
CHAPTER 3—AFFECTED ENVIRONMENT

3.1 INTRODUCTION

This chapter describes the existing physical, biological, cultural, social, and economic characteristics within the Bureau of Land Management's (BLM) planning area in the States of Alabama and Mississippi. Management of resources and resource uses on public lands and minerals administered by the BLM is directed by a variety of laws, regulations, policies, and other requirements (as specified in Appendix C). By describing existing conditions for resource programs in the planning area, this chapter serves as the baseline against which the impacts of the different alternatives are analyzed and compared.

3.1.1 How to Read This Chapter

This chapter is divided into four sections:

- **Introduction (Section 3.1).** This section presents an overview of the chapter and provides direction on How to Read This Chapter (Section 3.1.1).
- **Alabama Statewide Perspective (Section 3.2).** Oil and gas leasing of BLM-administered, non-United States Forest Service (USFS) Federal mineral ownership (FMO) could occur anywhere in the State; therefore, a statewide perspective is needed to cover the full geographic range for the environmental baseline. This statewide discussion is organized by resource according to the *BLM Land Use Planning Handbook* (H-1601-1).
- **Alabama Surface Tract Description (Section 3.3).** This section provides available information specific to each of the surface tracts in Alabama: the Coosa River tracts, Fort Morgan Beach tracts, Fort Morgan Highway tracts, Fowl River tract, Geneva tract, and Jordan Lake tract (as described in Chapter 2).
- **Mississippi Statewide Perspective (Section 3.4).** Oil and gas leasing of BLM-administered, non-USFS FMO could occur anywhere in the State; therefore, a statewide perspective is needed to cover the full geographic range for the environmental baseline. This statewide discussion is organized by resource according to the *BLM Land Use Planning Handbook* (H-1601-1).
- **Mississippi Surface Tract Description (Section 3.5).** This section provides available information specific to the Hancock County tract in Mississippi (as described in Chapter 2).

3.2 ALABAMA STATEWIDE PERSPECTIVE

3.2.1 Air Quality

Alabama is located in a humid, subtropical climatic region characterized by temperate winters; long, hot summers; and an evenly distributed annual rainfall. The region, however, is subject to periods of drought and flood—its climatic conditions are rarely average. A feast-or-famine situation attributed to weather conditions is typically expected as the climate delivers energy and moisture in subtropical latitudes between a large landmass to the north and the Gulf of Mexico to the south (Southeastern Regional Climate Center 2005).

Typical mean annual temperatures range from 60°F in the north to 70°F along the coast. Temperatures regularly exceed 100°F at many places in Alabama and drop to zero or lower about once a year. Freezing temperatures reach the Gulf Coast almost every winter. Normal precipitation ranges from 50 to 65 inches across the State (NOAA 2007a).

Air Quality Meteorology

Surface wind speeds are variable depending on terrain and proximity to the coast. Average wind speeds vary from 6 to 10 miles per hour in most locations and follow water drainage features of the land or are driven by sea breezes. Dispersion can also be related to the National Oceanic and Atmospheric Administration (NOAA) Stagnation Index, which primarily focuses on ozone (NOAA 2005). On the basis of this index, Alabama was prone to air stagnation for 25 to 50 percent of the days from May through September of 2002 through 2004. This dispersion index compares moderately to other areas in the country.

Baseline Air Quality

Ambient Air Quality. The Environmental Protection Agency (EPA) has established ambient air quality standards for criteria pollutants considered harmful to public health and the environment. The ambient air quality measurements in Alabama for sulfur dioxide (SO₂), nitrogen dioxide (NO₂), carbon monoxide (CO), ozone (O₃), and particulate matter (PM₁₀ and PM_{2.5}) are shown in Table 3-1. Ambient air quality measurements made by the Alabama Department of Environmental Management (ADEM) indicate that ambient air quality is within the standards, except for carbon monoxide, particulates, and ozone in Birmingham, Alabama, (Shelby and Jefferson Counties), and particulates in Russell County (near Columbus, Georgia). These areas are in nonattainment. Ozone is formed from the chemical reactions of nitrogen oxides, volatile organic compounds (VOCs), and sunlight. Several Alabama locations exceed the ambient air quality standards.

Table 3-1. Recent Highest Ambient Air Quality Measurements in Alabama^{1,2}

| Pollutant | Averaging Time | Highest Measured Value (ppm ³) | Location | National Ambient Air Quality Standard (ppm ³) |
|-------------------|----------------|--|------------------|---|
| SO ₂ | 1 year | 0.004 | Jefferson County | 0.03 |
| | 24 hours | 0.020 | Jefferson County | 0.14 |
| | 3 hours | 0.046 | Jefferson County | 0.50 |
| NO ₂ | 1 year | 0.008 | Helena | 0.053 |
| CO | 8 hours | 25.1 | North Birmingham | 9 |
| | 1 hour | 36.9 | North Birmingham | 35 |
| O ₃ | 8 hours | 0.102 | Shelby County | 0.080 |
| | 1 hour | 0.140 | Arrant City | 0.120 |
| PM ₁₀ | 1 year | 38 µg/m ³ | Birmingham | 50 µg/m ³ |
| | 24 hours | 185 µg/m ³ | Birmingham | 150 µg/m ³ |
| PM _{2.5} | 1 year | 21.5 µg/m ³ | Jefferson County | 15 µg/m ³ |
| | 24 hours | 57 µg/m ³ | Wylam | 65 µg/m ³ |

1 ADEM Annual Air Quality Report 2001 (ADEM 2002).

2 Three-year averages for 1999 through 2003 found at www.adem.state.us/AirDivision/AirDivision.htm (ADEM 2005).

3 ppm = parts per million

Visibility and Atmospheric Deposition. Visibility and atmospheric deposition measurements are not available for Alabama.

Area Air Quality Designations

Prevention of significant deterioration (PSD) of areas meeting the ambient air quality standards are divided into the following three categories: Class I for areas of restricted growth, Class II for areas of moderate growth, and Class III for industrialized areas (Clean Air Act of 1977, as amended). All of Alabama is designated as PSD Class II, except for the Sipsey Wilderness in northwest Alabama, which is Class I, and the areas listed previously that did not meet National Ambient Air Quality Standards (NAAQS) and are unclassified. Other Class I areas (within 100 kilometers of the potential development activities) include the Breton National Wildlife Refuge (NWR) off the coast of Louisiana, St. Marks NWR in the Florida Panhandle (each managed by the U.S. Fish and Wildlife Service [USFWS]), Cohutta Wilderness Area in northern Georgia, and Bradwell Bay Wilderness Area in the Florida Panhandle (each managed by USFS).

Climate Change

Ongoing scientific research has identified the potential effects of pollutants considered to be greenhouse gas (GHG) emissions (including carbon dioxide, CO₂; methane, CH₄; nitrous oxide, N₂O; water vapor; and several trace gasses) on global climate. Through complex interactions on a regional and global scale, these pollutants cause a net warming effect of the atmosphere, making surface temperatures suitable for life on earth, primarily by decreasing the amount of heat energy radiated by the earth back into space. Although GHG levels have varied for millennia, with corresponding variations in climatic conditions, recent industrialization and burning of fossil carbon sources have caused CO₂ concentrations to increase dramatically, and have been shown to contribute to overall climatic changes, typically referred to as global warming or climate change. Increasing CO₂ concentrations also lead to preferential fertilization and growth of specific plant species.

Some pollutants considered to be GHGs, such as CO₂, occur naturally and are emitted to the atmosphere through both natural processes and human activities, while others are created and emitted solely through human activities. The principal pollutants considered to be GHGs that enter the atmosphere because of human activities include CO₂, emitted through the burning of fossil fuels, solid waste, trees and wood products; CH₄ emitted during the production and transport of coal, natural gas, oil extraction, livestock production, deforestation, and other agricultural practices; N₂O emitted during agricultural and industrial activities and during the combustion of fossil fuels and solid waste; and fluorinated gases that are emitted from a variety of industrial processes (EPA 2008).

The assessment of GHG emissions and climate change is in its formative phase, and it is not yet possible to know with confidence the net impact to climate. Observed climatic changes may be caused by GHG emissions, or may reflect natural fluctuations (U.S. GAO 2007). It is known that in the past, the earth has gone through a number of ice ages with periods of warming and droughts between the periods. The most recent Ice Age ended around 13,000 years ago and the climate has warmed and dried since then. The warming and drying has not been continuous. However, the rate at which atmospheric CO₂ concentrations have risen in the past 100 years is unprecedented, and corresponds with observed temperature changes. The Intergovernmental Panel on Climate Change (IPCC 2007) concluded that “Warming of the climate

system is unequivocal” and “Most of the observed increase in globally average temperatures since the mid-20th century is very likely due to the observed increase in anthropogenic [man-made] greenhouse gas concentrations.”

Global mean surface temperatures have increased nearly 1.8°F (1.0°C) from 1890 to 2006 (Goddard Institute for Space Studies 2007). However, both observations and predictive models indicate that average temperature changes are likely to be greater in the Northern Hemisphere. The Goddard Institute for Space Studies (2007) data indicated that northern latitudes (above 24° N) have exhibited temperature increases of nearly 2.1°F (1.2°C) since 1900, with nearly a 1.8°F (1.0°C) increase since 1970 alone. Without additional meteorological monitoring systems, it is difficult to determine the spatial and temporal variability and change of climatic conditions, but increasing concentrations of GHG are likely to accelerate the rate of climate change. In 2001, the IPCC indicated that by the year 2100, global average surface temperatures will rise 2.5 to 10.4°F (1.4 to 5.8°C) above 1990 levels. The National Academy of Sciences (2006) has confirmed these findings, but also indicated there are uncertainties how climate change will affect different regions. Computer model predictions indicate that increases in temperature will not be equally distributed, but are likely to be accentuated at higher latitudes. Warming during the winter months is expected to be higher than during the summer.

According to the *EPA Inventory of U.S. Greenhouse Gas Emissions and Sinks* (2008), the total U.S. GHGs were estimated at 7,054.2 teragrams of CO₂ equivalent¹ (Tg CO₂ Eq.) in 2006. Overall, total U.S. emissions have risen by 14.7 percent from 1990 to 2006. The primary GHG emitted by human activities in the U.S. was CO₂, representing approximately 84.8 percent of total GHG emissions. The largest source of CO₂, and of overall GHG emissions, was fossil fuel combustion. Conversely, U.S. GHG emissions were partly offset by carbon sequestration in forests, trees in urban areas, and agricultural soils, which, in aggregate, offset 12.5 percent of total emissions in 2006 (EPA 2008).

In the Southeast and Gulf Coast, potential impacts on the resources and environment from climate change could occur from sea level rise and a warmer climate, resulting in higher summer heat and reduced winter cold stress. The IPCC suggests that a two foot rise in sea level would eliminate approximately 10,000 square miles of land nationwide and, by 2080, sea level rise could convert as much as 33 percent of the world’s coastal wetlands to open water (IPCC 2007). Some of the BLM-administered surface and mineral estate may become completely submerged. Coastal erosion, loss of barrier islands and wetlands, flooding, storm surge, and extreme precipitation events could greatly affect the biological resources within the planning area. For example, wildlife species could move northward and to higher elevations and extinction of endemic threatened/endangered plants may be accelerated. Due to loss of habitat, or due to competition from other species whose ranges may shift northward, the population of some animal species may be reduced. Additionally, the character of vegetation resources that provide wildlife habitat could change as disturbances (e.g., fire and insect outbreaks) increase (IPCC 2007). In the future, as tools for predicting climate changes in the planning area improve and/or changes in climate affect resources and necessitate changes in how resources are managed, BLM may be able to re-evaluate decisions made as part of this planning process and adjust management accordingly.

