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27 September 2008

Barbara Y. Hubbard
AREVA NP, Inc.
Solomon Pond Park
400 Donald Lynch Boulevard
Marlborough, Massachusetts 01752

SUBJECT: Report Transmittal
Bell Bend Wetlands Delineation Report

Dear Ms. Hubbard:

Please be advised that we have transmitted a copy of the wetlands report to AREVA's FTP site. The title of this report is: Wetlands Delineation Report for the Proposed Bell Bend Nuclear Power Plant Site, Luzerne County, Pennsylvania. Revision 0. This report includes identification and mapping of all wetlands within the Owner Controlled Area.

If you have any questions regarding this matter, please contact me. We appreciate having the opportunity to perform this work for you.

Sincerely yours,

*Paul*

Paul L. Harmon
Vice President

*Rev. 0*

# Wetlands Delineation Report for the Proposed Bell Bend Nuclear Power Plant Site, Luzerne County, Pennsylvania

**Submitted to:**
AREVA NP, Inc.
Marlborough, MA

September 2008

NORMANDEAU ASSOCIATES
ENVIRONMENTAL CONSULTANTS

# UNISTAR NUCLEAR DEVELOPMENT, LLC

## Bell Bend Nuclear Power Plant

## Salem Township
## Luzerne County, Pennsylvania

## Revision 0

# WETLANDS DELINEATION
# AND
# EXCEPTIONAL VALUE WETLANDS
# ANALYSIS REPORT

**To satisfy:**

## Pennsylvania Department of Environmental Protection
## Chapter 105 Dam Safety and Waterway Management
## Rules and Regulations

## and

## U.S. Army Corps of Engineers
## Regulatory Programs
## 33 CFR 320-330

**Prepared for:**

## UNISTAR NUCLEAR DEVELOPMENT, LLC

## September 2008

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# 1.0 INTRODUCTION

## 1.1 Study Objectives

Bell Bend Nuclear Power Plant (BBNPP) is proposed to be sited adjacent to the Susquehanna Steam Electric Station (SSES) in Salem Township, Luzerne County, Pennsylvania. The proposed BBNPP Owner Controlled Area, herein referred to as the site, is presented in Figure 1. Normandeau Associates, Inc. (Normandeau) was contracted by AREVA NP, Inc. to delineate the jurisdictional boundaries of wetlands and other waters onsite that are regulated by the Pennsylvania Department of Environmental Protection (PADEP) and U.S. Army Corps of Engineers (USACE).

PADEP regulates nearly all development activities within "Regulated Waters of this Commonwealth", including all wetlands, rivers, streams and other waterbodies, under the Title 25 PA Code Chapter 105 Dam Safety and Waterway Management Regulations (Chapter 105). PADEP Chapter 105 jurisdiction also extends to the floodways surrounding these areas. USACOE regulates development activities in "Waters of the U.S.", including wetlands, under Section 404 of the Clean Water Act (Section 404) and activities in "Navigable Waters" under Section 10 of the River and Harbors Act (Section 10). Regulatory approvals are usually required from these agencies for development activities involving wetlands and other waters under their jurisdiction. This report presents the findings of the delineation study and is intended to demonstrate that boundaries for wetlands and other waters were established in accordance with PADEP and USACE regulatory requirements.

## 1.2 Personnel

This wetland delineation report for the BBNPP site is the product of efforts from many well-trained personnel. The overall effort was coordinated by Project Manager Paul Harmon and Principal Ecologist Robert Blye. Field work was conducted during the period of July 2007 through September 2008 by Normandeau biologists Elizabeth Garlo, Jayme Schaeffer, Chris Roche and Keith Maurice. Dr. James Montgomery of Ecology III, Inc. also participated in the field work and provided technical assistance. Keith Maurice prepared the report, and Melonie Ettinger and Brenda Strouse provided secretarial support.

## 1.3 Description of the Site

The BBNPP site extends across 882 acres (1.38 mile$^2$) of property adjacent to SSES (Figure 1). The terrain is variable and ranges from steeply sloping hills in the west to the relatively level floodplain of the Susquehanna Riverlands in the east. Net relief is approximately 400-feet.

Landuses consist largely of cropland, fallow farmland including an abandoned orchard and deciduous forest. Prominent hydrologic features include the Susquehanna River, Walker Run, the North Branch Canal, several former farm ponds and a beaver pond. Man-made features consist of two active gravel quarries, several outlying SSES facilities and electric transmission line corridors, and two large soil stockpiles resulting from SSES construction in the 1970s. An aerial view of the site layout is presented in Figure 2.

# 2.0 DELINEATION METHODOLOGY

## 2.1 USACE 1987 Wetlands Delineation Manual

Jurisdictional areas within the site were identified and delineated in the field in accordance with the U.S. Army Corps of Engineers Wetlands Delineation Manual, January 1987 (USACE Manual), which involves the use of vegetation, soils, and hydrologic conditions to define wetlands boundaries. PADEP and USACE require the use of this methodology for establishing their jurisdictional boundaries and, in most cases; the same boundary represents the jurisdictional limits of both agencies. Recent U.S. Supreme Court rulings have limited USACE regulatory jurisdiction over certain categories of streams and wetlands. However, these rulings have had no affect on PADEP's regulatory program, which maintains jurisdiction over these areas.

The USACE Manual describes three diagnostic environmental characteristics upon which the identification of wetlands and delineation of wetlands boundaries are based:

1. Hydrophytic Vegetation: Macrophytic species adapted for life in soils that are at least periodically oxygen deficient (anaerobic) during the growing season as a result of inundation or saturation by surface or ground water. Typically, these plants are able to thrive in areas that are wet for prolonged periods of time.

2. Hydric Soils: Soils formed under conditions of saturation, flooding or ponding long enough during the growing season to develop anaerobic conditions in the upper part.

3. Wetlands Hydrology: encompasses all hydrologic characteristics of areas that are inundated (< 6.6' mean depth) or saturated to the soil surface for sufficient duration during the growing season (at least a week or two) to develop anaerobic conditions and support vegetation adapted for life in periodically anaerobic soils.

The manual provides specific field indicators that can be used to determine if the mandatory technical criteria are met for each parameter. In order for an area to be considered wetlands, at least one field indicator must be present for each parameter. Application of this methodology to the site is discussed in the following section.

## 2.2 Delineation of the Bell Bend Nuclear Power Plant Site

Wetlands were delineated following the methodology specified in the USACE Manual, Routine Wetlands Determination Subsection 2: On-site Inspection Necessary. This technique was the most appropriate for the size and environmental characteristics of the site. The delineation process was initiated by researching available reference materials in order to anticipate site conditions. References consulted included the Natural Resources Conservation Service (NRCS) Luzerne County Soil Survey, National Wetlands Inventory (NWI) mapping, aerial photography and other natural resources information. Examination of these references revealed which portions of the site would most likely be included within USACE and PADEP jurisdictions so that special attention could be focused on these areas while on site.

The site was then systematically searched for wetlands and other regulated waters. During this process all plant communities in the site were mapped and documented. Data collected for each community included dominant vegetation, hydrology, soil conditions and evidence of disturbance. This information was recorded on the appropriate data form adapted from the USACE Manual (Appendix B).

Vegetation data were evaluated using the U.S. Fish and Wildlife Service's 1988 National List of Plant Species that Occur in Wetlands Northeast (Region 1) and 1995 supplement to the list, supported by information from various vegetation identification keys for species not found on the list. The plant list categorizes species according to the following system:

Obligate (OBL): Always found in wetlands under natural (not planted) conditions (> 99% frequency), but may persist in nonwetlands if planted there by man or in wetlands that have been drained, filled, or otherwise transformed into nonwetlands.

Facultative Wetlands (FACW): Usually found in wetlands (67%-99% frequency), but occasionally found in nonwetlands.

Facultative (FAC): Sometimes found in wetlands (34%-66% frequency), but also occurs in nonwetlands.

Facultative Uplands (FACU): Seldom found in wetlands (1%-33% frequency) and usually occurs in nonwetlands.

Nonwetlands (UPL): Occurs in wetlands in another region, but not found (<1% frequency) in wetlands in the region specified. If a species does not occur in wetlands in any region, it is not on the list.

Soils evaluation on this site was based on a detailed examination of color, mottling, texture, consistence, presence of roots, and other characteristics as specified in the USACE Manual (step 14 of the Routine Determination Method Subsection 2: On-site Inspection Necessary). Additional guidance for interpreting soil conditions was provided by "*Field Indicators of Hydric Soils in the United States*." Munsell color charts were used to determine soil color. Typically, presence or absence of hydric soil conditions is determined within a diagnostic horizon extending from immediately below the A horizon (topsoil) to a depth of 10-inches. In plowed soils (>10-inches), hydric conditions must be present immediately below the Ap horizon (plow horizon).

