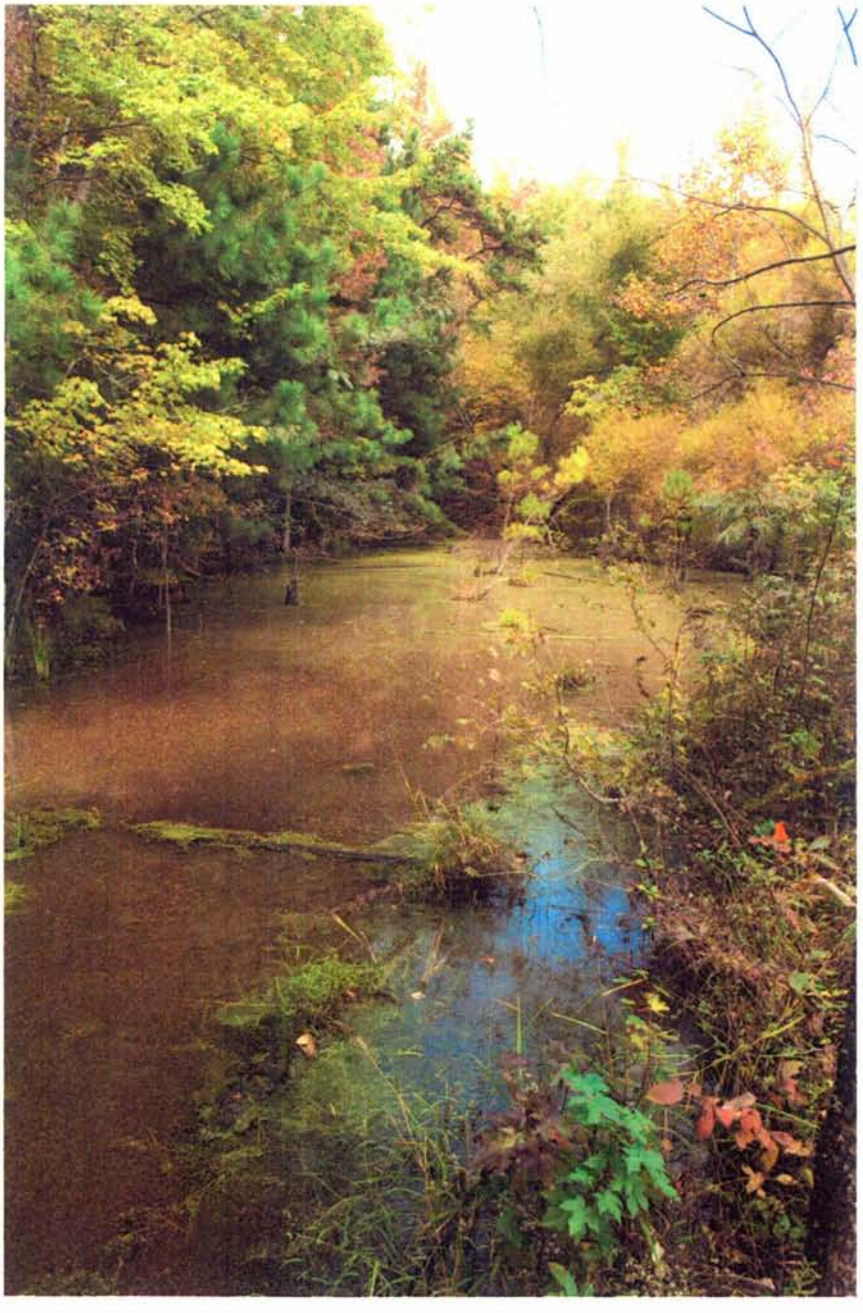
Wetland and Sensitive Species Survey Report for Y-12: Proposed Uranium Processing Facility (UPF)



Neil Giffen
Mark Peterson
Scott Reasor
Larry Pounds
Greg Byrd

WETLAND AND SENSITIVE SPECIES SURVEY REPORT FOR Y-12: PROPOSED URANIUM PROCESSING FACILITY (UPF)

Neil Giffen[1]
Mark Peterson[1]
Scott Reasor[3]
Larry Pounds[2]
Greg Byrd[2]

[1]Environmental Sciences Division
[2]Facilities and Operations Directorate
Oak Ridge National Laboratory
[3]Oak Ridge Institute for Science and Education

November 2009

Prepared for
Mick Wiest
Clarence Hill
Environmental Compliance Department
Y-12 National Security Complex

Prepared by
OAK RIDGE NATIONAL LABORATORY
Oak Ridge, Tennessee 37831
managed by
UT-BATTELLE, LLC
for the
U.S. DEPARTMENT OF ENERGY
under contract DE-AC05-00OR22725

(THIS PAGE LEFT BLANK INTENTIONALLY)

CONTENTS

(THIS PAGE LEFT BLANK INTENTIONALLY)

LIST OF FIGURES

(THIS PAGE LEFT BLANK INTENTIONALLY)

LIST OF TABLES

(THIS PAGE LEFT BLANK INTENTIONALLY)

1. INTRODUCTION

This report summarizes the results of an environmental survey conducted at sites associated with the proposed Uranium Processing Facility (UPF) at the Y-12 National Security Complex in September-October 2009. The survey was conducted in order to evaluate potential impacts of the overall project. This project includes the construction of a haul road, concrete batch plant, wet soil storage area and dry soil storage area. The environmental surveys were conducted by natural resource experts at ORNL who routinely assess the significance of various project activities on the Oak Ridge Reservation (ORR). Natural resource staff assistance on this project included the collection of environmental information that can aid in project location decisions that minimize impacts to sensitive resources such as significant wildlife populations, rare plants and wetlands. Natural resources work was conducted in various habitats, corresponding to the proposed areas of impact. The credentials/qualifications of the researchers are contained in Appendix A.

The proposed haul road traverses a number of different habitats including a power-line right-of-way, wetlands, streams, forest and mowed areas. It extends from what is known as the New Salvage Yard on the west to the Polaris Parking Lot on the east. This haul road is meant to connect the proposed concrete batch plant to the UPF building site. The proposed site of the concrete batch plant itself is a highly disturbed fenced area. This area of the project is shown in Fig. 1.

The proposed Wet Soils Disposal Area is located on the north side of Bear Creek Road at the former Control Burn Study Area. This is a second growth area containing thick vegetation, and extensive dead and down woody material. This area of the project is shown in Fig. 2.

The dry soils storage area is proposed for what is currently known as the West Borrow Area. This site is located on the west side of Reeves Road south of Bear Creek Road. The site is an early successional field. This area of the project is shown in Fig. 2.

(THIS PAGE LEFT BLANK INTENTIONALLY)

Fig. 2. Area of proposed UPF Wet Soils and Dry Soils (West Borrow Area) Disposal Areas.

(THIS PAGE LEFT BLANK INTENTIONALLY)

2. METHODS

The following is a brief description of the methods used during the study.

Bird Survey – A series of transect surveys of site habitats were conducted during the morning hours. During that time all birds either heard or seen were recorded. Incidental encounters with birds were also recorded during surveys of other natural resources. In addition, any sign (e.g., woodpecker drillings) was noted where it could be identified to species.

Small Mammal Survey – Small mammal surveys were conducted at the site using Sherman live traps. A total of 114 traps were set out on the site covering all habitats. Small mammals were trapped for a total of 17 nights during a two week period. This is equal to a total of 1938 trap nights (17 nights x 114 traps). All captured small mammals were identified and released at the location of capture. Incidental encounters with mammals were also recorded during surveys of other natural resources.

Reptile and Amphibian Survey – One day visual encounter surveys (VES) were conducted in all site habitats. This involved searching under logs, rocks, bark, leaf litter and other debris. All reptiles and amphibians encountered were identified and recorded. Incidental encounters with reptiles and amphibians were also recorded during surveys of other natural resources. Minnow traps were set and dip netting was conducted in wetlands with sufficient water, for the capture of amphibian species.

Vegetation Survey – Walk-through surveys of each habitat were conducted at which time all vascular plant species that could be identified were recorded. Additional surveys were conducted with a professional plant ecologist to specifically identify rare plants. A visual survey of trees was conducted on the site to determine the presence of potential bat roosting habitat.

Wetlands Survey – Wetlands are considered of high ecological value; consequently, destruction or loss of wetlands, as well as major disturbance such as dredging or filling of wetlands, is regulated by both federal and state agencies. Wetlands associated with the UPF project were determined and delineated per Army Corps of Engineers' wetland delineation protocols (ACOE, 1987). To be considered a jurisdictional wetland, a site must meet the necessary hydrology, soils, and wetland-vegetation criteria. For each wetland plant community type, the dominant plant species and their abundance were noted, and bore holes were dug to evaluate and characterize the soils and hydrology of the site. Wetland locations were mapped with a high accuracy Trimble GPS unit and accompanying software.

The wetland vegetation criterion is met if more than 50 percent of the dominant species within each stratum (trees, shrubs, woody vines, herbs) are hydrophytic. To make this determination, species are assigned an indicator status based on the USFWS National List of Plant Species that Occur in Wetlands: 1988 National Summary (Reed 1988). The indicator species status codes are: obligate wetland (OBL), facultative wetland (FACW), facultative (FAC), facultative upland (FACU), and upland (UPL). A plus (+) or minus (-) sign following the indicator code denotes a tendency towards the wetter (+) or drier (-) end of the scale. For classifying an area as hydrophytic, the dominant plant species in each stratum must have the following vegetation species codes: OBL, FACW+, FACW, FACW-, FAC+, or FAC. Indicator definitions, as defined by the U.S. Fish and Wildlife Service, are:

Obligate Wetland (OBL). Occur almost always (estimated probability >99%) under natural conditions in wetlands.

Facultative Wetland (FACW). Usually occur in wetlands (estimated probability 67%-99%), but occasionally found in non-wetlands.

Facultative (FAC). Equally likely to occur in wetlands or non-wetlands (estimated probability 34%-66%).

Facultative Upland (FACU). Usually occur in non-wetlands (estimated probability 67%-99%), but occasionally found in wetlands (estimated probability 1%-33%).

Obligate Upland (UPL). Occur in wetlands in another region, but occur almost always (estimated probability >99%) under natural conditions in non-wetlands.

Soil samples were extracted at multiple locations using a post-hole shovel to characterize the wetland sites and to assist in determining appropriate wetland boundaries. Each soil sample was examined for soil color and texture and reported per Munsell Company (1994) designations. The presence of mottles, manganese concretions, high organic content, and other indicators of hydric soil status was also examined.

The sites were examined for primary and secondary indicators of wetland hydrology. The presence and depth of surface water, as well as the soil saturation and depth to free water in the soil-boring hole was evaluated. The presence of watermarks, drift lines, oxidized root channels, water-stained leaves, and other indicators of wetland hydrology were also noted.

