CRITICAL HABITAT / ENDANGERED SPECIES MITIGATION PLAN FOR

PSE&G's Susquehanna-Roseland 500 kV Transmission Line Project

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TABLE OF CONTENTS

I. INTRODUCTION

Public Service Electric and Gas Company (PSE&G) is proposing to improve the power service of the region through the reconstruction of and upgrades to the existing Susquehanna to Roseland transmission line right of way (the "ROW"), approximately 26 miles of which occur within the Highlands Region. The project is an electrical reliability project that is proposed to occur within the existing 230kV ROW and will involve the construction of a double circuit vertical 500 kV & 230kV transmission line. The project requires the removal of the existing lattice transmission structures and replacement with new transmission structures that will support the new lines. Temporary laydown work areas will be needed to safely construct the structures and to maneuver about the site with construction equipment. Upgrades to existing access roads and construction of new access roads will also be required where there are no feasible or prudent alternatives. Finally, two new electrical switching stations are proposed. One will be located within Hopatcong Borough

and a second will be located within the Borough of Roseland as an expansion of the existing switching station.

Powerline right of ways have been documented as important habitats for wildlife species (Lee and Norden, 1996; New Jersey Audubon, 2009), and the Roseland-Bushkill ROW[1] is no exception. The extensive field studies conducted to understand the environmental conditions within the ROW have documented a broad array of wildlife species including rare species (i.e., species identified by State and Federal agencies as endangered, threatened or "of special concern" under various statutory and regulatory authorities) that are of conservation concern, such as State-listed and Federally-listed species.

Endangered Species are those whose prospects for survival in New Jersey are in immediate danger because of a loss or change in habitat, over-exploitation, predation, competition, disease, disturbance or contamination. Assistance is needed to prevent future extinction in New Jersey. Threatened Species are those who may become endangered if conditions surrounding them begin to or continue to deteriorate.

These species include amphibians, reptiles, invertebrates, birds, mammals and plants that are documented or potentially present in ROW habitats including meadows, streams and riparian zones, lakes, ponds, wetlands and wetland buffers, vernal habitats, rock outcrops, talus slopes, and adjacent forests, meadows and agricultural areas.

The diverse patchwork of habitats that occur within the ROW and the resulting mosaic of vegetative communities foster a diverse flora and fauna. Although the ROW contains unique habitats that are important for a number of plant and wildlife species, management of the ROW requires the resolution of several, seemingly contradictory goals. Maintenance activities required by State and Federal regulations have resulted in a linear reach of early successional habitat that is otherwise generally lacking in northern New

[1] The Project is known as the Susquehanna-Roseland 500kV Project since it extends from Susquehanna, PA to Roseland, NJ. In New Jersey, it will be constructed within PSE&G's existing Roseland-Bushkill transmission line ROW in New Jersey.

Jersey and therefore highly beneficial to a wide variety of plants and wildlife. However, required maintenance activities result in periodic human disturbance to the ROW and may limit management opportunities for rare species favoring habitats at advanced seral stages which are likely to be in conflict with allowable vegetation height beneath the lines. Many of these conflicts can be overcome through careful planning, creative management, and construction site monitoring, particularly if habitats within the ROW are integrated with habitats adjacent to and beyond the ROW.

The purpose of this Critical Habitat / Endangered Species Mitigation Plan (the "Plan") is:

- to identify potential negative impacts to confirmed rare species' habitats due to proposed construction associated with the project,
- to provide a mechanism for avoiding or mitigating adverse impacts to rare species, and
- to put forth a management strategy that protects, enhances, creates, restores, monitors or otherwise improves the functions and values of specific rare species' habitats within or adjacent to the ROW.

The Plan will also be used in support of more flexible construction timing restrictions than are often applied by the NJDEP to protect particular species. This standard practice is often a fail safe in the absence of a detailed plan, such as this one. This Plan presents a series of methods and approaches that go well beyond the standard timing restrictions. Some flexibility is critical since the Project is also subject to specific outage periods established by PJM Interconnection, LLC (PJM), the regional transmission operator. Although flexible with respect to timing restrictions, the Plan recognizes the importance of maintaining the rich biodiversity of the Highlands through rare-species conservation and management and has been designed to be consistent with the Highlands Regional Master Plan's goal to *"…protect and enhance the significant values of the resources…"* of the Highlands Region.

A. Scope

The Plan addresses rare wildlife, rare plants, and the critical habitats or ecological communities (Significant Natural Areas) documented to contain or likely to contain such species, for all portions of the project occurring within the Highlands Planning or Preservation Areas. For this report, rare wildlife and plants means species that are Federally threatened or endangered, State threatened or endangered, or New Jersey Species of Special Concern that are listed within the Highlands Regional Master Plan or that are known to occur within the project area, *with the exception of rare and other important avian species*, the treatment of which is provided for in the Avian Protection Plan (APP) component of the PSE&G Comprehensive Mitigation Plan (CMP) (PSEG, 2010).

B. Goals

The goal of the Plan is to minimize and mitigate any unavoidable disturbances to critical wildlife habitats that will occur as part of the upgrade of the existing alignment. Components that are associated with the project that have the potential to contribute to habitat impacts include the removal and reconstruction of transmission structures, required vegetative clearing, maintenance of access roads within the existing alignment, construction of temporary roads necessary to access the alignment for equipment and materials, and other disturbances associated with the construction phase of the project. These activities may result in soil compaction, loss of habitat, and changes to habitat use and movement patterns. These impacts will be temporary and will be mitigated by restoration and enhancement activities as described here and in other elements of the CMP.

The Plan seeks to protect the existing important functions and values of wildlife habitat that the alignment is currently providing both during and after construction, and to implement management opportunities to enhance these attributes upon completion of the upgrades. The Plan is based upon extensive fieldwork and a review of the biology of species and habitats of concern as well as input from regulatory agencies and other potential partners and stakeholders interested in protecting the wildlife resources that utilize the alignment and the surrounding habitats. It is expected that with this shared and integrated

approach, the Plan will serve to re-create and protect the current habitat benefits being derived from the alignment and will potentially offer significant opportunities to enhance these attributes, and achieve, at a minimum, "no net loss" of habitat values as required by the RMP and the Highlands Council for this project.

C. Mitigation and Management Options – Overview

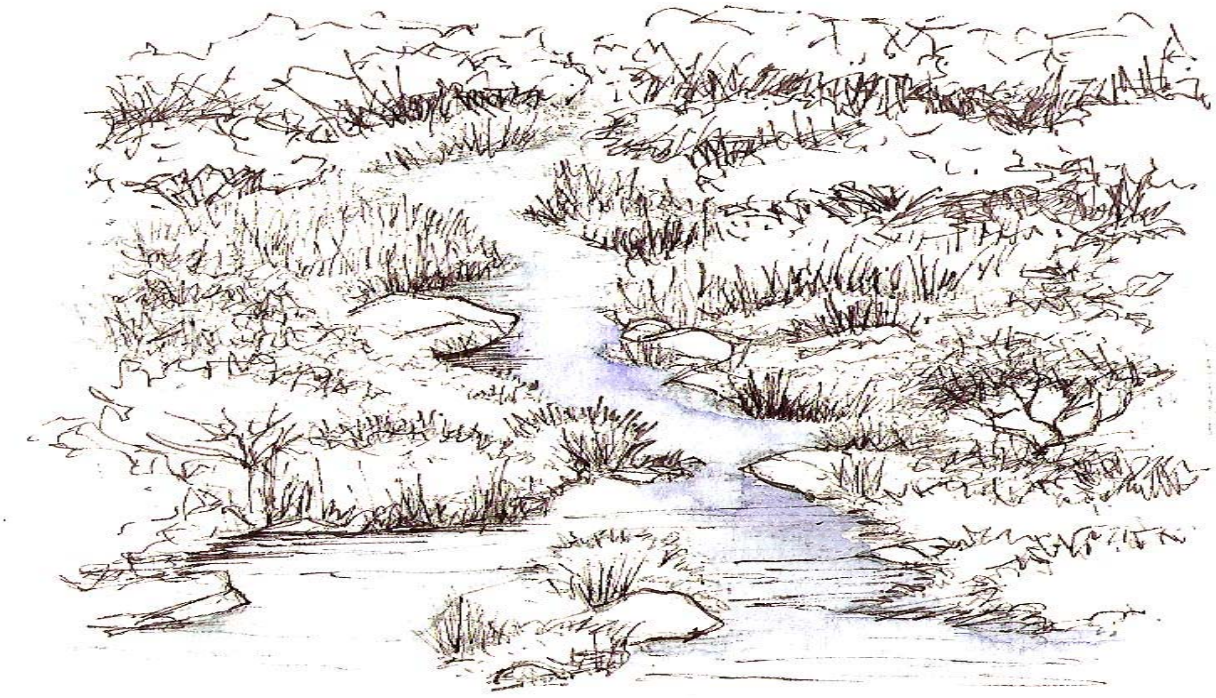
Much effort to minimize temporary and permanent impacts to ROW communities has preceded the development of the current construction plans. Ecological data collected by PSE&G's contracted consultants continues to be shared with, and reviewed by, State and Federal regulatory agencies and incorporated into their plans. This effort is anticipated to continue through construction as feedback is received from the various stakeholders, including the Highlands Council staff. Based upon this process, which included a delineation and survey of all wetlands and several years of environmental field assessments, proposed structure and road locations have avoided sensitive areas such as wetlands or critical habitats wherever possible. Where impacts cannot be avoided, they have been minimized and will be mitigated for so as to achieve no net loss of habitat value. When work is conducted, it will be in accordance with all appropriate permits and will be accompanied by carefully designed and implemented soil erosion control measures to ensure that disturbances to adjacent lands and waters are minimized. In addition, where biological field studies have indicated a particularly sensitive habitat (such as potential bog turtle habitat) in the vicinity of a proposed disturbance, additional steps, such as presence/absence studies have been or will be taken, which may lead to additional modifications of the plan, seasonal timing restrictions, or construction site monitoring by qualified environmental scientists.

Following construction activities, regular maintenance of the ROW will re-commence as required by existing regulations for the maintenance of transmission lines in New Jersey to ensure line safety and performance. Vegetation structure and the resulting species composition have generally been dictated by what is permitted by these regulations. Although limited in this way, the current management techniques have still allowed several different vegetative communities to develop and persist, thus creating wildlife habitats and

providing wildlife benefits, including areas for breeding, post-breeding dispersal, feeding, wintering, and migration and movement corridors. In many cases, these open habitats are the only similar types within an otherwise broad forested area and are therefore of regional importance. Furthermore, despite the apparent limitations resulting from required management activities, there are options to protect and enhance these important values.

D. Measurable Outcomes to be Achieved

The CMP is designed to protect and manage the natural resources and critical habitats within the alignment, and may provide opportunities beyond the right of way and within the broader Highlands Region. The Plan centers on various measures that will protect critical resources during construction, restoration and enhancement following disturbances. Monitoring of the project site specifics will follow implementation of the various elements of the Plan to gauge their success and to identify issues that may need to be resolved. For example, periodic survey of structural elements (rock/brush piles) for wildlife use, or periodic vegetation surveys to assess the success of restoration efforts. Specific measurable outcomes, in coordination with NJDEP – ENSP and USFWS, to be achieved for habitat enhancement include placement of rock piles in six spans, placement of brush piles in 10 spans, installation of turtle nesting sites in eight locations, placement of habitat logs/root wads in 13 locations and supplemental planting of *Baptisia sp.* for the butterfly frosted elfin in eight locations. For vegetation restoration monitoring, compliance with NJDEP permit conditions for wetland impacts are expected to require success to be defined as a measurable outcome of 85% survivorship of planted woody vegetation and 85% cover by herbaceous species after a three-year monitoring period. The same standard will be used to gauge the measurable outcome for success in the vegetation restoration within uplands. For additional details, please see Chapter VII. Monitoring.



E. <u>Relationship to Other CMP Elements</u>

In addition to critical habitats and rare species, the CMP consists of many additional plan elements that are integrally linked to each other, including a focus on vegetation, avian species, wetlands, waters and riparian zones, stormwater, historic resources, Green Acres, forests, and a monetary contribution creating a Highlands fund to be used to preserve critical Highlands resources. Within the alignment, ROW vegetation management conducted in accordance with the BPU standards and rules will dictate what type of vegetative communities can be created and how forest and wetland communities may be maintained or managed. ROW construction and the ongoing maintenance activities must look to reduce and minimize potential impacts to the waters of the Highlands, which are typically among the most ecologically sensitive natural resources. Finally, because rare plants and wildlife typical rely upon the presence of very specific habitats, impacts to the ecosystems of the ROW must be protective of such areas in particular, and the greater regional ecomosaic in general, in order to ensure the continued presence and survival of the rare plant and wildlife species that are currently documented or potentially existing within the project area.

Objectives of the CMP, among others, are to restore and mitigate for temporary and permanent impacts to the above ecological elements potentially affected by proposed construction activities and to establish best management practices consistent with the conservation of the natural resources of the Highlands region with the goal of achieving no

net loss of habitat value. This Plan focuses specifically on the protection, management, or creation of Highlands Region habitats that are critical for rare species. When integrated into the full CMP, the implementation of these components will together provide for the continued health and diversity of the ROW's natural resources while ensuring consistency with the ecological requirements of the Highlands and other State or Federal regulations. It is anticipated that following the termination of the monitoring period for the project that all provisions of the CMP except those regarding ongoing ROW maintenance will sunset. The long term maintenance of the ROW will continue to be required by federal standards, the BPU regulations, applicable DEP permit requirements, and relevant aspects of the Developer's Agreement with the Highlands Council. The criteria established in the CMP will enable the long-term management of the ROW to be more sustainable and beneficial to the resources within and along the ROW.

II. DATA SYNTHESIS

A. Identification of Critical Habitats

The initial rare species investigation of the ROW involved a review of the NJDEP Natural Heritage Program (NHP) databases, a review of the NJDEP Landscape Project, analysis of aerial photography, and field evaluations of mapped conditions to determine if there was suitable habitat for a particular rare species in the vicinity of proposed disturbances. In addition, as a result of EcolSciences' extensive experience conducting threatened and endangered species studies, the firm has compiled a library of books, field guides, technical reports from public and private agencies, and articles from technical journals concerning the threatened/endangered species and communities in New Jersey. These resources contain information regarding the natural history, historic records, habitat requirements, and survey methodologies for these species. Field guides and plant technical keys were consulted, as were public resources such as the United State Department of Agriculture (USDA), Natural Resource Conservation Service (NRCS) "Plant Database," available on the World Wide Web. Assessment methods are provided in greater detail below.

In July 2002, the NHP adopted use of the Landscape Project to supplement threatened and endangered species data requests. The Landscape Project was developed by the NJDEP Endangered and Nongame Species Program (ENSP). This wildlife habitat-mapping program is used to identify and map critical habitats for endangered, threatened, and special concern species. This method utilizes documented sightings of threatened and endangered wildlife and, based on a species-specific model, maps areas of suitable habitat contiguous to the sighting as critical wildlife habitat. Since its initial release, the Landscape Project has undergone revision. In 2008, the Landscape Project was updated to Version 2.1 and Version 3.0. Landscape Project Versions 2.1 and 3.0 cover separate areas of the state, with Version 3.0 mapping the Highlands Preservation and Planning Area as well as portions of surrounding municipalities and Version 2.1 covering the remainder of the state. This report addresses the portion of the project occurring within the Highlands Area and thus, within the coverage area of Version 3.0.

The critical areas mapped by the Landscape Project 3.0, in general, consist of numerous polygons broken down into ranked, species-based "patches". Landscape Project critical areas for listed species are determined through specific models applied from the location of an accepted record from the NHP Natural Heritage database. Each habitat is then ranked based on the status of a species record, if present. A Rank 5 patch indicates one or more occurrences of a Federally-listed species. Rank 4 patches indicate one or more occurrences of a State-listed endangered species. Rank 3 patches indicate one or more occurrences of a State-listed threatened species. Rank 2 patches indicate one or more occurrences of at least one Species of Concern. Rank 1 patches have no known species records, but may meet other habitat-specific criteria.

In addition to the database of rare wildlife occurrences and the habitat mapping provided in the Landscape Project, the NJDEP Office of Natural Lands Management maintains a database and associated map of documented rare plants and ecological communities in New Jersey. The database includes those plants listed as endangered at N.J.A.C. 7.5C-5.1 as well as numerous other rare or locally uncommon species. The map consists of a statewide grid with cells that are approximately 360 acres in size. Each cell

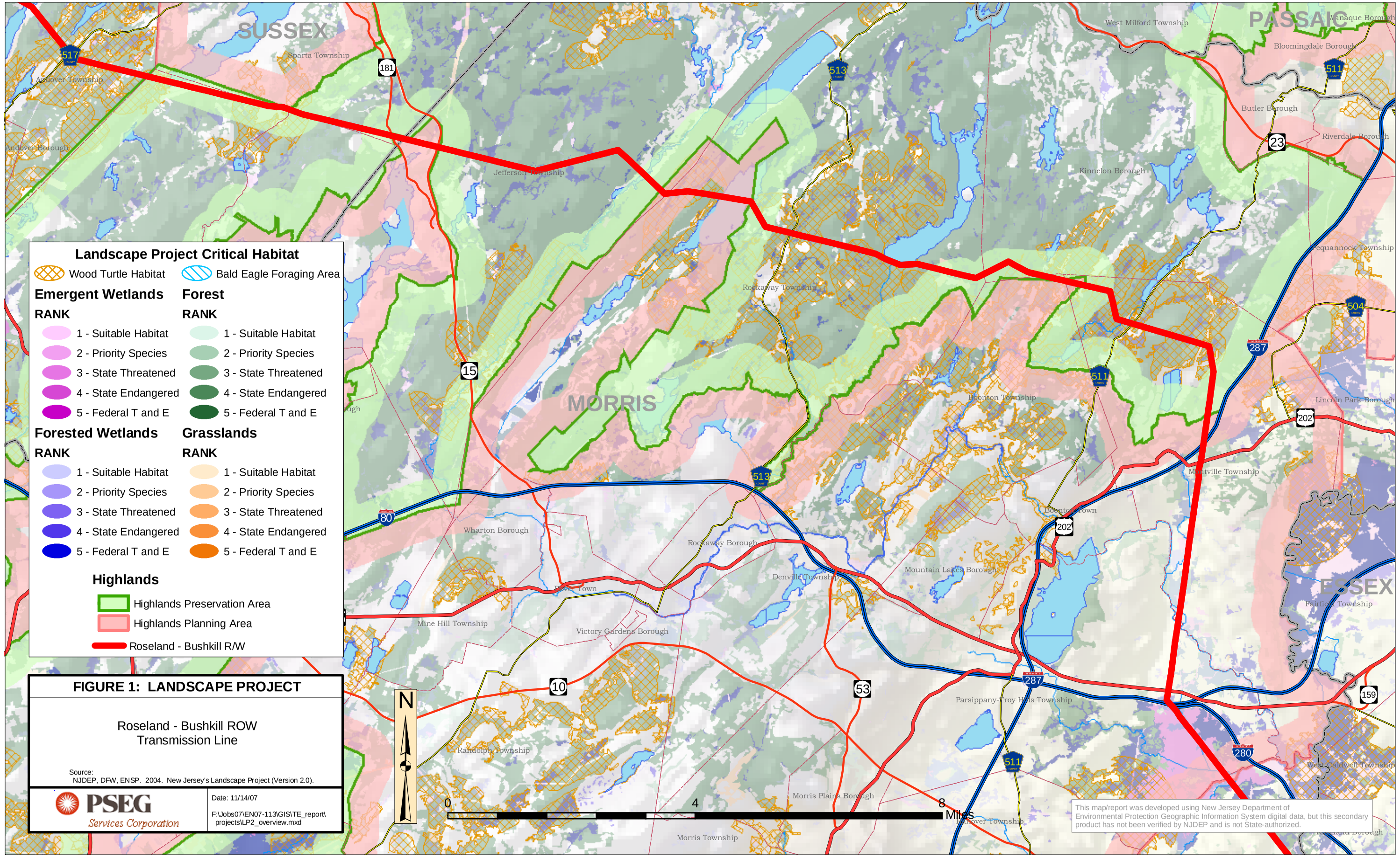


FIGURE 1: LANDSCAPE PROJECT

Roseland - Bushkill ROW
Transmission Line

Source:
NJDEP, DFW, ENSP. 2004. New Jersey's Landscape Project (Version 2.0).