Certain BLM-authorized activities within the planning area would produce pollutants considered to be GHGs, particularly CO₂. For example, oil and gas development, construction activities, vehicle travel, and mechanical hand tools or prescribed burning used in vegetation and wildlife habitat manipulation generate CO₂ and CH₄. These activities would impact the same resources in the planning area that could also be affected by climate change. Other activities may help sequester carbon, such as maintaining vegetative and forested cover, which may help build organic carbon in soils and function as “carbon sinks”. BLM recognizes the importance of climate change and the potential effects it may have on the

¹ Carbon comprises 12/44ths of carbon dioxide by weight. One teragram is equal to 10¹² grams or one million metric tons.

natural environment. However, BLM does not have an established mechanism to accurately predict the effect of resource management-level decisions from this planning effort on global climate change. The lack of scientific tools designed to predict climate change on regional or local scales limits the ability to quantify potential future impacts. A general discussion on the types of actions that would potentially impact climate change is presented in Chapter 4.

3.2.2 Soil Resources

Physiographic Regions and Soil Types

Alabama can be divided into four major physiographic regions: Coastal Plain, Piedmont, Valley and Ridge, and Appalachian Plateau (Highland Rim and Cumberland Plateau). Each physiographic region is described in Appendix F.

Soil formation and character are all determined by parent material, surface slope, climate, biological activity, and time. Because Alabama is located within the humid subtropics, its soils are transitional between the cool climatic regions and the tropics. Podzolization, a soil-forming process of humid cool climates, and laterization, a soil-forming process of lowland tropics, are represented by the red and yellow podzolic soils and reddish-brown lateritic soils in Alabama. The State has seven major soil areas, including limestone valleys and uplands, Appalachian Plateau, Piedmont Plateau, prairies, coastal plains, major flood plains and terraces, coastal marshes, and beaches (Mitchell 2004). A brief description of the major parent soil units and their locations in Alabama is provided in Appendix F.

The characteristics of soils in BLM-administered, non-USFS FMO areas are described in Appendix F.

Prime and Unique Farmlands

The Farmland Protection Policy Act requires the identification of proposed actions that would affect any lands classified as prime and unique farmlands. The U.S. Natural Resources Conservation Service (NRCS) administers this act to preserve farmland.

Prime farmland is defined as having the availability and best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops. Its soil quality, growing season, and moisture supply can produce economically sustained high yields of crops when treated and managed according to acceptable farming methods, including water management. In general, prime farmlands have an adequate and dependable water supply from precipitation or irrigation, a favorable temperature and growing season, acceptable acidity or alkalinity, acceptable salt and sodium content, and few or no rocks. The land is permeable to water and air. Prime farmlands are not excessively erodible or saturated with water for a long period of time, and they neither flood nor require protection from flooding.

Prime farmlands occur in dispersed areas across Alabama. Counties in Alabama with areas having high potential for oil and gas or coal development likely include soil units that have been identified as prime farmland by NRCS. Appendix F includes prime farmland classification information that is available for soils within non-USFS FMO.

3.2.3 Water Resources

Surface Water

Alabama is divided into 14 major river basins containing 77,272 miles of rivers and streams (47,072 miles of perennial rivers and streams and approximately 30,200 miles of intermittent streams). These 14

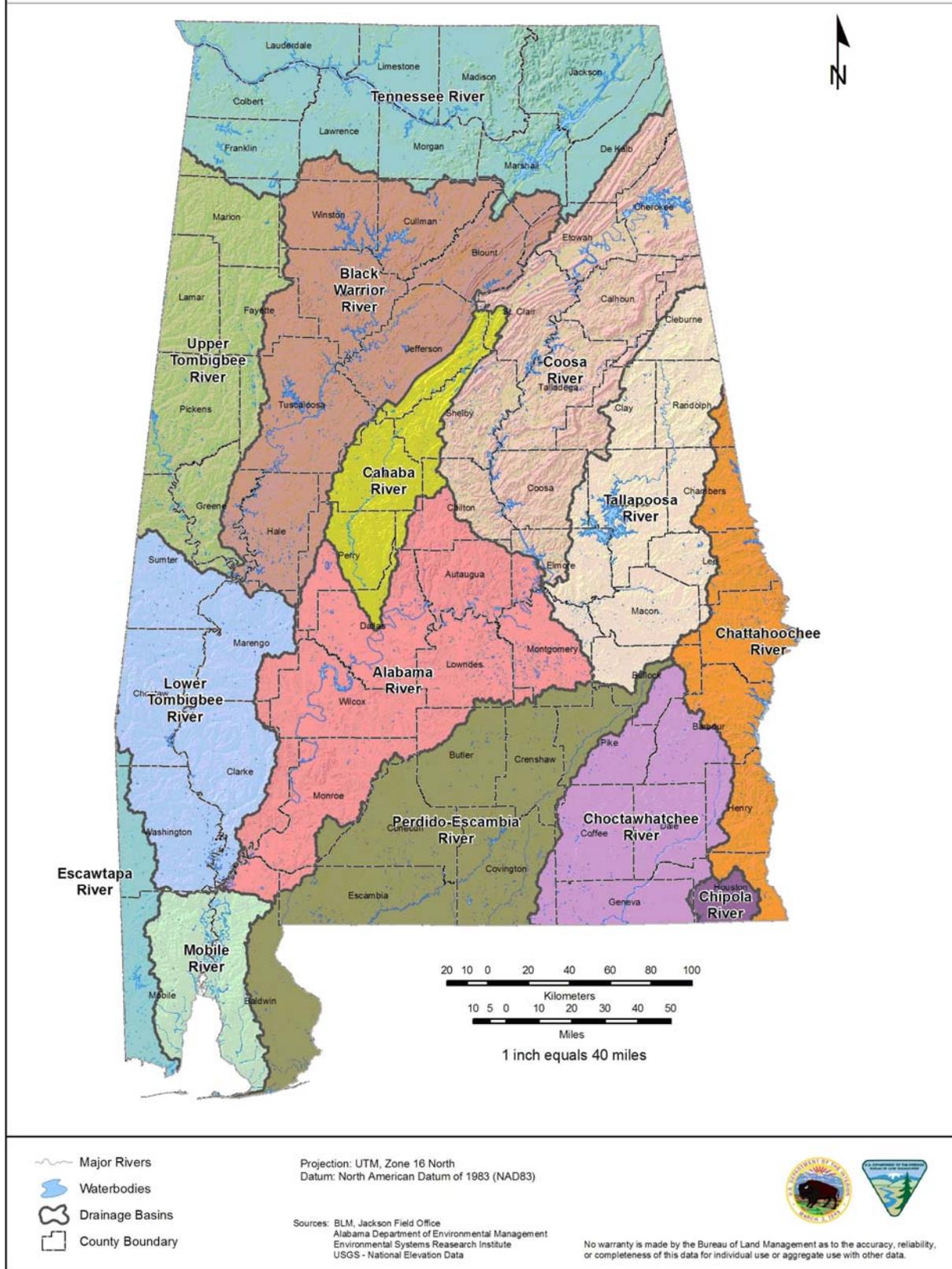
basins are the Tennessee, Upper Tombigbee, Lower Tombigbee, Black Warrior, Coosa, Cahaba, Tallapoosa, Chattahoochee, Choctawhatchee, Chipola, Perdido-Escambia, Alabama, Mobile, and Escatawpa River Basins (ADEM 2004) (Map 3-1). Appendix H briefly describes each major river basin. Alabama has ponds, lakes, and reservoirs in excess of 490,472 acres. Freshwater wetlands occupy an estimated 3.6 million acres (ADEM 2004).

Alabama's surface water is generally of high quality. An indication of full-use support (i.e., meeting established water quality criteria for its designated use classification) of rivers and streams can be found in Alabama's Final 2004 §303(d) List, as presented in ADEM 2004. As of 2004, Alabama has a high percentage of full-use support for rivers and streams.

Similarly, Alabama's publicly accessible lakes and reservoirs have 82.6 percent full-support status. However, much of the nonsupport acreage is related to historical, as well as recent, polychlorinated biphenyl (PCB) contamination (primarily from industrial point sources in the Upper Coosa River) and eutrophic conditions in the Coosa River Basin reservoirs. Naturally higher nutrients in Coosa River Basin soils largely dictate the eutrophic conditions of the basin's reservoirs (ADEM 2004). Several lakes and reservoirs are considered to be degrading in the Coosa River Basin, including the Neely Henry, Logan Martin, Lay, Mitchell, and Jordan. These reservoirs are characterized by increases in nutrient concentrations; implementation of fish tissue consumption advisories; increases in undesirable algal species; and violations of water quality standards; or a combination thereof (ADEM 2003). Several of the BLM's Coosa River tracts (Foshee Island, Little Rock Island, Big Rock Island, and Gilchrist Island) are within Mitchell Lake. One of the BLM's Coosa River (Jordan Lake) surface tracts is located approximately 10 river miles upstream from Jordan Lake and about 5.5 miles downstream from Mitchell Lake. The Coosa River tract at Smith Island is located about 10 miles upstream from Lay Lake. The Coosa River tract at Prince Island is located approximately 11 river miles upstream from Lay Lake.

About 25 river miles in Alabama are within BLM-administered, non-USFS FMO areas. Eight river miles flow over areas with potentially high mineral development prospects. Oil and gas leases exist on a total of about 0.6 river miles. The Cahaba River Basin is of particular interest, as there are nine leases in this area and there is renewed interest in coalbed methane natural gas production. Approximately 2,060 lake acres occur within non-USFS FMO areas. National Wetland Inventory (NWI) data are limited for Alabama. Because of the lack of available digital data for freshwater wetlands in Alabama, non-USFS FMO acreage within freshwater wetland areas in the State could not be estimated.

Map 3-1: Major Drainage Basins of Alabama
Alabama-Mississippi RMP-EIS



Ground Water

Alabama has 19 major aquifers and aquifer systems that supply drinking water to about 44 percent of the State's total population using a public water supply (an additional 6 percent use private wells) (ADEM 2003). The lack of chronic pollutants in public water supply ground water sources is a good indication of Alabama's high-quality ground water and effective resource management (ADEM 2004).

Precipitation is the sole source of water for the ground water system, but only a small part of the annual precipitation actually recharges the ground water system. Because the recharge of aquifers entirely depends on precipitation, natural ground water levels in Alabama follow the same pattern of seasonal fluctuation as precipitation (USGS 2003). Information on major ground water recharge zones in Alabama was not available for evaluation relative to non-USFS FMO.

Coastal Zone

The National Coastal Zone Management (CZM) Program is a voluntary partnership between the Federal Government and U.S. coastal states and territories authorized by the Coastal Zone Management Act of 1972. The Coastal Programs Division, within NOAA's Office of Ocean and Coastal Resource Management, administers the program at the Federal level and works with State CZM partners. Alabama's Coastal Area Management Program (ACAMP) was approved and has been in effect since 1979. The program regulates various activities on coastal lands and waters seaward of the continuous 10-foot contour in Baldwin and Mobile Counties of Alabama. The Fort Morgan Beach and Highway tracts in Baldwin County in addition to BLM-administered, non-USFS FMO fall within the ACAMP.

Alabama's coastal wetlands are estimated at 27,600 acres (NWI estimates, as presented in ADEM 2004). Coastal Alabama also has an estimated 610 square miles of estuaries and a coastal shoreline that is 337 miles long (including Mobile Bay and island shorelines) (ADEM 2004).

EPA has identified the Mobile Bay coastal drainage as a wetland restoration priority area. EPA's Gulf of Mexico program has also identified the Mobile Bay area as a priority for water quality and habitat improvement projects (ADEM 2004). In 2000, ADEM's coastal programs received a wetlands restoration grant to implement restoration strategies and address State lands within ADEM's Alabama Coastal Nonpoint Source Pollution Control Program's (ACNPCP) management area, which includes all of Mobile and Baldwin Counties. The project has targeted restoration and protection of priority tracts in the approximately 5,000 acres of wetlands in Baldwin County. ADEM identified the Bon Secour Bay and Fort Morgan Peninsula as priority candidate wetlands restoration sites (ADEM 2004). USFWS is the technical adviser to projects conducted under the wetlands restoration grant.

