

Final

A Field Survey of Plant Communities at the
Proposed Bell Bend Nuclear Power Plant Site,
Luzerne County, Pennsylvania



Submitted to:
AREVA NP, Inc.
Marlborough, MA

September 2008

**A Field Survey of Plant Communities at
the Proposed Bell Bend Nuclear Power
Plant Site, Luzerne County,
Pennsylvania**

**Prepared for:
AREVA NP, Inc.
Marlborough, MA**

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INTRODUCTION

Bell Bend Nuclear Power Plant (BBNPP) is proposed to be sited adjacent to the Susquehanna Steam Electric Station in Salem Township, Luzerne County, Pennsylvania (Figure 1). Normandeau Associates, Inc. was contracted by AREVA NP, Inc. to map the terrestrial plant communities on the proposed BBNPP owner controlled area (OCA). Herein the OCA is referred to as the site.

Personnel

This plant communities 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 accomplished 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.

METHODS

Mapping of terrestrial plant communities was initiated by a review of relevant literature and readily available natural resources mapping in order to anticipate the distribution of plant communities across the site. References consulted included the Natural Resources Conservation Service Luzerne County Soil Survey, National Wetlands Inventory mapping, aerial photography and information on plant species of special concern. Field mapping took place during the period of July 2007 through August 2008 in combination with wetlands delineation field studies. Documentation of the plant communities included an inventory of common plant species and representative photographs.

SITE DESCRIPTION

The BBNPP site extends across 882 acres (1.38 mile²) of property adjacent to the PPL Susquehanna Steam Electric Station (SSES) in Salem Township, Luzerne County, Pennsylvania (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.

RESULTS AND DISCUSSION

The Bell Bend site encompasses large tracts of upland plant communities, wetland plant communities, agricultural land and developed properties including several active gravel quarries (Figure 3). Descriptions of the upland and wetland communities are presented in the following sections.

Upland Plant Communities

Old Field/Former Agricultural

Old-field vegetation cover is composed of a variety 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 old field species include daisy fleabane (*Erigeron annuus*), Canada thistle (*Cirsium*

arvense), wrinkled goldenrod (*Solidago rugosa*), flat-top fragrant goldenrod (*Euthamia graminifolia*), Canada goldenrod (*Solidago canadensis*), giant foxtail grass (*Setaria faberi*), white heath aster (*Aster pilosus*), lamb's quarters (*Chenopodium album*), red clover (*Trifolium pretense*) and common ragweed (*Ambrosia artemisiifolia*).

Included with this habitat type in Figure 3 is an abandoned apple orchard several acres in size which is located on the hillside immediately north of the proposed location for the power block. A list of common plant species observed in the BBNPP site is presented in Table 1.

Upland Scrub/Shrub

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

Upland Deciduous Forest

Upland deciduous forest covers a large portion of the site to the west of Route 11. Common overstory species include northern red oak (*Quercus rubra*), white oak (*Quercus alba*), black cherry (*Prunus serotina*), white ash (*Fraxinus americana*), shagbark hickory (*Carya ovata*), bitternut hickory (*Carya cordiformis*), sweet birch (*Betula lenta*), black walnut (*Juglans nigra*), black locust (*Robinia pseudoacacia*), yellow poplar (*Liriodendron tulipifera*) and red maple (*Acer rubrum*).

Upland forest understories are composed predominantly of spicebush (*Lindera benzoin*), round-leaved greenbrier (*Smilax rotundifolia*), Virginia creeper (*Parthenocissus quinquefolia*) and saplings of overstory species. Groundcover

species include may-apple (*Podophyllum peltatum*), garlic mustard (*Allaria petiolata*), hayscented fern (*Dennstedtia punctilobula*), tree clubmoss (*Lycopodium obscurum*), partridge berry (*Mitchella repens*), ground cedar (*Lycopodium tristachyum*) and stilt grass (*Eulalia viminea*).

Wetland Plant Communities

Palustrine Emergent Wetlands

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

Palustrine Scrub/Shrub Wetlands

Several large palustrine scrub/shrub wetlands are located immediately southwest of SSES and hydrophytic shrubs are a common component of many wetlands across the BBNPP site. Spicebush is overwhelmingly the most abundant wetland-preferring shrub onsite. Other frequently occurring wetland shrubs are highbush blueberry (*Vaccinium corymbosum*), meadowsweet (*Spiraea latifolia*), alders (*Alnus spp.*), silky dogwood (*Cornus amomum*), arrow-wood (*Viburnum dentatum*) and grey dogwood (*Cornus racemosa*).