Representative determination reports are provided in Appendix B.

3. RESULTS

The results of the natural resources surveys are presented by area.

3.1 HAUL ROAD

The haul road traverses a series of rolling hills with some steep slopes. The western portion of the proposed haul road site travels along a power line corridor bordered on the north and south by forested areas. The corridor itself in this area contains old field habitat with a mixture of shrubs and herbaceous vegetation. This portion of the proposed haul road also contains five wetland areas, as well as streams. The eastern portion of the proposed haul road traverses mainly mowed grassy areas that contain four wetland areas.

Bird Survey Results – A total of 23 bird species were identified along the haul road by sight or song.

There were 6 species recorded at the site that are on the Partners In Flight (PIF) list as being of regional importance in the ridge and valley. PIF monitors population trends based on data gathered throughout the region and lists those species that are in apparent decline. Generally, the most sensitive species are those impacted by forest fragmentation (i.e., interior forest species). Species in this category that were noted along the proposed haul road corridor are downy woodpecker (*Picoides pubescens*), eastern-wood pewee (*Contopus virens*) and Carolina chickadee (*Poecile carolinensis*). Other forest birds of note recorded on the site are the yellow-billed cuckoo (*Coccyzus americanus*), eastern screech-owl (*Otus asio*), hairy woodpecker (*Picoides villosus*) and pileated woodpecker (*Dryocopus pileatus*). The belted kingfisher (*Ceryle alcyon*) is another notable species on the PIF list. This bird species frequents ponds with preferred prey items and was recorded at Wetland #1 (Fig. 3) where tadpoles and adult frogs are abundant. The remaining PIF listed birds found on the site are those common to edge and old field habitats. A complete bird list for the haul road is contained in Appendix C – Table C-1.

Small Mammal Survey Results – A total of 64 Sherman live traps were set out along the haul road corridor. Small mammals were trapped for a total of 7 nights. This is equal to a total of 448 trap nights (7 nights x 64 traps).

White-footed mouse (*Peromyscus leucopus*) and hispid cotton rat (*Sigmodon hispidus*) were the only species of small mammals captured in traps along the haul road corridor. White-tailed deer (*Odocoileus virginianus*) and striped skunk (*Mephitis mephitis*) were also recorded incidentally while conducting other surveys. Sign of coyote (*Canis latrans*) (tracks) was also noted.

Reptile and Amphibian Survey – A one day VES was conducted along the haul road corridor. This involved searching under logs, rocks, bark, leaf litter and other debris. All reptiles and amphibians found were recorded. Dip nets and minnow traps were used for sampling in wetlands with sufficient water. Incidental encounters with reptiles and amphibians were also recorded during surveys of other natural resources. A complete list of reptiles and amphibians recorded during the survey is contained in Appendix C – Table C-2.

Wetlands along the haul road corridor provide important habitat for amphibian species. Of particular note are Wetlands #1 and #2 (Fig. 3). Wetland #1 has a large pond that supports a good population of red-spotted newts (*Notophthalmus viridescens viridescens*) and several anuran (frog) species. Wetland

#2 has a pond at its west end that also supports a good population of red-spotted newts and larval marble salamanders (*Ambystoma opacum*).

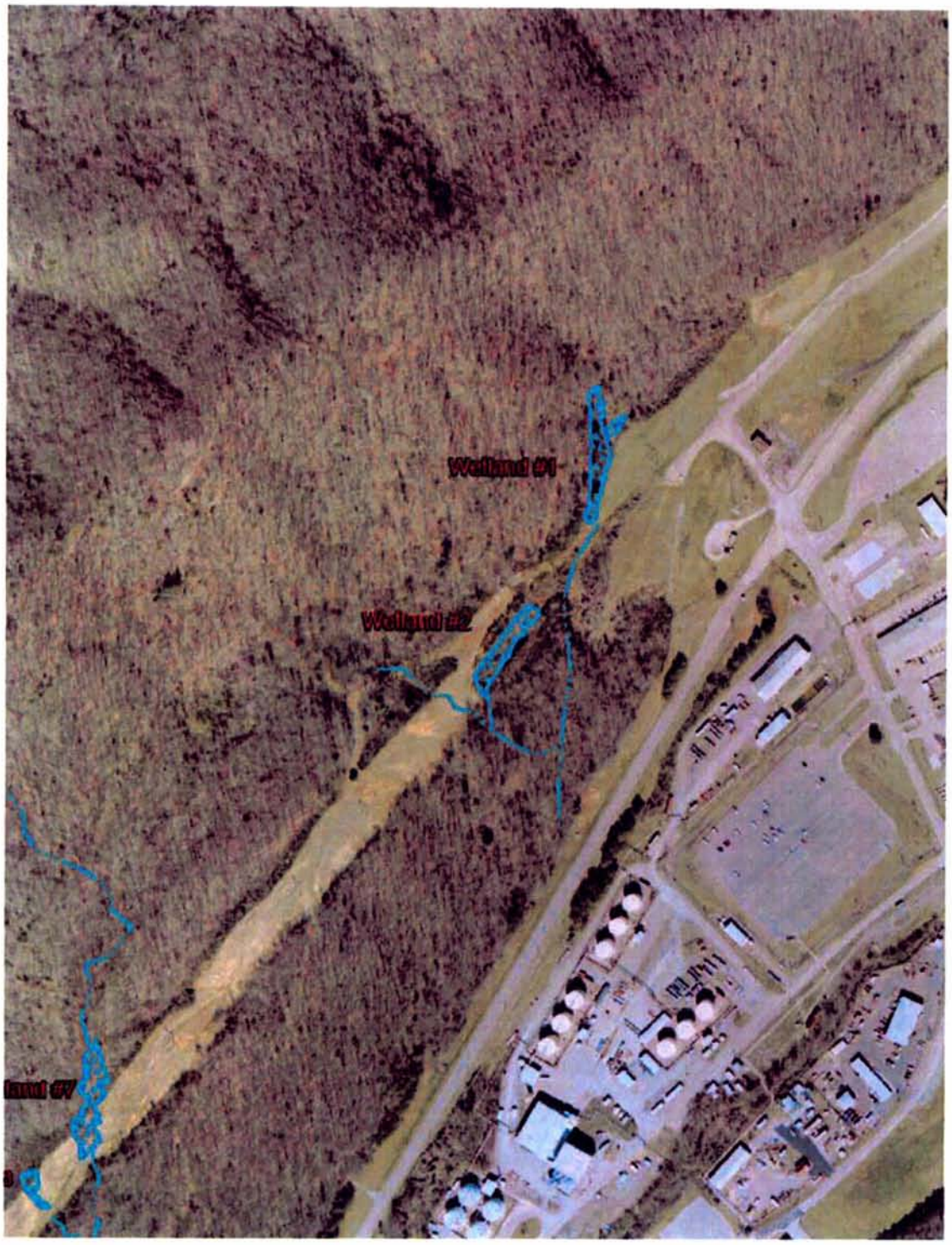


Fig. 3. Wetlands #1 and #2.

Vegetation Survey – A one day walk-through was conducted at which time all vascular plant species that could be identified were recorded. An additional survey was conducted with a professional plant ecologist to specifically identify rare plants. The haul road corridor consists of a mixture of old field and mowed turf grass areas, along with some small areas of forest and wetlands. No protected plant species were observed along the haul road corridor. A complete list of plant species recorded along the haul road corridor is contained in Appendix C – Table C-3.

3.1.1 West End Haul Road Corridor – New Salvage Yard to Wetland #1

The western end of the haul road corridor extending from the New Salvage Yard to Wetland # 1 includes old field habitat, forest and five scattered wetlands. Figure 4 shows a portion of this area.

The old field habitat is contained within the existing power-line corridor. In this corridor are scattered shrubs and herbaceous vegetation. Common shrubs in this area include smooth sumac (*Rhus glabra*), winged sumac (*Rhus copallina*) and eastern red cedar (*Juniperus virginiana*). Also in this area of the power-line corridor are sweetgum (*Liquidamber styraciflua*), tulip poplar (*Liriodendron tulipifera*) and black willow (*Salix nigra*) saplings. Blackberry (*Rubus sp.*) and Japanese honeysuckle (*Lonicera japonica*) are also prevalent in this area. Herbaceous species include goldenrods, other wildflowers and grasses.

The forest habitat in this area is characterized by an overstory that includes white oak (*Quercus alba*), southern red oak (*Quercus falcata*), chestnut oak (*Quercus montana*), tulip poplar, red maple (*Acer rubrum*) and sweetgum. The understory is relatively open and contains saplings of several different species, including American beech (*Fagus grandifolia*), red maple, sweetgum, southern red oak and pignut hickory (*Carya glabra*). Also in the understory are flowering dogwood (*Cornus florida*), sourwood (*Oxydendrum arboretum)*, black cherry (*Prunus serotina*), common pawpaw (*Asimina triloba*) and lowbush blueberry (*Vaccinium pallidum*). Groundcover in the area is also scattered, and includes Virginia creeper (*Parthenocissus quinquefolia*), Christmas fern (*Polystichum acrostichoides*), lady fern (*Athyrium filix-femina*), poison ivy (*Toxicodendron radicans*), muscadine (*Vitis rotundifolia*) and striped pipsissewa (*Chimaphila maculata*). Herbaceous growth includes horse-balm (*Collinsonia canadensis*), Nepal grass (*Microstegium vimineum*), beefsteak plant (*Perilla frutescens*), downy rattlesnake plantain (*Goodyera pubescens*) and little brown jug (*Hexastylis arifolia*). Of note where the haul road cuts north out of the power-line right-of-way into the forested area are white oaks with exfoliating bark. These trees provide potential roosting habitat for the federally endangered Indiana bat (*Myotis sodalis*). Indiana bats utilize such trees for maternity roosts from approximately mid-May through mid-September. The ORR is within the known range of the Indiana bat (Harvey et. al. 1999).

A small constricted wetland (#6) is present at the west end of the site on the power-line corridor near the New Salvage Yard Road (Fig. 5). This wetland is approximately 0.06 acres in size. The wetland contains black willow and some common alder (*Alnus serrulata*) in the overstory. Herbaceous vegetation in this wetland includes rice cutgrass (*Leersia oryzoides*), leafy bulrush (*Scirpus polyphyllus*), tearthumb (*Polygonum sagittatum*), orange jewelweed (*Impatiens capensis*), soft rush (*Juncus effusus*), small-spike false-nettle (*Boehmeria cylindrica*) and dotted smartweed (*Polygonum punctatum*).

Just northeast of Wetland #6 along the power-line right-of-way is Wetland #8 (Fig. 5). This wetland is approximately 0.06 acres in size. This is a constricted wetland with an intermittent stream that flows out of the south end across the right-of-way into the adjacent forested area. This wetland is dominated by tearthumb, with some *Juncus sp.* and *Cyperus sp.*

Fig. 4. West end haul road corridor.

