APPENDIX E

KEMPER COUNTY IGCC PROJECT SITE WETLAND ASSESSMENT AND ECOLOGICAL SURVEY REPORTS

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WETLAND ASSESSMENT OF THE INTEGRATED GASIFICATION COMBINED CYCLE GENERATING STATION IN KEMPER COUNTY, MISSISSIPPI

Prepared for

MISSISSIPPI POWER COMPANY
2992 WEST BEACH BOULEVARD
GULFPORT, MISSISSIPPI 39501

Prepared by

BARRY A. VITTOR & ASSOCIATES, INC.
8060 COTTAGE HILL ROAD
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(Contract No. BSU 0067717)

March 30, 2007

INTRODUCTION

Barry A. Vittor & Associates, Inc. (Vittor & Associates) was contracted by Mississippi Power Company to conduct surveys of wetlands within the 1,670-acre Integrated Gasification Combined Cycle generating station site in Kemper County, Mississippi. Vittor & Associates' wetland assessment involved detailed delineation and mapping of jurisdictional wetlands within a 128-acre core site, where the plant would be located, and a 500-foot wide access road corridor between Mississippi State Road 493 and the 128-acre block. Vittor & Associates also estimated the wetlands boundaries on 1,542 acres surrounding the 128-acre plant site property. The estimated wetland acreage was determined using information gathered from the detailed wetland survey on the plant site property, field groundtruthing and collecting GPS data at numerous predetermined locations throughout the 1,542 acres property, by referencing county soil maps, USGS topographic quadrangle maps for the area, and available aerial photography. Using that methodology, Vittor & Associates determined that wetlands occupy approximately 475 acres (30%) of the total 1,670-acre study area, including the 16.4 acres delineated on the 128-acre plant site.

Field studies were performed March 7-8, 2007 by Terry Whitehurst, Howard E. Horne, and David Knowles of Vittor & Associates. Mr. Horne conducted a follow-up field inspection on March 21, in conjunction with field surveys of the property by Archaeological Services, Inc.

GENERAL CHARACTERISTICS OF THE OVERALL STUDY AREA

The 128-acre plant site is comprised for the most part, of managed pine timberlands with mixed hardwood forest areas occurring. Large portions of the site had been clearcut at the time of this survey. The property is also presently being managed for deer and turkey hunting and numerous food plots were distributed across the property. Topography on the site is characterized by undulating sand/clay hills with maximum elevations reaching over 480 feet. The lowest elevations on the site are along the west and south property boundaries where elevations drop below 420 feet as the site slopes to the Chickasawhay Creek drainageway.

Various land use activities occur on the 1,542 acres surrounding the 128-acre plant site. The study area consists of undeveloped woodlands, managed pine timberlands, open fields and pastures, and light residential development. Wetlands throughout the study area are associated with tributaries to Chickasawhay Creek.

WETLAND DELINEATION METHODOLOGY

Vittor & Associates conducted this wetland survey according to the methodology and criteria set forth in the 1987 U.S. Army Corps of Engineers Wetland Delineation Manual. According to the Manual, jurisdictional wetlands must exhibit all of the following criteria: hydric soils; a dominance of wetland vegetation; and sufficient hydrology to sustain hydrophytic plants. A list of hydric soils has been compiled by the Natural Resources Conservation Service (NRCS) for the nation and each state. NRCS also distributes soil maps for most counties, giving the location of each soil type and a description of each soil. Also, lists are available that classify plant species on the basis of the likelihood of its occurrence in a wetland. To have a dominance of wetland vegetation, one must have hydrophytic species comprising 50% or more of the total species in that area. Sufficient hydrology is defined as water and/or indicators of water at or near the surface of the ground. Hydrologic indicators are factors such as water stained leaves, oxidized root channels, drainage patterns, watermarks on the trunks of the trees, etc. Field data sheets were compiled within each different wetland and contiguous upland habitat type, to document the basis for the delineation.

Once the soil map of the area was thoroughly studied and the USGS Topographic Quadrangle referenced, staff biologists mapped the wetlands based upon topographic features, soil types and the presence of wetland characteristics (as described above). Soil probes were used to give the biologist a clear view of the soil and allow the biologist to determine the taxonomic subgroup to which the soil belonged. Hydrologic indicators in the soil (*ie.*, oxidized root channels, the presence of water, or saturated soil near the surface of the ground) were used to determine if the area was a wetland. The biologist studied the vegetation of the area to determine if the area was dominated by wetland vegetation. If any one criterion is not met, the area will not be delineated as a jurisdictional wetland.

Boundaries of jurisdictional wetlands were clearly marked with flagging labeled "WETLAND BOUNDARY" and placed along the wetland boundaries, at approximately 50- to 75-foot intervals. Each flag location was determined with a Trimble ® GPS survey instrument that had sub-meter accuracy. A wetland delineation map will be prepared for review and use by Mississippi Power.

WETLAND SURVEY OF THE 128-ACRE PLANT SITE

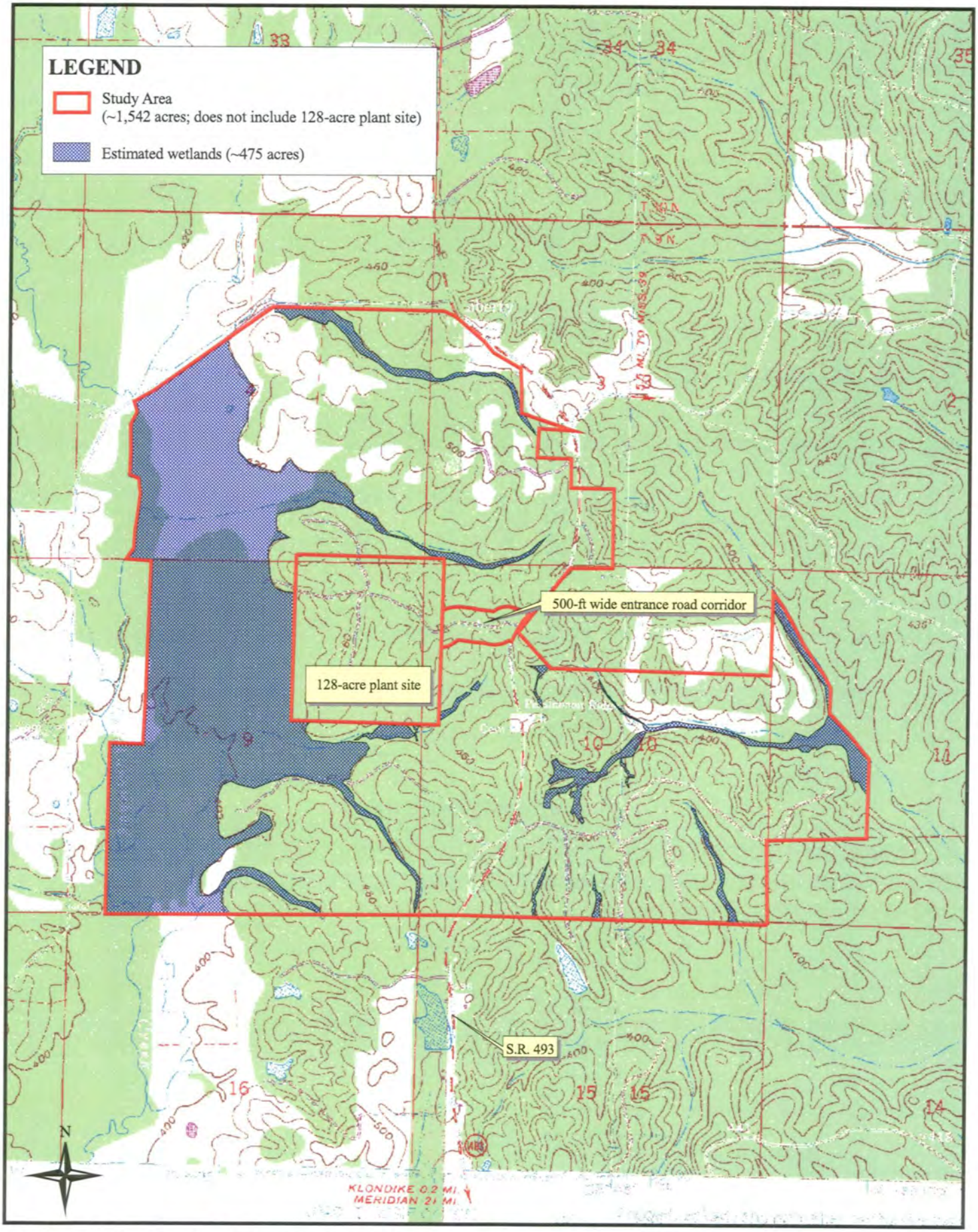
Vittor & Associates conducted a detailed wetland survey on the 128-acre plant site on March 7-8, 2007. Specifically, the site is located in Sections 3, 4, 9, and 10, Township 9N, Range 15E, on the Moscow, MS USGS 7.5-minute Quadrangle. Site locator maps are attached.

Vittor & Associates delineated and mapped a total of 16.4 acres of jurisdictional wetlands within the 128-acre plant site property. A 14.5-acre floodplain wetland encroaches into the site along much of the west property boundary and a small tributary to Chickasawhay Creek that comprises 1.9 acres originates near the southeast property line. These wetlands have been heavily impacted by clear cutting. Very few canopy trees remain and logging slash has been left in wetlands. Many wetland areas have been further degraded by silt run-off from the highly erodable, cut over upland slopes. The sparse canopy in the cut-over wetland areas is comprised of regenerating loblolly pine (*Pinus taeda*), red maple (*Acer rubrum*), sweet gum (*Liquidambar styraciflua*), and water oak, (*Quercus nigra*), while the shrub and herbaceous layer is dominated by wax myrtle broom sedge (*Andropogon virginicus*), slender wood oats (*Chasmanthium laxum*), giant plume grass (*Erianthus giganteus*), greenbriar (*Smilax glauca*), soft rush (*Juncus effusus*), trifoliate orange (*Poncirus trifoliate*), wooly bulrush (*Scirpus virginicus*), and saw-toothed blackberry (*Rubus argutus*). The few remaining undisturbed wetlands are vegetated by white oak (*Quercus alba*), red maple (*A. rubrum*), sweet gum (*L. styraciflua*), water oak (*Q. nigra*), willow oak (*Quercus phellos*), poplar (*Liriodendron tulipifera*), red cedar (*Juniperus virginiana*), Japanese honeysuckle (*Lonicera japonica*), wax myrtle (*Myrica cerifera*), trifoliate orange (*P. trifoliate*), blueberry (*Vaccinium* sp.), and Christmas fern (*Polystichum acrostichoides*). Wetland soils were poorly drained, low-chroma, sandy clay, and were saturated near the surface at all sampling

points. Surface water was frequently present in the floodplain wetlands in the southwest corner of the site.

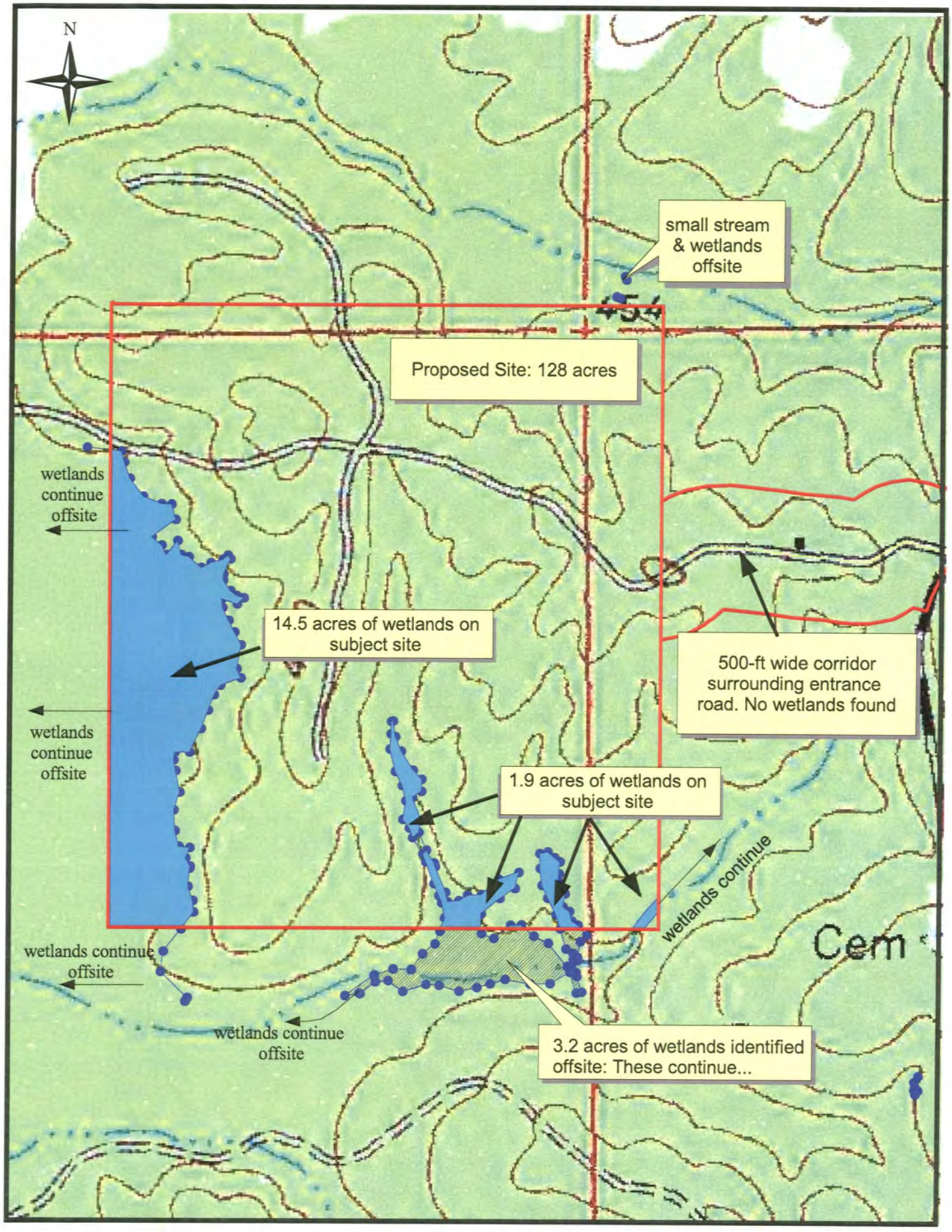
The remaining 111.7 acres of the 128-acre plant site consists of uplands. Vegetation on the uplands includes primarily loblolly pine (*P. taeda*) with water oak (*Q. nigra*), black cherry (*Prunus serotina*), yaupon (*Ilex vomitoria*), blueberry (*Vaccinium elliottii*), Japanese honeysuckle (*L. japonica*), and green briar (*S. glauca*) intermixed. Upland soils were well-drained, reddish-brown, sandy clay and slopes ranged from 5 to 35 percent.

Vittor & Associates also performed a wetland survey on a 500-foot-wide corridor along the access road that enters the plant site from Highway 493. No wetlands were found in the access road corridor.

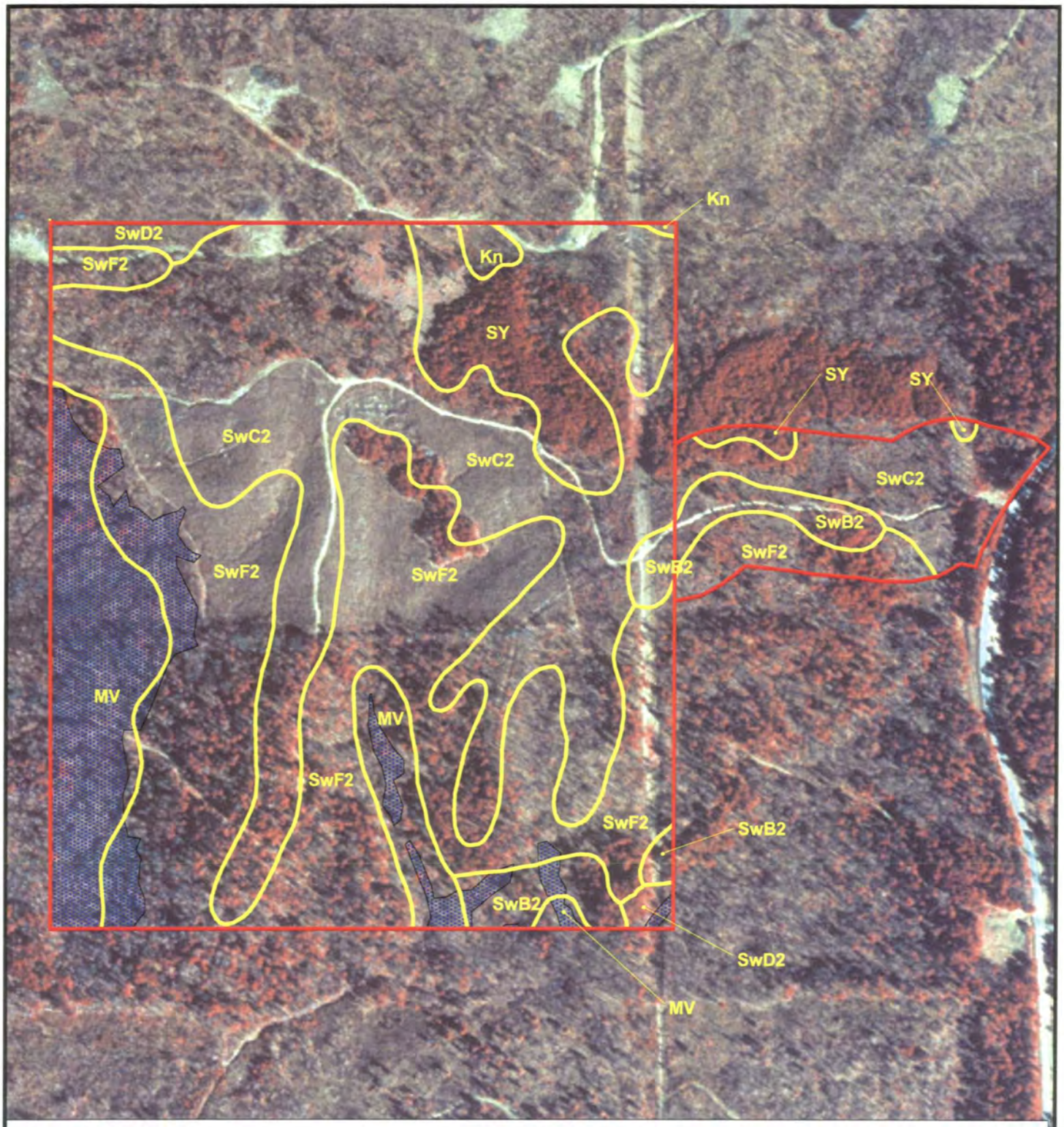


Estimated wetlands on the 1,542-acre study area. Does not include the 16.4 acres of wetlands found on the 128-acre plant site.