Wetland types in Baldwin County include riverine (overbank flooding of associated rivers and streams); fringe (shoreline of coastal ecosystems, marshes); flat (wet pine flats, pine savannas, and pitcher-plant bogs); and depressional (ponds, interdunal swales) (ADEM 2004). On the basis of a rough geospatial analysis, about 5,850 acres of BLM-administered, non-USFS FMO are within coastal wetland areas in Alabama.

3.2.4 Vegetative Communities

For this planning effort, Gap Analysis Program (GAP) was used to delineate land cover types on non-USFS FMO in Alabama. This land cover map is based on Landsat-7 satellite imagery using the National Land Cover Data (NLCD), which includes 21 very broad land cover classifications. The decision to use this data set was based on its statewide application and availability in a geographical information system format at the time this planning effort was initiated. Analysis of the GAP land cover map resulted in the

identification of seven dominant cover types on non-USFS FMO lands in Alabama. These cover types include deciduous (25 percent), mixed (23 percent), evergreen (19 percent), wetland forest/shrub land (10 percent), pasture/hay (8 percent), row/crops (5 percent), and open water (2 percent). Less dominant cover types (approximately 8 percent) are not discussed further. The following brief discussions provide an overview of the cover types found on non-USFS FMO in Alabama.

- **Deciduous (25 percent).** This classification is dominated by trees, of which 75 percent or more are hardwoods. Common trees in these areas include a wide variety of oak (*Quercus spp.*) and hickory (*Carya spp.*) species, red maple (*Acer rubrum*), ash (*Fraxinus spp.*), hackberry (*Celtis laevigata*), yellow poplar (*Liriodendron tulipifera*), beech (*Fagus grandifolia*), elm (*Ulmus spp.*), sweetgum (*Liquidambar styraciflua*), persimmon (*Diospyros virginiana*), and black cherry (*Prunus serotina*).
- **Mixed (23 percent).** This classification delineates areas where neither hardwood nor pine species represent more than 75 percent of the cover. These mixed hardwood/pine areas are typically dominated by loblolly (*Pinus taeda*), longleaf pine (*Pinus palustris*), slash pine (*Pinus elliottii*), or shortleaf pine (*Pinus echinata*), with a wide variety of oak and hickory species, plus hackberry, elm, sweetgum, common persimmon, and yellow poplar.
- **Evergreen (19 percent).** This classification delineates areas where 75 percent or more of the tree species are evergreen. In Alabama, the dominant pine species are loblolly, longleaf pine, slash pine, and shortleaf pine. This classification includes commercial pine plantations, which according to the Alabama Comprehensive Wildlife Conservation Strategy (CWCS) comprised 24 percent of the forested acreage in Alabama in 2000. Loblolly is the most commonly planted pine species. An additional species, sand pine (*Pinus clausa*) dominates a narrow band of scrub habitats behind the coastal dune systems along the Gulf of Mexico.
- **Wetland Forest/Shrub Land (10 percent).** This classification comprises areas in which forest or shrub land vegetation accounts for 25 to 100 percent of the cover and the soil or substrate is periodically saturated or covered with water. These encompass diverse communities ranging from forested wetlands and bald cypress (*Taxodium distichum*) swamps, to bogs and coastal marshes. Dominant species in seasonally flooded forests are sweet bay (*Magnolia virginiana*), sweetgum, wax myrtle (*Myrica cerifera*), various oaks, and titi (*Cyrilla racemiflora*). Typical wetland or bog species include pitcher plants, various rushes, sedges, arrowhead, and St. John's wort (*Hypericum spp.*). Typical species of coastal wetlands and marshes include sawgrass (*Cladium spp.*), black needlerush (*Juncus roemerianus*), and bulrush (*Scirpus spp.*).
- **Pasture/Hay (8 percent).** Vegetation in this community is composed of introduced grasses, legumes, or grass-legume mixtures planted for livestock grazing or the production of hay crops.
- **Row/Crops (5 percent).** This classification includes areas being actively cultivated.
- **Open Water (2 percent).** This classification includes areas with less than 25 percent cover of vegetation/land cover.

Alabama Invasive/Exotic Species

The Alabama Invasive Plant Council lists 45 invasive plants as occurring in the State. The top ten include Chinese tallow (*Triadica sebifera*), Chinese privet (*Ligustrum sinense*), multiflora rose (*Rosa multiflora*), tropical soda apple (*Solanum viarum*), Japanese climbing fern (*Lygodium japonicum*), kudzu (*Pueraria montana* var. *lobata*), cogon grass (*Imperata cylindrica*), hydrilla (*Hydrilla verticillata*), alligator weed (*Alternanthera philoxeroides*), and Eurasian milfoil (*Myriophyllum spicatum*). The most likely to be encountered on non-USFS FMO are Chinese tallow, Chinese privet, and cogon grass. Cogon grass, in

particular, has the potential to affect future land use practices because of its ability to alter natural fire regimes, its thick growth habit that excludes other vegetation, and the difficulty to control it. Chinese privet is a common invasive plant that occurs along edges and disturbed sites. Chinese tallow tree is often found near or in wetlands, and along fence rows and roads.

3.2.5 Fish and Wildlife

Game Species

Alabama's major game species include whitetail deer (*Odocoileus virginianus*), eastern turkey (*Meleagris gallapavo silvestris*), mourning dove, northern bobwhite quail, squirrel, and waterfowl species. Alabama held its first alligator hunt since the recovery of the species in 2006. The whitetail deer population in Alabama was estimated at 1.75 million in 2000, up from an estimated 2,000 in the early 1900s, due in part to major restocking efforts during the 1950s and 1960s. The Alabama Wildlife and Freshwater Fisheries Division estimates the current population of eastern wild turkey at 350,000. Turkey prefer hardwood and mixed pine-hardwood forestlands interspersed with open areas in both upland and bottomland regions. Mourning doves are common throughout the State on farms, and in towns, woodlots, agricultural fields, and grasslands. Quail occurrence is incidental across the State, generally associated with abandoned weedy fields and open pinelands or savanna with extensive groundcover of forbs, native grasses, and scattered brush thickets. Gray squirrel (*Sciurus carolinensis*) and fox squirrel are both found statewide. The gray squirrel is common in hardwood forests, mixed forests, and urban areas. The less common fox squirrel favors mature deciduous and pine-oak woodlands, but also occurs at forest edges and in riparian woodlands. Twenty-six species of ducks are found in the coastal and inland waters of Alabama. The wood duck (*Aix sponsa*) and the hooded merganser (*Mergus cucullatus*) occur statewide throughout the year and breed extensively in Alabama. As part of the Mississippi Flyway, Alabama provides important winter habitat for waterfowl that are produced in the Prairie Pothole Region and Great Lakes States. Alabama provides varied and abundant sport fishery with 26 game species. Reservoirs, ponds, lakes, and swamps throughout the State provide important habitats for sport fishes.

Neotropical Migratory Birds

The Alabama Ornithological Society State list includes 420 species of birds known to occur in the State. A total of 178 species are known to breed in Alabama, including 158 species that regularly breed in the State. Additionally, 174 species regularly winter in and 80 species migrate through Alabama. This list also contains 38 accidental, 3 extinct, 2 extirpated (no longer occurring in Alabama, but may occur in other States), and 4 exotic (non-native) species. Maritime forests and shrub lands along coastal Alabama provide important staging areas for migrating songbirds and hawks and are critical when weather is inclement or when exhausted birds make landfall.

3.2.6 Special Status Species

For the purposes of this document, special status species are defined as all Federally and State-listed, species proposed or candidates for Federal or State listing, and those species identified by the BLM as sensitive species. The BLM Eastern States policy designates as "BLM sensitive" those additional species that are considered to be critically imperiled (S-1) or imperiled (S-2) by the State Natural Heritage programs, as well as potentially affected bird species included on the USFWS Birds of Conservation Concern and Game Birds Below Desired Condition lists. The USFWS currently lists 132 Federally listed species which historically or currently occur in Alabama. The Alabama Natural Heritage Program (ANHP) inventory lists 712 species ranked as either critically imperiled (S-1) or imperiled (S-2) being tracked in the State in 2006. A complete list of S-1 and S-2 species being tracked by ANHP is included in

Appendix E. Much of the following discussions are based on the Alabama CWCS (2005), which includes a complete list of the wildlife species of conservation concern in the State.

This discussion of special status species takes a statewide perspective, even though management of the BLM's scattered surface acreage and oil and gas development would probably directly affect less than 264 acres in total. Oil and gas leasing of non-USFS FMO in particular could occur anywhere in the State, and future oil and gas development has the potential to affect aquatic systems downstream from locations, substantially increasing the area potentially affected. Therefore, a statewide perspective is needed to cover the full geographic range of potential impacts.

Overview

The high number of special status species in Alabama is a factor of the State's exceptional biodiversity, high rate of endemism, and a history of impacting land uses in the State. Physiographically, the State crosses five provinces (Interior Plateau, Southwestern Appalachians, Ridge and Valley, Piedmont, and East Gulf Coastal Plain) and is situated at the periphery of many species' ranges (see Section 0). It is also a well-known global hotspot for aquatic biodiversity. Alabama surpasses all eastern States in plant and animal diversity, ranking fifth in the nation after California, Texas, Arizona, and New Mexico (ANHP 2003). Alabama ranks first in the nation in freshwater species diversity. Of the 307 species of freshwater mussels recorded in the nation, 180 have been recorded in Alabama. The Nature Conservancy has ranked the Tennessee River and the Mobile River, including its major tributaries, as the first and second most biologically diverse rivers in the country.

This diverse fauna is affected by a history of impacting land uses. Most of Alabama's larger rivers are impounded for navigation, hydropower, and flood control, resulting in the loss of many aquatic species during this century. The Black Warrior River Basin is the largest coal-producing area in the South and coalbed methane production is among the highest in the nation (Alabama Oil and Gas Board), and the river system has been degraded by past coal mining, gas development, and other uses. Throughout the State, aquatic systems have been adversely affected by intensive silviculture and urbanization. Longleaf pine, once the State's most abundant tree (Harper 1928), was reduced to 732,800 acres by 2000 (Hartsell and Brown 2002). In the Southeast, longleaf pine forests now exist on only 3 percent of their previous range (Frost 1993). Throughout much of its range, these longleaf sites have been converted to loblolly pine or slash pine for commercial production and/or degraded by the absence of fire, to the detriment of many terrestrial species associated with this once widespread habitat. These factors have contributed to Alabama having more wildlife species at risk than any State east of the Colorado River. Only Hawaii, California, and Nevada have more imperiled species, and only Hawaii has lost more species to extinction (Stein 2002). At least 108 animal species (47 mussels, 44 aquatic snails, 11 fishes, 5 birds, and 4 mammals) have been extirpated in the State (Alabama CWCS 2005). Of the 117 Federally listed species in Alabama, 70 percent are associated with freshwater aquatic or wetland habitats.