Palustrine Forested Wetlands

Palustrine forested wetlands are the principal wetland type in the BBNPP site,

and large contiguous blocks of this habitat are associated with Walker Run and its eastern tributary. Trees commonly found in forested wetlands onsite include red maple (*Acer rubrum*), silver maple (*Acer saccharinum*), black gum (*Nyssa sylvatica*), pin oak (*Quercus palustris*) and river birch (*Betula nigra*). In addition, upland-preferring species such as white ash and yellow poplar are present on microsites scattered throughout some forested wetlands.

Wetland forest understories are comprised largely of spicebush, highbush blueberry, arrow-wood and winterberry (*Ilex verticellata*). Skunk cabbage (*Symplocarpus foetidus*) predominates in the groundcover along with sedges, jewelweed (*Impatiens capensis*), sensitive fern (*Onoclea sensibilis*), clearweed (*Pilea pumila*), cinnamon fern (*Osmunda cinnamomea*), stout woodreed grass (*Cinna arundinacea*), and swamp dewberry (*Rubus hispidus*).

INVASIVE EXOTIC PLANT SPECIES

Non-native invasive plants occur abundantly within particular upland and wetland habitats in the BBNPP site. Wetland invaders include reed canary grass, purple loosestrife, and common reed (*Phragmites australis*), which are herbaceous plants that commonly colonize emergent wetland habitat. Reed canary grass is a dominant species throughout much of the emergent wetlands onsite and forms monocultures in some areas. Purple loosestrife is moderately abundant and common reed is currently limited to a small foothold near the southeastern corner. These species will likely colonize additional emergent wetland habitat over time.

Upland invaders include garlic mustard, stilt grass, multiflora rose and bush honeysuckle. Garlic mustard and stilt grass are herbaceous plants that are very common in the groundcover of upland forests. Multiflora rose and bush honeysuckle are shrubs that occur in dense concentrations in successional old-field habitat and along forest edges.

Native species of wildlife are adapted to habitats made up of indigenous vegetation. Typically, non-native plants have little or no value to native animals. Aggressive non-native plants, such as those identified above, tend to spread rapidly, form monocultures and out-compete native flora, which results in negative consequences for native wildlife.

SPECIES OF SPECIAL CONCERN

Information concerning the presence of threatened, endangered, and other special concern plants 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) and Pennsylvania Department of Conservation and Natural Resources (PDCNR). USFWS jurisdiction includes flora designated as listed, proposed or candidate under the Federal Endangered Species Act. PDCNR has jurisdiction over flora and natural communities considered to be rare in Pennsylvania. Neither agency reported any known occurrences of plants designated as threatened, endangered or of special concern within the search area (USFWS 2008 and PDCNR 2008). No threatened, endangered or other special concern plants were observed during Normandeau's field surveys.

REFERENCES

- Gleason, H.A. and A. Cronquist. 1991. Manual of Vascular Plants of Northeastern United States and Adjacent Canada. The New York Botanical Garden. Bronx, New York.
- Harlow, William M. 1957. Trees of the Eastern and Central United States and Canada. Dover Publications, Inc., New York, New York.

Holmgren, N.H. 1998. Illustrated Companion to Gleason and Cronquist Manual.
The New York Botanical Garden. Bronx, New York.

Normandeau Associates, Inc. 2008 Wetlands Delineation and Exceptional Value
Wetlands Analysis Report, for Proposed UniStar Nuclear Project Area,
Bell Bend Nuclear Power Plant Site, Luzerne County, Pennsylvania.”
Normandeau Associates, Inc., Stowe, Pennsylvania.

Newcomb, Lawrence. 1977. Newcomb's Wildflower Guide. Little, Brown and
Company. Boston, Massachusetts.

Pennsylvania Department of Conservation and Natural Resources. 2005.
PAMAP Program 2005 Color Orthophotos of Luzerne County,
Pennsylvania. Department of Conservation and Natural Resources,
Bureau of Topographic and Geologic Survey, Harrisburg, Pennsylvania.

Pennsylvania Department of Conservation and Natural Resources. 2008. Letter
from Rebecca H. Bowden to George Wrobel (CEG GNA Engineering), Re:
Environmental Review of Bell Bend Nuclear Power Plant Site, Berwick,
Luzerne County, Pennsylvania, Dated: March 24, 2008.

Pennsylvania Natural Heritage Program. 2006. A Natural Areas Inventory
Luzerne County, Pennsylvania. Western Pennsylvania Conservancy,
Middletown, Pennsylvania.

Peterson, Roger Tory and Margaret McKeany. 1986. A Field Guide to
Wildflowers, Northeastern/Northcentral North America. Houghton Mifflin
Company. Boston, Massachusetts.

Petrides, George A. 1986. Trees and Shrubs. Houghton Mifflin Company.
Boston, Massachusetts.

Rhodes, A. and W. McKinley, Jr. 1993. The Vascular Flora of Pennsylvania: Annotated Checklist and Atlas. American Philosophical Society. Philadelphia, Pennsylvania.