2000 0 2000 4000 6000 8000 10000 Feet



Total wetlands on 128-acre subject site: 16.4



Nonhydric/Upland Soils

SwB2 = Sweatman fine sandy loam, 2 to 5 percent slope
SwC2 = Sweatman fine sandy loam, 5 to 8 percent slope
SwD2 = Sweatman fine sandy loam, 8 to 12 percent slope
SwF2 = Sweatman fine sandy loam, 12 to 30 percent slope
SY = Sweatman-Smithdale Association, 12 to 35 percent slope
SX = Sweatman - Smithdale association, 5 to 12 percent slope

Hydric/Wetland Soils

Kn = Kinston
MV = Mooreville-Kinston-Mantachie Association

Wetlands Delineated by BVA (16.4 acres)

250 0 250 500 750 1000 Feet

BARRY A. VITTOR & ASSOCIATES, INC.
Environmental Research and Consulting

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DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: Plant Site
Application/Owner:
Investigator: Terry Whitehurst & David Knowles
Do Normal Circumstances exist on the site? (Yes) No
Is the site significantly disturbed (Atypical Situation)? Yes (No)
Is the area a potential Problem area? Yes (No)
(If needed, explain on reverse.)

Date: 03-07-07
County: Kemper
State: Kemper
Community ID:
Transect ID:
Plot ID: Southwest

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
Liriodendron tulipifera	T	Fac	*Juniperus virginiana*	T	Fac
Quercus phellos	T	Fac W-	*Poncirus trifoliata*	S	Fac
Liquidambar styraciflua	T	Fac +	*Myrica cerifera*	S	Fac +
Quercus nigra	T	Fac	*Smilax glauca*	H	Fac
Acer rubrum	T	Fac			
Chasmanthium laxum	H	Fac W-			
Polystichum acrostichoides	H	Fac			
Lonicera japonica	H	Fac -			

Percent of Dominant Species that are OBL, FACW, or FAC (excluding FAC-) 100%

HYDROLOGY

_____ Recorded Data (Describe in Remarks):
_____ Stream, Lake, or Tide Gauge
_____ Aerial Photographs
_____ Other
_____ No Recorded Data Available

Wetland Hydrology Indicators:

Primary Indicators:
_____ Inundated
__X__ Saturated in Upper 12 inches
_____ Water Marks
_____ Drift Lines
_____ Sediment Deposits
__X__ Drainage Patterns in Wetlands

Field Observations:
Depth of Surface Water: N/A (in.)
Depth of Free Water in Pit: 10 (in.)
Depth to Saturated Soil: 4 (in.)

Secondary Indicators (2 or more required):
__X__ Oxidized Root Channels in Upper 12 inches
__X__ Water-Stained Leaves
__X__ Local Soil Survey Data
_____ FAC-Neutral Test
_____ Other (Explain in Remarks)

SOILS

Map Unit Name (Series and Phase): Mooreville-Kinston-Mantachie
Drainage Class: Poorly Drained
Taxonomy (Subgroup):
Field Observations:
Confirm Mapped Type? (Yes) No

Profile Description:

Depth (Inches)	Horizon	Matrix Color (Muncell Moist)	Mottle Colors (Muncell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
0-18		10 yr 5/1	10 yr 5/8	Common/Distinct	Sandy Clay

Hydric Soil Indicators:

_____ Histosol
_____ Histic Epipedon
_____ Sulfidic Odor
_____ Aquic Moisture Regime
_____ Reducing Conditions
__X__ Gleyed or Low-Chroma Colors
_____ Concretions
_____ High Organic Content in Surface Layer in Sandy Soils
_____ Organic Streaking in Sandy Soils
__X__ Listed on Local Hydric Soils List
_____ Listed on National Hydric Soils List
_____ Other (Explain in wetland)

WETLAND DETERMINATION

Hydrophytic Vegetation Present? (Yes) No
Wetland Hydrology Present? (Yes) No
Hydric Soils Present? (Yes) No

Is this Sampling Point within a Wetland? (Yes) No

Remarks: (use back if necessary)

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: Plant Site
Application/Owner:
Investigator: Terry Whitehurst & David Knowles
Do Normal Circumstances exist on the site? (Yes) No
Is the site significantly disturbed (Atypical Situation)? (Yes) No
Is the area a potential Problem area? Yes (No)
(If needed, explain on reverse.)

Date: 03-07-07
County: Kemper
State: Mississippi
Community ID:
Transect ID:
Plot ID: Northwest

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
**Pinus taeda*	T	Fac			
Prunus serotina	T	Fac U			
Ilex vomitoria	S	Fac			
Acer rubrum	T	Fac			
Vaccinium elliottii	S	Fac +			
Lonicera japonica	H	Fac -			
Smilax glauca	H	Fac			

Percent of Dominant Species that are OBL, FACW, or FAC (excluding FAC-) 85%

HYDROLOGY

_____ Recorded Data (Describe in Remarks):
_____ Stream, Lake, or Tide Gauge
_____ Aerial Photographs
_____ Other
_____ No Recorded Data Available

Wetland Hydrology Indicators:

Primary Indicators:
_____ Inundated
_____ Saturated in Upper 12 inches
_____ Water Marks
_____ Drift Lines
_____ Sediment Deposits
_____ Drainage Patterns in Wetlands

Field Observations:

Depth of Surface Water: N/A (in.)
Depth of Free Water in Pit: N/A (in.)
Depth to Saturated Soil: N/A (in.)

Secondary Indicators (2 or more required):
_____ Oxidized Root Channels in Upper 12 inches
_____ Water-Stained Leaves
_____ Local Soil Survey Data
_____ FAC-Neutral Test
_____ Other (Explain in Remarks)

SOILS

Map Unit Name (Series and Phase): Sweatman
Drainage Class: Well Drained
Field Observations:
Taxonomy (Subgroup):
Confirm Mapped Type? (Yes) No

Profile Description:

Depth (Inches)	Horizon	Matrix Color (Muncell Moist)	Mottle Colors (Muncell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
0-6		5 yr 4/4			Sandy Clay Loam
6-18		5 yr 4/6			Clay Loam

Hydric Soil Indicators:

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

WETLAND DETERMINATION

Hydrophytic Vegetation Present? (Yes) No
Wetland Hydrology Present? Yes (No)
Hydric Soils Present? Yes (No)

Is this Sampling Point within a Wetland? Yes (No)

Remarks: (use back if necessary)

*Sampling point was in a planted pine stand.

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: Plant Site
Application/Owner:
Investigator: Terry Whitehurst & David Knowles
Do Normal Circumstances exist on the site? (Yes) No
Is the site significantly disturbed (Atypical Situation)? Yes (No)
Is the area a potential Problem area? Yes (No)
(If needed, explain on reverse.)

Date: 03-07-07
County: Kemper
State: Mississippi
Community ID:
Transect ID:
Plot ID: Northwest at edge of floodplain

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
Quercus alba	T	Fac U	*Ligustrum sinense*	S	Fac
Acer rubrum	T	Fac			
Liquidambar styraciflua	T	Fac +			
Liriodendron tulipifera	T	Fac			
Vaccinium elliottii	S	Fac			
Chasmanthium laxum	H	Fac W-			
Juncus effusus	H	Fac W+			
Lonicera japonica	H	Fac			

Percent of Dominant Species that are OBL, FACW, or FAC (excluding FAC-) 100%

HYDROLOGY

___ Recorded Data (Describe in Remarks):
___ Stream, Lake, or Tide Gauge
___ Aerial Photographs
___ Other
___ No Recorded Data Available

Wetland Hydrology Indicators:

Primary Indicators:
___ Inundated
X Saturated in Upper 12 inches
X Water Marks
___ Drift Lines
___ Sediment Deposits
X Drainage Patterns in Wetlands

Field Observations:
Depth of Surface Water: N/A (in.)
Depth of Free Water in Pit: 8 (in.)
Depth to Saturated Soil: 2 (in.)

Secondary Indicators (2 or more required):
X Oxidized Root Channels in Upper 12 inches
X Water-Stained Leaves
X Local Soil Survey Data
___ FAC-Neutral Test
___ Other (Explain in Remarks)

SOILS

Map Unit Name (Series and Phase): Mooreville-Kinston-Mantachie
Drainage Class: Poorly
Taxonomy (Subgroup):
Field Observations:
Confirm Mapped Type? (Yes) No

Profile Description:

Depth (Inches)	Horizon	Matrix Color (Muncell Moist)	Mottle Colors (Muncell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
0-18		2.5 yr 3/2			Sandy Clay Loam

Hydric Soil Indicators:

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

WETLAND DETERMINATION

Hydrophytic Vegetation Present? (Yes) No
Wetland Hydrology Present? (Yes) No
Hydric Soils Present? (Yes) No

Is this Sampling Point within a Wetland? (Yes) No

Remarks: (use back if necessary)

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: Plant Site
Application/Owner:
Investigator: Terry Whitehurst & David Knowles
Do Normal Circumstances exist on the site? Yes (No)
Is the site significantly disturbed (Atypical Situation)? (Yes) No
Is the area a potential Problem area? Yes (No)
(If needed, explain on reverse.)
clearcut, few canopy trees remaining

Date: 03-08-07
County: Kemper
State: Mississippi
Community ID:
Transect ID:
Plot ID: Southeast drain (cut over)

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
Liquidambar styraciflua	T	Fac +	*Smilax glauca*	H	Fac
Quercus nigra	T	Fac	*Polystichum acrostichoides*	H	Fac
Acer rubrum	T	Fac			
Erianthus giganteus	H	Fac W			
Andropogon virginicus	H	Fac -			
Chasmanthium laxum	H	Fac W-			
Pinus taeda (regen.)	T	Fac			
Myrica cerifera	S	Fac +			

Percent of Dominant Species that are OBL, FACW, or FAC (excluding FAC-) 90%

HYDROLOGY

___ Recorded Data (Describe in Remarks):
___ Stream, Lake, or Tide Gauge
___ Aerial Photographs
___ Other
___ No Recorded Data Available

Wetland Hydrology Indicators:

Primary Indicators:
___ Inundated
X Saturated in Upper 12 inches
___ Water Marks
___ Drift Lines
___ Sediment Deposits
X Drainage Patterns in Wetlands

Field Observations:
Depth of Surface Water: ___ (in.)
Depth of Free Water in Pit: ___ (in.)
Depth to Saturated Soil: 12 (in.)

Secondary Indicators (2 or more required):
X Oxidized Root Channels in Upper 12 inches
X Water-Stained Leaves
X Local Soil Survey Data
___ FAC-Neutral Test
___ Other (Explain in Remarks)

SOILS

Map Unit Name (Series and Phase):
Taxonomy (Subgroup):
Drainage Class: Poorly Drained
Field Observations:
Confirm Mapped Type? Yes (No)

Profile Description:

Depth (Inches)	Horizon	Matrix Color (Muncell Moist)	Mottle Colors (Muncell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
0-4		10 yr 3/1			Sandy Loam
4-18		10 yr 5/1	7.5 yr 5/8	common/distinct	Sandy Loam

Hydric Soil Indicators:

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

WETLAND DETERMINATION

Hydrophytic Vegetation Present? (Yes) No
Wetland Hydrology Present? (Yes) No
Hydric Soils Present? (Yes) No

Is this Sampling Point within a Wetland? (Yes) No

Remarks: (use back if necessary)

THREATENED AND ENDANGERED SPECIES REPORT FOR THE INTEGRATED GASIFICATION COMBINED CYCLE GENERATING STATION IN KEMPER COUNTY, MISSISSIPPI

Prepared for

MISSISSIPPI POWER COMPANY
2992 WEST BEACH BOULEVARD
GULFPORT, MISSISSIPPI 39501

Prepared by

BARRY A. VITTOR & ASSOCIATES, INC.
8060 COTTAGE HILL ROAD
MOBILE, ALABAMA 36695

(Contract No. BSU 0067717)

March 30, 2007

INTRODUCTION

Barry A. Vittor & Associates, Inc. performed a threatened and endangered species survey of the proposed 128-acre Mississippi Power Company Integrated Gasification Combined Cycle (IGCC) generating station in Kemper County, Mississippi. This report details the results of our survey and discusses the potential for occurrence of federal and/or state protected species within the project site.

PROJECT LOCATION

The 128-acre study area is located in Kemper County, Mississippi on the west side of State Road 493, approximately 10 air miles south of the community of DeKalb. **Figure 1** depicts the subject property on the Moscow and Lauderdale, NW, Mississippi, United States Geological Survey (USGS) 7.5-minute topographic quadrangles. The project site is located in Township 9 North, Range 15 East and contains multiple sections: 3, 4, 9, and 10.

TARGET SPECIES

A review of the pertinent and available literature was conducted to help generate a list of federally and state protected species that could possibly occur on the property. The United States Fish & Wildlife Service's list of Mississippi's federally protected species by county was consulted as the primary reference on potentially occuring species (Ecological Services Field Office; http://www.fws.gov/southeast/jackson/index.html). The United States Fish and Wildlife Service (USFWS) lists the threatened Price's potato bean (*Apios priceana*) as the only federally protected species currently known to occur in Kemper County, Mississippi. Detailed natural history information on this species is provided for reference in **Appendix A** (Kral, 1983; Natureserve, 2006).

Other broadly distributed and wide ranging species such as Bald Eagle (*Halieetus leucocephalus*) and Red-cockaded Woodpecker (*Picoides borealis*) could possibly occur throughout Mississippi and Vittor & Associates usually considers these taxa as potential targets for all threatened and endangered species surveys performed in the state.

The Mississippi Department of Wildlife Fisheries and Parks is responsible for the regulation of protected nongame species in the state. A list of wildlife species protected by the state was generated from the following regulations on the Department of Wildlife Fisheries and Parks' website (http://www.mdwfp.com/Level2/Wildlife/hunting_regs.asp):

> "All birds of prey (eagles, hawks, osprey, owls, kites and vultures) and other nongame birds are protected and may not be hunted, molested, bought or sold.. The following endangered species are also protected: black bear, Florida panther, gray bat, Indiana bat, all sea turtles, gopher tortoise, sawback turtles (black-knobbed, ringed, yellow-blotched), black pine snake, eastern indigo snake, rainbow snake and the southern hognose snake "

In addition to the above sources, a data request was submitted to the Mississippi Natural Heritage Program (MNHP) to determine whether any federally protected species have been previously documented from the project site. For purposes of this investigation, Vittor & Associates utilized a 1,670-acre study area that included the 128-acre proposed plant site. MNHP performed a data search of records occuring within a 2-mile search distance surrounding the boundary of the larger tract.

FIELD SURVEY AND NATURAL COMMUNITIES

Field surveys of the property were performed on March 7, 8, and 21, 2007 to search for both federal and state protected species and to assess the natural communities and wildlife habitats found within the project boundaries. Topography on the site is characterized by undulating sand/clay hills with the maximum elevation reaching over 480 feet above sea level. The lowest elevations on the study area occur on the western edge of the property along the floodplain of the Chickasawhay River.

Historically, the property was most likely dominated by an upland mixed hardwood forest community based on the presence of remnant vegetation. Areas along the floodplain of Chickasaw River would have consisted of bottomland hardwood forest. A large majority of the property is now currently managed for timber production and is heavily impacted through logging activities. Based on our observations in the field and examination of 1996 aerial imagery of the site, we calculated that approximately 45 acres (~33%) of the property are planted in loblolly pine (*Pinus taeda*). Stand age was estimated to be between 15 to 20 years. Approximately 55 acres located on the southern portions of the study site have been recently clear cut and are regenerating in young sweetgum (*Liquidambar styraciflua*), water oak (*Quercus nigra*), and wax myrtle (*Myrica cerifera*). Herbaceous and groundcover species present in this clear cut area include broom sedge (*Andropogon virginicus*), sawtooth blackberry (*Rubus argutus*), and slender woodoats (*Chasmanthium laxum*). An additional 30 acres of clear cut land occurs on the western and northern portions of the property with large areas converted into planted food plots for hunting. There is the remains of an old home site located on the north side of the entrance road leading into the subject property. The vegetation here is dominated by non-native species such as Chinese wisteria (*Wisteria sinense*) and Chinese privet (*Ligustrum sinense*) most likely naturalized from previous cultivation around the former home.