A more extensive wetland system (Wetland #7) exists further along the power-line right-of-way (Fig. 5). This wetland is approximately 0.32 acres in size. The boundaries of this wetland include a portion of the power-line right-of-way, as well as the forested area to the north. The power-line portion of this wetland includes a fairly diverse assemblage of herbaceous species, including leafy bulrush, tearthumb, rice cutgrass, orange jewelweed, horse-balm, and cardinal flower (*Lobelia cardinalis*). This area of the wetland also includes scattered common alders and black willows. The forested portion of the wetland is dominated by common alder, with some red maple and American sycamore (*Platanus occidentalis*). An intermittent stream flows into the northern end of the wetland off of Pine Ridge. The stream corridor continues out the south end of the wetland and through the forested area. It actually connects to an intermittent stream that flows southward out of Wetland #8.

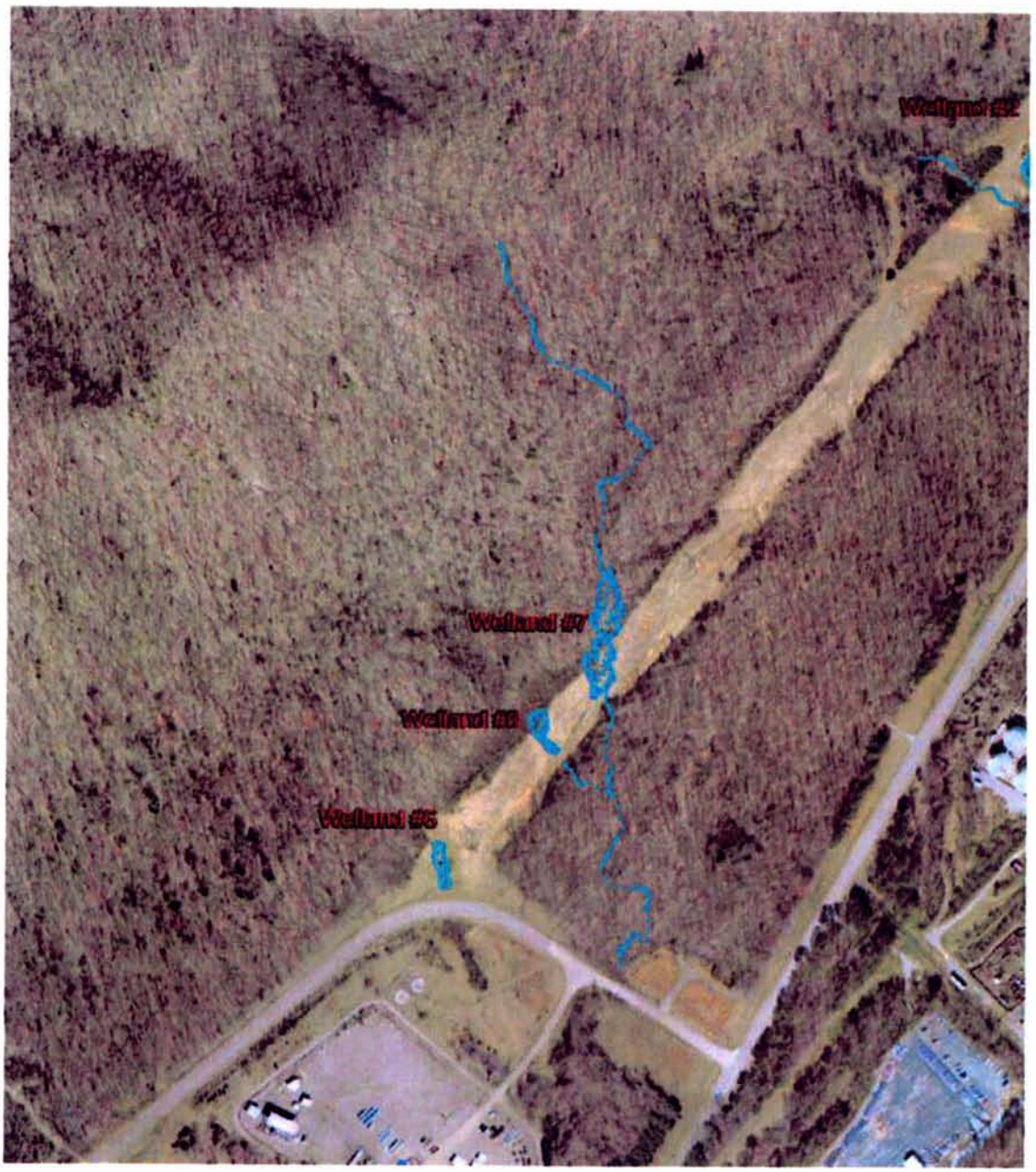


Fig. 5. Wetlands #6, #7 and #8.

Wetland #2 is a rectangular wetland located just south of the proposed haul road route (Fig. 3). This wetland has a ponded area at its west end. The wetland is approximately 0.24 acres in size. Much of this wetland is dominated by tearthumb. Other plants in this wetland include *cattail* (*Typha sp.*), long-beaked arrow-head (*Sagittaria australis*), rice cutgrass, umbrella sedge (*Cyperus strigosus*), beak-rush (*Rhyncospora sp.*), blunt spikerush (*Eleocharis obtusa*) and narrow-leaved sunflower (*Helianthus angustifolius*). Flow out of the southwestern end of this wetland connects to an existing drainage that crosses the power-line to west of this area and into the forest.

Wetland #1 is northeast of Wetland #2 (Fig. 3). This wetland consists of a large ponded area with wetland plant species on its fringes. The wetland is approximately 0.30 acres in size. Most of the wetland plants are concentrated on the south end of the pond and include small carpgrass (*Arthraxon hispidus*), rice cutgrass, cattail and long-beaked arrow-head. The northernmost end of the wetland includes a forested area. An intermittent stream flows out of the south end of the wetland and runs to the west into a large kudzu (*Pueraria lobata*) patch.

No rare plant species were found during the survey of this area.

3.1.2 East End Haul Road Corridor – East of Wetland #1 to Polaris Parking Lot

The eastern end of the haul road corridor extending from east of Wetland #1 to the Polaris Parking Lot includes mowed areas, four wetlands, limited early successional old field, and some forest. Figure 6 shows a portion of this area.

Fig. 6. East end haul road corridor area.

The majority of the proposed haul road in this area traverses the large mowed areas that contain fescue (*Festuca sp.*) and other turf species. There are also a limited number of rarely mowed areas.

Fingers of forest extend down off of Pine Ridge into the area of the proposed haul road corridor. These are mainly younger forested areas. Tree species include chestnut oak, white oak, red oaks (*Quercus sp.*), red maple, sweetgum, tulip poplar, pignut hickory and black gum (*Nyssa sylvatica*). Shrub species include eastern red cedar, winged sumac and bush honeysuckle (*Lonicera mackii*). Japanese honeysuckle is also present. There is also Christmas fern present in the groundcover in some areas. Fragrant goldenrod (*Solidago odora*) is present on the fringes of the forest.

Wetlands #3 and #4 are in a mowed turf grass area of the proposed haul road corridor (Fig. 7). These wetlands are approximately 0.01 and 0.33 acres in size, respectively. The two wetlands are split by the current road that runs through the area. Both wetlands have significant patches of black willow and cattail. Wetland #3 also has rice cutgrass, small hop sedge, soft rush and umbrella sedge. Wetland #4 is somewhat more diverse with rice cutgrass, blunt spikerush, small carpgrass, bushy seedbox (*Ludwigia alternifolia*), umbrella sedge (*Cyperus flavescens*), wool-grass (*Scirpus cyperinus*) and cardinal flower.

Fig. 7. Wetlands #3, #4, #5 and #9.

One of the wooded areas includes a wetland (Wetland #5) (Fig. 7). This wetland is approximately 0.05 acres in size. This is a ravine that extends down from pine ridge. This ravine contains a spring that feeds an intermittent stream which flows down to Wetland #5. Upland areas of the ravine contain mainly young second growth forest with a mixture of native and non-native trees and shrubs. Trees

include sweetgum, tulip poplar and scrub pine (*Pinus virginiana*). Shrubs include autumn olive (*Elaeagnus umbellata*), thorny olive (*Elaeagnus pungens*), winged sumac and Japanese barberry (*Berberis thunbergii*). Blackberry and Japanese honeysuckle are also present. Lady fern is present in the groundcover. Herbaceous species include Nepal grass, crown vetch (*Coronilla varia*), Sericea lespedeza (*Lespedeza cuneata*) and Canada goldenrod (*Solidago canadensis*). Tree species in the wetland portion of the ravine include eastern cottonwood (*Populus deltoides*), red maple, black willow, American sycamore and common alder. Other plant species in the wetland include cattail, cardinal flower, soft rush, *Scirpus sp.*, chufa (*Cyperus exculentus*), late-flowering thorough-wort (*Eupatorium serotinum*), willow-herb (*Epilobium sp.*), small carpgrass, bushy seedbox and dotted smartweed.

Wetland #9 is a previously flagged wetland just northwest of the Polaris Parking Lot (Fig. 7). This wetland is approximately 0.06 acres in size. The wetland has a shallow ponded area with limited wetland vegetation on the fringes. Wetland species include common alder, black willow and late-flowering thorough-wort. Additional plant species surrounding this wetland also include red maple, American beech, sweetgum, blackberry and lady fern. There is also a large patch of kudzu directly adjacent to the wetland on the east side. A drainage channel flows southward out of this wetland for a short distance along the existing road.

Table 1 shows acreages for all wetlands surveyed.

No rare plant species were found during the survey of this area.

Table 1. Wetland size and type for the UPF project

Site	Acreage	Wetland type	Description
W #1	0.30	Forested wetland	Narrow wooded wetland with pond adjacent to power-line right-of-way
W #2	0.24	Marsh	Herbaceous vegetation with pond along power-line right-of-way
W #3	0.01	Marsh	Herbaceous and woody vegetation along power-line right-of-way
W #4	0.33	Marsh	Herbaceous and woody vegetation along power-line right-of-way
W #5	0.05	Forested wetland	Narrow wooded wetland adjacent to power-line right-of-way
W #6	0.06	Marsh	Herbaceous and woody vegetation along power-line right-of-way
W #7	0.32	Forested wetland	Herbaceous and forest vegetation along power-line right-of-way
W #8	0.06	Marsh	Herbaceous and woody vegetation along power-line right-of-way
W #9	0.06	Forested wetland	Narrow wooded wetland with pond adjacent to Polaris Parking Lot
Total	1.43		

3.2 WET SOILS DISPOSAL AREA

The Wet Soils Disposal Area is located at the former Control Burn Study Area on the north side of Bear Creek Road and bordered by the Environmental Management Waste Management Facility (EMWMF) Haul Road to the north. The site is mainly second growth woods with significant amounts of dead and down woody material. Figure 8 shows a portion of this area. There are blue line streams to the east and west of the site (Fig. 9). No wetlands were found within the area.