Hydrology was evaluated based on topographic position and the list of indicators from the USACE Manual (step 10 of the Routine Determination Method Subsection 2: On-site Inspection Necessary). Evidence of wetlands hydrology includes the presence of standing water, saturated soils, high water tables, sediment deposits on leaves, water-stained leaves, braided drainage patterns and oxidized root channels within 12-inches of the soils surface.

The results of the data collection effort were used to identify wetlands and uplands plant communities, and to determine the site-specific indicators of transition between adjacent wetlands and uplands communities. The wetlands-uplands transition point corresponds to the wetlands jurisdictional boundary and a single boundary was determined that is intended to satisfy both the USACE and PADEP regulatory requirements. The wetlands boundaries were marked in the field with numbered surveyors' flags.

A registered professional surveyor located the flagged lines and the coordinates were plotted on the site topographic map. The wetlands boundaries were verified by Normandeau to ensure accuracy. A copy of the wetlands boundary map is enclosed (Figure 6).

## 3.0 REVIEW OF EXISTING RESOURCE INFORMATION

### 3.1 Wetlands

U.S. Fish and Wildlife Service National Wetlands Inventory (NWI) mapping (dated 1976) shows palustrine emergent (herbaceous), scrub/shrub and forested wetlands in the western section of the site. Hydrologic regimes for the wetlands were designated as temporarily flooded, seasonally flooded/saturated and semi-permanently flooded. In addition, several farm ponds in the western end of the site were classified as palustrine waterbodies (Figure 3). Most of the wetlands and waterbodies are associated with the main stem and eastern branch of Walker Run.

NWI mapping is useful for screening sites for larger wetlands but does not necessarily detect all wetlands, or show the full extent of mapped wetlands. Map resolution varies from 1 to 5 acres depending on the scale of the source aerial photography and vegetation cover of the mapped area. Typically, wetland boundaries are generalized and are not as accurate as ground-based delineations. In addition, most of this mapping is based on aerial photography from the 1980's or earlier and, therefore, may not always reflect current site conditions (National Wetlands Inventory 1998).

### 3.2 Soils

The Natural Resources Conservations Service (NRCS) mapped the majority of the site as upland soils encompassing Chenango gravelly loam, Arnot-Rock outcrop complex, Braceville gravelly loam, Morris very stony silt loam, Oquaga and Lordstown loams, Pope soils, Weikert and Klinesville channery silt loam and Wyoming gravelly loam (Figure 4). These soils are classified as somewhat poorly drained to excessively drained and have seasonal high water tables ranging from 6-inches in depth to greater than 72-inches in depth (Table 1). NRCS information indicates that Chenango and Wyoming soils are unlikely to have inclusions of hydric soil. However, the other five upland soils may potentially have inclusions of hydric soil in depressions, drainageways and bottomland areas (Natural Resources Conservation Service undated; 1981; 2005).

Hydric soils mapped onsite consist of Atherton silt loam, Holly silt loam and Rexford loam. These soils are classified as somewhat poorly drained to very poorly drained and have seasonal high water tables ranging from the soil surface to 18-inches in depth. Atherton and Rexford soils were largely mapped in association with Walker Run and its network of small tributaries in the western section of the site. Rexford soil is also mapped in association with a small stream in the eastern section of the site and in headwaters areas in the southern end of the site. Holly soil is mapped exclusively in the Riverlands along the Susquehanna River floodplain. Official NRCS soil series descriptions are provided in Appendix C.

### 3.3 Hydrology

NWI and NRCS mapping indicates that wetlands, waterbodies and poorly drained soils in the site are largely associated with headwaters areas and small streams draining the site. West of Confers Lane, the site drains to the Susquehanna River via Walker Run. East of Confers Lane, the site drains through two small-unnamed streams. One stream flows into the southern end of Lake Took-A-While and the other flows into the northern end of the reconstructed North Branch Canal. Lake Took-A-While also drains into the North Branch Canal, which then drains through an outlet channel into the Susquehanna River.
PADEP's Chapter 93 Water Quality Standards (Chapter 93) designates Walker Run as having the

protected water use of Cold Water Fishes (CWF). A CWF classification is intended to provide for the maintenance and propagation of fish species including the family Salmonidae and additional flora and fauna which are indigenous to a cold water habitat. Chapter 93 designates the Susquehanna River near the site as having the protected use of Warm Water Fishes (WWF). A WWF classification is intended to provide for the maintenance and propagation of fish species and additional flora and fauna that are indigenous to a warm water habitat.

## 4.0 RESULTS OF THE FIELD INVESTIGATION

The wetlands delineation determined that the site was primarily upland habitat composed of cropland, and old-field, shrub and deciduous forest communities. Wetlands consisted of palustrine emergent (herbaceous), scrub/shrub and forest communities (Figure 5). Many wetlands were composed of multiple vegetation communities and several contained large areas of open water. Wetlands distribution was generally consistent with NWI and NRCS soils mapping. The vegetation, soils and hydrologic conditions of the upland and wetland habitats observed during the field delineation are summarized in the following sections.

## 4.1 UPLAND PLANT COMMUNITIES

### Old-Field

Old-field vegetation cover was composed of a largely upland-preferring assemblage of grasses and herbaceous plants. During 2007, old-field vegetation extended over much of the fallow farmland in the western section of the site. However, during 2008 some of this habitat was returned to agricultural use for the production of corn. Dominant species included daisy fleabane (*Erigeron annuus,*FACU), Canada thistle *(Cirsium arvense*, FACU), wrinkled goldenrod (*Solidago rugosa*, FAC), flat-top fragrant goldenrod (*Euthamia graminifolia,* FAC), Canada goldenrod (*Solidago canadensis*, FACU), giant foxtail grass (*Setaria faberi,*UPL), white heath aster (*Aster pilosus,* UPL), lamb's quarters (*Chenopodium album,* FACU+), red clover *(Trifolium pretense*, FACU-) and common ragweed *(Ambrosia artemisiifolia,* FACU). A list of common plant species observed in the BBNPP site is presented in Table 2.

### Upland Scrub/Shrub

Upland shrub habitat was found mostly along transmission line corridors and in several abandoned farm fields located around the site that were undergoing secondary succession. This community consisted primarily of bush honeysuckle (*Lonicera tatarica*, FACU), multiflora rose (*Rosa multiflora*, FACU), Allegheny blackberry (*Rubus allegheniensis*, FACU-), and Russian olive (*Elaeagnus angustifolia*, FACU).

### Upland Deciduous Forest

Upland deciduous forest covered a large portion of the site to the west of Route 11. Common overstory species included northern red oak (*Quercus rubra,* FACU-), white oak (*Quercus alba*, FACU-), black cherry (*Prunus serotina,*FACU), white ash (*Fraxinus americana*, FACU), shagbark hickory (*Carya ovata*, FACU-), bitternut hickory (*Carya cordiformis*, FACU+), sweet birch (*Betula lenta*, FACU), black walnut (*Juglans nigra*, FACU), black locust (*Robinia pseudoacacia*, FACU-), yellow poplar *(Liriodendron tulipifera,* FACU) and red maple (*Acer rubrum*, FAC).
Upland forest understories were composed predominantly of spicebush (*Lindera benzoin*, FACW), round-leaved greenbrier (*Smilax rotundifolia*, FAC), Virginia creeper (*Parthenocissus*

*quinquefolia*, FACU) and saplings of overstory species. The groundcover included may-apple (*Podophyllum peltatum*, FACU), garlic mustard (*Allaria petiolata*, FACU), hayscented fern (*Dennsteadtia punctilobula*, UPL), tree clubmoss (*Lycopodium obscurum*, FACU), partridge berry (*Mitchella repens*, FACU), ground cedar (*Lycopodium tristachyum*, UPL) and stilt grass (*Eulalia viminea*, FAC).

**Hydrology and Soils**

Numerous borings were taken in upland soils during the delineation fieldwork and to formally document soil conditions at upland data points. Typical soil matrix colors at the diagnostic horizon ranged from brown (10YR 4/3) to light yellowish brown (10YR 6/4), indicating an absence of hydric conditions. In addition, mottling was usually absent indicating that the soils were reasonably well drained. Saturated soils and high water tables were observed in some upland areas during wetter parts of the year. However, high soil matrix chromas and a general absence of soil mottling indicated that these observations reflected hydrologic conditions that were short-term in nature.

## 4.2 WETLAND PLANT COMMUNITIES

**Palustrine Emergent**

Palustrine emergent wetlands were located throughout the site. A diverse group of herbaceous hydrophytic plants was present including soft rush (*Juncus effusus*, FACW+), sedges (*Carex spp.*, FAC – OBL), arrow-leaf tearthumb (*Polygonum sagittatum*, OBL), common boneset (*Eupatorium perfoliatum*, FACW+), giant goldenrod (*Solidago gigantea*, FACW), seedbox (*Ludwigia alternifolia*, FACW+), nutsedges (*Cyperus spp.*, FAC-OBL), blue vervain (*Verbena hasta*, FACW+), New York ironweed (*Vernonia noveboracensis*, FACW+), swamp aster (*Aster puniceus*, OBL), cut-leaf coneflower (*Rudbeckia laciniata*, FACW), broad-leaved cattail (*Typha latifolia*, OBL), reed canary grass (*Phalaris arundinacea*, FACW+) and purple loosestrife (*Lythrum salicaria*, FACW+).