There is non-USFS FMO in both major oil and gas producing regions of Alabama (the Black Warrior River Basin Region and the Southwest Alabama Region) and both of these regions have substantial special status species issues. The Black Warrior River Region includes the Black Warrior and Tombigbee Rivers and the upper portions of the Cahaba River, all part of the Mobile River Basin. Forty-two fish species have been identified as endemic to the basin, and according to the Alabama Natural Heritage 2006 Tracking List, there are now 35 aquatic species either Federally listed or considered imperiled or critically imperiled in the Black Warrior Basin alone. The Southwest Alabama Region includes the Conecuh, Mobile, Escatawpa, Perdido, and Blackwater River Basins. These basins support 26 special status aquatic animal species, including the Federally listed Alabama sturgeon and Gulf sturgeon. Uplands in this area contain almost 90 percent of the longleaf pine acreage, both natural and planted, remaining in the State (Hartsell and Brown 2002). Eighteen special status species are associated with this once widespread

habitat (Alabama CWCS 2005), including keystone species such as the red-cockaded woodpecker and gopher tortoise. Coastal areas in Mobile and Baldwin Counties support 10 special status species, including critical habitat for the Alabama beach mouse, nesting habitat for the loggerhead sea turtle, and critical habitat for wintering piping plover.

Outside of these oil and gas producing regions, there is non-USFS FMO in all but 10 southeastern counties in Alabama. Future development in these areas could occur in response to new finds or new technology that make recovery of the oil/gas more economical. For instance, recently there have been new wells drilled on private minerals in St. Clair and Etowah Counties. These counties are located in the Coosa River Basin, the largest and most biologically diverse portion of the Mobile River Basin, with 39 special status species. Nine of these are considered to be extirpated from this river basin and an additional four are considered to be extirpated from the State.

On non-USFS FMO across the State, there are a number of small, often isolated high-value habitats that support special status species. These include many wetland communities such as bogs, seeps, swamps, prairie and glade openings, and karst habitats. BLM-administered, non-USFS FMO has been estimated to include 38,898 acres of shrub and forested wetlands at least periodically inundated. There are 12 special status amphibians found in the State that utilize these habitats. There are also a number of plant species restricted to these habitats, including the green pitcher plant and white fringeless orchid, both candidates for Federal listing. Glades, in the northeastern half of the State and prairies in the “Black Belt” areas are scarce in this forest-dominated State and tend to support rare assemblages of plants. Karst areas in the northeastern portion of the State support a high number of endemic species. In Jackson County, caves support 24 species found nowhere else, and caves in Morgan and Madison Counties are designated as National Natural Landmarks.

Species Accounts

The following Federally listed or candidate species are known to occur or to have potential to occur on BLM-administered non-USFS FMO. There are currently no species proposed for Federal listing in Alabama (Natureserve 2006). A list of species ranked by ANHP as critically imperiled (S-1) or imperiled (S-2) is provided in Appendix E.

Mammals

Gray myotis (Myotis grisescens), Federally listed as endangered

Gray myotis roost almost exclusively in caves, generally utilizing different caves for summer and winter hibernaculum. Bats may migrate hundreds of kilometers between summer and winter caves. Only a very limited number of caves meet the thresholds for temperature, humidity, and isolation. Most records in Alabama are from near the Tennessee River, and there are small populations in the central and southern parts of the State. Water courses and associated forested riparian corridors are important foraging areas for gray myotis.

Indiana bat (Myotis sodalis), Federally listed as endangered

The Indiana bat hibernates in caves, typically limestone with pools where the mean midwinter temperature is 4–8 degrees Celsius. In Alabama, suitable caves are utilized by bats migrating hundreds of kilometers from breeding grounds in more northern States. Indiana bat records are primarily from the northern third of the State, particularly the Bankhead National Forest, and in the karst region of the extreme south-central portion of the State in Jackson County.

Alabama beach mouse (*Peromyscus polionotus ammobates*), Federally listed as endangered and ranked

The Alabama beach mouse is restricted to coastal dunes and scrub/shrub habitats along the Fort Morgan Peninsula in Baldwin County. Although the highest population numbers occur in primary dunes, higher secondary dunes and scrub habitats, which are less likely to be inundated, provide crucial habitat from which mice can recolonize after major storm events. All of the BLM-administered beach tracts in Baldwin County are within the designated critical habitat. On January 30, 2007, the Alabama beach mouse critical habitat was revised to include additional areas north of the coastal dunes. All of the BLM-administered highway tracts are now within areas designated as critical habitat for Alabama beach mouse. Approximately 365 acres of non-USFS FMO are within designated critical habitat.

West Indian manatee (*Trichechus manatus*), Federally listed as endangered

Manatee may utilize coastal areas near the BLM surface tracts, particularly Fowl River, during the summer months.

Birds***Piping plover (*Charadrius alexandrinus*), Atlantic Coast and Great Plains populations listed as Federally threatened, and Great Lakes populations listed as Federally endangered***

All three populations of piping plover winter along the southern Atlantic and Gulf Coasts, where they are classified as threatened. On July 3, 2001, USFWS designated 165,211 acres along 1,798 miles of coastline in eight southern States as critical habitat for the wintering population of piping plover. This included several barrier islands and the western tip of the Fort Morgan Peninsula. Piping plover can be present in Alabama from August to May, but numbers peak during the winter months.

Wood stork (*Mycteria americana*), Federally listed as endangered

The wetlands of the Coastal Plain of Alabama provide important foraging habitat for wood storks that disperse from breeding areas in Florida, Georgia, and South Carolina in late summer and early fall. There are no recent breeding records in Alabama, although wood storks may breed in remote swamps of the State (Imhof 1976). Primarily, habitats are marshes, swamps, lagoons, ponds, and flooded fields and ditches. During extended drought, depressions in marshes and brackish wetlands have increased in importance.

Red-cockaded woodpecker (*Picoides borealis*), Federally listed as endangered

Red-cockaded woodpeckers are found in open, mature, old-growth pine woodlands and savannahs. Cavity trees are pines generally over 60 years old, located in open stands with little or no hardwood midstory and few or no overstory hardwoods. Hardwood encroachment resulting from fire suppression can result in cluster abandonment. Potentially suitable foraging habitat is located within 0.5 mile of nesting habitat and contains at least 50 percent pines that are 30 years or older.

Bald eagle (*Haliaeetus leucocephalus*), Federally listed as threatened, proposed for delisting

Bald eagles are found throughout the State primarily along rivers and large bodies of water. Alabama supports an influx of wintering eagles. A January survey of bald eagles in Alabama has averaged about 100–150 birds in recent years. Concentrations occur on Pickwick Lake near Waterloo and Gunterville Lake near Gunterville State Park. A breeding population of bald eagles has been reestablished in the State. The Alabama Restoration Project tracked 91 juvenile bald eagles in the State from 1985–1991. In 2006, 100 nests were being monitored in the State.

Reptiles

Flattened musk turtle (Sternotherus depressus), Federally listed as threatened

The flattened musk turtle is endemic to Alabama and restricted to Black Warrior River watershed, where it is found in medium-size creeks to larger streams and even impoundments. Optimal stream habitat consists of a drainage at least 80.5 square kilometers (50 square miles); alternating pools and riffles, with pools at least 3–4.5 feet deep; an abundance of submerged boulders and rocks, with crevices; an abundant molluscan and benthic invertebrate fauna; a low silt load; and clean water (Mount 1981a). Streams with a predominant sandy substrate are also suitable as long as adequate boulder and crevice refugia are present (Ernst et al. 1989).

Alabama red-belly turtle (Pseudemys alabamensis), Federally listed as endangered

The Alabama red-belly turtle is restricted to the Mobile-Tensaw River Delta in Mobile and Baldwin Counties adjacent to Mobile Bay. They are rarely found north of Interstate 65. Systematic sampling of major tributaries in coastal Alabama have shown them to be present in major rivers and tributaries of the Mobile Bay, Bayou La Batre, Fowl, Dog, Fish, Magnolia, and Bon Secour Rivers. Specimens have also been recorded from Daphne and Point Clear, Alabama. Alabama red-belly turtles are found in shallow vegetated backwaters of freshwater streams, rivers, bays, and bayous in or adjacent to Mobile Bay.

Gopher tortoise (Gopherus polyphemus), population west of the Mobile and Tombigbee Rivers is Federally listed as threatened

In Alabama, gopher tortoise populations usually occur below the Fall Line in the Southern Pine Plains and Buhrstone/Lime Hills ecoregions. Small populations are found along alluvial sandy ridges that occur along southern Alabama waterways. In Alabama, gopher tortoises are protected by Federal and State laws and found in the following counties: Choctaw, Washington, Mobile, Baldwin, Barbour, Bullock, Butler, Clarke, Crenshaw, Coffee, Conecuh, Covington, Dale, Escambia, Geneva, Henry, Houston, Monroe, Montgomery, Pike, and Wilcox. Small populations occur in Autauga and Macon Counties, where they were introduced by man. The largest populations occur in dry, deep sandy soils where the overhead canopy is open. The best populations in Alabama are found in longleaf pine-scrub oak-wiregrass sand hills that are frequently burned. The more loamy soils found in the longleaf-wiregrass flatwoods support small scattered populations. Clear cuts created by timber operations where gophers occur will support the tortoise for the first few years, but will be abandoned as the canopy closes, usually causing the tortoises to move to the edges of the woodland roads. Pine plantations that are managed for open canopy by thinning and burning will provide the minimum requirements to support a tortoise population. Dense hardwood and unburned pine/hardwood habitats are unsuitable for tortoise populations. Agricultural fields and wildlife food plots will support some individuals but are considered marginal habitat. Tortoises found in these habitats are usually found on the field edges and fence lines where they are not disturbed by annual plantings. Loss of habitat and historic overhunting have caused a large statewide decline of tortoise populations. There are very few public places that have tortoise populations in Alabama, and only the Conecuh National Forest and Fort Rucker Military Base have more than 100 individuals. Research has shown that gopher tortoises move up to 600 feet between burrows for breeding purposes, and two or more burrows within 600 feet of each other can be defined as a population (McDearman personal communication).

Eastern indigo snake (Drymarchon couperi), Federally listed as threatened

The historical range of the eastern indigo snake was from the east coast of South Carolina through southern Georgia, Florida, into southern Alabama, and southwest Mississippi, and is often associated with gopher tortoises. Particularly outside of southern Florida, gopher tortoise burrows provide important refugia from temperature extremes. Naturally occurring populations are now found only in southern Georgia and Florida. Indigo snakes were historically found in the lower coastal plain along with the

burrowing gopher tortoise. In the 1980s, the indigo snake was reintroduced in its historical range within the State, including releases in Autauga, Baldwin, Bullock, Covington, Escambia, Mobile, and Washington Counties. There have been subsequent sightings.

Black pine snake (Pituophis melanoleucus lodingi), Candidate for Federal listing

Black pine snakes are endemic to the upland longleaf pine forests that once covered the southeastern United States. Habitat consists of sandy, well-drained soils with an overstory of longleaf pine, a fire-suppressed midstory, and dense herbaceous ground cover. In Alabama, there are recorded sightings in Mobile County.

Loggerhead sea turtle (Caretta caretta), Federally listed as threatened

The most common nesting sea turtle in Alabama, loggerheads nest on open sandy beaches above the high-tide mark, seaward of well-developed dunes from the Florida border to Dauphin Island, with the majority nesting between Fort Morgan and Gulf Shores. Nesting normally occurs from early May through August, with the majority of nests being laid during June and July. Females lay three to five nests, and sometimes more, during a single nesting season. The eggs incubate approximately 2 months before hatching sometime between late June and mid-November.

Kemp's Ridley sea turtle (Lepidochelys kempii), Federally listed as endangered

Kemp's Ridley sea turtle is an occasional visitor to Alabama waters, where it is sometimes caught in shrimp nets. Although virtually the entire population nests in Mexico and southern Texas, at least three nests have been documented in Alabama (2001, 2006, and 2007). Based on USFWS records, juvenile Kemp's Ridelys are the most common marine turtle in Alabama bays and estuaries.

Amphibians

Mississippi gopher frog (Rana sevosa), Federally listed as endangered

This species is currently known from four locations in Mississippi, but it has also been recorded from Gulf Coast Flatwoods of Alabama (at the mouth of Dog River). It is highly terrestrial. Breeding occurs late January to March in open temporary ponds. Habitat includes both upland sandy habitats historically forested with longleaf pine and isolated temporary wetland breeding sites imbedded within this forested landscape.