Bird Survey Results – A total of 13 bird species were identified in this habitat by either sight or song.

There were 5 species recorded at the site that are on the Partners In Flight (PIF) list as being of regional importance in the ridge and valley. One species in this category that frequents forested areas, the Carolina chickadee, was noted at the Wet Soils Disposal Area. The remaining PIF listed birds found on the site are those common to edge and old field habitats. A complete bird list for the Wet Soils Disposal Area is contained in Appendix C – Table C-4.

Small Mammal Survey Results – A total of 25 Sherman live traps were set out at the Wet Soils Disposal Area. Small mammals were trapped for a total of 5 nights. This is equal to a total of 125 trap nights (5 nights x 25 traps).

White-footed mouse and golden mouse (*Ochrotomys nuttalli*) were the only species of small mammals captured in traps at the Wet Soils Disposal Area. White-tailed deer tracks were also noted on the site.

Fig. 8. Wet Soils Disposal Area.

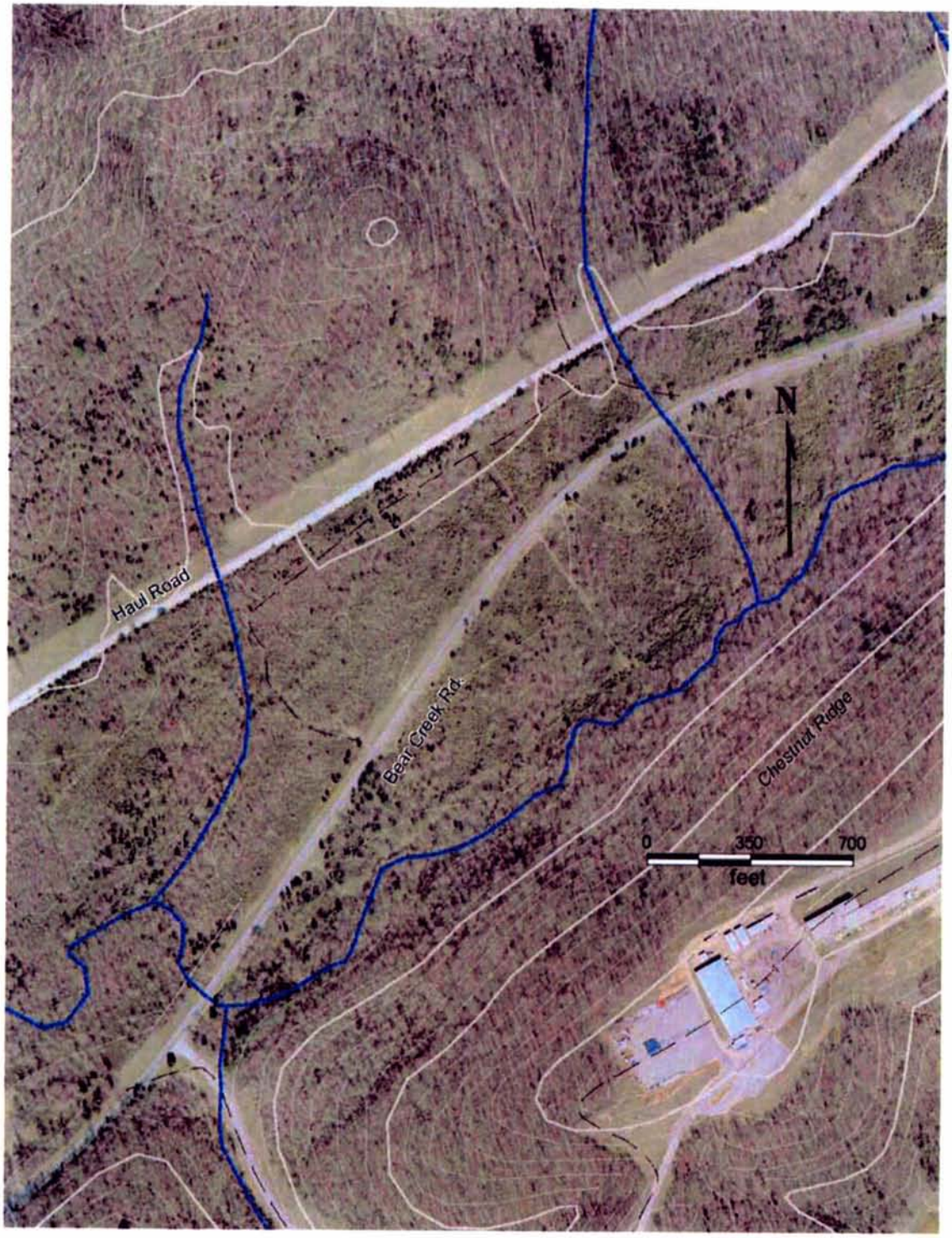


Fig. 9. Blue line streams in vicinity of Wet Soils Disposal Area.

Reptile and Amphibian Survey – A one day VES was conducted on the site. This involved searching under logs, rocks, bark, leaf litter and other debris. All reptiles and amphibians found were recorded. Incidental encounters with reptiles and amphibians were also recorded during surveys of other natural resources.

The only species recorded on the site were black rat snake (*Elaphe obsoleta obsoleta*) and five-lined skink (*Eumeces fasciatus*).

Vegetation Survey – A one day walk-through was conducted at which time all vascular plant species that could be identified were recorded. An additional survey was conducted with a professional plant ecologist to specifically identify rare plants.

This is an area of second growth with mainly young trees. Vegetation is thick through most of the site and there is a significant amount of dead and down woody material. Young trees on the site include blackjack oak (*Quercus marilandica*), red maple, tulip poplar, loblolly pine (*Pinus taeda*), American sycamore, white oak and sweetgum. There is a diversity of shrub species on the site including bush honeysuckle, multiflora rose (*Rosa multiflora*), prairie rose (*Rosa setigera*), privet (*Ligustrum sinense*), smooth sumac and winged sumac. Blackberry is also prevalent on the site. Vines on the site include Japanese honeysuckle, Virginia creeper and poison ivy. There is a diversity of herbaceous species on the site including black-eyed susan (*Rudbeckia hirta*), Canada goldenrod, butterfly-weed (*Asclepias tuberosa*), joy-pye-weed (*Eupatorium fistulosum*), narrow-leaf sunflower and Queen-Anne's lace (*Daucus carota*). The southern perimeter of the site supports a variety of grass species including silver plume grass (*Saccharum alopecuroides*), little bluestem (*Schizachyrium scoparium*), big bluestem (*Andropogon gerardii*) and Indian grass (*Sorghastrum nutans*).

No rare plant species were recorded on this site. However, tubercled rein-orchid (*Platanthera flava var. herbiola*), a Tennessee threatened plant, is known from wetlands in the general area. Possible habitat for this species was noted in a wetland just west of the Wet Soils Disposal Area. Appendix C – Table C-5 has a complete list of plant species recorded on the site during the survey.

3.3 WEST BORROW AREA

The West Borrow Area, proposed for storage of dry soils, is an early successional field containing mainly herbaceous plant species. No wetlands were found within the area. Figure 10 shows a portion of this area.

Bird Survey Results – A total of 12 bird species were recorded on and adjacent to this site.

There were two bird species recorded at the site that are on the PIF list as being of regional importance in the ridge and valley. Species in this category that were noted on the site were the field sparrow (*Spizella pusilla*) and the indigo bunting (*Passerina cyanea*). Both of these species are common in edge and old field habitats. Appendix C – Table C-6 has a complete list of bird species recorded on and adjacent to this site.

Small Mammal Survey Results – A total of 25 Sherman live traps were set out at the West Borrow Area. Small mammals were trapped for a total of 5 nights. This is equal to a total of 125 trap nights (5 nights x 25 traps). No small mammals were trapped on this site. Elk (*Cervus canadensis*) had been recorded in this area in the past.

Reptile and Amphibian Survey – A one day VES was conducted in this habitat. No reptile or amphibian species were noted in this habitat during the survey. However, green frogs (*Rana clamitans melanota*) and northern watersnakes (*Nerodia sipedon sipedon*) were recorded in the recharge basin to the south of the site.

Fig. 10. West Borrow Area.

Vegetation Survey – - A one day walk-through was conducted at which time all vascular plant species that could be identified were recorded. An additional survey was conducted with a professional plant ecologist to specifically identify rare plants.

The site is an early successional field that contains mainly herbaceous plant species, with a few pockets of woody vegetation. The site contains a number of grass species including fescue, weeping lovegrass (*Eragrostis curvula*), little bluestem, barnyard grass (*Echinocloa sp.*), Johnson grass (*Sorghum halepense*) and poverty grass (*Danthonia spicata).* There is a relatively large area of little bluestem on the site. A number of goldenrod species are present on the site, along with a variety of other wildflower species.

Columnar prairie coneflower (*Ratibada columnifera*) was recorded at this site. This would be a significant occurrence if the plant had been found in its natural habitat, as it is a prairie species. Its occurrence here is clearly from planting or recent accidental introduction and thus not a significant occurrence. No other rare plant species were recorded on this site. A complete plant list for this site is contained in Appendix C – Table C-7.

3.4 ADDITIONAL AREAS OF STUDY – POND NORTHEAST OF BUILDING 9114

A pond just northeast of Building 9114 on the south side of Bear Creek Road was also studied during this survey. Minnow traps were placed in the pond to survey for amphibians. Red-spotted newts and green frogs were recorded in this pond. The main wetland plant in the pond is rice cutgrass. Small-spike false-nettle, late-flowering thorough-wort and dotted smartweed are also present.

The pond is in a low area and is bordered by mature forest and edge habitat. The area slopes steeply from the pond into the upland forested area. The edges adjacent to a mowed grass area contain a variety of invasive plant species. It is isolated from other natural areas by roads and buildings.

Appendix C – Table C-8 contains a complete list of plant species found in this area.

(THIS PAGE LEFT BLANK INTENTIONALLY)

4. DISCUSSION

4.1 WEST END HAUL ROAD CORRIDOR – NEW SALVAGE YARD TO WETLAND #1

This section of the haul road corridor includes old field, forest and wetland habitat. The most significant potential impacts will be due to disturbance to forest and wetland habitat.