Strausbaugh, P. D. and Earl Core. 1977. Flora of West Virginia, Second Edition, Seneca Books, Inc., Grantsville, West Virginia.

U.S. Army Corps of Engineers. 1987. Corps of Engineers Wetland Delineation Manual. Technical Report Y-87-1, U.S. Army Engineer Experiment Station, Vicksburg, Mississippi.

U.S. Fish and Wildlife Service. 2008. Letter from David Densmore to Rod Krich (Unistar Nuclear), Re: USFWS Project #2008-518, Federally Listed Endangered and Threatened Species for the Bell Bend Nuclear Power Plant Site, Berwick, Luzerne County, Pennsylvania, Dated: January 18, 2008.

Table 1. Common plants identified in the Bell Bend NPP Owner Controlled Area.

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

Table 1. (Continued)

Scientific Name	Common Name
<u>Shrubs</u>	
<i>Alnus</i> spp.	alders
<i>Cornus amomum</i>	silky dogwood
<i>Cornus racemosa</i>	swamp dogwood
<i>Elaeagnus angustifolia</i>	Russian olive
<i>Ilex verticillata</i>	winterberry
<i>Kalmia latifolia</i>	mountain laurel
<i>Ligustrum obtusifolium</i>	privet
<i>Lindera benzoin</i>	northern spicebush
<i>Lonicera tatarica</i>	tartarian honeysuckle
<i>Rhus typhina</i>	staghorn sumac
<i>Rosa multiflora</i>	multiflora rose
<i>Rubus allegheniensis</i>	Allegheny blackberry
<i>Rubus occidentalis</i>	black raspberry
<i>Sambucus canadensis</i>	American elder
<i>Salix discolor</i>	pussy willow
<i>Spiraea latifolia</i>	broad-leaf meadow-sweet
<i>Vaccinium corymbosum</i>	highbush blueberry
<i>Viburnum cassinoides</i>	withe-rod
<i>Viburnum dentatum</i>	arrow-wood
<i>Viburnum prunifolium</i>	black-haw
<u>Herbs</u>	
<i>Achillea millefolium</i>	common yarrow
<i>Acorus calamus</i>	sweetflag
<i>Agropyron repens</i>	quack grass
<i>Agrostis gigantea</i>	redtop grass
<i>Alliaria petiolata</i>	garlic mustard
<i>Allium vineale</i>	field garlic
<i>Ambrosia artemisiifolia</i>	common ragweed
<i>Anthoxanthum odoratum</i>	sweet vernal grass
<i>Apocynum cannabinum</i>	clasping leaf dogbane
<i>Arctium minus</i>	common burdock
<i>Arisaema triphyllum</i>	swamp jack-in-the-pulpit
<i>Artemisia vulgaris</i>	mugwort
<i>Asclepias incarnata</i>	swamp milkweed
<i>Asclepias syriaca</i>	common milkweed
<i>Aster pilosus</i>	white heath aster
<i>Aster puniceus</i>	swamp aster
<i>Barbarea vulgaris</i>	winter-cress
<i>Bidens</i> spp.	beggar-ticks
<i>Boehmeria cylindrica</i>	false nettle
<i>Bromus inermis</i>	smooth brome grass
<i>Carex</i> spp.	sedges

Table 1. (Continued)

Scientific Name	Common Name
<u>Herbs</u>	
<i>Carex lurida</i>	shallow sedge
<i>Carex stricta</i>	uptight sedge
<i>Chenopodium album</i>	lamb's quarters
<i>Cicuta bulbifera</i>	water hemlock
<i>Cinna arundinacea</i>	stout wood-reedgrass
<i>Cirsium arvense</i>	Canada thistle
<i>Cirsium vulgare</i>	bull thistle
<i>Claytonia virginica</i>	spring beauty
<i>Conyza canadensis</i>	horseweed
<i>Coronilla varia</i>	crown-vetch
<i>Cyperus</i> spp.	nutsedges
<i>Dactylis glomerata</i>	orchard grass
<i>Dennstaedtia punctilobula</i>	hayscented fern
<i>Dichanthelium clandestinum</i>	deer-tongue grass
<i>Dipsacus sylvestris</i>	teasel
<i>Eleocharis</i> spp.	spikerushes
<i>Erechtites hieraciifolia</i>	American burn
<i>Erigeron annuus</i>	daisy fleabane
<i>Eulalia viminea</i>	Nepal microstegium
<i>Eupatoriadelphus</i> spp.	Joe-Pye-weed
<i>Eupatorium perfoliatum</i>	common boneset
<i>Euthamia graminifolia</i>	flat-top fragrant goldenrod
<i>Galium mollugo</i>	wild madder
<i>Geum canadense</i>	white avens
<i>Glyceria striata</i>	fowl manna grass
<i>Hesperis matronalis</i>	dames rocket
<i>Holcus lanatus</i>	common velvet grass
<i>Hypericum perforatum</i>	St. John's wort
<i>Impatiens capensis</i>	jewelweed
<i>Juncus effusus</i>	soft rush
<i>Juncus tenuis</i>	path rush
<i>Lamium purpureum</i>	purple dead nettle
<i>Leersia oryzoides</i>	rice cutgrass
<i>Leucanthemum vulgare</i>	oxeye daisy
<i>Lotus corniculatus</i>	birds-foot trefoil
<i>Ludwigia alternifolia</i>	seedbox
<i>Ludwigia palustris</i>	marsh seedbox
<i>Lycopodium obscurum</i>	tree clubmoss
<i>Lycopodium tristachyum</i>	ground cedar
<i>Lycopus</i> spp.	bugleweeds
<i>Lysimachia ciliata</i>	fringed loosestrife
<i>Lysimachia nummularia</i>	moneywort
<i>Lythrum salicaria</i>	purple loosestrife
<i>Maianthemum canadense</i>	false lily-of-the-valley