RESULTS AND FINDINGS

No federal or state protected species were observed during our survey. An electronic search of MNHP's Biological Conservation Database (BCD) performed on March 27, 2007 revealed no reports of any federally protected species from the project site nor were any protected species identifed within a two-mile search distance of the 1,670-acre study area. Since Price's potato bean has been previously documented from Kemper County, a specific request was made to identify the nearest element occurrence (EO) of *Apios priceana* in their database. According to MNHP records, the nearest EO in Kemper County is located approximately 25 air miles northeast of the project site and was last visited in 2001. Although no point locality data were provided for this EO, the general

location would place the record in the extreme northeast corner of the county. An examination of the Environmental Protection Agency's Level IV Ecoregions of Mississippi (**Figure 2**; Chapman, et al. 2004) shows that this northeast portion of Kemper County contains two different Level IV ecoregions: Blackland prairie (65a) and Flatwoods/Blackland Prairie Margins (65B). The study site is located well outside of these ecoregions in the Southern Hilly Gulf Coastal Plain (65d) . Nearby populations of Price's potato bean in Mississippi and Alabama are not known to occur in this particular ecoregion and are restricted to the ecoregions found further north of the project site. Additionally, the project falls within the drainage basin for the Chickasawhay River for which there are not any known records of this protected species. Price's potato bean is not expected to occur within the project boundaries and suitable habitat for this species does not exist on the site (e.g. rocky woodlands with calcareous substrates).

No individuals of Red-cockaded Woodpecker were observed on the project site. Red-cockaded Woodpecker is a specialist of fire-maintained pine ecosystems (*i.e.* longleaf pine forest) of the Southeastern United States. The species typically requires old growth longleaf pine (*Pinus palustris*) for its breeding cavities, but other pine species have also been utilized (Conner *et al.*, 2001). Large areas of the property are in commerical loblolly pine timber production and appear to lack the necessary old growth trees required for breeding (average stand age for planted loblolly pine was estimated to be between 15 & 20 years). Based on our field assessment, Red-cockaded Woodpecker is not likely to occur within the project boundaries and suitable habitat for Red-cockaded Woodpecker does not occur on the proposed plant site.

Bald Eagle is unlikely to occur as a breeder on the property, which lacks the large bodies of open water necessary for foraging. No eagles were seen during our field surveys of the property and the species is not expected to occur there.

STATE LISTED SPECIES

Black-knobbed map turtle (*Graptemys nigrinoda*)

Black-knobbed map turtle is found in rivers and streams with moderate current and sandy or clay substrates in the upper Tombigbee, Tibbee, Middle Tombigee-Lubbub river drainages in Alabama and Mississippi, all of which are outside of the Chickasawhay river basin (Natureserve, 2006; Ernst *et al.*, 1994). This species is not expected to occur within the property boundaries of the study area.

Yellow-blotched map turtle (*Graptemys flavimaculata*)

Yellow-blotched map turtle is federally protected as a threatened species. This species is restricted to the Pascagoula River system and its associated tributaries. *G. flavimaculata* is typically found in "wide rivers with strong currents" with sandbars suitable for nesting (Ernst, et al. 1994). The species has been documented from the Upper Chickasawhay River basin as far north as Clarke County, Mississippi (Natureserve, 2006). There are no known occurrences of yellow-blotched map turtle from Kemper County, Mississippi, based on Natural Heritage Program records (Natureserve, 2006). Although the western property boundary of the 1,670-acre study area abuts portions of the Chickasawhay River, the species is not expected there.

Ringed map turtle (*Graptemys oculifera*)

This species is restricted to the Pearl River drainage system in Mississippi and Louisiana (Natureserve, 2006; Ernst *et al.* 1994). It is not found in the Chickasawhay River basin and is not expected to occur within the project boundaries.

Southern hognose snake (*Heterodon simus*).

The Mississippi Natural Heritage Program considers *H. simus* extirpated from the state with no recent records reported during 1983 -1998 (Natureserve, 2006). There are old records from Forrest, Pearl River, and Stone counties (Natureserve, 2006). Southern hognose snake is typically found in xeric sandhill communities with well-drained sandy

soils (Natureserve, 2006) and these community types do not exist within the study area. It is not expected to occur within the project boundaries.

Black pine snake (*Pituophis melanoleucus lodingi*)

Black pine snake is a candidate species for Federal protection under the Endangered Species Act (ESA) This designation indicates that the USFWS has sufficient biological information to propose a particular species for listing under the ESA but such an action is precluded due to higher listing priorities. The species is also state protected in Mississippi. There are no known records of black pine snake from Kemper County and it has only been documented as far north as Marion and Lamar Counties in Mississippi (Natureserve, 2006). Black pine snake is not expected to occur on the property.

Rainbow Snake (*Farancia erytrogramma*)

Rainbow snake is state-protected in Mississippi. Ernst & Ernst (2003) considered this species endangered in the state. Rainbow snake is not federally protected under the Endangered Species Act. This secretive snake is typically found along "coastal plain waterways" such as "rivers, streams, canals, lakes, swamps and tidal and freshwater marshes" of the southeast (Ernst & Ernst, 2003). Conant and Collins (1998) state that it appears to prefer swamp with bald cypress (*Taxodium distichum*). Natureserve (2006) only lists records from as far north as Lamar County in Mississippi. Suitable habitat for rainbow snake does not occur within the project boundaries and it is not expected to occur there.

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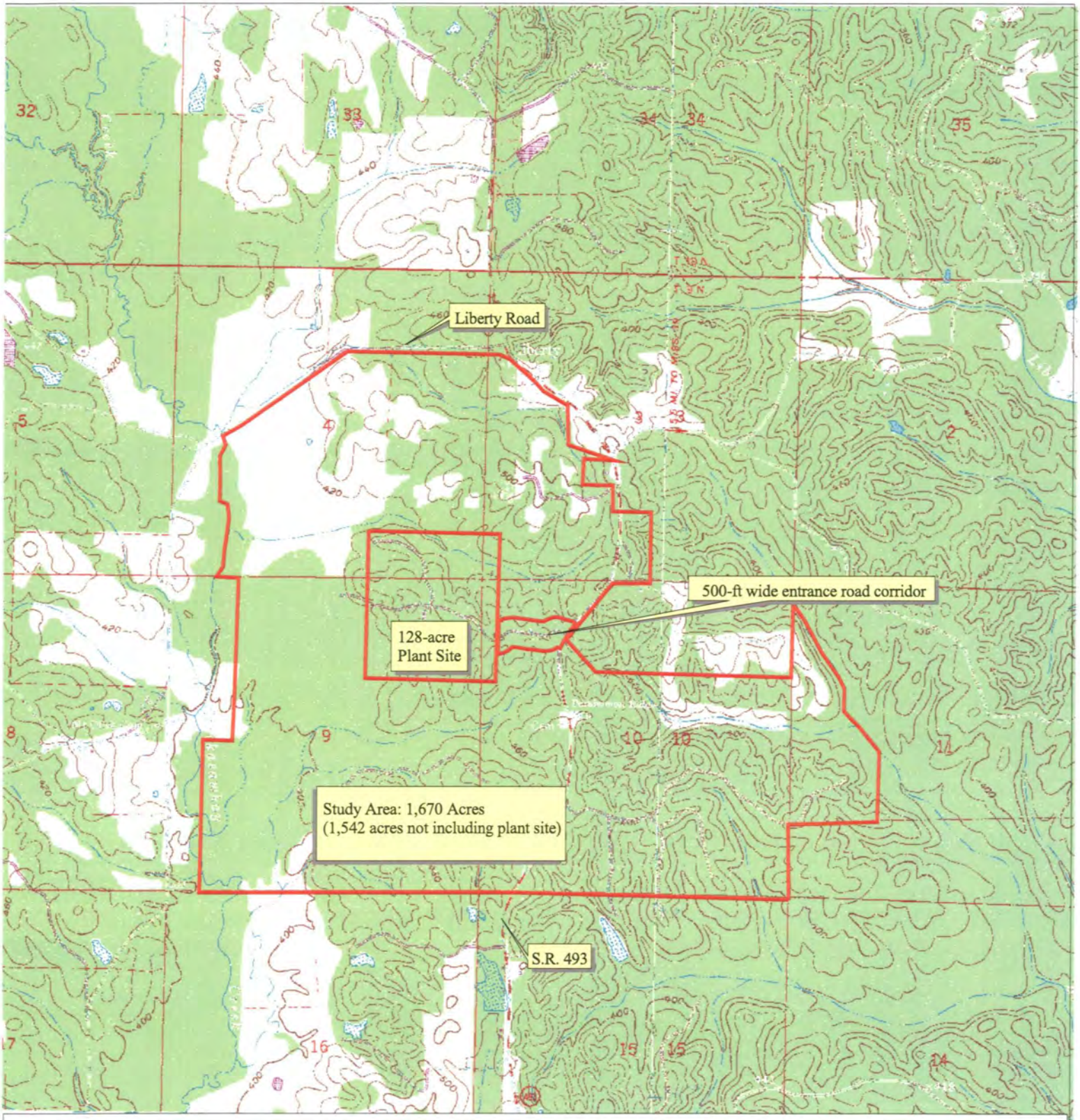


Figure 1: Site Location and Vicinity Map

Base Maps: Moscow and Lauderdale, NW, MS USGS topographic quadrangles.

Ecoregions of Mississippi

PRINCIPAL AUTHORS: Shannen S. Chapman (Dynamac Corporation), Glenn E. Griffith (Dynamac Corporation), James M. Omernik (USEPA, retired), Jeffrey A. Comstock (Indus Corporation), Michael C. Beiser (MS DEQ), and Delaney Johnson (NRCS).

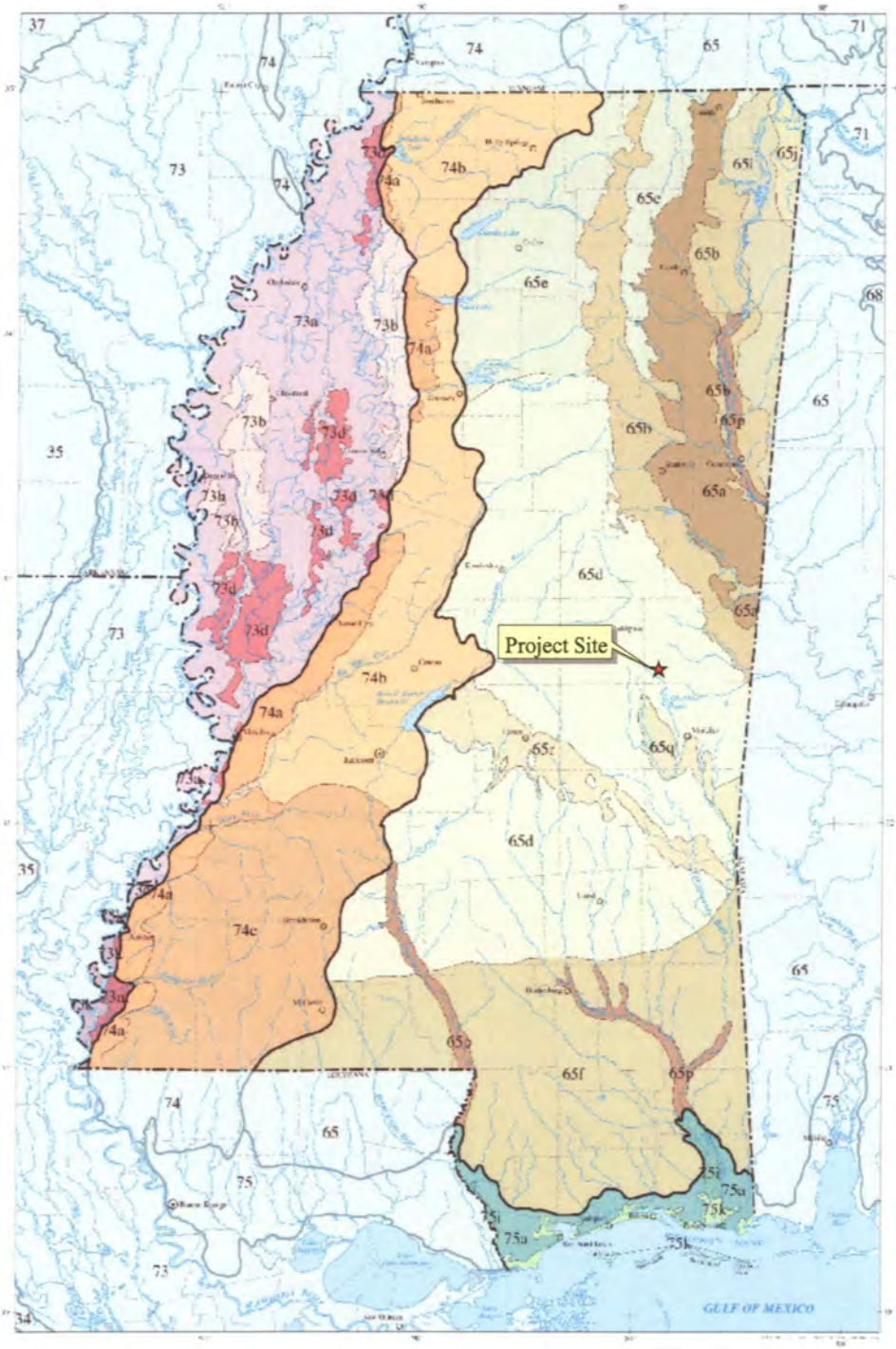
COLLABORATORS AND CONTRIBUTORS: Jim Harrison (USEPA), Mike Lilly (NRCS), Mike Bograd (MS DEQ), Larry Handley (USGS), Barb Kleiss (USACE), Alice Dossett (MS DEQ), Katherine Williams (MS DEQ), Chip Bray (MS DEQ), and Tom Loveland (USGS).

REVIEWERS: David Beckett (University of Southern Mississippi), J. Stephen Brewer (University of Mississippi), David Dockery (MS DEQ), Jerry Griffith, (University of Southern Mississippi), George Martin (NRCS), Robert Wales (University of Southern Mississippi), and Ron Wieland (Mississippi Natural Science Museum).

CITING THIS POSTER: Chapman, S.S, Griffith, G.E., Omernik, J.M., Comstock, J.A., Beiser, M.C., and Johnson, D., 2004, Ecoregions of Mississippi, (color poster with map, descriptive text, summary tables, and photographs): Reston, Virginia, U.S. Geological Survey (map scale 1:1,000,000).

This project was partially supported by funds from the Mississippi Department of Environmental Quality through grants provided by the U.S. Environmental Protection Agency Region IV under the provisions of Section 319(h) of the Federal Water Pollution Control Act.

For additional information about ecoregions, see http://www.epa.gov/wed/pages/ecoregions/ecoregions.htm. Digital files of the Mississippi ecoregion boundaries can be downloaded from ftp://ftp.epa.gov/wed/ecoregions/ms.



65 Southeastern Plains
- 65a Blackland Prairie
- 65b Flatwoods/Blackland Prairie Margins
- 65d Southern Hilly Gulf Coastal Plain
- 65e Northern Hilly Gulf Coastal Plain
- 65f Southern Pine Plains and Hills
- 65i Fall Line Hills
- 65j Transition Hills
- 65p Southeastern Floodplains and Low Terraces
- 65q Buhrstone/Lime Hills
- 65r Jackson Prairie

73 Mississippi Alluvial Plain
- 73a Northern Holocene Meander Belts
- 73b Northern Pleistocene Valley Trains
- 73d Northern Backswamps
- 73k Southern Holocene Meander Belts
- 73m Southern Backswamps

74 Mississippi Valley Loess Plains
- 74a Bluff Hills
- 74b Loess Plains
- 74c Southern Rolling Plains

75 Southern Coastal Plain
- 75a Gulf Coast Flatwoods
- 75i Floodplains and Low Terraces
- 75k Gulf Barrier Islands and Coastal Marshes

Level III ecoregion
Level IV ecoregion
County boundary
State boundary

0 20 40 mi
0 40 80 km

Albers equal area projection
Standard parallels 33°N and 45°N

Figure 2: Location of Project Site overlaid on the Level IV Ecoregions of Mississippi.