Flatwoods salamander (Ambystoma cingulatum), Federally listed as threatened

Flatwoods salamander's historic distribution in Alabama was confined to the southernmost tier of counties (Mobile, Baldwin, Escambia, Covington, Geneva, and Houston). The most recent records are from Covington and Houston Counties, 1980 and 1981, respectively. The species has not been recorded in over two decades, despite surveys from 1992 to 1995. Characteristic habitat is pine flatwoods, where larvae utilize shallow pondcypress or blackgum ponds, marshy pasture ponds, roadside ditches, or small, shallow borrow pits.

Red Hills salamander (Phaeognathus hubrichti), Federally listed as threatened

This salamander is irregularly distributed within a narrow belt of two geological formations (Tallahatta and Hachetigbee) in parts of five counties (Crenshaw, Butler, Covington, Conecuh, and Monroe) in the Red Hills (Schwaner and Mount 1970, Mount 1975). Its characteristic habitat is on steep slopes (especially north-facing) of ravines and bluffs dominated by hardwood trees such as magnolias, American beech, tuliptree, oaks, and hickories. Older-growth timber is preferred. Complete removal of forest canopy in most cases results in extirpation of a resident population.

Black Warrior waterdog (Necturus alabamensis), Candidate for Federal listing

The Black Warrior waterdog inhabits streams above the Fall Line within the Black Warrior River Basin in Alabama. Currently, the species is known from 14 sites in 5 counties: Blount, Marshall, Tuscaloosa, Walker, and Winston. Within these counties, occupied river systems, including the North River, Locust Fork, and Mulberry Fork, are all on the EPA's list of impaired waters. Black Warrior waterdogs are associated with clay substrates lacking silt. Stream depths range from 3.3 to 13.1 feet and contain large leaf packs supporting mayfly and caddis fly larvae.

Fish***Gulf sturgeon (Acipenser oxyrinchus dosotoi), Federally listed as threatened***

Adult Gulf sturgeons migrate into large river systems between late March and early April to spawn, sometimes moving as much as 140 miles upstream. Adults and subadults return to the Gulf of Mexico in late fall. The young generally stay in the river mouth through winter and spring. Critical habitat has been designated in Alabama and includes reaches of the Escambia/Conecuh River system in Escambia, Conecuh, and Covington Counties, and the Choctawhatchee River in Geneva County.

Alabama sturgeon (Scaphirhynchus suttkusi), Federally listed as endangered

The Alabama sturgeon is now restricted to a 130-mile reach of the Alabama River below Miller's Ferry Lock and Dam. The Alabama sturgeon currently inhabits only about 15 percent of its historic range, which originally included about 1,000 miles of the Mobile River system in Alabama (Black Warrior, Tombigbee, Alabama, Coosa, Tallapoosa, Mobile, Tensaw, and Cahaba Rivers) and Mississippi (Tombigbee River).

Blue shiner (Cyprinella caerulea), Federally listed as threatened

In Alabama, the blue shiner occurs in Weogufka Creek in Coosa County; Choccolocco Creek, and the lower reach of Shoal Creek in Calhoun County; and Little River in Cherokee County. The blue shiner prefers a sand or sand-and-gravel substrate sometimes with cobble, low to moderate velocity current, and a depth of about 0.15 to 1 meter.

Palezone shiner (Notropis albizonatus), Federally listed as endangered

Palezone shiner habitat is described as upland large creeks and small rivers with permanent flow, in runs and flowing upper portions of pools over clean substrates of bedrock, cobble, and gravel mixed with clean sand. The currently documented range includes two widely disjunct populations, one of which is a 25-km reach of the Paint Rock River in Jackson County, Alabama. The other population is found in portions of the Cumberland and Tennessee River systems in Kentucky and Tennessee.

Cahaba shiner (Notropis cahabae), Federally listed as endangered

The stronghold for the species is limited to about 15 river miles between the Fall Line and Piper Bridge in Bibb County, Alabama. The species occurs in large shoal areas of the main channel of the Cahaba River, particularly in the quieter water less than 1.64 feet deep just below swift riffle areas. The species prefers patches of sandy substrate at the edge of or scattered throughout gravel beds or downstream of larger rocks and boulders. This shiner probably requires a river with sufficient small crustaceans, insect larvae, and algae for food, similar to its close relative, the mimic shiner.

Alabama cavefish (Speoplatyrhinus poulsoni), Federally listed as endangered

The Alabama cavefish is known only from the type locality, Key Cave in Lauderdale County, Alabama.

Pygmy sculpin (Cottus paulus), Federally listed as threatened

The pygmy sculpin is an Alabama endemic known from Coldwater Spring and its adjacent downstream spring run, a tributary to Choccolocco Creek in Calhoun County.

Slackwater darter (Etheostoma boschungii), Federally listed as threatened

The slackwater darter is known from disjunct populations in the Cypress Creek, Swan Creek, upper Shoal Creek, and Flint River systems in north Alabama and south-central Tennessee, and from the headwaters of the Buffalo River in Tennessee.

Vermilion darter (Etheostoma chermocki), Federally listed as endangered

The vermilion darter is limited in distribution to upper Turkey Creek, a tributary to the Locust Fork of the Black Warrior River system in Jefferson County, Alabama. The vermilion darter occurs in moderate-to-swift currents in streams of alternating riffles and pools.

Watercress darter (Etheostoma nuchale), Federally listed as endangered

The watercress darter is only known to occur in three springs in Jefferson County. A new population has been successfully established by transplanting individuals from Roebuck Springs to Tapawingo Springs, a tributary of Turkey Creek.

Boulder darter (Etheostoma wapiti), Federally listed as endangered

Boulder darters currently occur in the Elk River system in Giles and Lincoln Counties, Tennessee, and Limestone County, Alabama. In 1993, in an effort to reestablish the species within its historic range, boulder darters were released at three locations in the Elk River, all upstream of Alabama Highway 127 in Limestone County.

Rush darter (Etheostoma phytophilum), Candidate for Federal listing

The rush darter is endemic to upland portions of the Black Warrior River system in Alabama where it occurs in shallow headwater streams. This species is uncommon and sporadic within its range, as it favors shallow, flowing water in spring runs and spring-associated streams with emergent vegetation. Only three disjunct populations are known: one in the Clear Creek system in Winston County, one in spring-fed tributaries of Turkey Creek in Jefferson County, and one population in Little Cove Creek in Etowah County.

Goldline darter (Percina aurolineata), Federally listed as threatened

The goldline darter continues to exist in fragmented populations in the Coosawattee River, Georgia, in about 7 miles of the Little Cahaba River and in 27 miles of the 49 miles of historic range in the Cahaba River, Alabama. This species prefers moderate-to-swift currents and water depths greater than 2 feet. It is found over sand or gravel substrata interspersed among cobble and small boulders.

Snail darter (Percina tanasi), Federally listed as threatened

The snail darter is presently known from only six Tennessee River tributaries and from the main stem of the Tennessee River near the mouth of three tributaries. In Alabama, the snail darter is restricted to the Paint Rock River in Jackson and Madison Counties. This species prefers two types of habitat: relatively shallow gravel shoal areas with moderate to swift current, and deep slackwater pools in large streams and rivers.

Spotfin chub (*Erimonax monachus*), Federally listed as threatened and experimental, non-essential

Although naturally occurring populations are considered extirpated in Alabama, there is a non-essential, experimental population recently established in Shoal Creek in Lauderdale County, Alabama.

Mussels

The following mussel species in Alabama are Federally listed as endangered, threatened, or are candidates for Federal listing. Most of these species require flowing water, over clean, stable sand and gravel. Pollution; construction of dams and impounding of major rivers, such as the Tennessee, Coosa, Black Warrior, and Alabama; and dredging and channelization have resulted in the declines and extirpation of many mussel species in Alabama. The occurrence records below were based on historic and current records from Nature Serve (2006).

Table 3-2. Federally Listed Mussel Species in Alabama

| Federally Listed Mussel Species in Alabama | Federal Status* | Critical Habitat Designated | County Occurrence Records |
|--|-----------------|-----------------------------|---|
| Acornshell, southern (<i>Epioblasma othcaloogensis</i>) probably extirpated | E* | Yes | Bibb, Cherokee, Etowah, St. Clair, and Shelby Counties |
| Bean, Choctaw (<i>Villosa choctawensis</i>) | C | No | Barbour, Bullock, Coffee, Covington, Dale, Geneva, Henry, Houston, and Pike Counties |
| Blossom, turgid (pearlymussel) (<i>Epioblasma turgidula</i>) probably extinct | E | No | Colbert, Franklin, and Lauderdale Counties |
| Blossom, yellow (pearlymussel) (<i>Epioblasma florentina florentina</i>) probably extirpated | E | No | Lauderdale and Colbert Counties |
| Catspaw (<i>Epioblasma obliquata obliquata</i>) probably extirpated | E | No | NA (Muscle Shoals) |
| Clubshell, black (=Curtus' mussel) (<i>Pleurobema curtum</i>) probably extirpated | E | No | NA (Tombigbee River) |
| Clubshell, ovate (<i>Pleurobema perovatum</i>) | E* | Yes | Blount, Greene, Fayette, Lee, Lamar, Lee, Etowah, Macon, Pickens, St. Clair, Sumter, Tuscaloosa, Walker, and Winston Counties |
| Clubshell, southern (<i>Pleurobema decisum</i>) | E* | Yes | Cherokee, Dallas, Etowah, Fayette, Greene, Lamar, Pickens, St. Clair, and Tuscaloosa Counties |
| Combshell, Cumberlandian (<i>Epioblasma brevidens</i>) | E* | Yes | Colbert and Etowah Counties |
| Combshell, southern (=penitent mussel) (<i>Epioblasma penita</i>) | E | No | Etowah, Lamar, and Marion Counties |

| Federally Listed Mussel Species in Alabama | Federal Status* | Critical Habitat Designated | County Occurrence Records |
|---|-----------------|-----------------------------|---|
| Combsshell, upland (<i>Epioblasma metastrata</i>) probably extirpated | E* | Yes | Bibb, Shelby, and Jefferson Counties |
| Fanshell (<i>Cyprogenia stegaria</i>) | E | No | Colbert, Lauderdale, and Marshall Counties |
| Heelsplitter, Alabama (=inflated) (<i>Potamilus inflatus</i>) | T | No | Baldwin, Bibb, Choctaw, Clarke, Greene, Hale, Marengo, Pickens, Sumter, Tuscaloosa, and Washington Counties |
| Kidneyshell, triangular (<i>Ptychobranhus greenii</i>) | E* | Yes | Blount, Cherokee, Cullman, Etowah, Jefferson, Lawrence, St. Clair, Walker, and Winston Counties |
| Kidneyshell, Southern (<i>Ptychobranhus jonesi</i>) | C | No | Barbour and Coffee Counties |
| Lampmussel, Alabama (<i>Lampsilis virescens</i>) | E | No | Jackson County |
| Lilliput, pale (pearlymussel) (<i>Toxolasma cylindrellus</i>) | E | No | Jackson County |
| Moccasinshell, Alabama (<i>Medionidus acutissimus</i>) | T* | Yes | Cherokee, Etowah, Greene, Lamar, Lawrence, Pickens, St. Clair, Shelby, and Winston Counties |
| Moccasinshell, Coosa (<i>Medionidus parvulus</i>) | E* | Yes | Cherokee, Talladega, and Winston Counties |
| Moccasinshell, Gulf (<i>Medionidus penicillatus</i>) Probably extirpated | E | No | NA (Chattahoochee River drainage) |
| Monkeyface, Cumberland (pearlymussel) (<i>Quadrula intermedia</i>) | E | Yes | Limestone County |
| Mucket, orange-nacre (<i>Hamiota (Lampsilis) perovalis</i>) | T* | Yes | Bibb, Fayette, Greene, Jefferson, Lamar, Lawrence, Pickens, Shelby, Tuscaloosa, and Winston Counties |
| Mucket, pink (pearlymussel) (<i>Lampsilis abrupta</i>) | E | No | Colbert, Jackson, Madison, Morgan, Marshall, Lauderdale, Lawrence, and Limestone Counties |
| Oyster mussel, (<i>Epioblasma capsaeformis</i>) | E* | No | NA (Tennessee and Cumberland river drainages) |
| Pearlshell, Alabama (<i>Margaritifera marrianae</i>) | C | No | Conecuh and Crenshaw Counties |
| Pearlymussel, cracking (<i>Hemistena lata</i>) | E | No | Colbert and Lauderdale Counties |
| Pearlymussel, dromedary (<i>Dromus dromas</i>) probably extirpated, possible reintroduction | E | No | Colbert and Lauderdale Counties |
| Pearlymussel, littlewing (<i>Pegias fabula</i>) probably extirpated | E | No | Lauderdale County |