Table 1. (Continued)

Scientific Name	Common Name
<u>Herbs</u>	
<i>Mitchella repens</i>	partridge-berry
<i>Oenothera biennis</i>	common evening-primrose
<i>Osmunda cinnamomea</i>	cinnamon fern
<i>Oxalis</i> spp.	wood-sorrels
<i>Panicum dichotomiflorum</i>	fall panic grass
<i>Phalaris arundinacea</i>	Reed canary grass
<i>Phleum pretense</i>	timothy grass
<i>Phragmites australis</i>	common reed
<i>Phytolacca americana</i>	common pokeweed
<i>Plantago lanceolata</i>	English plantain
<i>Plantago major</i>	common plantain
<i>Pilea pumila</i>	clearweed
<i>Podophyllum peltatum</i>	may-apple
<i>Polygonum arifolium</i>	halberd-leaf tearthumb
<i>Polygonum cespitosum</i>	cespitose knotweed
<i>Polygonum perfoliatum</i>	mile-a-minute
<i>Polygonum sagittatum</i>	arrow-leaved tearthumb
<i>Polygonum virginianum</i>	Virginia knotweed
<i>Prunella vulgaris</i>	heal-all
<i>Rubus hispidus</i>	bristly blackberry
<i>Rudbeckia hirta</i>	black-eyed Susan
<i>Rudbeckia laciniata</i>	cut-leaf coneflower
<i>Rumex crispus</i>	curly dock
<i>Sagittaria latifolia</i>	broad-leaf arrow-head
<i>Saponaria officinalis</i>	bouncing-bet
<i>Schizachrium scoparium</i>	little bluestem
<i>Scirpus cyperinus</i>	wool-grass
<i>Scirpus</i> spp.	bulrushes
<i>Setaria faberi</i>	Japanese bristle grass
<i>Setaria glauca</i>	yellow bristle grass
<i>Solanum carolinense</i>	Carolina nightshade
<i>Solidago canadensis</i>	Canada goldenrod
<i>Solidago gigantea</i>	giant goldenrod
<i>Solidago rigida</i>	stiff goldenrod
<i>Solidago rugosa</i>	wrinkled goldenrod
<i>Sparganium</i> spp.	burreeds
<i>Symplocarpus foetidus</i>	skunk-cabbage
<i>Taraxacum officinale</i>	common dandelion
<i>Tridens flavus</i>	purple-top tridens
<i>Trifolium pretense</i>	red clover
<i>Typha latifolia</i>	broad-leaved cattail
<i>Urtica dioica</i>	stinging nettle

Table 1. (Continued)

Scientific Name	Common Name
<u>Herbs</u>	
<i>Verbascum blattaria</i>	moth mullein
<i>Verbascum thapsus</i>	common mullein
<i>Verbena hastata</i>	blue vervain
<i>Vernonia noveboracensis</i>	New York ironweed