APPENDIX A

Text & map by:
Robert Kral

FABACEAE

Apios priceana B. L. Robinson. Price's groundnut
Glycine priceana (Robinson) Britton

Technical Description

Herbaceous perennial, sometimes rampant, vine from a stoutish, thickened tuber.
Stems.--TWining, also somewhat twisted, terete and also low-ridged, yellow-green or tan, smooth or with a scattering of stiff hairs, forming a large vine.
Leaves.--Alternate, the stipules linear with a round attachment scar, odd-pinnately compound, mostly 2-3 dm long, spreading on slender but stiff, sparingly pubescent petioles one-third to one-half the length of the leaf; leaflets on stalks 3-5 mm long, spreading, 5-9, mostly 7, broadly to narrowly ovate, the lowest pair usually the largest, acuminate, entire, the bases rounded, the upper surface at maturity smooth, dark yellow-green, reticulate, the lower surface paler, puberulent, reticulate-veiny.
Inflorescence.--All but the lower leaves bearing rather compact panicles or racemes 5-9 cm long on stout, hairy stalks 3-4 cm long. Flowers one or more in axils of pale green, ovate, hairy, acuminate bracts, on pedicels 3-5 mm long, in total length ca. 2 cm.
Flowers.--Calyx a thin, pale green, villous cup ca. 3-4 cm high, this bearing at its lower edge a very narrow projecting lobe ca. 3 mm long. Corolla as in pea or bean, brownish-green with maroon tints, when viewed from the side strongly curved outwardly below, concave on the keeled greenish-yellow or pink standard blade above, this blade folded over most of the rest of the corolla and longest, its tip fleshier than the rest, beak-like, its base short-auricled; wings oblong linear, short-clawed, each bearing a short auricle basally; keel petals rather fleshy, strongly curved upward and linear, blunt, short clawed.
Fruit.--Pods 13-20 cm long, linear, somewhat turgid, the base cuneate, the apex abruptly attenuated into a prominent slender beak, the surface smooth, the valves firm with somewhat thickened margins. Beans oblong, smooth, dark brown, 7-8 mm long.

Distribution and Flowering Season

Rocky wooded slopes and floodplain edges, middle Kentucky southward through middle Tennessee into northern Alabama and Mississippi. Flowering from late June into August; fruit maturing in August.

Special Identifying Features

This plant is distinguished from A. americana Medic as follows:

1. The leaves are larger, the leaflets usually with one pair more.
2. The standard petal (uppermost petal) is larger, pink or with yellow-green tints rather than purple-maroon (as in A. americana), bearing at its tip a thickened, mucro-like appendage. In A. americana

the standard tip is blunt, even emarginate.
3. The fruits are longer, with the shorter ones about equal to the longest ones produced by A. americana.

Habitat and Management Implications

A. priceana is usually found under mixed hardwoods or in clearings therein, usually where ravine slopes or banks break into creek or river bottoms. It is on well-drained loams either on old alluvium or over calcareous boulders.

This is such a rare plant that little is yet known for sure of its response to disturbance, grazing, etc. It has been collected in secondary growth hardwood forest, thus is known to survive in the wake of logging. I have observed it in an area of recent burning and it may be conceded that it may react well to fire disturbance as do many other leguminous plants that have large tuberous rootstocks (Gleason, 1952, measured some rootstocks to be 18 cm wide!) However, the very rarity of the plants is an indication that this species has a narrow ecological amplitude.

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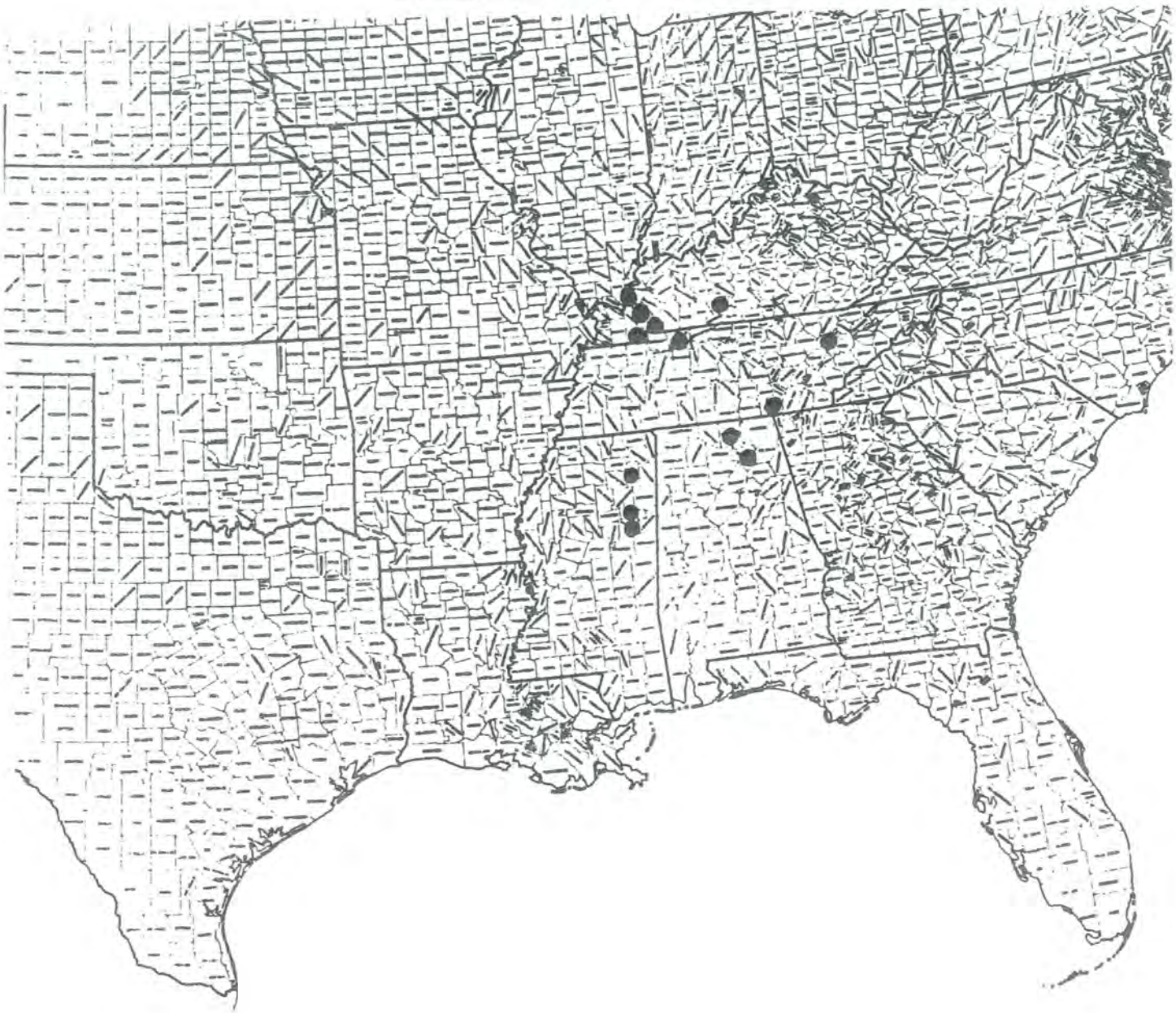
SPECIES Apios priceana B.L. Robinson

Expected* Effect on the Species	Management Practices							
	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over-story	Cut over-story	Establish Plantation	Graze
Destroy		X	NA	NA				
Damage					X	X		?
No Lasting Effect								
Beneficial if Done Properly	X							

Other Comments:

*Expected effect on the species is an estimate made by Dr. Robert Kral based on his knowledge of the habitat and on knowledge gained from personal field observations. Estimates are "rough" in many instances. Results of practices may be modified depending upon the degree of application, intensity of treatment, nearness to plant communities, etc. A management practice for which no entry is made indicates a lack of sufficient information from which to predict expected results. As observations are made in the field by users of the data, the expected effect will be refined.

Apios priceana B. L. Robinson



Apios priceana - B.L. Robins.
Price's Potato-bean
Unique Identifier: ELEMENT_GLOBAL.2.138209
Element Code: PDFAB0D020
Informal Taxonomy: Plants, Vascular - Flowering Plants - Pea Family

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University of Tennessee Herbarium - TENN

Kingdom	Phylum	Class	Order	Family	Genus
Plantae	Anthophyta	Dicotyledoneae	Fabales	Fabaceae	Apios

Check this box to expand all report sections: ☑

Concept Reference

Concept Reference: Kartesz, J.T. 1994. A synonymized checklist of the vascular flora of the United States, Canada, and Greenland. 2nd edition. 2 vols. Timber Press, Portland, OR.
Concept Reference Code: B94KAR01HQUS
Name Used in Concept Reference: *Apios priceana*
Taxonomic Comments: One of the two U.S. species in this small genus.

Conservation Status

NatureServe Status

Global Status: G2
Global Status Last Reviewed: 09Jul2004
Global Status Last Changed: 25Jul1983
Rounded Global Status: G2 - Imperiled
Reasons:
Currently known from about 25 widely scattered populations, most with fewer than 50 individuals. *Apios priceana* is apparently dependant on a moderate level of disturbance; however, excessive habitat modification is threatening the existence of the species. Many of these few remaining occurrences are threatened by successional canopy closure, cattle grazing/trampling, right-of-way maintenance and forestry activities.
Nation: United States
National Status: N2

U.S. & Canada State/Province Status	
United States	Alabama (S2), Illinois (SX), Kentucky (S1), Mississippi (S1), Tennessee (S2)

Other Statuses

U.S. Endangered Species Act: LT: Listed threatened (05Jan1990)
U.S. Fish & Wildlife Service Lead Region: R4 - Southeast

Comments on official statuses: Apios priceana was proposed threatened on May 12, 1989 and federally listed as a Threatened species by the U.S. Fish and Wildlife Service on January 5, 1990.

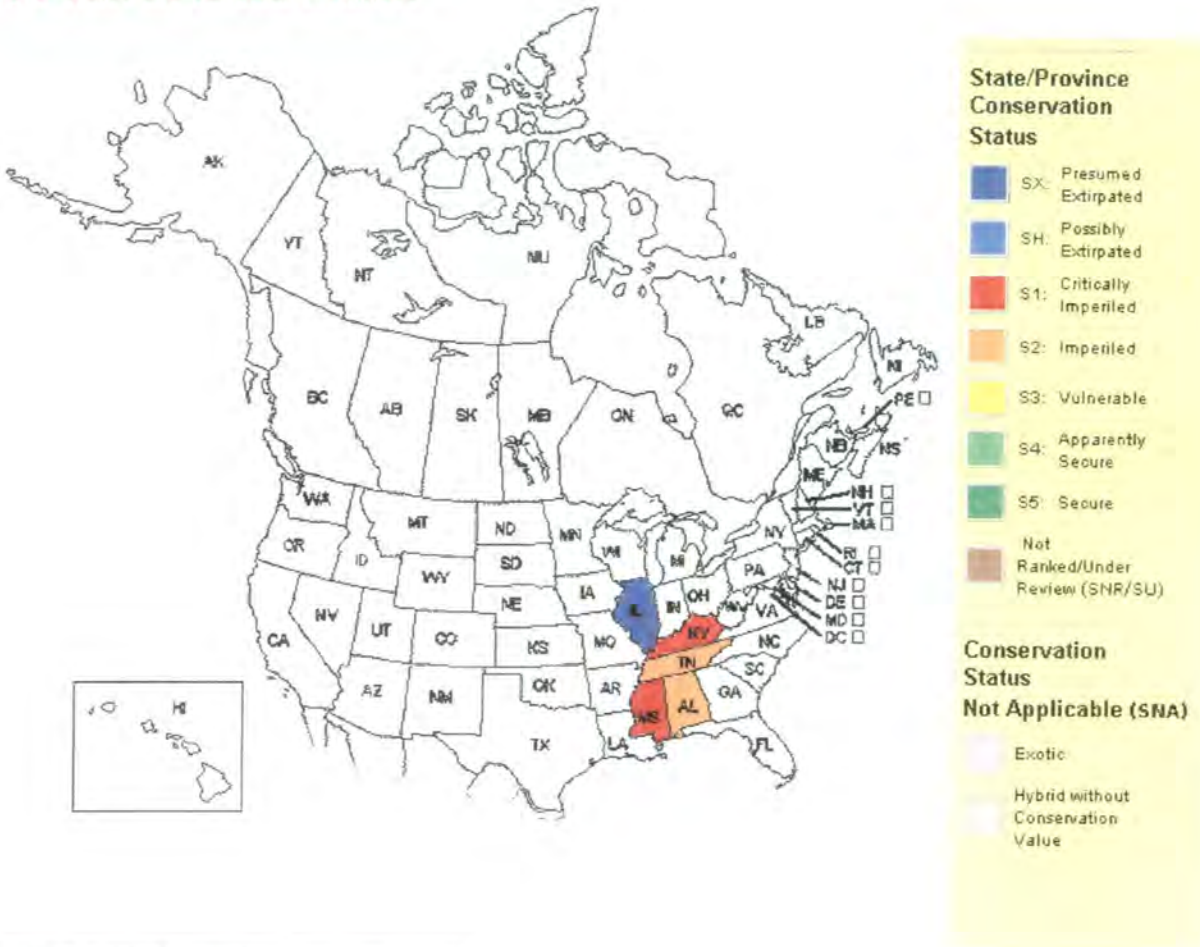
NatureServe Conservation Status Factors

Degree of Threat: Widespread, low-severity threat
Threat Scope: High
Threat Severity: Low
Threat Immediacy: Unknown
Threats: Habitat loss and degradation from heavy or clear-cut logging, highway right-of-way maintenance, trampling and soil compaction by cattle are threats to this early successional species (Bender pers comm., Norquist 1990, USFWS 1989, Medley 1980). Development of lands for housing or other uses is a potential threat to occurrences of this species (Medley 1980). Brush-clearing (bush-hogging) during the growing season, line replacement and upgrading are additional threats to some sites (Bender pers. comm.). Some sites are threatened by non-native invasive species.

Threats at the Trigg County, Kentucky, sites include trampling by hikers, overcrowding by shrubs, canopy closure, mowing, highway maintenance and competition from introduced crown vetch (Coronilla varia) (Chester and Holt 1990). Succession is considered a major threat at some sites (Norquist 1990).

Distribution

U.S. States and Canadian Provinces



U.S. & Canada State/Province Distribution	
United States	AL, IL, KY, MS, TN

Range Map
No map available.
Global Range Comments: Mississippi (Clay, Oktibbeha and Lee counties); Alabama (Madison, Autsuga and Marshall counties); Kentucky (Lyon, Livingston and Trigg counties); Tennessee (Marion, Montgomery and Williamson counties). Historic in Illinois.

U.S. Distribution by County (based on available natural heritage records)	
State	County Name (FIPS Code)

AL	Autauga (01001), Dallas (01047), Jackson (01071), Lawrence (01079), Madison (01089), Marshall (01095)
KY	Calloway (21035), Livingston (21139), Lyon (21143), Marshall (21157), Trigg (21221)
MS	Clay (28025), Kemper (28069), Lee (28081), Oktibbeha (28105)
TN	DeKalb (47041), Giles (47055), Hickman (47081), Marion (47115), Maury (47119), Montgomery (47125), Stewart (47161), Williamson (47187)

U.S. Distribution by Watershed (based on available natural heritage records)	
Watershed Region	**Watershed Name (Watershed Code)**
03	Upper Alabama (03150201), Middle Alabama (03150203), Town (03160102), Tibbee (03160104), Noxubee (03160108)
05	Caney (05130108), Harpeth (05130204), Lower Cumberland (05130205), Lower Ohio-Bay (05140203), Lower Ohio (05140206)
06	Sequatchie (06020004), Guntersville Lake (06030001), Wheeler Lake (06030002), Lower Elk (06030004), Lower Duck (06040003), Buffalo (06040004), Kentucky Lake (06040005)

Ecology & Life History

Technical Description: Plant a herbaceous, twining, perennial vine, to 5 m, scrambling over other vegetation, arising from a large, starchy underground tuber. Stems slender, twining, round in cross-section, ridged; green or tan, smooth or with scattered, stiff hairs. Leaves alternate, 0.6-1 foot long, composed of 5-9 (mostly 7) ovate leaflets; the lowest pair of leaflets usually the largest. Leaflets entire-margined, with rounded bases and narrowed points, widest below the middle, the upper surface smooth at maturity, dark yellow-green, net-veined, the lower surface paler, fine-hairy; tiny (but evident) rusty-brown hairs on the short stem at the base of each leaflet. The flowers are swollen, greenish-pink with maroon tints and a beak-like tip. They are arranged in compact racemes, on stout hairy stalks, in the axils of pale green, ovate, hairy, pointed bracts. Fruit an elongated legume, 5-8 inches long, somewhat swollen, abruptly narrowing into a slender beak. The seeds are oblong, smooth, dark brown, and about 0.3 inch long.

Diagnostic Characteristics: This species most closely resembles Apios americana (= A. tuberosa), from which it is distinguished by the following characteristics: (a) larger leaves, usually with 7 rather than 5 leaflets; (b) the uppermost petal (standard) has an elongated tip, is larger, and is pink with green tints rather than maroon; (c) the fruits are longer, the shortest ones similar in length to the longest ones in A. americana. Wisteria is similar, but can have more leaflets (5-11) which are all about the same size and widest in the middle (in contrast to those of Apios); the leaf rachis of Wisteria is hairy, and its flowers are purple and bloom in the early spring.

Reproduction Comments: Flowers of A. priceana bloom from June through August, possibly as late as September (Kral 1983, Mahler 1970). Legumes mature in August to September (Kral 1983). Early reports by the discoverer of the species, Sadie Price, suggested that it does not frequently set fruit (Robinson 1898).

Ecology Comments
Unlike its close relative, Apios americana, which produces numerous tubers, A. priceana produces only one. This fact may serve to severely limit natural dispersal of the species. Since A. priceana has just the single tuber, it is unable to be dispersed effectively along rivers by spring freshets as is A. americana (Seabrook and Dionne 1976).