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Date: 11/14/07

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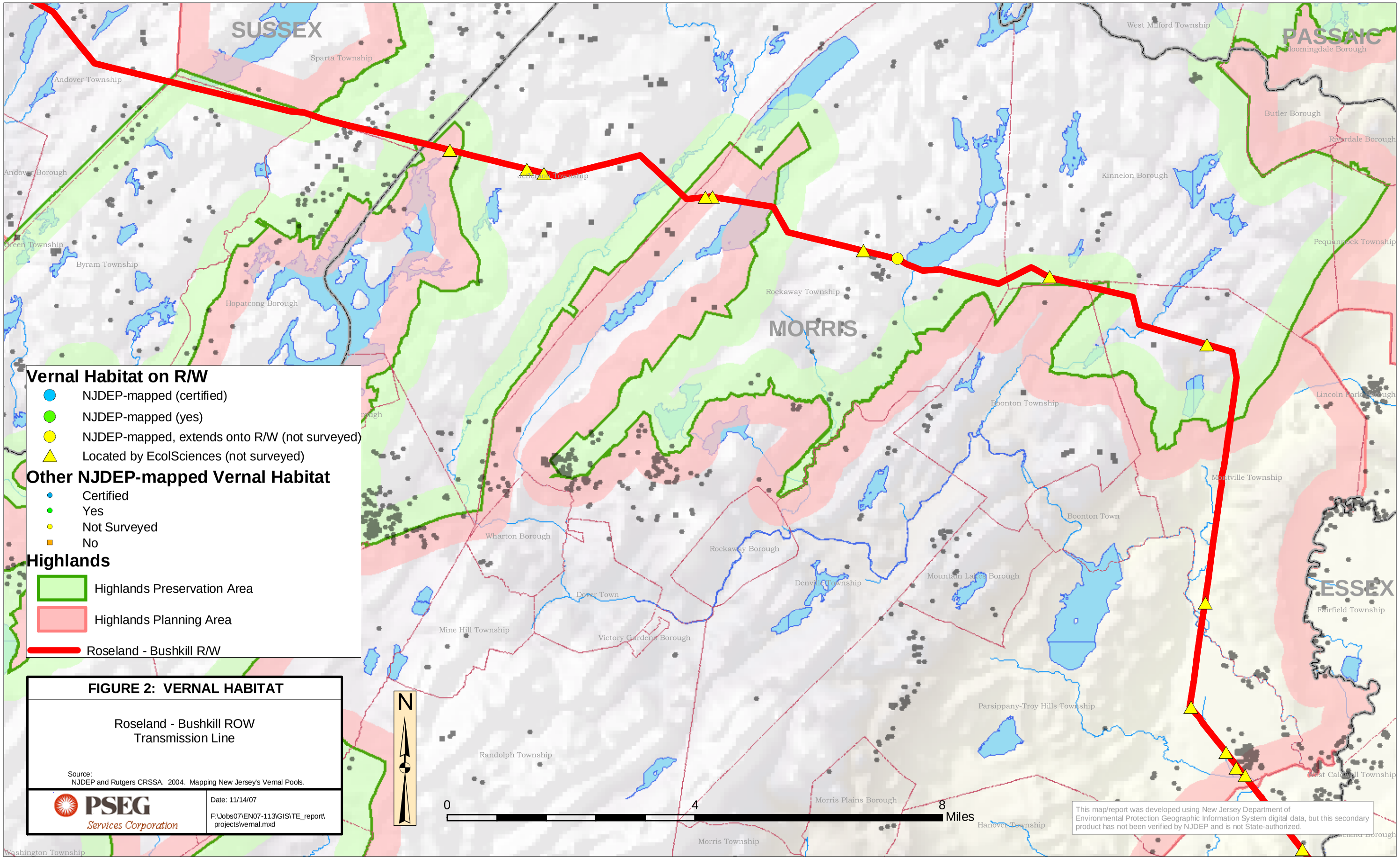

FIGURE 2: VERNAL HABITAT

Roseland - Bushkill ROW
Transmission Line

Source:
NJDEP and Rutgers CRSSA. 2004. Mapping New Jersey's Vernal Pools.

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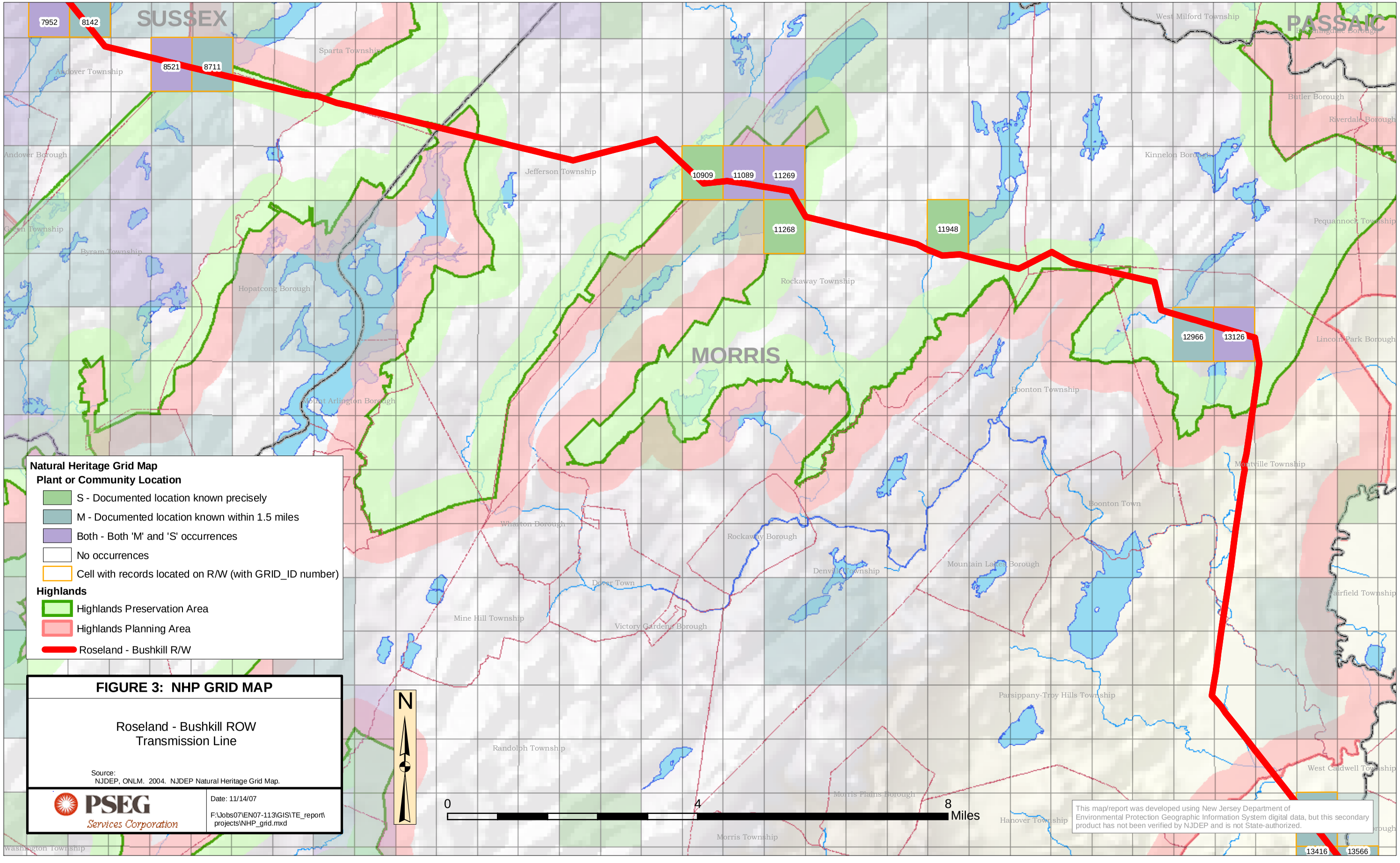

FIGURE 3: NHP GRID MAP

Roseland - Bushkill ROW
Transmission Line

Source:
NJDEP, ONLM. 2004. NJDEP Natural Heritage Grid Map.

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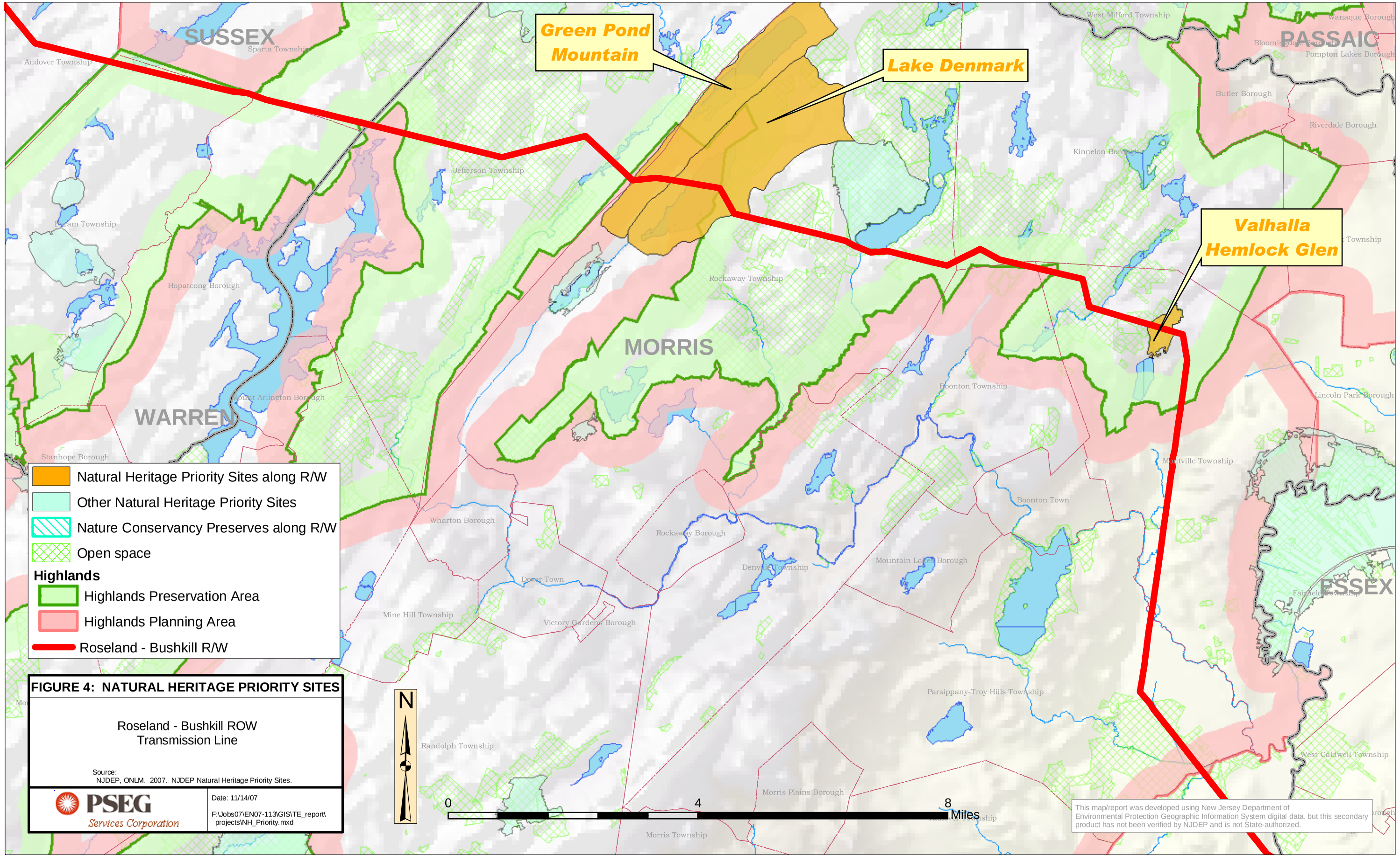

FIGURE 4: NATURAL HERITAGE PRIORITY SITES

Roseland - Bushkill ROW
Transmission Line

Source:
NJDEP, ONLM. 2007. NJDEP Natural Heritage Priority Sites.

PSEG Services Corporation

Date: 11/14/07

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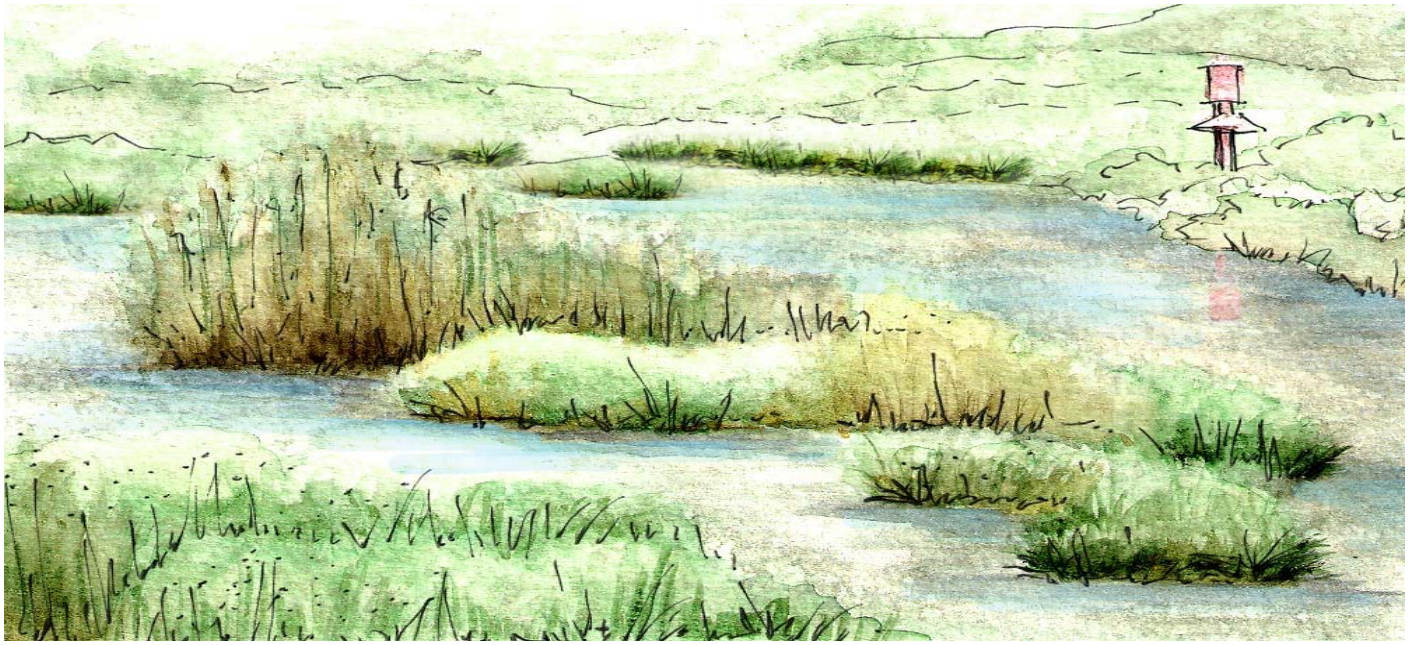
with documented rare plant sightings is linked to corresponding rare plant and ecological community records in a data table. Certain cells indicate the presence of a rare plant for which the documented location is known precisely. Other cells indicate only that a documented record of a rare plant is known within a 1.5-mile radius of the cell. In either case, a particular cell will only indicate the general location of rare species because, in order to prevent disturbance or illegal collecting, the NHP generally does not provide precise coordinates of rare species records.



B. <u>Wetland Delineation and Species Specific Field Surveys</u>

A wetland delineation of the entire ROW and adjacent areas including proposed access roads and substation parcels was conducted from 2007 through 2009. This delineation was submitted to the NJDEP for confirmation through a Letter of Interpretation. NJDEP has indicated verbally that the wetland delineation is accurate for permit submission purposes, however NJDEP has yet to issue a final LOI. The wetland delineation required that the entire length of the ROW be walked and allowed opportunity to evaluate all on-site habitats. The wetland delineation fieldwork provided an opportunity for extensive "ground truthing" of the mapped conditions and aided in determining if observed on-site habitats were potentially suitable for locally documented rare species. This effort allowed biologists to evaluate whether segments of the ROW were likely to contain the specific habitats

required by the rare species in question. The evaluation confirmed whether wetlands or waters were present, the type of vegetative cover or land use, and any local geological features indicative of rare ecological communities (e.g. rocky outcrop, vernal pool, broomsedge / bluestem meadow, emergent wetland, stream corridor, riparian zone, forested wetland, upland forest, calcareous geology). Based on the previous reviews, numerous follow-up field assessments were conducted at various segments of the ROW after conclusion of the delineation to gather additional data where particularly sensitive rare plant or wildlife species have the potential to be harmed by proposed activities. These supplementary surveys were therefore only conducted for bats, bobcat, bog turtle, timber rattlesnake, rare raptors, vernal pools, and rare plants.

C. Summary of Wildlife Species Ecology

Based upon the results of the background data collection and field surveys, a description of the distribution and habitat for the rare wildlife and plant species documented or potentially occurring on the ROW is provided in the following sections.

1. Allegheny Woodrat

The Allegheny woodrat is a State endangered species. They inhabit talus slopes that provide ample cover, denning on the barren slopes and foraging in the nearby vegetation. They feed on fruits, stems, berries, nuts, fungi, and seeds and store their food in caches for later use. In addition to food items, woodrats are known for collecting and caching piles of inedible natural and man-made objects such that the species is often referred to as packrats (Beans and Niles, 2003).

New Jersey's population of woodrat has experienced steep declines in the last several decades and the Palisades in Bergen County is the last known location in the state where this species is confirmed to persist. Research into this recent decline is often focused on mortality from the raccoon roundworm parasite which is spread via contact with raccoon feces and which can be fatal in woodrats (Beans and Niles, 2003) (LoGuidice, 2003).

Although not included in the current Landscape Project Version 3.0, previous versions of the Landscape Project had mapped habitats associated with Allegheny woodrat on the ROW in the vicinity of the Green Pond escarpment. The mapping was based on a population of woodrats that was discovered in Picatinny Arsenal. This population has been deemed extirpated since 1984 (Beans and Niles, 2003). As such, there is no ROW impact to any documented extant population of Allegheny woodrat. However, the remote and rugged character of the area is largely unchanged over the past several decades and large, contiguous stretches of apparently suitable woodrat habitat remain, portions of which are within the ROW at this location. Given the length and isolation of the talus area, and the generally inaccessibility of this area, there is the slight possibility that a woodrat population remains extant. In light of habitat suitability and the historical presence of Allegheny woodrat in this area, agency consultation is warranted.

2. Blue-spotted Salamander

Blue-spotted salamanders are a State endangered amphibian species and are a type of mole salamander (genus *Ambystoma*). They breed in ephemeral woodland ponds (vernal pools) associated with bottomland floodplains. The ponds are generally small, less than 40 feet in diameter and less than 3 feet deep. Outside of the breeding season in late winter and early spring, blue-spotted salamanders utilize surrounding upland and forested wetlands, burrowing under logs and into the soil while foraging and overwintering underground (NJDEP, 2008).

Although blue-spotted salamanders' overall range is widespread and extends from southern Canada and Minnesota east to New Jersey (Petranka, 1998), in New Jersey, blue-spotted salamanders are restricted to the former glacial lake basins in Somerset, Morris, Essex, Warren, and Sussex counties. The former glacial Lake Passaic, which occupies portions of Morris, Somerset, and Essex counties (i.e. Great Swamp, Troy Meadows, Great Piece Meadows) within the Passaic River Drainage Basin, contains a large concentration of blue-spotted salamanders (NJDEP, 2008).

The Landscape Project has mapped blue-spotted salamander habitat between Route 80 and the Roseland Switch station, within areas associated with Troy Meadows and the Passaic River Basin. Spring surveys of vernal pools in the vicinity of the ROW have confirmed the presence of breeding blue-spotted salamanders in some, but not all, of the vernal pools in this area. While presence of this salamander was confirmed in vernal pools near the junction of Route 80 and Route 280 during EcolSciences' field surveys, other vernal habitats associated with the ROW did not contain evidence of blue-spotted salamander.

3. Bobcat

The bobcat is a State endangered species. Historically, the range of bobcats extended throughout much of North America, however, their populations have been reduced or extirpated in a number of states due to habitat changes resulting from development and modern agricultural practices. Over the last century, deforestation, intensive agriculture, development, and hunting also reduced their numbers in New Jersey to a point that they were considered extirpated from the state by the 1970s. Following a reintroduction program conducted by the NJDEP in the late 1970s and early 1980s, the species has successfully re-colonized a number of counties in both northern and southern portions of the state. It is likely that ongoing development of bobcat habitat and the increasing number of roadkills will limit population growth of this species, however, these effects may be mitigated as large blocks of forest and agricultural lands are increasingly preserved as public or private open space.

Within its range, the bobcat is found in a variety of habitats including forests, areas of mixed forest and agriculture, and rural areas near cities and small towns. Bobcats use rough, variable habitat that has a mix of early and late successional stages. They prefer dense understory cover for resting and protection from weather and predators. Northern New Jersey habitats typically consist of large contiguous areas of forest and fragmented forests interspersed with agricultural areas or early succession vegetation.

Bobcat home range and habitat selection are influenced by prey availability. They prey on small mammals, ground nesting birds, turkey, and deer. Their territories are variable and have been recorded from 0.5 km^2 (0.2 $mi.^2$) to greater than 208 km2 (80 $mi.^2$). In northern New Jersey, home range of two males has been documented at 18 km^2 (7 $mi.^2$) (Beans and Niles, 2003). Male home ranges are generally larger than female home ranges. To identify potential critical bobcat habitats, the NJDEP's Landscape Project applies a 2.8 km radius potential habitat buffer around any documented bobcat sighting and then identifies as bobcat habitat all suitable habitats (forests and forested wetlands) within or intersecting the buffer.

The Landscape Project has mapped bobcat habitat on or adjacent to large portions of the ROW. The varied habitats preferred by bobcat and the generally forested character of areas adjacent to the ROW would indicate that the majority of the project area (with the exception of residential and commercial areas or major transportation thoroughfares) is potentially suitable as foraging habitat for the species. Although bobcat foraging habitats are likely to remain generally unaffected by construction activities, of particular concern are remote wooded habits and rocky outcrops (also identified for timber rattlesnake or Allegheny woodrat) as these habitats would be most likely to be utilized as bobcat den sites and most susceptible to permanent disturbance. During field surveys for such areas, a potential bobcat den site was located within a rocky slope on the west side of the Green Pond escarpment and was investigated using an automated trail camera. Subsequently, a bobcat was photographed as it passed by the camera location, confirming that bobcat do utilize the den site. Although the camera was left in place for several months following that photograph, no additional sightings of bobcat were observed. However, the location of the potential den was reported to the NJDEP Endangered and Nongame Species Program (ENSP).