| Federally Listed Mussel Species in Alabama | Federal Status* | Critical Habitat Designated | County Occurrence Records |
|---|-----------------|-----------------------------|--|
| Pearlymussel, slabside (<i>Lexingtonia dolabelloides</i>) | C | No | Colbert, Jackson, Madison, and Marshall Counties |
| Pigtoe, dark (<i>Pleurobema furvum</i>) | E* | Yes | Fayette, Lawrence, Tuscaloosa, Winston, and Jefferson Counties |
| Pigtoe, fine-rayed (<i>Fusconaia cuneolus</i>) | E | No | Jackson, Marshall, and Madison Counties |
| Pigtoe, flat (=Marshall's mussel) (<i>Pleurobema marshalli</i>) probably extirpated | E | No | Greene and Sumter Counties |
| Pigtoe, fuzzy (<i>Pleurobema strodeanum</i>) | C | No | Barbour, Bullock, Coffee, Conecuh, Dale, Escambia, Geneva, Henry, and Pike Counties |
| Pigtoe, oval (<i>Pleurobema pyriforme</i>) | E | No | Houston County |
| Pigtoe, heavy (=Judge Tait's mussel) (<i>Pleurobema taitianum</i>) | E | No | Baldwin, Clarke, Dallas, Greene, Monroe, Sumter, Pickens, and Wilcox Counties |
| Pigtoe, rough (<i>Pleurobema plenum</i>) | E | No | Colbert, Lauderdale, Madison, Morgan, Marshall, Lawrence, and Limestone Counties |
| Pigtoe, shiny (<i>Fusconaia cor</i> (=edgariana)) | E | No | Jackson, Marshall, and Madison Counties |
| Pigtoe, southern (<i>Pleurobema georgianum</i>) | E* | Yes | Cleburne County |
| Pimpleback, orangefoot (pearlymussel) (<i>Plethobasus cooperianus</i>) | E | No | Madison and Marshall Counties |
| Pink, ring (mussel) (<i>Obovaria retusa</i>) | E | No | Colbert and Lauderdale Counties |
| Pocketbook, finelined (<i>Hamiota</i> (=Lampsilis) <i>altilis</i>) | T* | Yes | Blount, Calhoun, Cherokee, Elmore, Etowah, Macon, Shelby, St. Clair, Talladega, Lawrence, Walker, Winston, DeKalb, Lee, Dallas, Clay, Bibb, Jefferson, Tuscaloosa, Fayette, Tallapoosa, and Cullman Counties |
| Pocketbook, shinyrayed (<i>Hamiota</i> (<i>Lampsilis</i>) <i>subangulata</i>) | E | No | Russell County |
| Purple bankclimber (<i>Plectomerus</i> (=Elliptoideus) <i>sloatianus</i>) | T | No | NA (Chattahoochee River) |
| Sandshell, southern (<i>Lampsilis australis</i>) | C | No | Barbour, Coffee, Covington, Dale, Geneva, Henry, and Pike Counties |
| Stirrupshell (<i>Quadrula stapes</i>) probably extinct | E | No | Pickens County |
| Wartyback, white (pearlymussel) (<i>Plethobasus cicatricosus</i>) | E | No | Colbert and Lauderdale Counties |
| Note: E=Endangered, C=Candidate, and T=Threatened *Denotes species with designated critical habitat in Alabama | | | |

Aquatic Snails

The following Federally listed snails utilize many of the same riverine habitats discussed above under “Mussels” and have been affected by many of the same land use practices, including impoundments and the general deterioration of water quality from siltation and other pollutants contributed by past mining activities, poor land-use practices, and waste discharges. Seven of these aquatic snails are endemic to the Mobile River Basin, where they inhabit shoals, rapids, and riffles of large streams and rivers above the Fall Line. All have disappeared from more than 90 percent of their historic ranges.

Table 3-3. Federally Listed Aquatic Snail Species in Alabama

| Federally Listed Aquatic Snail Species in Alabama | Federal Status | Critical Habitat Designated | County Occurrence Records |
|---|----------------|-----------------------------|---|
| Armored snail (<i>Pyrgulopsis pachyta</i>), Federally listed as endangered | E | No | Limestone County |
| Cylindrical lioplax (<i>Lioplax cyclostomaformis</i>), Federally listed as endangered | E | No | Bibb and Shelby Counties |
| Flat pebblesnail (<i>Lepyrium showalteri</i>) | E | No | Bibb and Shelby Counties |
| Lacy elimia (<i>Elimia renetella</i>) | T | No | Talladega County |
| Black mudalia (<i>Elimia melanoides</i>) | C | No | Blount |
| Painted rocksnail (<i>Leptoxis taeniata</i>) | T | No | Calhoun, Chilton, Shelby, and Talladega Counties |
| Plicate rocksnail (<i>Leptoxis plicata</i>) | E | No | Blount and Jefferson Counties. |
| Round rocksnail (<i>Leptoxis ampla</i>), Federally listed as threatened | T | No | Bibb and Shelby Counties |
| Interrupted rocksnail (<i>Leptoxis foremani</i>) | C | No | Elmore |
| Slender campeloma (<i>Campeloma decampi</i>) | E | No | Limestone County |
| Tulotoma snail (<i>Tulotoma magnifica</i>), Federally listed as endangered | E | No | Calhoun, Coosa, Elmore, Shelby, St. Clair, and Talladega Counties |
| Rough hornsnail (<i>Pleurocera formani</i>) | C | No | Elmore, Shelby |

Note: E=Endangered, C=Candidate, and T=Threatened

Crayfish

Although there are no Federally listed crayfish in Alabama, the State is home to 83 species of crayfish, more species than any other State. Twenty are listed as critically imperiled (S-1) or imperiled (S-2) by ANHP.

Cave Shrimp

Alabama cave shrimp (Palaemonia alabamae), Federally listed as endangered

This freshwater shrimp is known from only two caves in Madison County.

Insects

Mitchell's satyr butterfly (Neonympha mitchellii mitchellii), Federally listed as endangered

There are recent isolated records of this butterfly in calcareous wetlands dominated by sedges and eastern redcedar.

Plants

Alabama canebrake pitcher plant (Sarracenia rubra ssp. alabamensi), Federally listed as endangered

This pitcher plant is found in sand hills, swamps, and sloping bogs along the Fall Line Hills in saturated, deep peaty sands or clay soils. This species is now restricted to three counties: Autauga, Chilton, and Elmore in Alabama. One of the largest populations is located in the Roberta Case Pine Hills Preserve in Autauga County managed by The Nature Conservancy.

Price's potato bean (Apios priceana), Federally listed as threatened

Price's potato bean is an herbaceous twining perennial vine typically located under mixed hardwoods or in associated forest clearings, often where bluffs or ravine slopes meet creek or river bottoms. Soils are generally well drained and loamy, formed on alluvium or over calcareous boulders. Several populations extend onto road or powerline rights-of-way (ROW). Three extant populations are known from Alabama in Madison, Autauga, and Marshall Counties. Two of the populations are located along the floodplain of the Alabama River.

American chaffseed (Schwalbea americana), Federally listed as endangered

American chaffseed is a perennial member of the figwort family found in acidic, sandy, or peaty soils in open pine flatwoods, pitch pine lowland forests, seepage bogs, palustrine pine savannahs, and other grass- and sedge-dominated plant communities. It frequently grows in ecotonal areas between peaty wetlands and xeric sandy soils. In these situations, individuals sometimes extend well into the drier communities but seldom into the areas that support species characteristic of wetter soils. Surrounding plant communities are typically species-rich. There are historic records in Baldwin and Geneva Counties in Alabama.

Panhandle lily (Lillium iridollae), Candidate for Federal listing

In the Gulf Coastal Plain of Florida and Alabama, this species inhabits baygalls, wet flatwoods, seepage slopes, and the edges of bottomland forests. It is typically found in sandy peat or loamy soils which are saturated for at least part of the year and include soils classified as Bibb-Kinston-Johns complex, Dorovan-Pamlico complex, Lynchburg fine sandy loam, and Rutledge loamy sand. The sites are open to full sun or filtered light. This species often occurs in the ecotone between the more open pine/wiregrass uplands or along the stream corridor itself. In Alabama, there are records from Baldwin, Covington, and Escambia Counties.

Mohr's Barbara buttons (Marshallia mohrii), Federally listed as threatened

This aster is found in moist-to-wet prairie-like openings in pine woodlands, along shale-bedded streams, and in meadows. Other populations are located in swales on roadside ROW and in Ketona dolomite glades. It prefers full sunlight or partial shade. The soils are sandy clays, which are alkaline, high in organic matter, and seasonally wet. Common associates include various grasses, sedges, and prairie species. In Alabama, there are records in Bibb, Calhoun, Cherokee, and Walker Counties.

Tennessee yellow-eyed grass (*Xyris tennesseensis*), Federally listed as endangered

Although *Xyris* species are usually found on acidic soils, *X. tennesseensis* is restricted to basic or neutral soils that thinly cover calcareous substrates with year-round seepage or mineral-rich water flow. This species is found in open or thin canopy woods in gravelly seep-slopes or gravelly bars and banks of small streams, springs, and ditches. In Alabama, there are records from Bibb, Calhoun, Franklin, and Shelby Counties.

Georgia rockcress (*Arabis georgiana*), Candidate for Federal listing

Georgia rockcress is typically found in shallow soil accumulations on rocky bluffs, ecotones of gently sloping rock outcrops, outcrops along rivers, and sandy loam along eroding riverbanks. It is occasionally found in adjacent mesic woods, but it will not persist in heavily shaded conditions. In Alabama, there are records from Bibb, Elmore, and Wilcox Counties.

Georgia aster (*Symphotrichum georgiana*), Candidate for Federal listing

This aster prefers dry open woods, roadsides, and other openings. In Alabama, there are records in Bibb, Blount, Etowah, Shelby, St. Clair, and Tuscaloosa Counties.

White fringeless orchid (*Platanthera integrilabia*), Candidate for Federal listing

White fringeless orchid is generally found in wet, flat, boggy areas at the head of streams or seepage slopes. The species is often found in acidic muck or sand, and in partially but not fully shaded areas. In Alabama, there are records in Calhoun, Cleburne, Jackson, Marion, Tuscaloosa, and Winston Counties.

Alabama leather flower (*Clematis socialis*), Federally listed as endangered

The Alabama leather flower is an erect, non-viney perennial herb known from only five sites in northeast Alabama and one in northwest Georgia. One population is protected on The Nature Conservancy's Dry Creek Preserve in St. Clair County. Locations are described as having silt and clay of alluvial, grass-sedge openings extending into the adjacent hardwood edge.