Apios priceana has a potential value to humans as a food source (USFWS 1989). The large single tubers from which the plant grows are edible and may have been used by Native American Indians and early settlers as food, as was Apios americana. The ability of the species to grow in highly alkaline (pH > 8.0) and acidic (pH < 5.0) (Duke 19) soils could provide genetic resources for the development of Apios hybrids in cultivated lands otherwise marginal for most other crops (USFWS 1989, Walter et al. 1986). Perhaps the most valuable aspect of A. priceana is as a source of germ plasm for breeding with other Apios species (Norquist 1990, Walter et al 1986).

According to a recent study of A. priceana (Walter et al. 1986), the tubers were found to be composed of 61.9% water, 5.0% fiber, 2.6% crude protein, 2.7% ash, 27.1% carbohydrate and 0.7% fat. For a compositional comparison of A. priceana tubers with those of A. americana and A. fortunei, see Walter et al. (1986). As a food crop, A. priceana tubers are naturally low in essential amino acids. Extraction of nonprotein nitrogen by alcohol resulted in tuber protein that could be useful in human nutrition (Walter et al. 1986).

Open forest canopies tend to correlate with increased flowering in the species (Somers pers. comm.). Flowers of A. priceana bloom from June through August, possibly as late as September (Kral 1983, Mahler 1970). Legumes mature in August to September (Kral 1983). Early reports by the discoverer of the species, Sadie Price, suggested that it does not frequently set fruit (Robinson 1898). Potential pollinators include a butterfly (Eudamus tityrus), honey and bumble bees (Robinson 1898). Apparently the bees find the nectaries very difficult to access. Apios priceana can be readily germinated by scarification of the seed coat through chipping (Seabrook 1973) or acid (Walter et al. 1986).

Apios priceana is apparently quite easy to grow from seed, but requires scarification or other natural processes to break physical dormancy (Baskin pers. comm.; Bowden pers. comm.). Following scarification, 18 of 20 seeds planted 1 cm deep in soil grew in a recent test in Kentucky (Baskin pers. comm.). Scarification can be accomplished through a nick with a file, grinding wheel, hot water or sulfuric acid (Bowden pers. comm.). Plants can grow 5-6 feet during the first summer, but do not flower. Flowering is apparently initiated only in plants that have over-wintered (Baskin pers. comm.).

Tubers of A. priceana apparently require vernalization for growth (Bowden pers. comm.). Plants die back to the tuber in the mid-summer.

Additional research has been conducted on A. priceana for horticultural purposes. According to the Missouri Botanical Garden, A.

priceana prefers acidic, water retentive soils, requires no soil additives, can withstand winter temperatures below 5 degrees Celsius, shows no intolerance to supplemental feedings, and possesses no apparent pests (Bowden pers. comm.). The species has been successfully propagated.

Habitat Comments: Open, rocky, wooded slopes and floodplain edges. Sites are usually under mixed hardwoods or in associated forest clearings, often where bluffs or ravine slopes meet creek or river bottoms. Soils are well-drained and loamy, formed on alluvium or over calcareous boulders. Several populations extend onto road or powerline rights-of-way.

Price's potato-bean is an inhabitant of open, mixed-oak forests, forest edges and clearings on river bottoms and ravines, being unable to tolerate deep shade (USFWS 1989, Kral 1983). The species occurs on well-drained loams on old alluvium or over calcareous boulders (Kral 1983). Associates typically include Quercus muhlenbergii, Campanula americana, Lindera benzoin, Arundinaria gigantea, Tilia americana, Fraxinus americana, Acer saccharum, Ulmus rubra, Cercis canadensis, Toxicodendron radicans and Parthenocissus quinquefolius (Medly 1980).

Four extant populations of A. priceana are known from Kentucky. The type location near Bowling Green, Warren County, Kentucky, was characterized as a rocky woods (Robinson 1898); it has been destroyed. A population in Livingston County (estimated at 50-65 plants in 1984) has been severely degraded by cattle since their introduction into the area in 1986 (Norquist 1990). Additional collections in Kentucky have been made in Lyon and Trigg counties (Chester and Holt 1990, Browne and Athey 1976). The Lyon County site consisted of 25-30 individuals, extending onto a right-of-way (Norquist 1990).

The Hematite Lake site in northern Trigg County, Kentucky, was relocated by Woods (1985) and later by Chester and Holt (1990). The population had been considered extirpated (Medley 1980). This site is along a hiking trail at the base of a southeast-facing slope with numerous limestone outcrops (Chester and Holt 1990). The population consisted of 25 plants in 1989, but no plants were observed to set seed in that year. Associates included Arundinaria tecta, Symphoricarpos orbiculatus, Acer saccharum, Celtis laevigata, C. occidentalis, Carya ovata, Ulmus rubra, Quercus muehlenbergii, Ostrya virginiana, Amphicarpa bracteata, Hystrix patula, Solidago rugosa, Matelea gonocarpos, Agrimonia rostellata, Lobelia inflata and a species of Panicum (Chester and Holt 1990). The southern Trigg County, Kentucky, site (previously unseen since 1966) was rediscovered by Chester and Holt (1990). A population of 30-50 plants occurs at the base of a southeast-facing slope with numerous limestone outcrops, in a roadside ditch that is fairly open to light (Chester pers. comm., Chester and Holt 1990). In 1989, at least 15 mature legumes were produced by this population. Associates include Spigelia marilandica, Cimicifuga racemosa, Campanula americana, Geum canadensis, Anemone virginica, Lactuca canadensis, Melilotus officinalis, Rudbeckia triloba, Ptela trifoliata, Fraxinus americana, Morus rubra, Cercis canadensis, Carpinus caroliniana, Ostrya virginiana, Quercus muehlenbergii, Acer saccharum and Ulmus rubra (Chester and Holt 1990).

Tennessee has four extant sites of A. priceana. All occur in soils overlying limestone bedrock in the Highland Rim physiographic region or the Sequatchie Valley, which drains into Alabama (Somers pers. comm.). Associated vegetation varies considerably between sites, but all sites are close to streams or rivers. Western mixed mesophytic forest is present at two of the sites, while a third is present on a bluff. The largest population is in an area recovering from a recent clear-cut operation (Somers pers. comm.). Populations are known from Marion, Montgomery and Williamson counties (Norquist 1990).

Four extant sites occur in three counties in Mississippi: Clay, Oktibbeha and Lee (Norquist 1990). At Kilgore Hills (Clay County), 15-20 plants occur on the banks of a prairie stream. The population occurs on clay alluvial soil over the Demopolis Formation. Soil pH varies between 6.6 and 8.4. The Coonewah Creek (Lee County) and Ray's Woods (Oktibbeha County) sites occur in mixed deciduous forest on a calcareous north-facing slope above the broad expanse of the northeast Prairie Belt. The soil at both sites is a marly clay underlain by a thick bed of a white marine chalk deposit. At both sites the soil pH varies between 7.4 and 8.4 (Medley 1980). For site-specific information pertaining to associated species, see Medley (1980).

Three extant populations are known from Alabama in Madison, Autsuga and Marshall counties (Norquist 1990). Two of the populations are located along the floodplain of the Alabama River (Gunn pers. comm.).

A single population occurred along a swamp border in a federal ecological area in Illinois, but this population has been destroyed. The area has been searched repeatedly with no positive results (Karnes pers. comm.). Ebinger (1981) stated that the habitat of the species in the state was floodplain forests and thickets of the Lower Mississippi River.

Economic Attributes Not yet assessed

Management Summary

Stewardship Overview: Management techniques to provide long-term survival for the species will need to center around the maintenance of natural openings in the forest canopy brought on by prescribed fire, forest thinning or logging. Monitoring should be done to track population size and stability, fruit production, seed set and recruitment. Changes in these factors with respect to other vegetation and canopy closure are also in need of monitoring.

Restoration Potential: Apios priceana is currently being cultivated at the Missouri Botanical Garden (Pickering 1989). Information gained from the cultivation of Price's groundnut at this and other sites (such as the University of Kentucky) will prove important in the long-term recovery of the species. Early results indicate that seeds from the plant are relatively easy to germinate upon scarification. First-year plants grow rapidly, often reaching 5-6 feet in height during the first year.

Preserve Selection & Design Considerations: Land protection must include land occupied by the primary population as well as adequate buffer to protect the site from outside influences (pesticide drift, etc.). Protection of only the immediate population may lend it susceptible to a number of potential threats.

Management Requirements: Precise management needs are poorly known at this time. Maintenance of natural openings, possibly via artificial cutting or prescribed fire, have been suggested by some authorities. Apios priceana is apparently able to withstand light,

selective logging (Kral 1983), but whether this is a suitable management alternative is unknown. It has been suggested that light logging may enhance the species, while heavy clear-cut logging would destroy populations (Kral 1983, Medley 1980). The species may require specific seral stages or seasonal disturbances to arrest succession (Norquist 1990). Determination of precise habitat requirements through research is needed in order to suggest adequate management options.

Protection of the population from excessive grazing and trampling, as well as herbicide application is recommended. Presently, some populations are suffering from the adverse affects of grazing, while potential herbicide application threatens others.

Kral (1983) stated that A. priceana has been observed in secondary forests, suggesting that it is able to survive logging. He also observed that it reacted well to fire disturbance, as do many legumes with tuberous rootstalks. The rarity of the species suggests that it has a narrow ecological amplitude (Kral 1983), so management tolerance levels must be known prior to the undertaking of management options.

Bulldozing or root raking are believed to destroy the plant (Kral 1983). Thinning or cutting of the overstory may possibly damage A. priceana plants if done during the growing season. If undertaken, these methodologies should only be utilized when the plant is dormant.

Monitoring Requirements: Development of adequate monitoring techniques is a need at all sites (Somers pers. comm.). Monitoring should asses the actual number of plants in each extant population over time. Fruit production, seed set and recruitment also should be monitored (Bender pers. comm.). Monitoring should be considered on at least a five-year cycle. Many managers might wish to consider more extensive annual or biennial monitoring programs.

Habitat monitoring is also a major need. Apios priceana is intolerant of excessive canopy shading and competition. Canopy closure should be monitored to determine when canopy thinning or other management activities should be instituted.

Due to the relatively large size of this vine, counts of all individuals would be relatively easy to complete and should be undertaken on a periodical basis. Fruit production, seed set, and recruitment should be documented during the visit. For ease of monitoring, visits should coincide with that of fruit set. Locations of individuals should be mapped on a base map in order to determine life span, recruitment and death rates.

Canopy closure should be monitored on an annual basis using a wide-angle or similar photographic lens. Photographs of the canopy immediately above the population should help determine the extent to which closure is tolerated by the species, as well as the optimal time for appropriate management options.

Management Programs: The two Trigg County, Kentucky, sites occur within the Land Between The Lakes management area of the Tennessee Valley Authority (TVA). The area is designated as a multiple-use facility for recreation, education and conservation activities (Chester and Holt 1990). Contact: Beth Wellbaum, TVA Forester. Telephone No. (502) 924-5602; OR, Dr. Leo Collins, TVA Stewardship Program Botanist, Norris, TN. Telephone No. (615) 494-9800.

After acquisition of the Lyon County site in Kentucky, the State Nature Preserves Commission intends to open the canopy in several areas near the species' present location. Attempts to grow plants from seeds collected at the site, followed by introduction into new openings are also considered. All activities will have the approval of the USFWS prior to implementation. Contact: Joyce Bender, Stewardship Coordinator, Kentucky Heritage Program, KY Nature Preserves Commission, 407 Broadway, Frankfort, KY 40601. Telephone No. (502) 564-2886.

Barnett's Woods Preserve in Tennessee, owned by The Nature Conservancy, protects two element occurrences. At present, no specific management is being conducted for the species. Contact: Geoff Roach, Director of Protection Planning and Stewardship, Tennessee Field Office, The Nature Conservancy, P.O. Box 3017, Nashville, TN 37219. Telephone No. (615) 242-1787.

Monitoring Programs: The Kentucky State Nature Preserves Commission is currently pursuing the purchase of 140 acres in Lyon County to protect the species (Bender pers. comm.). The stem count of the population will be conducted in the summer of 1990 if the site has not been purchased by the time of flowering. Contact: Joyce Bender, Stewardship Coordinator, Kentucky Heritage Program, KY Nature Preserves Commission, 407 Broadway, Frankfort, KY 40601. Telephone No. (502) 564-2886.

The Tennessee Field Office of The Nature Conservancy will hire an independent contractor for the collection of ecological and biological information pertaining to A. priceana at one of its preserves. Duties will include: (1) identification of the community associated with A. priceana, (2) mapping, inventory and monitoring of A. priceana populations, and (3) generation of two reports. Monitoring will include the assessment of growth rates, flowering period, flower number, inflorescence number, seed set, fruit/seed ratio, average rainfall, soil moisture, relative humidity and competition. Contact: Geoff Roach, Land Steward, The Nature Conservancy of Tennessee, P.O. Box 3017, 174 Second Avenue N., Nashville, TN 37219. Telephone No. (615) 242-1787.

The Mississippi Natural Heritage Program does not have an active monitoring program for the species, but does determine if the habitat and the species are still present (Gordon pers. comm.). They continue to maintain contact with the private landowners who possess populations. Contact: Ken Gordon, Coordinator/Botanist, Mississippi Natural Heritage Program, Museum of Natural Science, 111 N. Jefferson St., Jackson, MS 39201-2897. Telephone No. (601) 354-7303.

Management Research Programs: Geoff Roach, Tennessee Field Office of The Nature Conservancy, and Drs. Carol Baskin, Jerry Baskin and Ed Chester are considering doing some life-history research on Apios priceana. Contact: Geoff Roach, Director of Protection Planning and Stewardship, Tennessee Field Office, The Nature Conservancy, P.O. Box 3017, Nashville, TN 37219. Telephone No. (615) 242-1787.

Carol Baskin is currently growing 18 plants in a greenhouse, some of which will be planted at TVA's Land Between the Lakes visitor center. Seed germination has been studied, but insufficient amounts of seed are available for adequate studies regarding flowering requirements and germination phenology. It is hoped that seed produced from the plants at the Land Between the Lakes visitor center will help facilitate these future studies. Contact: Dr. Carol Baskin, University of Kentucky, Lexington, KY. Telephone No. (606) 257-3996.

The Tennessee Ecological Services Division has received Section 6 money from the USFWS to search for additional populations this summer (1990). Contact: Paul Somers, ESD, Tennessee Department of Conservation, 701 Broadway, Nashville, TN 37219-5237. Telephone No. (615) 742-6549.

The Missouri Botanical Garden is currently propagating the species, but no active research is being conducted or is planned for the species. At present, plants are growing on a wall in the Scented Garden as well as six plants in the nursery. Additional plants in the Woodland Garden have died, and research will need to be conducted to determine the reason for death. Plants in the nursery may be used to replace those that died in the Woodland Garden. Contact: Robert Bowden, Director of Horticulture, Missouri Botanical Garden, P.O. Box 299, St. Louis, MO 63166. Telephone No. (314) 577-5189.

Biological Research Needs:

Population/Occurrence Delineation

Alternate Separation Procedure: Use the Habitat-based Plant Element Occurrence Delimitation Guidance (2004).
Date: 01Oct2004

Population/Occurrence Viability

Excellent Viability: An A-rated occurrence of *Apios priceana* is a population that contains 150 or more plants in a mature, relatively undisturbed forest. Ideally the occurrence should be well insulated from potential anthropogenic disturbance where the habitat is characterized by a partially shaded forest with no or minimal influence (< 10 %) by exotic and/or native invasive species.

Good Viability: A B-rated occurrence of *Apios priceana* is a population that contains 50 to 149 plants in a mature, relatively undisturbed forest. Ideally the occurrence should be well insulated from potential anthropogenic disturbance where the habitat is characterized by a partially shaded forest with no or minimal influence (< 10 %) by exotic and/or native invasive species. B-rated specifications also apply to larger occurrences having a greater affluence (to 30 %) of invasive species, logging, and/or development. Easily restored to A-rated conditions.

Fair Viability: A C-rated occurrence of *Apios priceana* is a population that contains 10 to 49 plants in a mature, relatively undisturbed forest. Ideally the occurrence should be well insulated from potential anthropogenic disturbance where the habitat is characterized by a partially shaded forest with no or minimal influence (< 10 %) by exotic and/or native invasive species. C-rated specifications also apply to larger occurrences having a moderate to high affluence (to 75 %) of invasive species, timber harvesting, and/or development. Restoration potential to A- and B-rated specifications is good.

Poor Viability: A D-rated occurrence of *Apios priceana* is a population that contains less than 10 plants in a mature, relatively undisturbed forest. D-rated specifications also apply to larger occurrences in highly modified habitat with minimal or no restoration potential.

Justification: Specifications are based on Element Occurrence Records, academic publications (namely USFWS), personal observations, and expert opinions. Currently limited research is being conducted on this species but no information outlining population dynamics and viability has been published. As new information becomes available, EO specs should be reassessed and updated.
Date: 04Jan2005
Author: Schotz, Alfred

U.S. Invasive Species Impact Rank (I-Rank) Not yet assessed

Authors/Contributors

NatureServe Conservation Status Factors Edition Date: 10Jul1990
NatureServe Conservation Status Factors Author: Ostlie, Wayne MRO; rev. Pyne/Maybury, 1996.
Management Information Edition Date: 30Jun1990
Management Information Edition Author: WAYNE OSTLIE

Botanical data developed by NatureServe and its network of natural heritage programs (see Local Programs), The North Carolina Botanical Garden, and other contributors and cooperators (see Sources).