**Palustrine Scrub/Shrub**

Several large palustrine scrub/shrub wetlands were located in the western part of the site and hydrophytic shrubs were a component of many wetlands across the site. Spicebush was overwhelmingly the most abundant wetland-preferring shrub onsite. Other frequently occurring wetland shrubs were highbush blueberry (*Vaccinium corymbosum*, FACW-), meadowsweet (*Spirea latifolia*, FAC+), alders (Alnus spp., FAC-OBL), silky dogwood (*Cornus ammomum*, FACW), arrow-wood (*Viburnum dentatum*, FAC) and grey dogwood (*Cornus racemosa*, FAC).

**Palustrine Forested**

Palustrine forested wetlands were the principal wetland type onsite and large contiguous blocks of this habitat extended across the western section of the site. Trees commonly found in wetland forest habitat included red maple (*Acer rubrum*), silver maple (*Acer saccharinum*) black gum (*Nyssa sylvatica*), pin oak (Q*uercus palustris*) and river birch (*Betula nigra*). In addition, upland-preferring species such as white ash and yellow poplar were present on upland microsites scattered throughout some forested wetlands.

Wetland forest understories were comprised largely of spicebush, highbush blueberry, arrow-wood and winterberry (*Ilex verticellata*, FACW+). Skunk cabbage (*Symplocarpus foetidus*,

OBL) predominated in the groundcover along with sedges, jewelweed (*Impatiens capensis*, FACW), sensitive fern (*Onoclea sensibilis*, FACW), clearweed (*Pilea pumila*, FACW), cinnamon fern (*Osmunda cinnamomea*, FACW), stout woodreed grass (*Cinna arundinacea*, FACW+), and swamp dewberry (*Rubus hispidus*, FACW).

**Hydrology and Soils**

Wetland habitat typically occurred in low-lying poorly drained lands adjacent to Walker Run and its tributaries, headwaters areas, or one of the other small streams that drain the site. A few isolated wetlands were also present. Indicators of wetlands hydrology observed during the delineation field work included prolonged inundation, saturated soils, high water tables, sediment deposits on leaves, water-stained leaves and oxidized root channels within 12-inches of the soil surface. In addition, many wetlands were associated with multiple actively flowing groundwater seeps and exhibited a characteristic braided drainage pattern. Trees with buttressed trunks and surface roots were also common in forested wetlands.

Numerous borings were taken in wetland soils during the delineation fieldwork and to formally document soil conditions at wetland data points. Coal overwash was detected in some of the soils examined in the Susquehanna Riverlands. Typical soil matrix colors at the diagnostic horizon ranged from gray (6/N) to very dark grayish brown (10YR 3/2) with mottling, indicating hydric conditions.

## 4.3 WETLANDS BOUNDARIES

Wetlands boundaries were usually associated with gradual to steep increases in slope and a distinct change from low chroma hydric soil matrix colors to the much brighter matrix colors of upland soils. In addition, wetlands were distinguished by the generally strong evidence of requisite hydrology, particularly the abundance of groundwater seeps.

Vegetation indicators were not always as definitive as soil and hydrology indicators. There was considerable vegetation overlap between wetlands and uplands, particularly in forest understories and overstories. As a rule, red maple and spicebush were abundant in both forested wetlands and upland deciduous forests. However, in upland forests spicebush tended to be less common in the understory, and upland preferring species as well as red maple predominated in the overstory. Boundaries between palustrine emergent wetlands and old field habitat were typically more distinct and characterized by a transition from hydrophytic cover to largely upland-preferring herbaceous plant communities dominated by Canada goldenrod, daisy fleabane and/or Canada thistle.

Many wetlands were bounded in part by manmade structures, especially in the Susquehanna Riverlands to the east of Route 11. These structures included roads, trails, SSES facilities and soil stockpiles created during SSES construction. Also, some farmlands in the western part of the site were tilled up to the wetland edge or within a few feet of wetlands habitat.

Wetland boundaries were documented by photographs (Appendix A) and data sheets (Appendix B). Wetlands boundaries, data points, and photograph locations are shown in Figure 6.

## 5.0 EXCEPTIONAL VALUE WETLANDS ANALYSIS

This section evaluates wetlands in the BBNPP site against the PADEP Dam Safety and Waterway Management Regulations criteria defining Exceptional Value Wetlands (Chapter 105.17).

According to Title 25 Pa. Code 105.17, Exceptional Value Wetlands are wetlands that exhibit one or more of the following characteristics:

1. *Wetlands which serve as habitat for fauna or flora listed as "threatened" or "endangered" under the Endangered Species Act of 1973, the Wild Resource Conservation Act, 30 Pa. C.S. (relating to the Fish and Boat Code), or 34 Pa. C.S. (relating to the Game and Wildlife Code).*

Information concerning the presence of species of special concern within a 0.5-mile radius of an area encompassing the site, PPL-owned lands to the north and the Susquehanna Riverlands was requested via correspondence submitted 21 December 2007 to the U. S. Fish and Wildlife Service (USFWS), Pennsylvania Department of Conservation and Natural Resources (DCNR), Pennsylvania Game Commission (PGC) and Pennsylvania Fish and Boat Commission (PFBC). A summary of each response is presented in the following sections:

U. S. Fish and Wildlife Service

USFWS has jurisdiction over species of flora and fauna designated as listed, proposed or candidate under the federal Endangered Species Act. The agency's reply indicated that the site was within the range of the federally endangered Indiana bat (*Myotis sodalis*). Furthermore, based on life history information cited in the response letter, the site contains habitat utilized by Indiana bats for foraging and roosting during the spring through fall.

A mist net survey was conducted at the request of USFWS in 2008 to determine the presence of the Indiana bat onsite. No Indiana bats captured during this survey; however, potential roosting and maternity den sites were observed in forested areas of the BBNPP site in the form of exfoliating bark of large, often dead, trees.

Pennsylvania Game Commission

PGC has jurisdiction over birds and mammals designated as special concern in Pennsylvania. The agency indicated that the site is located in the vicinity of known bat hibernacula and is concerned with potential impacts to five bat species encompassing the Small-footed Myotis (*Myotis leibii*), Northern Myotis (*Myotis spetentrionalis*), Little Brown (*Myotis lucifugas*), Big Brown (*Eptesicus fucsus*) and the Pipistrelle (*Pipistrellus subflavus*). The Small-footed Myotis is listed as threatened in Pennsylvania; however, the other four bat species are not listed as threatened or endangered at the state level. Surprisingly, the PGC response made no mention of the Indiana bat. Four northern myotis (Pennsylvania candidate rare) were captured during the Indiana bat mist net survey discussed above.

Pennsylvania Department of Conservation and Natural Resources

DCNR has jurisdiction over rare plants, natural communities, terrestrial invertebrates and certain geological features in Pennsylvania. DCNR replied that there were no known occurrences of plants or geological features of state concern within the site. However, the agency listed four butterfly species of concern known to occur in the project vicinity including the Northern Pearly-

Eye (*Enodia anthedon*), Baltimore Checkerspot (*Euphydras phaeton*), Mulberry Wing (*Poanes massasoit*) and Long Dash (*Polites mystic*). Similar DCNR correspondence pertaining to the SSES Units 1 and 2 license renewal application described these four species and one additional butterfly of concern as "utilizing the area east of the plant, near Rt. 11, although they may be found elsewhere onsite as well." See letter dated 8 January 2007 to Ms. Alicia Mullins, U.S. Nuclear Regulatory Commission.

The site potentially provides suitable habitat for these five butterflies based on habitat descriptions provided by DCNR and information researched by Normandeau concerning life histories, and breeding/foraging preferences of these species. DCNR requested in its current response letter that attempts be made to minimize impacts to potential habitat for these butterflies within the site.

A butterfly survey was conducted in 2008 to investigate the presence of the five butterfly species of special concern. Two butterfly species identified by DCNR as of special concern were observed, long dash (*Polites mystic*) and black dash (*Euphyes conspicua*); however, long dash has since been removed from the Pennsylvania Natural Diversity Inventory (PNDI) tracked species due to a recent revision of state ranks.

<u>Pennsylvania Fish and Boat Commission</u>

PFBC has jurisdiction over fishes, reptiles, amphibians, aquatic invertebrates and freshwater mussels designated as special concern in Pennsylvania. The agency's reply indicated that three special concern species encompassing the Eastern hognose snake (Heterodon platyrhinos), yellow lampmussel (*Lampsilis cariosa*) and green floater (*Lasmigona subviridis*) were known from the vicinity of the project area.

Herpetological field studies conducted at the BBNPP site in 2008 found no evidence of eastern hognose or other reptiles or amphibians of special concern likely to occur onsite. However, aquatic ecological surveys near the SSES Susquehanna River intake/discharge structure in 2007 confirmed the presence of the two mussel species.