Impacts to interior forest species due to habitat fragmentation and disturbance to potential bat roosting trees are the two major considerations with regard to forest impacts. The removal of potential bat roosting trees between April 1st and October 14th presents the potential for the disturbance of the federally endangered Indiana bat, a species whose known range includes the ORR. Trees providing potential bat roosting habitat (i.e., white oaks with exfoliating bark) were specifically noted on the western end of the proposed haul road corridor where it cuts north out of the power-line right-of-way into the forested area. Ten trees that fit this category were noted within the proposed haul road corridor in this area. An additional 15 trees (including one dead snag) were noted adjacent to the proposed haul road corridor in this area. All trees were marked with blue flagging for future reference. If potential bat roosting trees are to be removed during the April 1st through October 14th timeframe, mist netting must be conducted to determine presence or absence of the Indiana bat. U. S. Fish and Wildlife Service guidance allows for the removal of such trees between October 15th and March 31st when these tree roosting bats are absent.

The current route of the haul road will take it through or adjacent to five wetlands. The combined acreage of these wetlands is almost 1 acre. Direct disturbance and sedimentation into streams are two potential impacts. Disturbance to Wetlands #1 and #2, in particular, have the potential to impact significant amphibian populations.

4.2 EAST END HAUL ROAD CORRIDOR – EAST OF WETLAND #1 TO POLARIS PARKING LOT

The eastern end of the haul road corridor extending from east of Wetland #1 to the Polaris Parking Lot includes mowed areas, wetlands, limited early successional old field, and some forest. The greatest acreage in this area of the haul road corridor is in mowed turf grasses.

There is the potential for the disturbance and/or loss of wetland resources along this portion of the haul road. The current route of the haul road will take it through or adjacent to four wetlands. The combined acreage of these wetlands is almost 1/2 acre.

4.3 WET SOILS DISPOSAL AREA

This site is mainly second growth woods with significant amounts of dead and down woody material. There are blue line streams to the east and west of the site.

The clearing of this site will result in the loss of habitat for common wildlife species found in second growth areas and edge habitat. An important consideration is the potential for disturbance to wet areas and streams to the east and west of the site, especially for the wetland to the west of the site where there is habitat present for the tubercled rein-orchid.

4.4 WEST BORROW AREA

This site is mainly early successional old field.

The clearing of this site will result in loss of habitat for common field and edge wildlife species.

5. CONCLUSIONS

In conclusion, the proposed haul road and soil storage areas for the UPF project traverse a variety of habitats including mowed areas, fields, second growth forest, mature forest and wetlands.

The fields and second growth areas are common and relatively non-sensitive habitats. As is evident from the results of surveys conducted, these areas support common wildlife species with stable populations and relatively wide distributions.

The mature forested areas along the proposed haul road provide habitat sensitive to encroachment. A major impact of encroachment on such forests is affects on interior forest bird species. The cumulative impact of road widening, construction and other projects through interior forests can result in significant overall impacts to bird populations. A number of interior forest bird species were recorded during the surveys conducted along the proposed UPF haul road corridor. A specific area of potential impact to forest bird species is along the western portion of the haul road where it travels northward through the forested area. An additional potential impact from disturbance of this habitat is the loss of potential bat roosting habitat that is provided by the exfoliating bark of mature white oaks and standing dead snags. The loss of such habitat has the potential to impact the federally endangered Indiana bat. Mature white oaks were recorded in the forest in this area.

The potential for impacts to wetland resources along the proposed haul road corridor is another major consideration prior to commencement of the project. This report documents the presence of jurisdictional wetlands within the current footprint of the proposed project. The final acreage of wetland impacts could change depending on final project location and/or design, and after consultation with appropriate regulatory authorities. Similarly, any mitigation requirements in conjunction with the wetland loss will depend on future project decisions and regulatory input. As currently proposed, the total wetland impact is greater than 0.1 acres and the wetlands have a hydrological connection to the streams in the watershed. Therefore, the wetlands are not isolated and a permit for minor wetland alterations cannot be used to satisfy State regulatory requirements. A TDEC ARAP Permit will be required and there is a strong likelihood that wetland mitigation, such as wetland creation, restoration, or enhancement, will be required. The Army Corps of Engineers will also need to be consulted and/or notified. It is recommended that a wetland mitigation plan be developed to address proposed steps to be taken to mitigate wetland disturbances and losses. This plan should be submitted as part of the ARAP Permit.

The current footprint of the haul road corridor crosses a number of wet weather conveyances or intermittent streams, but does not directly cross "jurisdictional" streams with established biological communities. However, streams defined as waters of the state (i.e., blue line streams with fish and snails, etc.) are found immediately downhill of some of the wetlands within the corridor. Proper erosion control and other BMPs will need to be implemented to avoid impacts to downstream aquatic resources, and changes to flow to downstream waters should be avoided. Bear Creek and its major tributaries contain a rare fish species, and forested wetlands adjacent to these streams are generally of high natural quality.

The fish communities in the Bear Creek Watershed have been monitored by the ORNL Biological Monitoring and Abatement Program (BMAP) since 1984. The biological communities in the Bear Creek Watershed have been impacted by prior waste disposal practices in its headwaters and current land uses (Southworth et.al. 1992; Hinzman 1996). However, Bear Creek and its tributaries are frequented by the Tennessee dace, a fish species that is listed by the State as "In Need of

Management", and is afforded a level of protection that requires that its habitat be protected and not knowingly destroyed. This dace is found in the Ridge and Valley province of Tennessee with limited populations; the population in the Bear Creek Watershed has been indicated as one of the primary strongholds of the species in Tennessee (Etnier and Starnes 1993). The reproductive biology of the Tennessee dace represents the most critical aspect of its life cycle that could be impacted by projects in the Bear Creek Watershed. Several conditions are necessary for successful spawning of the Tennessee dace to occur. First, flow must be continuous throughout the spawning season (spring to early summer). Second, dace move into small streams during spawning and access for migration must be maintained throughout the watershed to allow for formation of aggregations. Thirdly, excess sedimentation to streams must be limited during the spawning season. Males of host species will continue to maintain a nest when sedimentation occurs, but if it is excessive, they will abandon the nests. Extended periods of sedimentation can result in a total spawning failure for the year. Because Tennessee dace are short-lived, consecutive poor spawning seasons could have a detrimental effect on the overall population viability in a watershed. Due to concerns for this fish species, extreme measures were taken during the construction of the Environmental Management Waste Management Facility (EMWMF) Haul Road. This included the implementation of unusual engineering designs in constructing the Haul Road bridge over Bear Creek, and unique culvert designs for Bear Creek tributary crossings (Peterson et. al. 2005).

Site-specific control measures of particular importance to protecting the Tennessee dace include using appropriately sized culverts and box bridges to prevent the impoundment of normal and base flows; using box bridges where appropriate to minimize impacts to existing streams with sensitive habitat; and designing specific oversized, partially submerged culverts with light infiltration to maintain and support fish movement. In addition to the design of crossings, the timing of construction to be outside the critical periods when migration and reproductive activities of the Tennessee dace are at a peak is of great importance. Several researchers have suggested that the spawning season spans the April to July timeframe in Tennessee (Starnes and Jenkins 1988; Etnier and Starnes 1993). Unpublished observations by E. M. Schilling and M. G. Ryon indicate that spawning occurs on the ORR from late March (after March 15) through the end of May. There is likely some variability in the spawning season depending on variations in flow, water temperature and host spawning activity, which could extend spawning through June if earlier conditions are unfavorable. Larval development proceeds for the two months following the spawn, with larval and juvenile fish occupying shallow, low water velocity areas adjacent to pools (Peterson et. al. 2005).

The contribution of the current project to cumulative impacts to the Bear Creek Watershed resulting from other projects should be taken into consideration. There are many environmental issues that could potentially impact the Bear Creek Watershed in the future.

Post construction control measures should be taken to prevent the spread of invasive species. Species such as kudzu, Nepal grass, autumn olive, lespedeza, and privet are just some of the invasive plants that can become established immediately after soil disturbance. Use of native plants in re-vegetating side slopes is one possibility for preventing the spread of invasive plants. Alternatively, not all areas can be seeded/re-vegetated. Application of straw (not hay) and use of silt fences could be adequate in many areas, and would allow native species to grow back to the road. Fire ants are a recent problem in construction zones and have been encountered in the project area. These ants may need to be controlled shortly after construction.

In summary, the following mitigation measures will aid in minimizing potential overall impacts to natural resources for the proposed UPF project:

- Restriction of the impacted area to the maximum extent possible to mowed areas and fields ~~were~~ where more common wildlife and habitats are present; JOSS 3/16/10
- Minimizing encroachment into and fragmentation of mature forested areas in order to avoid major impacts to interior forest birds and potential bat roosting habitat;
- Minimizing disturbance to wetlands, especially those that contain significant amphibian populations;
- Minimizing impacts to streams and wet-weather conveyances, especially in the Bear Creek tributaries that provide habitat for the Tennessee dace.

(THIS PAGE LEFT BLANK INTENTIONALLY)

6. REFERENCES

ACOE (Army Corps of Engineers). 1987. Wetlands Delineation Manual. U. S. Army Corps of Engineers. Technical Report Y-87-1. Waterways Experiment Station, Vicksburg, MS.

Etnier, D. A. and W. C. Starnes. 1993. The Fishes of Tennessee. University of Tennessee Press, Knoxville, TN.

Harvey, M. J., J. S. Altenbach, and T. L. Best. 1999. Bats of the United States. Arkansas Fish & Game Commission in cooperation with the Ashville Field Office, U. S. Fish and Wildlife Service, 64 pp.

Hinzman, R.L. (ed.). 1996. Report on the Biological Monitoring Program for Bear Creek at the Oak Ridge Y-12 Plant, Oak Ridge, Tennessee (1989-1994). ORNL/TM-12884. Oak Ridge National Laboratory, Oak Ridge, TN.

Jensen, J. B., C. D. Camp, W. Gibbons, and M. J. Elliott. 2008. Amphibians and Reptiles of Georgia. The University of Georgia Press, Athens, Georgia. 575 pp.

Nicholson, C. P. 1997. Atlas of the Breeding Birds of Tennessee. The University of Tennessee Press, Knoxville, TN. 426 pp.

Peterson, M. J., N. R. Giffen, M. G. Ryon, L. R. Pounds, and E. L. Ryan Jr. 2005. Environmental Survey Report for the ETTP: Environmental Management Waste Management Facility (EMWMF) Haul Road Corridor, Oak Ridge, Tennessee. ORNL/TM-2005/215. Oak Ridge National Laboratory, Oak Ridge, TN.

Reid, F. A. 2006. Mammals of North America. The Peterson Field Guide Series, Houghton Mifflin Company, New York. 579 pp.

Southworth, G. R., J. M. Loar, M. G. Ryon, J. G. Smith, A. J. Stewart, and J. A. Burris. 1992. Ecological Effects of Contaminants and Remedial Actions in Bear Creek. ORNL/TM-11977. Oak Ridge National Laboratory, Oak Ridge, TN.