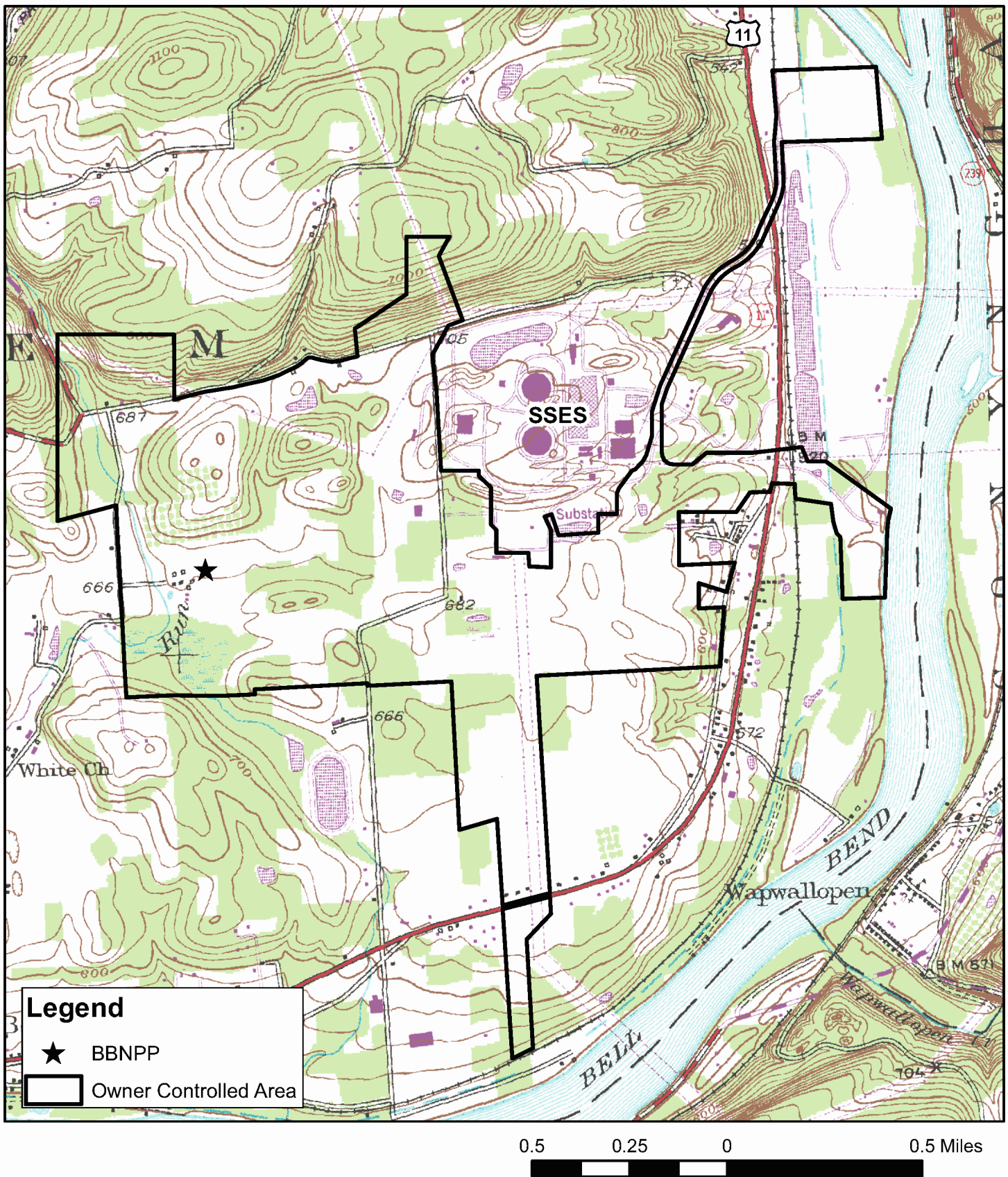


Figure 1.
**Bell Bend NPP
Site Location Map**



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

date: 09/11/08
project: 21159.000
prepared by: s.sherman

checked by: k.maurice
project name: Bell Bend
file name: Fig1.BBNPP_Flora_SiteLocation

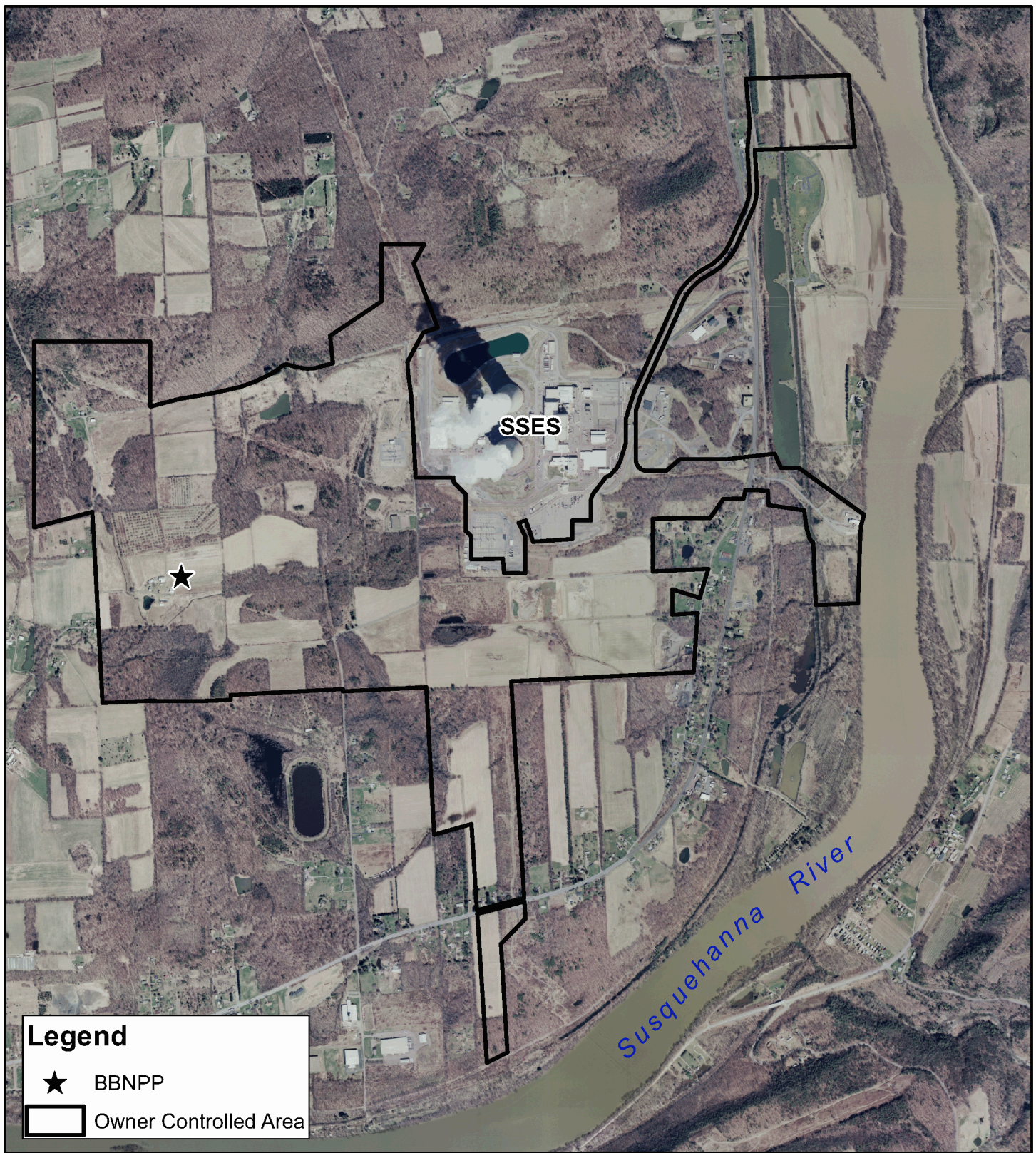


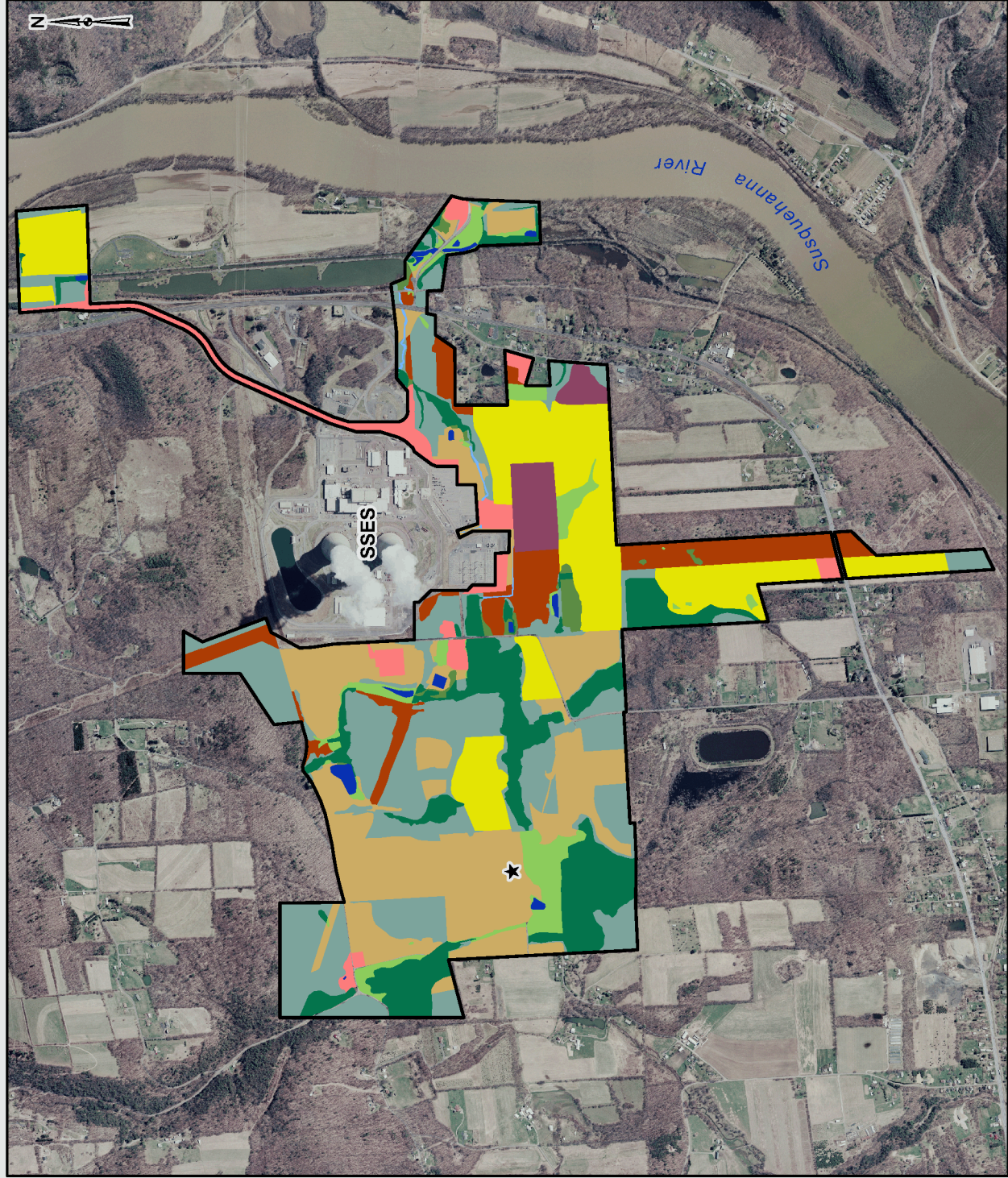
Figure 2.
Bell Bend NPP
Site Aerial Photograph



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

date: 09/11/08
project: 21159.000
prepared by: s.sherman

checked by: k.maurice
project name: Bell Bend
file name: Fig2.BBNPP_Flora_SiteAerial



Legend

★ BBNPP

Owner Controlled Area

Plant Communities

Upland Forest

Upland Scrub/Shrub

Old Field/Former Agricultural

Agricultural

Palustrine Forested Wetlands

Palustrine Scrub/Shrub Wetlands

Palustrine Emergent Wetlands

Waterbodies

Stream Channel

Gravel Quarry

Developed

1,500 750 0 1,500 Feet

Figure 3.

Bell Bend NPP

Plant Communities Map



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ENVIRONMENTAL CONSULTANTS
 400 Old Reading Pike, Bldg. A, Suite 101, Stowe, PA 19444

APPENDIX A

Photographs



Photo 1. Upland forest habitat generally consisted of young- to medium-aged trees in the overstory and an understory dominated by a robust cover of shrubs.



Photo 2. A typical wintertime view of upland forest.



Photo 3. Upland scrub/shrub communities were found on former agricultural lands undergoing secondary succession.



Photo 4. Scrub/shrub vegetation was composed of a variety of briars, shrubs, and saplings.



Photo 5. Most of the agricultural land in 2007 was fallow and vegetated by old field plant communities.



Photo 6. Some of the agricultural fields that were fallow in 2007 and in old-field cover were planted in corn in 2008.



Photo 7. Palustrine forested wetlands also generally consisted of young- to medium-aged trees in the overstory and a dense cover of shrubs in the understory (background).



Photo 8. Groundwater seeps were common throughout the forested wetlands.



Photo 9. Palustrine forested wetlands along Walker Run.



Photo 10. Palustrine scrub/shrub wetlands vegetated by alders.



Photo 11. Palustrine scrub/shrub wetlands vegetated by a dense growth of spicebush.



Photo 12. Palustrine emergent wetlands located on land that was formerly in agricultural use.



Photo 13. Palustrine emergent wetlands vegetated by a reed-canary grass monoculture along the eastern branch of Walker Run.



Photo 14. Most waterbodies were fringed by palustrine emergent wetlands.



Photo 15. Palustrine emergent and palustrine scrub/shrub habitat in a seasonally ponded wetland.



Photo 16. Seasonally ponded areas usually developed palustrine emergent vegetation cover during summertime draw-down.

APPENDIX B

Species Of Special Concern Information



United States Department of the Interior

FISH AND WILDLIFE SERVICE

Pennsylvania Field Office
315 South Allen Street, Suite 322
State College, Pennsylvania 16801-4850



January 18, 2008

Rod Krich
UniStar Nuclear Energy, LLC
750 East Pratt Street, 14th Floor
Baltimore, MD 21202-3106

RE: USFWS Project #2008-0518

Dear Mr. Krich:

This responds to your letter of December 21, 2007, requesting information about federally listed and proposed endangered and threatened species within the area affected by the proposed nuclear powered steam electric plant located in Luzerne County, Pennsylvania. The following comments are provided pursuant to the Endangered Species Act of 1973 (87 Stat. 884, as amended; 16 U.S.C. 1531 *et seq.*) to ensure the protection of endangered and threatened species.

The project is within the range of the Indiana bat (*Myotis sodalis*), a species that is federally listed as endangered. Indiana bats hibernate in caves and abandoned mines during the winter months (November through March), and use a variety of upland, wetland and riparian habitats during the spring, summer and fall. Indiana bats usually roost in dead or living trees with exfoliating bark, crevices or cavities. Female Indiana bats form nursery colonies under the exfoliating bark of dead or living trees, such as shagbark hickory, black birch, red oak, white oak, and sugar maple, in upland or riparian areas.

Land-clearing, especially of forested areas, may adversely affect Indiana bats by killing, injuring or harassing roosting bats, and by removing or reducing the quality of foraging and roosting habitat. To determine whether the proposed project will affect Indiana bats, we will need additional project information, including site plans and a detailed project description, that describe how much forest disturbance will occur (area, tree species, and size classes).

This response relates only to endangered or threatened species under our jurisdiction, based on an office review of the proposed project's location. No field inspection of the project area has been conducted by this office. Consequently, this letter is not to be construed as addressing potential Service concerns under the Fish and Wildlife Coordination Act or other authorities.

To avoid potential delays in reviewing your project, please use the above-referenced USFWS project tracking number in any future correspondence regarding this project.

If you have any questions regarding this matter, please contact Pam Shellenberger of my staff at 814-234-4090.

Sincerely,

A handwritten signature in black ink, appearing to read "David Densmore", followed by a long horizontal line extending to the right.

David Densmore
Supervisor



Pennsylvania Department of Conservation and Natural Resources

Bureau of Forestry

March 24, 2008

George Wrobel

CEG GNA Engineering

FAX: 585.771.3392 (hard copy will NOT follow—page 1 of 2)

<i>Pennsylvania Natural Diversity Inventory Review, PNDI Number</i>	019535
Unistar Nuclear Energy/ Berwick, PA NPP-1	
Salem Township; Luzerne County	

Dear Mr. Wrobel,

This responds to your request for information on species of special concern within the area under evaluation for this project. We screened this project for potential impacts to species and resources of special concern under the Department of Conservation and Natural Resources' responsibility, which includes plants, natural communities, terrestrial invertebrates and geologic features only.

PNDI records indicate that species and communities of special concern under DCNR's jurisdiction are known to occur in the vicinity of the above-mentioned project. Please see the attached list for butterfly species found in the project area. If any earth disturbance is planned or more detailed project information becomes available, please submit this project to our office for further review of potential impacts to the attached species list.

This response represents the most up-to-date summary of the PNDI data files and is good for one (1) year from the date of this letter. An absence of recorded information does not necessarily imply actual conditions on-site. A field survey of any site may reveal previously unreported populations. Should project plans change or additional information on listed or proposed species become available, this determination may be reconsidered.

This finding applies to impacts to plants, natural communities, terrestrial invertebrates and geologic features only. To complete your review of state and federally-listed species of special concern, please be sure the U.S. Fish and Wildlife Service, the PA Game Commission and the Fish and Boat Commission has been contacted regarding this project either directly or by performing a search with the online PNDI ER Tool found at www.naturalheritage.state.pa.us.

Rebecca H. Bowen, Environmental Review Specialist, PNHP

DCNR/BOF/PNDI, PO Box 8552, Harrisburg, PA 17105 ~ Ph: 717-772-0258 ~ F: 717-772-0271 ~ c-bowen@state.pa.us

Stewardship

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Bureau of Forestry

March 20, 2008

PNDI 019535

Invertebrates of Special Concern (no plant or geological features hits)

Scientific	Common	Status	Habitat	Larval Food	Adult Food	Flight
Enodia anthedon	Northern Pearly-Eye	S3S4	damp deciduous woods usually near marshes or waterways; mixed or grassy woodlands	various grasses turtlehead, hairy beardtongue, english plantain, foxglove, white ash	dung, fungi, carion, sap from willows poplars birches	June-Aug
Euphydras phaeton	Baltimore Checkerspot	S2S4	wet meadows, bogs, marshes		nectar from milkweed, viburnums, wild rose	June-Aug
Poanes massasoit	Mulberry Wing	S3	freshwater marshes or bogs	carex stricta	any flower nectar	late June-mid Aug
Polites mystic	Long Dash	S3	open, moist areas including meadows, marshes, prairie swales, streambanks, woods edges	bluegrasses	milkweed, selfheal, mountain laurel, tick trefoil	May-Aug

* These species are known to reside on site. Please make plans that attempt to minimize impacts to the potential habitats of these species. Also note, if any earth disturbance is planned or more detailed project information becomes available, please submit this project to our office for further review of potential impacts to the attached species list.