In summary, responses from jurisdictional agencies revealed that no threatened or endangered flora, birds, natural communities or geological features are known to occur with 0.5-miles of the site. This information was confirmed by field studies conducted on the BBNPP site in 2007 and 2008. Furthermore, these studies did not detect the presence of any threatened or endangered mammals, reptiles, amphibians or terrestrial invertebrates. However, the field studies did reveal the occurrence of one bat, one butterfly and two mussel species of special concern onsite.

2. *Wetlands that are hydrologically connected to or located within 1/2-mile of wetlands identified in question 1 and that maintain the habitat of the threatened or endangered species within the wetlands identified above.*

Information concerning the presence of species of special concern within a 0.5-mile radius of an area encompassing the site, PPL-owned lands to the north and the Susquehanna Riverlands was requested from jurisdictional natural resource management agencies and is summarized above.

3. *Wetlands that are located in or along the floodplain of the reach of a wild trout stream or waters listed as Exceptional Value under Chapter 93 (relating to water quality standards) and the floodplain of streams tributary thereto, or wetlands within the corridor or a*

*watercourse or body of water that has been designated as a National wild or scenic river in accordance with the Wild and Scenic Rivers Act of 1968 or designated as wild or scenic under the Pennsylvania Scenic Rivers Act.*

None of the wetlands within the BBNPP site are located in or along the floodplain of an Exceptional Value water, or within the corridor of a watercourse or body of water that has been designated as a wild or scenic river at the state or federal level. Walker Run and the Susquehanna River are not listed as Exceptional Value under PADEP's Chapter 93 Water Quality Standards. They are classified as having the protected uses of Cold Water Fisher (CWF) and Warm Water Fishes (WWF), respectively. In addition, neither watercourse is designated as wild or scenic at either the state or federal level.

Walker Run is not designated by PFBC as Class A Wild Trout Streams and is not included in the agency's April 2008 list of "Pennsylvania Stream Sections that Support Wild Trout". However, Normandeau collected small numbers of brown trout (*Salmo trutta*) in Walker Run during April and July 2008 at several stations located onsite, as well as stations located upstream and downstream of the site. Therefore, BBNPP site wetlands associated with Walker Run could potentially meet PADEP Exception Value wetland criteria since they are "located in or along the floodplain of the reach of a wild trout stream."

4. *Wetlands located along an existing public or private drinking water supply, including both surface water and groundwater sources, which maintain the quality or quantity of the drinking water supply.*

Walker Run is not used as a public or private drinking water supply. Although the Susquehanna River may be used as a water supply in some regions, the river is not used for this purpose in the vicinity of the site.

5. *Wetlands located in areas designated by the Department as "natural" or "wild" areas within state forest or park lands, wetlands located in areas designated as federal wilderness areas under the Wilderness Act or the Federal Eastern Wilderness Act of 1975 or wetlands located in areas designated as National Natural Landmarks by the Secretary of the Interior under the Historic Sites Act of 1935.*

The BBNPP site is wholly owned by PPL and none of the above state or federal designations are applicable.

In summary, BBNPP site wetlands do not meet any of the Exceptional Value Wetlands criteria addressed above with the possible exception of number 3. Under this criterion, BBNPP site wetlands associated with Walker Run could potentially be designated by PADEP as Exception Value wetlands since they are "located in or along the floodplain of the reach of a wild trout stream."

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# TABLES

Table 1. Soils Mapped in the Bell Bend Nuclear Power Plant Owner Controlled Area[1].

| Name | Drainage Class | Hydric Status |
|---|---|---|
| Atherton silt loam | Poorly to very poorly | Hydric |
| Arnot-Rock outcrop complex, steep | Well | Not hydric |
| Braceville gravelly loam | Moderately well | Not hydric[2] |
| Chenango gravelly loam | Well | Not hydric |
| Holly silt loam | Poorly | Hydric |
| Morris very stony silt loam | Somewhat poorly and poorly | Not hydric[2] |
| Oquaga & Lordstown channery silt loams | Well | Not hydric[2] |
| Oquaga & Lordstown extremely stony loams | Well | Not hydric[2] |
| Pope soils | Well | Not hydric[2] |
| Rexford loam | Somewhat poorly and poorly | Hydric |
| Weikert & Klinesville channery silt loam | Well | Not hydric[2] |
| Wyoming gravelly loam | Somewhat excessively | Not hydric |

[1] Sources: Natural Resources Conservation Service. 2007. Soil Map Version 2.
[2] May have inclusions of hydric soil in seepage areas, bottomlands, depressions and/or drainageways.

Table 2. Common plants identified in the Bell Bend NPP Owner Controlled Area.

| Scientific Name | Common Name | Indicator Status[1] |
|---|---|---|
| Trees and Saplings | | |
| *Acer saccharinum* | silver maple | FACW |
| *Acer rubrum* | red maple | FAC |
| *Ailanthus altissima* | tree-of-heaven | FACU- |
| *Betula alleghaniensis* | yellow birch | FAC |
| *Betula lenta* | sweet birch | FACU |
| *Betula nigra* | river birch | FACW |
| *Betula populifolia* | gray birch | FAC |
| *Carya cordiformis* | bitternut hickory | FACU+ |
| *Carya ovata* | shagbark hickory | FACU- |
| *Carya tomentosa* | mockernut hickory | UPL |
| *Celtis occidentalis* | hackberry | FACU |
| *Cornus florida* | flowering dogwood | FACU- |
| *Fagus grandifolia* | American beech | FACU |
| *Fraxinus americana* | white ash | FACU |
| *Juglans nigra* | black walnut | FACU |
| *Juniperus virginiana* | eastern red cedar | FACU |
| *Liriodendron tulipifera* | yellow poplar | FACU |
| *Malus* spp. | apple | UPL |
| *Nyssa sylvatica* | black gum | FAC |
| *Pinus resinosa* | red pine | FACU |
| *Pinus strobus* | eastern white pine | FACU |
| *Pinus sylvestris* | Scots pine | UPL |
| *Platanus occidentalis* | American sycamore | FACW- |
| *Populus tremuloides* | quaking aspen | FACU |
| *Prunus serotina* | black cherry | FACU |
| *Quercus alba* | white oak | FACU- |
| *Quercus bicolor* | swamp white oak | FACW+ |
| *Quercus palustris* | pin oak | FACW |
| *Quercus rubra* | northern red oak | FACU- |
| *Quercus velutina* | black oak | UPL |
| *Robinia pseudoacacia* | black locust | FACU- |
| *Sassafras albidum* | sassafras | FACU- |
| *Tilia americana* | American basswood | FACU |
| *Tsuga canadensis* | eastern hemlock | FACU |
| *Ulmus rubra* | slippery elm | FAC |
| Woody Vines | | |
| *Lonicera japonica* | Japanese honeysuckle | FAC- |
| *Parthenocissus quinquefolia* | Virginia creeper | FACU |
| *Rubus flagellaris* | northern dewberry | UPL |

Table 2. (Continued)

| Scientific Name | Common Name | Indicator Status[1] |
|---|---|---|
| Woody Vines | | |
| *Smilax glauca* | cat greenbrier | FACU |
| *Smilax rotundifolia* | common greenbrier | FAC |
| *Toxicodendron radicans* | poison ivy | FAC |
| Shrubs | | |
| *Alnus* spp. | alders | FAC-OBL |
| *Cornus amomum* | silky dogwood | FACW |
| *Cornus racemosa* | swamp dogwood | FAC |
| *Elaeagnus angustifolia* | Russian olive | FACU |
| *Ilex verticillata* | winterberry | FACW+ |
| *Kalmia latifolia* | mountain laurel | FACU |
| *Ligustrum obtusifolium* | privet | FACU |
| *Lindera benzoin* | northern spicebush | FACW- |
| *Lonicera tatarica* | tartarian honeysuckle | FACU |
| *Rhus typhina* | staghorn sumac | FACU |
| *Rosa multiflora* | multiflora rose | FACU |
| *Rubus allegheniensis* | Allegheny blackberry | FACU- |
| *Rubus occidentalis* | black raspberry | UPL |
| *Sambucus canadensis* | American elder | FACW- |
| *Salix discolor* | pussy willow | FACW |
| *Spirea latifolia* | broad-leaf meadow-sweet | FAC+ |
| *Vaccinium corymbosum* | highbush blueberry | FACW- |
| *Viburnum cassinoides* | withe-rod | FACW |
| *Viburnum dentatum* | arrow-wood | FAC |
| *Viburnum prunifolium* | black-haw | FACU |
| Herbs[3] | | |
| *Achillea millefolium* | common yarrow | FACU |
| *Acorus calamus* | sweetflag | OBL |
| *Agropyron repens* | quack grass | FACU- |
| *Agrostis gigantea* | redtop | FACW |
| *Alliaria petiolata* | garlic mustard | FACU- |
| *Allium vineale* | field garlic | FACU- |
| *Ambrosia artemisiifolia* | common ragweed | FACU |
| *Anthoxanthum odoratum* | sweet vernal grass | FACU |
| *Apocynum cannabinum* | clasping leaf dogbane | FACU |
| *Arctium minus* | common burdock | UPL |
| *Arisaema triphyllum* | swamp jack-in-the-pulpit | FACW- |