Starnes, W. C. and R. E. Jenkins. 1988. A new cyprinid fish of the genus Phoxinus (Pisces: Cypriniformes) from the Tennessee River drainage with comments on relationships and biogeography. *Proc. Biol. Soc. Wash.* 101(3): 517-529.

(THIS PAGE LEFT BLANK INTENTIONALLY)

Appendix A
CREDENTIALS AND QUALIFICATIONS

(THIS PAGE LEFT BLANK INTENTIONALLY)

Neil Giffen

Education: Master of Science Degree in Wildlife Management, University of Maryland

Experience: Mr. Giffen has over 25 years experience in the fields of wildlife management and environmental sciences. He is experienced in a variety of wildlife survey techniques involving birds, mammals, and reptiles and amphibians. For the past 6 years Mr. Giffen has been the Wildlife Management Coordinator for the Oak Ridge Reservation. His current duties include overseeing, deer hunts, turkey hunts, Canada goose management, nuisance wildlife management and wildlife population inventories.

Mark Peterson

Mark Peterson has over 25 years of environmental assessment experience focused on the effects of Department of Energy and Defense missions on aquatic and wetland ecosystems. A certified Professional Wetland Scientist, he has conducted hundreds of wetland assessments, including determinations and delineations per ACOE protocols, EIS and EA evaluations of affected wetland environments, and natural quality evaluations using floral and faunal community and T&E species data. Mr. Peterson's early career focused on natural quality assessment of Illinois floodplain ponds for his graduate work (Masters, Southern Illinois University, 1988) and The Nature Conservancy. He joined ORNL in 1988 where he has studied a wide variety of aquatic and wetland community types across the U.S. and Canada, including man-made and natural communities (e.g., vernal pools, glacial potholes, sphagnum bogs, longleaf pine ponds, swamp/rainforest, desert wash communities, and arctic wetland tundra). Recent interests include development of innovative pond and wetland restoration strategies. Mr. Peterson is currently the Science Team Leader for the Ecological Assessment Group at Oak Ridge National Laboratory, and the Program Manager for the Biological Monitoring and Abatement Program.

Scott Reasor

Education: Bachelor of Science Degree in Wildlife and Fisheries Science and Management, Minor in Forestry, University of Tennessee

Experience: Mr. Reasor has one year of work experience in wildlife science and management with the Tennessee Wildlife Resources Agency and Oak Ridge National Laboratory (ORNL). He is currently an Oak Ridge Institute for Science and Education technician with the ORNL Environmental Sciences Division.

Larry Pounds

Education: Ph.D. in Ecology, University of Tennessee

Experience: Dr. Pounds has 22 years experience as a plant ecologist. He specializes in endangered plant species, special plant communities and exotic pest plants. Dr. Pounds is currently working as an endangered plant specialist for Oak Ridge National Laboratory and the Tennessee Valley Authority Heritage Project. His work at Oak Ridge National Laboratory includes the study of special plant communities, in particular, cedar barrens and wetlands.

Greg Byrd

Education: Bachelor of Science Degree in Forest Resources Management, University of Tennessee

Experience: Mr. Byrd has 20 years of work experience as the Oak Ridge Reservation forester. He is a member of the International Association of Wildland Fire (IAWF). Mr. Byrd is also skilled in the use of Global Positioning Systems (GPS) equipment, in particular, high accuracy Trimble units.

Appendix B
REPRESENTATIVE WETLAND DELINEATION REPORTS

(THIS PAGE LEFT BLANK INTENTIONALLY)

Table B-1. Wetland #4

Project/Site: UPF Project/Wetland #4 Applicant/Owner: Mick Wiest, Y-12 Staff Investigator: M. J. Peterson (ORNL), N. R. Giffen (ORNL)	Date: 21 September 2009 Location: Bear Creek Road, Y-12 National Security Complex, Anderson County State: TN
Do Normal Circumstances Exist on the site?: Yes Is the site significantly disturbed (Atypical Situation): No Is the area a potential Problem Area? No	Commun. ID: Marsh Monitoring Point: West end, Wetland #4

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
Salix nigra	tree	OBL	*Scirpus cyperinus*	herb	OBL
Typha sp.	herb	OBL	*Lobelia cardinalis*	herb	OBL
Leersia oryzoides	herb	OBL			
Eleocharis obtuse	herb	OBL			
Arthraxon hispidus	herb	FACW			
Ludwigia alternafolia	herb	OBL			
Cyperus flavescens	herb	OBL			

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-): 100%
Remarks: The dominant plants are wetland species. Fescue is dominant just outside the wetland zone, especially around the seep areas.

HYDROLOGY

_X__ Recorded Data (Describe in Remarks):	Wetland hydrology Indicators:
___ Stream, Lake, or Tide Gauge	Primary Indicators:
___ Aerial Photographs	_X_ Inundated
___ Other	_X_ Saturated in Upper 12 inches
___ No Recorded Data Available	___ Water Marks
	_X_ Drainage Patterns in Wetlands
Field Observations:	___ Drift Lines
Depth of Surface Water: At least 30% surface water, ranging from surface to 12 inches deep.	_X_ Sediment Deposits
Depth to Saturated Soil outside the ponded zone: saturated at surface	
Depth of Water in Soil Pit: 4 inches	Secondary Indicators
	_X_ Oxidized Root Channels in upper 12"
	___ Water-Stained Leaves
	___ Local Soil Survey Data
	___ FAC-Neutral Test
	___ Other (Explain in Remarks)

Remarks:
Some of the rust-colored seep inputs have been previously investigated and found to be natural (M. Wiest, personal communication). Similar tributary wetlands were identified west of the site by Rostensteel (1993). Small wetlands and ponding as a result of berms or road crossings are common features of Bear Creek's north tributaries.

Project/Site: UPF Project/Wetland #4	Date: 21 September 2009
Applicant/Owner: Mick Wiest, Y-12 Staff	Location: Bear Creek Road, Y-12 National Security Complex, Anderson County
Investigator: M. J. Peterson (ORNL), N. R. Giffen (ORNL)	State: TN

SOILS

Classification

Fine, silty to sandy loam, mixed, thermic, Typic Endoaqualf. Such hydric soils are characteristic of Pine Ridge terraces and shallow sloped tributary areas (4-6% slope) of Bear Creek valley. Surrounding soils on the 12-20% slopes are Armuchee shaly, silty clay loam (Anderson County Soil Survey). Highly organic, fibrous root material in A horizon. All soils in this area of Pine Ridge underlain by multicolored shale, siltstone, and sandstone. Strong evidence of soil mixing in some areas, with little or no horizon development below the A horizon. Underlaying rock at surface or just below the A horizon, especially at steep banks where soils removed by historical earth moving activities. Areas with surface water have shallow organic horizon on top of loose rock (either bedrock or old fill). Soils vary by location. Extensive erosion and depositing of upland soils in the area.

Profile Description:

Depth (in.)	Horizon	Matrix Color	Mottle Colors	Mottle Abundance/Contrast	Texture, Concretions, Structures
0-2"	A	10YR 5/1	none	none	Fibric
2 – 12"	B	Mixed; 7.5YR 6/1, 7.5 YR 7/6	10R 4/4	20% of matrix	Clay, silt loam

Hydric Soil Indicators:

___ Histosol	___ Concretions
___ Histic Epipedon	___ High Organic Content in Surface Layer Sandy Soils
___ Sulfidic Odor	___ Organic Streaking in Sandy Soils
_X__ Aquic Moisture Regime	_X_ Listed on State Hydric Soils List
_X__ Reducing Conditions	___ Listed on National Hydric Soils List
_X__ Gleyed or Low-Chroma Colors	___ Other (Explain in Remarks)

Remarks: Soils show strong evidence of sustained wet conditions toward center of site. Soils near periphery of wet zone shallow, not well developed, or absent. Water in soil near surface of these peripheral sites due to surface flow from seeps, little or no saturation in small B horizon. Soil mixing, high shale deposits, shallow soil, and layering of eroded upland soils are all clear evidence of previous soil disturbances in this area.

WETLAND DETERMINATION

Hydrophytic Vegetation Present?	YES	
Wetland Hydrology Present?	YES	
Hydric Soils Present?	YES	**Is this sampling point within a wetland? YES**

Remarks: This site has the necessary vegetation, soils, and hydrology to be classified a jurisdictional wetland. Native wetland species are dominant, particularly in the area of standing water, but the site shows strong evidence of human disturbance, particularly along the edges and where seeps enter the site. Evidence of previous earth moving activities that removed or mixed soil. Periphery of site regularly mowed.

Table B-2. Wetland #7

Project/Site: UPF Project/Wetland #7 Applicant/Owner: Mick Wiest, Y-12 Staff Investigator: M. J. Peterson (ORNL), N. R. Giffen (ORNL)	Date: 22 September 2009 Location: Bear Creek Road, Y-12 National Security Complex, Anderson County State: TN
Do Normal Circumstances Exist on the site?: Yes Is the site significantly disturbed (Atypical Situation): No Is the area a potential Problem Area? No	Commun. ID: Forested wetland Monitoring Point: Middle, Wetland #7

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
Alnus serrulata	tree	OBL	*Leersia oryzoides*	herb	OBL
Acer rubrum	tree	FAC	*Impatiens capensis*	herb	FACW
Platanus occidentalis	tree	FACW	*Collinsonia canadensis*	herb	FAC
Salix nigra	tree	OBL	*Lobelia cardinalis*	herb	OBL
Fraxinus pennsylvanica	tree	FACW			
Scirpus polyphyllus	herb	OBL			
Polygonum sagittatum	herb	OBL			

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-): 100%
Remarks: The dominant plants are wetland species. Portion of wetland is bordered by upland old field vegetation on power-line right-of-way. Forested portion of wetland bordered by mature upland forest.

HYDROLOGY

X Recorded Data (Describe in Remarks):	Wetland hydrology Indicators:
Stream, Lake, or Tide Gauge	Primary Indicators:
Aerial Photographs	X Inundated
Other	X Saturated in Upper 12 inches
No Recorded Data Available	X Water Marks
	X Drainage Patterns in Wetlands
Field Observations:	Drift Lines
Depth of Surface Water: At least 30% surface water, ranging from surface to 6 inches deep.	X Sediment Deposits
Depth to Saturated Soil outside the ponded zone: 0 to 8 inches	
Depth of Water in Soil Pit: 8 inches	Secondary Indicators
	X Oxidized Root Channels in upper 12"
	X Water-Stained Leaves
	Local Soil Survey Data
	FAC-Neutral Test
	Other (Explain in Remarks)

Remarks:
Blue line stream feeds into natural braided channel. Similar tributary wetlands were identified in vicinity of site by Rostensteel (1993). Small wetlands and ponding as a result of berms or road crossings are common features of Bear Creek's north tributaries.

