APPENDIX E

KEMPER COUNTY IGCC PROJECT SITE WETLAND ASSESSMENT AND ECOLOGICAL SURVEY REPORTS

This page intentionally left blank.

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)

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

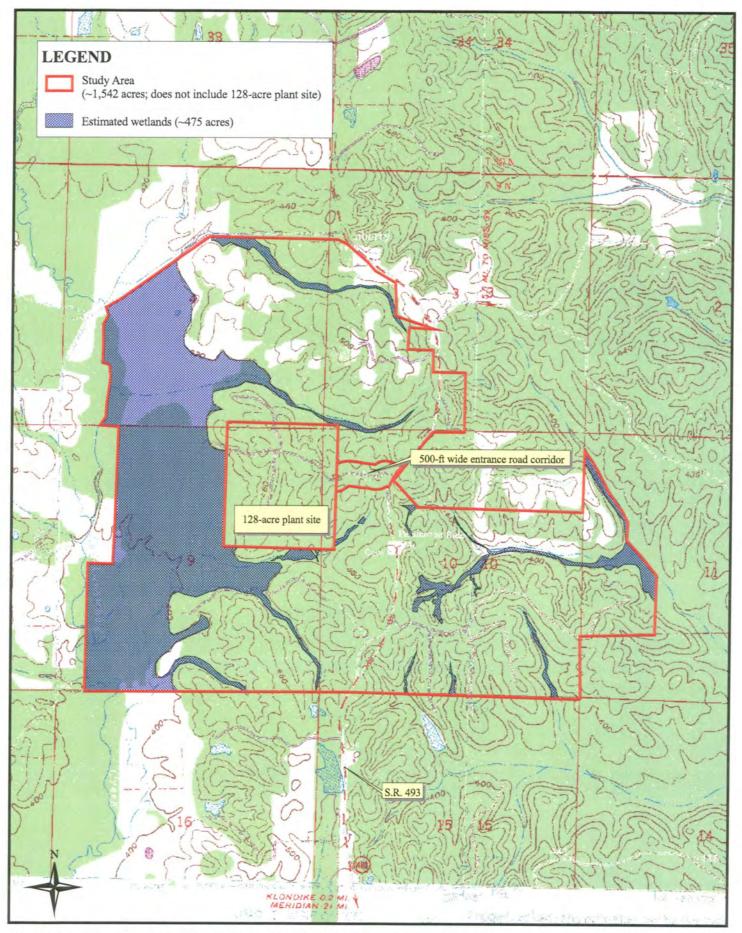
Vittor & Associates conducted a detailed wetland survey on the 128-acre plant site on March 7-8, 2007. Specifically, the site is located in Sections 3, 4, 9, and 10, Township 9N, Range 15E, on the Moscow, MS USGS 7.5-minute Quadrangle. Site locator maps are attached.

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.

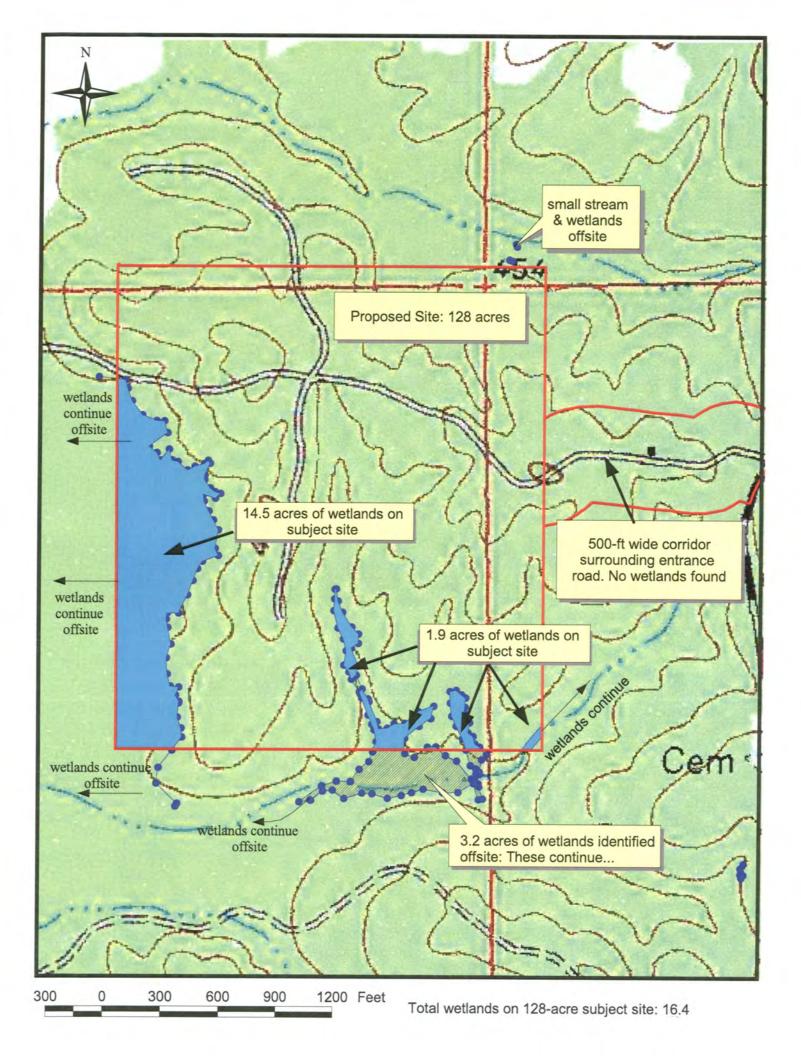
The remaining 111.7 acres of the 128-acre plant site consists of uplands. Vegetation on the uplands includes primarily loblolly pine (*P. taeda*) with water oak (*Q. nigra*), black cherry (*Prunus serotina*), yaupon (*Ilex vomitoria*), blueberry (*Vaccinium elliottii*), Japanese honeysuckle (*L. japonica*), 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
		the second se	and the second se	and the second se		





Nonhydric/Upland Soils

SwB2 = Sweatman fine sandy loam, 2 to 5 percent slopeHSwC2 = Sweatman fine sandy loam, 5 to 8 percent slopeNSwD2 = Sweatman fine sandy loam, 8 to 12 percent slopeSwF2 = Sweatman fine sandy loam, 12 to 30 percent slopeSWF2 = Sweatman-Smithdale Association, 12 to 35 percent slopeSX = 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) e 250 0 250 500 750 1000 Feet



