

**ATTACHMENT 3  
NORTHEAST-POCONO RELIABILITY PROJECT  
ENVIRONMENTAL SETTING**

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**LIST OF ACRONYMS**

Acronym	Definition
ACE	Agricultural Conservation Easement
ASA	Agricultural Security Area
CWF	Cold Water Fishery
CRGIS	Cultural Resources Geographic Information System
EV	Exceptional Value
FEMA	Federal Emergency Management Agency
F.E.W. Reservoir	Francis E. Walker Reservoir
GIS	Geographic Information Systems
HQ	High Quality
I	Interstate
J	Jenkins Substation
IBA	Important Bird Area
kV	Kilovolt
LCPC	Luzerne County Planning Commission
LCRPC	Lackawanna County Regional Planning Commission
MF	Migratory Fishery
MCPC	Monroe County Planning Commission
NAI	Natural Areas Inventory
NHD	National Hydrography Dataset
NP	North Pocono Substation
NPL	National Priority List
NPS	National Park Service
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
NWI	National Wetland Inventory
NWPS	National Wilderness Preservation System
P	Paupack Substation
PADCNR	Pennsylvania Department of Conservation and Natural Resources
PADEP	Pennsylvania Department of Environmental Protection
PCBC	Pike County Board of Commissioners
PFBC	Pennsylvania Fish and Boat Commission
PFO	Palustrine Forested

Acronym	Definition
PGC	Pennsylvania Game Commission
PHMC	Pennsylvania Historical and Museum Commission
PNDI	Pennsylvania Natural Diversity Inventory
PNHP	Pennsylvania Natural Heritage Program
POTC	Pennsylvania Ornithological Technical Committee
PPL Electric	PPL Electric Utilities Corporation
PSS	Palustrine Scrub/Shrub
RTE	Rare, Threatened, or Endangered
SGL	State Game Land
SR	State Route
TNC	The Nature Conservancy
USDA	U.S. Department of Agriculture
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
WCPC	Wayne County Planning Commission
WP	West Pocono Substation

## **1.0 INTRODUCTION**

PPL Electric Utilities Corporation (PPL Electric) seeks approval from the Pennsylvania Public Utility Commission (Commission or PUC) to site and construct transmission line connections associated with two new 230-69 kV transmission substations, the West Pocono 230 – 69 kV Substation and North Pocono 230 – 69 kV Substation.<sup>1</sup> As explained in **Attachment 2**, the proposed Northeast-Pocono Reliability Project is required to resolve violations of PPL Electric’s “Reliability Principles & Practices” (RP&P) guidelines and to reinforce the existing 138/69 kV systems serving Carbon, Lackawanna, Monroe, Pike, and Wayne Counties by bringing a new 230 kV supply source closer to the growing load centers.

To resolve the violations of the RP&P and reinforce the systems serving the Northeast Pocono area, PPL Electric proposes to locate the new West Pocono and North Pocono 230-69 kV Substations central to the load they will serve. The two new Substations and associated new transmission lines will enable PPL Electric to shorten the length of the existing 69 kV circuits, which will reduce the distance between the supply of power and the homes and businesses that use the electricity. This proposed arrangement also will provide a backup source of power to the Northeast Pocono area in the event that the normal sources are interrupted, which will improve power restoration times and provide operating flexibility and improved reliability for customers in the region. The proposed Northeast-Pocono Reliability Project will reduce the number of customers affected by a single facility outage, as well as the duration of the outage.

The new Substations will be connected to the existing local 230 kV transmission systems by building an approximately 58-mile new 230 kV transmission line. The new Substations will be connected to the existing local 138/69 kV transmission systems by building approximately 11.3 miles of new 138/69 kV transmission lines.

This Attachment provides background information describing the environmental setting of the Northeast-Pocono Reliability Project Study Area (Project Study Area) for the siting of the proposed transmission lines in northeast Pennsylvania. The purpose of this

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<sup>1</sup> PPL Electric will file zoning petitions for the West Pocono and North Pocono 230-69 kV Substations, seeking a finding for a finding that the buildings to shelter control equipment at each of the Substations are reasonably necessary for the convenience or welfare of the public and, therefore, exempt from any local zoning ordinance pursuant to 52 Pa. Code § 5.41 and 53 P.S. § 10619.

Attachment is to provide a contextual discussion of the natural environment and man-made features within the Project Study Area, which are used in the detailed siting study process discussed in **Attachment 4**. The siting study methodology, which is reviewed in **Attachment 4**, involves the development of the Project Study Area (based on Macro Corridors), Alternative Corridors within the Project Study Area, Alternative Routes, and the determination of a Selected Route. The process of determining the Project Study Area boundaries is conducted in the first phase of the siting study, as discussed in detail in **Attachment 4, Section 1.2**. The Project Study Area is used throughout these Attachments and is illustrated in **Figure 3-1**.

The siting study process was completed independently for each of the three segments of the proposed 230 kV transmission line, which includes the study area for the proposed 138/69 kV transmission lines associated with the proposed West Pocono and North Pocono 230-69 kV Substations. The first segment of line will connect the existing Jenkins 230-69 kV Substation with the proposed new West Pocono 230-69 kV Substation (Jenkins-West Pocono). The second segment would run between two new proposed substations, the West Pocono 230-69 kV Substation and the North Pocono 230-69 kV Substation (West Pocono-North Pocono). The final segment will link the proposed North Pocono 230-69 kV Substation and the previously approved Paupack 230-69 kV Substation (North Pocono-Paupack), which is located adjacent to the eventual connection point, the Peckville-Blooming Grove 230 kV transmission line.

Information discussed in this Attachment was gathered from numerous sources, including federal, state, and local geographic information system (GIS) databases, published reports and maps, and field reconnaissance surveys. The combination of data sources within this Attachment provides a concise, yet thorough, description of the environmental setting of the Project Study Area. A complete list of data sources is included at the end of this Attachment.

The Project Study Area includes areas of Carbon, Lackawanna, Luzerne, Monroe, Pike, and Wayne Counties, all located in northeastern Pennsylvania (**Figure 3-1**). The following thirty one municipalities are located either partially or wholly within the Project Study Area:

**TABLE 3-1: Counties and Municipalities within the Project Study Area**

County	Municipality	County	Municipality	
<b>Carbon</b>	Kidder Township	<b>Monroe</b>	Coolbaugh Township	
	Thornhurst Township		Tobyhanna Township	
<b>Lackawanna</b>	Clifton Township		Tunkhannock Township	
	Covington Township		<b>Pike</b>	Greene Township
	Spring Brook Township			Palmyra Township
	Jefferson Township	<b>Wayne</b>	Dreher Township	
	Madison Township		Lehigh Township	
<b>Luzerne</b>	Buck Township		Sterling Township	
	Bear Creek Township		Cherry Ridge Township	
	Bear Creek Village Borough		Lake Township	
	Jenkins Township		Paupack Township	
	Laflin Borough		Salem Township	
	Laurel Run Borough		South Canaan Township	
	Pittston Township			
	Plains Township			
	Wilkes Barre Township			
	Wilkes Barre City			
Yatesville Borough				



## **2.0 NATURAL ENVIRONMENT OF THE PROJECT STUDY AREA**

Features of the natural environment help define the opportunity and constraint areas within the Project Study Area making them an important component of the transmission line siting process. This section provides a description of the environmental setting of the Project Study Area including its physiography, geology, soils, surface waters, vegetation and wildlife habitats, and special use areas. This section is divided into three subsections to mirror the segmented organization of the Project siting process.

### **2.1 Jenkins to West Pocono Segment (J-WP)**

This segment of the Project begins at the existing Jenkins Substation in Plains Township, Luzerne County and heads generally southwest to the site of the proposed West Pocono Substation in Buck Township, Luzerne County. The following discussion covers the portion of the Project Study Area associated with this segment of the overall Project.

#### **2.1.1 Physiographic Provinces and Terrain**

Pennsylvania physiographic provinces are defined by the geomorphology, underlying bedrock geology, and the glacial signature of the landscape. The portion of the Project Study Area associated with the Jenkins-West Pocono Segment of the Project extends across two physiographic provinces (**Figure 3-2**): the Anthracite Valley Section of the Ridge and Valley Province, and the Glaciated Pocono Plateau Section of the Appalachian Plateaus Province.

The northwestern portion of the Project Study Area is within the Anthracite Valley Section of the Ridge and Valley Province. The Anthracite Valley Section is a broad canoe-shaped valley enclosed by steeply sloping mountains to the east and west. It is filled with shallow folds made up of mainly sandstone, siltstone, conglomerate, and anthracite coal. The cities of Wilkes-Barre and Scranton are located within this valley, commonly called the Wyoming Valley, and have been supported by the abundance and accessibility of coal in this region (Pennsylvania Department of Conservation and Natural Resources [PADCNR] 2012a). The remainder of the J-WP Segment is within the Glaciated Pocono Plateau Section of the Appalachian Plateaus Province. The Glaciated Pocono Plateau Section is a broad upland made of erosion resistant sandstone. The topography is relatively flat and smooth due to the influence of three glaciated periods (PADCNR 2012c).

Several areas of steep slopes are concentrated along the Wilkes-Barre Mountain and along the banks of the Lehigh River. The slopes leaving the Wyoming Valley (Anthracite Valley Section) and extending up over the Wilkes-Barre Mountain onto the Glaciated Pocono Plateau are steep because of the sudden change between the deep valley of the Ridge and Valley Province and the high flat plateau of the Appalachian Plateaus Province. The steep slopes along the Lehigh River exist due to the sharp erosion of the river system through the erosion-resistant sandstone. Steep slopes within the J-WP Segment are illustrated in **Figure 3-4a**.

### **2.1.2 Geologic Areas**

The geology within the J-WP Segment of the Project Study Area can be described in terms of underlying consolidated rocks (bedrock geology) and unconsolidated deposits positioned atop the bedrock (surficial geology). Rock units that underlie the unconsolidated material date from the Late Devonian to Pennsylvanian period, which ranges in age from about 385 million to about 300 million years ago. The following rock units and associated map symbols (i.e., Dcd) are listed from older to younger:

- Catskill Formation
- Dcd - Duncannon Member
- MDsk – Spechty Kopf Formation
- Mmc – Mauch Chunk Formation
- Mp – Pocono Formation
- Pl – Llewellyn Formation
- Pp – Pottsville Formation

The Jenkins Substation is located in the Wyoming Valley and is underlain by one of the youngest rock formation in the study area, the coal rich Llewellyn Formation. Heading southeast over the steep slopes and out of the valley, the study area crosses Wilkes-Barre Mountain and then Wyoming Mountain, passing across bands of sandstone, which change from younger to older with increased elevation. At the top of these slopes is the broad upland of the Glaciated Pocono Plateau Section noted in **Section 2.1.1**. This upland is composed of members of the Catskill Formation, a hard and erosion resistant sandstone deposited during the Devonian Period when much of northeast Pennsylvania

was covered by the Catskill Delta. Portions of the Spechty Kopf Formation and the Pocono Formation are present on small hills that rise above the general surface of the upland plateau. The bedrock geology of the J-WP Segment of the Project Study Area is presented geographically in **Figure 3-4a**.

The following discussion is a summary of Braun Surficial Geology documents dating from 2006-2008. Unconsolidated geologic units overlying the Project Study Area bedrock are glacial, alluvial, and colluvial, as defined below. This area is known to have undergone several glaciations during the Pleistocene Epoch of the Quaternary Period. It is believed that glaciers advanced into this region generally from the northeast on three separate occasions between 850,000 and 20,000 years ago. Most of the Project Study Area is covered with material carried by and deposited directly from the ice sheets, called glacial till and outwash. Sediments transported and deposited by present-day and ancestral streams are called alluvium. Alluvial deposits primarily occur within stream banks and in floodplains, most of which are post-glacial floodplains. Loose rock debris that has accumulated at the base of gently sloping cliffs or slopes through the action of weather or gravity is called colluvium. Due to the variable topography, colluvial deposits may be located at various elevations throughout the Project Study Area, as well as along the edge of stream banks and floodplains (Braun 2006b & 2008b/d/e).

### **2.1.3 Soil Characteristics**

The general characteristics of soils that have developed in the Project Study Area correspond closely to the area's physiography and geology (Bush 1981, Eckenrode 1982, Fisher et al 1962, Lipscomb 1981, Martin 1985). The following discussion of soils is based on information provided by the U.S. Department of Agriculture/Natural Resources Conservation Service (USDA/NRCS 2011). Soils in the Ridge and Valley Province, including the Anthracite Valley Section, are generally well to moderately well drained, may be shallow or deep, and are derived from till, colluvium, or bedrock. Deep, excessively drained to well drained soils form as alluvium on terraces and floodplains. Soils in the Glaciated Pocono Plateau Section of the Appalachian Plateau Province are somewhat excessively well drained to somewhat poorly drained, typically deep, and are derived from sandstone and siltstone. Many of these soils are characterized as being very stony and having high water tables.

Hydric soils are formed under wet conditions (saturation, flooding, or ponding) sufficient to develop anaerobic conditions during the growing season in the upper regions of the soil layer and support the growth of hydrophytic vegetation (**Table 3-2**). **Figure 3-5a** illustrates the soil-mapping units within the Project Study Area defined as hydric soils.