Project/Site: UPF Project/Wetland #7	Date: 22 September 2009
Applicant/Owner: Mick Wiest, Y-12 Staff	Location: Bear Creek Road, Y-12 National Security Complex, Anderson County
Investigator: M. J. Peterson (ORNL), N. R. Giffen (ORNL)	State: TN

SOILS

Classification

Fine, silty to sandy loam, mixed, thermic, Typic Endoaqualf. Such hydric soils are characteristic of Pine Ridge terraces and shallow sloped tributary areas (4-6% slope) of Bear Creek valley. Surrounding soils on the 12-20% slopes are Armuchee shaly, silty clay loam (Anderson County Soil Survey). Highly organic, fibrous root material in A horizon. All soils in this area of Pine Ridge underlain by multicolored shale, siltstone, and sandstone. Soils vary by location.

Profile Description:

Depth (in.)	Horizon	Matrix Color	Mottle Colors	Mottle Abundance/Contrast	Texture, Concretions, Structures
0-8	A	10YR 4/2	none	none	Organic, fibrous roots

Hydric Soil Indicators:

___ Histosol	___ Concretions
___ Histic Epipedon	___ High Organic Content in Surface Layer Sandy Soils
___ Sulfidic Odor	___ Organic Streaking in Sandy Soils
_X__ Aquic Moisture Regime	_X_ Listed on State Hydric Soils List
_X__ Reducing Conditions	___ Listed on National Hydric Soils List
_X__ Gleyed or Low-Chroma Colors	___ Other (Explain in Remarks)

Remarks: Soils show strong evidence of sustained wet conditions in most areas.

WETLAND DETERMINATION

Hydrophytic Vegetation Present? YES
Wetland Hydrology Present? YES
Hydric Soils Present? YES **Is this sampling point within a wetland? YES**

Remarks: This site has the necessary vegetation, soils, and hydrology to be classified a jurisdictional wetland. Native wetland species are dominant and the wetland receives steady flow from tributaries to the north.

Appendix C
FAUNA AND FLORA LISTS

(THIS PAGE LEFT BLANK INTENTIONALLY)

Table C-1. Bird species list – haul road corridor

Scientific name	Common name	Habitat	Status		
			Federal	State	PIF [c]
VULTURES					
Cathartes aura	turkey vulture	flyover			
CUCKOOS					
Coccyzus americanus	yellow-billed cuckoo	forest			
OWLS					
Otus asio	eastern screech-owl	forest			
KINGFISHERS					
Ceryle alcyon	belted kingfisher	wetland			RI
WOODPECKERS					
Melanerpes carolinus	red-bellied woodpecker	forest			
Picoides villosus	hairy woodpecker	forest			
Picoides pubescens	downy woodpecker	forest			RI
Dryocopus pileatus	pileated woodpecker	forest			
TYRANT FLYCATCHERS					
Sayornis phoebe	eastern phoebe	edge			
Contopus virens	eastern wood-pewee	forest			RI
VIREOS					
Vireo griseus	white-eyed vireo	edge			
CROWS AND JAYS					
Cyanocitta cristata	blue jay	forest			
Corvus brachyrhynchos	American crow	forest			
CHICKADEES AND TITMICE					
Baeolophus bicolor	tufted titmouse	forest			
Poecile carolinensis	Carolina chickadee	forest			RI
NUTHATCHES					
Sitta carolinensis	white-breasted nuthatch	forest			
WRENS					
Thryothorus ludovicianus	Carolina wren	edge			
THRUSHES					
Sialia sialis	eastern bluebird	edge			
MOCKINGBIRDS AND THRASHERS					
Dumetella carolinensis	gray catbird	edge			
WOOD-WARBLERS					
Geothlypis trichas	common yellowthroat	edge			
TOWHEES					
Pipilo erythrophthalmus	eastern towhee	edge			RI
BUNTINGS					

Scientific name	Common name	Habitat	Status		
			Federal	State	PIF [c]
Passerina cyanea	indigo bunting	edge			RI
FINCHES					
Carduelis tristis	American goldfinch	edge			

RI = regional importance
[c]Partners In Flight

Table C-2. Reptile and amphibian species list – haul road corridor

Scientific name	Common name	Location	Status	
			Federal	State
AMPHIBIANS - ORDER CAUDATA				
Ambystoma opacum	marbled salamander	Wetland #2		
Notophthalmus viridescens viridescens	red-spotted newt	Forest and Wetlands #1 and #2		
Desmognathus sp.	dusky salamander	streams		
AMPHIBIANS - ORDER ANURA				
Pseudacris crucifer crucifer	northern spring peeper	Wetland #7		
Pseudacris feriarum feriarum	upland chorus frog	Wetland #4		
Rana catesbeiana	American bullfrog	Wetland #1		
Rana clamitans melanota	green frog	Wetland #1		
Rana palustris	Pickerel frog	western power-line area, Wetland #1		
Schaphiopus holbrookii	eastern spadefoot	Wetland #6		
REPTILES – ORDER TESTUDINES				
Terrepene carolina carolina	eastern box turtle	Wetland #7		
REPTILES – ORDER TESTUDINES – SUBORDER IGUANIA				
Sceloporus undulatus hyacinthinus	northern fence lizard	western power-line area		

Table C-3. Plant species list for the haul road corridor

Scientific name	Common name
FOREST	
Quercus alba	White oak
Quercus montana	Chestnut oak
Quercus falcata	Southern red oak
Pinus virginiana	Scrub pine
Pinus taeda	Loblolly pine
Acer rubrum	Red maple
Acer saccharum	Sugar maple
Juniperus virginiana	Eastern red cedar
Liquidambar styraciflua	Sweetgum
Liriodendron tulipifera	Tulip poplar
Carya glabra	Pignut hickory
Nyssa sylvatica	Black gum
Prunus serotina	Black cherry
Fagus grandifolia	American beech
Fraxinus pennsylvanica	Green ash
Oxydendrum arboreum	Sourwood
Cornus florida	Flowering dogwood
Asimina triloba	Common pawpaw
Vitis rotundifolia	Muscadine
Elaeagnus umbellata	Autumn olive
Elaeagnus pungens	Thorny olive
Rhus copallina	Winged sumac
Rhus radicans	Poison ivy
Lonicera mackii	Bush honeysuckle
Lonicera japonica	Japanese honeysuckle
Vaccinium pallidum	Lowbush blueberry
Rubus sp.	Blackberry
Berberis thunbergii	Japanese barberry
Parthenocissus quinquefolia	Virginia creeper
Polystichum acrostichoides	Christmas fern
Chimaphila maculata	Striped pipissewa
Athyrium filix-femina	Lady fern
Solidago canadensis	Canada goldenrod
Solidago odora	fragrant goldenrod
Lespedeza cuneata	Sericea lespedeza
Microstegium vimineum	Nepal grass
Coronilla varia	Crown vetch

Scientific name	Common name
Hexastylis arifolia	Little brown jug
Perilla frutescens	Beefsteak plant
Goodyera pubescens	Downy rattlesnake plantain
WETLANDS	
Salix nigra	Black willow
Populus deltoides	Eastern cottonwood
Acer rubrum	Red maple
Fraxinus pennsylvanica	Green ash
Platanus occidentalis	American sycamore
Alnus serrulata	Common alder
Typha sp.	Cattail
Sagittaria australis	Long-beaked arrow-head
Lobelia puberula	Downy lobelia
Lobelia cardinalis	Cardinal flower
Helianthus angustifolius	Narrow-leaved sunflower
Impatiens capensis	Orange jewelweed
Arisaema triphyllum	Jack-in-the-pulpit
Collinsonia canadensis	Horse-balm
Mimulus ringens	Alleghany monkey-flower
Polygonum sagittatum	Tearthumb
Polygonum punctatum	Dotted smartweed
Eupatorium serotinum	Late-flowering thorough-wort
Epilobium sp.	Willow-herb
Ludwigia alternifolia	Bushy seedbox
Spiranthes sp.	Lady's tresses
Fimbristylis autumnalis	Slender fimbry
Boehmeria cylindrica	Small-spike false-nettle
Arthraxon hispidus	Small carpgrass
Leersia oryzoides	Rice cutgrass
Carex lurida	Smaller hop sedge
Cyperus flavescens	Umbrella sedge
Cyperus strigosus	Umbrella sedge
Cyperus esculentus	Chufa
Eleocharis obtusa	Blunt spike-rush
Juncus effusus	Soft rush
Rhyncospora sp.	Beak-rush
Scirpus polyphyllus	Leafy bulrush
Scirpus cyperinus	Wool-grass
OLD FIELD	

Scientific name	Common name
Salix nigra	Black willow
Liquidambar styraciflua	Sweetgum
Liriodendron tulipifera	Tulip poplar
Rhus glabra	Smooth sumac
Rhus copallina	Winged sumac
Lonicera japonica	Japanese honeysuckle
Rubus sp.	Blackberry
Pueraria lobata	Kudzu
Solidago canadensis	Canada goldenrod
Solidago speciosa	Showy goldenrod
Helianthus angustifolius	Narrow-leaved sunflower
Vernonia gigantean	Tall ironweed
Verbesina occidentalis	Crown-beard
Ambrosia sp.	Ragweed
Agalinis sp.	Gerardia
Lobelia sp.	Lobelia
Lespedeza cuneata	Sericea lespedeza
Lespedeza repens	Trailing bush-clover
Microstegium vimineum	Nepal grass
Andropogon gerardii	Big bluestem
Setaria sp.	Foxtail
Panicum anceps	Panic grass
Sorghum halepense	Johnson grass
Festuca sp.	Fescue

Table C-4. Bird species list – Wet Soils Disposal Area

Scientific name	Common name	Habitat	Status		
			Federal	State	PIF [c]
WOODCOCKS					
Scolopax minor	American woodcock	Second growth			
WOODPECKERS					
Melanerpes carolinus	red-bellied woodpecker	Second growth			
TYRANT FLYCATCHERS					
Sayornis phoebe	eastern phoebe	Edge			
VIREOS					
Vireo griseus	white-eyed vireo	edge			
CROWS AND JAYS					
Cyanocitta cristata	blue jay	Second growth			
Corvus brachyrhynchos	American crow	Second growth			
CHICKADEES AND TITMICE					
Poecile carolinensis	Carolina chickadee	Second growth			RI
WRENS					
Thryothorus ludovicianus	Carolina wren	edge			
MOCKINGBIRDS AND THRASHERS					
Toxostoma rufum	Brown thrasher	edge			RI
WOOD-WARBLERS					
Icteria virens	Yellow-breasted chat	edge			RI
TOWHEES					
Pipilo erythrophthalmus	eastern towhee	edge			RI
BUNTINGS					
Passerina cyanea	indigo bunting	edge			RI
FINCHES					
Carduelis tristis	American goldfinch	edge			