Kral's water plantain (*Sagittaria secundifolia*), Federally listed as threatened

Kral's water plantain typically occurs on frequently exposed shoals or rooted among loose boulders in quiet pools up to 3.2 feet or 1 meter in depth. In Alabama, this aquatic perennial is known to occur in only 12 sites scattered along 25 miles of the Little River drainage system in Dekalb and Cherokee Counties.

Whorled sunflower (*Helianthus verticillatus*), Candidate for Federal listing

The whorled sunflower is restricted to remnant prairie habitat. In Alabama, there are records in Cherokee County.

Leafy prairie-clover (*Dalea foliosa*), Federally listed as endangered

Leafy prairie-clover is a perennial herb found in open, thin-soiled limestone glades and limestone barrens. In Alabama, there are records in Colbert, Franklin, Lawrence, and Morgan Counties.

Louisiana quillwort (*Isoetes louisianensis*), Federally listed as threatened

Louisiana quillwort appears to be restricted to shallow blackwater streams in riparian woodland and bayhead forest areas of pine flatwoods. The plants are found on stable sand and gravel bars, moist overflow channels with silty sand substrates, and on low, sloping banks near and below water level. In Alabama, there are records from Conecuh and Monroe Counties.

Pondberry (Lindera melissifolia), Federally listed as endangered

Pondberry habitat is characterized as seasonally flooded wetlands, such as floodplain hardwood forests and forested swales, usually in shade, but tolerates full sun. In Alabama, there are 2,004 records in Covington County.

Harperella (Ptilimnium nodosum), Federally listed as endangered

Harperella is an annual that typically occurs in two habitat types: rocky or gravelly shoals of clear, swift-flowing streams, usually in microsites that are sheltered from rapidly moving water; and the edges of intermittent pineland ponds or low, wet savannah meadows on the Coastal Plain. In Alabama, there are records from Cherokee and Dekalb Counties. On non-USFS FMO, there are 642 acres of potential habitat within 200 meters of known occurrences.

Lyrate bladder-pod (Lesquerella lyrata), Federally listed as threatened

Lyrate bladder-pod is found in red soils, limestone outcroppings, disturbed cedar glades and glade-like areas, including open pastures, cultivated fields, and roadsides in calcareous areas. In Alabama, there are records in Colbert, Franklin, and, Lawrence Counties.

Gentian pinkroot (Spigelia gentianoides var. entianoides), Federally listed as endangered

Gentian pinkroot is an herbaceous perennial found in sandy or dry-mesic pine-oak woods or in longleaf pine-oak woods with a sparse herbaceous element, including wiregrass (*Aristida stricta*). It is known only from Bibb County.

Relict trillium (Trillium reliquum), Federally listed as endangered

Relict trillium is a species of mesic hardwood forests. The forests can be on slopes of various aspects and inclinations or on bottomlands and floodplains. Soils and subsoils range from rocky clays to alluvial sands; all soils have high organic matter content in the top level. In Alabama, there are records from Bullock, Henry, and Lee Counties.

Morefield's leather-flower (Clematis morefieldii), Federally listed as endangered

Morefield's leather flower is a perennial vine found in basic clay-loam soils in rocky limestone woods on the south- and southwest-facing slopes of mountains. It is currently known from only five locations in Madison County.

American hart's-tongue fern (Phyllitis scolopendrium var. americana), Federally listed as threatened

This species is typically found in areas with shady, moist areas and in dolomitic limestone. The two populations known in Alabama are associated with caves. One population occurs in a Jackson County sinkhole on lands managed as an NWR. The other population is in Morgan County, in the privately owned pit entrance to a limestone cave.

Fleshyfruit gladecress (Leavenworthia crassa), Candidate for Federal listing

The fleshyfruit gladecress occurs in limestone cedar glades, as well as disturbed roadsides, pastures, cultivated fields, and old fields. In Alabama, there are records from Lauderdale, Lawrence, and Morgan Counties.

Green pitcher plant (Sarracenia oreophila), Federally listed as endangered

Green pitcher plants are found in seepage bogs, sandstone streambanks, and mixed oak or pine flatwoods, where soils are sandy and highly acidic. In Alabama, records are from the northeastern counties of

Jackson, Marshall, DeKalb, Cherokee, and Etowah. There are confirmed records of green pitcher plant on 635 acres of non-USFS FMO in Cherokee, DeKalb, and Etowah Counties and an additional 646 acres of non-USFS FMO within 200 meters of known occurrences.

3.2.7 Wildland Fire Ecology and Management

There are two wildfire seasons each year in southeastern States. The first wildfire season usually begins in late October with the first frost and hardwood leaf drop and runs through December. The second wildfire season usually begins in February and runs to mid-April or until spring green-up. These seasons vary from year to year, depending on rainfall, wind, and other weather factors. Wildfires in the South are normally not as large as those that occur in the West because of aggressive initial fire control. However, wildfires in the South cause extensive damage and can be an avenue for decay in individual trees, weakening them and making them susceptible to insect disease and infestation (Southern Group of State Foresters 2004).

Alabama's forests and associated species are adapted to regular wildland fire. However, changing land use practices, urban sprawl, land fragmentation, natural disasters such as hurricanes, increasing land values, population increases, and the transition from urban to rural populations results in a build up of fuels and a need to increase fuels management and wildland fire activities (Southern Group of State Foresters 2004). Through the course of an average year in Alabama, there are 4,000 individual wildland fires that burn 40,000 acres (Southern Group of State Foresters 2004). The average wildfire size is approximately 12 acres per fire (AFC 2004). Escaped fires from debris burning and arson are major causes of wildland fire, though lightning accounts for approximately 7 percent of wildfires (Southern Group of State Foresters 2004). "Each year Alabama wildfires damage or destroy 46 homes, 114 structures, and 1,100 vehicles" (Southern Group of State Foresters 2004). A rapidly expanding population has led to large and expanding areas of wildland-urban interface (WUI) across the State, with an estimated 1,350 WUI communities with potential wildland fire damage risk (Southern Group of State Foresters 2004).

The Alabama Forestry Commission (AFC) is responsible for suppression of all wildland fires in the State, except on lands under Federal ownership (Southern Group of State Foresters 2004). This includes suppression of wildland fires on nearly 28 million of the 32 million acres in Alabama and 23 million acres of forestland. These suppression activities apply to State and private forested acres plus other vegetated areas, such as farms and pastures. On Federally managed lands (5 percent of the forestland base), the AFC has mutual aid agreements to support Federal wildland fire suppression efforts.

Since forestlands and species in Alabama are adapted to regular disturbance by wildland fires to maintain forest health, but suppression activities limit the role of natural wildland fires, managed fuel treatments are needed to maintain forest health. Table 3-4 shows the fuels treatments completed in Alabama by Department of the Interior agencies and USFS. The BLM did not conduct any fuels treatments in Alabama over these 4 years. More than 98 percent of these treatments were completed by the USFS using prescribed fires approximately 90 percent of the time. More than 97 percent of Federal fuels treatments were applied in WUI areas.

Table 3-4. DOI and USDA Fuels Treatment Accomplishments for Alabama (Acres)

| Year | Wildland-Urban Interface | | | Other | | | Total |
|------|--------------------------|------------|--------|-------|------------|-------|--------|
| | Fire | Mechanical | Total | Fire | Mechanical | Total | |
| 2006 | 69,112 | 3,602 | 72,714 | 3,529 | 5,190 | 8,719 | 81,433 |
| 2005 | 84,804 | 12,313 | 97,117 | 157 | 282 | 439 | 97,556 |

| Year | Wildland-Urban Interface | | | Other | | | Total |
|------|--------------------------|------------|--------|-------|------------|-------|--------|
| | Fire | Mechanical | Total | Fire | Mechanical | Total | |
| 2004 | 82,391 | 6,336 | 88,727 | 0 | 0 | 0 | 88,727 |
| 2003 | 76,884 | 16 | 76,900 | 0 | 0 | 0 | 76,900 |

Source: <http://www.fireplan.gov/overview/States/al.html>, accessed March 2, 2007

Fuels treatments, including prescribed fire, are also implemented by the AFC on the private and State-owned forests. In addition, the AFC provides training and permitting to ensure that fuels treatments in these areas, and prescribed fire in particular, are completed in a manner that protects firefighter and public safety, as well as capital improvements and natural resources.

3.2.8 Cultural Resources

The Alabama surface and non-USFS FMO tracts have not been fully surveyed for cultural resources. Surveys that have been conducted are usually initiated by project proponents on a project-specific basis, such as for oil and gas, coal mining, transportation, or water projects, to comply with the requirements of Section 106 of the National Historic Preservation Act (NHPA), outlined in 36 Code of Federal Regulations (CFR) Part 800. Section 106 requires Federal agencies to identify prehistoric and historic properties potentially affected by an undertaking; assess the effects of the undertaking; consult with appropriate entities; and seek ways to avoid, minimize, or mitigate any adverse effects to the property.

A cultural resources literature and records search was conducted for the BLM surface and non-USFS FMO tracts in the State of Alabama. The results of the research are presented in an overview (Panamerican Consultants, Inc. 2005a) on file at the BLM office in Jackson. The following cultural resource information was taken from Panamerican Consultants, Inc. (2005a), unless otherwise noted.

Prehistory

A variety of cultural resource site types attributed to a range of culturally distinct chronological periods ranging from more than 10,000 years ago to the present day have been recorded in the southeastern United States. The cultural time periods represented include Paleoindian, Archaic, Gulf Formational, Woodland, Mississippian, and Protohistoric. Descriptions of the prehistoric periods and general types of cultural materials associated with each one are provided in Table 3-5 below. Cultural resources from any of these time periods may be present on BLM-administered surface and non-USFS FMO tracts.

Table 3-5. Prehistoric Periods Present in Southeastern United States

| Cultural Time Period | Time Frame (Years Before Present [B.P.]) | Characteristics |
|----------------------|--|--|
| PALEOINDIAN | 12,500–10,000 | Specialized nomadic hunters of now-extinct megafauna |
| Early Paleoindian | 12,500–10,900 | Fluted lanceolate points resembling western Clovis forms |
| Middle Paleoindian | 10,900–10,500 | Fluted and unfluted points with broad blades and constricted hafts, such as Cumberland, Suwannee, Simpson, Quad, and Beaver Lake |
| Late Paleoindian | 10,500–10,000 | Resharpended lanceolate corner- and side-notched forms, such as Dalton, San Patrice, and Bolen |

| Cultural Time Period | Time Frame (Years Before Present [B.P.]) | Characteristics |
|-------------------------|--|--|
| ARCHAIC | 10,000–3,000 | Marked by a shift in lifeways indicated by development of a more complex material culture, nomadism giving way to more sedentism, localized habitat exploitation, and dramatic population increase; many tool forms appeared for the first time during this stage |
| Early Archaic | 10,000–8,000 | A directional shift from highly curated tool forms associated with Paleoindian sites to highly expedient forms linked to Early Archaic corner-notched assemblages; an increase in residential mobility, as indicated by greater numbers of expedient tools in Early Archaic assemblages |
| Middle Archaic | 8,000–5,000 | Demarcated by the appearance of stemmed bifaces |
| Late Archaic | 5,000–3,050 | Increased sedentism and a practice of a dichotomous pattern of resource exploitation that shifted between riverine and uplands locations |
| GULF FORMATIONAL | 4,000–1,850 | Primarily recognized as an intermediate stage of social and economic change; the rise and development of baked clay ceramic technology during which Archaic peoples learned the manufacture of stone and ceramic vessels |
| Middle Gulf Formational | 3,200–2,500 | Characterized by fiber-tempered plain and punctate wares |
| Late Gulf Formational | 2,500–2,100 | Represented by disappearance of fiber-tempered ceramics and the rise of more decorative ceramic series |
| WOODLAND | 2,600–850 | Marked by the advent of cord-marked, fabric-impressed, and stamped pottery, construction of burial mounds, and increased reliance on domesticated cultigens; the bow and arrow was introduced |
| Early Woodland | 2,950–2,050 | Three phases, including the Kellog phase (sand-tempering fabric-impressed pottery types), Dry Branch phase (sand-tempered incised, punctated, and pinch pottery types), and Cedar Bluff phase (limestone-tempered fabric-impressed pottery) |
| Middle Woodland | 2,150–1,550 | Diversity in style and manufacture of pottery increased markedly; there was also an increase in burial mound construction, shared artifacts, and iconography, suggesting that a wide trade interaction continued across the United States |
| Late Woodland | 1,550–950 | A period of cultural decline related to turmoil across much of the East; however, this was not the case in every region of the Southeast; some diffusion of exotic and decorative motifs on pottery, and mound construction continued to play a crucial role in some regions of the eastern United States; population growth exploded early in this period; consequently, small communities and households were widely scattered across the landscape; the increase in population stress, particularly over food resources, and increased use of the bow and arrow, heightened warfare |