**TABLE 3-2: Soils with Hydric Characteristics within the J-WP Segment**

Soil Symbol	Soil Map Unit Name	Soil Symbol	Soil Map Unit Name
Ag	Alluvial land	MxD	Morris extremely stony loam, 8 – 25% slopes
At*	Atherton silt loam, gray subsoil variant	NcB*	Norwich & Chippewa channery silt loams, 3 - 8% slopes
Bf	Basher soils	NxB*	Norwich & Chippewa extremely stony silt loams, 0 - 8% slopes
BrA	Braceville gravelly loam, 0 - 3% slopes	Ps	Pope soils
BrB	Braceville gravelly loam, 3 – 8% slopes	RdA	Rexford loam, 0 - 3% slopes
BrC	Braceville gravelly loam, 8 – 15% slopes	RdB	Rexford loam, 3 - 8% slopes
CIA*	Chippewa silt loam, 0 - 3% slopes	VcB	Volusia channery silt loam, 3 - 8% slopes
CIB*	Chippewa silt loam, 3 – 8% slopes	VcC	Volusia channery silt loam, 8 - 18% slopes
CnB*	Chippewa very stony silt loam, 0 - 8% slopes	VoB	Volusia channery silt loam, 0 – 8% slopes
DYD	Dystrochrepts & Rock outcrop, moderately steep	VoC	Volusia channery silt loam, 8 – 15% slopes
FA	Fluvents & Fluvaquents	VrB	Volusia very stony silt loam, 0 – 8% slopes
Ho	Holly silt loam	VrC	Volusia very stony silt loam, 8 – 15% slopes
HO*	Holly silt loam, ponded	VxB	Volusia extremely stony silt loam, 0 - 8% slopes
Ln	Linden soils	VxD	Volusia extremely stony silt loam, 8 - 25% slopes
MaC	Mardin channery silt loam, 8 – 15% slopes	Wa*	Wayland silt loam
McB/MaB	Mardin channery silt loam, 3 - 8% slopes	WcB	Wellsboro channery loam, 3 - 8% slopes
McB	Mardin very stony silt loam, 3 – 8% slopes	WfB	Wellsboro flaggy loam, 3 - 8% slopes
McD	Mardin very stony silt loam, 8 – 25% slopes	WgB	Wellsboro extremely stony loam, 3 - 8% slopes
MhB	Mardin extremely stony silt loam, 3 - 8% slopes	WgD	Wellsboro extremely stony loam, 8 - 25% slopes
MhD	Mardin extremely stony silt loam, 8 - 25% slopes	WkB/WrB	Wurtsboro channery loam, 3 - 8% slopes
MK*	Medisapristis & Medihemists	WkC/WrC	Wurtsboro channery loam, 8 – 15% slopes
Mm	Minewash	WIB	Wellsboro channery silt loam, 3 - 8% slopes
MoB	Morris channery silt loam, 0 – 8% slopes	WIC	Wellsboro channery silt loam, 8 – 15% slopes
MoC	Morris channery silt loam, 8 – 15% slopes	WmB	Wellsboro very stony silt loam, 3 - 8% slopes
MsB	Morris very stony silt loam, 0 - 8% slopes	WmD	Wellsboro very stony silt loam, 8 - 25% slopes
MsC	Morris very stony silt loam, 8 – 15% slopes	WxB/WtB	Wurtsboro extremely stony loam, 3 - 8% slopes
Mu*	Muck	WxD/WtD	Wurtsboro extremely stony loam, 8 - 25% slopes
MxB	Morris extremely stony loam, 0- 8% slopes		

\*Soils composed of major hydric components; others contain minor hydric inclusions

Also present within this portion of the Project Study Area are prime farmland soils and soils of state importance, which are defined as having a combination of physical and chemical characteristics that make them optimal for producing food and feed. These soil criteria are used to determine if farms are eligible to be incorporated into the County Agricultural Conservation Easement (ACE) program (see **Section 3.1.1**).

Erosion potential associated with the Project will be related to clearing the vegetation and constructing the access roads and transmission structures. Following existing access roads and co-locating the new transmission line within portions of existing ROW reduces the potential for erosion and the resulting sedimentation. Erosion and sedimentation control plans will be developed that will address the construction and post-construction stormwater concerns. These plans will be reviewed and approved by the individual County Conservation Districts prior to the issuance of other mandatory permits.

#### **2.1.4 Hydrology**

The portion of the Project Study Area between Jenkins and West Pocono spans across two major watersheds: the Susquehanna River Basin to the northwest of the crest of Wyoming Mountain and the Delaware River Basin to the southeast. On the north side, the Project Study Area is within the watershed of the Susquehanna River itself. On the south side, the Project Study area is within the Lehigh Valley watershed of the Delaware River Basin. Major streams and lakes found on the U.S. Geological Survey (USGS) National Hydrography Dataset (NHD), as well as watershed boundaries, are illustrated in **Figure 3-6a** and discussed further below.

##### **2.1.4.1 Streams**

The Pennsylvania Code, Title 25, Chapter 93 (Pennsylvania Department of Environmental Protection [PADEP] 2011) establishes narrative and numeric water quality criteria necessary to support a variety of protected water uses. All surface waters must be protected for aquatic life (warm water fishes), water supply (potable, industrial, livestock, wildlife, and irrigation), and recreation (boating, fishing, water contact sports, and aesthetics). PADEP assigns all streams in the Commonwealth a *Designated Use*, which is the water use goal for a particular stream segment, whether or not it is currently being attained. In contrast, a stream's *Existing Use* is the use actually attained by

existing water quality. PADEP’s antidegradation policy requires existing uses, and the level of water quality necessary to protect existing uses, shall be maintained and protected. As such, the water quality of a stream segment with an existing use that exceeds its designated use may not be degraded below the water quality levels protective of that existing use.

**TABLE 3-3: Streams and Chapter 93 Designated Uses within the J-WP Segment**

Susquehanna River Basin		Delaware River Basin	
Stream Name	Designated Use	Stream Name	Designated Use
<b>Mill Creek</b>	CWF, MF	<b>Lehigh River (at FEW Reservoir)</b>	HQ-CWF, MF
<i>Deep Creek</i>	CWF, MF	<i>&gt; 10 un-named tributaries</i>	HQ-CWF, MF
<i>Gardner Creek</i>	CWF, MF	<b>Stony Run</b>	HQ-CWF, MF
<i>Lampblack Creek</i>	CWF, MF	<b>Bear Creek</b>	HQ-CWF, MF
<i>Laurel Run</i>	CWF, MF	<i>Geneceda Creek</i>	HQ-CWF, MF
<i>Spring Run</i>	CWF, MF	<i>Little Bear Creek</i>	HQ-CWF, MF
<i>Three Spring Brook</i>	CWF, MF	<i>Little Shades Creek</i>	HQ-CWF, MF
<i>Warden Creek</i>	CWF, MF	<i>Meadow Run</i>	HQ-CWF, MF
<i>&gt; 10 un-named tributaries</i>	CWF, MF	<i>Mud Run</i>	HQ-CWF, MF
		<i>Mud Run Creek</i>	HQ-CWF, MF
		<i>Porter Run</i>	HQ-CWF, MF
		<i>Red Run</i>	HQ-CWF, MF
		<i>Red Run Creek</i>	HQ-CWF, MF
		<i>Shades Creek</i>	HQ-CWF, MF Class A
		<i>Snider Run</i>	HQ-CWF, MF
		<i>Spring Run</i>	HQ-CWF, MF
		<i>Tennile Run</i>	HQ-CWF, MF
		<i>White House Run</i>	HQ-CWF, MF
		<i>Wright Creek</i>	HQ-CWF, MF
		<i>&gt; 50 un-named tributaries</i>	HQ-CWF

  

Delaware River Basin	
Stream Name	Designated Use
<b>(above FEW Reservoir)</b>	EV, MF
<i>Butler Run</i>	EV, MF
<i>Choke Creek</i>	EV, MF
<i>Kendall Creek</i>	EV, MF
<i>Sand Spring Creek</i>	Class A
<i>~ 20 un-named tributaries</i>	EV, MF

Stream sections within the J-WP Segment of the Project Study Area can be grouped by their major watershed. The northwestern portion drains to the Susquehanna River through one main tributary, Mill Creek. Mill Creek and its tributaries have the Chapter 93 designated use classification of Cold Water Fishery (CWF). These streams, and all streams within the Project Study Area, also have a migratory fishes (MF) designated use for the passage, maintenance and propagation of migratory fish. The central and

southeastern portions of J-WP Segment are within the Lehigh River watershed of the Delaware River Basin. The central area is drained primarily by two tributaries to the Lehigh River, Bear Creek and Stony Run, which feed into the Francis E. Walter (F.E.W.) Reservoir. The F.E.W. Reservoir is created by a dam built at the confluence of Bear Creek and the Lehigh River by the U.S. Army Corps of Engineers as a flood control structure. Bear Creek, Stony Run, their tributaries, and the F.E.W. Reservoir are classified in Chapter 93 with a designated use of High Quality-Cold Water Fisheries (HQ-CWF). The southeastern portion of the J-WP Segment is drained by other tributaries to the Lehigh River located upstream of the F.E.W. Reservoir. The Lehigh River and its tributaries upstream of the F.E.W. Reservoir have a Chapter 93 designated use of Exceptional Value (EV). All of the streams within the J-WP Segment of the Project Study Area, as well as their Chapter 93 designated use, are listed in **Table 3-3**.

Additionally, within this portion of the Project Study Area, the Pennsylvania Fish and Boat Commission (PFBC) has indicated that Shades Creek and Sand Spring Creek are Class A wild trout streams. The PFBC defines Class A streams as “*Streams that support a population of natural produced trout of sufficient size and abundance to support a long-term and rewarding sport fishery* (PFBC 2012).”

#### **2.1.4.2 100-year Floodplains**

The areas adjacent to streams subject to inundation by a flood elevation with a 1-percent-annual-chance of being equaled or exceeded each year are known as the 100-year floodplains. The Federal Emergency Management Agency (FEMA) delineates the extent of some 100-year floodplains on Flood Insurance Rate Maps. 100-year floodplain extents in the Project Study Area and surrounding landscape were obtained and examined. The floodplain data was adapted by PADEP from the FEMA 100-year floodplains and issued through the Pennsylvania Spatial Data Access (PASDA) database (PADEP 1996). **Figure 3-7a** shows the 100-year floodplain boundaries for the J-WP Segment of the Project Study Area.

#### **2.1.4.3 Lakes**

Numerous open water bodies are located within this portion of the Project Study Area. Major lakes include Mill Creek Reservoir, Lake Aleeda, Meadow Lake, Bear Creek



Lake, and Behren Lake (**Figure 3-6a**). A complete list of named lakes within the J-WP Segment of the Project Study Area, obtained from the USGS NHD, is provided in **Table 3-4**.

**TABLE 3-4: NHD Named Lakes within the J–WP Segment**

NHD Waterbodies - Lakes (GNIS Name)			
Bear Lake	Gardner Creek Reservoir	Meadow Lake	Mud Pond
Bear Creek Lake	Indian Lake	Meadow Run Ponds	Nines Pond
Behren Pond	Kiel Lake	Meadow Run Lake	~ 100 un-named lakes
Deep Hollow Pond	Lake Aleeda	Mill Creek Reservoir	

#### 2.1.4.4 Wetlands

U.S. Fish and Wildlife Service (USFWS) National Wetland Inventory (NWI) wetland maps indicate that wetlands throughout of the Project Study Area are primarily palustrine (i.e., non-tidal, freshwater) wetlands dominated by trees, shrubs, persistent emergent vegetation, and emergent mosses or lichens. NWI wetlands are classified in accordance with the Cowardin system (Cowardin et al. 1979), which also includes open waters (e.g., streams, ponds, lakes) as wetlands. Large concentrations of NWI wetlands, primarily palustrine forested (PFO) or shrub/scrub (PSS) communities, are present in the J-WP Segment of the Project Study Area especially at the higher elevations of the Delaware River Basin in Bear Creek Township and Buck Township. There are few palustrine emergent (PEM) wetlands scattered throughout the landscape. One riverine system, the Lehigh River, is located within this segment of the Project Study Area (**Figure 3-6a**) (USFWS 2012a).

The wetlands depicted in the NWI database are not identified or delineated in accordance with methodologies used by regulatory agencies to establish boundaries of wetlands under their jurisdiction. The NWI maps were created based on the analysis of aerial photographs from the 1980s with limited ground verification, and should not be considered an alternative to delineating wetlands using regulatory requirements. An official delineation of the wetlands along the length of the Selected Route will be required prior to issuance of the environmental permits necessary for construction of the transmission line.



### 2.1.5 Plant and Wildlife Habitats

The J-WP Segment of the Project Study Area contains areas composed of native plant and wildlife habitats. Many of these habitats are within Priority Natural Areas identified by The Nature Conservancy. Most of these areas are preserved for their ecological benefit through their association with larger preserved recreational resources such as the Lackawanna State Forest and SGL #091.

#### 2.1.5.1 Vegetation

The Project Study Area lies within the Central Appalachian Broadleaf Forest-Coniferous Forest-Meadow Forest ecosystem province (Bailey 1998). This province is temperate, with distinct summer and winter seasons and some of the highest precipitation levels in the eastern United States. The vegetation of this portion of the Project Study Area can be divided and summarized based on terrestrial and palustrine vegetation. The terrestrial vegetation of the J-WP Segment of the Project Study Area is split between two forest types according to Rhoads' and Block's *Trees of Pennsylvania: a complete reference guide* (Rhoads & Block 2005). The northwestern two thirds of this portion of the Project Study Area are within the Appalachian Oak Forest; the remaining third falls within the Northern Hardwood Forest.

The Appalachian Oak Forest is the dominant forest type in Pennsylvania; it is characterized by the presence of red oak (*Quercus rubra*), white oak (*Quercus alba*), tulip tree (*Liriodendron tulipifera*), red maple (*Acer rubrum*), and hickory trees (*Carya* species). It also generally has a dense layer of shrubs including mountain laurel (*Kalmia latifolia*) and black huckleberry (*Gaylussacia baccata*). The Northern Hardwood Forest is prevalent throughout the northern third of the Commonwealth. It is characterized by hardwoods and conifers usually containing beech (*Fagus* species), birch (*Betula* species), sugar maple (*Acer saccharum*), Canadian hemlock (*Tsuga canadensis*), and white pine trees (*Pinus strobus*). The understory is generally comprised of moosewood (*Acer pensylvanicum*), witch-hazel (*Hamamelis virginiana*), mountain holly (*Ilex montana*), and shadbush (*Amelanchier arborea*).

The palustrine vegetation of this portion of the Project Study Area is not constrained to the same boundaries as the terrestrial vegetation. Throughout this region, wetter

environments, such as the Boreal Conifer Swamps created by glacial activities, are abundant and include black spruce (*Picea mariana*), larch (*Larix* species), balsam fir (*Abies balsamea*), and red spruce (*Picea rubens*). Some of the common shrubs include swamp azalea (*Rhododendron simsii*), highbush blueberry (*Vaccinium corymbosum*), and mountain holly (*Ilex montana*) (Fike 1999).