Application/Owner: David Mnowles David Mnowles Do Normal Circumstances exist on the site? Yes No Do Normal Circumstances exist on the site? Yes No Is the site significantly disturbed (Ayprical Situation)? Yes No Is the area a potential Problem area? Yes No VICEETATION Dominant Basecies Statum Dominant Basecies T Fac Juniferrat Main Linicolendron tulip/fera T Fac Juniferrat Main Quercus phellos T Fac Myrica cerifera Quercus nigra T Fac Myrica cerifera Quercus nigra T Fac Multa glauca Chasmanthum lacam H Fac Descretaria glaura Percent of Dominant Species that are OBL, FACW, or FAC (excluding FAC-) 100% Inundated Myrob Order No Recorded Data (Descrethe in Remarks): Yes and the drass of the cost of	at A	
Investigator: Terry Whitehurst & David Knowles State: Kempe Do Normal Circumstances exist on the site? Yet No Transect ID: Is the site significantly disturbed (Atypical Situation)? Yet No Transect ID: Is the site significantly disturbed (Atypical Situation)? Yet No Plot ID: Southw VEGETATION T Fac Juniperus virginiana Quercus phellos T Fac + Morica cerifera Quercus phellos T Fac + Morica cerifera Quercus ingra T Fac + <td>51.</td> <td></td>	5 1 .	
Do Normal Circumstances exist on the site? Is the site significantly disturbed (Atypical Situation)? Yes No Transect ID: T		
Is the site significantly disturbed (Atypical Situation)? Yes No Community fib. Transect ID:	-	
(If needed, explain on reverse.) Prior ID: Southweight of the second		
VEGETATION Dominant Plant Species Stratum Indicator Dominant Plant Species Liridendron tulipifera T Fac Juniperus virginiana Quercus phellos T Fac W- Poncirus trifoliata Quercus nigra T Fac + Myrica cerifera Quercus nigra T Fac + Smilaz glauca Acer rubrum T Fac Smilaz glauca Acer aubrum T Fac Smilaz glauca Chasmanthium lazam H Fac Smilaz glauca Chasmanthium acrostichoides H Fac Inundated Polystichum acrostichoides H Fac Inundated Maria Photographs Inundated Stream, Lake, or Tide Gauge Stream Pac Dotter Mare Marks Stream Packe, or Tide Gauge Stream Packe, or Tide Gauge Stream Packe, or Tide Gauge Dotter Stream Packe, or Tide Gauge Mare Marks Stream Packe, or Tide Gauge Stream Packe, or Tide Gauge Dotter Stream Packe, or Tide Gauge Mare Marks Stream Packe, or Tide Gauge Stream Packe, or Tide Gauge Stream Packe, or Tide Gauge <td< td=""><td>vest</td><td></td></td<>	vest	
Dominant Plant Species Stratum Indicator Dominant Plant Species Liriodendron tulipifera T Fac Juniperus virginiana Quercus phellos T Fac W. Poncirus trifoliata Quercus nigra T Fac W. Poncirus trifoliata Quercus nigra T Fac W. Poncirus trifoliata Quercus nigra T Fac M. Smilas glauca Acer rubrum T Fac Smilas glauca Chasmanihium laxam H Fac - Procession Polystichum acrostichoides H Fac - 100% HYDROLOGY Inundated No Recorded Data (Describe in Remarks): Wetland Hydrology Indicators: Stream, Lake, or Tide Gauge Primary Indicators: Inundated Quert Marks Stream, Lake, or Tide Gauge Softment Deposits Mater Marks Stream, Lake, or Tide Gauge Doft Lanes Stream Lake, or Tide Gauge Stream Lake, or Tide Gauge Doft Lanes Mater Marks Stream Lake, or Tide Gauge Stream Lake, or Tide Gauge Doft Lanes Stream Lake, or Tide Gauge Acrantal Photographs Doft Lanes		
Liriodendron tulipifera T Fac Juniperus virginiana Quercus phellos T Fac + Myrica cerifera Liquidambar styraciflua T Fac + Myrica cerifera Quercus ingra T Fac + Myrica cerifera Quercus ingra T Fac + Myrica cerifera Quercus ingra T Fac + Smilax glauca Acer rubrum T Fac + Smilax glauca Chasmanthium laxum H Fac + Smilax glauca Chasmanthium laxum H Fac + Smilax glauca Lonicera japonica H Fac - Integration of the construction of the constru		
Liriodendron tulipifera T Fac Juniperus virginiana Quercus phellos T Fac Poncirus trifoliata Liquidambar styraciflua T Fac Myrica cerifera Quercus ingra T Fac Smilax glauca Acer rubrum T Fac Smilax glauca Chasmanthium laxum H Fac Smilax glauca Polystichum acrostichoides H Fac Smilax glauca Lonicera japonica H Fac Smilax glauca Percent of Dominant Species that are OBL, FACW, or FAC (excluding FAC-) 100% HYDROLOGY HYDROLOGY Stream, Lake, or Tide Gauge Primary Indicators: Inundated	Stratum Ind	ndica
Quercus phellos T Fac W. Poncirus trifoliata Liquidambar styracifha T Fac + Myrica cerifera Quercus nigra T Fac + Smilax glauca Acer rubrum T Fac Smilax glauca Chasmanthium laxum H Fac - Smilax glauca Polystichum acrostichoides H Fac - Smilax glauca Lonicera japonica H Fac - Smilax glauca Percent of Dominant Species that are OBL, FACW, or FAC (excluding FAC-) 100% 100% HYDROLOGY Recorded Data (Describe in Remarks): Wetland Hydrology Indicators: Stream, Lake, or Tide Gauge Arrai Photographs Dundards Other Water Marks Dift Lines No Recorded Data Available Stream, Lake, or Tide Gauge Struated in Upper 12 inches Stream Lake, or Tide Gauge Arrai Photographs Dift Lines Struated in Upper 12 inches Depth of Surface Water: N/A (in.) X Oxidized Koot Channels in Upper 12 inches Depth to Surface Water: N/A (in.) X Coal Surrey Data X Depth to Surface Water: M/A (in.)		Fac
Quercus nigra T Fac Smilax glauca Acer rubrum T Fac Smilax glauca Chasmanthium laxum H Fac W. Smilax glauca Polystichuum acrostichoides H Fac Smilax glauca Lonicera japonica H Fac Smilax glauca Percent of Dominant Species that are OBL, FACW, or FAC (excluding FAC-) 100% HYDROLOGY Recorded Data (Describe in Remarks): Wetland Hydrology Indicators: Stream, Lake, or Tide Gauge Aerial Photographs Inundated Other Statrated in Upper 12 inches Statrated in Upper 12 inches No Recorded Data Available Water Marks Drift Lines Depth of Surface Water: N/A (in.) Secondary Indicators (2 or more required): Local Soil Survey Data FAC-Neutral Test Vater-Staune Leaves Uther (Explain in Remarks) SOILS Map Unit Name (Series and Phase): Mooreville-Kinston-Mantachie Drainage Class: Poorly Drained faxonomy (Subgroup):		Fac
Acer rubrum T Fac Chasmanthium laxum H Fac 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): Wetland Hydrology Indicators: Acer and Photographs Staturated in Upper 12 inches Other No Recorded Data Available Primary Indicators: Field Observations: Depth of Surface Water: N/A (in.) Secondary Indicators (2 or more required): Depth to Saturated Soid: 4 (in.) X Coxidized Rool Channels in Upper 12 in Ches SOILS Map Unit Name (Series and Phase): Mooreville-Kinston-Mantachie Drainage Class: Poorly Drained Facdonomy (Subgroup): Confirm Mapped Type? Yorfile Description: Confirm Mapped Type? Yorfile Description: Path Matrix Color Mottle Colors Mottle Texture, Concret		Fac
Chasmanthium laxum H Fac W. Polystichum acrostichoides 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): Wetland Hydrology Indicators:		Fac
Polystichum acrostichoides H Fac Lonicera japonica 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): Wetland Hydrology Indicators:		
Lonicera japonica H Fac - Percent of Dominant Species that are OBL, FACW, or FAC (excluding FAC-) 100% HYDROLOGY Recorded Data (Describe in Remarks): Wetland Hydrology Indicators:		
Percent of Dominant Species that are OBL, FACW, or FAC (excluding FAC-) 100% HYDROLOGY Recorded Data (Describe in Remarks): Wetland Hydrology Indicators:		
HYDROLOGY Recorded Data (Describe in Remarks): Wetland Hydrology Indicators: Stream, Lake, or Tide Gauge Primary Indicators: Aerial Photographs Inundated Other X Saturated in Upper 12 inches No Recorded Data Available Drift Lines Field Observations: X Drainage Patterns in Wetlands Depth of Surface Water: N/A (in.) Depth of Surface Water: N/A (in.) Water Stained Leaves X Oxidized Koot Channels in Upper 12 in		
Recorded Data (Describe in Remarks): Wetland Hydrology Indicators:		
Stream, Lake, or Tide Gauge Primary Indicators: Aerial Photographs Inundated Other Saturated in Upper 12 inches No Recorded Data Available Saturated in Upper 12 inches Field Observations: Dift Lines Depth of Surface Water: N/A (in.) Depth of Free Water in Pit: 10 (in.) Depth of Saturated Soil: 4 (in.) Stream Active Vater in Pit: 10 (in.) Water-Stained Leaves X Local Soil Survey Data FaC-Neutral Test Other (Explain in Remarks) SOILS Mooreville-Kinston-Mantachie Drainage Class: Poorly Drained Field Observations: Confirm Mapped Type? Profile Description: Vatrix Color Mottle Colors Depth Matrix Color Mottle Colors Mottle Texture, Concret Stream (Muncell Moist) Abundance/Contrast		
Stream, Lake, or Tide Gauge Primary Indicators: Aerial Photographs Inundated Other Saturated in Upper 12 inches No Recorded Data Available Saturated in Upper 12 inches Field Observations: Drift Lines Depth of Surface Water: N/A (in.) Depth of Free Water in Pit: 10 (m.) Depth to Saturated Soil: 4 (in.) Soll S Mooreville-Kinston-Mantachie Map Unit Name (Series and Phase): Mooreville-Kinston-Mantachie Factors: Confirm Mapped Type? Profile Description: Outper Motions: Cepth Matrix Color Matrix Color Mottle Colors Mottle Texture, Concret Stream, Lake, or Tide Gauge Stream Matrix Color Mottle Colors Mottle Texture, Concret Stream Moncell Moist) Muncell Moist) Abundance/Contrast		
Other X Saturated in Upper 12 inches No Recorded Data Available X Saturated in Upper 12 inches Depth of Surface Water: N/A (in.) X Depth of Surface Water: N/A (in.) X Secondary Indicators (2 or more required); Depth of Surface Water in Pit: 10 (in.) X Water Stained Leaves Depth to Saturated Soil: 4 (in.) X Local Soil Survey Data FAC-Neutral Test Other (Explain in Remarks) Other (Explain in Remarks) SOILS Map Unit Name (Series and Phase): Mooreville-Kinston-Mantachie Drainage Class: Poorly Drained Field Observations: Confirm Mapped Type? Poorly Drained Field Observations: Confirm Mapped Type? Profile Description: Depth Matrix Color Mottle Colors Mottle Texture, Concret Unches) Horizon Mutrix Color Mottle Colors Mottle Structure, etc.		
No Recorded Data Available A Saduated in Opper 12 inches Water Marks Drift Lines Sediment Deposits Varianage Patterns in Wetlands Depth of Surface Water: N/A Depth of Free Water in Pit: 10 Depth to Saturated Soil: 4 Map Unit Name (Series and Phase): Mooreville-Kinston-Mantachie Soills Drainage Class: Poorly Drained Field Observations: Confirm Mapped Type? Profile Description: Depth Matrix Color Mottle Colors Mottle Texture, Concret Inches) Horizon Matrix Color Mottle Colors Mottle Texture, concret Structure, etc.		
Field Observations: Sediment Deposits Depth of Surface Water: N/A (in.) Depth of Surface Water: N/A (in.) Depth of Surface Water: N/A (in.) Depth of Free Water in Pit: 10 (in.) Depth to Saturated Soil: 4 (in.) Depth to Saturated Soil: 4 (in.) SOILS Map Unit Name (Series and Phase): Mooreville-Kinston-Mantachie Drainage Class: Poorly Drained Field Observations: Confirm Mapped Type? Poorly Drained Field Observations: Confirm Mapped Type? Profile Description: Depth Matrix Color Mottle Colors Mottle Texture, Concret Depth Horizon (Muncell Moist) Abundance/Contrast Structure, etc.		
X Drainage Patierns in Wetlands Depth of Surface Water: N/A (in.) Secondary Indicators (2 or more required): X Oxidized Root Channels in Upper 12 in X Water-Stained Leaves Depth of Free Water in Pit: 10 (in.) X Water-Stained Leaves Depth to Saturated Soil: 4 (in.) X Local Soil Survey Data FAC-Neutral Test Dother (Explain in Remarks) Other (Explain in Remarks) Other (Explain in Remarks) SOILS Map Unit Name (Series and Phase): Mooreville-Kinston-Mantachie Drainage Class: Poorly Drained Field Observations: faxonomy (Subgroup):		
Field Observations: N/A (in.) Secondary Indicators (2 or more required): Depth of Surface Water in Pit: 10 (in.) X Oxidized Root Channels in Upper 12 in X Depth of Free Water in Pit: 10 (in.) X Oxidized Root Channels in Upper 12 in X Depth to Saturated Soil: 4 (in.) X Local Soil Survey Data FAC-Neutral Test Other (Explain in Remarks) SOILS Mooreville-Kinston-Mantachie Drainage Class: Poorly Drained Faxonomy (Subgroup):		
Depth of Free Water in Pit: 10 (m.) X Water-Stained Leaves Depth to Saturated Soil: 4 (in.) X Water-Stained Leaves SOILS 4 (in.) FAC-Neutral Test Other (Explain in Remarks) SOILS Mooreville-Kinston-Mantachie Drainage Class: Poorly Drained Faxonomy (Subgroup): Field Observations: Confirm Mapped Type? Profile Description: Depth Matrix Color Mottle Colors Mottle Texture, Concret Depth Morecill Moist) Abundance/Contrast Structure, etc.		
Depth of Free Water in Pit: 10 (m.) X Oxidized Root Channels in Upper 12 in X Depth to Saturated Soil: 4 (m.) X Local Soil Survey Data SOILS 4 (in.) FAC-Neutral Test Other (Explain in Remarks) SOILS Mooreville-Kinston-Mantachie Drainage Class: Poorly Drained Faxonomy (Subgroup): Confirm Mapped Type? Confirm Mapped Type? Profile Description: Depth Matrix Color Mottle Colors Mottle Texture, Concret Depth Matrix Color Mottle Colors Mottle Structure, etc.		
Depth to Saturated Soil:	nches	
Depth to Saturated Soit: 4(m.) FAC-Neutral Test Other (Explain in Remarks) SOILS Map Unit Name (Series and Phase): Mooreville-Kinston-Mantachie Drainage Class: Poorly Drained Faxonomy (Subgroup):		
SOILS Mooreville-Kinston-Mantachie Drainage Class: Poorly Drained Faxonomy (Subgroup): Field Observations: Confirm Mapped Type? Profile Description: Depth Matrix Color Mottle Colors Mottle Texture, Concret Inches) Horizon (Muncell Moist) Abundance/Contrast Structure, etc.		
Faxonomy (Subgroup): Field Observations: Profile Description: Confirm Mapped Type? Depth Matrix Color Mottle Colors Mottle Inches) Horizon (Muncell Moist) Abundance/Contrast Structure, etc.		
Faxonomy (Subgroup): Field Observations: Profile Description: Confirm Mapped Type? Depth Matrix Color Mottle Colors Mottle Inches) Horizon (Muncell Moist) Abundance/Contrast Structure, etc.		
Profile Description: Depth Matrix Color Mottle Colors Mottle Inches) Horizon (Muncell Moist) (Muncell Moist) Abundance/Contrast Structure, etc.		
Depth Matrix Color Mottle Colors Mottle Texture, Concret Inches) Horizon (Muncell Moist) Abundance/Contrast Structure, etc.	Yes No	
Inches) Horizon (Muncell Moist) (Muncell Moist) Abundance/Contrast Structure, etc.		
Inches) Horizon (Muncell Moist) (Muncell Moist) Abundance/Contrast Structure, etc.		
10 cl in contract official	nons,	
fydric Soil Indicators:		
Histosol Concretions	1.1.1.1	
Sulfidie Odor	ly Soils	
Aquic Moisture Regime X Listed on Local Hydric Soils List Reducing Conditions List		
X Gleyed or Low-Chroma Colors Other (Explain in wetland)		
VETLAND DETERMINATION		
lydrophytic Vegetation Present? Yes No Vetland Hydrology Present? Yes No		
ydric Soils Present? Yes No Is this Sampling Point within a Wetland?		
	Yes No.	
emarks: (use back if necessary)	Yes No	

Project/Site	e: Plant Site					Date:	03-07-0	07		
Application	n/Owner:						: Kempe	r		
Investigato	r: Terry Wh	itehurst & David Kno	owles			State:	Mississ	1		
Do Normal	l Circumstan	ces exist on the site?		Yes No			unity ID:	and the second s		
		disturbed (Atypical Si	ituation)?	Yes No		Transe				
	a potential Pr ed, explain or	roblem area? h reverse.)		Yes No		Plot ID	: Northw	/est		
VEGETAT										
Dominant I	Plant Species		Stratum	Indicator	Dominant Plant Species			Stratum	Indicate	
*Pinus taea	da		T	Fac				_		
Prunus ser	otina		T	Fac U						
llex vomito	ria		S	Fac						
Acer rubru	m		T	Fac	· · · · · · · · · · · · · · · · · · ·			_	(
Vaccinium	elliottii		S	Fac +						
Lonicera ja	iponica		H	Fac -						
Smilax glau	uca		Н	Fac						
Percent of I	OGY	ecies that are OBL, F Data (Describe in Re		C (excluding FAC-) <u>85%</u> Wetland Hydrology Indicate	and a			2	
		Stream, Lake, or Tid Aerial Photographs Other			Primary Indicators: Inundated Saturated in Upp Water Marks					
	No Record	ded Data Available			Drift Lines Sediment Depos Drainage Pattern	its in Wetland	•			
Field Obser	vations:				Dramage rater	is in wenand	3			
	h of Surface	Water:	N/A	(in.)	Secondary Indicators	2 or more p	equired).	1.1		
					Oxidized Root C	Secondary Indicators (2 or more required): Oxidized Root Channels in Upper 12 inches				
Depth	h of Free Wat	ter in Pit:	N/A	(in.)	Water-Stained L Local Soil Surve					
Depth	h to Saturated	t Soil:	N/A((in.)	FAC-Neutrai Ter Other (Explain i	st				
SOILS										
Map Unit N	lame (Series	and Phase);	Sweatman		Drainage Class:	Well D	rained			
Taxonomy (Subgroup):				Field Observatio Confirm Mapped			Yes 1	No	
Profile Desc	cription:									
Depth (Inches)	Horizon	Matrix Color (Muncell Moist)	Mottle Cold (Muncell N		Mottle Abundance/Contrast	Texture Structu	e, Concre ire, etc.	etions,		
0-6	· · · · · ·	5 yr 4/4	_				Clay Loa	am		
5-18		<u>5 yr 4/6</u>				Clay L	oam			
Index Port	Te di ser					-				
Hydric Soil	moreators;									
11111	Reducing				Concretions High Organic Content in Organic Streaking in Sa Listed on Local Hydric Listed on National Hydr Other (Explain in wetlan	ndy Soils Soils List ic Soils List	ver in San	dy Soils		
WETLAND) DETERMI	INATION								
and the second second	Vegetation	Present?	(Yes) N	No.						

*Sampling point was in a planted pine stand.

Project/Si	te: Plant Site	5	_			Date:	03-07-07	
Applicatio	on/Owner:					County	Kemper	
Investigat	or: Terry WI	nitehurst & David Kr	iowles			State:	Mississippi	
Do Norma	al Circumstan	ces exist on the site?		Yes No		Commu	inity ID:	
Is the site	significantly	disturbed (Atypical S	ituation)?	Yes No		Transec		
	a a potential P led, explain o			Yes No		Plot ID:	Northwest at edge of	f floodplain
VEGETA Dominant	TION Plant Species		Stratum	Indicator	Dominant Plant Species		Stratum	Indianta
Quercus a			T	Fac U	Ligustrum sinense		Stratum	Indicato Fac
Acer rubr			T	Fac			3	Pac
Liquidami	bar styraciflua	1	T	Fac +				
Liriodend	ron tulipifera		Т	Fac				
Vaccinium	elliottii		S	Fac				-
Chasmant	hium laxum		н	Fac W-				-
Juncus eff	usus		Н	Fac W+				-
Lonicera j	iaponica		Н	Fac				-
Depi Depi SOILS Map Unit ! Faxonomy	ervations: th of Surface th of Free Wal th to Saturated Name (Series (Subgroup):	ter in Pit: I Soil:	(i (i	n.)	Primary Indicators: Inundated X Saturated in Upp X Water Marks Drift Lines Sediment Depos X Drainage Pattern Secondary Indicators X Oxidized Root C X Water-Stained L X Local Soil Surve FAC-Neutral Tes Other (Explain in Drainage Class: Field Observatio Confirm Mapped	its is in Wetlands (2 or more re channels in Up eaves y Data st n Remarks) <u>Poorly</u> ns:	equired): oper 12 inches	No
Profile Des	scription:	7.0.2						
Depth (Inches) 0-18	Horizon	Matrix Color (Muncell Moist) 2.5 yr 3/2	Mottle Color (Muncell Mo		Mottle Abundance/Contrast	Structur	, Concretions, re, etc. Clay Loam	
Hydric Soi	Indicators:						July Doum	
E	Histosol Histic Epij Sulfidic O Aquic Moi Reducing				Concretions High Organic Content in Organic Streaking in Sar X Listed on Local Hydric Z Listed on National Hydr Other (Explain in wetlan	ndy Soils Soils List ic Soils List	er in Sandy Soils	
VETLAN	D DETERMI	NATION						
	c Vegetation I drology Prese s Present?		Yes No Yes No	0	Is this Sampling Point w	ithin a Wetlan	d? Yes	No

Remarks: (use back if necessary)

Investigator: Terry Whitelenst & David Knowles: Do Normal Creations exist of the hild? Solution on reverse.) Universe a potential Problem area? Uf neede.crpain on reverse.) Ves Contractions: Ves Contractions: Ves Contractions: Ves Contractions: Provide a solution on reverse.) Ves Contractions: Ves Contractions: Provide a solution on reverse.) Ves Contractions: Provide a solution on reverse.) Vestigation on reverse.) Vestigation reverse. Provide a solution on r	Project/Site: Pla Application/Own							03-08-07		
Do Normal Circumstances exist on the site? Yes So No Son Son Son Son Son Son Son Son Son So	1. C.		itahuret & David Ka	ouilar						
Is the site significantly disturbed (Atypical Situation)? Is the area a potential Poblem area? Is the area apotential poblem area? Is the area apotentis apotential poblem area? Is the area apotential poblem area? Is t							State:	Mississipp	Ŭ.	
Is the area a potential Problem area? If the area a potential Problem area? If the area a potential Problem area? If medde, explain on reverte. Prior 10. Southeast dmain (cut over) Prior 10. South							Commu	mity ID:		
If needed, explain on reverse.) Cleared, few campy trees remaining VEGETATION Cleared, few campy trees remaining VEGETATION T Daminant Plant Species Stratum Liquidandor styraciflua T T Fac Portrass nigo H Charman Plant Species H Addregoon virginicus H Handrogoon virginicus H Fac Provincionum control to the standard styracifluar development virginicus Markogoon virginicus H Parsa tunda (regen.) T T Fac Marko cerifera S Fac Stratum Lake, or Tide Gauge Marko cerifera S Stratum Lake, or Tide Gauge Stratum Lake, or Tide Gauge Marko cerifera Stratum Lake, or Tide Gauge Marko cerifera Inn. Stratum Lake, or Tide Gauge Stratum Lake, or Tide Gauge Marko cerifera Inn. Depth of Surface Water: (in.) Depth of Stratum Lake, or Tide Gauge Stratum Lake, or Tide Gauge Stratum Lake, or Tide Gauge Stratum Lake, or Tide Gauge	Is the site signific	cantly d	listurbed (Atypical S	ituation)?	(Yes) No		Transec	t ID:		
VEGETATION Deminant Plant Species Stratum Indicator Liquidambar styraciflua T Fac + Outros nigua T Fac + Prison Chuma Construction H Fac + Chasmanthian Learn H Fac + Plans tacka (regen.) T Fac + Online of Dominant Species that are OBL_FACW, or FAC (excluding FAC.) 90%. Prime value Outros or fac Gauge - Innulated			reverse.)		Q		Plot ID:	Southeast of	drain (cut	over)
Deminant Plant Species Stratum Indicator Liquidandor styracifiua T Fac + Smilex glanca H Acer unitary T Fac + Polystichum acrostichoides H Acer unitary T Fac + Polystichum acrostichoides H Acer unitary T Fac + Polystichum acrostichoides H Adropogon virginicus H Fac + Pelevitichum acrostichoides H Mattergen, J T Fac + Pelevitichum acrostichoides H Mattergen, J T Fac + Pelevitichum acrostichoides Pelevitichum acrostichoides Miria cerifera S Fac + Pelevitichum acrostichoides Pelevitichum acrostichoides Miria cerifera S Fac + Pelevitichum acrostichoides Pelevitichum acrostichoides Miria cerifera S Fac + Pelevitichum acrostichoides Pelevitichum acrostichoides Miria cerifera S Fac + Pelevitichum acrostichoides Pelevitichum acrostichoides Miria cerifera S Seconded Data (Describe in Remarks): Pelevitichum acrostichoides Pelevitichum acrostichoides	And the second		clearcut, few	canopy trees	s remaining					
Liquidamber styraciflua T Fac+ Sinitary Lanced Status Million Quertos infra T Fac Polystichum acrostichoides H Quertos infra T Fac Polystichum acrostichoides H Pace ruhrum T Fac Polystichum acrostichoides H Paras faced tregen.j H Fac Mathematical Status H Pinas faced tregen.j T Fac Softee Softee Charomathiam lacoum H Fac Softee Softee Charomathiam lacoum H Fac Softee Softee Charomathiam lacoum H Fac Softee Softee Primas face (tregen.j T Fac Softee Softee Myrica cerifera S Fac + Softee Softee Period Observations: Stream Lake, of Tide Gauge Acrial thoographis Primary fadicators: Primary fadicators: Marcial charage Softee Softee Softee Dorn false Depth of Surface Water: (in.) Scoondary Indicators (2 or more required): X Okaria State Charabes Marcial Choice Softee Marcial Choice Softee Marcial Choice Softee Softee Marcial Choice Softee Marcin Colo										
Queres signal T Fac Polystichun acrostichoides H Acer ruhrum T Fac H Acer ruhrum T Fac H Adtropogon virginicus H Fac H Autropogon virginicus H Fac H Pitus standa (tegen.) T Fac H Precent of Dominant Species that are OBL, FACW, or FAC (excluding FAC-) 90% H Mrica cerifera S Fac + H Precent of Dominant Species that are OBL, FACW, or FAC (excluding FAC-) 90% H HYBROLOGY Wetland Hydrology Indicators: Frimary Indicators: Maria Constructure Coher Scondary Indicators: Primary Indicators: Scondary Indicators: Coher Coher (Esplan in Remarks) Scondary Indicators: Coher (Esplan in Remarks) Depth of Surface Water in Fit: (in.) Scondary Indicators: Coher (Esplan in Remarks) Stutic				Stratum	Indicator	Dominant Plant Species		S	tratum	Indicate
Accr rubrum T Fac Proceedings Proceedings Productions signatures H Fac Proceedings Proceedings Productions signatures H Fac Proceedings Proceedings Productions signatures H Fac Proceedings Proceedings <td< td=""><td>Liquidambar styr</td><td>raciflua</td><td></td><td>T</td><td>Fac +</td><td>Smilax glauca</td><td></td><td></td><td>Н</td><td>Fac</td></td<>	Liquidambar styr	raciflua		T	Fac +	Smilax glauca			Н	Fac
Erionthus giganteus H Fac W Andropogn virginicus H Fac W Andropogn virginicus H Fac W Pinus tackad (regen.) T Fac Mirica certifera S Fac + Percent of Dominant Species that are OBL, FACW, or FAC (excluding FAC-) 90% MYROLOGY Mecorded Data (Describe in Remarks): 90% Morica certifera S Fac + Primery Indicators: Primary Indicators: Marting Company Mart Staturated in Upper 12 inches Mart Marks Drint Lines Water Marks Drint Lines Staturated Soil: 12 (in.) Secondary Indicators (2 or mor required): X Autore Staturated Soil: 12 (in.) Mare Marks Charlen Phase Water Marks Other Itsplain in Remarks) SollLS Matrix Color Map Unit Name (Series and Phase): Printinge Class: Poorly Drained Field Observations: Structure, concretions, Structure, etc. Applie Horizon Matrix Color Mottle Mare Marks Structure, etc. Sandy Loam	Quercus nigra	_		T	Fac	Polystichum acrostichoides		-	H	Fac
Andropagan virginicus H Fac Chasmadhium latam H Fac Chasmadhium latam H Fac Merica certifera S Fac Merica certifera S Fac + Percent of Dominant Species that are OBL, FACW, or FAC (excluding FAC-) 90% Myrica certifera S Fac + Percent of Dominant Species that are OBL, FACW, or FAC (excluding FAC-) 90% Myrica certifera Stream, Lake, or Tide Gauge Arenal Photographs Primary Indicators: Without the Colors No Recorded Data Available No Recorded Data Available Dirit Lines Field Observations; Scondary Indicators (2 or more required); X Oxidired Root Channels in Upper 12 inches Matrix Color (in.) X SOILS Matrix Color Mortle Colors Matrix Color Mureel Moist) Mortle Colors Muncell Moist) Muncell Moist) Mondance/Contrast Androny Indicators: Structure, etc. Matrix Color Mortle Colors Mortle Matrix Color Mureell Moist) Montle S	Acer rubrum			T	Fac					1
Charmanthium Laxum H Fac Pinus tacka (tregen.) T Fac Price certifera S Fac Percent of Dominant Species that are OBL, FACW, or FAC (excluding FAC:) 90% MYDROLOGY Primary Indicators: Primary Indicators: Primary Indicators: Acreal Photographs Inundated Other No Recorded Data (Describe in Remarks): Primary Indicators: Mark Marks Drift Lines Inundated Water Marks Drift Lines Water Marks Depth of Surface Water: (in.) X Outper 12 inches X Water Marks Drinnage Patterns in Wetlands Scoondary Indicators (2 or more required); X Outper 2 inches X Water Marks Depth of Surface Water: (in.) X Outper 12 inches X Water Marks Outper 12 inches X Mark Marks Dial Marks Outper 12 inches X Water Marks Outper 12 inches X Vater Marks Depth of Surface Water: [in.] X Outper 12 inches Mark Marks Concretio	Erianthus gigante	eus		H	Fac W					
Privas tateda (regen.) T Fac Merica cerifera S Fac + Percent of Dominant Species that are OBL, FACW, or FAC (excluding FAC-) 90% Merica cerifera S Fac + Percent of Dominant Species that are OBL, FACW, or FAC (excluding FAC-) 90% Merica cerifera Stream, Lake, or Tide Gauge Primary Indicators: Achal Photographs Stream, Lake, or Tide Gauge Primary Indicators: Other Other Stream Identificators: No Recorded Data Available Derin Photographs Stream Identificators: Depth of Surface Water: (in.) X Stream Identificators (2 or more required); X Oxidized Not Charles Water Stained Leaves Water Stained Leaves Depth of Sarface Water: (in.) X Oxidized Not Charles Water Stained Leaves May Unit Name (Series and Phase): Inc. Drainage Class: Poorly Drained Field Observations: Poorly Drained Field Observations: Structure, etc. Map Unit Name (Series and Phase): Mortic Colors Mortic Mortic Structure, etc. Maptin Dispretor Matrix Color Mortis <td>Andropogon virgi</td> <td>inicus</td> <td></td> <td>H</td> <td>Fac -</td> <td></td> <td></td> <td></td> <td></td> <td></td>	Andropogon virgi	inicus		H	Fac -					
Myrica cerifera S Fac + Percent of Dominant Species that are OBL, FACW, or FAC (excluding FAC-) 90% HYDROLOGY Recorded Data (Describe in Remarks): Wetland Hydrology Indicators:	Chasmanthium la	xum		Н	Fac W-					
Myrica cerifera S Fac + Percent of Dominant Species that are OBL, FACW, or FAC (excluding FAC-) 90% HYDROLOGY Recorded Data (Describe in Remarks): Primary Indicators:	Pinus taeda (rege	en.)		T						
Percent of Dominant Species that are OBL, FACW, or FAC (excluding FAC-) HYDROLOGY Recorded Data (Describe in Remarks): Arenal Photographs Aren										
Profile Description: Depth Matrix Color Mottle Colors Mottle Abundance/Contrast Texture, Concretions, Structure, etc. 10 yr 3/1 10 yr 3/1 Sandy Loam Sandy Loam 10 yr 5/1 7.5 yr 5/8 common/distinct Sandy Loam 4 10 yr 5/1 7.5 yr 5/8 common/distinct Sandy Loam 4 10 yr 5/1 7.5 yr 5/8 common/distinct Sandy Loam 4 10 yr 5/1 7.5 yr 5/8 common/distinct Sandy Loam 4 10 yr 5/1 7.5 yr 5/8 common/distinct Sandy Loam 4 10 yr 5/1 7.5 yr 5/8 common/distinct Sandy Loam 4 10 yr 5/1 7.5 yr 5/8 common/distinct Sandy Loam 4 10 yr 5/1 7.5 yr 5/8 common/distinct Sandy Loam 4 Histosol Histo Color Concretions Up reserveryContent in Surface Layer in Sandy Soils 5 Sulfidic Odor Congranic Streaking in Sandy Soils List Dreaking in Sandy Soils List Dreaking in Sandy Soils List 4 Gleyed or Low-Chroma Colors Cother (Explain in wetland)	Field Observations Depth of Su Depth of Fro Depth to Sat SOILS Map Unit Name (S	Record IS: Inface V ee Wate turated Series a	Stream, Lake, or Tid Aerial Photographs Other ed Data Available Vater: er in Pit: Soil:	le Gauge (in.)	Primary Indicators: Inundated X Saturated in Upp Water Marks Drift Lines Sediment Depos X Drainage Pattern Secondary Indicators X Oxidized Root C X Water-Stained Lt X Local Soil Surve FAC-Neutral Tes Other (Explain in Drainage Class:	ber 12 inches its is in Wetlands (2 or more r hannels in Up eaves y Data it n Remarks) Poorly I	equired); oper 12 inch	ies	
Depth Inches) Matrix Color (Muncell Moist) Mottle Colors (Muncell Moist) Mottle Abundance/Contrast Texture, Concretions, Structure, etc. 10 yr 3/1 10 yr 3/1 Sandy Loam Sandy Loam 1-18 10 yr 5/1 7.5 yr 5/8 common/distinct Sandy Loam 4 10 yr 5/1 7.5 yr 5/8 common/distinct Sandy Loam 4 10 yr 5/1 7.5 yr 5/8 common/distinct Sandy Loam 4 10 yr 5/1 7.5 yr 5/8 concretions sandy Loam 4 Histic Eppedon Sulfidic Odor Sulfidic Odor Sulfidic Odor High Organic Content in Surface Layer in Sandy Soils Aquic Moisture Regime Listed on Local Hydric Soils List Listed on Local Hydric Soils List Usted on Local Hydric Soils List X Gleyed or Low-Chroma Colors Yes <no< td=""> No Other (Explain in wetland) VertLAND DETERMINATION Yes No No Yes No No</no<>	faxonomy (Subgro	oup):				Confirm Mapped	Type?	1	Yes (10
Depth Inches) Matrix Color (Muncell Moist) Mottle Colors (Muncell Moist) Mottle Abundance/Contrast Texture, Concretions, Structure, etc. 04 10 yr 3/1 7.5 yr 5/8 Sandy Loam 10 yr 5/1 7.5 yr 5/8 common/distinct Sandy Loam 44 10 yr 5/1 7.5 yr 5/8 common/distinct Sandy Loam 4/dric Soil Indicators:	Profile Description	1:								
L18 10 yr 5/1 7.5 yr 5/8 common/distinct Sandy Loam Aydric Soil Indicators:	Inches) Hori	izon	(Muncell Moist)				Structure	e, etc.	ns,	
Hydric Soil Indicators: Concretions Histosol High Organic Content in Surface Layer in Sandy Soils Sulfidic Odor Organic Streaking in Sandy Soils Aquic Moisture Regime Listed on Local Hydric Soils List Reducing Conditions Listed on National Hydric Soils List X Gleyed or Low-Chroma Colors Other (Explain in wetland) VETLAND DETERMINATION Yes No Hydrophytic Vegetation Present? Yes No	1-18			7.5 yr 5/8		common/distinct				_
Histosol Histic Epipedon Sulfidic Odor Aquic Moisture Regime Reducing Conditions Televent 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) Concretions VETLAND DETERMINATION Vdrog Soils Versent? Vers No							Salidy D	oam		_
VETLAND DETERMINATION Index State St	Histo Histo Sultio Aqui Redu	osol ic Epipe dic Ode ic Mois icing C	or ture Regime onditions			High Organic Content in Organic Streaking in Sar Listed on Local Hydric S Listed on National Hydr	idy Soils Soils List ic Soils List	er in Sandy	Soils	
Vetland Hydrology Present? Yes No	VETLAND DETI	ERMI	NATION							
	etland Hydrology	y Preser		Yes N	0	Is this Sampling Point w	ithin a Wetlan	id? 🖸	(es 1	No

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; <u>http://www.fws.gov/southeast/jackson/index.html</u>). 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 identified 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. Redcockaded 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.

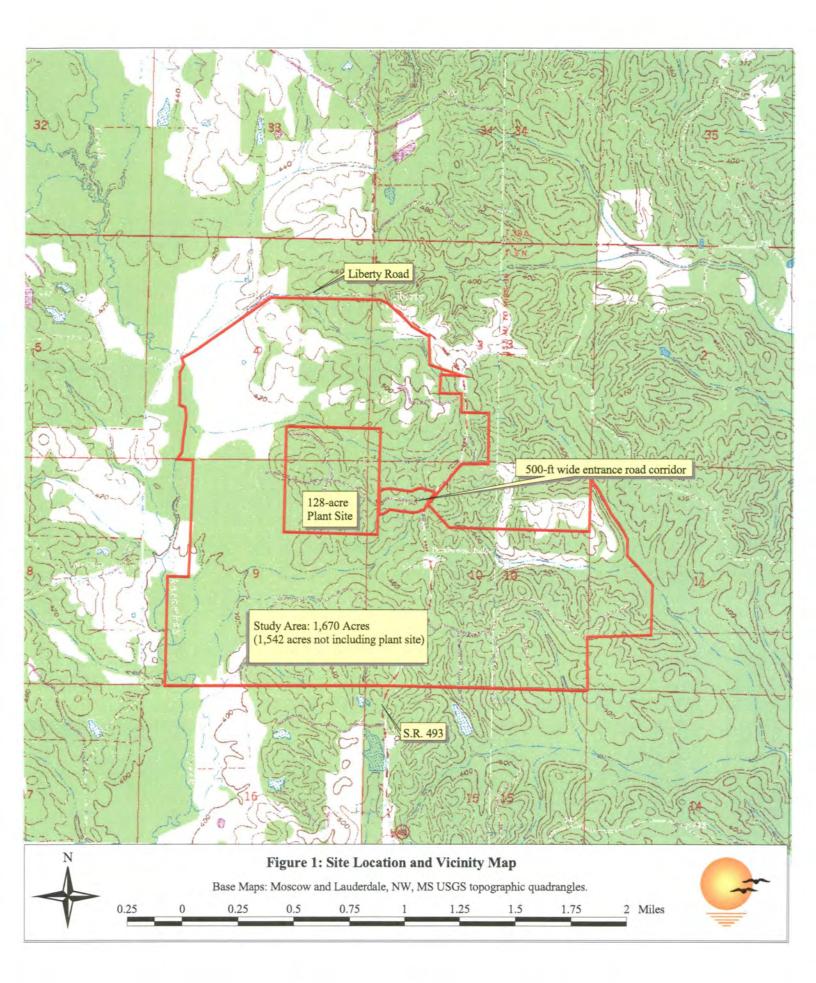
Rainbow Snake (Farancia erytrogramma)

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.

LITERATURE CITED

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. Geologica Survey (map scale 1:1,000,000).

- Conant, R. and Joseph T. Collins. 1998. Reptiles and Amphibians. Eastern/Central North America. Peterson Field Guide Series. Houghton Miflin Company. Boston, MA and New York, NY.
- Conner, Richard N., D. Craig Rudolph, and Jeffrey R. Walters. 2001. The Red-cockaded Woodpecker: Surviving in a Fire Maintained Ecosystem. University of Texas Press, Austin.
- Ernst, C.H., J. E. Lovich, and R. W. Barbour. 1994. Turtles of the United States and Canada. Smithsonian Institution Press, Washington, D.C.
- Ernst, C.H., and Evelyn M. Ernst. 2003. Snakes of the United States and Canda. Smithsonian Institution Press, Washington, D.C.
- Kral, R. 1983. A report on some rare, threatened or endangered forest related vascular plants of the south. Atlanta, GA: U.S. Forest Service. p.718. USFS technical publication R8-TP2, . Vol. 1.
- NatureServe. 2006. NatureServe Explorer: An online encyclopedia of life [web application]. Version 6.1. NatureServe, Arlington, Virginia. Available http://www.natureserve.org/explorer. (Accessed: March 28, 2007).

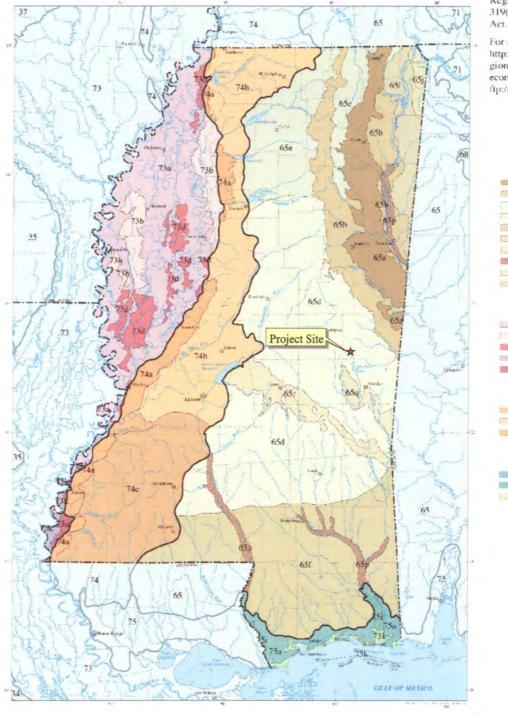


Ecoregions of Mississippi

PRINCIPAL AUTHORS: Shannen S. Chapman (Dynamae Corporation), Glenn E. Griffith (Dynamae 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., Reiser, 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/ecore gions.htm. Digital files of the Mississippi ecoregion boundaries can be downloaded from ftp://ftp.epa.gov/wed/ecoregions/ms.



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:

 The leaves are larger, the leaflets usually with one pair more.
 The standard petal (uppermost petal) is larger, pink or with yellow-green tints rather than purple-maroon (as in <u>A. americana</u>), bearing at its tip a thickened, mucro-like appendage. In <u>A. americana</u> the standard tip is blunt, even emarginate. 3. The fruits are longer, with the shorter ones about equal to the longest ones produced by <u>A</u>. <u>american</u>a.

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.

References

Gleason, H. A. 1952. Illustrated flora, ed. 3, Vol. 11: 448-449. New York.

Small, J.K. 1933. Manual of the southeastern flora, p. 723. Chapel Hill, N.C.

	Management Practices									
Expected* Effect on the Species	Prescribe Burn	Bulldoze or Root Rake	Bed	Chop	Thin over- story	Cut over- story	Establish Plantation	Graze		
Destroy		Х	NA	NA						
Damage					Х	X		3		
No Lasting Effect										
Beneficial if Done Properly	Х									

SPECIES Apios priceana B.L. Robinson

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.







0

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 State/Province Conservation Status Presumed Extirpated Possibly Zas YT Extirpated NR I NT Critically Imperiled S2: Imperiled BC S3: Vulnerable AB 80 SK ON ME I Apparently 94 Secure 14.8 S5 Secure ы ND OR Not 1D SD Ranked/Under w Review (SNR/SU) IA NE NY UT 00 CA NC MO KS Conservation 50 Status OK AR AZ G/ NBJ. 10 Not Applicable (SNA) Ū, TX Exotic Hybrid without Conservation Value

U.S. & Canada State/Province Distribution United States AL, ILP, 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) (2) State County Name (FIPS Code) Autauga (01001), Dallas (01047), Jackson (01071), Lawrence (01079), Madison (01089), Marshall (01095)

MS	Calloway (21035), Livingston (21139), Lyon (21143), Marshall (21157), Trigg (21221) 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)

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 entiremargined, 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 vemalization 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, Melliotus 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

3

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)

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).

References

0

Ø

Not yet assessed

- Bowles, M.L., et al. 1991. Rarely seen endangered plants, rediscoveries, and species new to Illinois. Erigenia 11:27-51.
- Browne, E.T. and R. Athey. 1976. Herbarium and field studies of Kentucky plants. III. New or rare flowering plants in western Kentucky, J. Elisha Mitchell Soc. 92: 104-109.
- Chester, E.W. and S.E. Holt. 1990. An update on Price's potato bean. Kentucky Native Plant Society Newsletter. 5(1): 7-8.
- Emanuel, C. M. 1998. Sadie Price's Potato-bean. Alabama's Threatened and Endangered Species. Available ONLINE: http://www.forestry.state.al.us/publication/TF_publications/endangered/potatobean.htm. Accessed July 2004.
- Herkert, Jim. 1998. Proposed additions, deletions, and changes to the Illinois List of Threatened and Endangered Plants. 100th ESPB Meeting, May 15, 1998. 12pp.
- Isely, D. 1990. Vascular flora of the southeastern United States. Vol. 3, Part 2, Leguminosae (Fabaceae), Univ. North Carolina Press, Chapel Hill, 258 pp.
- Isely, D. 1998. Native and naturalized Leguminosae (Fabaceae) of the United States (exclusive of Alaska and Hawaii). Monte L. Bean Life Science Museum, Brigham Young University; MLBM Press, Provo, Utah. 1007 pp.
- 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.
- · Kral, R. 1983. A report on some rare, threatened or endangered forest related vascular plants of the south. USFS technical

publication R8-TP2, Atlanta, GA. Vol. 1: 718 pp.

- Kral, R. 1983. A report on some rare, threatened, or endangered forest-related vascular plants of the South. U.S. Dept. of Agriculture Forest Service Technical Publication R8-TP2, Athens, GA. 1305 pp.
- MAHLER, W.F. 1970. MANUAL OF THE LEGUMES OF TENNESSEE. J. OF THE TENN. ACAD. OF SCI. 45(3):65-96.
- Medley, M.E. 1980. Status report on Apios priceana. Unpublished report for U.S. Fish and Wildlife Service contract #14-16-0004-79-105.
- Mohlenbrock, R.H. and J.W. Voigt. 1965. An annotated checklist of vascular plants of the Southern Illinois University Pine Hills field station and environs. Trans. III. State Acad. Sci. 58:268-301.
- Norquist, C. 1990. Endangered and threatend wildlife and plants; threatened status for Apios priceana (Price's potato-bean). Federal Register 55(4): 429-432.
- Pickering, J. 1989. A collection of rare species from Missouri and surrounding states, displayed of the Missouri Botanical Garden. Guide prepared for The Genetics of Rare Plant Conservation: A Conference on Integrated Strategies for Conservation and Management.
- Pyne, M., M. Gay, and A. Shea. 1995. Guide to rare plants Tennessee Division of Forestry District 4. Tennessee Dept. Agriculture, Division of Forestry, Nashville.
- Robinson, B.L. 1898. A new species of APIOS from Kentucky. Bot. Gaz. 25:450-453.
- Robinson, B.L. 1898. A new species of Apios from Kentucky. Bot. Gazette 25: 450-453.
- Seabrook, J.A.E. 1973. A biosystematic study of the genus Apios Fabricius (Leguminosae) with special reference to Apios
 americana Medikus. M.S. Thesis, University of New Brunswick, Fredericton.
- Seabrook, J.A.E. and L.A. Dionne. 1976. Studies on the genus Apios. I. Chromosome number and distribution of Apios americana and A. priceana. Can. J. Bot. 54: 2567-2572.
- Seebrook, J.A.E. and L.A. Dionne. 1976. Studies in the genus APIOS I. Chromosome number and distribution of APIOS AMERICANA and APIOS PRICEANA. Canad. J. Bot. 54:2567-2572.
- Somers, P. 1982. Tennessee element state ranking form. Unpublished Tennessee Natural Heritage Program report. 1 p.
- U.S. Fish and Wildlife Service. 1989. Listing proposals. Endangered Species Tech. Bull. 24(6): 4-5, 11.
- U.S. Fish and Wildlife Service. 1989. USFWS Redbook of Endangered and Threatened Species. Great Lakes Region.
- Walter, William M., et al. 1981. Compositional study of Apios priceana Tubers. Journal of Agriculture & Food Chem- istry, 34 (1):39-41.
- White, J. 1981. Illinois state element ranking form. Illinois Natural Heritage Inventory unpublished report. 1 p.
- Winterringer, G.S. 1951, New and infrequently collected Illinois plants. Amer. Midl. Nat. 45:504-506.

Use Guidelines & Citation

Use Guidelines and Citation

The Small Print: Trademark, Copyright, Citation Guidelines, Restrictions on Use, and Information Disclaimer.

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

Trademark Notice: "NatureServe", NatureServe, NatureServe Explorer, The NatureServe logo, and all other names of NatureServe programs referenced herein are trademarks of NatureServe. Any other product or company names mentioned herein are the trademarks of their respective owners.

Copyright Notice: Copyright © 2006 NatureServe, 1101 Wilson Boulevard, 15th Floor, Arlington Virginia 22209, U.S.A. All Rights Reserved. Each document delivered from this server or web site may contain other proprietary notices and copyright information relating to that document. The following citation should be used in any published materials which reference the web site.

Citation for data on website including Watershed and State Distribution maps:

NatureServe. 2006. NatureServe Explorer: An online encyclopedia of life [web application]. Version 6.1. NatureServe, Arlington, Virginia. Available http://www.natureserve.org/explorer. (Accessed: March 28, 2007).

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.

Restrictions on Use: Permission to use, copy and distribute documents delivered from this server is hereby granted under the following conditions:

- 1. The above copyright notice must appear in all copies;
- 2 Any use of the documents available from this server must be for informational purposes only and in no instance for commercial purposes;
- Some data may be downloaded to files and altered in format for analytical purposes, however the data should still be referenced using the citation above;
- 4. No graphics available from this server can be used, copied or distributed separate from the accompanying text. Any rights not expressly granted herein are reserved by NatureServe. Nothing contained herein shall be construed as conferring by implication, estoppel, or otherwise any license or right under any trademark of NatureServe. No trademark owned by NatureServe may be used in advertising or promotion pertaining to the distribution of documents delivered from this server without specific advance permission from NatureServe. Except as expressly provided above, nothing contained herein shall be construed as conferring any license or right under any NatureServe copyright.

Information Warranty Disclaimer: All documents and related graphics provided by this server and any other documents which are referenced by or linked to this server are provided "as is" without warranty as to the currentness, completeness, or accuracy of any specific data. NatureServe hereby disclaims all warranties and conditions with regard to any documents provided by this server or any other documents which are referenced by or linked to this server, including but not limited to all implied warranties and conditions of merchantibility, fitness for a particular purpose, and non-infringement. NatureServe makes no representations about the suitability of the information delivered from this server or any other documents that are referenced to or linked to this server. In no event shall NatureServe be liable for any special, indirect, incidental, consequential damages, or for damages of any kind arising out of or in connection with the use or performance of information contained in any documents provided by this server or in any other documents which are referenced by or linked to this server, under any theory of liability used. NatureServe may update or make changes to the documents provided by this server at any time without notice; however, NatureServe makes no commitment to update the information contained herein. Since the data in the central databases are continually being updated, it is advisable to refresh data retrieved at least once a year after its receipt. The data provided is for planning, assessment, and informational purposes. Site specific projects or activities should be reviewed for potential environmental impacts with appropriate regulatory agencies. If ground-disturbing activities are proposed on a site, the appropriate state natural heritage program(s) or conservation data center can be contacted for a site-specific review of the project area (see Visit Local Programs).

Feedback Request: NatureServe encourages users to let us know of any errors or significant omissions that you find in the data through (see Contact Us). Your comments will be very valuable in improving the overall quality of our databases for the benefit of all users.



Version 6 1 (9 November, 2006) Ecological systems data last up dated 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.

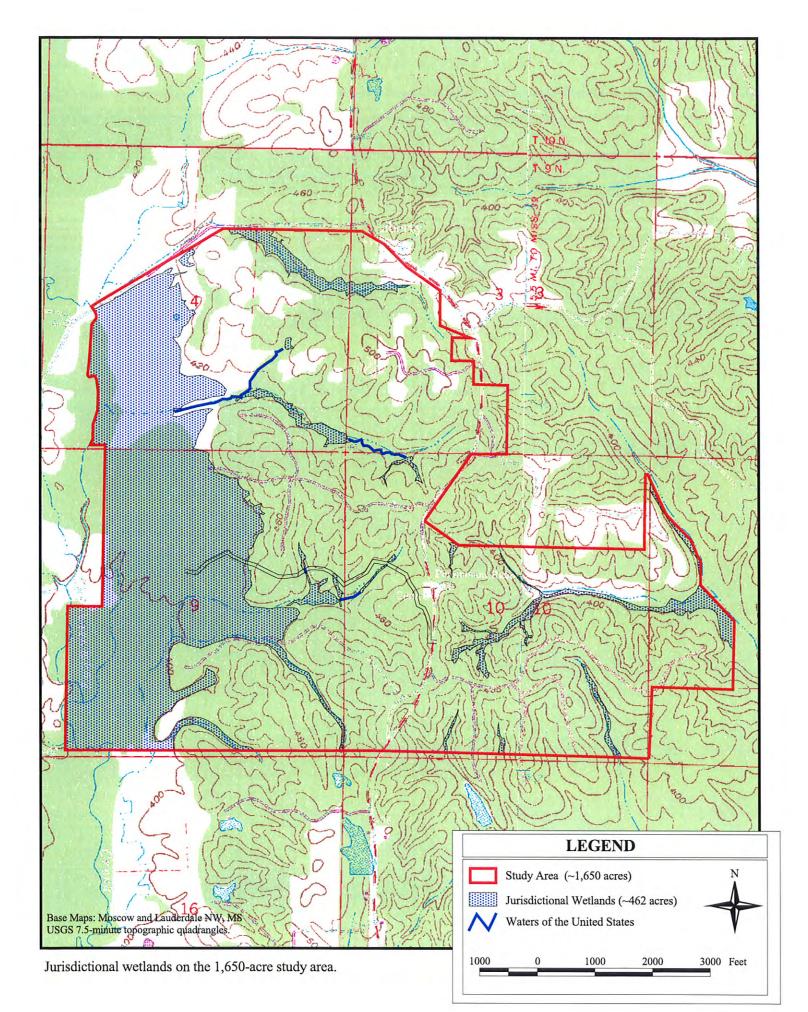
WETLAND SURVEY OF THE 1,650-ACRE PLANT SITE

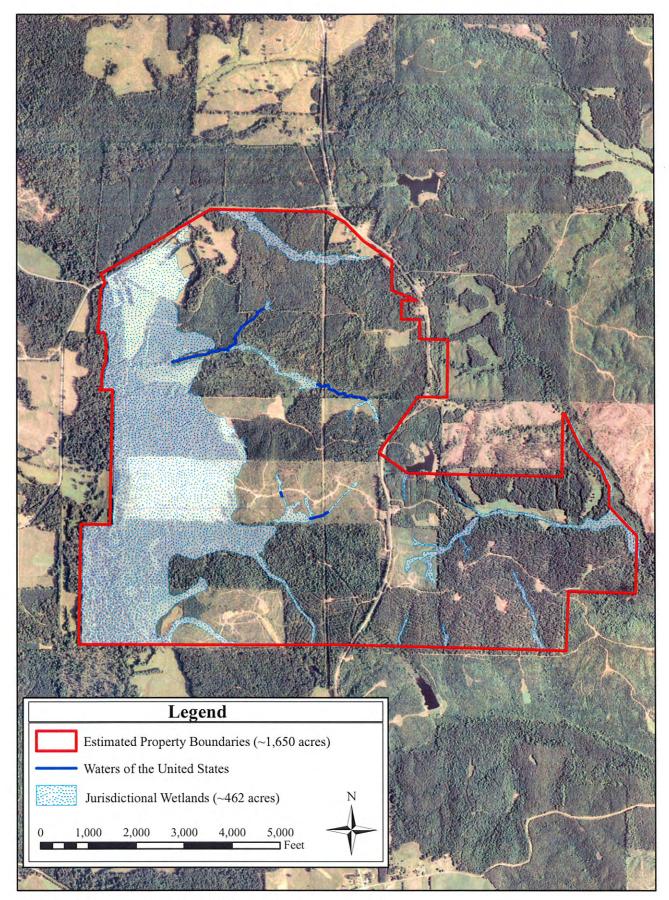
Vittor & Associates delineated and mapped a total of 462 acres of jurisdictional wetlands within the 1,650-acre plant site property. The wetlands within the initial 128-acre study area were the first to be surveyed and were altered by human influences. A 14.5-acre floodplain wetland encroaches into the 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 aquatica*) 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, reddishbrown, sandy clay and slopes ranged from 5 to 35 percent.





2006 Aerial Imagery from the National Agriculture Imagery Program

Project/Site: Mississippi Power IGCC							Date: 07-24	-07			
Application/Owner: Investigator: T. Whitehurst & J. Everett						County: Kemper					
					••••••	State: MS					
		es exist on the site?		Yes No			Community ID:				
Is the site sig	gnificantly di	isturbed (Atypical Sit	uation)?	Yes (No			Transect ID:		<u> </u>		
Is the area a g (If needed	potential Pro , explain on	oblem area? reverse.)		Yes No			Plot ID: <u>Data F</u>	Point D1	·		
VEGETATI	ON										
<u>Dominant Pl</u>	ant Species		<u>Stratum</u>	<u>Indicator</u>	<u>Dominan</u>	t Plant Species		<u>Stratum</u>	<u>Indicator</u>		
Liquidambar	Liquidambar styraciflua T			Fac	Smilax ro	tundifolia		<u> </u>	Fac		
Pinus taeda			T	Fac U-				<u> </u>	<u> </u>		
Carya alba		<u></u>	T	Fac U+							
Acer rubrum	1		<u> </u>	Fac U							
Diospyros vi	rginiana		Т	Fac U+							
Aralia spino:	sa		<u> </u>	Fac							
Asplenium p	latyneuron	······	<u> </u>	Fac U							
Quercus phe	llos		<u> </u>	Fac W-	·						
Percent of Da HYDROLO	GY Recorded	ccies that are OBL, F Data (Describe in Re Stream, Lake, or Tid Aerial Photographs	marks):	C (excluding FAC	Wetland	70% Hydrology Indicators: imary Indicators: Inundated			-		
	No Record	Other led Data Available				Saturated in Upper Water Marks Drift Lines Sediment Deposits Drainage Patterns i					
Field Observ		17.4		<i></i>				Χ.			
Depth	of Surface \	warer:		(in.)	26	condary Indicators (2 - Oxidized Root Cha	or more required innels in Upper 12	inches			
Depth	of Free Wat	er in Pit:	((iu.)	_	Water-Stained Leaves					
Depth	to Saturated	l Soil:	((in.)	FAC-Neutral Test Other (Explain in Remarks)						
SOILS											
Map Unit Na	ame (Series	and Phase):				Drainage Class:	Somewhat po	orly drained	-		
Taxonomy (S	Subgroup):					Field Observations Confirm Mapped T		Yes (No		
D. 61 D.	•							6			
Profile Desci	nption:										
Depth		Matrix Color	Mottle Col	ors	Mottle		Texture, Cone	cretions,			
(Inches)	<u>Horizon</u>	(Muncell Moist)	(Muncell M	loist)	<u>Abundan</u>	ce/Contrast	Structure, etc				
0-6		10 yr 5/3					Sandy Clay	<u>.</u>	<u></u>		
6-12		10 yr 6/4					Sandy Clay				
12-18		10 yr 7/2 7/3	·····				Sandy Clay L	oam			
Hydric Soil I	Histosol Histic Epi Sulfidic O Aquic Mo	dor isture Regime				oncretions gh Organic Content in S ganic Streaking in Sand sted on Local Hydric So	ly Soils iils List	andy Soils			
WETLAND	Gleyed or					sted on National Hydric her (Explain in wetland)					
Hydrophytic Wetland Hyd Hydric Soils	drology Pres		Yes Yes Yes	No. No.	Is	this Sampling Point wit	hin a Wetland?	Yes	N		

BARRY A. VITTOR ASSOCIATES, INC.

Remarks: (use back if necessary)

Project/Site: Mississippi Power IGCC		Date: 07-24-07					
Application/Owner.		Connty: Kemper					
Investigator:		State: MS					
Do Normal Circumstances exist on the site?	Yes N	Community ID:					
Is the site significantly disturbed (Atypical Sit	ਦ /						
is the area a potential Problem area?	Yes X	Plot ID: Data Point D2					
(If needed, explain on reverse.)							
VEGETATION							
Dominant Plant Species	Stratum Indicator						
Pinus taeda	<u> </u>	<u>Toxicodendron radicans</u> HFac					
Liquidambar styraciflua	T Fac +						
Cdnea alba	<u> </u>						
Callicaupa americana	H Fac U-						
Vaccinium elliottii	<u>S</u> <u>Fac +</u> T Fac -						
llex opaca Ulnus americana	<u> </u>						
Asplenium platyneuron	H Fac U						
Percent of Dominant Species that are OBL, FA	ACW, or FAC (excluding F	AC-) <u>70%</u>					
HYDROLOGY							
Recorded Data (Describe in Re	marks):	Wetland Hydrology Indicators:					
Stream, Lake, or Tide	e Gauge	Primary Indicators:					
Aerial Photographs Other		Inundated Saturated in Upper 12 inches					
No Decended Date Assillable		X Water Marks					
No Recorded Data Available		Drift Lines Sediment Deposits					
		Drainage Patterns in Wetlands					
Field Observations:							
Depth of Surface Water:	<u>N/A</u> (in.)	Secondary Indicators (2 or more required): X Oxidized Root Channels in Upper 12 inches					
Depth of Free Water in Pit:	<u>N/A</u> (in.)	Water-Stained Leaves Local Soil Survey Data					
Depth to Saturated Soil:	<u>N/A</u> (in.)	FAC-Nentral Test					
		Other (Explain in Remarks)					
SOILS							
Map Unit Name (Series and Phase):		Drainage Class: Very Poorly					
Taxonomy (Subgroup):		Field Observations: Confirm Mapped Type? Yes No.					
	· · · · · · · · · · · · · · · · · · ·						
Profile Description:							
Depth Matrix Color	Mottle Colors	Mottle Texture, Concretions,					
(Inches) Horizon (Muncell Moist)	(Muncell Moist)	Abundance/Contrast Structure, etc.					
0-18 10 yr 6/2	7.5 yr 4/4	<u>C/D</u> Sandy Clay					
<u>Hydric Soil Indicators:</u>							
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? Wetland Hydrology Present? Hydric Soils Present?	No No No	ls this Sampling Point within a Wetland? <u>Yes</u> No					

Remarks: (use back if necessary)

-		i Power IGCC			<u> </u>		Date: 07-25			
Application/					<u></u>	County: Kemper				
-		urst & J. Everett		<u> </u>	·		State: MS			
		es exist on the site?		Yes No						
is the site sig	inificantly di	sturbed (Atypical Site	uation)?	Yes No			Transect ID:			
Is the area a (If needed	potential Pro , explain on			Yes 🚺			Plot ID: Data H	Point D3		
VEGETATI Dominant Pla			<u>Stratum</u>	Indicator	Dominar	t Plant Species		<u>Stratum</u>	Indicator	
Pinus taeda			T	Fac	Nyssa sy	lvatica		Т	Obl	
Liquidambar	styraciflua		Т	Fac +						
Quercus nigr	a		Т	Fac						
Carya alba			T	Upl						
Quercus stell	lata		<u> </u>	Fac U						
Vaccinium el	liottii		S	Fac U				<u> </u>		
Calicarpa an	nericana		<u> </u>	Fac U-						
llex opaca			<u> </u>	Fac						
HYDROLO Field Observ Depth Depth Depth	GY Recorded	er in Pit: Soil: r onl y in deeper scour	marks): e Gauge ((((pools)	(excluding FAC- in.) in.) illsite Rock Oute	Wetland Pi Se	50% Hydrology Indicators: inundated Saturated in Upper 1 Water Marks Drift Lines Sediment Deposits Drainage Patterns in water-Stained Leave Local Soil Survey D FAC-Neutral Test Other (Explain in Re Drainage Class: Field Observations: Confirm Mapped Ty	Wetlands r more required nels in Upper 12 sa ata amarks) <u>Moderately V</u>	l inches		
Profile Descr Depth (Inches)	<u>iption:</u> Horizon	Matrix Color (Muncell Moist)	Mottle Colc (Muncell M	-	Mottle Abundar	ice/Contrast	Texture, Con Structure, etc			
0-6	11214620	7.5 yr 4/4	ALL SHOULD IN		1100100		Clay	· · · · ·		
6-18		7.5 yr 4/6					Clay			
								··· ··		
Hydric Soil I	ndicators:									
	Reducing					oncretions igh Organic Content in St rganic Streaking in Sandy sisted on Local Hydric Soi isted on National Hydric S ther (Explain in wetland)	Soils Is List	andy Soils		
WETLAND	DETERM	INATION								
Hydrophytic Wetland Hyd Hydric Soils Remarks: (us	Vegetation I Irology Press Present?	Present? ent?	Yes Yes Yes		Is	this Sampling Point with	in a Wetland?	Yes (No	
		-								

Project/Site: Application/0		oi Power IGCC				Date: County:	07-25-0 Kemper				
Investigator:	T. Whiteh	urst & J. Everett				State: MS					
Do Normal C	Circumstane	es exist on the site?		Yes №		Commu	mity ID:				
Is the site sig	nificantly di	isturbed (Atypical Sit	uation)?	Yes No		Transec	: ID:				
Is the area a (If needed)	potential Pro , explain on			Yes No		Plot ID:	Data Po	oint D4			
VEGETATI	ON										
Dominant Pla			Stratum	Indicator	Dominant Plant Species			<u>Stratum</u>	Indicator		
Paspalum no	•		H	Fac U+	Bonnian Flan Operes			onutern	moreator		
Juncus effusi			н	Fac W+	•••••						
Hypericum h			н	Fac							
Liquidambar			 S	Fac +	· · · · · · · · · · · · · · · · · · ·		<u> </u>				
Sorghum hal			<u></u> н	Fac U	·						
<u></u>			<u> </u>								
Percent of De	ominant Spe	ecies that are OBL, Fa	ACW, or FAC	(excluding FAC	-) <u>60%</u>				_		
HYDROLO	GY										
	Recorded	Data (Describe in Re	marks):		Wetland Hydrology Indicators						
		Stream, Lake, or Tid	-		Primary Indicators:						
	X	Aerial Photographs Other	-		<u> </u>	10 inchas					
					Water Marks	12 menes					
	No Recon	led Data Available			Drift Lines Sediment Deposits						
					X Drainage Patterns		5				
<u>Field Observ</u> Depth	<u>ations:</u> of Surface V	Water	<u>N/A (</u> i	n.)	Secondary Indicators (2	or more re	quired):				
Depth	of Free Wat	er in Pit:	N/A (i	n.)	Oxidized Ront Channels in Upper 12 inches X Water-Stained Leaves						
					Local Soil Survey Data						
Depth	to Saturated	i Soil:	<u>N/A</u> (i	n.)	FAC-Neutral Test Other (Explain in 1	Remarks)					
(Sta	anding water	r only in deeper scou	r pools.)			,					
Map Unit Na	me (Series :	and Phase):	Muskellunge !	Silt Loam	Drainage Class:	Poorly	Drainec	1			
Taxonomy (S	Subgroup):	3-8% Slopes; MwI	3		Field Observations Confirm Mapped 7			Yes 🤇	- 10		
Profile Descr	ription:										
Depth		Matrix Color	Mottle Colo	rc	Mottle	Textus	. Coner	etions			
(Inches)	Horizon	(Muncell Moist)	(Muncell M		Abundance/Contrast		Texture, Concretions, Structure, etc.				
0-18	HOHLOH	2.5 yr 6/2	7.5 yr 5/8	olacy	C/D		Clay Lo	am			
<u> </u>		2.0 91 0.2	<u>- 110 ji bio</u>	-		oundy	Ciuj Eo	GIII			
					· · · · · · · · · · · · · · · · · · ·						
		·			······						
Hydric Soil I	Indicators:										
	Histosol				Concretions			1.0.11			
	Histic Epi Sulfidic O				High Organic Content in Sand Organic Streaking in Sand		er in Sar	idy Soils			
		isture Regime			Listed on Local Hydric So	oils List					
		Conditions Low-Chroma Colors			Listed on National Hydric Other (Explain in wetland						
WETLAND						-					
				í.							
Hydrophytic Wetlaud Hyd Hydric Soils	Irology Pres		Yes N	(o (o (o	Is this Sampling Point wit	hìn a Wetla	ind?	Yes	No		
Remarks: (us	se back if ne	cessary)									

Project/Site: Mississippi Power IGCC				Date: 07-26-	07			
Application/Owner:				County: Kemp	er			
Investigator: T. Whitehurst & J. Everett				State: MS				
Do Normal Circumstances exist on the site?		Yes No		Community ID:				
Is the site significantly disturbed (Atypical Sit	uation)?	Yes No	Transect ID:					
Is the area a potential Problem area? (If needed, explain on reverse.)		Yes		Plot ID: <u>Data F</u>	oint D5			
VEGETATION								
Dominant Plant Species	<u>Stratum</u>	Indicator	Dominant Plant Species		<u>Stratum</u>	Indicator		
Pinus taeda	<u> </u>	Fac						
Juncus effusus	<u> </u>	Fac W+						
Fraxinus pennsylvanica	<u> </u>	Fac W						
Nyssa sylvatica	<u> </u>	Obl Ese Us						
Rubus arguius	<u>н</u> .	Fac U+ Fac U+						
Paspalum notatum	<u> </u>							
Percent of Dominant Species that are OBL, F. HYDROLOGY Recorded Data (Describe in Re Stream, Lake, or Tid Aerial Photographs Other	marks):	(excluding FAC	Wetland Hydrology Indicators: Primary Indicators: Inundated Saturated in Upper	12 inches		-		
No Recorded Data Available			Water Marks X Drift Lines Sediment Deposits Drainage Patterns in) Wetlands				
Field Observations:								
Depth of Surface Water:	<u>NA</u> (i	п.)	Secondary Indicators (2 o X Oxidized Root Char	or more required anels in Hoper 12): inches			
Depth of Free Water in Pit:	<u>NA</u> (i	п.)	Water-Stained Leav	es	menes			
Depth to Saturated Soil:	<u>NA</u> (i	п.)	Local Soil Survey I FAC-Neutral Test Other (Explain in R					
SOILS								
Map Unit Name (Series and Phase):			Drainage Class:	Well Drained		_		
Taxonomy (Subgroup):			Field Observations: Confirm Mapped Ty		Yes (NO		
Profile Description:								
rione Desemption.								
Depth Matrix Color	Mottle Colo	rs	Mottle	Texture, Con				
(Inches) Horizon (Muncell Moist)	(Muncell M	oist)	Abundance/Contrast	Structure, etc.				
0-12 10 yr 4/3 6/2	75 yr 4/4		<u>C/D</u>	Sandy Clay				
<u>12-18</u> <u>10 yr 6/1</u>	10 yr 6/6		<u>C/D</u>	Sandy Clay				
			·					
Hydric Soil Indicators:	<u> </u>							
Histosol			Concretions					
Histic Epipedon Sulfidic Odor Aquic Moisture Regime Reducing Conditions Gleyed or Low-Chroma Colors			High Organic Content in S Organic Streaking in Sand Listed on Local Hydric So Listed on National Hydric Other (Explain in wetland)	y Soils ils List Soils List	andy Soils			
WETLAND DETERMINATION								
Hydrophytic Vegetation Present? Wetland Hydrology Present? Hydric Soils Present?	Yes Yes Yes		Is this Sampling Point with	in a Wetlaod?	Yes	Þ		
Remarks: (use back if necessary)								

Project/Site: Mississippi Power IGCC				Date:	07-26-07		
Application/Owner:				County:	Kemper		
Investigator: T. Whitehurst & J. Everett				State:	MS		
Do Normal Circumstances exist on the site?		Yes No		Commu			
Is the site significantly disturbed (Atypical Site	uation)?	Yes No		Transect ID:			
Is the area a potential Problem area?		Yes No		Plot ID:	Data Point D6		
(If needed, explain on reverse.)		-					
VEGETATION							
Dominant Plant Species	Stratum	Indicator	Dominant Plant Species		Stratum	n Indicator	
Quercus alba	Т	Fac U					
Quercus pagoda	T	NA					
Fayinus sylvatica	Т	Fac					
Ulnus americana	Т	Fac W					
Poncirus trifoliata	<u> </u>	NA					
Chasmanthium laxum	Н	Fac W					
						_	
Percent of Dominant Species that are OBL, FA	CW, or FAC	C (excluding FAC	C-) 50%				
HYDROLOGY							
Recorded Data (Describe in Ren	narks):		Wetland Hydrology Indicators:				
Stream, Lake, or Tide			Primary Indicators:				
X Aerial Photographs			Inundated				
Other			Saturated in Upper Water Marks	12 inches			
No Recorded Data Available			Drift Lines				
			Sediment Deposits Drainage Patterns in	n Wetland	5		
Field Observations:							
Depth of Surface Water:	<u>N/A</u> (in.)	Secondary Indicators (2 of	or more r	equired):		
Depth of Free Water in Pit:	N/A (in.)	Oxidized Root Channels in Upper 12 iuches Water-Stained Leaves Local Soil Survey Data FAC-Neutral Test				
Depth to Saturated Soil:	<u>N/A</u> (in. <i>)</i>	Other (Explain in R	emarks)			
			``	,			
SOILS							
Map Unit Name (Series and Phase):			Drainage Class:	Moder	ately well drained	1	
map one mane (benes and r hase).			Field Observations:		atory went dramed	<u></u>	
Taxonomy (Subgroup):			Confirm Mapped T	ype?	Yes	(Ng)	
Profile Description:							
Profile Description:							
Depth Matrix Color	Mottle Cole	ors	Mottle	Texture	e, Concretions,		
(Inches) Horizon (Muncell Moist)	(Muncell M	loist)	Abundance/Contrast	Structure, etc.			
0-18 10 yr 4/6				Sandy Clay Loam			
			·				
Hydric Soil Indicators:							
Histosol			Concretions				
Histic Epipedon			High Organic Content in S		yer in Sandy Soils		
Sulfidic Odor Aquic Moisture Regime			Organic Streaking in Sand Listed on Local Hydric So	y Soils			
Reducing Conditions			Listed on National Hydric	Soils List			
Gleyed or Low-Chroma Colors			Other (Explain in wetland)	•			
WETLAND DETERMINATION	\sim						
Hydrophytic Vegetation Present?	(Yes) I	No					
Wetland Hydrology Present? Hydric Soils Present?	Yes /	**	Is this Sampling Point with	uin a Wetl	and? Yes	Na	
-	C C					Ś	
Remarks: (use back if necessary)							

Project/Site	: <u>Mississipp</u>	i Power IGCC			·	Date:	07-26-07		
Application	/Owner:				County:	Kemper			
Investigator	r: <u>T. Whiteh</u> u	ırst & J. Everett				State:	MS		
							· -		.
Is the site significantly disturbed (Atypical Situation)? Yes Use (If needed, explain on reverse.) Yes (If needed, explain on reverse.) The reading of the reverse of Dominant Species that are OBL, FACW, or FAC (excluding FAC HYDROLOGY Recorded Data (Describe in Remarks): (If needed, excilation of the reverse of the reverse of the reverse reverses (If needed, excert of Data Available (If of the reverse reverses) (If needed, excert of the reverse reverses rever				Transect	t ID:				
				Yes No		County: Kemper State: MS Community ID: Transect ID: Plot ID: Data Point D7 At Species Stratum at Species Stratum 100% rology Indicators: ry Indicators: ry Indicators: Inundated Saturated in Upper 12 inches Water Marks Drift Lines Sediment Deposits Drainage Patterns in Wetlands Mater Marks Drift Lines Sediment Deposits Drainage Patterns in Wetlands Mater Marks Drift Lines Sediment Deposits Drainage Class: Very Poorly Field Observations: Confirm Mapped Type? Yes Texture, Concretions,			
VEGETAI	TION								
Dominant I	<u>Plant Specie</u> s		Stratum	<u>Indicator</u>	Dominant Plant Species			<u>Stratum</u>	Indicator
Nyssa biflo	ra		<u> </u>	Obl					
Liriodendro	on tulipifera		<u> </u>	Fac					
Acer rubru	m		<u> </u>	Fac					
Ulnus amei	ricana		T	Fac W	·				
Juncus effu	5115		<u>H</u>	Fac W+					
Erianthus g	giganteus		<u>H</u>	Fac W	·				<u>.</u>
Typha latife	olia		<u> </u>	Оы					
HYDROL Field Obse Dept Dept Dept	OGY Recorded X No Record rvations: h of Surface V h of Free Wat	Data (Describe in Rei Stream, Lake, or Tide Aerial Photographs Other led Data Available Vater: er in Pit:	narks): = Gauge N/A(N/A(in.) in.)	Wetland Hydrology Indicators Primary Indicators: Inundated X Saturated in Upper X Water Marks Drift Lines Sediment Deposits X Drainage Patterns Secondary Indicators (2 X Oxidized Root Chi Water-Stained Lea Local Soil Survey FAC-Neutral Test	r 12 inches in Wetlands or more re annels in U ves Data	equired):	ches	
Map Unit N	Name (Series	and Phase):			Drainage Class:		oorly		_
Тахолоту	(Subgroup):							Yes (No.
Profile Des	cription:								
(Inches)	<u>Horizon</u>	(Muncell Moist)	(Muncell M		Mottle <u>Abundance/Contrast</u> C/D	Structu	ire, etc.	tions,	
	Histosol Histic Epi Sulfidic O Aquic Mo Reducing	dor isture Regime Conditions			Concretions High Organic Content in A Organic Streaking in San Listed on Local Hydric So Listed on National Hydric Other Granis is no setteed	dy Soils oils List o Soils List		ly Soils	
		Low-Chroma Colors			Other (Explain in wetland	ŋ			
	D DETERM		\bigcirc	м. –					
	ic Vegetation ydrology Pres ls Present?			No No No	Is this Sampling Point wit	thin a Wetla	and?	(JB)	No
Remarks: (use back if ne	cessary)							

Project/Site:	Mississipp	i Power IGCC				Date: 07-26-07					
Application/	-					County: Kemper					
		owles & A. Pate				State: MS					
		es exist on the site?		(Yes No)		Community ID:					
Is the site sig	mificantly d	isturbed (Atypical Si	tuation)?	Yes		Transect ID:					
Is the area a (If needed	potential Pro , explain on			Yes No		Plot ID: Data Po	oint D8				
VEGETATI	-		_				_				
<u>Dominant Pl</u>	• • • • •		<u>Stratum</u>	Indicator	Dominant Plant Species		<u>Stratum</u>	Indicator			
Paspalum no			<u>H</u>	Fac U+	Scirpus cyperinus		<u> </u>	Obl			
Juncus effusi	us		<u> </u>	Fac W+							
Liquidamba			<u> </u>	Fac +							
Nussa sylvat	ica var biflo	ra	<u> </u>	ОЫ	·····						
Rubus argun	115		<u> </u>	Fac U+							
Rhexia mari	ana		<u>H</u>	Fac W+							
Liriodendron	ı tulipifera		<u> </u>	Fac							
Quercus nig	ra		<u> </u>	Fac							
HYDROLO Field Observ Depth Deptb SOILS Map Unit Na Taxonomy (3)			in.) in.)	Wetland Hydrology Indicators: Primary Indicators: Inundated Saturated in Upper 1 Water Marks Drift Lines Sediment Deposits X Drainage Patterns in Secondary Indicators (2 of	r 12 inches in Wetlands cor more required): annels in Upper 12 inches types Data Remarks) s: <u>Poorly Drained</u>						
Profile Desc	nption;										
Depth (Inches)	Ua-la	Matrix Color	Mottle Cole		Mottle	Texture, Conc	retions,				
(<u>Inches)</u> 0-12	<u>Horizon</u>	(Muncell Moist)	(Mnncell M	101SL)	Abundance/Contrast	Structure, etc.					
12-18		7.5 yr 5/8 10 yr 6/1	7.5 yr 5/8	,	Common Distinct	Sandy Loam Sandy Clay					
12-10		10 91 0/1	7.5 yr 5/6	• • •		Salloy Clay					
Hydric Soil	Histosol Histic Epi Sulfidic O Aquic Mo				Concretions High Organic Content in S Organic Streaking in Sand Listed on Local Hydric Soi Listed on National Hydric	y Soils ils List	andy Soils				
_		Low-Chroma Colors			Other (Explain in wetland)	Contra Lines					
WETLAND	DETERM	INATION	_								
Hydrophytic Wetland Hyd Hydric Soils	trology Pres Present?	sent?		40 40 40	Is this Sampling Point with	iin a Wetland?	(Jes	No			
Remarks: (u	se back if ne	ecessary)									

Application/	Owner:	i Power IGCC				Date: 07-26-07 County: Kemper					
-		rst & J. Everett es exist on the site?		Yes No			State: <u>MS</u> Community ID:				
Is the site sig	gnificantly di	sturbed (Atypical Si	tuation)?	Yes 😡			Transect ID:				
Is the area a (If needed	potential Pro I, explain on			Yes No			Plot ID: <u>Data P</u>	oint D9			
VEGETATI	ION										
Dominant P	lant Species		<u>Stratum</u>	Indicator	<u>Dominant</u>	Plant Species		<u>Stratum</u>	<u>Indicator</u>		
Fraxinus per	nnsylvanica		<u> </u>	Fac W							
Ulnus ameri	icana		<u> </u>	Fac W							
Juncus effus			<u> </u>	Fac W+				<u></u>			
Paspalum ne	• • •		<u> </u>	Fac U+					<u>.</u>		
Baccharis h	amilifolia		<u> </u>	Fac		<u> </u>					
Percent of D	Dominant Spe	cies that are OBL, F	ACW. or FAC	C (excluding FA	 	90%					
		· · ·	,		- /				-		
HYDROLC	Recorded	Data (Describe in Re Stream, Lake, or Tid Aerial Photographs Other led Data Available	-			Hydrology Indicators: Inundated Saturated in Upper I Water Marks Drift Lines Sediment Deposits Drainage Patterns in					
Field Observ Depth	vations: of Surface V	Water.	(i	п.)	Sec	condary Indicators (2 o		1):			
-						C Oxidized Root Char	inels in Upper 12	2 inches			
	of Free Wat		<u>N/A</u> (i <u>12</u> (i			Water-Stained Leave Local Soil Survey D FAC-Neutral Test Other (Explain in Red	Data				
SOILS											
Map Unit N	ame (Series	and Phase):				Drainage Class:	Poorly				
Taxonomy (· -				Field Observations: Confirm Mapped Ty		Yes (
Profile Desc	••••					Commin mapped ()					
Depth	•	Matrix Color	Mottle Colo	Nre	Mottle		Taxture Conc	retions			
(Inches)	Horizon	(Muncell Moist)	(Muncell M			e/Contrast	Texture, Concretions, Structure, etc.				
0-18	moniton	10 yr 6/1	7.5 yr 5/8		Abundance/Contrast		Structure, etc. Sandy Clay				
0,10		10 11 01	<u></u>				buildy only				
			·		·						
Hydric Soil	Indicators:										
	Reducing		5			ncretions gh Organic Content in S ganic Streaking in Sandy ted on Local Hydric Soi ted on National Hydric her (Explain in wetland)	y Soils ils List Soils List	Sandy Soils			
WETLANI) DETERM	INATION									
	c Vegetation drology Pres s Present?		Yes N	lo lo lo	js t	his Sampling Point with	iin a Wetland?	(Yes)	No		
Remarks: (u	ise back if ne	ecessary)									

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; <u>http://www.fws.gov/southeast/jackson/index.html</u>). 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 (<u>http://www.mdwfp.com/Level2/Wildlife/hunting_regs.asp</u>):

"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.

LITERATURE CITED

Chapinan, 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. Geologica Survey (map scale 1:1,000,000).

- Conant, R. and Joseph T. Collins. 1998. Reptiles and Amphibians. Eastern/Central North America. Peterson Field Guide Series. Houghton Miflin Company. Boston, MA and New York, NY.
- Conner, Richard N., D. Craig Rudolph, and Jeffrey R. Walters. 2001. The Red-cockaded Woodpecker: Surviving in a Fire Maintained Ecosystem. University of Texas Press, Austin.
- Ernst, C.H., J. E. Lovich, and R. W. Barbour. 1994. Turtles of the United States and Canada. Smithsonian Institution Press, Washington, D.C.
- Ernst, C.H., and Evelyn M. Ernst. 2003. Snakes of the United States and Canda. Smithsonian Institution Press, Washington, D.C.
- Kral, R. 1983. A report on some rare, threatened or endangered forest related vascular plants of the south. Atlanta, GA: U.S. Forest Service. p.718. USFS technical publication R8-TP2, . Vol. 1.
- NatureServe. 2006. NatureServe Explorer: An online encyclopedia of life [web application]. Version 6.1. NatureServe, Arlington, Virginia. Available http://www.natureserve.org/explorer. (Accessed: March 28, 2007).



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.

This page intentionally left blank.