Table 2. (Continued)

| Scientific Name | Common Name | Indicator Status[1] |
|---|---|---|
| Herbs[3] | | |
| *Artemisia vulgaris* | mugwort | UPL |
| *Asclepias incarnata* | swamp milkweed | OBL |
| *Asclepias syriaca* | common milkweed | FACU- |
| *Aster pilosus* | white heath aster | UPL |
| *Aster puniceus* | swamp aster | OBL |
| *Barbarea vulgaris* | winter-cress | FACU |
| *Biden* spp. | beggar-ticks | FACW-OBL |
| *Boehmeria cylindrica* | false nettle | FACW+ |
| *Bromus inermis* | smooth brome grass | UPL |
| *Carex* spp. | sedges | FAC-OBL |
| *Carex lurida* | shallow sedge | OBL |
| *Carex stricta* | uptight sedge | OBL |
| *Chenopodium album* | lamb's quarters | FACU+ |
| *Cicuta bulbifera* | water hemlock | OBL |
| *Cinna arundinacea* | stout wood-reedgrass | FACW+ |
| *Cirsium arvense* | Canada thistle | FACU |
| *Cirsium vulgare* | bull thistle | FACU- |
| *Claytonia virginica* | spring beauty | FACU |
| *Conyza canadensis* | horseweed | UPL |
| *Coronilla varia* | crown-vetch | UPL |
| *Cyperus* spp. | nutsedges | FACW |
| *Dactylis glomerata* | orchard grass | FACU |
| *Dennstaedtia punctilobula* | hayscented fern | UPL |
| *Dichanthelium clandestinum* | deer-tongue witchgrass | FAC+ |
| *Dipsacus sylvestris* | teasel | FACU- |
| *Eleocharis* spp. | spikerushes | FACW-OBL |
| *Erechtites hieraciifolia* | American burn | FACU |
| *Erigeron annuus* | daisy fleabane | FACU |
| *Eulalia viminea* | Nepal microstegium | FAC |
| *Eupatoriadelphus* spp. | Joe-Pye-weed | FAC-FACW |
| *Eupatorium perfoliatum* | common boneset | FACW+ |
| *Euthamia graminifolia* | flat-top fragrant goldenrod | FAC |
| *Galium mollugo* | wild madder | FACU |
| *Geum canadense* | white avens | FACU |
| *Glyceria striata* | fowl manna grass | OBL |
| *Hesperis matronalis* | dames rocket | FACU- |
| *Holcus lanatus* | common velvet grass | FACU |
| *Hypericum perforatum* | St. John's wort | FACU |
| *Impatiens capensis* | jewelweed | FACW |
| *Juncus effusus* | soft rush | FACW+ |
| *Juncus tenuis* | path rush | FAC- |
| *Lamium purpureum* | purple dead nettle | UPL |

Table 2. (Continued)

| Scientific Name | Common Name | Indicator Status[1] |
|---|---|---|
| Herbs[3] | | |
| *Leersia oryzoides* | rice cutgrass | OBL |
| *Leucanthemum vulgare* | oxeye daisy | UPL |
| *Lotus corniculatus* | birds-foot trefoil | FACU- |
| *Ludwigia alternifolia* | seedbox | FACW+ |
| *Ludwigia palustris* | marsh seedbox | OBL |
| *Lycopodium obscurum* | tree clubmoss | FACU |
| *Lycopodium tristachyum* | ground cedar | UPL |
| *Lycopus* spp. | bugleweeds | OBL |
| *Lysimachia ciliata* | fringed loosestrife | FACW |
| *Lysimachia nummularia* | moneywort | OBL |
| *Lythrum salicaria* | purple loosestrife | FACW+ |
| *Maianthemum canadense* | false lily-of-the-valley | FAC- |
| *Mitchella repens* | partridge-berry | FACU |
| *Oenothera biennis* | common evening-primrose | FACU- |
| *Onoclea sensibilis* | sensitive fern | FACW |
| *Osmunda cinnamomea* | cinnamon fern | FACW |
| *Oxalis spp.* | wood-sorrel | FACU-UPL |
| *Panicum dichotomiflorum* | fall panic grass | FACW- |
| *Phalaris arundinacea* | Reed canary grass | FACW+ |
| *Phleum pretense* | timothy grass | FACU |
| *Phragmites australis* | common reed | FACW |
| *Phytolacca americana* | common pokeweed | FACU+ |
| *Plantago lanceolata* | English plantain | UPL |
| *Plantago major* | common plantain | FACU |
| *Pilea pumila* | clearweed | FACW |
| *Podophyllum peltatum* | may-apple | FACU |
| *Polygonum arifolium* | halberd-leaf tearthumb | OBL |
| *Polygonum cespitosum* | cespitose knotweed | FACU- |
| *Polygonum perfoliatum* | mile-a-minute | FAC |
| *Polygonum sagittatum* | arrow-leaved tearthumb | OBL |
| *Polygonum virginianum* | Virginia knotweed | FAC |
| *Prunella vulgaris* | heal-all | FACU+ |
| *Rubus hispidus* | bristly blackberry | FACW |
| *Rudbeckia hirta* | black-eyed Susan | FACU- |
| *Rudbeckia laciniata* | cut-leaf coneflower | FACW |
| *Rumex crispus* | curly dock | FACU |
| *Sagittaria latifolia* | broad-leaf arrow-head | OBL |
| *Saponaria officinalis* | bouncing-bet | FACU- |
| *Schizachrium scoparium* | little bluestem | FACU- |
| *Scirpus cyperinus* | wool-grass | FACW+ |
| *Scirpus* spp. | bulrushes | FACW-OBL |

Table 2. (Continued)

| Scientific Name | Common Name | Indicator Status[1] |
|---|---|---|
| Herbs[3] | | |
| *Setaria faberi* | Japanese bristle grass | UPL |
| *Setaria glauca* | yellow bristle grass | FAC |
| *Solanum carolinense* | Carolina nightshade | UPL |
| *Solidago canadensis* | Canada goldenrod | FACU |
| *Solidago gigantea* | giant goldenrod | FACW |
| *Solidago rigida* | stiff goldenrod | UPL |
| *Solidago rugosa* | wrinkled goldenrod | FAC |
| *Sparganium* spp. | burreeds | OBL |
| *Symplocarpus foetidus* | skunk-cabbage | OBL |
| *Taraxacum officinale* | common dandelion | FACU- |
| *Tridens flavus* | purple-top tridens | FACU |
| *Trifolium pretense* | red clover | FACU- |
| *Typha latifolia* | broad-leaved cattail | OBL |
| *Urtica dioica* | stinging nettle | FACU |
| *Verbascum blattaria* | moth mullein | UPL |
| *Verbascum thapsus* | common mullein | UPL |
| *Verbena hastata* | blue vervain | FACW+ |
| *Vernonia noveboracensis* | New York ironweed | FACW+ |

[1]National List of Plant Species that Occur in Wetlands 1996 National Summary: Northeast (Region 1).