#### 2.1.5.2 Wildlife

Typical wildlife species found within the Project Study Area include a variety of mammals, birds, amphibians, and reptiles. Common mammals include the white-tailed deer (*Odocoileus virginianus*), eastern cottontail (*Sylvilagus floridanus*), gray squirrel (*Sciurus carolinensis*), and chipmunk (*Tamias striatus*); other less common mammals include the black bear (*Ursus americanus*), river otter (*Lutra canadensis*), and beaver (*Castor canadensis*). Bird species range from the robins (*Turdus migratorius*), blue jays (*Cyanocitta cristata*), red-wing blackbirds (*Agelaius phoeniceus*), and house wrens (*Troglodytes aedon*) that are noted in more developed areas to the common yellowthroat (*Geothlypis trichas*), wood ducks (*Aix sponsa*), bobwhite quails (*Colinus virginianus*), and whip-poor-wills (*Caprimulgus vociferous*) that are typically found in specific habitat areas. Common amphibians and reptiles include the northern green frog (*Rana clamitans melanota*), bullfrog (*Rana catesbeiana*), red-spotted newt (*Notophthalmus viridescens*), wood turtle (*Clemmys insculpta*), black rat snakes (*Elapha obsoleta*), and northern water snake (*Nerodia sipedon*) (Fergus and Hansen 2000).

#### 2.1.5.3 Rare, Threatened, and Endangered Species

Based on a search of the Pennsylvania Natural Diversity Inventory (PNDI) database, administered by the Pennsylvania Natural Heritage Program (PNHP), and follow-up consultations with the USFWS (USFWS 2012b), PFBC (PFBC 2011a), Pennsylvania Game Commission (PGC) (PGC 2011a), and PADCNr (PADCNr 2011a), the following federal and/or state rare, threatened, or endangered (RTE) species could potentially occur within the J-WP Segment the Project Study Area:

- Indiana bat (*Myotis sodalists*) State endangered, Federal endangered mammal (USFWS)
- Timber Rattlesnake (*Crotalus horridus*) – State candidate reptile (PFBC)
- Eastern Small-footed Bat (*Myotis leibii*) – State threatened species (PGC)

- Northern myotis (*Myotis septentrionalis*) – State species of Special Concern (PGC)
- Horned Bladderwort (*Utricularia cornuta*) – State plant species of Special Concern (PADCNR)
- Few-seeded Sedge (*Carex oligosperma*) – State plant species of Special Concern (PADCNR)
- Common Labrador-tea (*Ledum groenlandicum*) – State plant species of Special Concern (PADCNR)
- Creeping Snowberry (*Gaultheria hispidula*) – State plant species of Special Concern (PADCNR)
- Rhodora-Mixed Heath- Scrub Oak Shrubland – State Community of Special Concern (PADCNR)
- Scrub Oak Shrubland - State Community of Special Concern (PADCNR)
- Leatherleaf-Cranberry Peatland - State Community of Special Concern (PADCNR)
- Red Dart moth (*Diarsia rubifera*) – State terrestrial invertebrate species of Special Concern (PADCNR)
- Bog Copper (*Lycaena epixanthe*) – State terrestrial invertebrate species of Special Concern (PADCNR)
- A Noctuid Moth (*Platyperigea meralis*) – State terrestrial invertebrate species of Special Concern (PADCNR)

Habitat assessments for these RTE species may be required by the jurisdictional agencies as part of the environmental permitting and approval process for the proposed Northeast-Pocono Reliability Project.

Aside from the Indiana bat, UFSWS, further notes that avian species protected under the Migratory Bird Treaty Act (MBTA) and the Bald and Golden Eagle Protection Act may use the Project area for wintering, migrating, or breeding activities. Electrocutions from power lines are of particular concern, and USFWS recommends that the proposed Project be evaluated in light of the *National Bald Eagle Management Guidelines* to determine whether or not eagles might be disturbed as a direct result of the Project. USFWS, in conjunction with the Avian Power Line Interaction Committee (APLIC), provides guidelines for power lines to minimize impacts from existing facilities and in the construction of new utility and energy systems and associated infrastructure (USFWS 2012b).

## **2.1.6 Special Use Areas**

Special use areas are places recognized by regulatory agencies or local governments as providing habitat characteristics or wildlife management opportunities that indicate a need for preservation. Examples include scenic areas, wilderness areas, wild and scenic rivers, state and conserved lands, priority natural areas, and important bird areas (IBA).

### **2.1.6.1 Scenic Areas**

The PADCNr provides designations for vistas and overlooks, waterfalls, scenic hikes, and other special use areas. There are no designated scenic areas within the J-WP Segment of the Project Study (PADCNr 2012d). There is, however, one Heritage Geology Site designated by the Pennsylvania Natural Heritage Program (PNHP) within this portion of the Project Study Area (PADCNr 2012f). The site is The Tubs (Whirlpool Canyon), which consists of a series of potholes and a deep gorge created by glacial meltwater 10,000 years ago during the Pleistocene Epoch (Geyer 1987) (**Figure 3-8a**).

### **2.1.6.2 Wilderness Areas**

No areas within this portion of the Project Study Area are located within the National Wilderness Preservation System (NWPS 2012).

### **2.1.6.3 Wild and Scenic Rivers**

No wild or scenic rivers, as designated pursuant to the federal Wild and Scenic Rivers Act or by the Pennsylvania Scenic Rivers Act, are located within the J-WP Segment of the Project Study Area (PADCNr 2012e). The nearest Pennsylvania Scenic River is a 64-mile stretch of the Lehigh River between the F.E.W. Reservoir, situated at the confluence of Bear Creek and the Lehigh, and the town of Jim Thorpe. The F.E.W. Reservoir is located along the southern boundary of the Project Study Area and the scenic section of the Lehigh River flows south away from the Project Study Area. This section is acknowledged because the Project Study Area does encompass the remaining Lehigh River watershed area upstream of the scenic portion.

### 2.1.6.4 State and Conserved Lands

The portion of the Project Study Area between Jenkins and West Pocono contains a number of state-owned and other forms of conserved lands.

Several State Game Lands (SGL) including, 16,000-acre SGL #091, 624-acre SGL #292, and 8,000-acre SGL #119, are each located at least partially within the J-WP Segment of the Project Study Area (PGC 2012). Also partially included are areas of the approximately 11,000-acre Thornhurst section of the Lackawanna State Forest. Aside from state-owned land, there are also privately conserved land areas. These include the Bear Creek Preserve (Natural Lands Trust), Bear Creek Camp (North Branch Land Trust), a reclaimed mine (Earth Conservancy), lands conserved by the Luzerne Conservation District, and water protection areas surrounding two Pennsylvania American Water Company reservoirs. The exact extents and locations of these areas are depicted in **Figure 3-8a**.

### 2.1.6.5 Priority Natural Areas

The Natural Area Inventories (NAI) for Lackawanna and Luzerne Counties, conducted by The Nature Conservancy (TNC), indicate that thirty-four (34) Priority Natural Areas are partially or wholly located within this portion of the Project Study Area (**Figure 3-9a**) (TNC 2003, 2005, 2006). These sites are associated with “locations of rare, threatened, and endangered species and of the highest quality natural areas” (TNC 2006). Based on biodiversity and concentration of rare species, TNC has ranked the Statewide Significance of each NAI between one (1), indicating highest priority, and five (5), indicating lowest priority. These rankings as well as the names of the Priority Natural Areas are listed in **Table 3-5**.

**TABLE 3-5: Priority Natural Areas within the Project Study Area (J-WP)**

Site Name	Significance State Rank	Significance Local Rank	County	Publication Year
Bear Lake - Grassy Pond	1		Lackawanna	2003
Balsam Swamp	3		Lackawanna	2003
Nine Ponds	3		Lackawanna	2003
America Swamp	4		Lackawanna	2003
Horseshoe Swamp	5		Lackawanna	2003
Sand Spring Woods	5		Lackawanna	2003

Site Name	Significance State Rank	Significance Local Rank	County	Publication Year
Tannery Road Swamp	5		Lackawanna	2003
Arbutus Peak	1		Luzerne	2006
F.E. Walter Reservoir Site	2		Luzerne	2006
Behren Pond	3		Luzerne	2006
Dry Land Hill Pools	3		Luzerne	2006
Gardner Creek Reservoir	3		Luzerne	2006
Lehigh River - Route 115 Bridge	3		Luzerne	2006
Mud Pond Woods	3		Luzerne	2006
Old Boston Mines	3		Luzerne	2006
Orloski's Bog	3		Luzerne	2006
Tannery Road Site/Behler Swamp	3		Luzerne	2006
Wyoming Mountain Barrens	3		Luzerne	2006
Bald Mountain Road Swamp	4		Luzerne	2006
Bear Creek RR Site	4		Luzerne	2006
Canada Bog	4		Luzerne	2006
Mud Pond	4		Luzerne	2006
Pipeline Swamp	4		Luzerne	2006
Shades Glen Headwaters	4		Luzerne	2006
Choke Creek Shrub Swamp	5		Luzerne	2006
Haas Route 115	5		Luzerne	2006
Indian Lake Swamp - East	5		Luzerne	2006
Indian Lake Swamp - North	5		Luzerne	2006
Kendall Creek Wetland	5		Luzerne	2006
Pipeline Swamp North	5		Luzerne	2006
Red Bear Swamp	5		Luzerne	2006
The Tubs	5		Luzerne	2006
Bear Creek at Shades Creek		Medium	Luzerne	2006
Prospect Rock		Medium	Luzerne	2006

### 2.1.6.6 Important Bird Areas

Important Bird Areas (IBA) are “designated by the Pennsylvania Ornithological Technical Committee (POTC), as the most critical regions in the Commonwealth for conserving bird diversity and abundance, and are the primary focus of Audubon Pennsylvania’s conservation efforts” (Audubon Pennsylvania Birds Conservation 2012). There are no IBAs within the J-WP Segment of the Project Study Area.

## 2.2 West Pocono to North Pocono Segment (WP-NP)

This segment of the Project connects the proposed West Pocono Substation to the proposed North Pocono Substation in Covington Township, Lackawanna County. The following discussion covers the portion of the overall Project Study Area associated with this segment.

### 2.2.1 Physiographic Provinces and Terrain

The West Pocono to North Pocono Segment of the Project Study Area is split between two sections of the Appalachian Plateaus Province: the Glaciated Pocono Plateau Section (discussed in **Section 2.1.1**) and the Glaciated Low Plateau Section. The divisions between the physiographic sections and provinces are depicted in **Figure 3-2**. The majority of this portion of the Project Study Area is within the Glaciated Pocono Plateau Section, with only the northernmost corner in the Glaciated Low Plateau Section. The Glaciated Low Plateau section is characterized by the remnants of its once glaciated landscape. Glacial erosion and deposition have carved the current topography of valleys, smooth hills, and glacial deposits (PADCNR 2012b). Beneath the glacially influenced surficial geology, the bedrock of this province is dominated by the Catskill Formation, a Devonian Age sedimentary rock deposited when Pennsylvania was mostly covered by the Catskill Delta.

There are relatively few areas of steep slopes within the WP-NP Segment of the Project Study Area. Where they do appear is along the banks of the Lehigh River. The origin of this phenomenon is discussed above in **Section 2.1.1**. The steep slopes of this region are illustrated in **Figure 3-3**.

### 2.2.2 Geologic Areas

The position of this portion of the Project Study Area within the Glaciated Pocono Plateau Section of the Appalachian Plateaus Province makes its bedrock geology relatively straightforward. The following rock units and associated map symbol (*e.g.*, Dcd) are listed from oldest to youngest:

- Catskill Formation
  - Duncannon Member - Dcd
  - Poplar Gap Member - Dcpg
  - Poplar Gap and Packerton Members – Dcpp

- Spechty Kopf Formation – MDsk
- Pocono Formation - Mp

A majority of the upland is composed of members of the Catskill Formation with areas of Pocono Formation and Spechty Kopf Formation rock on the small hills protruding above the upland plateau (reviewed in **Section 2.1.2**). The bedrock geology of the WP-NP Segment of the Project Study Area is shown in **Figure 3-4b**.

The unconsolidated surficial geology of this area mirrors that described in **Section 2.1.2** above (Braun 2008c/e).

### **2.2.3 Soil Characteristics**

The soils of the Project Study Area within the Glaciated Low Plateau Section of the Appalachian Plateau Province are somewhat excessively drained to well drained, are moderately deep, and are derived from sandstone and siltstone. These soils are characterized as less stony and having deeper water tables. Glacial till and outwash areas are prevalent throughout the area.

A description of the soils of the Glaciated Pocono Plateaus Province is included in the Soil Characteristics of the J-WP Segment, reviewed in **Section 2.1.3**. There are abundant hydric soils present within this portion of the Project Study Area as well. The map units identified as hydric are listed in **Table 3-6** and displayed in **Figure 3-5b**.

Discussions of prime farmland soil and soil erosion potential are located in **Section 2.1.3** and apply to this section as well.