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Note: Ecological systems data presented in NatureServe Explorer at http://www.natureserve.org/explorer were updated to be current with NatureServe's central databases as of **February 10, 2007**. All other data were updated as of **October 6, 2006**.
Note: This report was printed on **March 28, 2007**

Citation for data on website including Watershed and State Distribution maps:
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Citation for Bird Range Maps of North America:
Ridgely, R.S., T.F. Allnutt, T. Brooks, D.K. McNicol, D.W. Mehlman, B.E. Young, and J.R. Zook. 2003. Digital Distribution Maps of the Birds of the Western Hemisphere, version 1.0. NatureServe, Arlington, Virginia, USA.

Acknowledgement Statement for Bird Range Maps of North America:
"Data provided by NatureServe in collaboration with Robert Ridgely, James Zook, The Nature Conservancy - Migratory Bird Program, Conservation International - CABS, World Wildlife Fund - US, and Environment Canada - WILDSPACE."

Citation for Mammal Range Maps of North America:

Patterson, B.D., G. Ceballos, W. Sechrest, M.F. Tognelli, T. Brooks, L. Luna, P. Ortega, I. Salazar, and B.E. Young. 2003. Digital Distribution Maps of the Mammals of the Western Hemisphere, version 1.0. NatureServe, Arlington, Virginia, USA.

Acknowledgement Statement for Mammal Range Maps of North America:
"Data provided by NatureServe in collaboration with Bruce Patterson, Wes Sechrest, Marcelo Tognelli, Gerardo Ceballos, The Nature Conservancy-Migratory Bird Program, Conservation International-CABS, World Wildlife Fund-US, and Environment Canada-WILDSPACE."

NOTE: Full metadata for the Bird Range Maps of North America is available at:
http://www.natureserve.org/library/birdDistributionmapsmetadatav1.pdf.

Full metadata for the Mammal Range Maps of North America is available at:
http://www.natureserve.org/library/mammalsDistributionmetadatav1.pdf.


NatureServe

Version 6.1 (9 November, 2006)
Ecological systems data last updated:
February 10, 2007
All other data last updated: October 6, 2006

WETLAND ASSESSMENT OF THE INTEGRATED GASIFICATION COMBINED CYCLE GENERATING STATION IN KEMPER COUNTY, MISSISSIPPI

Prepared for

MISSISSIPPI POWER COMPANY
2992 WEST BEACH BOULEVARD
GULFPORT, MISSISSIPPI 39501

Prepared by

BARRY A. VITTOR & ASSOCIATES, INC.
8060 COTTAGE HILL ROAD
MOBILE, ALABAMA 36695

(Contract No. BSU 0067717)

October 2, 2007

INTRODUCTION

Barry A. Vittor & Associates, Inc. (Vittor & Associates) was contracted by Mississippi Power Company to conduct surveys of wetlands within the 1,650-acre Integrated Gasification Combined Cycle (IGCC) generating station site in Kemper County, Mississippi. Specifically, the site is located in Sections 3, 4, 9, and 10, Township 9N, Range 15E, on the Moscow, MS USGS 7.5-minute Quadrangle. Site locator maps are attached.

Vittor & Associates' initial wetland assessment of the IGCC property involved detailed delineation and mapping of jurisdictional wetlands within the initial 128-acre core site (Figure 1) in March, 2007. Subsequent to the March delineation, approximately 622 acres surrounding the original survey area in Sections 3, 4 and 10 were surveyed for presence of jurisdictional wetlands in July and August, 2007. Mississippi Power requested the additional survey to determine whether wetland impacts could be avoided by shifting the plant location to the north of the original site and away from the Chickasawhay River. The remaining wetland acreage, to the south of the original survey site, was estimated using information gathered through field groundtruthing by collecting GPS data at numerous predetermined locations that were chosen by referencing county soil maps, USGS topographic quadrangle maps for the area, and available aerial photography. Using that methodology, Vittor & Associates determined that wetlands occupy approximately 462 acres (~30%) of the total 1,650-acre study area.

The second set of field studies was performed by Terry Whitehurst, Howard E. Horne, Josh Everett, and David Knowles of Vittor & Associates.

GENERAL CHARACTERISTICS OF THE OVERALL STUDY AREA

Various land use activities occur throughout the property. The study area consists of undeveloped woodlands, managed pine timberlands, open fields and grazing pastures, and light residential development. Wetlands throughout the study area are associated with tributaries to Chickasawhay Creek.

The 1,650-acre plant site is comprised for the most part, of managed pine timberlands in the uplands and mixed hardwood forest in the wetlands. Large portions of uplands on the site had been clear-cut at the time of this survey. The property is also presently being managed for deer and turkey hunting and numerous food plots were distributed across the property. Approximately 200 acres of the property, occurring to the north in Section 4, are maintained as cleared pasture for grazing. Livestock were present in this locating on the property at the time of survey.

Topography on the site is characterized by undulating sand/clay hills with maximum elevations reaching over 480 feet. The lowest elevations on the site are along the west and south property boundaries where elevations drop below 420 feet as the site slopes to the Chickasawhay River drainageway.

WETLAND DELINEATION METHODOLOGY

Vittor & Associates conducted this wetland survey according to the methodology and criteria set forth in the 1987 U.S. Army Corps of Engineers Wetland Delineation Manual. According to the Manual, jurisdictional wetlands must exhibit all of the following criteria: hydric soils; a dominance of wetland vegetation; and sufficient hydrology to sustain hydrophytic plants. A list of hydric soils has been compiled by the Natural Resources Conservation Service (NRCS) for the nation and each state. NRCS also distributes soil maps for most counties, giving the location of each soil type and a description of each soil. Also, lists are available that classify plant species on the basis of the likelihood of its occurrence in a wetland. To have a dominance of wetland vegetation, one must have hydrophytic species comprising 50% or more of the total species in that area. Sufficient hydrology is defined as water and/or indicators of water at or near the surface of the ground. Hydrologic indicators are factors such as water-stained leaves, oxidized root channels, drainage patterns, watermarks on the trunks of the trees, etc. Field data sheets were compiled within each different wetland and contiguous upland habitat type, to document the basis for the delineation.

Once the soil map of the area was thoroughly studied and the USGS Topographic Quadrangle referenced, staff biologists mapped the wetlands based upon topographic features, soil types and the presence of wetland characteristics (as described above). Soil probes were used to give the biologist a clear view of the soil and allow the biologist to determine the taxonomic subgroup to which the soil belonged. Hydrologic indicators in the soil (*ie.*, oxidized root channels, the presence of water, or saturated soil near the surface of the ground) were used to determine if the area was a wetland. The biologist studied the vegetation of the area to determine if the area was dominated by wetland vegetation. If any one criterion is not met, the area will not be delineated as a jurisdictional wetland.

Boundaries of jurisdictional wetlands were clearly marked with flagging labeled "WETLAND BOUNDARY" and placed along the wetland boundaries, at approximately 50- to 75-foot intervals. Each flag location was determined with a Trimble ® GPS survey instrument that had sub-meter accuracy. A wetland delineation map was prepared for review and use by Mississippi Power Company.

WETLAND SURVEY OF THE 1,650-ACRE PLANT SITE

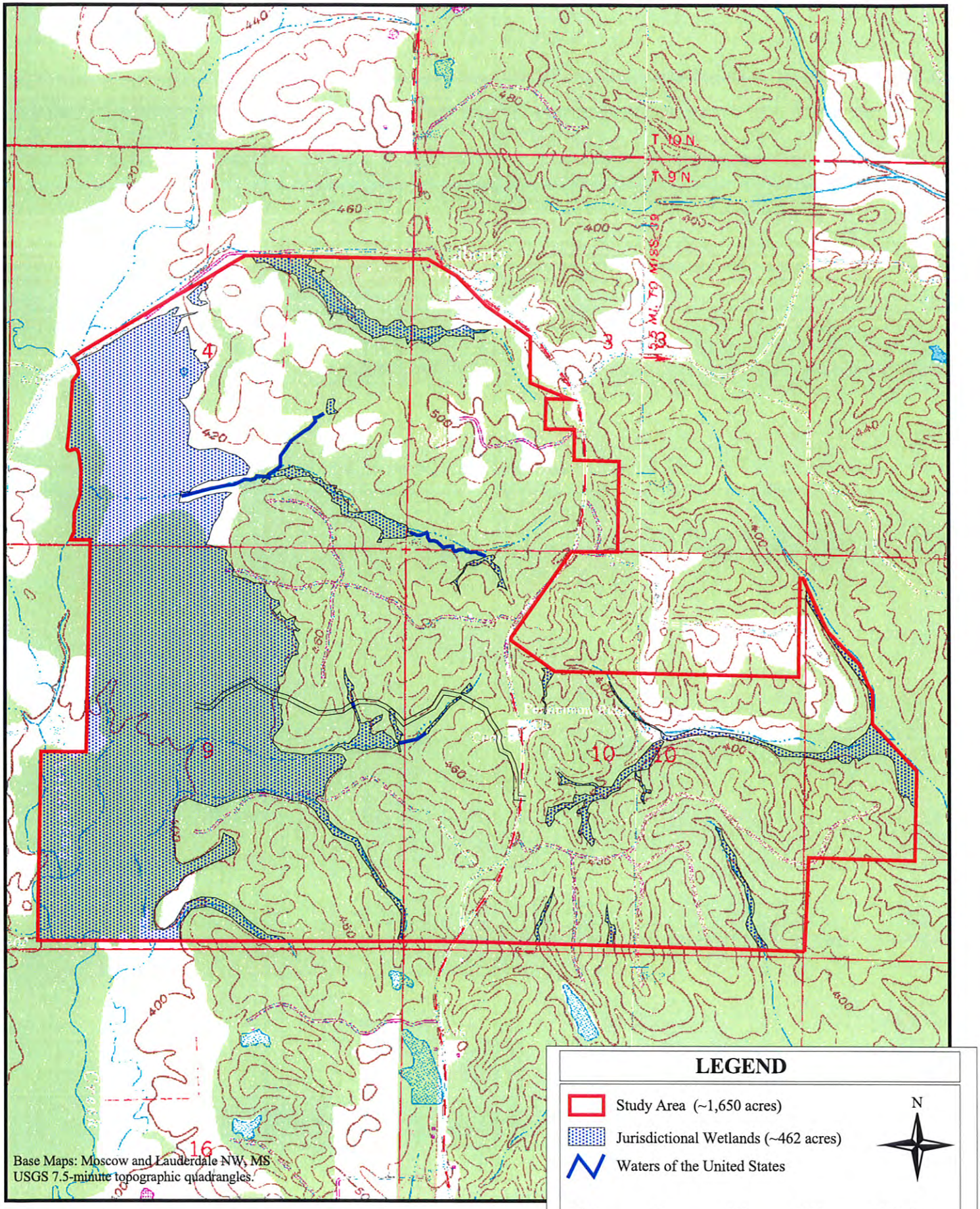
Vittor & Associates delineated and mapped a total of 462 acres of jurisdictional wetlands within the 1,650-acre plant site property. The wetlands within the initial 128-acre study area were the first to be surveyed and were altered by human influences. A 14.5-acre floodplain wetland encroaches into the initial site along much of its west boundary and a small tributary to Chickasawhay Creek that comprises 1.9 acres originates near the southeast boundary. These wetlands have been heavily impacted by clear cutting. Very few canopy trees remain and logging slash has been left in wetlands. Many wetland areas have been further degraded by silt run-off from the highly erodable, cut over upland slopes. The sparse canopy in the cut-over wetland areas is comprised of regenerating loblolly pine (*Pinus taeda*), red maple (*Acer rubrum*), sweet gum (*Liquidambar styraciflua*), and water oak, (*Quercus nigra*), while the shrub and herbaceous layer is dominated by wax myrtle (*Morella cerifera*), broom sedge (*Andropogon virginicus*), slender wood oats (*Chasmanthium laxum*), giant plume grass (*Erianthus giganteus*), greenbriar (*Smilax glauca*), soft rush (*Juncus effusus*), trifoliate orange (*Poncirus trifoliate*),

wooly bulrush (*Scirpus virginicus*), and saw-toothed blackberry (*Rubus argutus*). The few remaining undisturbed wetlands are vegetated by white oak (*Quercus alba*), red maple (*A. rubrum*), sweet gum (*L. styraciflua*), water oak (*Q. nigra*), willow oak (*Quercus phellos*), yellow poplar (*Liriodendron tulipifera*), red cedar (*Juniperus virginiana*), Japanese honeysuckle (*Lonicera japonica*), wax myrtle (*Morella cerifera*), trifoliate orange (*P. trifoliate*), blueberry (*Vaccinium* sp.), and Christmas fern (*Polystichum acrostichoides*). Wetland soils were poorly drained, low-chroma, sandy clay, and were saturated near the surface at all sampling points. Surface water was frequently present in the floodplain wetlands in the southwest corner of the initial study site.

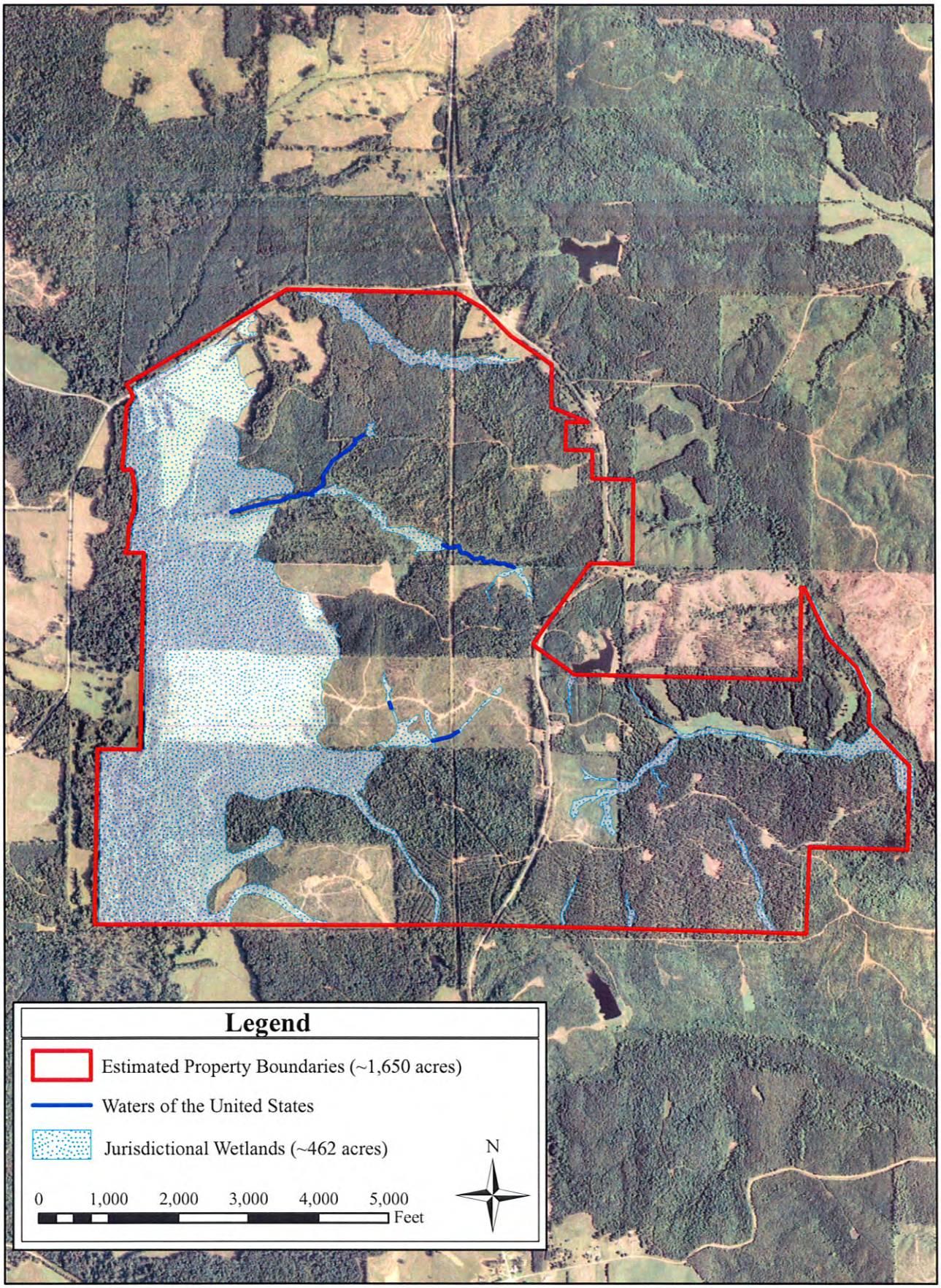
Wetlands to the south of the initial 128-acre study site on the property were generally less severely impacted. Siltation of streams was less evident and the vegetation present was more consistent with natural plant communities in the area. The canopy of these wetlands were dominated by red maple, yellow poplar and sweet gum. Shrub layers were primarily made up of wax myrtles and sapling trees, and the herbaceous layers contained Christmas ferns and young seedling trees.