# FIGURES

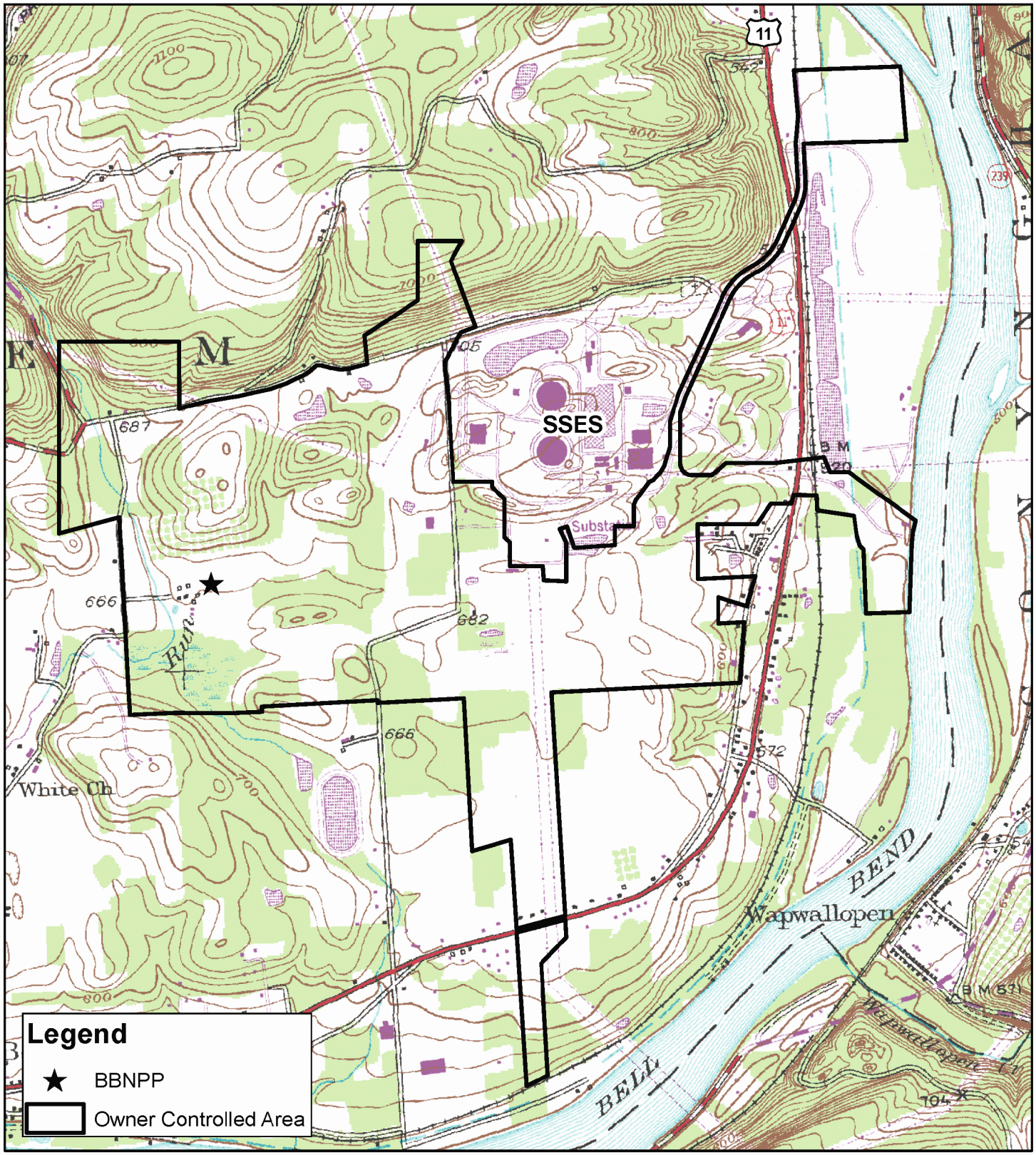


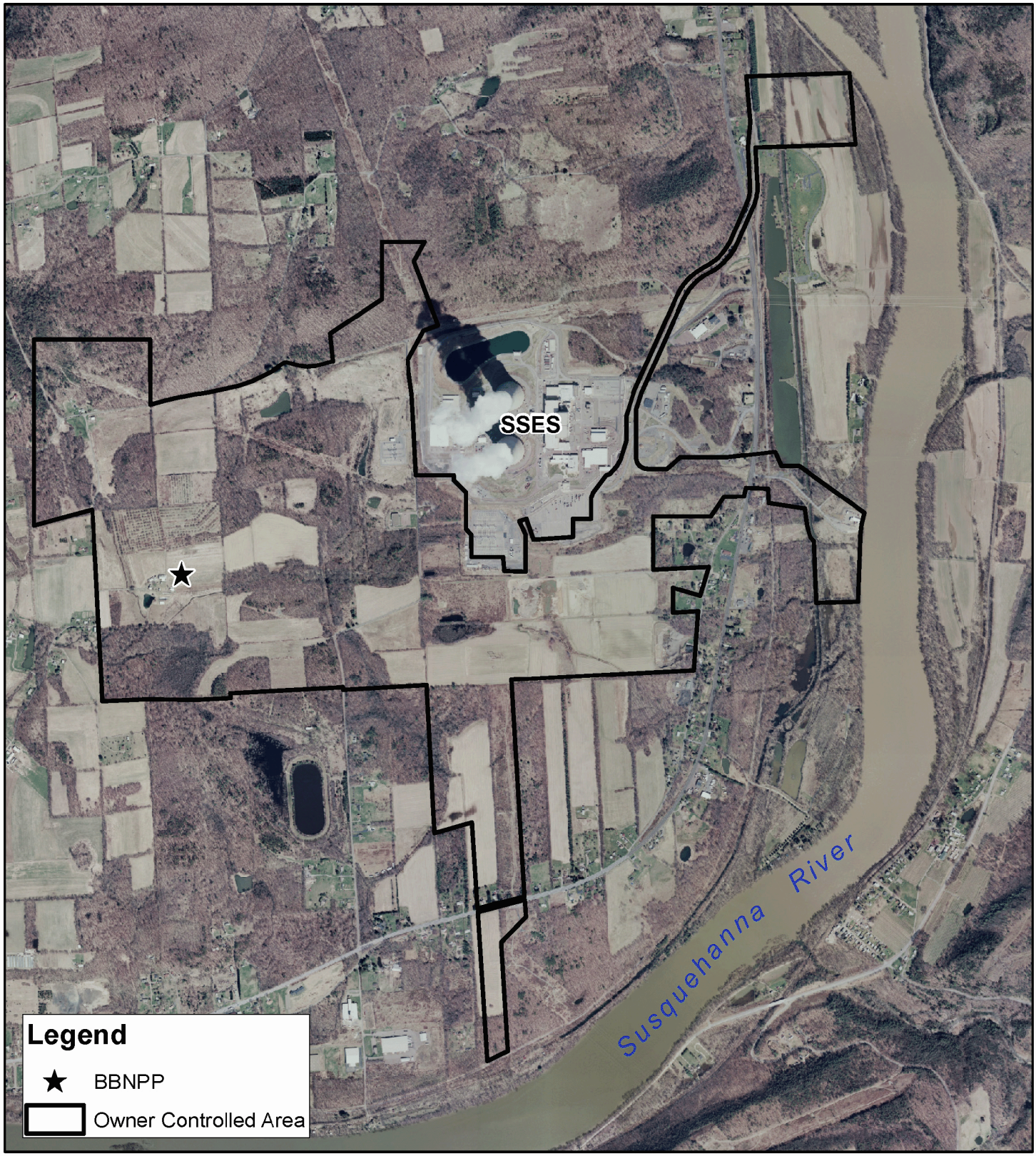

Figure 1.
**Bell Bend NPP**
**Site Location Map**

N

NORMANDEAU ASSOCIATES
ENVIRONMENTAL CONSULTANTS
400 Old Reading Pike, Bldg A, Suite 101 Stowe, PA 19464

date: 09/11/08
project: 21159.002
prepared by: s.sherman

checked by: k.maurice
project name: Bell Bend
file name: BBNPP_Site_USGS




0.5 0.25 0 0.5 Miles

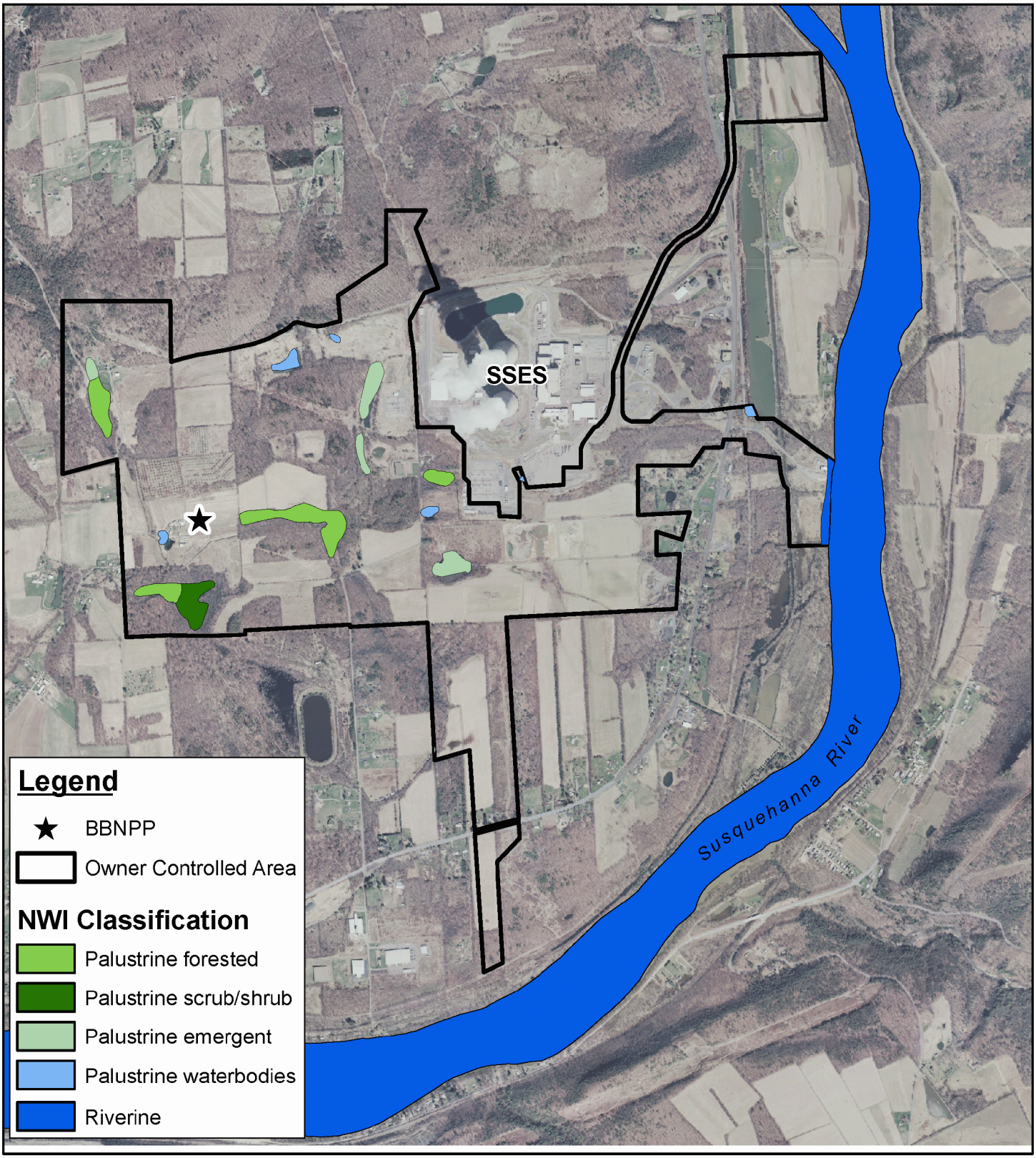
Figure 2.
**Bell Bend NPP**
**Site Aerial Photograph**

N

NORMANDEAU ASSOCIATES
ENVIRONMENTAL CONSULTANTS
400 Old Reading Pike, Bldg A, Suite 101 Stowe, PA 19464

date: 09/11/08
project: 21159.002
prepared by: s.sherman

checked by: k.maurice
project name: Bell Bend
file name: BBNPP_Site_Aerial




Note:
Aerial Photography from PAMAP Program, PA DCNR,
Bureau of Topographic and Geologic Survey, 2005
USFWS NWI Berwick, PA Quad, 1976

0.5 0.25 0 0.5 Miles

Figure 3.
**Bell Bend NPP**
**National Wetlands Inventory Map**

N

NORMANDEAU ASSOCIATES
ENVIRONMENTAL CONSULTANTS
400 Old Reading Pike, Bldg A, Suite 101 Stowe, PA 19464

date: 09/15/08
project: 21159.002
prepared by: s.sherman

checked by: k.maurice
project name: Bell Bend
file name: BBNPP_NWI

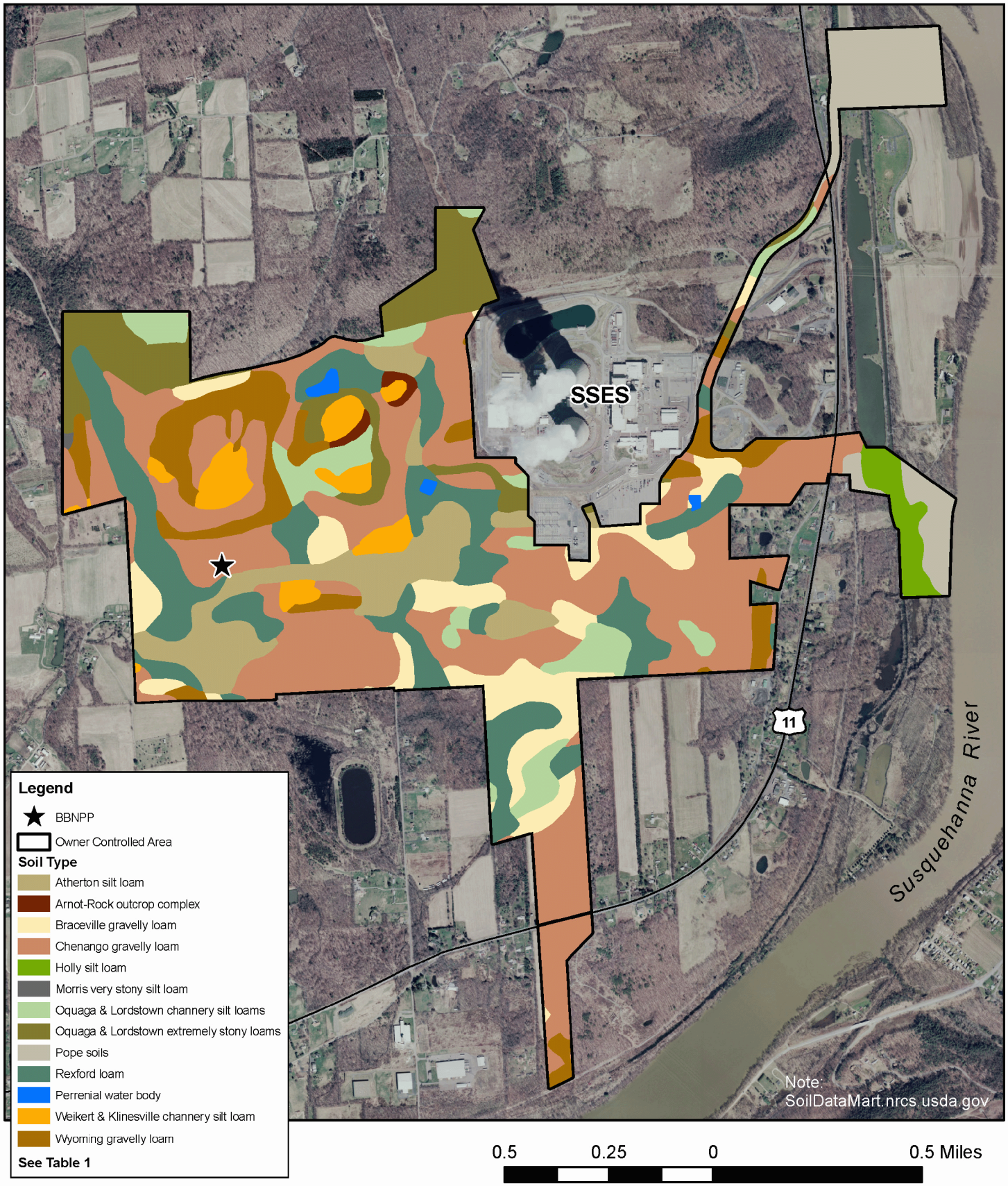


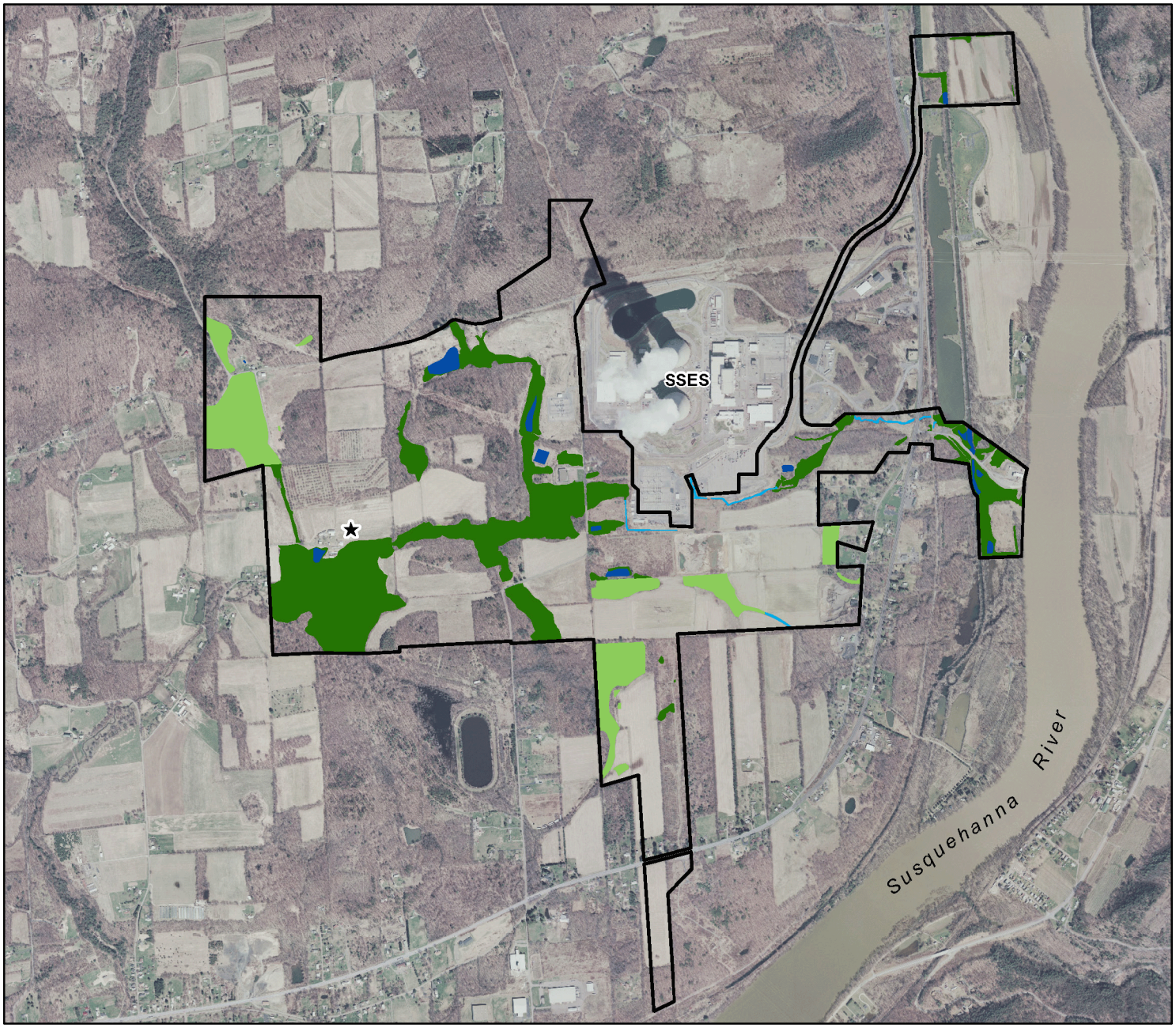

Figure 4.
**Bell Bend NPP**
**Soil Survey Map**

N

NORMANDEAU ASSOCIATES
ENVIRONMENTAL CONSULTANTS
400 Old Reading Pike, Bldg A, Suite 101 Stowe, PA 19464

date: 09/11/08
project: 21159.002
prepared by: s.sherman

checked by: k.maurice
project name: Bell Bend
file name: BBNPP_Ste_Soils




**Legend**

- ★ BBNPP
- Owner Controlled Area

**Wetland Type**

- Wetlands (surveyed boundary)
- Wetlands (approximate boundary)
- Stream Channel
- Waterbodies

Note:
Aerial Photography from PAMAP Program, PA DCNR, Bureau of Topographic and Geologic Survey, 2005
Wetlands delineated by Normandeau Associates, Inc. and surveyed by Peters Consultants, Inc.

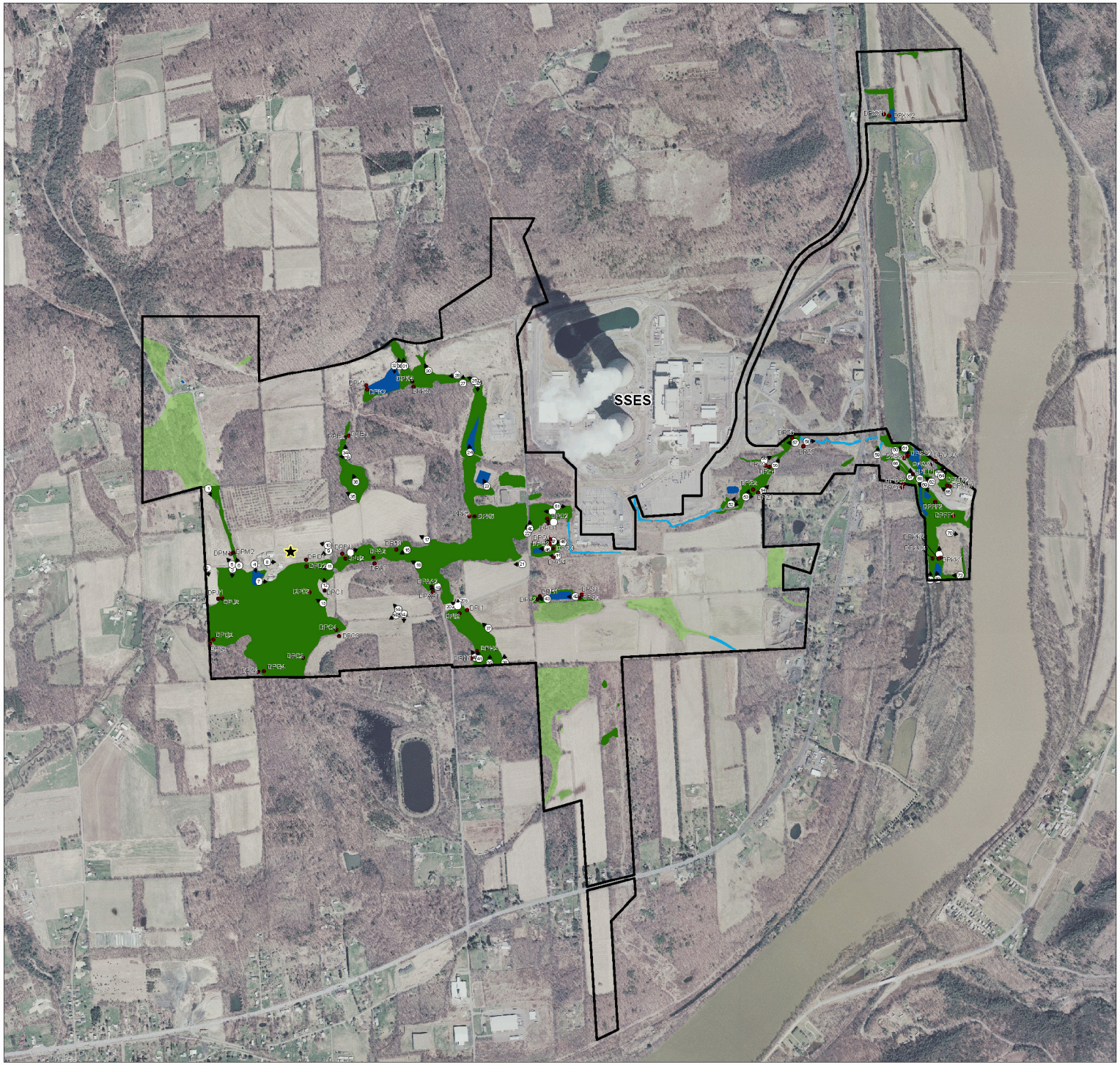
0.3 0.15 0 0.3 Miles

Figure 5.
**Bell Bend NPP**
**Wetlands Map**

NORMANDEAU ASSOCIATES
ENVIRONMENTAL CONSULTANTS
400 Old Reading Pike, Bldg A, Suite 101 Stowe, PA 19464

date: 09/15/08
project: 21159.002
prepared by: s.sherman

checked by: k.maurice
project name: Bell Bend
file name: BBNPP_Wetlands_Figure5




N

## Legend

- BBNPP
- Data Points
- Photograph Location and Orientation
- Owner Controlled Area

## Wetland Type

- Wetlands (surveyed boundary)
- Wetlands (approximate boundary)
- Stream Channel
- Waterbodies

Note:
Aerial Photography from PAMAP Program, PA DCNR, Bureau of Topographic and Geologic Survey, 2005
Wetlands delineated by Normandeau Associates, Inc. and surveyed by Peters Consultants, Inc.

0.25 0.125 0 0.25 Miles

Figure 6.
**Bell Bend NPP**
**Wetlands Boundary Map**

NORMANDEAU ASSOCIATES
ENVIRONMENTAL CONSULTANTS
1400 Old Reading Pike Bldg. A, Suite 101 Stowe, PA 19464

date: 09/15/08
project: 21159.002
prepared by: s.sherman

checked by: k.maurice
file name: BBNPP_yWetlands_Figure6.mxd

# APPENDIX A

## Photographs

1. Looking south from the vicinity of boundary point M-25 (2008).

2. The J wetland boundary follows the forest edge.

Normandeau Associates, Inc.
400 Old Reading Pike
Building A, Suite 101
Stowe, PA 19464

3. Palustrine emergent and palustrine forested wetlands.

4. Former Kinzer farm pond.

Normandeau Associates, Inc.
400 Old Reading Pike
Building A, Suite 101
Stowe, PA 19464

5. Fallow farmland vegetated by old field habitat (2007).

6. Vicinity of Walker Run.

Normandeau Associates, Inc.
400 Old Reading Pike
Building A, Suite 101
Stowe, PA 19464

7. Upland(left) to wetland (right) transition at boundary point D23.

Normandeau Associates, Inc.
400 Old Reading Pike
Building A, Suite 101
Stowe, PA 19464

8. Wetland boundary points D1 - D14 are located near the edge of the unmowed herbaceous vegetation.

Normandeau Associates, Inc.
400 Old Reading Pike
Building A, Suite 101
Stowe, PA 19464

9. Old field habitat.

10.

Normandeau Associates, Inc.
400 Old Reading Pike
Building A, Suite 101
Stowe, PA 19464

11a. The vicinity of Walker Run is vegetated by reed canary-grass.

11b.

Normandeau Associates, Inc.
400 Old Reading Pike
Building A, Suite 101
Stowe, PA 19464

12a. Old field habitat along the C boundary line.

12b.

Normandeau Associates, Inc.
400 Old Reading Pike
Building A, Suite 101
Stowe, PA 19464

13a. Palustrine emergent wetlands.

13b.

Normandeau Associates, Inc.
400 Old Reading Pike
Building A, Suite 101
Stowe, PA 19464