RI = regional importance
[c]Partners In Flight

Table C-5. Plant species list for the Wet Soils Disposal Area

Scientific name	Common name
Quercus marilandica	Blackjack oak
Acer rubrum	Red maple
Liriodendron tulipifera	Tulip poplar
Pinus taeda	Loblolly pine
Platanus occidentalis	American sycamore
Rhamnus caroliniana	Carolina buckthorn
Fraxinus pennsylvanica	Green ash
Fagus grandifolia	American beech
Quercus alba	White oak
Cornus florida	Flowering dogwood
Juniperus virginiana	Eastern red cedar
Cercis canadensis	Red bud
Liquidambar styraciflua	Sweetgum
Rhamnus caroliniana	Carolina buckthorn
Corylus americana	American hazelnut
Lonicera japonica	Japanese honeysuckle
Lonicera maackii	Bush honeysuckle
Rosa multiflora	Multiflora rose
Rosa setigera	Prairie rose
Ligustrum sinense	Privet
Rhus glabra	Smooth sumac
Rhus copallina	Winged sumac
Rubus sp.	Blackberry
Vitis rotundifolia	Muscadine
Vaccinium pallidum	Pale lowbush blueberry
Euonymus americanus	Heart's-a-bursting
Parthenocissus quinquefolia	Virginia creeper
Toxicodendron radicans	Poison ivy
Wisteria sp.	Wisteria
Botrychium dissectum	Common grape fern
Polystichum acrostichoides	Christmas fern
Heterotheca mariana	Shaggy golden aster
Rudbeckia hirta	Black-eyed susan
Lespedeza cuneata	Sericea lespedeza
Silphium terebinthinaceum	Prairie dock
Helianthus microcephalus	Small wood sunflower
Panicum anceps	Panic grass
Solidago canadensis	Canada goldenrod

Scientific name	Common name
Solidago speciosa	Showy goldenrod
Solidago gigantea	Tall goldenrod
Asclepias tuberosa	Butterfly-weed
Eupatorium fistulosum	Joe-Pye-weed
Saccharum alopecuroides	Silver plume grass
Schizachyrium scoparium	Little bluestem
Andropogon gerardii	Big bluestem
Arthraxon hispidus	Small carpgrass
Microstegium vimineum	Nepal grass
Agrimonia sp.	Agrimony
Boehmeria cylindrica	Small-spike false-nettle
Juncus effusus	Soft rush
Aster dumosus	Bushy aster
Anemone virginiana	Thimbleweed
Sorghastrum nutans	Indian grass
Asclepias sp.	milkweed
Coreopsis tripteris	Tall tickseed
Helianthamum autumnal	Sneezeweed
Helianthus angustifolius	Narrow-leaved sunflower
Daucus carota	Queen-Anne's lace

Table C-6. Bird species list – West Borrow Area

Scientific name	Common name	Habitat	Status		
			Federal	State	PIF [c]
TURKEYS					
Meleagris gallopavo	Wild turkey	field			
WOODPECKERS					
Melanerpes carolinus	red-bellied woodpecker	forest			
Dryocopus pileatus	Pileated woodpecker	forest			
TYRANT FLYCATCHERS					
Sayornis phoebe	eastern phoebe	edge			
CROWS AND JAYS					
Cyanocitta cristata	blue jay	forest			
Corvus brachyrhynchos	American crow	forest			
CHICKADEES AND TITMICE					
Baeolophus bicolor	tufted titmouse	forest			
WRENS					
Thryothorus ludovicianus	Carolina wren	edge			
SPARROWS					
Spizella pusilla	Field sparrow	field			RI
CARDINALS					
Cardinalis cardinalis	Northern cardinal	edge			
BUNTINGS					
Passerina cyanea	indigo bunting	edge			RI
FINCHES					
Carduelis tristis	American goldfinch	field			

RI = regional importance
[c]Partners In Flight

Table C-7. Plant species list for West Borrow Area

Scientific name	Common name
Lespedeza cuneata	Sericea lespedeza
Coronilla varia	Crown vetch
Solidago canadensis	Canada goldenrod
Echinocloa sp.	Barnyard grass
Cyperus strigosus	Umbrella sedge
Aster pilosus	Downy aster
Iva annua	Rough marsh elder
Ambrosia artemmisiifolia	ragweed
Festuca sp.	fescue
Juncus effusus	Soft rush
Eleocharis obtusa	Spike rush
Eragrostis curvula	Weeping lovegrass
Schizachyrium scoparium	Little bluestem
Solidago speciosa	Showy goldenrod
Aster dumosus	Bushy aster
Ageratina aromatica	Lesser snakeroot
Helianthus angustifolius	Narrow-leaved sunflower
Perilla frutescens	beefsteakplant
Pinus virginiana	Scrub pine
Pinus taeda	Loblolly pine
Liriodendron tulipifera	Tulip poplar
Platanus occidentalis	American sycamore
Liquidambar styraciflua	sweetgum
Albizia julibrissin	mimosa
Juncus coriaceus	Rush
Rubus sp.	blackberry
Juniperus virginiana	Eastern red cedar
Setaria sp.	Foxtail
Cercis canadensis	Red bud
Cornus florida	Flowering dogwood
Ulmus alata	Winged elm
Rhus copallina	Winged sumac
Elaeagnus umbellata	Autumn olive
Lonicera japonica	Japanese honeysuckle
Rhus radicans	Poison ivy
Diospyros virginiana	persimmon
Anaphalis margaritacea	Pearly everlasting
Erechtites hieracifolia	pilewort

Scientific name	Common name
Sorghum halepense	Johnson grass
Solanum carolinense	Horse-nettle
Daucus carota	Queen-Anne's lace
Ratibada columnifera	Columnar prairie coneflower
Solidago nemoralis	Gray goldenrod
Solidago gigantea	Tall goldenrod
Dioscorea oppositifolia	Air potato
Danthonia spicata	Poverty grass
Diodia sp.	buttonweed

Table C-8. Plant species list for the pond and adjacent areas near Building 9114

Scientific name	Common name
Acer rubrum	Red maple
Liriodendron tulipifera	Tulip poplar
Juglans nigra	Black walnut
Quercus prinus	Chestnut oak
Platanus occidentalis	American sycamore
Prunus serotina	Black cherry
Fraxinus pennsylvanica	Green ash
Quercus alba	White oak
Ulmus sp.	Elm
Morus rubus	Red mulberry
Acer saccharum	Sugar maple
Juniperus virginiana	Eastern red cedar
Cercis canadensis	Red bud
Lonicera japonica	Japanese honeysuckle
Lonicera maackii	Bush honeysuckle
Rosa multiflora	Multiflora rose
Ligustrum sinense	Privet
Elaeagnus umbellata	Autumn olive
Rhus glabra	Smooth sumac
Rubus sp.	Blackberry
Celastrus orbiculatus	Oriental bittersweet
Toxicodendron radicans	Poison ivy
Lespedeza cuneata	Sericea lespedeza
Solidago caesia	Blue-stemmed goldenrod
Microstegium vimineum	Nepal grass
Boehmeria cylindrica	False-nettle
Leersia oryzoides	Rice cutgrass
Polygonum punctatum	Dotted smartweed
Gerardia sp.	False foxglove
Hepatica	hepatica
Chimaphila maculata	Striped pipsissewa

UCN-7721B (07-08)

Y-12 INFORMATION CONTROL FORM

* sorry for the urgent request.

DOCUMENT DESCRIPTION (Completed by Requesting Organization)

Document No.	Date of Request	Requested Date of Release (Allow 5 to 10 Days)	Page Count
RP-SH-801768-A006 Rev.2	2-25-10	2-25-10 *	54

Unclassified Title: Wetland and Sensitive Species Survey Report

Author's / Requestor's Name	User ID	Telephone No., Pager No. and Fax Number
Mick Wiest	mxy	574-3390, pager 417-5261

INTENDED AUDIENCE: ☑ Public ☑ Environmental Regulators ☐ NWC ☑ DOE Contractors ☐ Other

TYPE: ☐ Abstract ☐ Brochure ☐ Co-op Report ☑ Formal Report ☐ Informal Report ☐ CD
☐ Invention Disclosure ☐ Journal Article ☐ News Release ☐ Photograph/Visuals ☐ Technical Progress Report ☐ DVD
☐ Thesis/Term Paper ☐ Videotape ☐ Other
☐ Oral Presentation (identify meeting, sponsor, location, date):

PATENT OR INVENTION SIGNIFICANCE ☐ Yes ☑ No (Identify) Document will be published in proceedings ☐ Yes ☑ No
Document has been previously released ☐ Yes ☑ No (Reference) Document will be distributed at meeting ☐ Yes ☑ No

This document contains unclassified controlled information. ☐ YES ☒ NO [If yes, please identify below.]

☐ Unclassified Controlled Nuclear Information (UCNI) ☐ Intellectual Property Information ☐ Internal Use Only
☐ Export Controlled Information ☐ Proprietary Information ☐ Official Use Only
☐ Privacy Act Information ☐ Applied Technology Information ☐ Work For Others or CRADA
☐ Copyrighted Information ☐ Other Sensitive Information

ORGANIZATION REVIEW AND APPROVAL (Completed by Requesting Organization)

DERIVATIVE CLASSIFIER (DC) REVIEW

TITLE Level U Category N/A
ABSTRACT Level U Category N/A
DOCUMENT Level U Category N/A

S.T. Duke (Please Print Name) Stan Duke (Signature) 2/25/10 (Date)

DOCUMENT REQUEST APPROVED (Organization/Department Mgr.)

S.E. McNamara, Mgr. Env. Compliance (Please Print Name and Title)

S E McNamara by Sphoutz (Signature) 2-25-10 (Date)

APPROVAL AND RELEASE (Completed by the Classification and Technical Information Office)

CLASSIFICATION OFFICE REVIEW

TITLE U ABSTRACT –
DOCUMENT Level U Category –
Weapons Data – Sigma –

Wendell Loves (Y-12 Classification Office) Wendell Loves 2/25/10 (Date)

☐ Patent Office Date
☐ Operations Security (OPSEC) Date
2/25/10 Date Received

DISTRIBUTION:
☑ UNLIMITED
☐ LIMITED
☐ SPECIAL LIMITED
☑ DOE-OSTI: Distribution Category UC-702
☐ OTHER

Distribution Remarks:

☐ Release subject to use of the following admonitory markings and conditions
☐ Disclaimer ☐ Copyright ☐ Patent Caution ☐ Other

Request Approved
A. Young (Y-12 Technical Information Office) 2/25/10 (Date)

Conditions/Remarks: