. These berries ripen in August and September and can be found still attached to the plant throughout the winter. Common buckthorn is considered an invasive species throughout most of the northeastern and central United States and southeastern Canada because of the dense thickets it forms (NYIS, 2015a).

Common reed (*Phragmites australis*)

Common reed is an aquatic perennial grass which grows up to 18 feet in height and is found in a variety of marshes, swamps, streams, and rivers. It is easily distinguished by its seed heads, tan to brown panicles, which can reach up to a foot in length. These leaves, with long white hairs at the leaf-sheath junction, help in the identification of common reed. Leaf sheaths may reach as much as 10 feet in height. The major concern is that common reed has little wildlife value and its aggressive colonization in a community causes a decline in species diversity (Cornell, 1997).

Common eradication methods include manipulation of water levels and chemical herbicide application. Herbicides should be applied after the plant has flowered (late summer or early fall) and may require multiple years of application to eliminate surviving rhizomes. Mechanical removal of common reed is not known to be effective, as small rhizomes left in the soil can create new plants (NYIS, 2015b).

Garlic mustard (*Alliaria petiolata*)

Garlic mustard is an invasive herb that has spread throughout much of the United States, becoming one of the worst invaders of forests in the American Northeast. This plant can be identified by the dark-green, kidney shaped leaves (6 to 10 cm in diameter) which have round teeth along the edges. This plant produces white flowers in April which die by June. Additionally, when crushed, the leaves of this plant produce a very obvious garlic odor which allows for easy identification. While typically found in the undergrowth of disturbed woodlots and forest edges, garlic mustard has recently been found to also establish and spread in pristine areas. This spread has allowed it to become the dominant plant in the undergrowth of some forests, greatly reducing the diversity of all species. Garlic mustard is one of very few non-native plants to be able to successfully invade forest understories (NYIS, 2015).

Common eradication methods include manual removal by digging up roots, hand pulling of flowering plants, and cutting while flowering, as well as herbicide application to the foliage (FIPRC, 2015).

Japanese barberry (*Berberis thunbergii*)

Japanese barberry is a dense herbaceous or shrubby plant introduced as an ornamental which is adaptable to a variety of open and wooded habitats. This plant forms dense stands which compete with other native tree and herbaceous plant species, as well as reducing wildlife habitat and forage. Barberry can reach six (6) feet in height and is equally as wide. The bush can be identified by the green leaves, yellow flowers, sharp thorns and red berries that remain through the winter months (USDA, 2002).

Common eradication methods include hand pulling of small plants, mechanical uprooting of larger plants, and herbicide application (PCA, 2009).

Japanese stilt grass (*Microstegium vimineum*)

Japanese stilt grass is an invasive annual grass introduced possibly from its use as a packaging material from shipments from China. The plant forms dense mats underlain with moist soils that are partially shaded from the sun. The invasive grass can typically found within moist woods, marshes, ditches woodland borders, damp meadows, streamsides, trails and roadsides. The stems of the silt grass can reach up to 40 inches long and may also root where nodes come in contact with surface soils. The leaves have a lime green blade and can be 4 to 5 inches long by half inch wide. Flowers are inconspicuous, which typically occurs late summer to early fall (Rhoads, 2011).

Common eradication methods include hand pulling of small plants, which is recommended for seven consecutive years due to a long seed bank viability of the species. Chemical eradication of Japanese stilt grass can also be effective with the use of Glyphosate (Phoads, 2011).

Mugwort (*Artemisia vulgaris*)

Mugwort is a woody perennial species that is commonly spread by cultivation equipment and is found in sunny locations with well drained soils. This plant reaches up to five (5) feet in height and is often reddish-brown in color. Leaves are two (2) to four (4) inches long, are deeply lobed, and have a distinctive aroma. Undersides of the leaves are covered with soft, white to gray hairs (Cornell, 1997).

The most common eradication method utilized is herbicide application (NJ Audubon, 2007).

Multiflora rose (*Rosa multiflora*)

Multiflora rose is a vigorous perennial shrub which reaches heights of up to 10 feet. The red to green twigs may have numerous recurved thorns, compound leaves grow alternately with 5, 7, 9 or 11 oval, saw toothed leaflets, and white to pink flowers which bloom in late May or June. The spread of multi flora rose increased in the 1930s, when it was introduced by the U.S. Soil Conservation Service for use in erosion control and as living fences, or natural hedges, to confine livestock. It was also discovered to provide effective habitat and cover protection for pheasant, northern bobwhite, and cottontail rabbit and food for animals such as songbirds and deer. These uses encouraged its distribution, usually via root cuttings, to landowners, through State Conservation departments (NYIS, 2015).

Common eradication methods include digging and/or uprooting of entire plants and application of herbicide to cut stumps or foliage (FIPRC, 2015b).

Purple loosestrife (*Lythrum salicaria*)

Purple loosestrife is an herbaceous exotic which is a perennial that can grow to heights of 6 feet and taller. This plant is easily recognized from a distance by its elongated spike of purple flowers which bloom between July and September. Purple loosestrife prefers highly organic and moist soils, but is tolerant of a wide range of conditions. This adaptability, coupled with lack of predators and high production of viable seeds, allows loosestrife to out-compete native species found in salt marshes, wet meadows and swamps (USDA, 2002).

Common eradication methods include water-level manipulation, cutting and herbicide application on small, localized stands. In addition, there are four (4) host specific insect species which feed on purple loosestrife and can effectively control species proliferation (Blossey, 2002).

Spotted knapweed (*Centaurea stoebe*)

Spotted knapweed is a biennial species that forms a basal rosette during the first year of growth and produces a flowering stem in the second year of growth. This knapweed is associated with pastures,

hayfields, roadsides, and turf grass. Leaves form a basal rosette during the first year of growth, are deeply lobed, and are approximately 6 inches long. Leaves that are produced on the flowering stems are alternate and finely dissected. A solitary flower emerges at the ends of branches and is approximately 8 to 15 millimeters wide. Individual flowers are pink to purple in color (Cornell, 1997).

Common eradication methods include hand-pulling of entire plants prior to seed production each year and herbicide application through multiple treatments to eliminate the seed bank (Zouhar, 2001).

Tatarian honeysuckle (*Lonicera tatarica*)

Tatarian honeysuckle is a perennial woody vine shrub species that inhabits a large array of ecosystem types. These species thrive in abandoned fields, pastures, early successional areas, open canopies, along edges of woodlots or planted forests, and disturbed areas including rights-of-way. This honeysuckle grows up to 15 feet in height and the vines can reach upwards of 30 feet in length. The plant contains egg-shaped leaves (1 to 3 inches in length) and flowers from May to June with an array of white to pink or crimson colored pedals. Red berries are also produced from mid-summer through early fall. This species became so prominent in New York, and much of North America, as it was distributed as a garden plant to stabilize soils and allow for wildlife planning from the 1800s to as recently as the mid-1980s (NYIS, 2015).

Common eradication methods include hand removal of seedlings or younger plants and herbicide application on larger infestations (NYIS, 2015c).

4.2 Terrestrial Invertebrates

Emerald ash borer (*Agrilus planipennis*)

Emerald ash borer is an invasive insect native to Asia which feeds on ash trees (*Fraxinus spp.*), eventually killing them. This wood boring insect is thought to have been brought into the United States around the 1990's via cargo ships carrying ash pallets and/or shipping containers (NYIS, 2015e). These beetles have an average length of 0.75 inches, and are bright, emerald green as the name suggests. Females lay between 60 and 100 eggs during their lifespan which take 7-10 days to hatch. The larvae can be up to 1.5 inches in length, and make galleries (*i.e.*, marks on the sapwood underneath the bark) in the wood that can span 4 to 20 inches (NYIS, 2015e).

Common prevention of the spread of the emerald ash borer is to limit the movement of firewood. As stated above, all four Project area counties are within a USDA APHIS Emerald Ash Borer Quarantine Area and the movement of firewood is under certain restrictions (NYIS, 2015e).

Pine shoot beetle (*Tomicus piniperda*)

The pine shoot beetle is an invasive insect that attacks the new shoots of pine trees (*Pinus spp.*), which stunts their growth and creates high stress for the species. The beetle normally does not kill the trees, unless the trees are under high stress or the population of beetles is very high. The pine shoot beetle is native to Europe and was first discovered in Ohio which has since expanded to 19 other states, including New York.

This wood-boring insect is a dark brown color and creates galleries under the bark on the sapwood. The easiest distinction of the beetle's presence is trees with dying terminals becoming a brown color (USDA APHIS, 2015).

Common prevention of the spread of this species is to limit the distance of pine wood movement. As stated above, Delaware, Sullivan, and Orange Counties are within a USDA APHIS Pine Shoot Beetle Quarantine Area and the movement of pine wood is under certain restrictions (USDA APHIS, 2015).

Hemlock woolly adelgid (*Adelges tsugae*)

Hemlock woolly adelgid is an invasive insect that feeds on hemlock trees (*Tsuga spp.*) and poses a serious threat to hemlock forest stands. This species is often detected through identification of white, woolly clusters of wax (approximately 1/8 inch in size) needles which are produced by females in the late winter and are attached to the base of hemlock. These wax clusters persist throughout the year (NYIS, 2015f).

The hemlock woolly adelgid was first identified in the United States in Richmond, Virginia, in the mid-1950s and is thought to be accidentally introduced from Japan. The hemlock woolly adelgid has spread to 18 eastern states and was first detected in New York in the early 1980s. According to the NYSDEC Division of Lands and Forests, Forest Health Unit, the hemlock woolly adelgid has been detected throughout the Project area counties, with the first detections starting around 1987 in Orange and Rockland Counties, spreading northwest into Sullivan and Delaware counties with detections in 1998 (NYIS, 2015f).

The life cycle of the hemlock woolly adelgid involves wingless forms which remain on hemlock trees and a winged form which utilizes spruce trees as a host. In New York, there are no suitable spruce trees available to the hemlock woolly adelgid and therefore only the wingless form is found in New York. These wingless forms produce two generations, approximately 200 eggs per winter per female, and can kill an adult hemlock tree in as quickly as four years (NYIS, 2015f).

Infested hemlock trees can be treated with a chemical, systemic insecticide applied by a certified pesticide applicator; however, costs of the insecticide, as well as concerns about application near water resources, makes insecticide use less feasible. Common prevention of the spread of hemlock woolly adelgid involves reducing tree stress (e.g., watering during droughts) to decrease their susceptibility to infestation and to limit the movement of hemlock wood and mulch from infested to uninfested areas (NYIS, 2015f).

5.0 MANAGEMENT AND CONTROL

5.1 Construction Phase Mitigation Measures

Preliminary data gathered during field surveys revealed that multiple populations of large dominant stands of Japanese stilt grass are present within the Project survey corridor. The remaining invasive species identified are present to a much lesser extent. In many cases, the species identified are well established within individual wetlands. As previously discussed, the purpose of this ISMP is to control the spread of

invasive plants to areas where they do not presently occur and limit the spread of existing populations into restored workspace areas. Millennium will implement the mitigation measures described below prior to and during construction and restoration of disturbed areas to control the spread of invasive species.

- 1) Prior to construction, environmental inspector(s) will photograph each wetland and document the percentage and location of the listed invasive species or indicators of invasive invertebrates present in the wetland and surrounding area. These measurements will be utilized as a baseline for post-construction monitoring.
- 2) Construction equipment and mats will be kept clean and free of dirt and mud prior to entering wetlands or waterbodies and any regulated Adjacent Area, as invasive species can spread through the transfer of dirt and/or mud in seeds or fragments. Regulated Adjacent Area includes those areas of land or water that are outside an Article 24 Freshwater Wetland and within 100 feet (approximately 30 meters), measured horizontally, of the boundary of the wetland (6 CRR-NY 663.2). Equipment cleaning areas will be designated to ensure that equipment is cleaned to the extent practicable before moving equipment and/or mats between wetland areas. In wetlands, equipment shall be tracked and/or operate on matting to reduce soil disturbance during construction.
- 3) In accordance with New York State stormwater management regulations, erosion and sediment control devices will be installed across construction work area on slopes leading into wetlands and along the edges of the construction work area to prevent material (including spoil, seeds, and plant fragments) from migrating into these areas.
- 4) Except for areas with standing water or heavily inundated soils, wetland areas will be revegetated by segregating the topsoil from over the trench, which will be stockpiled in accordance with Millennium's Environmental Construction Standards (ECS). This will help maintain the native integrity of the soil and prevent inclusion of invasive species. Once the pipeline is installed, the area will be restored as provided in the ECS and the segregated topsoil shall be replaced as the surficial layer to promote re-establishment of native vegetation. To further promote re-establishment of native vegetation, Millennium will apply an appropriate native seed mix to workspace areas within palustrine forested wetlands and Article 24 Freshwater Wetlands and their regulated Adjacent Areas during restoration. All erosion and sediment controls shall remain in place until the site has achieved final stabilization. This will also help to prevent invasive species from entering the restored wetland area
- 5) In non-wetland areas, the restored right-of-way will be seeded with appropriate seed mixture as provided in the ECS. To the extent permitted by the ECS, the seed mixes will include annual ryegrass to create rapid cover over the disturbed right-of-way. This will help prevent establishment of invasive species, which often heavily colonize disturbed sites.

As described above, disturbed areas present opportunities for invasive species to colonize new areas. Construction in and around wetlands as provided in the ECS will reduce the amount of disturbances and

thus the potential for the spread of invasive species. In areas where soil must be disturbed, the use of erosion and sediment control devices and restoration as described in the ECS will minimize opportunities for invasive species to spread to new areas. The Environmental Inspector on the Project will monitor the use of these practices during construction of the Project.

5.2 Post-Construction Monitoring for Invasive Plant Species

To ensure successful revegetation of native wetland species, wetland areas will be monitored as provided in the ECS. It is anticipated that this monitoring will ensure that the establishment of large populations of invasive species do not develop and persist. In the event that nuisance plant species spread into new right-of-way areas where it was not documented as occurring prior to construction, Millennium will work with the landowners to implement removal and eradication measures. Although wetland areas throughout the Project will be monitored for invasive species, emphasis will be placed on locations where invasive species were not present prior to construction, as determined through the baseline evaluation.

5.3 Control Methods for Invasive Species

Early detection and eradication of invasive species is imperative in preventing their spread. Although many methods are utilized to control invasive plant species, several, such as mowing, burning and flooding, are largely ineffective and can often spread invasive species further.

Millennium will utilize a combination of physical removal and herbicide application, depending on plant stem density and location of the invasive species, to eradicate invasive plant species within the Project areas. These two (2) methods are described in further detail below:

- 1) **Physical Removal:** identify and remove entire plant (including roots) before the end of the flowering season if their occurrence is **no greater than 100 stems per acre and in wetland areas**. Plants shall be removed from the Project areas and disposed of at an approved waste facility. Care shall be taken to ensure no seeds or plant fragments remain within the Project areas.
- 2) **Herbicide:** hand application of Glyphosate (*e.g.*, Rodeo® or Roundup®), or a comparable herbicide, as recommended by the United States Army Corps of Engineers and appropriate state agencies, will be used by a certified applicator in areas where the invasive plant species population is greater than 100 stems per acre, including in wetland areas to the extent allowed by applicable regulations.

In addition, to avoid the spread of invasive terrestrial invertebrates, Millennium will abide by New York State restrictions on the movement of wood to limit the potential spread of invasive species (6 CRR-NY 192.5). This includes limiting the movement of cut or chipped wood, not including wood being transported to operations or manufacturing facilities as outlined in the regulation, to no more than 50 miles from the source. Where landowner agreements require salvage of wood products, the landowner will be responsible for a self-issued certificate of origin.

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APPENDIX 3C

Bald Eagle Presence / Absence Survey Report

**Provided under Separate Cover in Volume III -
PRIVILEGED AND CONFIDENTIAL -
DO NOT RELEASE**

APPENDIX 3D

***Indiana Bat Acoustic Survey Report and Acoustic
Survey Study Plan***

**Provided under Separate Cover in Volume III -
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APPENDIX 3E

Revised Phase I Bog Turtle Habitat Survey Report

**Provided under Separate Cover in Volume III -
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APPENDIX 3F

Phase II Bog Turtle Presence /Absence Survey Report

**Provided under Separate Cover in Volume III -
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APPENDIX 3G

Timber Rattlesnake Presence / Absence Survey Report

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