4. Bog Turtle

The bog turtle is classified as a State endangered species. In addition, its northern population (occurring in Connecticut, Delaware, Maryland, Massachusetts, New Jersey, New York and Pennsylvania) has been listed as a Federally threatened species. The species

is highly susceptible to habitat loss, degradation, and fragmentation, and the small attractive turtle is often illegally captured and sold to collectors.

The bog turtle is one of North America's smallest turtles, with an average adult carapace length of less than 100 millimeters. The best diagnostic identifying feature of the species is its lightly sculpted carapace and bright orange, often hourglass shaped marking on each side of its head. The carapace is generally dark brown to ebony in coloration, while the plastron varies in coloration.

Bog turtles are strongly associated with emergent wetlands. Bog turtles commonly use the open emergent areas for foraging and basking. Breeding occurs in mid to late spring and eggs are typically laid in mid-summer. Nests sites usually have a sunny exposure and eggs are often loosely buried or left in the open, on top of tussock sedge or other vegetative hummocks above the water line. Hatchlings typically emerge in late summer, although some may overwinter within the nest for hibernation. Bog turtles may crawl into soft peat,

use old muskrat or other small mammal burrows, or nest around the roots of woody vegetation (Klemens, 2001).

Unlike other turtle species, the bog turtle's range is small; the turtles rarely leave the marsh for upland foraging. Most bog turtle habitats are less than 2 acres in size (NJDEP, 2008). As such, micro-habitat conditions in the wetland are critical to maintaining appropriate habitat conditions. Suitable bog turtle habitat is recognized by three criteria; hydrology, soils, and vegetation (although not all suitable habitats will contain bog turtle). Sustained hydrology is extremely important in maintaining the soil and vegetative characteristics preferred by this species. In general, appropriate wetland hydrology consists of shallow, spring-fed seepages with water or soil saturation present year-round. Suitable soils generally consist of organic mucks or muck-like soils. The characteristic mucky soils are often easily compressed and, in areas grazed by livestock, bog turtles are often found within pockets of standing water in old hoof-prints. Suitable vegetative communities for bog turtle are generally characterized by an open wetland meadow that may be interspersed with shrub/scrub areas and a forested wetland perimeter. Common emergent wetland species include sedges, grasses, and rushes such as tussock sedge, woolgrass, soft rush and rice cut grass. Associated herbaceous species include skunk cabbage, arrowhead, sweet flag and cattail. Shrubby vegetation includes alder, shrubby cinquefoil and red maple saplings. In disturbed areas, purple loosestrife, reed canary grass and multiflora rose are also common (USFWS, 2001; NJDEP, 1995).

The Landscape Project has mapped bog turtle habitat along/near the ROW in one location east of the Green Pond Escarpment in Rockaway, Morris County. Where ROW habitats are hydrologically connected to off-site habitats with confirmed bog turtle observations, a Phase I habitat assessment was conducted and suitable habitat meeting the ecological requirements of bog turtle was identified within the ROW. In addition, Phase I habitat assessments along access roads and elsewhere within ROW have identified additional areas of potential bog turtle habitat, although no record for the species occurs at those locations. Phase I habitat assessments for the proposed Hopatcong Switch Station did not identify suitable habitat for bog turtle. In areas where construction activities may

conflict with potential habitats, Phase 2 Bog Turtle Surveys were conducted in accordance with a USFWS approved Study Plans. No bog turtles were identified in association with any of these surveys.

5. Indiana Bat

The Indiana bat is a federally endangered species and is likewise an endangered species in New Jersey. Indiana bats often use travel corridors that consist of open flyways such as streams, woodland trails, easements, and wood roads. In the summer, males may travel and roost in several locations, and do not appear to be restricted to specific roost trees. Roost trees are often located where they have solar exposure. Gravid females form nursery colonies under exfoliating bark of trees in a variety of habitat types, including uplands and riparian habitats. In living trees, species with exfoliating bark such as large black locust, shagbark hickory, and white oak may provide maternity colony roosts and multiple tree species may be used as nursery colonies indicating that it is tree form, not species, that is important for roosts. Recent research has also found Indiana bats using buildings for roosts and maternity colonies. Indiana bats forage on insects. Foraging activity is generally around the tree canopy in upland and riparian woods, around crowns of individual or widely spaced trees, and along forest edges. They may also forage over old fields, forest edges, and small openings (Indiana Bat Recovery Team, 1999).

The federally endangered Indiana bat is known from that portion of the region that includes the ROW. Specifically, several Priority III hibernacula have been identified in Rockaway, New Jersey. The USFWS also found evidence of a summer maternity colony (and other summer presence) of Indiana bats in Morris County at Picatinny Arsenal (in Rockaway Township) and in the region of Great Swamp also located in Morris County. The USFWS letter (in Appendix D of the original HAD application dated Sept 09) states that a reproductive female from one of the nearby maternity colonies was previously captured within the ROW in Rockaway Township, Morris County.

Telemetry data have indicated that Indiana bats identified from hibernacula in New York State may also be entering the northern portion of New Jersey for summer foraging

and possible maternity colonies. Based on the life history of the species, Indiana bats likely utilize portions of the ROW for movement corridors and for foraging along the wooded borders of the ROW. Particular areas of concern are a 13-mile portion of the ROW through Jefferson, Rockaway, Boonton, and Montville Townships and Kinnelon Borough. These areas of concern are located within five miles of both summer maternity colonies and winter hibernacula. This five-mile radius around a hibernacula and maternity colony is generally determined by USFWS as a critical zone.

The currently wooded and undeveloped Hopatcong substation parcel may also provide appropriate foraging habitat with its interspersion of forest, clearings along the dual easements, and wetlands. Based on EcolSciences site inspection, it was noted that the tree composition at the Hopatcong substation parcel generally does provide good maternity or roosting habitat for cave bats since some of the tree species observed in the area have exfoliating bark, and several dead snag trees with bark attached were observed. Due to the presence of potential habitat for cave bats and Indiana bat in particular, a summer mist net survey was conducted on the parcel in the summer of 2009. The results of these surveys identified bat activity including; big brown bat (*Eptesicus fuscus*), Little brown bat (*Myotis lucifugus*), Northern long-eared bat (*Myotis septentrionalis*), and Eastern red bat (*Lasiurus borealis*). No Indiana bats were captured or identified during the survey (ESI, 2009).

Currently cave bat populations in the Northeast are suffering devastating losses resulting from White Nose Syndrome (WNS). WNS is a cold climate fungus that attacks over-wintering bats during their hibernation in caves and mines. The disease was first identified in New York in 2006 and has since spread throughout the northeast and is currently confirmed in the southern and western States of Tennessee and Oklahoma. WNS was identified in 2008 in the New Jersey Hibernia and Mount Hope Mine hibernacula. The cause and effect of the disease are still being studied. However, the fungus appears to disrupt the over wintering ability of the bats causing bats to emerge from hibernation in mid-winter and dying from lack of food. The fungus can also cause necrosis of wing tissue interfering with flight. In New Jersey, mortality rates in the known hibernacula are rapidly approaching 100 percent (USFWS, NJDEP ENSP).

Until a method of treatment is identified, New Jersey may lose a substantial number of its small cave bat species including Little brown bats, Northern long-eared bats, Eastern myotis, and Indiana bats. With the pressure the cave bats are experiencing in their over wintering areas, protection of high quality foraging habitat close to the hibernacula areas is critical. These habitats include the forest, wetlands, and streams, that intersect with the PSEG alignment.

6. Timber Rattlesnake

The timber rattlesnake is a State endangered species. The current geographic range of the timber rattlesnake encompasses 30 states from New Hampshire to Minnesota in the north, from extreme southeastern Nebraska and eastern Iowa to Texas in the mid-west, across the south to northern Florida, and along the eastern coastal plain (Brown, 1993). The species is most abundant in the Appalachian Mountains from northeastern Alabama to Pennsylvania. There are two disjunct populations of timber rattlesnake in New Jersey. In

northern New Jersey, timber rattlesnakes are found along the entire length of the Kittatinny Ridge from the Delaware Water Gap to High Point and in other mountainous areas of

Sussex, Morris, Warren, Passaic, and Bergen counties. In southern New Jersey, timber rattlesnakes historically occur within the Pine Barrens and fringe areas but are presently known to be extant only in Burlington and Ocean counties (Beans and Niles, 2003; NJDEP, 2008).

In the northeastern United States, this species generally prefers remote mountainous terrain characterized by steep ledges and rock slides, timbered areas with rocky outcroppings, dry ridges, and deciduous or coniferous forests, usually in areas with southern exposures (Brown, 1993). Though typically an upland species in northern New Jersey, the timber rattlesnake will utilize both upland and wetland habitats, with use of wetlands depending on the type of wetland habitat present, the percentage of wetland comprising total summer habitat areas, and the location of wetland habitats relative to the den site (NJDEP, 2008). Timber rattlesnakes hibernate during the late fall, winter, and early spring. For hibernation, northern New Jersey populations of timber rattlesnakes use communal den sites located in rock outcroppings and talus slope areas associated with major ridges (NJDEP, 2008). They emerge from their communal dens during mild weather in mid-spring. Often, snakes will remain close to their dens for days or weeks after emergence in order to take advantage of basking opportunities available on warm spring days. The snakes then begin to return to their summer foraging areas which are typically adjacent forested habitats located within a 2-mile radius of the den (NJDEP, 2008).

Timber rattlesnakes are venomous snakes that rely on cryptic coloration in order to ambush their prey, which consists of small mammals including mice, voles, chipmunks, and cottontail rabbits. Foraging activity is generally undertaken only by males and non-gravid females, as gravid females typically do not eat in the months prior to giving birth. Foraging continues until the breeding season begins in summer. At this time, sexually mature males follow scent trails and pursue receptive females over long distances and continue to do so until early fall (Beans and Niles, 2003). After successful mating, females will not give birth until the next year, at which time six to ten live young are typically born in late summer. Migration back to the winter dens begins as the weather cools in the early autumn. Adults

and young snakes alike then follow scent trails back to their dens (Beans and Niles, 2003), which may be shared with numerous other individual snakes from several different species.

Within the Landscape Project, approximately eleven miles of the project area is mapped as containing timber rattlesnake habitat (Structures 61/1 to 72/3). This mapping appears to center around confirmed sightings in the vicinity of Picatinny Arsenal in Rockaway Township. Although the resulting Landscape Project habitat map is quite broad and inclusive of large forested tracts located well away from the core area, EcolSciences Inc. has not been alerted to any other confirmed rattlesnake colonies within the project area, thus the occurrence may be localized. An assessment of the ROW was conducted to confirm the Landscape Project mapping and to identify potential hibernacula within or near the ROW and proposed access roads or substations. Based upon these investigations, the Landscape Project mapping in the vicinity of Picatinny Arsenal was confirmed via the observation of a juvenile timber rattlesnake, a shed rattlesnake skin, and the presence of preferred habitats (south facing talus slopes surrounded by other rocky slopes, forests, shrublands, and wetlands) that are suitable for den sites, basking areas, foraging, and gestation. In addition, several other rocky outcrops appearing to be suitable rattlesnake habitat were identified elsewhere within the Highlands portions of the ROW. These include ROW areas immediately west of Berkshire Valley Road, ROW areas immediately east of the Route 15 corridor, and ROW areas in the vicinity of the proposed Hopatcong Switch Station. Each of these areas was surveyed multiple times during the appropriate emergence and active period for rattlesnake, and no rattlesnakes were observed. However, although there is likely only a slight possibility that these additional areas contain extant population of rattlesnake, they do warrant protective measures (discussed later in this report) due to their relative proximity to a known timber rattlesnake population and the general scarcity of suitable rattlesnake habitats.

7. Long-tailed Salamander

In New Jersey, long-tailed salamanders are a State threatened species usually associated with limestone regions, primarily in Sussex and Warren counties. Long-tailed salamanders have also been recorded from Hunterdon, Mercer, Morris, Passaic, Somerset,

and Union counties (NJDEP, 2008). This species requires wetland and upland habitats and have been reported in a wide range of habitats including springs, streams, rivers, caves, mines, vernal pools, and sinkholes (Anderson and Martino, 1966; Stein, 1992 in NJDEP, 2008). Subadults and adults are most frequently found under rocks, logs, and other surface cover near the margins of shaded seepages, springs, or streams, but individuals are occasionally found far from running water in forest habitats (Ireland, 1979 in Petranka,

1998; Minton, 1972 in Petranka, 1998; Mount, 1975 in Petranka, 1998; Smith, 1961 in Petranka, 1998). Generally, the species is associated with areas of high water quality (NJDEP, 2008). The species also makes use of a closed canopy upland/wetland forested habitat along these wetland and water features (NJDEP, 2008). In New Jersey, long-tailed salamanders have also been found in streams in Hunterdon and Somerset counties (R. Stein, pers. comm. in NJDEP, 2008) and vernal ponds and sinkholes in limestone areas of Warren and Sussex County (Anderson and Martino, 1966; Zappolarti and Reap, 1983 in NJDEP, 2008). The association of long-tailed salamanders found in New Jersey with limestone formations is apparently unique to the species' range (NJDEP, 2008).

Mating primarily occurs in the autumn and early winter and females breed in seepages, streams, or stream fed ponds. Adults and sub-adults show marked seasonal shifts in microhabitat use and remain in the area of ponds throughout the summer inhabiting slow moving streams, sinkhole ponds, fens, and swamps. Adults emerge from hibernation in late April to early May and can be found through mid-summer underneath logs, flat stones, vegetation and debris in slow moving streams, sinkhole ponds, fens, and swamps.

The Landscape Project maps long-tailed salamander habitat between Route 15 to the west and Berkshire Valley Road to the east. Much of this area is occupied by Mahlon Dickerson Reservation and Rockaway River Wildlife Management Area and is characterized by dry ridges, steep slopes, and wet valleys which often contain beaver-impoundments on streams. Based upon EcolSciences' field assessments, appropriate forest and wetland long-tailed salamander habitats occur within this portion of the ROW, however regulatory protections (including freshwater wetlands and floodplain rules) and the implementation of the wetland mitigation and vegetation management CMP elements will ensure protection of critical long-tailed salamander habitats along or within the ROW. Minimization of disturbance to adjacent woodlands, such as along proposed access roads will also ensure that over wintering salamanders are not impacted in their underground hibernacula.

8. Wood Turtle

The wood turtle is a State threatened species. It occurs primarily in the northern two-thirds of the state. Large portions of the project area are mapped as containing wood turtle habitat. These areas include ROW lands in the vicinity of Route 517, Lake Mohawk, Longwood Lake, Green Pond Escarpment, Splitrock Reservoir, Pyramid Mountain, and Troy Meadows. EcolSciences' field inspections confirm that the mapped areas are generally suitable for wood turtle, particularly in the vicinity of Highlands streams and other water bodies.

Wood turtles require both aquatic and terrestrial habitat. In general, wood turtles use streams and rivers for breeding and hibernating. Breeding occurs underwater, often in slow meandering streams with sandy bottoms and shoals in either the spring (April and May) or fall (September-October). During hibernation, wood turtles are primarily found on the bottom or in the banks of waterways. Suitable aquatic habitat for the wood turtle is considered to be streams or rivers featuring flowing water of varying depths, undercut banks, exposed roots, muskrat burrows, fish populations, and evidence of good water quality (e.g., trout-associated waters).

In New Jersey, wood turtles are primarily terrestrial from mid-May to October (Farrell and Zappalorti, 1979; Zappalorti et al., 1984). Apart from breeding and hibernating, wood turtles make use of wetlands and uplands adjacent to their aquatic habitat. Wood turtles are an extremely mobile species that have been documented to move at least 1.8 km (1 mi) along a stream corridor and exhibit familiarity with wetland habitats 2 km (1.2 mi) from an initial capture point (NJDEP, 2008). Favored adjacent upland/wetland habitats are characterized by mosaics of forest, field, shrubs, and agricultural lands, though wood turtles also occur in more monotypic areas. Thickets of alder, greenbrier, or multiflora rose adjacent to aquatic habitats are favored basking areas (NJDEP, 2008). Based upon EcolSciences' field assessments, appropriate wood turtle habitats generally occur where mapped, however regulatory protections (including freshwater wetlands and floodplain

rules) and the implementation of the wetland mitigation and vegetation management CMP elements will ensure protection of wood turtle habitats along or within the ROW.

9. Invertebrates

Frosted elfin - The frosted elfin is a NJ state-threatened butterfly species. It is found in small populations from the eastern seaboard to the Mississippi River and is known to occur within power line right of ways. New Jersey is globally important for this species because the state holds one of the largest single populations at the Atlantic City Airport (ACA). However, despite its presence elsewhere in the state and the presence of suitable habitat within the ROW, frosted elfin is believed to be extirpated from northern New Jersey (Beans and Niles, 2003).

Frosted elfin are host and habitat specific and require wild indigo, (*Baptisia spp.*) or lupine (*Lupinus perennis*) as their larval food. This plant colonizes dry, sterile, sandy or

rocky sites that receive full sun. The butterflies pupate in mid-spring and need an early-blooming nectar source located near the host plant. The preferred nectar source is Ericaceous shrubs such as blueberries and huckleberries - plants that also grow well in dry, sterile, sandy soils. Frosted elfin also need bare ground for basking and shade for cooling off. The butterflies are not strong flyers and require all these elements close together and sheltered from the wind.

Leonard's skipper - Leonard's skipper is a Species of Special Concern in the Highlands Region and have been observed at power line rights-of-way in northern New Jersey and adjacent Pennsylvania (Gochfeld and Burger, 1997). In northern New Jersey, they appear to be primarily associated with extensive meadows of little bluestem grass (*Schizachyrium scoparius*), although other host grasses may be used (see footnote 9). There is also anecdotal information that purple flowering nectar sources may be of value.

Silver-bordered fritillary – This species is threatened in New Jersey and is found in wet meadows and marshes. The larval host plants are violets including *Viola glabella* and *V. nephrophylla*. This species is univoltine with one flight from June-July. Habitat for this species includes emergent wetlands for male patrol areas and larval host plants and adjacent uplands for adult nectar sources.

10. Plant Species

A number of rare plants are mapped along or adjacent to the ROW within the Highlands Region. After confirming potential habitat, detailed field surveys were conducted for rare plants in specific locations. Surveys were generally focused on portions of the ROW within 100 feet of an existing structure location, the wooded border of proposed access roads, or within the footprint of the proposed substations in order to concentrate efforts in areas of potential permanent disturbance. For all species, surveys were conducted during the appropriate season (typically coinciding with the flowering period). The Robbin's pondweed *(Potamogeton robbinsii*) was the only State Endangered plant species identified near the ROW. It was found within Lake Denmark.

In terms of federally listed plants, only small whorled pogonia (*Isotria medeoloides*) has the potential to occur in the Highlands Region of New Jersey and information regarding known sightings must be obtained by request from the USFWS. This species occurs in dry deciduous woodlands with deep leaf litter (Williams and Williams, 1983) and is not likely to be found in the ROW. This species would only be of concern if small whorled pogonia was present in wooded areas adjacent to the ROW and if construction access areas cross the habitat noted. As such, EcolSciences biologists conducted field surveys for small whorled pogonia along both sides of proposed access roads occurring within forested areas and within the proposed Hopatcong Switch property. No small whorled pogonia was observed during the course of these field studies.

The alignment also crosses five Natural Heritage Priority Sites. In an east to west direction, these are: Valhalla Hemlock Glen, Lake Denmark and Green Pond Mountain (contiguous) are briefly described below. The remaining two sites; Site 564 and Muckshaw Ponds are not within the Highlands Region.

Valhalla Hemlock Glen – This site consists of rocky slopes in a hemlock ravine and associated wetlands along a small stream. The Priority Site contains a good occurrence of a state-imperiled plant species. The boundary includes the known extent of a rare plant population plus additional buffer. The hemlock stand has been substantially reduced presumably due to mortality from the woolly adelgid and currently includes many standing dead trees of hemlock. Most of the Priority Site is also within Morris County's Pyramid Mountain Park.

Lake Denmark – This site includes a large glaciated lake and adjacent herbaceous, shrubby and forested wetlands. It includes an excellent population of a globally rare species and numerous populations of other state-imperiled species. The Priority Site boundary includes the lake and adjacent wetland habitats and additional lands draining toward the lake.

Green Pond Mountain – This Priority Site includes a large landscape patch of forests, lakes, and streams. Much of the land is within Picatinny Arsenal. The site contains habitat for a concentration of State-endangered and threatened plant and vertebrate species, and several rare invertebrate species. The boundary includes large contiguous areas of forest, wetlands, lakes and streams used by State-endangered and threatened plants and animals and additional buffer lands draining toward Lake Denmark.

III. IMPACT ASSESSMENT

The impacts from the proposed project are associated with construction activities that are needed to remove the existing lattice transmission structures and to construct the new transmission structures, followed by post-construction ROW maintenance activities. These impacts may involve limited clearing of vegetation, soil excavations or fills, placement of rock or gravel, drilling, the use of construction vehicles and mowers, the placement of concrete footings, and the use of temporary matting or timbers to facilitate wetland and stream crossings. Access to the project site and maneuvering within the ROW also necessitates the construction or improvement of access roads and the establishment of laydown areas in order to stage the equipment and materials needed to remove and reconstruct the lines. It is also expected that noise, operation of heavy equipment, and other human activity during the construction phase of the project will cause most mobile wildlife species to move from disturbance areas into the adjacent undisturbed areas. Where practicable, the project has been designed to avoid impacts to sensitive areas, as discussed in the following section. Due to careful planning, most significant wetland impacts have been avoided. However, due to the linear nature of the project, some wetland impacts are unavoidable and have been detailed in previous NJDEP filings associated with PSE&G's application for a Freshwater Wetlands Individual Permit and further addressed within the wetland mitigation component of the CMP.