The two northernmost wetland drains on the property in Sections 3 and 4 were more heavily impacted than those to the south of the original 128-acre survey. These wetlands have been ditched in several places and other portions have been converted to large grazing pastureland. The sections of these wetlands that remain forested have a canopy consisting primarily of yellow poplar, red maple, sweet gum, swamp tupelo (*Nyssa biflora*), water hickory (*Carya aquatic*a) and green ash (*Fraxinus pennsylvanica*). The shrub layer consists of wax myrtle, green briar, grapevine (*Vitis rotundifolia*) and saw-toothed blackberry. Due to thick canopy and shrub layers the herbaceous layer has been shaded out and is very sparse.

The uplands on the property are primarily planted pine sandhills. Vegetation on the uplands includes primarily loblolly pine (*P. taeda*) with water oak (*Q. nigra*), black cherry (*Prunus serotina*), yaupon (*Ilex vomitoria*), blueberry (*Vaccinium elliottii*), Japanese honeysuckle (*L. japonica*), and green briar (*S. glauca*) intermixed. Upland soils were well-drained, reddish-brown, sandy clay and slopes ranged from 5 to 35 percent.



Jurisdictional wetlands on the 1,650-acre study area.



2006 Aerial Imagery from the National Agriculture Imagery Program

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: Mississippi Power IGCC
Application/Owner:
Investigator: T. Whitehurst & J. Everett
Do Normal Circumstances exist on the site? (Yes) No
Is the site significantly disturbed (Atypical Situation)? Yes (No)
Is the area a potential Problem area? (If needed, explain on reverse.) Yes (No)

Date: 07-24-07
County: Kemper
State: MS
Community ID:
Transect ID:
Plot ID: Data Point D1

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
Liquidambar styraciflua	T	Fac	*Smilax rotundifolia*	H	Fac
Pinus taeda	T	Fac U-			
Carya alba	T	Fac U+			
Acer rubrum	T	Fac U			
Diospyros virginiana	T	Fac U+			
Aralia spinosa	S	Fac			
Asplenium platyneuron	H	Fac U			
Quercus phellos	T	Fac W-			

Percent of Dominant Species that are OBL, FACW, or FAC (excluding FAC-) 70%

HYDROLOGY

_____ Recorded Data (Describe in Remarks):
_____ Stream, Lake, or Tide Gauge
__X__ Aerial Photographs
_____ Other
_____ No Recorded Data Available

Wetland Hydrology Indicators:

Primary Indicators:
_____ Inundated
_____ Saturated in Upper 12 inches
_____ Water Marks
_____ Drift Lines
_____ Sediment Deposits
_____ Drainage Patterns in Wetlands

Field Observations:

Depth of Surface Water: _____ (in.)
Depth of Free Water in Pit: _____ (in.)
Depth to Saturated Soil: _____ (in.)

Secondary Indicators (2 or more required):
_____ Oxidized Root Channels in Upper 12 inches
_____ Water-Stained Leaves
_____ Local Soil Survey Data
_____ FAC-Neutral Test
_____ Other (Explain in Remarks)

SOILS

Map Unit Name (Series and Phase):
Taxonomy (Subgroup):

Drainage Class: Somewhat poorly drained
Field Observations:
Confirm Mapped Type? Yes (No)

Profile Description:

Depth (Inches)	Horizon	Matrix Color (Muncell Moist)	Mottle Colors (Muncell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
0-6		10 yr 5/3			Sandy Clay
6-12		10 yr 6/4			Sandy Clay
12-18		10 yr 7/2 7/3			Sandy Clay Loam

Hydric Soil Indicators:

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

WETLAND DETERMINATION

Hydrophytic Vegetation Present? (Yes) No
Wetland Hydrology Present? Yes (No)
Hydric Soils Present? Yes (No)

Is this Sampling Point within a Wetland? Yes (No)

Remarks: (use back if necessary)

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: Mississippi Power IGCC
Application/Owner:
Investigator:
Do Normal Circumstances exist on the site? (Yes) No
Is the site significantly disturbed (Atypical Situation)? Yes (No)
Is the area a potential Problem area? Yes (No)
(If needed, explain on reverse.)

Date: 07-24-07
County: Kemper
State: MS
Community ID:
Transect ID:
Plot ID: Data Point D2

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
Pinus taeda	T	Fac	*Toxicodendron radicans*	H	Fac
Liquidambar styraciflua	T	Fac +			
Cdnea alba	T	Upl			
Callicaupa americana	H	Fac U-			
Vaccinium elliottii	S	Fac +			
Ilex opaca	T	Fac -			
Ulnus americana	T	Fac W			
Asplenium platyneuron	H	Fac U			

Percent of Dominant Species that are OBL, FACW, or FAC (excluding FAC-) 70%

HYDROLOGY

_____ Recorded Data (Describe in Remarks):
_____ Stream, Lake, or Tide Gauge
_____ Aerial Photographs
_____ Other
_____ No Recorded Data Available

Wetland Hydrology Indicators:

Primary Indicators:
_____ Inundated
_____ Saturated in Upper 12 inches
X Water Marks
_____ Drift Lines
_____ Sediment Deposits
_____ Drainage Patterns in Wetlands

Field Observations:
Depth of Surface Water: N/A (in.)
Depth of Free Water in Pit: N/A (in.)
Depth to Saturated Soil: N/A (in.)

Secondary Indicators (2 or more required):
X Oxidized Root Channels in Upper 12 inches
_____ Water-Stained Leaves
_____ Local Soil Survey Data
_____ FAC-Neutral Test
_____ Other (Explain in Remarks)

SOILS

Map Unit Name (Series and Phase):
Drainage Class: Very Poorly
Field Observations:
Taxonomy (Subgroup):
Confirm Mapped Type? Yes (No)

Profile Description:

Depth (Inches)	Horizon	Matrix Color (Muncell Moist)	Mottle Colors (Muncell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
0-18		10 yr 6/2	7.5 yr 4/4	C/D	Sandy Clay

Hydric Soil Indicators:

_____ Histosol
_____ Histic Epipedon
_____ Sulfidic Odor
_____ Aquic Moisture Regime
_____ Reducing Conditions
X Gleyed or Low-Chroma Colors
_____ Concretions
_____ High Organic Content in Surface Layer in Sandy Soils
_____ Organic Streaking in Sandy Soils
_____ Listed on Local Hydric Soils List
_____ Listed on National Hydric Soils List
_____ Other (Explain in wetland)

WETLAND DETERMINATION

Hydrophytic Vegetation Present? (Yes) No
Wetland Hydrology Present? (Yes) No
Hydric Soils Present? (Yes) No

Is this Sampling Point within a Wetland? (Yes) No

Remarks: (use back if necessary)

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: Mississippi Power IGCC
Application/Owner:
Investigator: T. Whitehurst & J. Everett
Do Normal Circumstances exist on the site? (Yes) No
Is the site significantly disturbed (Atypical Situation)? Yes (No)
Is the area a potential Problem area? Yes (No)
(If needed, explain on reverse.)

Date: 07-25-07
County: Kemper
State: MS
Community ID:
Transect ID:
Plot ID: Data Point D3

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
Pinus taeda	T	Fac	*Nyssa sylvatica*	T	Obl
Liquidambar styraciflua	T	Fac +			
Quercus nigra	T	Fac			
Carya alba	T	Upl			
Quercus stellata	T	Fac U			
Vaccinium elliottii	S	Fac U			
Calicarpa americana	H	Fac U-			
Ilex opaca	T	Fac -			

Percent of Dominant Species that are OBL, FACW, or FAC (excluding FAC-) 50%

HYDROLOGY

_____ Recorded Data (Describe in Remarks):
_____ Stream, Lake, or Tide Gauge
_____ Aerial Photographs
_____ Other
_____ No Recorded Data Available

Wetland Hydrology Indicators:

Primary Indicators:
_____ Inundated
_____ Saturated in Upper 12 inches
_____ Water Marks
_____ Drift Lines
_____ Sediment Deposits
_____ Drainage Patterns in Wetlands

Field Observations:

Depth of Surface Water: _____ (in.)
Depth of Free Water in Pit: _____ (in.)
Depth to Saturated Soil: _____ (in.)
(Standing water only in deeper scour pools)

Secondary Indicators (2 or more reqnired):
_____ Oxidized Root Channels in Upper 12 inches
_____ Water-Stained Leaves
_____ Local Soil Survey Data
_____ FAC-Neutral Test
_____ Other (Explain in Remarks)

SOILS

Map Unit Name (Series and Phase): Heuvelton-Millsite Rock Outcrop
Drainage Class: Moderately Well Drained
Field Observations:
Taxonomy (Subgroup): Undulating; HmB
Confirm Mapped Type? Yes (No)

Profile Description:

Depth (Inches)	Horizon	Matrix Color (Muncell Moist)	Mottle Colors (Muncell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
0-6		7.5 yr 4/4			Clay
6-18		7.5 yr 4/6			Clay

Hydric Soil Indicators:

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

WETLAND DETERMINATION

Hydrophytic Vegetation Present? (Yes) No
Wetland Hydrology Present? Yes (No)
Hydric Soils Present? Yes (No)

Is this Sampling Point within a Wetland? Yes (No)

Remarks: (use back if necessary)

BARRY A. VITTOR ASSOCIATES, INC.

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: Mississippi Power IGCC
Application/Owner:
Investigator: T. Whitehurst & J. Everett
Do Normal Circumstances exist on the site? (Yes) No
Is the site significantly disturbed (Atypical Situation)? Yes (No)
Is the area a potential Problem area? Yes (No)
(If needed, explain on reverse.)

Date: 07-25-07
County: Kemper
State: MS
Community ID:
Transect ID:
Plot ID: Data Point D4

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
Paspalum notatum	H	Fac U+			
Juncus effusus	H	Fac W+			
Hypericum hypericoides	H	Fac			
Liquidambar styraciflua	S	Fac +			
Sorghum halepense	H	Fac U			

Percent of Dominant Species that are OBL, FACW, or FAC (excluding FAC-) 60%

HYDROLOGY

___ Recorded Data (Describe in Remarks):
___ Stream, Lake, or Tide Gauge
X Aerial Photographs
___ Other
___ No Recorded Data Available

Wetland Hydrology Indicators:

Primary Indicators:
___ Inundated
___ Saturated in Upper 12 inches
___ Water Marks
___ Drift Lines
___ Sediment Deposits
X Drainage Patterns in Wetlands

Field Observations:
Depth of Surface Water: N/A (in.)
Depth of Free Water in Pit: N/A (in.)
Depth to Saturated Soil: N/A (in.)
(Standing water only in deeper scour pools.)

Secondary Indicators (2 or more required):
___ Oxidized Ront Channels in Upper 12 inches
X Water-Stained Leaves
___ Local Soil Survey Data
___ FAC-Neutral Test
___ Other (Explain in Remarks)

SOILS

Map Unit Name (Series and Phase): Muskellunge Silt Loam
Drainage Class: Poorly Drained
Field Observations:
Taxonomy (Subgroup): 3-8% Slopes; MwB
Confirm Mapped Type? Yes (No)

Profile Description:

Depth (Inches)	Horizon	Matrix Color (Muncell Moist)	Mottle Colors (Muncell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
0-18		2.5 yr 6/2	7.5 yr 5/8	C/D	Sandy Clay Loam

Hydric Soil Indicators:

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

WETLAND DETERMINATION

Hydrophytic Vegetation Present? (Yes) No
Wetlaud Hydrology Present? (Yes) No
Hydric Soils Present? (Yes) No

Is this Sampling Point within a Wetland? (Yes) No

Remarks: (use back if necessary)

BARRY A. VITTOR ASSOCIATES, INC.

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE WetlandS Delineation Manual)

Project/Site: Mississippi Power IGCC
Application/Owner:
Investigator: T. Whitehurst & J. Everett
Do Normal Circumstances exist on the site? (Yes) No
Is the site significantly disturbed (Atypical Situation)? Yes (No)
Is the area a potential Problem area? Yes (No)
(If needed, explain on reverse.)

Date: 07-26-07
County: Kemper
State: MS
Community ID:
Transect ID:
Plot ID: Data Point D5

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
Pinus taeda	T	Fac			
Juncus effusus	H	Fac W+			
Fraxinus pennsylvanica	T	Fac W			
Nyssa sylvatica	T	Obl			
Rubus argutus	H	Fac U+			
Paspalum notatum	H	Fac U+			

Percent of Dominant Species that are OBL, FACW, or FAC (excluding FAC-) 67%

HYDROLOGY

Recorded Data (Describe in Remarks):
- Stream, Lake, or Tide Gauge
- X Aerial Photographs
- Other

No Recorded Data Available

Wetland Hydrology Indicators:
Primary Indicators:
- Inundated
- Saturated in Upper 12 inches
- Water Marks
- X Drift Lines
- Sediment Deposits
- Drainage Patterns in Wetlands

Field Observations:
- Depth of Surface Water: NA (in.)
- Depth of Free Water in Pit: NA (in.)
- Depth to Saturated Soil: NA (in.)

Secondary Indicators (2 or more required):
- X Oxidized Root Channels in Upper 12 inches
- Water-Stained Leaves
- Local Soil Survey Data
- FAC-Neutral Test
- Other (Explain in Remarks)

SOILS

Map Unit Name (Series and Phase):
Drainage Class: Well Drained
Field Observations:
Taxonomy (Subgroup):
Confirm Mapped Type? Yes (No)

Profile Description:

Depth (Inches)	Horizon	Matrix Color (Muncell Moist)	Mottle Colors (Muncell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
0-12		10 yr 4/3 6/2	7..5 yr 4/4	C/D	Sandy Clay
12-18		10 yr 6/1	10 yr 6/6	C/D	Sandy Clay

Hydric Soil Indicators:
- Histosol
- Histic Epipedon
- Sulfidic Odor
- Aquic Moisture Regime
- Reducing Conditions
- Gleyed or Low-Chroma Colors
- Concretions
- High Organic Content in Surface Layer in Sandy Soils
- Organic Streaking in Sandy Soils
- Listed on Local Hydric Soils List
- Listed on National Hydric Soils List
- Other (Explain in wetland)

WETLAND DETERMINATION

Hydrophytic Vegetation Present? (Yes) No
Wetland Hydrology Present? Yes (No)
Hydric Soils Present? Yes (No)

Is this Sampling Point within a Wetlaod? Yes (No)

Remarks: (use back if necessary)

BARRY A. VITTOR ASSOCIATES, INC.

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: Mississippi Power IGCC
Application/Owner:
Investigator: T. Whitehurst & J. Everett
Do Normal Circumstances exist on the site? (Yes) No
Is the site significantly disturbed (Atypical Situation)? Yes (No)
Is the area a potential Problem area? Yes (No)
(If needed, explain on reverse.)

Date: 07-26-07
County: Kemper
State: MS
Community ID:
Transect ID:
Plot ID: Data Point D6

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
Quercus alba	T	Fac U			
Quercus pagoda	T	NA			
Fayinus sylvatica	T	Fac			
Ulnus americana	T	Fac W			
Poncirus trifoliata	S	NA			
Chasmanthium laxum	H	Fac W			

Percent of Dominant Species that are OBL, FACW, or FAC (excluding FAC-) 50%

HYDROLOGY

_____ Recorded Data (Describe in Remarks):
_____ Stream, Lake, or Tide Gauge
X Aerial Photographs
_____ Other
_____ No Recorded Data Available

Wetland Hydrology Indicators:

Primary Indicators:
_____ Inundated
_____ Saturated in Upper 12 inches
_____ Water Marks
_____ Drift Lines
_____ Sediment Deposits
_____ Drainage Patterns in Wetlands

Field Observations:
Depth of Surface Water: N/A (in.)
Depth of Free Water in Pit: N/A (in.)
Depth to Saturated Soil: N/A (in.)

Secondary Indicators (2 or more required):
_____ Oxidized Root Channels in Upper 12 iuches
_____ Water-Stained Leaves
_____ Local Soil Survey Data
_____ FAC-Neutral Test
_____ Other (Explain in Remarks)

SOILS

Map Unit Name (Series and Phase):
Taxonomy (Subgroup):
Drainage Class: Moderately well drained
Field Observations:
Confirm Mapped Type? Yes (No)

Profile Description:

Depth (Inches)	Horizon	Matrix Color (Muncell Moist)	Mottle Colors (Muncell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
0-18		10 yr 4/6			Sandy Clay Loam

Hydric Soil Indicators:

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

WETLAND DETERMINATION

Hydrophytic Vegetation Present? (Yes) No
Wetland Hydrology Present? Yes (No)
Hydric Soils Present? Yes (No)

Is this Sampling Point within a Wetland? Yes (No)

Remarks: (use back if necessary)

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: Mississippi Power IGCC
Application/Owner:
Investigator: T. Whitehurst & J. Everett
Do Normal Circumstances exist on the site? (Yes) No
Is the site significantly disturbed (Atypical Situation)? Yes (No)
Is the area a potential Problem area? Yes (No)
(If needed, explain on reverse.)

Date: 07-26-07
County: Kemper
State: MS
Community ID:
Transect ID:
Plot ID: Data Point D7

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
Nyssa biflora	T	Obl			
Liriodendron tulipifera	T	Fac			
Acer rubrum	T	Fac			
Ulnus americana	T	Fac W			
Juncus effusus	H	Fac W+			
Erianthus giganteus	H	Fac W			
Typha latifolia	H	Obl			

Percent of Dominant Species that are OBL, FACW, or FAC (excluding FAC-) 100%

HYDROLOGY

Recorded Data (Describe in Remarks):
- ___ Stream, Lake, or Tide Gauge
- X Aerial Photographs
- ___ Other

___ No Recorded Data Available

Wetland Hydrology Indicators:

Primary Indicators:
- ___ Inundated
- X Saturated in Upper 12 inches
- X Water Marks
- ___ Drift Lines
- ___ Sediment Deposits
- X Drainage Patterns in Wetlands

Field Observations:

Depth of Surface Water: N/A (in.)
Depth of Free Water in Pit: N/A (in.)
Depth to Saturated Soil: 12 in (in.)