**TABLE 3-6: Soils with Hydric Characteristics within the WP-NP Segment**

Soil Symbol	Soil Map Unit Name	Soil Symbol	Soil Map Unit Name
20*	Freetown mucky peat	MsB	Morris flaggy loam, 3 - 8 % slopes
111B	Edgemere-Shohola complex, 3 - 15 % slopes, very rubbly	Mu*	Muck
11A*	Edgemere extremely stony loam, 0 - 3 % slopes, very rubbly	MxB	Morris extremely stony loam, 0 - 8 % slopes
30B	Wurtsboro stony fine sandy loam, 0 - 8 % slopes, extremely stony	MxC	Morris extremely stony loam, 8 - 15 % slopes
30C	Wurtsboro stony fine sandy loam, 8 - 15 % slopes, extremely stony	MxD	Morris extremely stony loam, 8 - 25 % slopes
7B	Shohola-Edgemere complex, 0 - 8 % slopes, very rubbly	NcA*	Norwich and Chippewa channery silt loams, 0 - 3 % slopes
AcB	Albrights very stony loam, 0 - 8 % slopes	NcB*	Norwich and Chippewa channery silt loams, 3 - 8 % slopes
Ag/As	Alluvial land	NxA*	Norwich and Chippewa extremely stony silt loams, 0 - 3 % slopes
At*	Atherton loam, ponded	NxB*	Norwich and Chippewa extremely stony silt loams, 0 - 8 % slopes
Ba	Barbour loam	Ph	Philo silt loam
Bf	Basher soils	Po	Pope soils
Bh	Basher silt loam	ReA	Rexford loam, 0 - 5 % slopes
BrB	Braceville gravelly loam, 3 - 8 % slopes	Tf	Tioga fine sandy loam
CIA*	Chippewa silt loam, 0 - 3 % slopes	TmB	Tioga and Middlebury very stony loams, 0 - 8 % slopes
CnB*	Chippewa and Norwich extremely stony soils, 0 - 8 % slopes	VaC	Very stony land and Rock outcrops, sloping
CnB*	Chippewa very stony silt loam, 0 - 8 % slopes	VcA	Volusia channery silt loam, 0 - 3 % slopes
DYD	Dystrochrepts and Rock outcrop, moderately steep	VcB	Volusia channery silt loam, 3 - 8 % slopes
ExB	Empeyville extremely stony sandy loam, 0 - 8 % slopes	VcC	Volusia channery silt loam, 8 - 18 % slopes
FA	Fluvents and Fluvaquents	VfB	Volusia flaggy silt loam, 3 - 8 % slopes
FF	Fluvents and Fluvaquents, cobbly	VfC	Volusia flaggy silt loam, 8 - 15 % slopes
Hm*	Holly silt loam	VoA	Volusia gravelly silt loam, 0 - 3 % slopes
HO*	Holly silt loam, ponded	VoB	Volusia gravelly silt loam, 3 - 8 % slopes
Ho*	Holly silt loam	VoC	Volusia channery silt loam, 8 - 15 % slopes
Ln	Linden soils	VxB	Volusia extremely stony silt loam, 0 - 8 % slopes
MaB	Mardin channery loam, 3 - 8 % slopes	VxC	Volusia extremely stony silt loam, 8 - 15 % slopes
MaC	Mardin channery loam, 8 - 15 % slopes	VxD	Volusia extremely stony silt loam,
McB	Mardin channery silt loam, 3 - 8 % slopes	Wa*	Wayland silt loam
McC	Mardin channery silt loam, 8 - 15 % slopes	WcB	Wellsboro channery loam, 3 - 8 % slopes
McD	Mardin very stony silt loam, 8 - 25 % slopes	WcC	Wellsboro channery loam, 8 - 15 % slopes
MdB	Mardin extremely stony loam, 3 - 8 % slopes	WeB	Wellsboro channery loam, 3 - 8 % slopes
MdD	Mardin extremely stony loam, 8 - 25 % slopes	WeC	Wellsboro channery loam, 8 - 15 % slopes

Soil Symbol	Soil Map Unit Name	Soil Symbol	Soil Map Unit Name
ME*	Medihemists and Medifibrists	WfB	Wellsboro flaggy loam, 3 - 8 % slopes
MeA3	Middlebury and Tioga silt loams, 0 - 3 % slopes, severely eroded	WfC	Wellsboro flaggy loam, 8 - 15 % slopes
MfB	Mardin flaggy silt loam, 3 - 8 % slopes	WgB	Wellsboro extremely stony loam, 3 - 8 % slopes
MfC	Mardin flaggy silt loam, 8 - 15 % slopes	WgD	Wellsboro extremely stony loam, 8 - 25 % slopes
MhB	Mardin extremely stony silt loam, 3 - 8 % slopes	WkB	Wurtsboro channery loam, 3 - 8 % slopes
MhD	Mardin extremely stony silt loam, 8 - 25 % slopes	WkC	Wurtsboro channery loam, 8 - 15 % slopes
MK*	Medisapristis and Medihemists	WIB	Wellsboro channery silt loam, 3 - 8 % slopes
MoB	Morris extremely stony silt loam, 0 - 8 % slopes	WIC	Wellsboro channery silt loam, 8 - 15 % slopes
MoB	Morris channery loam, 3 - 8 % slopes	WmB	Wellsboro very stony silt loam, 3 - 8 % slopes
MoC	Morris extremely stony silt loam, 8 - 20 % slopes	WmD	Wellsboro very stony silt loam, 8 - 25 % slopes
MoC	Morris channery loam, 8 - 15 % slopes	WoB	Wellsboro extremely stony loam, 3 - 8 % slopes
Mp*	Mucky peat, deep	WoD	Wellsboro extremely stony loam, 8 - 25 % slopes
MrA	Morris channery loam, 0 - 3 % slopes	WpB	Wellsboro extremely stony loam, 0 - 8 % slopes
MrB	Morris channery loam, 3 - 8 % slopes	WpC	Wellsboro extremely stony loam, 8 - 25 % slopes
MrB	Morris very stony silt loam, 0 - 8 % slopes	WsB	Wurtsboro channery loam, 2 - 12 % slopes
MrC	Morris channery loam, 8 - 18 % slopes	WxB	Wurtsboro extremely stony loam, 0 - 8 % slopes
Ms*	Mucky peat, shallow	WxB	Wurtsboro extremely stony loam, 3 - 8 % slopes
MsB	Morris flaggy loam, 3 - 8 % slopes	WxC	Wurtsboro extremely stony loam, 8 - 25 % slopes
MsB	Morris very stony silt loam, 0 - 8 % slopes	WxD	Wurtsboro extremely stony loam, 8 - 25 % slopes
MsC	Morris flaggy loam, 8 - 15 % slopes		

\*Soils composed of major hydric components; others contain minor hydric inclusions

## 2.2.4 Hydrology

The portion of the Project Study Area between West Pocono and North Pocono is almost entirely within the Delaware River Basin; only the northern corner extends into the Susquehanna River Basin. Major streams and lakes found on the USGS NHD, as well as watershed boundaries, are illustrated in **Figure 3-6b** and discussed further below.

### 2.2.4.1 Streams

The small corner of the WP-NP Segment of the Project Study Area that is within the Susquehanna River Basin is drained by two creeks which feed the Lackawanna River, a major tributary of the Susquehanna River. The two creeks are Roaring Brook and Spring

Brook, which along with their tributaries have the Chapter 93 designated use classification of HQ-CWF.

The remainder of the WP-NP Segment is entirely within the Delaware River Basin's Lehigh River watershed. The watersheds feeding the Lehigh River within WP-NP Segment are generally smaller tributaries, such as Choke Creek, Pond Creek, and Ash Creek. One main tributary, Tobyhanna Creek, flowing from the east side of the Lehigh River watershed, meets the Lehigh River at the upstream end of the F.E.W. Reservoir. The Lehigh River and its tributaries upstream of its confluence with the Tobyhanna Creek are classified with a Chapter 93 designated use of EV. The Tobyhanna Creek and its tributaries are classified with a Chapter 93 designated use of HQ-CWF. The streams within WP-NP Segment of the Project Study Area as well as their Chapter 93 designated use classifications are listed in **Table 3-7**.

**TABLE 3-7: Streams and Chapter 93 Designated Uses within the WP-NP Segment**

Susquehanna River Basin			
Stream Name	Designated Use	Stream Name	Designated Use
<b>Spring Brook</b>	HQ-CWF, MF	<i>Emerson Run</i>	HQ-CWF, MF
<b>Roaring Brook</b>	HQ-CWF, MF Class A	<i>Lake Run</i>	Class A
<i>East Branch Roaring Brook</i>	HQ-CWF, MF	<i>&gt; 10 un-named tributaries</i>	HQ-CWF, MF
Delaware River Basin			
Stream Name	Designated Use	Stream Name	Designated Use
<b>Lehigh River</b>	EV, MF	<b>Tobyhanna Creek</b>	HQ-CWF, MF
<i>Ash Creek</i>	EV, MF Class A	<i>Beaver Creek</i>	HQ-CWF, MF
<i>Blexley Run</i>	EV, MF	<i>Clear Run</i>	HQ-CWF, MF
<i>Buckey Run</i>	EV, MF	<i>Davey Run</i>	HQ-CWF, MF
<i>Butler Run</i>	EV, MF	<i>Deep Run</i>	HQ-CWF, MF
<i>Choke Creek</i>	EV, MF	<i>Dotters Run</i>	HQ-CWF, MF
<i>Cross Keys Run</i>	EV, MF	<i>Dresser Run</i>	HQ-CWF, MF
<i>Fenner Mill Run</i>	EV, MF	<i>Duckpuddle Run</i>	HQ-CWF, MF
<i>Frame Cabin Run</i>	EV, MF	<i>East Branch Tobyhanna Creek</i>	HQ-CWF, MF
<i>Fritz Run</i>	EV, MF	<i>Hawkey Run</i>	HQ-CWF, MF
<i>Hagen Run</i>	EV, MF	<i>Hummler Run</i>	HQ-CWF, MF
<i>Kendall Creek</i>	EV, MF	<i>Jim Smith Run</i>	HQ-CWF, MF
<i>Mash Creek</i>	EV, MF	<i>Kistler Run</i>	HQ-CWF, MF
<i>Meadow Brook</i>	EV, MF	<i>Pole Bridge Run</i>	HQ-CWF, MF
<i>Pond Creek</i>	EV, MF	<i>Pollys Run</i>	HQ-CWF, MF
<i>Rauscher Run</i>	EV, MF	<i>Red Run</i>	HQ-CWF, MF
<i>Rucks Run</i>	EV, MF	<i>Seventeenmile Creek</i>	HQ-CWF, MF
<i>Sand Spring Creek</i>	EV, MF Class A	<i>Singer Run</i>	HQ-CWF, MF Class A
<i>Silver Creek</i>	EV, MF	<i>Twomile Run</i>	HQ-CWF, MF
<i>Spring Run</i>	EV, MF	<i>Upper Tunkhannock Creek</i>	HQ-CWF, MF
<i>Spruce Run</i>	EV, MF	<i>Wagner Run</i>	HQ-CWF, MF
<i>Tamarack Creek</i>	EV, MF	<i>Wallenpaupack Creek</i>	HQ-CWF, MF
<i>Tripup Run</i>	EV, MF	<i>Wolfs Spring Run</i>	HQ-CWF, MF
<i>Trout Creek</i>	EV, MF	<i>&gt; 50 un-named tributaries</i>	HQ-CWF, MF
<i>West Fork Lehigh River</i>	EV, MF		
<i>Wolf Run</i>	EV, MF		
<i>&gt; 100 un-named tributaries</i>	EV, MF		

Additionally, within this portion of the Project Study Area, the PFBC has indicated that Ash Creek, Lake Run, Roaring Brook, Sand Spring Creek, and Singer Run are Class A wild trout streams (PFBC 2012).

#### **2.2.4.2 100-year Floodplains**

The areas adjacent to streams subject to inundation by a flood elevation with a 1-percent-annual-chance of being equaled or exceeded each year are known as the 100-year floodplains. **Figure 3-7b** shows the 100-year floodplain boundaries for this portion of the Project Study Area (PADEP 1996).

#### **2.2.4.3 Lakes**

Numerous open water bodies are located within this portion of the Project Study Area. Major lakes include Lake Watawga, Gouldsboro Lake, Tobyhanna Lake, Brady’s Lake, Arrowhead Lake, Bear Lake, Pocono Lake, and Lake Naomi (**Figure 3-6b**). A complete list of named lakes, obtained from the USGS NHD, within this portion of the Project Study Area is included in **Table 3-8**.

**TABLE 3-8: NHD Named Lakes within the WP-NP Segment**

NHD Waterbodies - Lakes (GNIS Name)		
Anglewood Lake	Hollister Reservoir	Locust Lake
Arrowhead Lake	Ice Pond	Lost Lakes
Bear Lake	Jimmy Pond	Lower Klondike Pond
Big Bass Lake	Kasulaitis Lake	Millpond Number One
Bradys Lake	Lake Carobeth	Nines Pond
Dresser Lake	Lake Champagne	Pilgrim Lake
East Lake	Lake Naomi	Pocono Lake
Echo Lake	Lake Onocup	Snag Pond
Gouldsboro Lake	Lake Watawaga	Tamaque Lake
Grassy Pond	Larsen Lake	Tobyhanna Lake
Henry Lake	Lehigh Pond	> 200 un-named lakes

#### 2.2.4.4 Wetlands

In the WP-NP Segment of the Project Study Area, the USFWS National Wetland Inventory (NWI) wetland maps indicate that several relatively isolated wetland areas, primarily PFO or PSS communities, are present in portions of Luzerne County and Lackawanna County along the western side of the Lehigh River. Wetlands on the eastern side of the Lehigh River in Monroe County and Wayne County are relatively similar in type, but much more abundant and larger in area (**Figure 3-6b**) (USFWS 2012a). Many of these wetlands are located within SGL #127, a 25,500-acre conservation area situated between Arrowhead Lake and Gouldsboro.

#### 2.2.5 Plant and Wildlife Habitats

The WP-NP Segment of the Project Study Area contains areas of natural environment composed of native plant and wildlife habitats. Many of these habitats are within Priority Natural Areas identified by The Nature Conservancy. Some of these areas are specifically preserved for their ecological benefit, and others are associated with larger preserved recreational resources such as Lackawanna State Forest.

##### 2.2.5.1 Vegetation

The terrestrial vegetation of this segment of the Project Study Area is entirely within the Northern Hardwood Forest, described in detail in **Section 2.1.5.1**. The palustrine vegetation of this segment also matches that described above in **Section 2.1.5.1**.

##### 2.2.5.2 Wildlife

Typical wildlife species found within the Project Study Area include a variety of mammals, birds, amphibians, and reptiles that are reviewed in **Section 2.1.5.2**.