IV. MITIGATION OPPORTUNITIES AND BEST MANAGEMENT PRACTICES

This Plan will be merged with and implemented with other recommendations developed by other CMP components, including the separate plans for avian management, vegetation management, wetlands and transition area mitigation, and stream and riparian management. These integrated mitigating strategies and best management practices (BMPs) will work together to help guide the project during planning and construction phases and to perpetuate ecological stewardship of the ROW within the Highlands Region.

V. BEST MANAGEMENT PRACTICES

The CONSTRUCTION AND RESTORATION STANDARDS dated April 20, 2010 and last revised on June 18, 2010 have been prepared to guide contractors in the field with respect to several environmental issues and areas of concern. These standards include the following aspects to implement the Critical Habitat Plan during construction and in support of the restoration aspects of the Project.

1. Contractors will be provided training by PSE&G on the applicable policies and procedures to be followed in accordance with the CMP and related State and Federal law. All contractor staff working within critical habitats will be required to participate in this training, prior to entering the construction workspace. In addition, a protocol shall be established to direct contractors as to the appropriate course of action to be taken if individual rare species are encountered within the workspace during the course of their activities. Work within certain sensitive areas will be overseen by qualified environmental professionals.

2. Exclusion Fences and Wildlife Tunnels

   In advance of disturbances within particularly sensitive critical habitats (e.g., vernal pools, amphibian travel corridors, bog turtle habitats), the use of installed drift or silt fencing and wildlife crossings on access roads (wildlife tunnels) will be required to be installed as determined by PSE&G and their environmental consultants in cooperation with the applicable regulatory agencies based on site field conditions and species of

concern. The purpose would be to mark the limits of allowable construction disturbance and to prevent rare species from entering construction sites where they would be subject to harm. In addition, areas shall be pre-screened to insure that target species are not present, and if found, moved beyond the limits of the exclusion fences for safety by or under the supervision of qualified personnel. Tunnels and one-way passages would allow wildlife to move under, around, or through the area safely or direct them back to undisturbed areas. Inspections of the disturbance areas for species of concern are to occur on a daily basis. Trenches, ruts and holes can trap migrating salamanders and newts, these areas should be inspected daily especially during the breeding season, preferably first thing in the morning. Any individuals found must be moved by or under the supervision of qualified personnel. Fencing will not be used within 2 miles of known rattlesnake dens (applicable access roads and ROW segments to be identified by the ENSP); alternative measures will be incorporated to prevent other reptiles and amphibians from traveling but permitting rattlesnakes (and copperheads) to move freely through the area.

3. Timing restrictions may be used as a component of the overall mitigation strategy. However, due to the constraints on construction that are also predicated on the electrical outage periods established by PJM for the project, it is believed that the application of a series of standard overlapping timing restrictions would make the project construction infeasible. In lieu of a timing restriction, PSE&G has established very specific standards for construction and restoration that involve the employment of compliance inspectors, qualified wildlife biologists and habitat restoration specialists. However, there still may the need for more limited timing restrictions to prevent certain disturbances during a particularly sensitive season for a given species (such as den emergence for rattlesnake or breeding season for vernal pool species). The company will discuss this issue with the NJDEP and USFWS as needed on a site-by-site and species-specific basis, and will notify the Highlands Council of any timing restrictions that are imposed or agreed upon.

A. Targeted Mitigation / Management Opportunities

1. Allegheny Woodrat

The population of Allegheny woodrats previously occurring within the ROW is believed to be extirpated as of the mid-1980s, however, suitable habitat remains in the ROW between Structures 65/3 and 65/4, west of Lake Denmark. No structures are currently located or are proposed to be located within the primary habitats represented by the talus slopes on the eastern face of the escarpment, however, structures and access roads are located on the high ridge directly above the escarpment and on the rocky slopes east and west of the escarpment. Impacts to these secondary woodrat habitats are small, and for the most part, temporary impacts associated with the use of access roads. The limited footprint of new structures will not damage primary woodrat habitat (the talus slope) and maintenance activities (clearing) of the ROW are unlikely to damage primary woodrat habitat as the talus is naturally un-vegetated and rock outcrops in the vicinity will not be disturbed. Although woodrats are presumed extirpated from the ROW, the talus slopes here are several miles long and potential human access is minimized.

Given the length and isolation of the talus area there is the small possibility that a woodrat population could remain extant and undetected. In light of habitat suitability and the historical presence of Allegheny woodrat in this area, agency consultation is warranted. In the rare event that this species is present, then mitigation for this species would include the planting of low shrub greenways across the ROW in designated areas where this species was previously known to occur. The shrub greenway will provide a corridor across the open ROW which could be acting as a barrier. Other potential benefits may be realized by piling slash from cut saplings and dead wood/logs along the edge of the cleared alignment corridor to provide cover. Minimize disturbance to oak seedlings, since acorns are an important part of the woodrat diet. Encourage the growth of grape vines, berries, sumac and other fruit or

mast producing species in the outer reaches of the alignment, outside of the wire zone, to provide food sources that benefit any extant population.

Opportunities may also exist to assist NJDEP ENSP with the treatment of raccoons infected with the parasite *Baylisascaris procyonis* (raccoon roundworm). This nematode has been found to be fatal to woodrats. With woodrats and raccoons often occurring in the same areas, NJDEP has a program of placing baits treated with anthelminthic drugs to treat the infected raccoons located in wood rat habitats.

PSE&G would participate in and enable the ROW to be part of intensive presence/absence surveys for Allegheny woodrat along the length of the Green Pond Escarpment and Picatinny Arsenal, in cooperation with NJDEP and the U.S. Army. As discussed previously, this area is remote and relatively unchanged over several decades. The difficult and inaccessible terrain allows the possibility that a yet undiscovered colony of woodrats has persisted. As the species is currently known to occur in only one locationwithin New Jersey (the Palisades), the discovery (or re-discovery) of a second population would be extremely significant and a rare opportunity to help avoid the extirpation of woodrats from the state. If a population is identified using the ROW, PSEG will work closely with the NJDEP ENSP biologists to ensure that this species is protected from future maintenance activities in the alignment.

2. Bobcat

Bobcats, when present, are likely to use the maintained ROW for foraging and for travel between the forests on either side of the ROW. In most instances, the ROW does not currently and will not afford bobcats any permanent shelter or denning opportunities due to the frequent maintenance of brush, the clearing of slash piles, and the lack of rock outcrops or other habitats containing large holes. However one location within the ROW (west slope of Green Pond Escarpment) has been confirmed during the field surveys to be utilized by

bobcat as a den through a remote-sensing camera. However, the use of this site as a den was only observed on one occasion in the late fall and no subsequent activity has been observed.[2] Therefore, the area appears to only serve as a transient den and not utilized as a nursery den. Where rocky or forested habitats do occur within the ROW, the potential exists for bobcat to utilize cavities for shelter while with young or while traversing their territory. Small areas of such habitats occur within several locations on the ROW, including in the vicinity of the proposed Hopatcong substation, portions of Mahlon Dickerson Reservation, Rockaway River WMA, Green Pond Escarpment, Picatinny Arsenal, Splitrock Reservoir, Pyramid Mountain, etc. Because bobcat range widely and are adept at avoiding humans, impacts to bobcat as a result of construction activities are expected to be minimal and mitigated by the species' behavioral response to avoid the area. Post construction, it is believed that bobcat use of the ROW for foraging and travel will immediately resume and that the resulting successional vegetative communities will be utilized by bobcat to the extent that they are currently being utilized.

In specific areas associated with rocky woodlands, effective management of bobcat would include the use of stacking of loose brush and log piles where topographic conditions permit (to create den opportunities and habitat for prey items), the preservation of talus slopes and significant rocky outcrops (such as those found along and adjacent to the Green Pond Escarpment), and the blocking of unauthorized access roads and ATV trails so as to limit the amount of human disturbance occurring within the ROW.

3. Bog Turtle

In accordance with USFWS guidelines, Phase II presence/absence surveys were conducted by USFWS-qualified bog turtle surveyors at the 5 wetland locations containing suitable habitats located in the vicinity of proposed ROW disturbances (Wetland Nos. 90, 91, 101, 105, and 110). No bog turtles were observed during the course of the surveys, and survey results for Phase I and Phase II surveys have been forwarded to both the USFWS and

[2]The bobcat den site utilization will be evaluated in 2011 through the placement of a motion remote sensing camera.

the NJDEP Endangered and Nongame Species Program. A letter from USFWS issued on November 12, 2009 (Appendix A) agreed with our survey results. Thus, based upon the Phase I and Phase II investigation, it is anticipated that no impacts to bog turtle will occur within the surveyed wetlands. However, as site plans are finalized, other suitable habitats may also require Phase II assessment if it is determined that they will potentially be affected by the project.

To the extent suitable bog turtle habitat is encountered, and to avoid impacts to the same, the following steps will be incorporated into the construction phase of the project for all wetland areas that are confirmed as bog turtle habitat (or that are treated as such in the absence of a Phase II survey).

To avoid impacts to the bog turtle and its habitat, the following conservation measures developed in cooperation with the USFWS (tracking # 2008-I-0319) will be incorporated into the construction plans for all wetland areas that are confirmed as bog turtle habitat (through field surveys and/or Landscape Project mapping) or that are treated as such in the absence of a Phase II survey. If the following conservation measures cannot be implemented for any particular area of confirmed bog turtle habitat, PSE&G will work with the USFWS to develop alternative site-specific conservation measures sufficient to avoid adverse effects to the bog turtle.

a. No permanent structures (including but not limited to tower footings and new or improved access roads) will be located within 300 feet of confirmed bog turtle habitat. All confirmed bog turtle habitat, plus a 150-foot buffer, will be flagged prior to construction and will remain flagged during all work in that span. No temporary disturbances (including but not limited to removal of existing towers or other structures, use of motorized equipment, earth disturbance, and equipment/materials storage areas) will take place within flagged areas. If vegetation must be managed within flagged areas, PSE&G will follow the conservation measures detailed in its October 23, 2009 letter to the USFWS.

b. In any span containing confirmed bog turtle habitat, a double row of silt fencing will be installed around all work areas (e.g., areas for installation of new tower footings or other structures, removal of existing towers or other structures, construction of new or improved access roads, use of motorized equipment, earth disturbance, equipment/materials storage areas, other temporary work spaces) prior to the start of any construction. As described in a., above, all work areas will be at least 150 feet from confirmed bog turtle habitat (i.e., outside of flagged areas). Work areas will be inspected by a recognized, qualified bog turtle surveyor concurrent with fence installation, to ensure no bog turtles are present. In any such span, a recognized, qualified bog turtle surveyor will inspect work areas and flagged areas daily for any work between April 15 and September 15. The recognized, qualified bog turtle surveyor will take notes and color photographs of the construction area and surrounding wetlands on a regular schedule and during any significant events or unusual circumstances.

c. Where existing paved or unpaved roads within 300 feet of confirmed bog turtle habitat will be utilized for access without any road enlargement or improvement, a double row of silt fencing will be installed along the road, concurrent with inspection by a recognized, qualified bog turtle surveyor to ensure no bog turtles are present. A recognized, qualified bog turtle surveyor will inspect the fence for signs of bog turtle activity at least weekly for any use between April 15 and September 15. Where appropriate, directional funnels will be used to facilitate movement of turtles through culverts between wetland areas; plans for any turtle crossing will be provided to the USFWS for review and approval.

d. Silt fencing will be buried six inches into the ground, using large stakes. Silt fencing will be installed by non-mechanical means. No equipment staging, vehicle access, or other activities will be permitted outside of the approved

(silt-fenced) construction limits, other than for vegetation management as described in a., above. All silt fencing will be maintained year-round and will inspected and maintained daily. Inspection and maintenance logs will be kept and provided to the USFWS and/or NJDEP upon request.

e. Contractors will be trained by a recognized, qualified bog turtle surveyor on the identification of bog turtles. All contractor staff working in spans with confirmed bog turtle habitats will be required to participate in this training conducted as part of the overall environmental training, prior to entering spans containing confirmed bog turtle habitat. A protocol will be established to direct contractors as to the appropriate course of action to be taken if individual turtles are encountered within the workspace. The USFWS will be provided a copy of the protocol for review and approval.

f. As of August 5, 2009, a guidance advisory bulletin has been issued by USFWS for all human activities occurring within bog turtle habitat. As long as the advisory guidance is in effect, all monitoring, flagging, and vegetation management activities occurring within 150 feet of confirmed bog turtle habitat will be conducted in accordance with the decontamination protocols issued in the bulletin (see attached). These practices apply to all equipment and personnel working within bog turtle habitats. Pursuant to the advisory bulletin, any dead bog turtles encountered during project implementation will be collected and shipped for analysis to the National Wildlife Health Center after the USFWS and the New Jersey Endangered and Nongame Species Program have been notified and apprised of the circumstance under which the turtle was found.

g. At periodic intervals (approximately 300 to 500 feet) along the construction corridor, signage will be placed along the limits of the workspace indicating that work is occurring in proximity to designated rare species habitat. The signs will include representative photographs of bog turtles as well as a

summary of the protocol to follow should one be encountered within the workspace. Signage will be removed upon completion of work in each span containing confirmed bog turtle habitat. While signage is in place, PSE&G will limit access to work crews, agency/company staff and authorized State and Federal agency staff. PSE&G will inform all personnel that locations of confirmed bog turtle habitat are considered confidential and should not be disclosed verbally, in print, or electronically.

h. If any bog turtle, live or dead, is found during habitat flagging, silt fence installation, construction, vegetation management or any other phase of project implementation, PSE&G will stop work and contact the USFWS immediately. Neither PSE&G nor its contractors, employees, or representatives will move any living bog turtle except to avoid imminent danger to people or the turtle.

4. Indiana Bat

The majority of the cleared ROW has been and will remain cleared. As such, it will continue to serve as an open corridor suitable for use by various bat species for foraging and dispersal during and after construction activities. Due to the NJBPU rules for vegetation management, it is highly unlikely for there to be to be mature trees or dead/dying trees exhibiting peeling bark within the ROW that may be used as maternity roosts during the summer months. Nonetheless, adjacent forested areas are likely to contain various age classes of trees, including some suitable for use by bats. In particular, Indiana bat maternity colonies typically establish primary roost sites in areas that can be heated by the sun, such as in openings or at forest edges. Therefore, any disturbance within the ROW to forest edges or openings would potentially constitute a disturbance to Indiana bat roosting sites. As a result, in ROW areas proximate to known maternity colonies, timing restrictions to avoid the maternity period may be established, to be determined after input from the USFWS and NJDEP.

Mitigation for this species is predominantly accomplished by limiting removal of specific tree species and establishing timing restrictions to preclude construction activities when the bats are roosting in maternity colonies. If the following conservation measures cannot be implemented for any particular area, PSE&G will work with the USFWS to develop alternative site-specific conservation measures sufficient to avoid adverse effects to the Indiana bat. The following conservation measures refer to the GIS shapefile provided to PSE&G by the USFWS via e-mail on September 30, 2009 through a Non-disclosure agreement with the USFWS.

a) In those spans identified in the GIS shapefile as hibernacula foraging habitat (HI) and as hibernacula and maternity colony foraging habitat (HIMA) - and along access roads and in temporary work spaces associated with such spans both inside and outside the ROW- PSE&G will maintain a seasonal restriction on cutting trees greater than five (5) inches in diameter at breast height (dbh) from April 1 through November 15, except in areas where USFWS has concurred in writing that the

seasonal restriction is not necessary based on the results of a summer mist net survey.

b) In those spans identified in the GIS shapefile as maternity colony foraging habitat (MA) - and along access roads and in temporary work spaces associated with such spans both inside and outside the ROW, PSE&G will maintain a seasonal restriction on cutting trees greater than five (5) inches dbh from April 1 through September 30), except in areas where USFWS has concurred in writing that the seasonal restriction is not necessary based on the results of a summer mist net survey.

c) In those spans identified in the GIS shapefile as occurring within the Geographic Range of the Indiana bat (P) - and along access roads and in temporary work spaces associated with such spans both inside and outside the ROW- PSE&G will not cut more than five (5) trees greater than five (5) inches dbh per linear mile between April 1 and September 30), except in areas where USFWS has concurred in writing that the seasonal restriction is not necessary based on the results of a summer mist net survey.

d) In those spans identified in the GIS shapefile as hibernacula foraging habitat (HI), hibernacula and maternity colony foraging habitat (HIMA), and maternity colony foraging habitat (MA) - and along access roads and in temporary work spaces associated with such spans both inside and outside the ROW- PSE&G will flag and preserve high-suitability roost trees to the maximum extent practical, including:
- live shagbark hickories (*Carya ovata*) over 9 inches in diameter at breast height (dbh);
- lightning-struck trees over 9 inches dbh;
- dead, dying, or damaged trees of any species over 9 inches dbh with at least 10% exfoliating bark;
- den trees, broken trees, or stumps over 9 inches dbh and over 9 feet in height; and
- live trees of any species over 26 inches dbh.

In these same areas, when practical, PSE&G will girdle trees over 9 inches dbh when such trees would otherwise be cut.

e) In those spans identified in the GIS shapefile as hibernacula foraging habitat (HI), hibernacula and maternity colony foraging habitat (HIMA), and maternity colony foraging habitat (MA) - and along access roads and in temporary work spaces associated with such spans both inside and outside the ROW- PSE&G will not install any permanent structure (e.g., access road, tower) within 300 feet of wetlands or open waters and will not clear trees or locate temporary work spaces within 150 feet of wetlands or open waters.

f) For any replanting of temporary work spaces or compensatory mitigation, PSE&G will preferentially include the following tree species that are likely to provide suitable roosts for the Indiana bat:

Red maple (Acer rubrum)	Shagbark hickory* (Carya ovata)	White oak* (Quercus alba)
Silver maple* (Acer saccharinum)	Other hickories (Carya spp.)	Pin oak (Quercus palustris)
Sugar maple* (Acer saccharum)	White ash (Fraxinus americana)	Post oak (Quercus stellata)
Yellow birch (Betula alleghaniensis)	Green ash* (Fraxinus pennsylvanica)	Red oak (Quercus rubra)
Gray birch (Betula populifolia)	White pine (Pinus strobus)	Slippery elm (Ulmus rubra)
Bitternut hickory (Carya cordiformis)	Eastern cottonwood* (Populus deltoides)	
Sweet pignut hickory (Carya ovalis)	American elm* (Ulmus americana)	

[*denotes the more commonly used roost tree species]:

5. Timber Rattlesnake

The timber rattlesnake is a species that is believed to be declining across of much of its range. Most, if not all, of the causes of the decline are of human origin, be it from development of critical habitats, deliberate killing, illegal collecting, or the suppression of ecological events such as fire. This species occurs within the alignment and was observed by EcolSciences in the vicinity of Picatinny Arsenal. Potentially suitable habitat was also found in other Landscape Project mapped areas for this species. Because of this, the ROW affords a unique opportunity to preserve and enhance this rare species' habitat. To avoid impacts to the timber rattlesnake and to manage habitat going forward, the following steps will be incorporated into the construction phase of the project for all project areas occupied by confirmed and potential rattlesnake habitat:

Construction related mitigation - When working within 2 miles of known rattlesnake dens (applicable access roads and ROW segments will be identified by the ENSP prior to construction), a qualified (and ENSP-approved) herpetologist would be on site to prevent negative interactions and to relocate snakes that may wander into harms way per the ENSP protocol.

- **Access roads** – Fencing will not be used on access roads within 2 miles of known rattlesnake dens (applicable access roads will be identified by the ENSP prior to construction). PSE&G will ensure all contractors are trained to properly identify timber rattlesnakes (and northern copperheads) and will travel $\leq$ 20 mph along access roads diligently monitoring the roads for coiled and crossing snakes. Construction vehicles must safely avoid coiled snakes and wait for crossing snakes to travel across the road (keeping a distance $\geq$15 meters) or until the ENSP-approved construction monitor can safely move the snake from harms way.
    - Accidentally injured (or potentially injured) rattlesnakes (and copperheads) must be safely collected and released to the licensed venomous snake rehabilitator per the ENSP venomous snake protocol for construction monitors
    - Accidentally killed rattlesnakes (and copperheads) must be safely collected and released to the ENSP immediately.

- **ROW (and access roads)**
    - A fence barrier (1/4" hardware/wire mesh cloth, minimum 4' high with 5-6" embedded in the ground) will be installed along the ROW sides of the construction area. On days when no construction is occurring and each evening after the day's construction has completed, gaps no smaller than 30 meters will be created in the fence lines such that the fence lengths do not exceed 200 meters; this is to prevent snakes from traveling long distances attempting to reach their target locations. An ENSP-approved construction monitor will survey area prior to fence installation and removal, and throughout each day during construction activities to move snakes from harms way.
    - Blasting will not occur within 200 meters of known den areas (applicable access roads and ROW segments will be identified by the ENSP prior to construction).
    - Identified dens will not be destroyed or altered.
    - Identified gestation/birthing areas will not be destroyed. PSE &G and their contractors will adhere to the ENSP protocol pertaining to gravid and post-partum timber rattlesnakes (and northern copperheads). Active gestation/birthing areas (areas where gravid or post-partum females and/or neonates are found) will be protected from construction-related disturbances and females (and young) will not be moved. A minimum 15 meter-radius buffer around the gestation/birthing area (rock outcrop) will be maintained and an ENSP-approved construction monitor will monitor the gestation site and surrounding area frequently during construction to ensure no females or young are injured. Traveling gravid females (i.e., gravid females en route across the ROW during construction activities) in areas where no gestation areas have been identified will be moved to suitable habitat within the nearest wood line (in the direction of travel) adjacent to the ROW per the ENSP protocol. Traveling post-partum females (late August – October 31) will not be moved; construction activities will avoid disturbing such females to permit their natural path of travel.

- Seasonal timing restrictions (generally mid April to late-October) on cutting or construction activities within 2 miles of a known den site will be used to insure a low potential for direct impacts to above-ground individuals.

- If timing restrictions cannot be implemented prior to construction in the vicinity of a known or potential den site (within 2 miles), install silt fence barriers along the sides of the construction area. Silt fencing should be buried six inches into the ground. No equipment staging, vehicle access, or other activities will be permitted outside of the approved construction limits. Silt fence construction should be done following an inspection of the entire proposed construction area by a qualified biologist to ensure no timber rattlesnakes or other herptile species are inadvertently disturbed by installing the fencing. The area inside the fence should then be surveyed to verify the absence of herptiles. Any species identified within the fenced construction area should be relocated by the biologist to suitable habitat outside of the disturbance area. The monitor will notify the Construction Manager upon arrival at the site and upon completion of the inspection. Initial monitoring may be extended to be conducted daily during construction activities if there is deemed a high probability of impact to a den or to individual rattlesnakes. If daily monitoring is not required, a biologist will be available "on-call" to resolve any additional issues during the construction process, such as if a rattlesnake is encountered by a worker on the site. Upon completion of construction activities, a qualified biologist will inspect the site to ensure no timber rattlesnakes or other herptile species, such as northern copperhead, are inadvertently disturbed during removal of the fencing.

- Cutting within the ROW should be conducted in the vicinity of known or suspected rattlesnake habitats so as to create a "mosaic" effect within the ROW, with alternating patches of woody shrubs and herbaceous vegetation. While much of the ROW may be cleared in any given year, permanent small plots of native shrubs should be retained within the habitat to allow for heterogeneous structural elements to persist. Cut vegetation should be left in

place to serve as brush and stump piles to the extent that regulatory programs and restrictions allow. Both shrub plots and slash piles will provide cover and foraging opportunities to rattlesnake as well as habitat for a variety of prey items.

- In addition to general clearing, a body of evidence is mounting that across the timber rattlesnake's range, advanced forest succession and encroaching canopy closure above den and basking sites has diminished their value to timber rattlesnake, leading to widespread reductions in observed populations at many sites (Brown, 1993). As such, in the vicinity of south-facing rocky outcrops or talus slopes, canopy openings should be maintained by felling or girdling larger trees, especially those that are casting deep shade on potential dens and basking areas. Accomplishing this effort on state lands is proposed as part of this plan and will be accomplished where feasible as approved by NJDEP and in coordination NJDEP ENSP field biologists and PSE&G-contracted wildlife biologists.

- Placement of supplemental rock (created basking/hibernacula/rodent habitats) stacked broadly and deeply in appropriate areas can immediately enhance marginal rattlesnake habitats. Rock should be a mixture of large and small boulders and flat rock stacked horizontally so to provide basking surfaces and sheltered crevices into which snakes may rest or retreat. Such structures have been previously recommended by the Pennsylvania DCNR during their evaluations of right-of-way projects (Pennsylvania Department of Conservation and Natural Resources. 2009). While placement of boulder fields or rockpiles may be done anywhere within the ROW, creation of these structures is particularly encouraged within temporarily disturbed portions of the ROW in the vicinity of Picatinny Arsenal.

- Finally, as human disturbance, including deliberate killing and illegal collecting, remains a primary threat to timber rattlesnake populations, measures to limit incidental or intentional human contact with rattlesnakes

are important for comprehensive management of the species. With emphasis on the areas surrounding Picatinny Arsenal, temporary roads and trails leading to suitable rattlesnake habitats should be effectively blocked to vehicular traffic (including ATVs) upon conclusion of the project. Although no exclusionary measures are likely to be entirely successful, locked iron gates and possibly large rock or log barriers should be used wherever they are needed to discourage illegal vehicular entry into sensitive areas. Because some of the observed rattlesnake habitats occur on public lands, human foot traffic is to be expected and should also be accounted for in the design of supplemental rock piles and in the cutting regime. Emphasis should be on retaining or creating a rough, varied habitat containing numerous crevices and cavities, so that snakes may spread out more broadly into the habitat rather than congregate in limited micro habitats where they are highly visible and subject to repeated disturbance.

6. Wood Turtle

This species utilizes different habitat during different times of the year. They are found in stream corridors from mid-November through mid-March for breeding and hibernation. From mid-May through mid-September they are terrestrial, traveling hundreds of yards from the steams through adjacent wetlands and uplands. When work occurs in the vicinity of documented habitat between March and November, a qualified biologist will be on site with work crews to relocate any turtles found in the work area.

Current ROW actions are often compatible with these species, as evidenced by their use of the ROW in a number of locations. Wood turtle are documented in several areas of the Highlands Region and EcolSciences has observed them using similar right-of-way habitats in other locations. Additionally, spotted turtles and box turtles were both observed along the ROW during field studies. These populations are unlikely to be significantly harmed as a result of temporary ROW disturbances or a change in transmission structure configuration. It is more likely that individual turtles may be displaced or harmed due to the use of construction equipment or mowers, or careless entry into wetland habitats and stream corridors.

Accordingly, measures to protect these species are, in part, similar to those in place to prevent impacts to regulated areas, as detailed in the wetland mitigation element of the CMP. Additionally, individual turtles will be protected by the use of silt fencing around particularly sensitive areas such as wetland, streams, and riparian zones. Prior to construction, the area inside the fence will be surveyed by a qualified biologist to verify the absence of turtles and all turtles identified within the fenced construction area will be relocated by the biologist to suitable habitat outside of the disturbance area. Contractors will be trained to identify and remove any turtles they encounter to a location outside of the fence or away from construction activities, or should be instructed to contact the appropriate supervising biologist.

Additional benefits of the silt fences include the prevention of sediment from reaching streams and also protection of reseeded disturbed areas that are planted immediately upon completion of construction activities adjacent to streams. In order to ensure that water quality is being maintained, monitoring for turbidity will be conducted during and after construction adjacent to streams No pesticides or herbicides shall be used in wood turtle habitat. Avoidance of wood turtle habitat requires site disturbance activities to occur outside streams and surrounding riparian corridors. Siting of such should occur in existing edge or disturbed portions of riparian areas, so as not to fragment these corridors.

The creation of turtle nesting areas is proposed along watercourses identified as wood turtle habitat. Nesting sites will be constructed in accordance with NJDEP guidance. Nest sites will include the creation of cleared mounds of soil that are exposed to solar heating. The nesting habitat will be located within 150 feet of streams that have been identified by Landscape Project mapping or by EcolSciences' sightings as supporting wood turtles. Nest mounds may be in the ROW but clearings are also proposed within State owned lands adjacent to the ROW to provide appropriate nesting habitat outside of the alignment as well. This effort will be coordinated with NJDEP-ENSP and the Division of Parks and Forestry, NJDEP in the field.

7. Salamanders / Vernal Pool Species

Suitable habitat for salamanders and other vernal pool species was confirmed in many locations within or along the ROW. Long-term impacts to such habitats as a result of the project are

anticipated to be minimal, as most activities avoid wetlands and vernal pools altogether or, as detailed in the wetland mitigation element of the CMP, they are temporary impacts that will be restored upon completion of the project. Permanent impacts to potential salamander / vernal pool habits are few and are associated with the placement of structures in or near wetland areas due to unavoidable engineering requirements (such as may be the case near extremely broad wetlands or wetland complexes that are wider than the typical span distance). Also, salamander habitat and vernal pools are generally well protected under current wetlands regulations and, based upon their confirmed presence in ROW habitats, their continued presence is consistent with ROW maintenance activities. Nevertheless, certain precautions will be taken during construction to ensure that sensitive amphibian habitats, including vernal pools, wetlands, streams, transition areas, and upland travel corridors are not inadvertently impacted as a result of the project. These protections include adherence to all applicable regulations including soil and sediment control protocols, adherence to timing restrictions (typically March to June) for work to be conducted in or around a confirmed vernal pool, and the installation of silt fencing and "critter crossing" tunnels under roads along any identified amphibian travel corridor between uplands and vernal pools that will remain in place during certain sensitive seasonal periods.

Construction-related mitigation – In cooperation with the EC and staff herpetologists, the contractor shall insure that all vernal ponds shall be silt fenced (using “super silt fencing” or equivalent) with built in herptile passage ways to prevent sedimentation of the ponds while allowing access for breeding and dispersal. All super silt fence and barrier/wildlife tunnel treatments must be in place prior to the commencement of any proposed construction or use of any road, laydown or staging area. Silt fence installation and herptile passage shall be based on a typical diagram to be provided to the Department for its review and approval, and thereafter modified to suit the existing conditions based on in-field direction provided.

Daily timing limitations would limit activities conducted along the ROW in the vicinity of vernal ponds between sunset and sunrise as migratory activities typically occur after dark. Seasonal timing restrictions will be considered to ensure that all appropriate or required mitigation treatments are in place prior to the typical breeding/migration period, as follows:

A. opacum pools: All site prep in place prior to September 1.

A. maculatum, A. jeffersonianum, A. laterale, L. sylvaticus, P. crucifer, C. guttata pools: All site prep in place prior to Feb 15.

Warm-weather species (all remaining Lithobates, Hylidae, or unmentioned species): All site prep in place prior to May 1.

Vehicles will be required to stay on established roads in the vicinity of vernal ponds to prevent animals which wander away from the pond and hide under rocks, logs, brush and debris during the day from being accidentally crushed. Roads created, improved or used in existing condition within 50 feet of a vernal pool should employ wetlands matting as appropriate to minimize the generation of sediments generated adjacent to the pool. New temporary access roads in the vicinity of vernal ponds would be constructed with culverts and directional funnels to prevent the roads from becoming barriers limiting access to and from the ponds. Seasonal conditions may also apply that would limit work during critical seasonal breeding periods depending on the species present and the prevailing weather patterns. However, any seasonal work limitations would be cognizant of the designated outage periods established by PJM to assure reliable energy demands are met during critical periods such as during the summer months.

a. Large woody debris or other potential herpetile refuge would be removed from within the footprint of construction, staging or laydown areas, as well as from any areas where roadway improvements will be made, 2 weeks prior to any proposed use of the area. Herpetiles species would thereafter be allowed to vacate the area. Two weeks after any available refuge has been removed, the work areas would be silt-fenced as directed above, precluding re-entry into the work area.

b. Logs over 15” in diameter and 118” in length, including rootwads with attached trunk lengths where appropriate, would be salvaged and stockpiled for use as habitat logs or wildlife snags. Habitat logs would be placed near wetlands or waters, which would provide potential basking habitat for turtles, and cover for amphibians. Wildlife snags provide bird and raptor roosting habitat.

c. Vernal pool creation within the ROW could provide benefits to many plants and wildlife in addition to vernal pool obligates. Careful placement and design of constructed vernal pools is a well-documented way in which to positively influence local populations of obligate and

facultative amphibian and reptile species. PSE&G will evaluate the construction of new vernal pools depending upon on-site conditions and extent of excavated materials that become available on the construction site. The location of proposed vernal pools will therefore vary based on specific site conditions. However, this will follow standard design details for vernal pool creation and adjusted based on field conditions.

8. Invertebrate Species

Separate habitat mitigation measures for impacts to invertebrate species are not expected to be needed as a result of proposed project activities. Invertebrate species will likely be protected through adherence to environmental regulations and the implementation of activities to protect other rare species and habitats. However, restoration after construction may provide an opportunity to improve upon the existing invertebrate habitats. Specifically, these opportunities can include the elimination of invasive vegetation species from certain communities, restoration with select meadow grasses and forbs, and the creation of vernal habitats. Opportunities will be sought to target restoration activities to certain butterfly species by providing larval food sources. In particular, habitat for several rare butterflies, such as frosted elfin and Leonard's skipper (and possibly Arogos skipper), will be assessed for possible enhancement or creation.

Frosted Elfin - An example of a restoration plan for frosted elfin is underway at the Atlantic City Airport. To help create more breeding habitat for these butterflies, approximately 11,000 wild indigo specimens will be planted over the next year. The wild indigo will be interspersed with important nectar plants like lowbush blueberry (*Vaccinium vacillans*) and staggerbush (*Lyonia mariana*).

Because of the potential for frosted elfin to occur within the alignment, despite its apparent extirpation from Northern New Jersey, extensive plantings of the host plant *Baptisia spp.* will be established if feasible (although the suitability of these plantings as high quality larval habitat may be compromised by the lack of shade in the alignment). This was suggested as a result of recent field studies in New England where suitable habitat and the host plant is still present. Nonetheless, with careful planning and management it may be possible to utilize topography, adjacent areas or the border zone to provide tree cover. If high quality habitats were to be created, frosted elfin could

conceivably colonize them naturally, or a reintroduction of this species from larger populations in Southern New Jersey could be attempted with the support of the NJDEP ENSP.

Leonard's Skipper - Leonard's skipper adults, like other skipper species, exhibit strong flight vagility and are therefore likely to colonize suitable habitats if nearby source populations exist. Because the larval food source is already growing in many locations within the alignment, the restoration of these areas after construction and the establishment of extensive new little bluestem meadows could benefit this species. It is also possible that the creation of these habitats could provide suitable habitat for the State-endangered Arogos skipper as well. This species is known from Morris County. The larvae are also known to be host specific on little bluestem grass, and habitats have also been documented in power line right of ways in northern New Jersey.

Silver-bordered fritillary - Restoration of the wetland habitats following construction and routine vegetation maintenance in the alignment will reestablish any suitable habitats. Therefore, no specific measures for this species are proposed.

9. Rare Plants

With the exception of wood lily, which was observed in the ROW at Mahlon Dickerson Reservation and in the ROW near the proposed Hopatcong Switch Station, none of the other NJDEP-mapped rare upland plants were observed on or along the ROW (Appendix A). In general, much of the maintained ROW appears to be unfavorable for colonization by most rare plant species, due to the lack of forest cover, the frequent disturbances associated with cutting and/or herbicide treatments, and the prevalence of invasive species such as thickets of multiflora rose. Nevertheless, infrequent occurrences or small populations of rare plant species within the ROW may be possible. Rare upland plants, if present, may be affected by construction activities such as clearing, fill placement, and soil compaction. However, it must always be kept in mind that the ROW is not a pristine habitat but one characterized by ongoing maintenance disturbances such as periodic clearing, off-road vehicle use, and herbicide application. The general vegetative management procedures including restoration of temporarily disturbed work areas, routine maintenance, and

limits on the use of herbicides and the control of invasive species will benefit any rare upland plants that may be present in the ROW. Details on these and other management practices are detailed further within the CR Standards of the CMP. This would consist of removal of gravel from temporary impact areas such as access roads and lay-down areas followed by raking/harrowing to reduce soil compaction and vegetation re-establishment using habitat specific seed mixes of native species. These restoration and maintenance efforts meet the goal of no net loss of habitat value.

Six wetland-associated or aquatic plants were observed during the course of the field study. Most of these plants were observed within open water areas of Lake Denmark, a New Jersey Natural Heritage Priority Site. In addition to the plants actually observed, habitats for other mapped wetland and aquatic plant species was confirmed in those areas where wetland habitats coincided with the NHP Grid Map. Because permanent impacts to wetland areas are generally being avoided, and where they cannot be avoided impacts to any rare wetland plant species would consist of activities such as clearing, fill placement, and soil compaction. The restoration activities following construction will involve the removal of gravel from temporary impact areas like access roads and lay-down areas followed by raking/harrowing to reduce soil compaction and vegetation re-establishment using habitat specific seed mixes of native species followed by routine ROW maintenance. These restoration and maintenance efforts meet the goal of no net loss of habitat value.

Construction-related mitigation - A number of State listed plant species have been identified along the ROW through on site vegetation surveys. Mitigation would include avoidance and fencing of known populations of these species. Photographic records and GPS coordinates (confidential) shall be maintained of any populations of these species. Specifically, tubercled rein orchid (*Platanthera flava var. herbiola*) (S2) occurs within the alignment in Pyramid Mountain County Park (Morris) along the existing hiking trail between towers 73/3 and 73/4. the proposed access road in this area does not impact the plants. To exclude construction vehicles and personnel from the population, chain link fencing would be placed along the northern edge of the laydown area for proposed tower 73/4 and along the western edge of the access road up to the proposed temporary bridge in this span. In addition, water plantain spearwort (*Ranunculus ambigens*) (S2) occurs within the alignment in the Wildcat Ridge Wildlife Management Area near existing tower 68/2 (western part of wetland No. 133). Impacts proposed in this area consist of an access road and removal of the existing tower. To

minimize wetland impacts, the new tower is proposed within the uplands west of the existing tower. Chain link fencing will be placed along the limits of disturbance of the tower removal area and along the southern edge of the access road to exclude construction vehicles and personnel from the population.

10. Natural Heritage Priority Sites

The Natural Heritage Priority Sites are generally identified as sensitive environmental areas based on the presence of rare plant species and natural communities. As such, one important restoration objective is to prevent the introduction of invasive plant species following construction. In most cases, some of these species are already present within the alignment, however, introduction of additional species or increasing the abundance of these species must be avoided. To minimize negative impacts to the Natural Heritage Priority Sites, the following steps will be incorporated into the restoration phase of the project within the Priority Sites:

- Prior to placement of gravel in all temporary disturbance areas, filter fabric will be placed and staked to clearly separate the existing soil from the gravel.
- Access road areas with soils that are highly compactable, or that may be damaged by creation of deep ruts, will be protected through the use of road constructions methods such as temporary matting that distribute vehicle weight and avoid such soil impacts.
- Following construction, the gravel and filter fabric will be removed from all temporary disturbance areas.
- After removal of the gravel and filter fabric, the areas will be harrowed/disked/raked in order to loosen the soil. This process of soil loosening will avoid disruption of the distinct soil layers to the maximum extent feasible.
- Following loosening or removal of mats, the disturbed areas will be seeded and mulched. The seed mix will be specially developed for the type of habitat to be re-established and will consist of native species.
- Any mulch proposed for use in the restoration should be free of invasive species.

Through the establishment period, the disturbance areas will be frequently monitored to ensure that native species are becoming established and for the presence of invasive plants. Should

invasive species be observed, steps will be taken immediately to eliminate them including hand removal and, if necessary, selective use of herbicides. The priority will be to remove or kill invasives prior to their flowering and setting seed. However these decisions will also depend on the species of invasive vegetation and extent of coverage.

The Lake Denmark Priority Site presents a special case because this disturbance involves an access road on temporary matting over a dense shrub-dominated wetland for a distance of approximately 850 feet. In this case, the objective will be to minimize impacts to the existing shrub vegetation and underlying mat of root crowns and woody material so that the shrubs will re-sprout following construction. The following steps will be taken in order to achieve this objective:

- To the extent possible, schedule this work for the non-growing season.(November-March)
- To minimize the possibility of introducing new/invasive species, prior to installation, all matting and all equipment, especially truck tires and tracks on construction vehicles shall be inspected and thoroughly rinsed/cleaned to remove any existing soil before being brought to the site For further details, please refer to the Construction and Restoration Standards.
- When installing and removing the matting, it should be placed (installation), then lifted (removal), not dragged over the swamp surface.
- Continue to evaluate the feasibility for using a helicopter to install this structure, which would avoid the need to construct a temporary access road.
- Any mulch proposed for use in the restoration should be free of invasive species.

11. Off-ROW Alignment T&E Habitat Improvements

The creation habitat improvements or physical natural resource area improvements within NJDEP Wildlife Management Areas or other parkland property may be required to be conducted in response to temporary access road agreements with state agencies and/or the Morris County Park Commission. To the extent that these habitat improvements are reasonable and prudent then these plans will further enhance the functions and values of these lands for threatened or endangered species. It is anticipated that these requirements would be detailed within the Green Acres plan component of the CMP.

VI. ADAPTIVE MANAGEMENT & SUSTAINABILITY

Implementation of the CMP will entail and assumes a certain degree of flexibility in approaches and tactics over time. This flexibility is needed to incorporate changes necessitated by post-construction monitoring observations and results. As such, over the long term, an adaptive management/maintenance approach will be developed. In this process, outcomes of the CMP implementation will be evaluated periodically and, as necessary, restoration or mitigation measures will be modified in consultation with regulatory agencies, project consultants, 3rd party participants (as applicable), and PSE&G. These modifications shall be documented and become part of the CMP upon agreement by the appropriate parties for each modification. In terms of sustainability, the long term management strategy for the transmission ROW is for it to require less physical maintenance as they revert or are converted from a shrubby/woody vegetative state to a more herbaceous grassland habitat condition.

VII. MONITORING

Monitoring by qualified biologists will begin during construction to ensure proper implementation of the Plan and to correct unanticipated problems. In general, monitoring will continue until the pre-construction protective measures are fully implemented or until construction activities with potential to affect critical areas (such as activities in the vicinity of a known timber rattlesnake den, bobcat den, or activities occurring within bog turtle habitat) are complete. In addition, any formal restorations required in areas such as rocky outcrops or stream crossings will be evaluated by qualified biologists to ensure full implementation of the measure. Many of these monitoring activities will be associated with other CMP elements, such as wetlands mitigation and stream restoration, as these are based on well-established criteria contained within the regulations, and last for a period of generally three years after planting to assure greater than an 85% survival rate of the plant material. Monitoring requirements at non-traditional resources such as dens, roosts, travel corridors, etc. will be determined on a case-by-case basis, subject to 3rd party regulatory review (USFWS, NJDEP, etc) and input.

If the monitoring program indicates that the mitigation does not meet the regulatory criteria, or if it does not appear that it will be effective at accomplishing the protection of the critical

resource, corrective measures will be implemented as appropriate. PSE&G will submit CMP Annual Reports to the NJDEP, USFWS (for federally-listed species) and New Jersey Highlands Council, which documents and summarizes the yearly events and regular monitoring that has occurred in support of the progress of the implemented mitigation plan and any corrective measures taken to meet the objectives of the approved CMP.

A. Pre-construction

During the required safety training course, PSE&G will provide a training module on the applicable policies and procedures to be followed in accordance with the applicable Permit conditions and recommendations made in the CMP. All contractor staff working within critical habitats will be required to participate in this training module, prior to entering the construction workspace. In addition, a protocol shall be established to direct contractors as to the appropriate course of action to be taken if individual rare species are encountered within the workspace during the course of their activities. It is also expected that work within certain sensitive areas will be overseen by qualified environmental professionals.

B. During Construction

For site preparation and construction activities methods shall be designed to limit, so far as reasonable, erosion or subsidence. The contractor shall abide by soil and resource conservation and protection measures in accordance with the specifications and that the PSE&G Engineer determines necessary, and specified in the CR Standards and NJDEP and SCD Standards as a minimum. Following rain events, qualified environmental professionals shall inspect downgradient water features. If evidence of sedimentation is observed due to failure of any soil erosion or sediment control measures, action will be taken to correct the problem.

C. Post Construction

Specific outcomes to be monitored for habitat enhancement include placement of rock piles in six spans, placement of brush piles in 10 spans, installation of turtle nesting sites in eight locations, placement of habitat logs/root wads in 13 locations, the supplemental planting of *Baptisia sp.* for the butterfly frosted elfin in eight locations and several vernal pools in locations to be determined during project construction. The table in Appendix B identifies the locations proposed for these habitat enhancements. To enhance public resources, they are proposed in County or State parks, State Wildlife Management Areas, or Natural Heritage Priority Sites.

For vegetation restoration monitoring, compliance with NJDEP permit conditions for wetland impacts are expected to require success to be defined as an outcome of 85% survivorship of planted woody vegetation and 85% cover by herbaceous species after a three-year monitoring period. The same standard will be used to gauge the measurable outcome for success in the vegetation restoration within uplands. The monitoring would consist of quantitative vegetation surveys in former laydown areas, former tower areas, or access roads following construction. The vegetation surveys will be conducted by recording vegetative cover by species within 1 square meter quadrats at 10 meter intervals along a transect through the monitored areas. The intention of the restoration is to reestablish 85% vegetative cover with a predominance of native species (greater than 50% cover) with cover of newly invasive species less than 10% after three years

The vegetation monitoring proposed for this CMP element (that is in upland area not subject to NJDEP permit compliance monitoring) would be in select, more sensitive areas, namely, Natural Heritage Priority Sites, Wildlife Management Areas, and State or County Parklands. Specifically, monitoring is proposed at:

- Access Road 60 and Tower 74/4 in Valhalla Glen Natural Heritage Priority Site;
- Access Road 57 between Towers 73/3 and 73/4 in Morris County's Pyramid Mt. Park (near location of S2 plant species *Platanthera flava var. herbiola*);
- Removal area for existing Tower 73/2 in Morris County's Pyramid Mt. Park;
- Portion of Access Road 51.1 and Tower 71/3 in Buck Mt. State Park;
- Portion of Access Road 46.1 and removal area for existing Tower 68/2 in Wildcat Ridge Wildlife Management Area (location of S2 plant species *Ranunculus ambigens*);
- Access Road 45 and 45.1 and Towers 66/4, 67/1 and 67/2 in Lake Denmark Natural Heritage Priority Site;
- Towers 65/2, 65/3, 66/1 and Access Road 43 in Green Pond Mt. Natural Heritage Priority Site or Highlands Greenway Wildlife Management Area;
- Access Roads 40.2 and 41 in Rockaway River Wildlife Management Area;
- Towers 64/2, 63/1, and 62/4 in Rockaway River Wildlife Management Area; and
- Access Road 39.1 in Rockaway River Wildlife Management Area and Morris County's Mahlon Dickerson Reservation.

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APPENDIX A

LISTING OF T&E CONCERNS BY SPAN LOCATION

NATURAL HERITGAGE PROGRAM REVIEW LETTER

RARE PLANT SPECIES LIST FROM THE NATURAL HERITAGE PROGRAM

Table 1:
Wildlife, Plants, and Natural Heritage Priority Sites
Roseland - Bushkill ROW
Warren, Sussex, and Morris Counties

County			Warren County					Sussex County																			Morris County
Municipality/Location		Delaware River	Hardwick Twp					Stillwater Twp				Fredon Twp					Newton Town	Andover Twp				Byram Twp		Sparta Twp		Jefferson Twp
Towers		38/4-40/1	40/1-41/1	41/1-42/1	42/1-43/1	43/1-44/1	44/1-45/1	45/1-46/1	46/1-47/1	47/1-48/1	48/1-49/1	49/1-50/1	50/1-51/1	51/1-52/1	52/1-53/1	53/1-54/1	54/1-55/1	55/1-56/1	56/1-57/1	57/1-58/1	58/1-59/1	59/1-60/1	60/1-61/1	61/1-62/1
Wildlife/Plants/NHP Priority Site	**Status**																										
Herptiles[1]																											
Bog turtle	LT/E				O		O				X/O								O				O				O
Blue-spotted salamander	E													X													
Timber rattlesnake	E	X/O	X/O	X/O	X	X	X	X																			X
Longtail salamander	T	X	X	X	X/O	X	X	X		X	X			X	X/O	X/O	X										X
Wood turtle	T	X/O	X/O	X/O	X/O	X	X/O	X/O	X/O	X/O							X	X/O	X/O	X/O	X/O	X/O					
Herptile species of special concern	SC	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X			X
Mammals[1]																											
Indiana bat	LE/E																									O	X/O
Allegheny woodrat	E																										X
Bobcat	E	X	X	X	X	X	X	X										X	X	X	X	X	X	X			X
Birds[1]																											
Bald eagle nest buffer	E	X	X	X	X	X	X	X																			
Bald eagle foraging habitat	E	X/O																									
Northern harrier	E																										
Northern goshawk	E	X	X	X	X	X	X	X																			X
Red-shouldered hawk	E	X	X	X	X	X	X	X						X	X	X	X	X	X	X	X	X	X	X			X
Cooper's hawk	T	X	X	X	X	X	X	X						X	X	X	X	X	X	X	X	X	X	X			X
Barred owl	T	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X			X
Long-eared owl	T													X	X												
Red-headed woodpecker	T	X	X	X	X	X	X	X						X	X	X	X	X	X	X	X	X	X	X			X
Bobolink	T							X	X		X	X															
Grasshopper sparrow	T										X	X															
Bird species of special/priority concern	SC	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X			X
Invertebrates[1]																											
Silvered-bordered fritillary	T													X/O													
Invertebrate species of special concern	SC									X	X			X	X	X	X										
Vernal Habitat[2]																											
NJDEP mapped habitat and observed habitat							X/O								X/O	X/O											O
Plants[3]																											
State-listed and Rare Plants, Communities			X	X			X	X					X	X	X	X	X	X	X	X							
Priority Sites[4]																											
Natural Heritage Priority Sites														X	X	X											

Status Key
LE - Federally Endangered
LT - Federally Threatened
E - State Endangered
T - State Threatened
SC - Special Concern

X - Mapped habitat on ROW

O - Habitat on ROW, as determined by field assessment

Sources:
[1]NJDEP, DFW, ENSP. 2004. New Jersey's Landscape Project (Version 2.0)
[2]NJDEP, CRSSA. 2004. Mapping New Jersey's Vernal Pools
[3]NJDEP, ONLM. 2004. NJDEP Natural Heritage Grid Map
[4]NJDEP, ONLM. 2007. NJDEP Natural Heritage Priority Site

Table 1:
Wildlife, Plants, and Natural Heritage Priority Sites
Roseland - Bushkill ROW
Warren, Sussex, and Morris Counties

Wildlife/Plants/NHP Priority Site	Status	62/1-63/1	63/1-64/1	64/1-65/1	65/1-66/1	66/1-67/1	67/1-68/1	68/1-69/1	69/1-70/1	70/1-71/1	71/1-72/1	72/1-73/1	73/1-74/1	74/1-75/1	75/1-76/1	76/1-77/1	77/1-78/1	78/1-79/1	79/1-80/1	80/1-81/1	81/1-82/1	82/1-83/1	83/1-84/1	84/1-AFR
County		Jefferson Twp				Rockaway Twp					Kinnelon Boro	Boonton Twp	Montville Twp							Parsippany-Troy Hills Twp			East Hanover Twp		Essex County Roseland Boro
Herptiles																								
Bog turtle	LT/E	O																						
Blue-spotted salamander	E																					X/O	X/O	
Timber rattlesnake	E	X	X	X/O	X/O	X/O	X	X	X	X	X	X	X												
Longtail salamander	T	X	X	X	X	X	X																	
Wood turtle	T				X/O	X/O	X/O	X/O	X/O		X/O	X/O	X/O	X/O	X/O									
Herptile species of special concern	SC	X	X	X	X	X	X	X	X	X	X	X	X							X	X	X	X	X
Mammals																								
Indiana bat	LE/E	X/O	X/O	X/O	X/O	X/O	X/O	X/O	X/O	X/O	X/O	X/O	X/O											
Allegheny woodrat	E	X	X	X	X	X/O	X/O																	
Bobcat	E	X	X	X	X	X	X	X	X	X	X	X	X								X	X		
Birds																								
Bald eagle nest buffer	E																							
Bald eagle foraging habitat	E																							
Northern harrier	E																					X		
Northern goshawk	E	X	X	X	X	X	X	X	X	X	X	X	X											
Red-shouldered hawk	E	X	X	X	X	X	X	X	X	X	X	X	X	X	X								X	X
Cooper's hawk	T	X	X	X	X	X	X	X	X	X	X	X	X		X	X								
Barred owl	T	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X			X	X	X	X
Long-eared owl	T																							
Red-headed woodpecker	T	X	X	X	X	X	X	X	X	X	X	X	X											
Bobolink	T																							
Grasshopper sparrow	T																							
Bird species of special/priority concern	SC	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X					
Invertebrates																								
Silvered-bordered fritillary	T																							
Invertebrate species of special concern	SC						X	X	X	X	X	X	X											
Vernal Habitat[2]																								
NJDEP mapped habitat and observed habitat						O			X/O		O			O					O		O	O	O	O
Plants																								
State-listed and Rare Plants, Communities					X	X	X		X	X			X	X	X								X	X
Priority Sites																								
Natural Heritage Priority Sites					X	X	X							X										

Status Key
LE - Federally Endangered
LT - Federally Threatened
E - State Endangered
T - State Threatened
SC - Special Concern

X - Mapped habitat on ROW

O - Habitat on ROW, as determined by field assessment

Sources:
[1]NJDEP, DFW, ENSP. 2004. New Jersey's Landscape Project (Version 2.0)
[2]NJDEP, CRSSA. 2004. Mapping New Jersey's Vernal Pools
[3]NJDEP, ONLM. 2004. NJDEP Natural Heritage Grid Map
[4]NJDEP, ONLM. 2007. NJDEP Natural Heritage Priority Site

State of New Jersey

DEPARTMENT OF ENVIRONMENTAL PROTECTION

JON S. CORZINE
Governor

Division of Parks and Forestry
Office of Natural Lands Management
Natural Heritage Program
P.O. Box 404
Trenton, NJ 08625-0404
Tel. #609-984-1339
Fax. #609-984-1427

LISA P. JACKSON
Commissioner

June 27, 2008

Robert Pollock
PSE&G
80 Park Plaza, Mailcode T17H
Newark, NJ 07102

Re: Existing Roseland - Bushkill 230 kV Transmission Line

Dear Mr. Pollock:

Thank you for your data request regarding rare species information for the above referenced project site in Morris, Sussex, Warren, and Essex Counties.

Searches of the Natural Heritage Database and the Landscape Project (Version 3 in the highlands region, Version 2.1 elsewhere) are based on a representation of the boundaries of your project site in our Geographic Information System (GIS). We make every effort to accurately transfer your project bounds from the topographic map(s) submitted with the Request for Data into our Geographic Information System. We do not typically verify that your project bounds are accurate, or check them against other sources.

We have checked the Natural Heritage Database and the Landscape Project habitat mapping for occurrences of any rare wildlife species or wildlife habitat on the referenced site. Please see Table 1 (attached) for species list and conservation status.

We have also checked the Natural Heritage Database and the Landscape Project habitat mapping for occurrences of any rare wildlife species or wildlife habitat within one mile of the referenced site. Please see Table 2 for species list and conservation status. This table excludes any species listed in Table 1.

For requests submitted as part of a Flood Hazard Area Control Act (FHACA) rule application, we report records for all rare plant species and ecological communities tracked by the Natural Heritage Program that may be on your project site. (In some borderline cases these records may be described as on or in the immediate vicinity of your project site.) A subset of these plant species are also covered by the FHACA rules when the records are located within one mile of the project site. One mile searches will only report occurrences for those plant species identified under the FHACA regulations as being critically dependent on the watercourse.

We have checked the Natural Heritage Database for occurrences of rare plant species or ecological communities. The Natural Heritage Database has records for occurrences of limestone fen, talus slope community and *Lycopodium annotinum* that may be on the site, and for twenty four occurrences of rare plant species covered by the Flood Hazard Area Control Act rule that may be within one mile of the site. The attached lists provide more information about these occurrences. **Because some species are sensitive to disturbance or sought by collectors, this information is provided to you on the condition that no specific locational data are released to the general public. This is not intended to preclude your submission of this information to regulatory agencies from which you are seeking permits.**

Also attached is a list of rare species and ecological communities that have been documented from Morris, Sussex, Warren, and Essex Counties. If suitable habitat is present at the project site, these species have potential to be present.

Status and rank codes used in the tables and lists are defined in the attached EXPLANATION OF CODES USED IN NATURAL HERITAGE REPORTS.

The Natural Heritage Program reviews its data periodically to identify priority sites for natural diversity in the State. Included as priority sites are some of the State's best habitats for rare and endangered species and ecological communities.

Seven of these sites are located within or near the areas you have outlined. Please refer to the enclosed Natural Heritage Priority Site Maps for the locations and boundaries of these sites. On the back of each Priority Site Map is a report describing the significance of the site. You may find the site biodiversity significance rating to be useful if you need to prioritize among the sites in your environmental assessment.

If you have questions concerning the wildlife records or wildlife species mentioned in this response, we recommend that you visit the interactive I-Map-NJ website at the following URL, http://www.state.nj.us/dep/gis/depsplash.htm or contact the Division of Fish and Wildlife, Endangered and Nongame Species Program at (609) 292 9400.

PLEASE SEE THE ATTACHED 'CAUTIONS AND RESTRICTIONS ON NHP DATA'.

Thank you for consulting the Natural Heritage Program. The attached invoice details the payment due for processing this data request. Feel free to contact us again regarding any future data requests.

Sincerely,

Herbert A. Lord

Herbert A. Lord
Data Request Specialist

cc: Robert J. Cartica
NHP File No. 08-General

CAUTIONS AND RESTRICTIONS ON NATURAL HERITAGE DATA

The quantity and quality of data collected by the Natural Heritage Program is dependent on the research and observations of many individuals and organizations. Not all of this information is the result of comprehensive or site-specific field surveys. Some natural areas in New Jersey have never been thoroughly surveyed. As a result, new locations for plant and animal species are continuously added to the database. Since data acquisition is a dynamic, ongoing process, the Natural Heritage Program cannot provide a definitive statement on the presence, absence, or condition of biological elements in any part of New Jersey. Information supplied by the Natural Heritage Program summarizes existing data known to the program at the time of the request regarding the biological elements or locations in question. They should never be regarded as final statements on the elements or areas being considered, nor should they be substituted for on-site surveys required for environmental assessments. The attached data is provided as one source of information to assist others in the preservation of natural diversity.

This office cannot provide a letter of interpretation or a statement addressing the classification of wetlands as defined by the Freshwater Wetlands Act. Requests for such determination should be sent to the DEP Land Use Regulation Program, P.O. Box 401, Trenton, NJ 08625-0401.

The Landscape Project was developed by the Division of Fish & Wildlife, Endangered and Nongame Species Program in order to map critical habitat for rare animal species. Natural Heritage Database response letters will also list all species (if any) found during a search of the Landscape Project. However, this office cannot answer any inquiries about the Landscape Project. All questions should be directed to the DEP Division of Fish and Wildlife, Endangered and Nongame Species Program, P.O. Box 400, Trenton, NJ 08625-0400.

This cautions and restrictions notice must be included whenever information provided by the Natural Heritage Database is published.

NJ Department of Environmental Protection
Division of Parks and Forestry
Natural Lands Management

Table 1 (on referenced site).

Common Name	Scientific Name	Federal Status	State Status	Grank	Srank
a silver-bordered fritillary	*Boloria selene myrina*		T	G5T5	S2
arrowhead spiketail	*Cordulegaster obliqua*		SC	G4	S3
bald eagle	*Haliaeetus leucocephalus*		E	G4	S1B,S1N
bald eagle foraging	*Haliaeetus leucocephalus*		E	G4	S1B,S1N
barred owl	*Strix varia*		T/T	G5	S2B,S2N
black-billed cuckoo	*Coccyzus erythropthalmus*		SC/S	G5	S3B
blackburnian warbler	*Dendroica fusca*			G5	S2B
black-throated green warbler	*Dendroica virens*		S/S	G5	S3B
blue-headed vireo	*Vireo solitarius*		S/S	G5	S3B
blue-spotted salamander	*Ambystoma laterale*		E	G5	S1
bobcat	*Lynx rufus*		E	G5	S1
bobolink	*Dolichonyx oryzivorus*		T/SC	G5	S2B,S3N
bog turtle	*Glyptemys muhlenbergii*	LT	E	G3	S1
broad-winged hawk	*Buteo platypterus*		SC/RP	G5	S3B
brown thrasher	*Toxostoma rufum*		SC/S	G5	S3B,S4N
brush-tipped emerald	*Somatochlora walshli*		SC	G5	S3
Canada warbler	*Wilsonia canadensis*		S/S	G5	S3B
cerulean warbler	*Dendroica cerulea*		S/S	G4	S3B,S3N
Cooper's hawk	*Accipiter cooperii*		T/S	G5	S2B,S4N
creeper	*Strophitus undulatus*			G5	S3
eastern box turtle	*Terrapene carolina carolina*		SC	G5T5	S3
eastern meadowlark	*Sturnella magna*		SC/SC	G5	S3B,S3N
eastern small-footed myotis	*Myotis leibii*		SC	G3	S3
Fowler's toad	*Bufo woodhousii fowleri*		SC	G5	S3
golden-winged warbler	*Vermivora chrysoptera*		SC/SC	G4	S3B,S3N
grasshopper sparrow	*Ammodramus savannarum*		T/SC	G5	S2B,S3N
great blue heron	*Ardea herodias*		SC/S	G5	S3B,S4N
great blue heron forage	*Ardea herodias*		SC/S	G5	S3B,S4N
harpoon clubtail	*Gomphus descriptus*		SC	G4	S3
hooded warbler	*Wilsonia citrina*		D/S	G5	S3B
Indiana bat	*Myotis sodalis*	LE	E	G2	S1
Jefferson salamander	*Ambystoma jeffersonianum*		D	G4	S3
Kennedy's emerald	*Somatochlora kennedyi*		SC	G5	S3
Kentucky warbler	*Oporornis formosus*		SC/SC	G5	S3B,S3N
least bittern	*Ixobrychus exilis*		SC/SC	G5	S3B,S3N
least flycatcher	*Empidonax minimus*		S/S	G5	S3B
long-eared owl	*Asio otus*		T/T	G5	S2B,S2N
longtail salamander	*Eurycea longicauda longicauda*		T	G5T5	S2
marbled salamander	*Ambystoma opacum*		D	G5	S3
New England bluet	*Enallagma laterale*		SC	G3	S3
northern copperhead snake	*Agkistrodon contortrix contortrix*		SC	G5T5	S3
northern goshawk	*Accipiter gentilis*		E/SC	G5	S1B,S3N
northern harrier	*Circus cyaneus*		E/U	G5	S1B,S3N
northern metalmark	*Calephelis borealis*		SC	G3G4	S3
northern parula	*Parula americana*		P/S	G5	S3B
northern spring salamander	*Gyrinophilus p. porphyriticus*		D	G5T5	S3
potential vernal habitat area					
rapids clubtail	*Gomphus quadricolor*		SC	G3G4	S3
red-headed woodpecker	*Melanerpes erythrocephalus*		T/T	G5	S2B,S2N
red-shouldered hawk	*Buteo lineatus*		E/T	G5	S1B,S2N
spatterdock darner	*Rhionaeschna mutata*		SC	G3G4	S3
spotted turtle	*Clemmys guttata*		SC	G5	S3
timber rattlesnake	*Crotalus horridus horridus*		E	G4T4	S1
veery	*Catharus fuscescens*		S/S	G5	S3B
vernal habitat area					
Williamson's emerald	*Somatochlora williamsoni*		SC	G5	S3
wood thrush	*Hylocichla mustelina*		SC/S	G5	S3B
wood turtle	*Glyptemys insculpta*		T	G4	S2

Table 2 (additional species within 1 mile of referenced site).

Common Name	Scientific Name	Federal Status	State Status	Grank	Srank
cliff swallow	*Petrochelidon pyrrhonota*		SC/SC	G5	S3B,S3N
pied-billed grebe	*Podilymbus podiceps*		E/S	G5	S1B,S3N
sable clubtail	*Gomphus rogersi*		SC	G4	S3
savannah sparrow	*Passerculus sandwichensis*		T/T	G5	S2B,S4N
ski-tailed emerald	*Somatochlora elongata*		SC	G5	S3
triangle floater	*Alasmidonta undulata*		T	G4	S2

June 26, 2008
Page: 1

Possibly on Project Site
Based on Search of Natural Heritage Database
Rare Plant Species and Ecological Communities Currently Recorded in the New Jersey Natural Heritage Database

Scientific Name	Common Name	Federal Status	State Status	Regional Status	G Rank	S Rank	Last Obs	Ident	Location
Terrestrial Community - Other Classification									
Calcareous fen	Limestone Fen				G3?	S1	1986-07-07	Y	CA. 0.5 MI. N. OF STICKLE POND, 0.3 MI. W. OF STICKLES POND RD.
Talus slope community	Talus Slope Community				G4?	S2S3	1985-05-13		CA. 5.7 MI. OF TALUS SLOPE ON SE SIDE OF KITTATINNY MT. FROM 0.5 MI. W. OF SAND POND TO 1.1. MI. NE OF LAKE KATHYRN.
Vascular Plant									
Lycopodium annotinum	Stiff Club-moss		E	LP, HL	G5	S1	1933-07-23	Y	ALONG W. SIDE OF BROOK, S. OF TRANSMISSION LINE, 1 MI. S. OF GREEN POND.

3 Records Selected

Rare Plant Species Covered by the Flood Hazard Area Control Act Rule
Within One Mile of Project Site
Based on Search of Natural Heritage Database

Scientific Name	Common Name	Federal Status	State Status	Regional Status	G Rank	S Rank	Last Obs	Ident
Vascular Plant								
Andromeda glaucophylla	Bog Rosemary		E	LP, HL	G5T5	S1	2007-06-19	Y
Aster borealis	Rush Aster		E	LP, HL	G5	S1	2007-06-19	Y
Athyrium pycnocarpon	Glade Fern		E	LP, HL	G5	S1	1994-06-??	
Bidens beckii	Water-marigold		E	LP, HL	G4G5	S1	1996-09-25	Y
Carex aquatilis	Water Sedge		E	LP, HL	G5	S1	2007-06-19	Y
Galium labradoricum	Labrador Marsh Bedstraw		E	LP, HL	G5	S1	1984-??-??	Y
Galium trifidum	Small Bedstraw		E	LP, HL	G5T5	S1	1997-08-15	Y
Hottonia inflata	Featherfoil		E	LP, HL	G4	S1	1994-06-11	Y
Hottonia inflata	Featherfoil		E	LP, HL	G4	S1	1994-06-10	Y
Hypericum prolificum	Shrubby St. John's-wort		E	LP, HL	G5	S1	1988-06-30	Y
Ilex montana	Large-leaf Holly		E	LP, HL	G5	S1	1994-06-10	Y
Kalmia polifolia	Pale-laurel		E	LP, HL	G5	S1	1994-05-19	Y
Myriophyllum sibiricum	Common Water-milfoil		E	LP, HL	G5	S1	1996-09-25	Y
Potamogeton illinoensis	Illinois Pondweed		E	LP, HL	G5	S1	1996-09-25	Y
Potamogeton illinoensis	Illinois Pondweed		E	LP, HL	G5	S1	1988-07-28	Y
Potamogeton robbinsii	Robbin's Pondweed		E	LP, HL	G5	S2	1994-06-07	Y
Rhododendron canadense	Rhodora		E	LP, HL	G5	S1	2007-06-19	Y
Sagittaria cuneata	Arum-leaf Arrowhead		E	LP, HL	G5	S1	1997-08-15	Y
Salix pedicellaris	Bog Willow		E	LP, HL	G5	S1	1981-05-23	Y

**Rare Plant Species Covered by the Flood Hazard Area Control Act Rule
Within One Mile of Project Site
Based on Search of Natural Heritage Database**

Scientific Name	Common Name	Federal Status	State Status	Regional Status	G Rank	S Rank	Last Obs	Ident
Salix pedicellaris	Bog Willow		E	LP, HL	G5	S1	1984-??-??	Y
Sparganium minimum	Small Burr-reed		E	LP, HL	G5	S1	1993-09-30	Y
Sparganium minimum	Small Burr-reed		E	LP, HL	G5	S1	1993-09-30	Y
Thuja occidentalis	Arborvitae		E	LP, HL	G5	S1	2007-06-19	Y
Triglochin maritima	Seaside Arrow-grass		E	LP, HL	G5	S1	2007-06-19	Y

24 Records Selected

EXPLANATIONS OF CODES USED IN NATURAL HERITAGE REPORTS

FEDERAL STATUS CODES

The following U.S. Fish and Wildlife Service categories and their definitions of endangered and threatened plants and animals have been modified from the U.S. Fish and Wildlife Service (F.R. Vol. 50 No. 188; Vol. 61, No. 40; F.R. 50 CFR Part 17). Federal Status codes reported for species follow the most recent listing.

LE	Taxa formally listed as endangered.
LT	Taxa formally listed as threatened.
PE	Taxa already proposed to be formally listed as endangered.
PT	Taxa already proposed to be formally listed as threatened.
C	Taxa for which the Service currently has on file sufficient information on biological vulnerability and threat(s) to support proposals to list them as endangered or threatened species.
S/A	Similarity of appearance species.

STATE STATUS CODES

Two animal lists provide state status codes after the Endangered and Nongame Species Conservation Act of 1973 (NSSA 23:2A-13 et. seq.): the list of endangered species (N.J.A.C. 7:25-4.13) and the list defining status of indigenous, nongame wildlife species of New Jersey (N.J.A.C. 7:25-4.17(a)). The status of animal species is determined by the Nongame and Endangered Species Program (ENSP). The state status codes and definitions provided reflect the most recent lists that were revised in the New Jersey Register, Monday, June 3, 1991.

D	Declining species–a species which has exhibited a continued decline in population numbers over the years.
E	Endangered species–an endangered species is one whose prospects for survival within the state are in immediate danger due to one or many factors – a loss of habitat, over exploitation, predation, competition, disease. An endangered species requires immediate assistance or extinction will probably follow.
EX	Extirpated species–a species that formerly occurred in New Jersey, but is not now known to exist within the state.
I	Introduced species–a species not native to New Jersey that could not have established itself here without the assistance of man.
INC	Increasing species–a species whose population has exhibited a significant increase, beyond the normal range of its life cycle, over a long term period.
T	Threatened species–a species that may become endangered if conditions surrounding the species begin to or continue to deteriorate.
P	Peripheral species–a species whose occurrence in New Jersey is at the extreme edge of its present natural range.
S	Stable species–a species whose population is not undergoing any long-term increase/decrease within its natural cycle.
U	Undetermined species–a species about which there is not enough information available to determine the status.

Status for animals separated by a slash(/) indicate a duel status. First status refers to the state breeding population, and the second status refers to the migratory or winter population.

SC Special Concern - applies to animal species that warrant special attention because of some evidence of decline, inherent vulnerability to environmental deterioration, or habitat modification that would result in their becoming a Threatened species. This category would also be applied to species that meet the foregoing criteria and for which there is little understanding of their current population status in the state.

Plant taxa listed as endangered are from New Jersey's official Endangered Plant Species List N.J.S.A. 131B-15.151 et seq.

E Native New Jersey plant species whose survival in the State or nation is in jeopardy.

REGIONAL STATUS CODES FOR PLANTS AND ECOLOGICAL COMMUNITIES

LP Indicates taxa listed by the Pinelands Commission as endangered or threatened within their legal jurisdiction. Not all species currently tracked by the Pinelands Commission are tracked by the Natural Heritage Program. A complete list of endangered and threatened Pineland species is included in the New Jersey Pinelands Comprehensive Management Plan.

HL Indicates taxa or ecological communities protected by the Highlands Water Protection and Planning Act within the jurisdiction of the Highlands Preservation Area.

EXPLANATION OF GLOBAL AND STATE ELEMENT RANKS

The Nature Conservancy developed a ranking system for use in identifying elements (rare species and ecological communities) of natural diversity most endangered with extinction. Each element is ranked according to its global, national, and state (or subnational in other countries) rarity. These ranks are used to prioritize conservation work so that the most endangered elements receive attention first. Definitions for element ranks are after The Nature Conservancy (1982: Chapter 4, 4.1-1 through 4.4.1.3-3).

GLOBAL ELEMENT RANKS

G1 Critically imperiled globally because of extreme rarity (5 or fewer occurrences or very few remaining individuals or acres) or because of some factor(s) making it especially vulnerable to extinction.

G2 Imperiled globally because of rarity (6 to 20 occurrences or few remaining individuals or acres) or because of some factor(s) making it very vulnerable to extinction throughout its range.

G3 Either very rare and local throughout its range or found locally (even abundantly at some of its locations) in a restricted range (e.g., a single western state, a physiographic region in the East) or because of other factors making it vulnerable to extinction throughout it's range; with the number of occurrences in the range of 21 to 100.

G4 Apparently secure globally; although it may be quite rare in parts of its range, especially at the periphery.

G5 Demonstrably secure globally; although it may be quite rare in parts of its range, especially at the periphery.

GH Of historical occurrence throughout its range i.e., formerly part of the established biota, with the expectation that it may be rediscovered.

GU Possibly in peril range-wide but status uncertain; more information needed.

GX Believed to be extinct throughout range (e.g., passenger pigeon) with virtually no likelihood that it will be rediscovered.

G? Species has not yet been ranked.

GNR Species has not yet been ranked.

STATE ELEMENT RANKS

S1 Critically imperiled in New Jersey because of extreme rarity (5 or fewer occurrences or very few remaining individuals or acres). Elements so ranked are often restricted to very specialized conditions or habitats and/or restricted to an extremely small geographical area of the state. Also included are elements which were formerly more abundant, but because of habitat destruction or some other critical factor of its biology, they have been demonstrably reduced in abundance. In essence, these are elements for which, even with intensive searching, sizable additional occurrences are unlikely to be discovered.

S2 Imperiled in New Jersey because of rarity (6 to 20 occurrences). Historically many of these elements may have been more frequent but are now known from very few extant occurrences, primarily because of habitat destruction. Diligent searching may yield additional occurrences.

S3 Rare in state with 21 to 100 occurrences (plant species and ecological communities in this category have only 21 to 50 occurrences). Includes elements which are widely distributed in the state but with small populations/acreage or elements with restricted distribution, but locally abundant. Not yet imperiled in state but may soon be if current trends continue. Searching often yields additional occurrences.

S4 Apparently secure in state, with many occurrences.

S5 Demonstrably secure in state and essentially ineradicable under present conditions.

SA Accidental in state, including species (usually birds or butterflies) recorded once or twice or only at very great intervals, hundreds or even thousands of miles outside their usual range; a few of these species may even have bred on the one or two occasions they were recorded; examples include European strays or western birds on the East Coast and vice-versa.

SE Elements that are clearly exotic in New Jersey including those taxa not native to North America (introduced taxa) or taxa deliberately or accidentally introduced into the State from other parts of North America (adventive taxa). Taxa ranked SE are not a conservation priority (viable introduced occurrences of G1 or G2 elements may be exceptions).

SH Elements of historical occurrence in New Jersey. Despite some searching of historical occurrences and/or potential habitat, no extant occurrences are known. Since not all of the historical occurrences have been field surveyed, and unsearched potential habitat remains, historically ranked taxa are considered possibly extant, and remain a conservation priority for continued field work.

SP Element has potential to occur in New Jersey, but no occurrences have been reported.

SR Elements reported from New Jersey, but without persuasive documentation which would provide a basis for either accepting or rejecting the report. In some instances documentation may exist, but as of yet, its source or location has not been determined.

SRF Elements erroneously reported from New Jersey, but this error persists in the literature.

SU Elements believed to be in peril but the degree of rarity uncertain. Also included are rare taxa of uncertain taxonomical standing. More information is needed to resolve rank.

SX Elements that have been determined or are presumed to be extirpated from New Jersey. All historical occurrences have been searched and a reasonable search of potential habitat has been completed. Extirpated taxa are not a current conservation priority.

SXC Elements presumed extirpated from New Jersey, but native populations collected from the wild exist in cultivation.

SZ Not of practical conservation concern in New Jersey, because there are no definable occurrences, although the taxon is native and appears regularly in the state. An SZ rank will generally be used for long distance migrants whose occurrences during their migrations are too irregular (in terms of repeated visitation to the same locations), transitory, and dispersed to be reliably identified, mapped and protected. In other words, the migrant regularly passes through the state, but enduring, mappable element occurrences cannot be defined.

Typically, the SZ rank applies to a non-breeding population (N) in the state – for example, birds on migration. An SZ rank may in a few instances also apply to a breeding population (B), for example certain lepidoptera which regularly die out every year with no significant return migration.

Although the SZ rank typically applies to migrants, it should not be used indiscriminately. Just because a species is on migration does not mean it receives an SZ rank. SZ will only apply when the migrants occur in an irregular, transitory and dispersed manner.

B Refers to the breeding population of the element in the state.

N Refers to the non-breeding population of the element in the state.

T Element ranks containing a "T" indicate that the infraspecific taxon is being ranked differently than the full species. For example *Stachys palustris* var. *homotricha* is ranked "G5T? SH" meaning the full species is globally secure but the global rarity of the var. *homotricha* has not been determined; in New Jersey the variety is ranked historic.

Q Elements containing a "Q" in the global portion of its rank indicates that the taxon is of questionable, or uncertain taxonomical standing, e.g., some authors regard it as a full species, while others treat it at the subspecific level.

,1 Elements documented from a single location.

Note: To express uncertainty, the most likely rank is assigned and a question mark added (e.g., G2?). A range is indicated by combining two ranks (e.g., G1G2, S1S3).

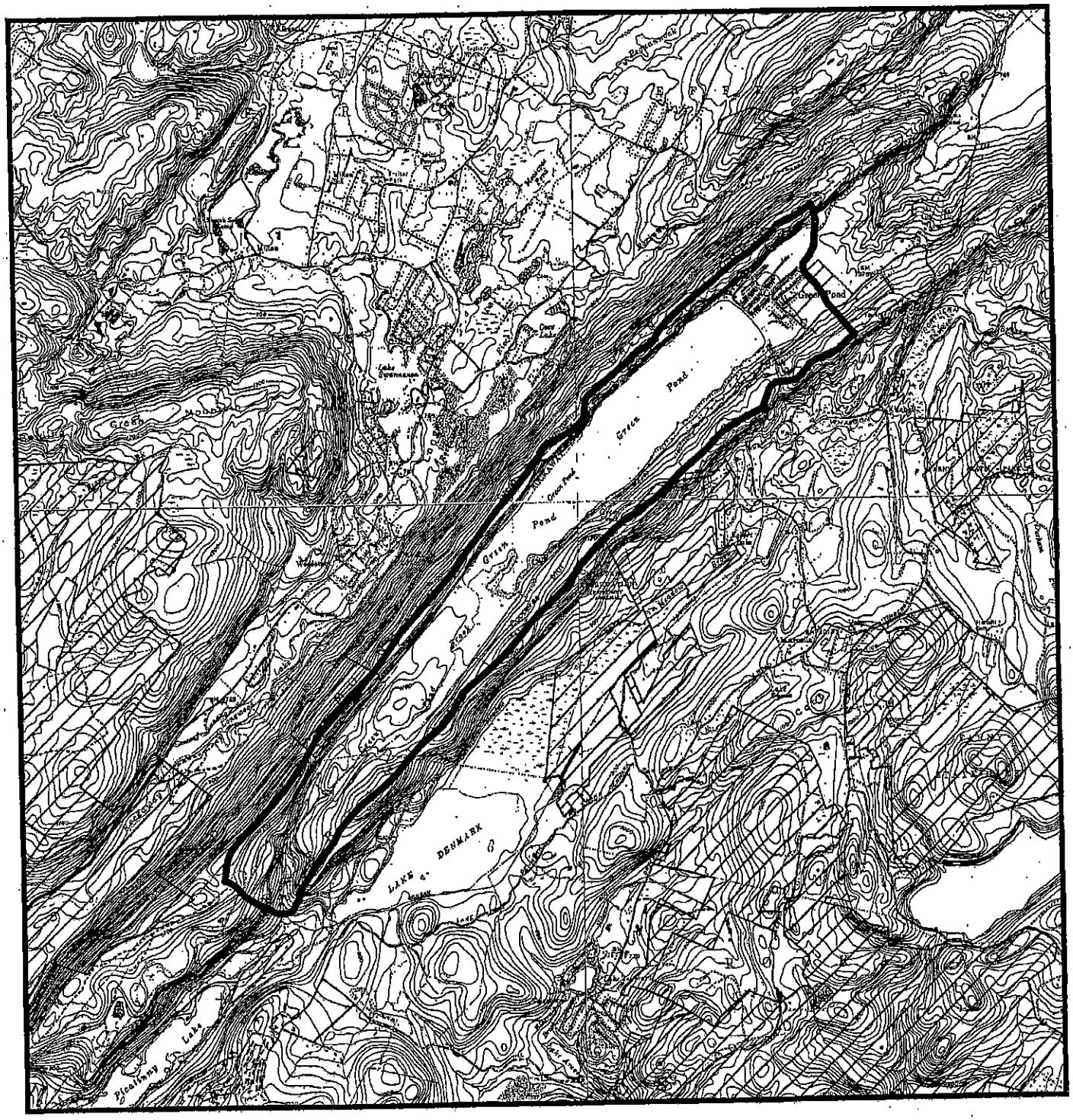
IDENTIFICATION CODES

These codes refer to whether the identification of the species or community has been checked by a reliable individual and is indicative of significant habitat.

Y Identification has been verified and is indicative of significant habitat.

BLANK Identification has not been verified but there is no reason to believe it is not indicative of significant habitat.

? Either it has not been determined if the record is indicative of significant habitat or the identification of the species or community may be confusing or disputed.



Natural Heritage Priority Site

Green Pond Mountain

Morris County

NJ Department of Environmental Protection
Division of Parks and Forestry

1 0 1 Miles

Priority Site
Public Land

N
W E

Natural Heritage Priority Site

Green Pond Mountain

Locational Information

Quad Name: Dover ; Newfoundland ; Boonton ; Franklin
County: Morris
Municipality Rockaway Twp ; Jefferson Twp

Description of Site

An extensive matrix of forests, talus slopes, wooded wetlands and aquatic plant communities on Green Pond Mountain.

Boundary Justification

Boundaries drawn to include the watersheds on Green Pond Mountain which drain into Green Pond and Green Pond Brook.

Biodiversity Rank B4V1

Contains habitat for a concentration of state critically imperiled, imperiled and rare plant species.

Natural Heritage Priority Site

Lake Denmark

Morris County

NJ Department of Environmental Protection
Division of Parks and Forestry
Natural Lands Management

0.8 0 0.8 Miles

Priority Site
Public Land

N
W E

Natural Heritage Priority Site

Lake Denmark

Locational Information

Quad Name: Dover ; Boonton ; Newfoundland
County: Morris
Municipality Rockaway Twp

Description of Site

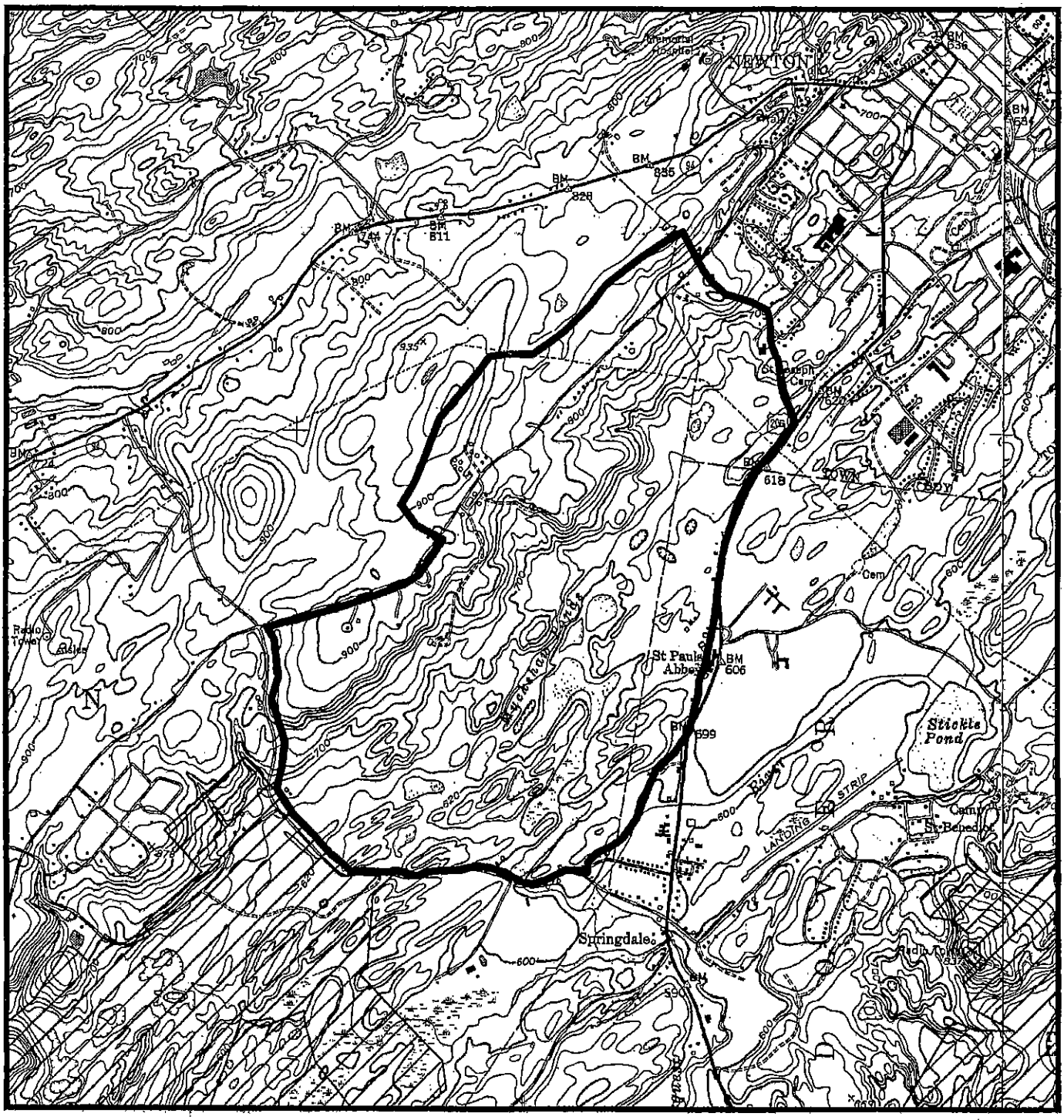
A large glaciated lake and adjacent herbaceous, shrubby and forested wetlands.

Boundary Justification

Boundary matches that of the watershed basin. It includes the lake and adjacent wetland habitats and lands draining toward the wetlands.

Biodiversity Rank B4V1

The site contains excellent populations of state-imperiled and other rare species.



Natural Heritage Priority Site

Muckshaw Ponds

Sussex County

NJ Department of Environmental Protection
Division of Parks and Forestry
Natural Lands Management

0.4 0 0.4 Miles

Priority Site
Public Land

N
W E

Natural Heritage Priority Site

Muckshaw Ponds

Locational Information

Quad Name: Newton West
County: Sussex
Municipality Fredon Twp ; Andover Twp ; Newton Town

Description of Site

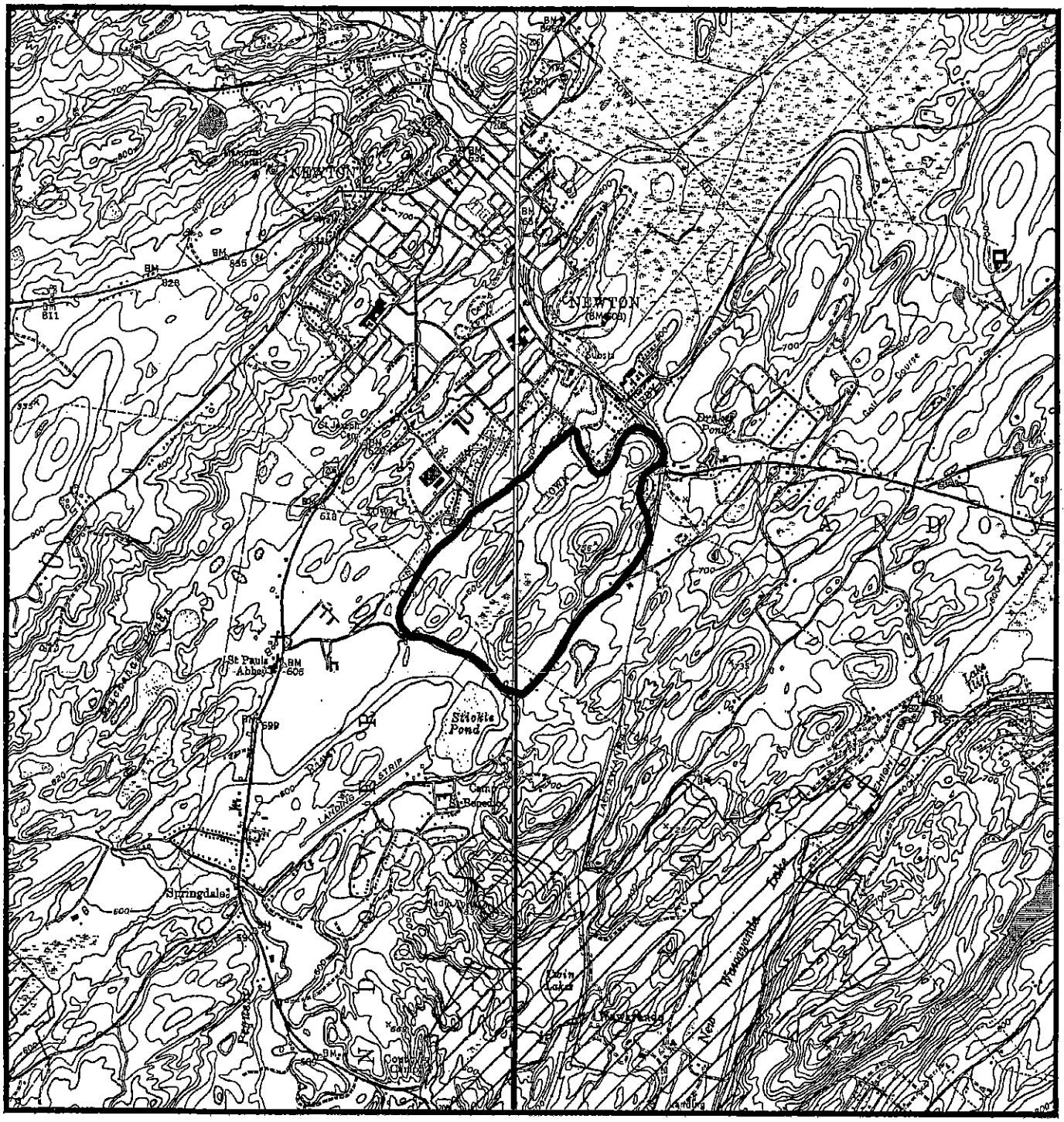
Series of sinkholes and one larger pond surrounded by steep, wooded dolomite ridges.

Boundary Justification

The primary boundary includes globally rare upland forest, globally imperiled wetlands, and associated rare plants and animals. The secondary boundary includes the karst watershed and adjacent upland buffer.

Biodiversity Rank B3

High quality assemblage of globally rare upland and wetland natural communities with nine State Endangered plants and one State Threatened animal.



Natural Heritage Priority Site

Site 564

Sussex County

NJ Department of Environmental Protection
Division of Parks and Forestry
Natural Lands Management

0.4 0 0.4 Miles

Priority Site
Public Land

N
W E

Natural Heritage Priority Site
Site 564

Locational Information

Quad Name: Newton East ; Newton West
County: Sussex
Municipality Andover Twp ; Newton Town

Description of Site

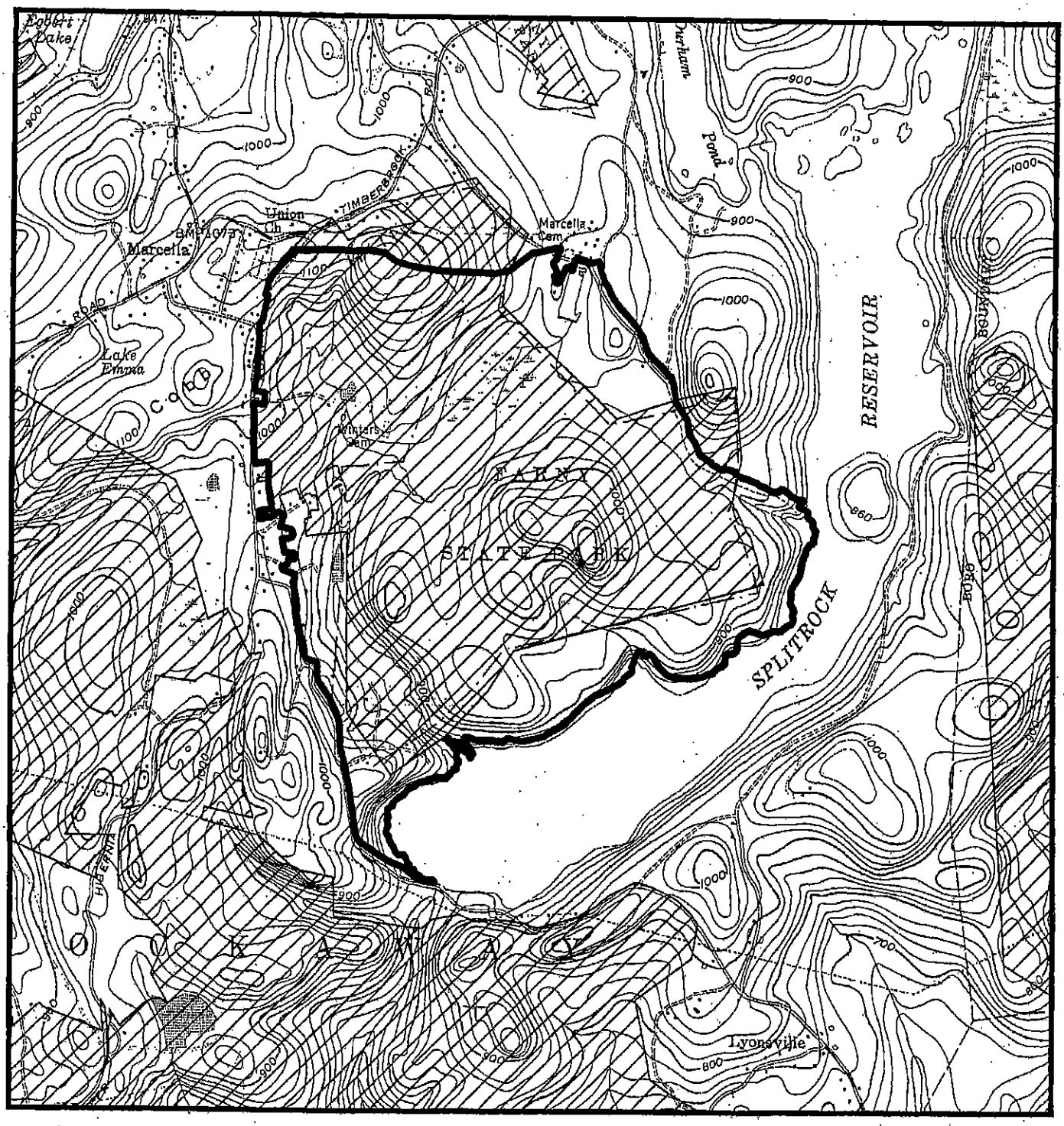
A shub and herb dominated wetland surrounded by limestone ridges and mixed hardwood forest dissected by logging roads. The wetland comprises part of the headwaters of Stickle Pond to the southeast.

Boundary Justification

Primary boundary contains species and community occurrences. Secondary boundary contains entire watershed.

Biodiversity Rank *B1*

Contains significant natural community with numerous globally and state-imperilled plant/animal species.



Natural Heritage Priority Site

Splitrock Reservoir Site

Morris County

NJ Department of Environmental Protection
Division of Parks and Forestry
Natural Lands Management

0.4 0 0.4 Miles

Priority Site

Public Land

N

W E

Natural Heritage Priority Site

Splitrock Reservoir Site

Locational Information

Quad Name: Boonton
County: Morris
Municipality Rockaway Twp

Description of Site

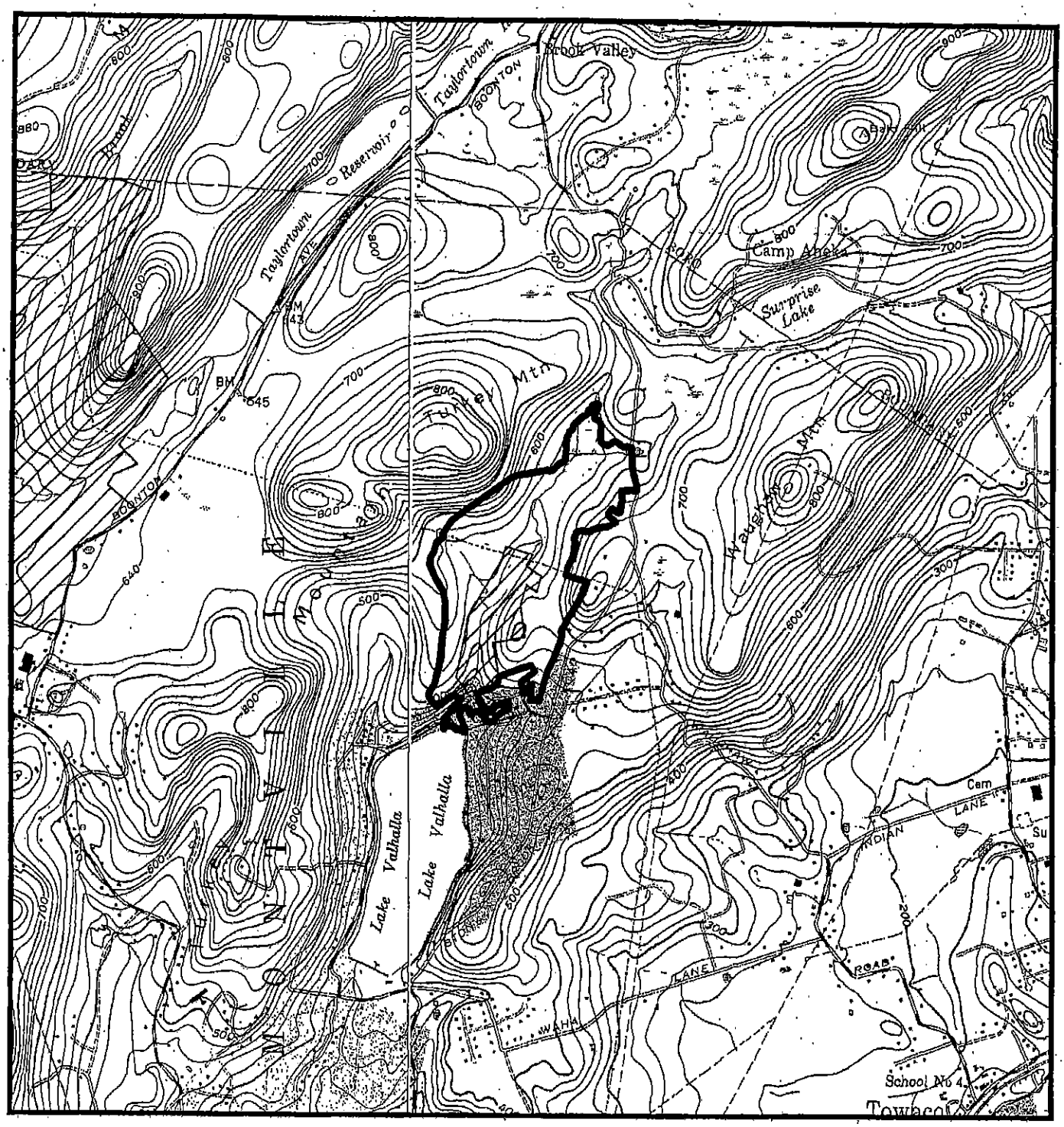
The site contains mixed deciduous woodlands with steep slopes that are very rocky in places, with a few permanent and intermittent streams.

Boundary Justification

Boundary is drawn to contain contiguous habitat for a plant species that is critically imperiled in the state, and lands that drain toward the habitat.

Biodiversity Rank B5V1

The site contains the only documented occurrence of a plant species that is critically imperiled in the state.



Natural Heritage Priority Site

Valhalla Hemlock Glen

Morris County

NJ Department of Environmental Protection
Division of Parks and Forestry

0.5 0 0.5 Miles Priority Site

N
W E

Natural Heritage Priority Site

Valhalla Hemlock Glen

Locational Information

Quad Name: Pompton Plains
County: Morris
Municipality Montville Twp

Description of Site

Rocky slopes in hemlock ravine and associated wetlands along small stream.

Boundary Justification

Includes known extent of rare plant population plus additional buffer.

Biodiversity Rank B5V4

Contains a good occurrence of a state imperiled plant species.

Appendix A

Rare Plant Species List Provided by the National Heritage Program
Possibly on or Within 1 Mile of the
Susquehana - Roseland ROW

Common Name	Scientific Name	State Status	G Rank	S Rank
Upland Species				
Glade Fern	*Athyrium pycnocarpon*	E	G5	S1
Large-leaf Holly	*Ilex montana*	E	G5	S1
Stiff Club-moss	*Lycopodium annotinum*	E	G5	S1
Wetland Species				
Bog Rosemary	*Andromeda glaucophylla*	E	G5T5	S1
Rush Aster	*Aster borealis*	E	G5	S1
Water-marigold	*Bidens beckii*	E	G4G5	S1
Water sedge	*Carex aquatilis*	E	G5	S1
Labrador Marsh Bedstraw	*Galium labradoricum*	E	G5	S1
Small Bedstraw	*Galium trifidum*	E	G5T5	S1
Featherfoil	*Hottonia inflata*	E	G4	S1
Shrubby St. John's-wort	*Hypericum prolificum*	E	G5	S1
Pale-laurel	*Kalmia polifolia*	E	G5	S1
Common Water-milfoil	*Myriophyllum sibiricum*	E	G5	S1
Illinois Pondweed	*Potamogeton illinoensis*	E	G5	S1
Robbin's Pondweed	*Potamogeton robbinsii*	E	G5	S2
Rhodora	*Rhododendron canadense*	E	G5	S1
Arum-leaf Arrowhead	*Sagittaria cuneata*	E	G5	S1
Bog Willow	*Salix pedicellaris*	E	G5	S1
Small Burr-reed	*Sparganium minimum*	E	G5	S1
Arborvitae	*Thuja occidentalis*	E	G5	S1
Seaside Arrow-grass	*Triglochin maritima*	E	G5	S1

APPENDIX B

HABITAT ENHANCEMENTS PROPOSED FOR THE SUSQUEHANNA-ROSELAND

Species	Habitat Enhancement	Locations
Timber Rattlesnake	Rock Piles	**Green Pond Mt. NHPS**
		Span 66/1 - 66/2
		Span 65/2 - 65/3
		Rockaway River WMA
		Span 64/1 - 64/2
		Span 63/1 - 63/2
		Span 63/1 - 63/2
		Buck Mt. SP
		Span 71/2 - 71/3
Bobcat /Timber Rattlesnake	Brush Piles	**Green Pond Mt. NHPS**
		Span 66/1 - 66/2
		Span 65/2 - 65/3
		Rockaway River WMA
		Span 64/1 - 64/2
		Span 63/1 - 63/2
		Span 63/1 - 63/2
		Buck Mt. SP
		Span 71/2 - 71/3
		Pyramid Mt. CP
		Span 73/5 - 73/6
		Span 74/2 - 74/3
		Wildcat Ridge WMA
		Span 69/1 -69/2
		Span 68/3 - 68/4
Wood Turtle	Nesting Sites	**Pyramid Mt. CP**
		West of Tower 74/4
		East of Tower 73/3
		Wildcat Ridge WMA
		West of Tower 68/1
		Lake Denmark NHPS
		West of Tower 67/2
		West of Tower 67/1
		East of Tower 66/3
		Green Pond Mt. NHPS
		West of Tower 66/1
		Rockaway River WMA

Herpetiles	Habitat Logs/Root Wads	East of Tower 64/2 **Pyramid Mt. CP** West of Tower 74/4 Span 73/2 - 73/3 Span 73/3 - 73/4 **Buck Mt. SP** West of Tower 71/3 **Wildcat Ridge WMA** West of Tower 68/1 Span 68/2 - 68/3 **Lake Denmark NHPS** West of Tower 67/2 West of Tower 67/1 East of Tower 66/3 **Green Pond Mt. NHPS** West of Tower 66/1 **Rockaway River WMA** East of Tower 64/2 East of Tower 63/1 East of Tower 62/3
Frosted Elfin	*Baptisia* planting	**Wildcat Ridge WMA** West of Tower 70/2 West of Tower 68/6 West of Tower 68/2 **Green Pond Mt. NHPS** West of Tower 66/2 East of Tower 66/3 **Rockaway River WMA** Span 64/1 - 64/2 West of Tower 62/4 **Hopatcong Switch** West of Tower 59/4

APPENDIX C

Annotated color photographs

1

Photo of the Susquehanna - Roseland ROW in Troy Meadows, Parsippany-Troy Hills Township.

2

Photo of the Susquehanna - Roseland ROW in Montville Township..

3

Photo of the Susquehanna - Roseland ROW in Rockaway Township.

4

Photo of the Susquehanna - Roseland ROW in Rockaway Township.

5

Photo of the Susquehanna - Roseland ROW in Lake Denmark, Rockaway Township.

6

Photo of the Susquehanna - Roseland ROW in Picatinny Arsenal, Rockaway Township.

7

Photo of the Susquehanna - Roseland ROW in Rockaway River WMA, Jefferson Township.

8

Photo of the Susquehanna - Roseland ROW in Rockaway River WMA, Jefferson Township.

9

Photo of the Susquehanna - Roseland ROW along border of Mahlon Dickerson Reservation, Jefferson Township.

10

Photo of the Susquehanna - Roseland ROW in Byram Township.