Secondary Indicators (2 or more required):
- X Oxidized Root Channels in Upper 12 inches
- ___ Water-Stained Leaves
- ___ Local Soil Survey Data
- ___ FAC-Neutral Test
- ___ Other (Explain in Remarks)

SOILS

Map Unit Name (Series and Phase):
Taxonomy (Subgroup):

Drainage Class: Very Poorly
Field Observations:
Confirm Mapped Type? Yes (No)

Profile Description:

Depth (Inches)	Horizon	Matrix Color (Muncell Moist)	Mottle Colors (Muncell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
0-18		10 yr 6/1	7.5 yr 5/8	C/D	Clay Loam

Hydric Soil Indicators:
- ___ Histosol
- ___ Histic Epipedon
- ___ Sulfidic Odor
- ___ Aquic Moisture Regime
- ___ Reducing Conditions
- X Gleyed or Low-Chroma Colors
- ___ Concretions
- ___ High Organic Content in Surface Layer in Sandy Soils
- ___ Organic Streaking in Sandy Soils
- ___ Listed on Local Hydric Soils List
- ___ Listed on National Hydric Soils List
- ___ Other (Explain in wetland)

WETLAND DETERMINATION

Hydrophytic Vegetation Present? (Yes) No
Wetland Hydrology Present? (Yes) No
Hydric Soils Present? (Yes) No

Is this Sampling Point within a Wetland? (Yes) No

Remarks: (use back if necessary)

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: Mississippi Power IGCC
Application/Owner:
Investigator: David Knowles & A. Pate
Do Normal Circumstances exist on the site? (Yes) No
Is the site significantly disturbed (Atypical Situation)? Yes (No)
Is the area a potential Problem area? Yes (No)
(If needed, explain on reverse.)

Date: 07-26-07
County: Kemper
State: MS
Community ID:
Transect ID:
Plot ID: Data Point D8

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
Paspalum notatum	H	Fac U+	*Scirpus cyperinus*	H	Obl
Juncus effusus	H	Fac W+			
Liquidambar styraciflua	S	Fac +			
Nussa sylvatica var biflora	S	Obl			
Rubus argutus	H	Fac U+			
Rhexia mariana	H	Fac W+			
Liriodendron tulipifera	S	Fac			
Quercus nigra	S	Fac			

Percent of Dominant Species that are OBL, FACW, or FAC (excluding FAC-) 78%

HYDROLOGY

_____ Recorded Data (Describe in Remarks):
_____ Stream, Lake, or Tide Gauge
__X__ Aerial Photographs
_____ Other
_____ No Recorded Data Available

Wetland Hydrology Indicators:

Primary Indicators:
_____ Inundated
_____ Saturated in Upper 12 inches
_____ Water Marks
_____ Drift Lines
_____ Sediment Deposits
__X__ Drainage Patterns in Wetlands

Field Observations:

Depth of Surface Water: N/A (in.)
Depth of Free Water in Pit: N/A (in.)
Deptb to Saturated Soil: N/A (in.)

Secondary Indicators (2 or more required):
__X__ Oxidized Root Channels in Upper 12 inches
_____ Water-Stained Leaves
_____ Local Soil Survey Data
_____ FAC-Neutral Test
_____ Other (Explain in Remarks)

SOILS

Map Unit Name (Series and Phase):
Taxonomy (Subgroup):

Drainage Class: Poorly Drained
Field Observations:
Confirm Mapped Type? Yes (No)

Profile Description:

Depth (Inches)	Horizon	Matrix Color (Muncell Moist)	Mottle Colors (Mnncell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
0-12		7.5 yr 5/8			Sandy Loam
12-18		10 yr 6/1	7.5 yr 5/8	Common Distinct	Sandy Clay

Hydric Soil Indicators:

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

WETLAND DETERMINATION

Hydrophytic Vegetation Present? (Yes) No
Wetland Hydrology Present? (Yes) No
Hydric Soils Present? (Yes) No

Is this Sampling Point within a Wetland? (Yes) No

Remarks: (use back if necessary)

BARRY A. VITTOR ASSOCIATES, INC.

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: Mississippi Power IGCC
Application/Owner:
Investigator: T. Whitehurst & J. Everett
Do Normal Circumstances exist on the site? (Yes) No
Is the site significantly disturbed (Atypical Situation)? Yes (No)
Is the area a potential Problem area? Yes (No)
(If needed, explain on reverse.)

Date: 07-26-07
County: Kemper
State: MS
Community ID:
Transect ID:
Plot ID: Data Point D9

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
Fraxinus pennsylvanica	T	Fac W			
Ulnus americana	T	Fac W			
Juncus effusus	H	Fac W+			
Paspalum notatum	H	Fac U+			
Baccharis hamilifolia	S	Fac			

Percent of Dominant Species that are OBL, FACW, or FAC (excluding FAC-) 90%

HYDROLOGY

___ Recorded Data (Describe in Remarks):
___ Stream, Lake, or Tide Gauge
_X_ Aerial Photographs
___ Other
___ No Recorded Data Available

Wetland Hydrology Indicators:

Primary Indicators:
___ Inundated
_X_ Saturated in Upper 12 inches
___ Water Marks
___ Drift Lines
___ Sediment Deposits
___ Drainage Patterns in Wetlands

Field Observations:

Depth of Surface Water: N/A (in.)
Depth of Free Water in Pit: N/A (in.)
Depth to Saturated Soil: 12 (in.)

Secondary Indicators (2 or more required):
_X_ Oxidized Root Channels in Upper 12 inches
_X_ Water-Stained Leaves
___ Local Soil Survey Data
___ FAC-Neutral Test
___ Other (Explain in Remarks)

SOILS

Map Unit Name (Series and Phase):
Taxonomy (Subgroup):

Drainage Class: Poorly
Field Observations:
Confirm Mapped Type? Yes (No)

Profile Description:

Depth (Inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
0-18		10 yr 6/1	7.5 yr 5/8		Sandy Clay

Hydric Soil Indicators:

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

WETLAND DETERMINATION

Hydrophytic Vegetation Present? (Yes) No
Wetland Hydrology Present? (Yes) No
Hydric Soils Present? (Yes) No

Is this Sampling Point within a Wetland? (Yes) No

Remarks: (use back if necessary)

BARRY A. VITTOR ASSOCIATES, INC.

THREATENED AND ENDANGERED SPECIES REPORT FOR THE INTEGRATED GASIFICATION COMBINED CYCLE GENERATING STATION IN KEMPER COUNTY, MISSISSIPPI

Prepared for

MISSISSIPPI POWER COMPANY
2992 WEST BEACH BOULEVARD
GULFPORT, MISSISSIPPI 39501

Prepared by

BARRY A. VITTOR & ASSOCIATES, INC.
8060 COTTAGE HILL ROAD
MOBILE, ALABAMA 36695

(Contract No. BSU 0067717)

October 2, 2007

INTRODUCTION

In July-August, 2007, Barry A. Vittor & Associates, Inc. performed a threatened and endangered species survey of the additional lands within the proposed Mississippi Power Company Integrated Gasification Combined Cycle (IGCC) generating station site in Kemper County, Mississippi. This report details the results of our survey and discusses the potential for occurrence of federal and/or state protected species within the project site.

PROJECT LOCATION

The 1,650-acre study area is located in Kemper County, Mississippi on the east and west sides of State Road 493, approximately 10 air miles south of the community of DeKalb. **Figure 1** depicts the subject property on the Moscow and Lauderdale, NW, Mississippi, United States Geological Survey (USGS) 7.5-minute topographic quadrangles. The project site is located in Township 9 North, Range 15 East and contains multiple sections: 3, 4, 9, 10 and 11.

TARGET SPECIES

A review of the pertinent and available literature was conducted to help generate a list of federally and state protected species that could possibly occur on the property. The United States Fish & Wildlife Service's list of Mississippi's federally protected species by county was consulted as the primary reference on potentially occuring species (Ecological Services Field Office; http://www.fws.gov/southeast/jackson/index.html). The United States Fish and Wildlife Service (USFWS) lists the threatened Price's potato bean (*Apios priceana*) as the only federally protected species currently known to occur in Kemper County, Mississippi. Detailed natural history information on this species is provided for reference in **Appendix A** (Kral, 1983; Natureserve, 2006).

Other broadly distributed and wide ranging species such as Bald Eagle (*Halaieetus leucocephalus*) and Red-cockaded Woodpecker (*Picoides borealis*) could possibly occur throughout Mississippi and Vittor & Associates usually considers these taxa as potential targets for all threatened and endangered species surveys performed in the state.

The Mississippi Department of Wildlife Fisheries and Parks is responsible for the regulation of protected nongame species in the state. A list of wildlife species protected by the state was generated from the following regulations on the Department of Wildlife Fisheries and Parks' website (http://www.mdwfp.com/Level2/Wildlife/hunting_regs.asp):

> "All birds of prey (eagles, hawks, osprey, owls, kites and vultures) and other nongame birds are protected and may not be hunted, molested, bought or sold.. The following endangered species are also protected: black bear, Florida panther, gray bat, Indiana bat, all sea turtles, gopher tortoise, sawback turtles (black-knobbed, ringed, yellow-blotched), black pine snake, eastern indigo snake, rainbow snake and the southern hognose snake "

In addition to the above sources, a data request was submitted to the Mississippi Natural Heritage Program (MNHP) to determine whether any federally protected species have been previously documented from the project site. For purposes of this investigation, Vittor & Associates utilized a 1,650-acre study area that included the original 128-acre proposed plant site. MNHP performed a data search of records occuring within a 2-mile search distance surrounding the boundary of the larger tract.

FIELD SURVEY AND NATURAL COMMUNITIES

The field survey of the initial 128-acre proposed plant site, and the adjacent acreage to its South and East on the property, was performed on March 7, 8, and 21, 2007 to search for both federal and state protected species and to assess the natural communities and wildlife habitats found within the project boundaries. The remainder of the property was searched on July 30 and 31, 2007 and August 23, 2007. Topography in the site is characterized by undulating sand/clay hills with the maximum elevation reaching over 480 feet above sea level. The lowest elevations on the study area (394 feet above sea

level) occur on the western edge of the property along the floodplain of the Chickasawhay River.

Historically, the property was most likely dominated by an upland mixed hardwood forest community, based on the presence of remnant vegetation. Areas along the floodplain of Chickasawhay River would have consisted of bottomland hardwood forest. Hardwoods still dominate the banks of the River and small portions of the floodplain; however, the majority of the property is now currently managed for pine timber production and has been heavily impacted through logging activities. Based on found conclude that a vast majority of the uplands on the property had been planted in loblolly pine (*Pinus taeda*). There is a recent clear-cut of approximately 55 acres located in the south-central portion of the study site, that is regenerating in young sweetgum (*Liquidambar styraciflua*), water oak (*Quercus nigra*), and wax myrtle (*Myrica cerifera*). Herbaceous and groundcover species present in this clear-cut area include broom sedge (*Andropogon virginicus*), sawtooth blackberry (*Rubus argutus*), and slender woodoats (*Chasmanthium laxum*). An additional 30 acres of clear-cut land occurs in close proximity to the west and north of the previously mentioned clear-cut, and has been converted into planted food plots for hunting. There are remains of an old home site located on the north side of the entrance road leading into the subject property. The vegetation here is dominated by non-native species such as Chinese wisteria (*Wisteria sinense*) and Chinese privet (*Ligustrum sinense*) most likely naturalized from previous cultivation around the former home.

RESULTS AND FINDINGS

No federal or state protected species were observed during our survey. An electronic search of MNHP's Biological Conservation Database (BCD) performed on March 27, 2007 revealed no reports of any federally protected species from the project site nor were any protected species identified within a two-mile search distance of the 1,650-acre study area. Since Price's potato bean (*Apios priceana*) has been previously documented from Kemper County, a specific request was made to identify the nearest element occurrence

(EO) of *A. priceana* in their database. According to MNHP records, the nearest EO in Kemper County is located approximately 25 air miles northeast of the project site and was last visited in 2001. Although no point locality data were provided for this EO, the general location would place the record in the extreme northeast corner of the county. An examination of the Environmental Protection Agency's Level IV Ecoregions of Mississippi (**Figure 2**; Chapman, et al. 2004) shows that this northeast portion of Kemper County contains two different Level IV ecoregions: Blackland prairie (65a) and Flatwoods/Blackland Prairie Margins (65B). The study site is located well outside of these ecoregions in the Southern Hilly Gulf Coastal Plain (65d). Nearby populations of Price's potato bean in Mississippi and Alabama are not known to occur in this particular ecoregion and are restricted to the ecoregions found farther north of the project site. Additionally, the project falls within the drainage basin for the Chickasawhay River for which there are no known records of this protected species. No individuals of Price's potato bean were observed within the project boundaries and suitable habitat for this species does not exist on the site (e.g. rocky woodlands with calcareous substrates).

No individuals of Red-cockaded Woodpecker (*Picoides borealis*)were observed on the project site. Red-cockaded Woodpecker is a specialist of fire-maintained pine ecosystems (*i.e.* longleaf pine forest) of the Southeastern United States. The species typically requires old growth longleaf pine (*Pinus palustris*) for its breeding cavities, but other pine species have also been utilized (Conner *et al.*, 2001). Large areas of the property are in commerical loblolly pine timber production and appear to lack the necessary old growth trees required for breeding (average stand age for planted loblolly pine was estimated to be between 15 & 20 years). Based on our field assessment, Red-cockaded Woodpecker is not likely to occur within the project boundaries and suitable habitat for Red-cockaded Woodpecker does not occur on the proposed plant site.

Bald Eagle (*Haliaeetus leucocephalus*) is unlikely to occur as a breeder on the property, which lacks the large bodies of open water necessary for foraging. No eagles were seen during our field surveys of the property and the species is not expected to occur there.

STATE LISTED SPECIES

Black-knobbed map turtle (*Graptemys nigrinoda*)

Black-knobbed map turtle is found in rivers and streams with moderate current and sandy or clay substrates in the upper Tombigbee, Tibbee, Middle Tombigee-Lubbub river drainages in Alabama and Mississippi, all of which are outside of the Chickasawhay river basin (Natureserve, 2006; Ernst *et al.*, 1994). This species is not expected to occur within the property boundaries of the study area.

Yellow-blotched map turtle (*Graptemys flavimaculata*)

Yellow-blotched map turtle is federally protected as a threatened species. This species is restricted to the Pascagoula River system and its associated tributaries. *G. flavimaculata* is typically found in "wide rivers with strong currents" with sandbars suitable for nesting (Ernst, et al. 1994). The species has been documented from the Upper Chickasawhay River basin as far north as Clarke County, Mississippi (Natureserve, 2006). There are no known occurrences of yellow-blotched map turtle from Kemper County, Mississippi, based on Natural Heritage Program records (Natureserve, 2006). Although the western property boundary of the 1,650-acre study area abuts portions of the Chickasawhay River, the species is not expected there.

Ringed map turtle (*Graptemys oculifera*)

This species is restricted to the Pearl River drainage system in Mississippi and Louisiana (Natureserve, 2006; Ernst *et al.* 1994). It is not found in the Chickasawhay River basin and is not expected to occur within the project boundaries.

Southern hognose snake (*Heterodon simus*).

The Mississippi Natural Heritage Program considers *H. simus* extirpated from the state with no recent records reported during 1983 -1998 (Natureserve, 2006). There are old records from Forrest, Pearl River, and Stone counties (Natureserve, 2006). Southern

hognose snake is typically found in xeric sandhill communities with well-drained sandy soils (Natureserve, 2006) and these community types do not exist within the study area. It is not expected to occur within the project boundaries.

Black pine snake (*Pituophis melanoleucus lodingi*)

Black pine snake is a candidate species for Federal protection under the Endangered Species Act (ESA) This designation indicates that the USFWS has sufficient biological information to propose a particular species for listing under the ESA but such an action is precluded due to higher listing priorities. The species is also state protected in Mississippi. There are no known records of black pine snake from Kemper County and it has only been documented as far north as Marion and Lamar Counties in Mississippi (Natureserve, 2006). Black pine snake is not expected to occur on the property.

Rainbow Snake (*Farancia erytrogramma*)

Rainbow snake is state-protected in Mississippi. Ernst & Ernst (2003) considered this species endangered in the state. Rainbow snake is not federally protected under the Endangered Species Act. This secretive snake is typically found along "coastal plain waterways" such as "rivers, streams, canals, lakes, swamps and tidal and freshwater marshes" of the southeast (Ernst & Ernst, 2003). Conant and Collins (1998) state that it appears to prefer swamp with bald cypress (*Taxodium distichum*). Natureserve (2006) only lists records from as far north as Lamar County in Mississippi. Suitable habitat for rainbow snake does not occur within the project boundaries and it is not expected to occur there.

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Chickasawhay River floodplain, Northwest corner of the property.

Sandy/Clayey Pinehills, North central portion of the property.

Open grazing pasture adjacent to Liberty Road, in the Northeast section of the property.

Dirt road through a large clear-cut near the center of the property.

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