##### 2.2.5.3 Rare, Threatened, and Endangered Species

Based on a search of the (PNDI) database and follow-up consultations with the USFWS (USFWS 2012b), PFBC (PFBC 2011b), PGC (PGC 2011b), and PADCNR (PADCNR 2011b), the following federal and/or state RTE species could potentially occur within the WP-NP Segment of the Project Study Area:

- Indiana bat (*Myotis sodalists*) State endangered, Federal endangered mammal (USFWS)
- Timber Rattlesnake (*Crotalus horridus*) – State candidate reptile (PFBC)

- Eastern Small-footed Bat (*Myotis leibii*) – State threatened species (PGC)
- Short-awn Foxtail (*Alopecurus aequalis*) – State plant species of Special Concern (PADCNR)
- Bog-rosemary (*Andromeda polifolia*) – State plant species of Special Concern (PADCNR)
- Dwarf Mistletoe (*Arceuthobium pusillum*) – State plant species of Special Concern (PADCNR)
- Slender Sedge (*Carex lasiocarpa*) – State plant species of Special Concern (PADCNR)
- Mud Sedge (*Carex limosa*) – State plant species of Special Concern (PADCNR)
- Few-seeded Sedge (*Carex oligosperma*) – State plant species of Special Concern (PADCNR)
- Bog Sedge (*Carex paupercula*) – State plant species of Special Concern (PADCNR)
- Common Labrador-tea (*Ledum groenlandicum*) – State plant species of Special Concern (PADCNR)
- Creeping Snowberry (*Gaultheria hispidula*) – State plant species of Special Concern (PADCNR)
- Bog Goldenrod (*Solidago uliginosa*) – State plant species of Special Concern (PADCNR)
- Horned Bladderwort (*Utricularia cornuta*) – State plant species of Special Concern (PADCNR)
- Black Spruce-Tamarack Palustrine Woodland – State Community of Special Concern (PADCNR)
- Hemlock-Mixed Hardwood Palustrine Forest - State Community of Special Concern (PADCNR)
- Arctic Skipper (*Carterocephalus palaemon mandan*) – State terrestrial invertebrate species of Special Concern (PADCNR)
- Bog Copper (*Lycaena epixanthe*) – State terrestrial invertebrate species of Special Concern (PADCNR)

Habitat assessments for these RTE species may be required by the jurisdictional agencies as part of the environmental permitting and approval process for the Northeast-Pocono Reliability Project.

The WP-NP Segment would also be subject to USFWS analysis regarding avian species protected under the MBTA and the Bald and Golden Eagle Protection Act (USFWS 2012b).

### **2.2.6 Special Use Areas**

Special use areas are places recognized by regulatory agencies or local governments as

providing habitat characteristics or wildlife management opportunities that indicate a need for preservation. Examples include scenic areas, wilderness areas, wild and scenic rivers, state and conserved lands, priority natural areas, and IBAs.

#### **2.2.6.1 Scenic Areas**

The PADCNr provides designations for vistas and overlooks, waterfalls, scenic hikes, and other special areas. Gouldsboro State Park and Tobyhanna State Park, both within the WP-NP Segment of the Project Study Area, are designated scenic areas in the Wildlife Watching category (**Figure 3-8b**). They are described by the PADCNr as “rugged highlands” with a “diversity of animals and plants” (PADCNr 2012d). There are no Heritage Geology Sites designated by the PNHP within this portion of the Project Study Area (PADCNr 2012f).

#### **2.2.6.2 Wilderness Areas**

No part of the WP-NP Segment of the Project Study Area is located within the National Wilderness Preservation System (NWPS 2012).

#### **2.2.6.3 Wild and Scenic Rivers**

No wild or scenic rivers, as designated pursuant to the federal Wild and Scenic Rivers Act or by the Pennsylvania Scenic Rivers Act, are located within this portion of the Project Study Area (PADCNr 2012e).

#### **2.2.6.4 State and Conserved Lands**

This portion of the Project Study Area includes areas of State Game Lands, State Forests, State Parks, and other conserved lands.

Several State Game Lands, including 16,000-acre SGL #091, 3,500-acre SGL #135, 25,500-acre SGL #127, and 4,000-acre SGL #312, are each located at least partially within the WP-NP Segment of the Project Study Area (PGC 2012). Areas of the Lackawanna State Forest, 2,800-acre Gouldsboro State Park, and 5,400-acre Tobyhanna State Park are also within the Project Study Area. Aside from these state owned lands, there are lands conserved by private groups including The Nature Conservancy, Pocono Heritage Land Trust, and the Big Bass Lake Community Association. All of these areas are depicted on **Figure 3-8b**.



### 2.2.6.5 Priority Natural Areas

The NAI’s for Lackawanna, Luzerne, Monroe, and Wayne Counties, conducted by The Nature Conservancy, indicate that sixty-four (64) Priority Natural Areas are partially or wholly located within this portion of the Project Study Area (**Figure 3-9b**) (TNC 2003, 2006, 1999, 1991b). The names of these Priority Natural Areas and their significance rankings are listed in **Table 3-9**.

**TABLE 3-9: Priority Natural Areas within the WP-NP Segment**

Site Name	Significance Statewide Rank	Significance Local Rank	County	Publication Year
Bear Lake - Grassy Pond	1		Lackawanna	2003
English Swamp	1		Lackawanna	2003
Balsam Swamp	3		Lackawanna	2003
Daleville Swamp	3		Lackawanna	2003
Nine Ponds	3		Lackawanna	2003
America Swamp	4		Lackawanna	2003
Horseshoe Swamp	5		Lackawanna	2003
Johnson Pond-Westend Pond	5		Lackawanna	2003
Sand Spring Woods	5		Lackawanna	2003
Tannery Road Swamp	5		Lackawanna	2003
Eagle Lake		Low	Lackawanna	2003
Mash Creek Marsh		Medium	Lackawanna	2003
Lehigh River at Choke Creek	3		Luzerne	2006
Tannery Road Site/Behler Swamp	3		Luzerne	2006
Shades Glen Headwaters	4		Luzerne	2006
Choke Creek Shrub Swamp	5		Luzerne	2006
Indian Lake Swamp - East	5		Luzerne	2006
Kendall Creek Wetland	5		Luzerne	2006
Long Pond Macrosite (Long Pond Macrosite Preserve)	1		Monroe	1999
Twomile Run Swamp	2		Monroe	1999
Bradys Swamp	3		Monroe	1991
Fern Ridge Bog	3		Monroe	1991
Lost Lakes	3		Monroe	1999
Pocono Lake Preserve Site	3		Monroe	1999
Big Marsh	4		Monroe	1991
Eschenbaugh Swamp	4		Monroe	1991
Huckleberry Marsh	4		Monroe	1991
Pond Swamp	4		Monroe	1991
Wagners Bog	4		Monroe	1991
Laurel Drive Bog	4		Monroe	1999
Tamaque Lake Swamp	4		Monroe	1999
Lake Naomi	5		Monroe	1991

Site Name	Significance Statewide Rank	Significance Local Rank	County	Publication Year
NC534	5		Monroe	1991
NC545 SA517	5		Monroe	1991
NC546	5		Monroe	1991
NC557	5		Monroe	1991
NC562 SP563	5		Monroe	1991
NC565 SP566	5		Monroe	1991
NC570 SP569	5		Monroe	1991
SP508	5		Monroe	1991
SP511 SA569	5		Monroe	1991
SP515	5		Monroe	1991
SP529	5		Monroe	1991
SP536	5		Monroe	1991
SP564	5		Monroe	1991
Barneys Lake Swamp	5		Monroe	1999
East Branch Dresser Run Shrub Swamp	5		Monroe	1999
Hummler Run	5		Monroe	1999
Lehigh River - Rt 115 Bridge	5		Monroe	1999
Pocono Lake North	5		Monroe	1999
Scott Property Site	5		Monroe	1999
Anglewood Lake Swamp	5		Monroe	1999
Powder Smoke Ridge Wetlands - SP521	5		Monroe	1999
Oakes Swamp (SP548 SA571 SP579 )	5		Monroe	1999
Warnertown Wetlands	5		Monroe	1999
Selfice Swamp		Low	Monroe	1991
Wagner Way Swamp		Low	Monroe	1991
Mud Swamp / Sipos Swamp Area		Medium	Monroe	1991
Long Patch Swamp		High	Monroe	1991
Underwood Swamp		High	Monroe	1991
Lehigh Pond	3		Wayne	1991
Bender Swamp	4		Wayne	1991
Snag Pond	4		Wayne	1991
Wallenpaupak Creek		Low	Wayne	1991

### 2.2.6.6 Important Bird Areas

The WP-NP Segment of the Project Study Area includes land designated by the POTC as IBAs. The POTC identified the Pocono Lake Preserve and adjacent SGL #127 as an Important Bird Area (IBA #63). IBA #63 is located within Coolbaugh Township, Monroe County. Species identified within IBA #63 include ruffed grouse (*Bonasa*

*umbellus*), spotted sandpiper (*Actitis macularius*), American woodcock (*Scolopax minor*), black-billed cuckoo (*Coccyzus erythrophthalmus*), and northern saw-whet owl (*Aegolius acadicus*). This ecosystem also provides habitat for several threatened bird species including the osprey (*Pandion haliaetus*) and the yellow-bellied flycatcher (*Empidonax flaviventris*) (Audubon Pennsylvania Birds Conservation 2010).

The POTC has also identified the Long Pond Macrosite and adjacent SGL #38 as an Important Bird Area (IBA #64). IBA #64 is located within Jackson Township and Pocono Township, Monroe County. Species identified in IBA #64 include scarlet tanagers (*Piranga olivacea*), bobolinks (*Dolichonyx oryzivorus*), wood ducks (*Aix sponsa*), and various warblers. This ecosystem also provides habitat for several threatened bird species including the American bittern (*Botaurus lentiginosus*), osprey, and the northern harrier (*Circus cyaneus*) (Audubon Pennsylvania Birds Conservation 2010). These two IBA areas are illustrated in **Figure 3-9b**.

### **2.3 North Pocono to Paupack Segment (NP-P)**

This segment of the Project connects the proposed North Pocono Substation to the previously-approved Paupack Substation and adjacent Peckville-Blooming Grove 138/230 kV transmission line in Paupack Township, Wayne County. The following discussion covers the portion of the overall Project Study Area associated with this segment.

#### **2.3.1 Physiographic Provinces and Terrain**

The North Pocono to Paupack Segment of the Project Study Area is split between the same two sections of the Appalachian Plateaus Province as the WP-NP Segment of the Project Study Area: the Glaciated Pocono Plateau Section (discussed in **Section 2.1.1**) and the Glaciated Low Plateau Section (discussed in **Section 2.2.1**). The majority of the NP-P Segment of the Project Study Area is within the Glaciated Low Plateau Section, with the southeastern corner in the Glaciated Pocono Plateau Section. The divisions between the physiographic sections and provinces are depicted in **Figure 3-2**.

This portion of the Project Study Area includes many areas of steep slopes (> 30% slope). They are mostly associated with the division between the Glaciated Pocono Plateau and the Glaciated Low Plateau Sections of the Appalachian Plateaus Province, which is

visibly evident in Sterling Township, Wayne County. Their presence is explained by the change in physiography between the high plateau and the lower elevations of the low plateau. Areas of steep slopes throughout the Project Study Area are illustrated on **Figure 3-3**.

### 2.3.2 Geologic Areas

The bedrock geology of the NP-P Segment of the Project Study Area is very similar to that of the WP-NP Segment portion and is visible in **Figure 3-4c**. The following rock units and associated map symbol (*e.g.*, Dcd) are listed from oldest to youngest:

- Catskill Formation
  - Duncannon Member - Dcd
  - Long Run and Walcksville Members – Dclw
  - Poplar Gap Member – Dcpg
  - Poplar Gap and Packerton Members – Dcpp

The Catskill Formation of the Glaciated Pocono Plateau Section dominates the bedrock of this region, with the Pocono Formation and Spechty Kopf Formation of the prior segments being replaced by the introduction of the Long Run and Walcksville Members of the Catskill Formation.

The unconsolidated surficial geology of this area mirrors that described in **Section 2.1.2** above (Braun 2006a & 2008b/c).

### 2.3.3 Soil Characteristics

The characteristics of the soils of the Glaciated Low Plateau Province and the Glaciated Pocono Plateau Province are discussed in detail in **Section 2.1.3** and **Section 2.2.3** respectively. Hydric soils present within the NP-P Segment of the Project Study Area are listed in **Table 3-10** and displayed geographically in **Figure 3-5c**.

**TABLE 3-10: Soils with Hydric Characteristics within the NP-P Segment**

Soil Symbol	Soil Map Unit Name	Soil Symbol	Soil Map Unit Name
20*	Freetown mucky peat	MxB	Morris extremely stony loam, 0 - 8 % slopes
111B	Edgemere-Shohola complex, 3 - 15 % slopes, very rubbly	MxC	Morris extremely stony loam, 8 - 15 % slopes
11A*	Edgemere extremely stony loam, 0 - 3 % slopes, very rubbly	MxD	Morris extremely stony loam, 8 - 25 % slopes
30B	Wurtsboro stony fine sandy loam, 0 - 8 % slopes, extremely stony	NcA*	Norwich and Chippewa channery silt loams, 0 - 3 % slopes
7B	Shohola-Edgemere complex, 0 - 8 % slopes, very rubbly	NxA*	Norwich and Chippewa extremely stony silt loams, 0 - 3 % slopes
Ba	Barbour loam	NxB*	Norwich and Chippewa extremely stony silt loams, 0 - 8 % slopes
Bh	Basher silt loam	Re	Rexford loam
DYD	Dystrochrepts and Rock outcrop, moderately steep	ReA	Rexford loam, 0 - 5 % slopes
FA	Fluvents and Fluvaquents	VaC	Very stony land and Rock outcrops, sloping
FF	Fluvents and Fluvaquents, cobbly	VcA/VoA	Volusia channery silt loam, 0 - 3 % slopes
Hm*	Holly silt loam	VcB/VoB	Volusia channery silt loam, 3 - 8 % slopes
Ho*	Holly silt loam	VcC	Volusia channery silt loam, 8 - 18 % slopes
HO*	Holly silt loam, ponded	VfB	Volusia flaggy silt loam, 3 - 8 % slopes
La	Linden fine sandy loam, rarely flooded	VfC	Volusia flaggy silt loam, 8 - 15 % slopes
MaB	Mardin channery loam, 3 - 8 % slopes	VoC	Volusia channery silt loam, 8 - 15 % slopes
MaC	Mardin channery loam, 8 - 15 % slopes	VxB	Volusia extremely stony silt loam, 0 - 8 % slopes
McB	Mardin channery silt loam, 3 - 8 % slopes	VxC	Volusia extremely stony silt loam, 8 - 15 % slopes
McC	Mardin channery silt loam, 8 - 15 % slopes	VxD	Volusia extremely stony silt loam, 8 - 25 % slopes
MdB	Mardin extremely stony loam, 3 - 8 % slopes	WcB	Wellsboro channery loam, 3 - 8 % slopes
MdD	Mardin extremely stony loam, 8 - 25 % slopes	WcC	Wellsboro channery loam, 8 - 15 % slopes
ME*	Medihemists and Medifibrists	WeB	Wellsboro channery loam, 3 - 8 % slopes
MfB	Mardin flaggy silt loam, 3 - 8 % slopes	WeC	Wellsboro channery loam, 8 - 15 % slopes
MfC	Mardin flaggy silt loam, 8 - 15 % slopes	WeD	Wellsboro channery loam, 15 - 25 % slopes
MhB	Mardin extremely stony silt loam, 3 - 8 % slopes	WfB	Wellsboro flaggy loam, 3 - 8 % slopes
MhD	Mardin extremely stony silt loam, 8 - 25 % slopes	WfC	Wellsboro flaggy loam, 8 - 15 % slopes
MK*	Medisaprists and Medihemists	WgB/WoB	Wellsboro extremely stony loam, 3 - 8 % slopes
MoA/MrA	Morris channery loam, 0 - 3 % slopes	WgD/WoD	Wellsboro extremely stony loam, 8 - 25 % slopes
MoB/MrB	Morris channery loam, 3 - 8 % slopes	WkB	Wurtsboro channery loam, 3 - 8 % slopes
MoB	Morris extremely stony silt loam, 0 - 8 % slopes	WkC	Wurtsboro channery loam, 8 - 15 % slopes
MoC	Morris channery loam, 8 - 15 % slopes	WpB	Wellsboro extremely stony loam, 0 - 8 % slopes

Soil Symbol	Soil Map Unit Name	Soil Symbol	Soil Map Unit Name
MrC	Morris channery loam, 8 - 18 % slopes	WxB	Wurtsboro extremely stony loam, 0 - 8 % slopes
MsB	Morris flaggy loam, 3 - 8 % slopes	WxD	Wurtsboro extremely stony loam, 8 - 25 % slopes
MsC	Morris flaggy loam, 8 - 15 % slopes		

\*Soils composed of major hydric components; others contain minor hydric inclusions

Discussions of prime farmland soil as well as soil erosion potential are located in **Section 2.1.3** and apply to this segment of the Project Study Area as well.

### **2.3.4 Hydrology**

The portion of the Project Study Area between the proposed North Pocono and previously approved Paupack Substations is almost entirely within the Delaware River Basin; only the southwestern corner extends into the Susquehanna River Basin. Major streams and lakes found on the USGS NHD, as well as watershed boundaries, are illustrated in **Figure 3-6c** and discussed further below.

#### **2.3.4.1 Streams**

The southwestern corner of the Project Study Area that is within the Susquehanna River Basin is drained by Roaring Brook, which feeds the Lackawanna River, a major tributary of the Susquehanna River. Roaring Brook and its tributaries have a Chapter 93 designated use classification of HQ-CWF.

The remainder of the Project Study Area is within the Delaware River Basin and is predominantly within the Upper Delaware River watershed, aside from a small area of the Lehigh River watershed along the southern edge. The southern portion of the NP-P Segment of the Project Study Area is drained by Wallenpaupack Creek and the northern portion is drained by Middle Creek, both of which are tributaries of the Lackawaxen River. All of the streams in these two watersheds are classified in Chapter 93 with a designated use of HQ-CWF. Streams in the Lehigh River watershed portion of the Project Study Area have a Chapter 93 designated use of EV. Streams within NP-P Segment of the Project Study Area as well as their Chapter 93 designated use classifications are listed in **Table 3-11**.

Additionally within the NP-P Segment, the PFBC has indicated that Mill Brook and Kleinhans Creek are Class A wild trout streams (PFBC 2012).

**TABLE 3-11: Streams and Chapter 93 Designated Uses within the NP- P Segment**

Susquehanna River Basin			
Stream Name	Designated Use	Stream Name	Designated Use
<b>Lackawanna River</b>		<i>East Branch Roaring Brook</i>	HQ-CWF, MF
<b>Roaring Brook</b>	HQ-CWF, MF	<i>Lake Run</i>	HQ-CWF, MF
<i>Bear Brook</i>	HQ-CWF, MF	<i>~ 20 un-named tributaries</i>	HQ-CWF, MF
Delaware River Basin			
Stream Name	Designated Use	Stream Name	Designated Use
<b>Upper Delaware River</b>		<i>Taylor Creek</i>	HQ-CWF, MF
<b>Middle Creek</b>	HQ-CWF, MF	<i>Freeling Run</i>	HQ-CWF, MF
<i>Red Shale Brook</i>	HQ-CWF, MF	<i>Potter Creek</i>	HQ-CWF, MF
<i>Wangum Creek</i>	HQ-CWF, MF	<i>Stevens Creek</i>	HQ-CWF, MF
<i>Mile Brook</i>	HQ-CWF, MF	<i>Webster Creek</i>	HQ-CWF, MF
<i>&gt;10 un-named tributaries</i>	HQ-CWF, MF	<i>Uban Creek</i>	HQ-CWF, MF
<b>Wallenpaupack Creek</b>	HQ-CWF, MF	<i>Butternut Creek</i>	HQ-CWF, MF
<i>Swan Creek</i>	HQ-CWF, MF	<i>Wilcox Creek</i>	HQ-CWF, MF
<i>Purdy Creek</i>	HQ-CWF, MF	<i>Bridge Creek</i>	HQ-CWF, MF
<i>Ariel Creek</i>	HQ-CWF, MF	<i>Mill Brook</i>	HQ-CWF, MF Class A
<i>Moss Hollow Creek</i>	HQ-CWF, MF	<i>Sheridan Brook</i>	HQ-CWF, MF
<i>Rock Port Creek</i>	HQ-CWF, MF	<i>Spinner Brook</i>	HQ-CWF, MF
<i>East Branch Wallenpaupack Creek</i>	HQ-CWF, MF	<i>Kleinhans Creek</i>	HQ-CWF, MF Class A
<i>West Branch Wallenpaupack Creek</i>	HQ-CWF, MF	<i>&gt; 100 un-named tributaries</i>	HQ-CWF, MF
<i>Jones Creek</i>	HQ-CWF, MF		
<i>Nevin Creek</i>	HQ-CWF, MF	<b>Lehigh River</b>	EV, MF
<i>Sugar Hill Creek</i>	HQ-CWF, MF	<i>West Fork Lehigh River</i>	EV, MF
<i>Mill Creek</i>	HQ-CWF, MF	<i>~ 5 un-named tributaries</i>	EV, MF
<i>Manny Run</i>	HQ-CWF, MF		

### 2.3.4.2 100-year Floodplains

The areas adjacent to streams subject to inundation by a flood elevation with a 1-percent-annual-chance of being equaled or exceeded each year are known as the 100-year floodplains. **Figure 3-7c** shows the 100-year floodplain boundaries for this portion of the Project Study Area (PADEP 1996).

### 2.3.4.3 Lakes

Numerous open water bodies are located within the NP-P Segment of the Project Study Area. The most prominent of these lakes is Lake Wallenpaupack, a man-made reservoir. Lake Wallenpaupack is the largest lake in the region at 13-miles long and covering 5,700 acres. Other major lakes include Clemo Pond, Cobb Pond, Paupackan Lake, Lake Ariel, Waynewood Lake, and Pocono Peak Lake (**Figure 3-6c**). A complete list of named lakes, obtained from the USGS NHD, within this portion of the Project Study Area is included in **Table 3-12**.

**TABLE 3-12: NHD Named Lakes within the NP-P Segment**

NHD Waterbodies - Lakes (GNIS Name)		
Beaver Lake	Goose Pond	Memory Lake
Beyea Pond	Haas Pond	Moc-a-Tek Lake
Big Spring Pond	Hidden Lake	Murray Pond
Brooks Lake	Hollister Reservoir	Paupackan Lake
Buehler Lake	Kuehners Pond	Pine Lake
Butler Pond	Lake Ariel	Pocono Peak Lake
Clemo Pond	Lake Genero	Roaming Woods Lake
Cobb Pond	Lake Lacawac	Siebecker Pond
NHD Waterbodies - Lakes (GNIS Name)		
Cooks Pond	Lake Wallenpaupack	Upper Wilcox Pond
Craft Pond	Locklin Pond	Waynewood Lake
Deer Lake	Marsh Pond	Wildwood Lake
Finn Swamp	Meigs Pond	> 700 un-named lakes

### 2.3.4.4 Wetlands

In the NP-P Segment of the Project Study Area, the USFWS NWI wetland maps indicate that the wetland areas, primarily PFO or PSS communities, are more abundant and concentrated in the southern portions of Wayne County near the headwaters of the Lehigh River. Wetlands north of the village of Sterling are smaller and scattered across the landscape (**Figure 3-6c**) (USFWS 2012a). Riverine systems in this portion of the Project Study Area include Wallenpaupack Creek and the West Branch Wallenpaupack Creek.



### 2.3.5 Plant and Wildlife Habitats

The NP-P Segment of the Project Study Area contains a few areas of natural environment composed of native plant and wildlife habitats. Many of these habitats are within Priority Natural Areas identified by The Nature Conservancy. Some of these areas are associated with larger preserved recreational resources such as Lackawanna State Forest and SGL #312; others are specifically preserved for their ecological benefit, such as Lacawac Sanctuary.

#### 2.3.5.1 Vegetation

The terrestrial vegetation of this segment of the Project Study Area is entirely within the Northern Hardwood Forest, described in detail in **Section 2.1.5.1**. The palustrine vegetation of this segment matches that described above in **Section 2.1.5.1**.

#### 2.3.5.2 Wildlife

Typical wildlife species found within the Project Study Area include a variety of mammals, birds, amphibians, and reptiles that are reviewed in **Section 2.1.5.2**.

#### 2.3.5.3 Rare, Threatened, and Endangered Species

Based on a search of the PNDI database and follow-up consultations with the USFWS (USFWS 2012b), PFBC (PFBC 2011c), PGC (PGC 2011c), and PADCNR (PADCNR 2011c), the following federal and/or state RTE species could potentially occur within the NP-P Segment of the Project Study Area:

- Indiana bat (*Myotis sodalists*) State endangered, Federal endangered mammal (USFWS)
- Eastern Small-footed Bat (*Myotis leibii*) – State threatened species (PGC)
- Northern Flying Squirrel (*Glaucomys sabrinus*) – State endangered species (PGC)
- Bog-rosemary (*Andromeda polifolia*) – State plant species of Special Concern (PADCNR)
- Dwarf Mistletoe (*Arceuthobium pussillum*) – State plant species of Special Concern (PADCNR)
- Mud Sedge (*Carex limosa*) – State plant species of Special Concern (PADCNR)
- Bog Sedge (*Carex paupercula*) – State plant species of Special Concern (PADCNR)
- Common Labrador-tea (*Ledum groenlandicum*) – State plant species of Special

- Concern (PADCNR)
- Creeping Snowberry (*Gaultheria hispidula*) – State plant species of Special Concern (PADCNR)
  - Braun’s Holly Fern (*Polystichum braunii*) – State plant species of Special Concern (PADCNR)
  - Water Bulrush (*Schoenoplectus subterminalis*) – State plant species of Special Concern (PADCNR)
  - Black Spruce-Tamarack Palustrine Woodland – State Community of Special Concern (PADCNR)
  - Leatherleaf-Cranberry Peatland - State Community of Special Concern (PADCNR)
  - Red Spruce Palustrine Forest - State Community of Special Concern (PADCNR)
  - Arctic Skipper (*Carterocephalus palaemon mandan*) – State terrestrial invertebrate species of Special Concern (PADCNR).

Habitat assessments for these RTE species will be required by the jurisdictional agencies as part of the environmental permitting and approval process for the Northeast-Pocono Reliability Project.

The NP-P Segment would also be subject to USFWS analysis regarding avian species protected under the MBTA and the Bald and Golden Eagle Protection Act (USFWS 2012b).

### 2.3.6 Special Use Areas

Special use areas are places recognized by regulatory agencies or local governments as providing habitat characteristics or wildlife management opportunities that indicate a need for preservation. Examples include scenic areas, wilderness areas, wild and scenic rivers, state and conserved lands, priority natural areas, and important bird areas.

#### 2.3.6.1 Scenic Areas

A small section of 5,440-acre Tobyhanna State Park is within the NP-P Segment of the Project Study Area. As discussed above in **Section 2.2.6.1**, Tobyhanna State Park is a designated scenic area in the Wildlife Watching category (PADCNR 2012d). There are no Heritage Geology Sites designated by the PNHP within this portion of the Project Study Area (PADCNR 2012f) (**Figure 3-8c**).

### 2.3.6.2 Wilderness Areas

No part of this portion of the Project Study Area is located within the National Wilderness Preservation System (NWPS 2012).

### 2.3.6.3 Wild and Scenic Rivers

No wild or scenic rivers, as designated pursuant to the federal Wild and Scenic Rivers Act or by the Pennsylvania Scenic Rivers Act, are located within this portion of the Project Study Area (PADCNr 2012e).

### 2.3.6.4 State and Conserved Lands

This portion of the Project Study Area includes areas of State Game Lands, State Forests, State Parks, and other conserved lands.

Portions of 1,100-acre SGL #310 and 4,000-acre SGL #312 are located at least partially within the NP-P Segment of the Project Study Area. Their exact extents and locations are depicted in **Figure 3-8c** (PGC 2012). Areas of the 80,000-acre Delaware State Forest, the 1,600-acre Gouldsboro Section of the Lackawanna State Forests, and 5,440-acre Tobyhanna State Park are also within the Project Study Area. Also owned by the PADCNr is the 343-acre Varden Conservation Area. Privately conserved lands include the Lacawac Sanctuary and the Goose Pond Boy Scout Reservation, which is also protected through conservation easements monitored by the Natural Lands Trust.

### 2.3.6.5 Priority Natural Areas

The NAIs for Lackawanna, Pike, and Wayne Counties, conducted by The Nature Conservancy, indicate that twenty-one (21) Priority Natural Areas are partially or wholly located within the NP-P Segment of the Project Study Area (**Figure 3-9c**) (TNC 2003, 2011, 1991b). The names of the Natural Areas and their rankings are listed in **Table 3-13**.

**TABLE 3-13: Priority Natural Areas within the NP-P Segment**

Site Name	Significance Statewide Rank	Significance Local Rank	County	Publication Year
Potter Creek Bog	3		Lackawanna	2003
Freytown Marsh	5		Lackawanna	2003
Pine Lake	High		Pike	2011
East Branch Wallenpaupack Creek	Notable		Pike	2011

Site Name	Significance Statewide Rank	Significance Local Rank	County	Publication Year
Lake Wallenpaupack	Notable		Pike	2011
Route 507 Wetland	Notable		Pike	2011
Ledgedale Swamp		Low	Pike	1990-95
Topps Bog	2		Wayne	1991
Clemo Pond	3		Wayne	1991
Lake Ariel	3		Wayne	1991
Lake Lacawac	3		Wayne	1991
Lehigh Pond	3		Wayne	1991
Thousand Acre Swamp	3		Wayne	1991
Beyea Pond	4		Wayne	1991
Freytown Swamp	4		Wayne	1991
Gas Hollow	4		Wayne	1991
Marsh Pond	4		Wayne	1991
Wangum Creek Heron Rookery	5		Wayne	1991
Butternut Creek		Low	Wayne	1991
Wallenpaupack Creek		Low	Wayne	1991
Silkmans Swamp		Medium	Wayne	1991

### 2.3.6.6 Important Bird Areas

This portion of the Project Study Area includes land designated by the POTC as IBA # 62, which includes Promised Land State Park, Bruce Lake Natural Area, and portions of Delaware State Forest. IBA #62 is located in western sections of Pike County and northern Monroe County (**Figure 3-9c**). Specific species include osprey, bald eagles (*Haliaeetus leucocephalus*) and olive-sided flycatchers (*Contopus cooperi*) (Audubon Pennsylvania Birds Conservation 2012).

### **3.0 HUMAN ENVIRONMENT OF THE PROJECT STUDY AREA**

Human influences on the natural environment within the Project Study Area are represented by many development types and patterns. These are discussed below using a land use code framework (described in **Section 3.1**) that is applicable to all counties within the Project Study Area.

#### **3.1 Land Use**

Land use codes designated by all counties within the Project Study Area were reviewed then synthesized to form a standardized land use code to characterize the entire Project Study Area. The land use codes, which are discussed below and displayed in **Figure 3-10**, include:

- Agriculture and Open Lands
- Developed Land: Non-Residential
- Developed Land: Residential
- Hardwood/Coniferous Forests

##### **3.1.1 Agriculture and Open Lands**

Relatively few sections of the Project Study Area are used for agricultural purposes with most agricultural land uses located predominately within the NP-P Segment in Wayne County. Covering only 8 percent of the Project Study Area, these agricultural land uses primarily involve farming activities related to row crops such as hay, corn, and soybeans. Other agricultural land uses include the open lands used for horse pastures and dairy farms, which are less frequent relative to row crop farms. Many of these farms surround the villages of Newfoundland, Sterling, Hamlin, Lake Ariel, and Lakeville. All of these lands are privately owned. Some open lands within the J-WP Segment near the City of Wilkes-Barre are associated with local ball fields, parks, and the Pocono Downs Race Track. Some of these lands are publically owned.

A majority of the counties within the Project Study Area and the Commonwealth of Pennsylvania have several mechanisms for protecting farmland, including:

- Agricultural Security Area (ASA)
- Agricultural Conservation Easement (ACE)
- Act 319 ("Clean and Green Act")

The state or county Agricultural Preservation Board administers the creation of an ASA and the purchase of an ACE. An ASA is an area of 500 or more semi-contiguous acres that is used for agricultural production. Farmers voluntarily form and/or join an ASA as a means of receiving special consideration with regard to regulations, nuisance complaints, and conflicting land uses.

The ACE purchase program allows counties to use specific state-issued farmland preservation funds to purchase development rights. Qualifying farms must be part of an existing ASA and are rated on the basis of soil quality, proximity to other farms, and other criteria. Once a farm is in easement, agricultural production must continue every year thereafter, with no new structures permitted except farm accessory buildings. Act 319 provides a means by which landowners whose property meets one of three qualifying uses (farming, forest, or water supply/open space) to have their property assessed, for tax purposes, on the basis of its use rather than on the basis of its fair market value.

Mapped agricultural conservation easements and agricultural security areas identified within the Project Study Area are found on **Figures 3-8b-c**.

### **3.1.2 Developed Land: Non-Residential**

Developed, non-residential land uses comprise 6 percent of the Project Study Area, and consist of industrial, commercial, public utility, and transportation usages. The largest developed, non-residential land use is within the City of Wilkes-Barre located on the northwest border of the J-WP Segment. Specific industrial land uses included several quarries and mines, as well as warehouses and manufacturing centers located along I-81 and the freight railroad network. Mohegan Sun Casino, Geisinger Hospital, and local hotels, offices, and shops are examples of commercial uses. The Jenkins Substation and associated electrical transmission line rights-of-way are examples of utility uses. Transportation uses included the Pennsylvania Turnpike, I-81, and all other public roads, as well as the Conrail Lehigh Line and Freight Main Line railroads.

Several clusters of developed, non-residential land use are located within the WP-NP Segment, primarily in the northern portion near Gouldsboro and Tobyhanna. These non-residential land uses include the Covington Industrial Park, a small commercial district outside Gouldsboro, the Tobyhanna Army Depot, and a retail warehouse located adjacent

to I-380 near Tobyhanna. The Delaware, Lackawanna, & Western Railroad and I-380, which bisect the Project Study Area in a north-to-south direction, are examples of non-residential transportation land uses in this segment.

A few minor areas of non-residential land uses are scattered within the NP-P Segment, with a general concentration along the I-84 corridor and the village of Hamlin. These isolated non-residential lands uses, which are noted equally throughout the Project Study Area, include local township maintenance yards, the Williams' Compressor Station, active quarries, golf courses, marinas, and resorts.

### **3.1.3 Developed Land: Residential**

Residential land use is a relatively prominent land use cover type encompassing 11 percent of the Project Study Area. Although composed primarily of single-family residences, the form of this land use category varies across the landscape. Dense urban configurations consisting of tight-knit neighborhoods, row homes, apartment complexes, and condominiums are noted in the City of Wilkes-Barre. Moderately dense towns that also serve as regional centers of employment and commerce include Blakeslee, Gouldsboro, Mount Pocono/Tobyhanna, and Hamlin. Various low-density villages and hamlets that have developed at local crossroads include Thornhurst, Sterling, Newfoundland, and Lake Ariel. Most of these population centers have been in existence for over 100 years.

A distinctive residential configuration noted within the Project Study Area involves lake-side communities. Several of these communities are associated with well-established towns, such as the Eagle Lake and Big Bass Lake communities located within Gouldsboro. Many lake-side communities, however, are located in less developed portions of the Project Study Area. Larger lake-side communities include Bear Creek Village, Arrowhead Lake, Pocono Pines, Pocono Springs Estates, Ledgeville, and The Hideout located near Lake Ariel. Many smaller lake-side communities are scattered throughout the area, including Indian Lake, Pleasant View Summit, Waynewood Lake, Paupackan Lake, and Whitney Lake. Most of the homes located within these lake-side communities are private houses inhabited by local residents, but many are second homes used for weekend retreats for people from the New York or Philadelphia metropolitan

region, or as vacation rental homes. Most of the residential development associated with these communities has occurred within the past 30 years and is presently expanding.

**3.1.4 Hardwood/Coniferous Forest**

Forests are a land use/cover type that range from large uninterrupted areas of undeveloped wooded land typically associated with public service or recreational uses, to smaller forested areas associated with local residential development that often indicates the presence of steep slopes, rocky soils, or wet areas that could not be developed. Cumulatively, these forested areas account for 76 % of the Project Study Area.

The largest parcels of forest cover found within the Project Study Area are associated with public services, such as preserved lands, watershed protection areas, and Boy Scout camps, and recreational uses that include state game lands, local and state parks, and state forests. Public service and recreation lands within the Project Study Area are listed by segment in **Table 3-14**.

Aside from these public service and recreational uses, large tracts of forest cover are also maintained by private groups such as the Lakeville Hunting Club and Cherry Ridge Hunting Club, which manage the approximately 4,600-acre forested area in the northern portion of the NP-P Segment. Many other smaller, privately owned forested lands are located throughout the Project Study Area. Some of these tracts are owned by individual families and are being maintained for private uses; others are associated with larger communities and are being maintained as community open space, such as those located within Big Bass Lake.

**TABLE 3-14: Public Service and Recreational Areas within the Project Study Area**

Name	Area (acres)	Managing Agent
<b>J-WP Segment</b>		
State Game Land #292	624	PA Game Commission
State Game Land #091	16,000	PA Game Commission
Lackawanna State Forest (Thornhurst)	11,000	PADCNR
Bear Creek Preserve	3,400	Natural Lands Trust
The Tubs Natural Area	522	Natural Lands Trust
Mill Creek Reservoir Watershed Conservation	305	PA American Water Company
Bear Creek Camp/Adjacent Properties	3,100	North Branch Land Trust
Camp Acahela	242	Boy Scouts of America



<b>WP-NP Segment</b>		
State Game Land #127	25,500	PA Game Commission
State Game Land #312	4,000	PA Game Commission
State Game Land #135	3,500	PA Game Commission
Gouldsboro State Park	2,800	PADCNR
Tobyhanna State Park	5,400	PADCNR
Lackawanna State Forest (Gouldsboro)	1,600	PADCNR
Stoddartsville Property	151	The Nature Conservancy
Thomas Darling Preserve	2,500	The Nature Conservancy
Pocono Lake Preserve	3,900	Natural Lands Trust
One Clifton Township Property	743	Pocono Heritage Land Trust
Camp Minis	1,200	Boy Scouts of America
<b>NP-P Segment</b>		
State Game Land #310	1,100	PA Game Commission
Varden Conservation Area	343	PADCNR
Delaware State Forest	80,000	PADCNR
Lacawac Sanctuary*	545	The Nature Conservancy
Two Sterling Township Properties	121	Delaware Highlands Conservancy
Goose Pond	500	Boy Scouts of America/NLT

\*Lacawac Sanctuary is also a National Natural Landmark (NPS 2011)

### 3.2 Linear Features

Linear features present in the Project Study Area include roadways, railroads, and existing transmission corridors, as illustrated in **Figure 3-11**.

#### 3.2.1 Roadways

The primary roadway systems within the Project Study Area are I-81 (north to south) and the Pennsylvania Turnpike (north to south) in the J-WP Segment, I-380 (north to south) in the WP-NP Segment, and I-84 (east to west) located in the NP-P Segment. Remaining road networks are comprised of multiple state routes, local roads, residential streets, and unpaved rural roadways.

Within the J-WP Segment, SR 115 is the main state road that connects the Wilkes-Barre area with Blakeslee and I-80 to the south. Within the WP-NP Segment, the main north to south state roadways includes SR 435, SR 212, and SR 611 which collectively connect the Scranton area to Mount Pocono. Major east to west routes include SR 423 and SR 507 which connect to rural Wayne County. Major state roadways found within the NP-P Segment include State route is SR 196 (north to south) SR 191 and SR 590 (east to west).

### 3.2.2 Railroads

Railroads within the Project Study Area include two Conrail freight lines that bisect the J-WP Segment in the vicinity of the Jenkins Substation and the Delaware, Lackawanna, & Western Railroad freight and scenic rail alignment that bisects the WP-NP Segment between Tobyhanna and Gouldsboro.

### 3.2.3 Transmission Line Corridors

Power transmission corridors located within the Project Study Area primarily consist of 69 kV lines that are owned by PPL Electric. Transmission lines within the J-WP Segment include the Susquehanna-Jenkins 230 kV line, which provides bulk power to the Jenkins Substation and bisects the area from east to west, and the Bear Creek-East Mountain 69 kV line that runs south from the Jenkins Substation to the Bear Creek community located near the southern edge of the Project Study Area. The Gouldsboro-Madisonville 69 kV line bisects the NP-P Segment from north to south near the proposed North Pocono Substation and the Peckville-Blooming Grove 138/230 kV line bisects the northern extent of this segment from east to west. There are no existing transmission lines within the WP-NP Segment.

## 3.3 Historic, Cultural, and Archaeological Resources

A review of cultural resources with the Project Study Area is required by various state agencies to ensure their preservation. A desktop survey of existing historic structures and archaeological resources within the Project Study Area was conducted by accessing the Pennsylvania Historical and Museum Commission's (PHMC) Bureau of Historic Preservation's Cultural Resources Geographic Information System (CRGIS) to review available information on historic structures, archaeological surveys, and previously recorded archaeological sites. This was accomplished by drawing a polygon in CRGIS approximating the limits of the Project Study Area and capturing all data contained within that polygon in the form of spreadsheets generated by CRGIS (PHMC 2011).

### 3.3.1 Historic Architecture

Approximately 16 National Register of Historic Places (NRHP)-listed or -eligible historic properties were identified in the Project Study Area (**Figure 3-12**). Historic properties are defined as buildings, structures, districts, objects, sites, and linear historic

sites. There are three historic districts in the Project Study Area: Bear Creek Village Historic District (PHMC Key No. 109870); Haags Mill Historic District (PHMC Key No. 125875); and Stoddartsville Historic District (PHMC Key No. 082615). In general, these districts were settled in the early-to-mid 19<sup>th</sup> century as grist and sawmill locations and later served as resort centers with the development of the Pocono Mountain resort industry in the early-20<sup>th</sup> century. One historically significant railroad traverses the Project Study Area, the Delaware, Lackawanna, & Western Railroad (PHMC Key No. 097540). The remainder of the NRHP-listed or –eligible properties are, for the most part, individual buildings, such as dwellings, schools, and bridges. These resources have generally been found to be significant for their architectural style and/or contributions to local development.

In addition to the approximately 20 NRHP-listed or –eligible resources, there are approximately 60 historic properties in the Project Study Area whose historic status is considered undetermined by PHMC. A status of undetermined indicates that the historic data that is on file with PHMC does not include an indication of National Register eligibility status. Such resources may or may not be eligible for the NRHP.

In general, throughout the 19<sup>th</sup> century, the Project Study Area did not experience much development beyond limited settlement along the rivers and major creeks and at crossroad villages. Settlers were drawn to these locations by early industries, such as milling, lumbering, maple sugar harvesting, and ice harvesting. By the late-19<sup>th</sup> century, numerous railroads crossed the study area, primarily to link the surrounding anthracite region with markets in Scranton, Wilkes-Barre, and beyond. The coming of the automobile in the early 20<sup>th</sup> century spurred the resort industry and resulted in an improved road system and isolated resort developments. The second half of the 20<sup>th</sup> century saw concentrated residential development in the form of vacation homes around Lake Wallenpaupack and other smaller lakes. Nevertheless, despite such modern development, large portions of the Project Study Area remain forested and largely undeveloped.

### 3.3.2 Archaeology

The Project Study Area is almost entirely within the Delaware River watershed and has several large drainage systems running through it, including the Lehigh River, Tobyhanna Creek, and Wallenpaupack Creek. Although more than 40 archaeological surveys were done throughout the Project Study Area between the years 1981 and 2008, large portions have not been studied. Most of the surveys were studies of inundated valleys associated with Lake Wallenpaupack in Wayne County; F.E. Walter Dam in Luzerne, Monroe, and Carbon Counties; and Pocono Lake in Monroe County.

More than 100 archaeological sites have been identified within the Project Study Area, , most of which cluster around the F.E. Walter Dam, along the Lehigh River, at Pocono Lake, and along the shores of Lake Wallenpaupack (**Figure 3-12**). Site types include historic-period domestic and industrial sites, pre-contact period<sup>2</sup> rock shelters and open habitation sites, and multi-component sites. The sites occupy landforms varying from floodplains, stream benches, and terraces, to lower and upper slopes, ridges, hilltops, and upland flats. Three-quarters of the sites are located less than 100 yards from water.

Most of the sites have not been evaluated for National Register significance, with the exception of four resources that have been determined eligible in State Historic Preservation Office (SHPO) opinions, or are listed on the National Register of Historic Places. The Stoddartsville Historic District (36LU0098), the site of a 19th-century milling village located on the Lehigh River in Lehigh and Monroe Counties, was listed on the National Register in 1998 and includes contributing archaeological components. The Locust Ridge Road site (36LW0056), a pre-contact period site of undetermined function is also located on the Lehigh River, but in Thornhurst Township, Lackawanna County; it was determined eligible by SHPO in 2007. Sugar Maple II (36WY0142) and Sugar Maple III (36WY0146) are historic-period sites associated with the production of maple sugar. The sites are located in Salem Township, Wayne County, and were determined eligible by SHPO in 2005 and 2003, respectively.

The Project Study Area encompasses areas of high, medium, and low sensitivity for pre-contact and historic-period archaeological resources. In general, pre-contact period

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<sup>2</sup> These are before significant European influence.

habitation sites tend to be located near a water source while historic-period archaeological sites tend to occur along roadways or at the end of farm lanes extending back from public thoroughfares. In many cases, historic architectural resources also contain an archaeological component.

### **3.4 Local Zoning and Comprehensive Plans**

Local zoning ordinances have been adopted in twenty-six of the thirty-one townships located within the Project Study Area (**Table 3-15**). Generally, these ordinances are used to guide future land use in the townships by encouraging development of desirable residential, commercial, agricultural, and industrial areas with appropriate groupings of compatible and related land uses. The various zoning districts outlined in these ordinances reflect the diverse land use character of the region, which consists of dense urban/suburban and industrial centers that transition to large areas of rural open space and forest cover. Ordinances defining the allowances and restrictions associated with the various zoning districts typically identify “Essential Services”, which include distribution, transmission, or collection systems associated with utilities such as water, gas, and electric, to be conditionally exempt from local regulations, as long as the required actions are approved by the Pennsylvania Public Utility Commission (PUC). In townships that lack local zoning ordinances, specifically Madison Township (Lackawanna County), Lake, South Canaan, and Salem Townships (Wayne County), and Greene Township (Pike County), county-level land use regulations regarding subdivision and land development supervene.

Of the six counties within the Project Study Area, only Carbon County does not have a comprehensive plan. Lackawanna County, Luzerne County, Monroe County, Pike County, and Wayne County have prepared comprehensive plans for their particular areas. In general, comprehensive plans are intended to serve as a means to review the assets and pressures within the county and provide guidance for future development and preservation; they are not intended to regulate and have no official authority. According to the *Wayne County Comprehensive Plan Update*, prepared by the Wayne County Planning Commission (WCPC), the most basic function of a comprehensive plan is to “develop government policies for addressing growth and change in a community (WCPC 2010).”

In addition to the comprehensive plans, several counties within the Project Study Area have also developed open space plans, which identify natural resources within the county and provide strategies for protecting and restoring the environment while also increasing opportunities for ecologically sensitive public enjoyment and education. Lackawanna and Luzerne Counties, for example, have adopted a bi-county *Open Space, Greenways, and Outdoor Recreation Master Plan* that was created jointly by the Lackawanna County Regional Planning Commission (LCRPC) and the Luzerne County Planning Commission (LCPC). Aside from providing a review of the natural resources and enhancement opportunities within the counties, this plan also addresses how the “*preservation of open space and the development of greenways and outdoor recreation area at the county level will provide local leaders at the municipal level with a defensible blueprint for decision making* (LCRPC/LCPC 2004).” These ideals are also mirrored in the *Monroe County Open Space Plan*, issued by the Monroe County Open Space Advisory Board (MCOSAB 2001), the *Pike County Open Space, Greenways, and Recreation Plan*, prepared for the Pike County Board of Commissioners (PCBC 2008), as well as relevant township-based open space plans (Coolbaugh, Tobyhanna, and Tunkhannock Townships 2000).

Each of the county comprehensive plans indicates that the surrounding region has been experiencing one of the highest growth rates in Pennsylvania. Wayne County specifically notes that most of its population growth over the past decades has been in “*Lake, Paupack, and Salem Townships as second homes converted to first homes and existing developments within these communities continued to build out.*” (WCPC 2010). Lackawanna, Luzerne, Monroe and Pike Counties provide similar examples of population changes and increased demand for land development. Each of these comprehensive plans also identifies goals that are fairly consistent between the counties. These goals generally include “*conservation of the County’s natural resources, retention of open space and rural character, and managing growth,*” as noted in the *Pike County Comprehensive Plan* (PCBC 2006). Examples of measures provided to attain these goals include promotion of water quality monitoring, support of farmland preservation techniques, and improved zoning regulations.

Another common theme through these comprehensive plans is the development of an improved working partnership between the county government and associated

municipalities so that county agencies can further assist municipalities that are dealing with growth issues, primarily by encouraging the enactment of land use regulations which require development to recognize and protect the natural resources. The *Monroe County Comprehensive Plan*, prepared for the Monroe County Planning Commission (MCPC), notes that one of its key goals is to “*encourage multi-jurisdictional planning and zoning activity (aided by the County) and joint jurisdictional agreements in planning, zoning, and operation of services to form the basis of plan implementation.*” (MCPC 1999).

As a result of this initiative, many of the townships within these counties have developed or updated municipal zoning ordinances to provide more guidance to local growth and protection to the environment. Many of these townships have also worked jointly with adjacent townships to develop multi-municipal comprehensive plans (**Table 3-15**). In the Gouldsboro area for example, Clifton Township, Lackawanna County has coordinated with adjacent Lehigh Township, Wayne County to develop the *Clifton-Lehigh Comprehensive Plan* (Clifton Township Planning Commission 2010). Coolbaugh, Tobyhanna, and Tunkhannock Townships are part of a *Regional Comprehensive Plan* (Coolbaugh, Tobyhanna, and Tunkhannock Townships 2005). Along the NP-P Segment, Jefferson Township and Madison Township, Lackawanna County and adjacent Salem Township, Wayne County have coordinated to develop the *Jefferson-Madison-Salem Townships Regional Comprehensive Plan* (Jefferson, Madison, and Salem Townships 2007), Sterling Township and Dreher Township are part of the *Dreher-Lehigh-Sterling Comprehensive Plans* (Sterling and Dreher Townships, 1996), and Lake Township and Paupack Township, Wayne County are both associated with the *Lake Region Comprehensive Plan*, prepared by the WCPC (WCPC 2007). Specific townships, including Bear Creek (Luzerne County), Covington, Spring Brook (Lackawanna County), and Palmyra (Pike County) have prepared individual comprehensive plans to guide their specific land use plans (Bear Creek Township 1996; Covington Township 2006, Spring Brook Township 2003; Palmyra Township 2004). These municipal comprehensive plans generally reiterate the concerns raised by the county-level comprehensive plans.



**TABLE 3-15: Summary of Zoning and Comprehensive Plans within the Project Study Area**

COUNTY/TOWNSHIP	ZONING	COMPREHENSIVE PLANS
<b>J-WP SEGMENT</b>		
LUZERNE COUNTY		Lackawanna-Luzerne County Regional Plan – Final Draft (2011)
Wilkes Barre City	Zoning Map (2002) and Ordinances	No Comprehensive Plan
Wilkes Barre Township	Zoning Map (2005) and Ordinances	No Comprehensive Plan
Jenkins Township	Zoning Map (2007) and Ordinances	No Comprehensive Plan
Laflin Borough	Zoning Map (2008) and Ordinances	No Comprehensive Plan
Yatesville Borough	NO ZONING	No Comprehensive Plan
Laurel Run Borough	Zoning Map (2006) and Ordinances	No Comprehensive Plan
Pittston Township	Zoning Map (2006) and Ordinances	No Comprehensive Plan
Plains Township	Zoning Map (2007) and Ordinances	No Comprehensive Plan
Bear Creek Township	Zoning Map (2007) and Ordinances	Bear Creek Township Comprehensive Plan (1996)
Bear Creek Village Borough	Zoning Map (2010) and Ordinances	No Comprehensive Plan
Buck Township	Zoning Map (2008) and Ordinances	No Comprehensive Plan
CARBON COUNTY		No Comprehensive Plan
Kidder Township	Zoning Map (1991) and Ordinances	No Comprehensive Plan
<b>WP-NP SEGMENT</b>		
LACKAWANNA COUNTY		Lackawanna-Luzerne County Regional Plan – Final Draft (2011)
Thornhurst Township	Zoning Map (1995) and Ordinances	No Comprehensive Plan
Clifton Township	Zoning Map (2011) and Ordinances	Clifton-Lehigh Comprehensive Plan (2010)
Covington Township	Zoning Map (2007) and Ordinances	Covington Township Comprehensive Plan (2006)
Madison Township	Zoning Map (2010) and Ordinances	Jefferson-Madison-Salem Regional Comprehensive Plan (2007)
Spring Brook Township	Zoning Map (2012) and Ordinances	Spring Brook Township Comprehensive Plan (2003)
Jefferson Township	Zoning Map (2010) and Ordinances	Jefferson-Madison-Salem Regional Comprehensive Plan (2007)
MONROE COUNTY		Monroe County Comprehensive Plan: Monroe 2020 (1999)
Coolbaugh Township	Zoning Map (2006) and Ordinances	Regional Comprehensive Plan (2005)
Tobyhanna Township	Zoning Map (2001) and Ordinances	Regional Comprehensive Plan (2005)
Tunkhannock Township	Zoning Map (2005) and Ordinances	Regional Comprehensive Plan (2005)
<b>NP-P SEGMENT</b>		
WAYNE COUNTY		Wayne County Comprehensive Plan (2010)
Lehigh Township	Zoning Map (2011) and Ordinances	Clifton-Lehigh Comprehensive Plan (2010)
Sterling Township	Zoning Map (2005) and Ordinances	Dreher-Lehigh-Sterling Comprehensive Plan (1996)
Dreher Township	Zoning Map (2007) and Ordinances	Dreher-Lehigh-Sterling Comprehensive Plan (1996)
Salem Township	NO ZONING	Jefferson-Madison-Salem Regional Comprehensive Plan (2007)
Lake Township	NO ZONING	Lake Region Comprehensive Plan (2007)
Paupack Township	Zoning Map (2006) and Ordinances	Lake Region Comprehensive Plan (2007)
Cherry Ridge Township	Zoning Map (2006) and Ordinances	No Comprehensive Plan
South Canaan Township	NO ZONING	No Comprehensive Plan
PIKE COUNTY		Pike County Comprehensive Plan (2006)
Greene Township	NO ZONING	No Comprehensive Plan
Palmyra Township	Zoning Map (2004) and Ordinances	Palmyra Township Comprehensive Plan (2009)



In regards to electrical transmission, only Pike County addressed the potential effect of the regional growth on the existing power supply infrastructure. The *Pike County Comprehensive Plan* notes that their survey of the residents indicated that the adequacy of existing electrical services is an important issue to over 75-percent of the population. The notion of enhancing infrastructure systems was identified as a priority action and that encouraging electrical utilities to improve plans for service reliability was one of the specific objectives identified (PCBC 2006).

### 3.5 Proposed Development

The U.S. Census Bureau reports that the populations in the six counties that are associated with the Project Study Area have increased between 2000 and 2010, but the population change has not been equal across the region (**Table 3-16**). Based on the 2010 Census, the population of Lackawanna and Luzerne Counties has been relatively stationary, whereas the populations of Carbon and Wayne Counties have risen by over 10-percent, and the populations of Monroe and Pike Counties have risen by over 20-percent (U.S. Census 2010). Several of the townships located within these growing counties have seen a 20 to 40 percent growth in population between 2000 and 2010 and some townships are expected to double in population by 2020. Based on this growth pattern, proposed development within the Project Study Area is anticipated to increase.

**TABLE 3-16: County Population Change (2000-2010)**

County	Census 2000	Census 2010	Percent Change
Carbon	58,802	65,249	+11.0%
Lackawanna	213,295	214,437	+0.5%
Luzerne	319,250	320,918	+0.5%
Monroe	138,687	169,842	+22.5%
Pike	46,302	57,369	+23.9%
Wayne	47,722	52,822	+10.7%

Several specific areas of proposed development within the Project Study Area were identified during initial review of aerial imagery and various field surveys; others have become evident during the real estate assessment process. Many proposed developments were identified as part of the existing parcel datasets obtained for each of the counties. Review of the parcel lines relative to recent aerial imagery illustrated proposed development roads and lots over undeveloped wooded areas. Some of these areas

involve extensive road networks or detailed property subdivisions and were typically associated with existing large residential subdivisions, such as Thornhurst Country Club Estates, Eagle Lake, Big Bass Lake, Pocono Springs Estates, and The Hideouts. Some proposed development areas were observed near dead-end spur roads within smaller subdivisions that would serve as potential extensions of a community that may be expanding in phases; others were noted through signage posted along the roads indicating subdivision approval. Particular proposed developments, specifically along River Road near Thornhurst, along Freytown Road near Gouldsboro, and along SR 191 near Jericho, became evident during closer analysis of the various properties within Project Study Area.

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