| Cultural Time Period | Time Frame (Years Before Present [B.P.]) | Characteristics |
|---|--|--|
| MISSISSIPPIAN | 1,050–450 | Complex sociopolitical organizations (chiefdoms) marked by the development of institutional inequality; large fortified settlements and civic-ceremonial centers distinguished by elaborate temple mounds were widespread phenomena during the Mississippian period |
| Early Mississippian | 1,050–750 | A very complex society and diversity varied greatly throughout the Southeast |
| Mature Mississippian | 750–450 | A very complex society and diversity varied greatly throughout the Southeast |
| PROTOHISTORIC | 400–235 | Defined in the southeastern United States as the era of transition from occupation of the region by preliterate societies to occupation by literate societies; widespread destruction of Indian villages and fields and introduction of previously absent Euro-Asian diseases caused massive demographic upheaval; trade and political networks were altered or broken down, and whole populations relocated or were devastated by illness |
| Source: Panamerican Consultants, Inc. 2005a, 2005b. | | |

History

A wealth of Alabama history is associated with American Indian inhabitants, European exploration, multiple battles, and the evolution of Southern culture. The events discussed below provide the context and relative importance of the cultural site types that may be encountered on BLM-administered surface and non-USFS FMO tracts.

From the 16th to the 19th century, Spain, France, and England fought for domination and possession of the territories and resources in the southeastern United States. Led by Hernando De Soto, Spanish explorers in search of gold were the first Europeans to reach this territory in 1539. During the Pontotoc Battle of 1541, many members of De Soto's expedition were killed in an attack by the Chickasaw Indians. An initial settlement in the Mobile Bay area by Spanish colonists from Mexico was abandoned in 1559, and Spain made no further effort to settle the area. The French were the first to successfully colonize Alabama. Early settlements were fortified trading posts along major rivers. French influence waned as the American Indians began to favor British traders from the Carolinas and Georgia. Great Britain and France fought a series of wars, climaxing with the French and Indian War (1754–1763). By the terms of the treaty ending the war, France ceded its North American lands to England. Britain created Reservation Lands for the American Indians in portions of the southeastern States.

American Indians had low immunity to new diseases brought by Europeans. By the 18th century, their numbers had been reduced and many tribes approached extinction (Dobyns 1983; Milner 1980; Ramenofsky 1987). Most of the survivors in present-day Alabama were members of four major Indian nations—the Creek, the Cherokee, the Chickasaw, and the Choctaw. The Cherokee Indians inhabited the northeastern corner, and the Chickasaw Indians claimed the northwestern corner of the State. The Choctaw Indians lived in the west-central portion, and the Creek Indians occupied the east-central and southern portions of the State.

In the language of the local Creek Indians, the word Alabama means “tribal town.” The American Revolution (1775–1783) had a profound effect on Alabama and American Indians, as did the Louisiana

Purchase, the War of 1812, and the Creek War. Until 1817, Alabama was a part of the Mississippi Territory, but in 1819, it became the 22nd State to enter the Union. From 1829–1837, the remaining Indian nations were forced to give up their lands and were moved west of the Mississippi. From the early 19th century, Alabama's economy was dominated by cotton. The highly productive regions of the State, namely the Black Belt region and the Tennessee Valley, soon brought a shift from independent, small farms to large plantations. Slavery was vital to the growth and production of cotton and became a contentious issue in Alabama and the other States. The pro-slavery States began to move toward secession from the Union, and in 1861, Alabama also voted to secede (Butterworth 1959). The people of Alabama played a major role in the Civil War; multiple battles were fought on State soil; and Montgomery was the first capital of the Confederacy, which was later moved to Virginia. In 1865, the Civil War ended and slaves were emancipated. Sharecropping and tenant farming became the common mode of farming.

In the late 1870s, railroads were built and cities that focused on the steel and iron industry emerged in north and north-central Alabama. Boll weevil damage to cotton crops in 1915 and exorbitant shipping charges caused farmers to concentrate on raising livestock and crops other than cotton. Coal mining also increased and brought new industry and economic opportunities to relatively poor regions of the State. In the 1930s, low-cost power provided by the Tennessee Valley Authority (TVA) encouraged industrial development and provided some rural residents with electricity for the first time. Alabama industry and farming further prospered under the demands of World War II (Rogers 1994). Alabama retained segregation as a policy until the civil rights movement from the 1950s through 1960s. Many of the major events and court cases that defined the modern civil rights movement in the United States took place in Alabama, including equal access for Black Americans to public and private transportation, schools, voting booths, economic opportunities, and housing. Manufacturing remained the dominant economic sector through the 1990s. Alabama's gross product also received significant contributions from the Government and service sectors.

Cultural Resource Sites

Prehistoric or historic cultural resource sites, structures, or objects listed on or eligible for listing on the National Register of Historic Places (NRHP) are protected and managed as directed by 36 CFR 800. A resource is considered eligible for listing in NRHP if it is at least 50 years old, unless of exceptional historical significance; retains integrity of location, design, setting, materials, workmanship, feeling, and association; and has one or more of the following characteristics:

- Associated with events that have made a significant contribution to the broad patterns of history
- Associated with the lives of persons significant in its past
- Embodies the distinctive characteristics of a type, period, or method of construction
- Represents the work of a master, has high artistic values, or represents a significant and distinguishable entity whose components may lack individual distinction
- Yielded, or may be likely to yield, information important in prehistory or history (36 CFR 60.4).

Cultural resources found ineligible for the NRHP require no further archaeological work and are not protected by law. Sites identified as undetermined or unknown need additional work to determine the site's eligibility.

Under the Archaeological Resources Protection Act (ARPA; 16 United States Code [USC] Section 470hh), the nature and location of any archaeological resource cannot be disclosed to the public unless the Federal land manager determines that such disclosure would provide further protection and there is no risk of harm to the site. To adequately address the existing condition of these resources while protecting their importance, only the general types of resources are discussed herein.

Records were searched for 2,847 non-USFS FMO tracts in Alabama. The records revealed 1,348 cultural sites within the BLM-administered, non-USFS FMO tracts, of which 315 were considered eligible for NRHP. Components of these sites ranged from Paleoindian to 20th-century historic. Most of the tracts have never been surveyed. There is a high potential for finding additional archaeological sites.

Records were searched for scattered BLM surface tracts in Alabama. None of the BLM surface tracts contain previously recorded NRHP properties. Thirteen sites were recorded within one-half mile of the BLM surface tracts and could provide information on the potential for occurrence sites on adjacent BLM surface tracts; however, these sites are not and will not be affected by BLM activities and management. Identified cultural sites are summarized in Table 3-6.

Table 3-6. Cultural Sites on BLM Surface and non-USFS FMO Tracts in Alabama

| Tract Type | Total Sites | NRHP Status | | |
|---|-------------|-----------------------------------|------------|--------------------------|
| | | Potentially Eligible/ Eligible | Ineligible | Undetermined/ Unknown |
| Non-USFS FMO Tracts | 1,348 | 315 | 669 | 364 |
| Surface Tracts ¹ | 0 | 0 | 0 | 0 |
| Areas Adjacent to Surface Tracts ² | 13 | 0 | 13 | 0 |

1 Sites located on surface, belong to surface owner.
2 Reflects sites within one-half mile of the surface tract boundaries.

3.2.9 Visual Resources

Visual resources consist of the natural and manmade features that contribute to a particular environment's aesthetics. These features may be natural (e.g., canyon views) or manmade (e.g., city skyline). Together, they form the overall impression of an area referred to as the landscape character. Visual resources also have a social setting, which includes public values, awareness, and concern about visual quality. Visual Resource Management (VRM) classifications are established for public lands so that visual resource values can be maintained through informed management decisions. Current conditions of visual character on the BLM-administered surface tracts are discussed in Section 3.3.

The visual resource inventory process contained in BLM Handbook H-8410-1 provides the BLM managers guidance for determining visual values. The inventory consists of scenic quality evaluation, sensitivity-level analysis, and delineation of distance zones. Based on these three factors, BLM-administered lands are placed into one of four visual resource inventory classes. These inventory classes represent the relative value of the visual resource: Classes I and II are the most valued, Class III represents a moderate value, and Class IV has the least value. Management objectives have been assigned to each class. An area may be inventoried as VRM Class III, but a decision may be made to manage it to VRM Class IV, or vice versa. Cultural modifications may detract from the scenery, complement it, or improve the overall scenic quality of an area. Cultural modifications in landform/water and vegetation values and addition of structures will be considered in examining proposed resource management actions.

The following VRM Class objectives from BLM Handbook H-8410-1 have been amended for the purpose of developing and implementing this resource management plan (RMP). Amendments incorporate the visual resource values provided by existing cultural features that are significant to the character of the landscape in Alabama and Mississippi.

- **VRM Class I Objective.** The objective of this class is to preserve the existing natural and cultural character of the landscape. This class provides for natural ecological changes; however, it does not preclude very limited management activity. The level of change to the characteristic landscape should be very low and must not detract from the existing landscape character.
- **VRM Class II Objective.** The objective of this class is to retain the existing natural and cultural character of the landscape. The level of change to the characteristic should be low. Management activities may be visible but should not attract the attention of the casual observer. Any changes must repeat the basic elements of form, line, color, and texture found in the predominant natural and/or cultural features of the characteristic landscape.
- **VRM Class III Objective.** The objective of this class is to partially retain the existing natural and cultural character of the landscape. The level of change to the characteristic landscape should be moderate. Management activities may be visible but should not dominate the view of the casual observer. Changes should blend with the natural environment.
- **VRM Class IV Objective.** The objective of this class is to provide for management activities that require significant modification of the existing landscape or the existing character of the natural and cultural landscape. The level of change to the characteristic landscape can be high. These management activities may dominate the view and be the major focus of the casual observer's attention; however, every attempt should be made to minimize the impact of these activities through selective location, minimal disturbance, and repetition of basic elements.

3.2.10 Minerals

There are 313,819 acres of non-USFS FMO in Alabama that underlie various surface ownership. Surface owners include the BLM, the Department of Defense (DoD), USFWS, National Park Service (NPS), and other Federal agencies. Table 3-7 shows BLM-administered FMO by surface ownership in Alabama.

Table 3-7. BLM-administered Federal Mineral Ownership by Surface Ownership in Alabama

| Surface Owners | Federal Mineral Ownership (Acres) |
|--------------------------------------|-----------------------------------|
| BLM | 159 |
| DoD | 1,495 |
| NPS | 3,300 |
| USFWS | 3,384 |
| Other Federal Agencies | 2,041 |
| Non-Federal surface | 303,440 |
| TOTAL non-USFS FMO | 313,819 |
| USFS | 585,394 |
| TOTAL FMO (included USFS FMO) | 899,213 |

Minerals—Oil and Gas

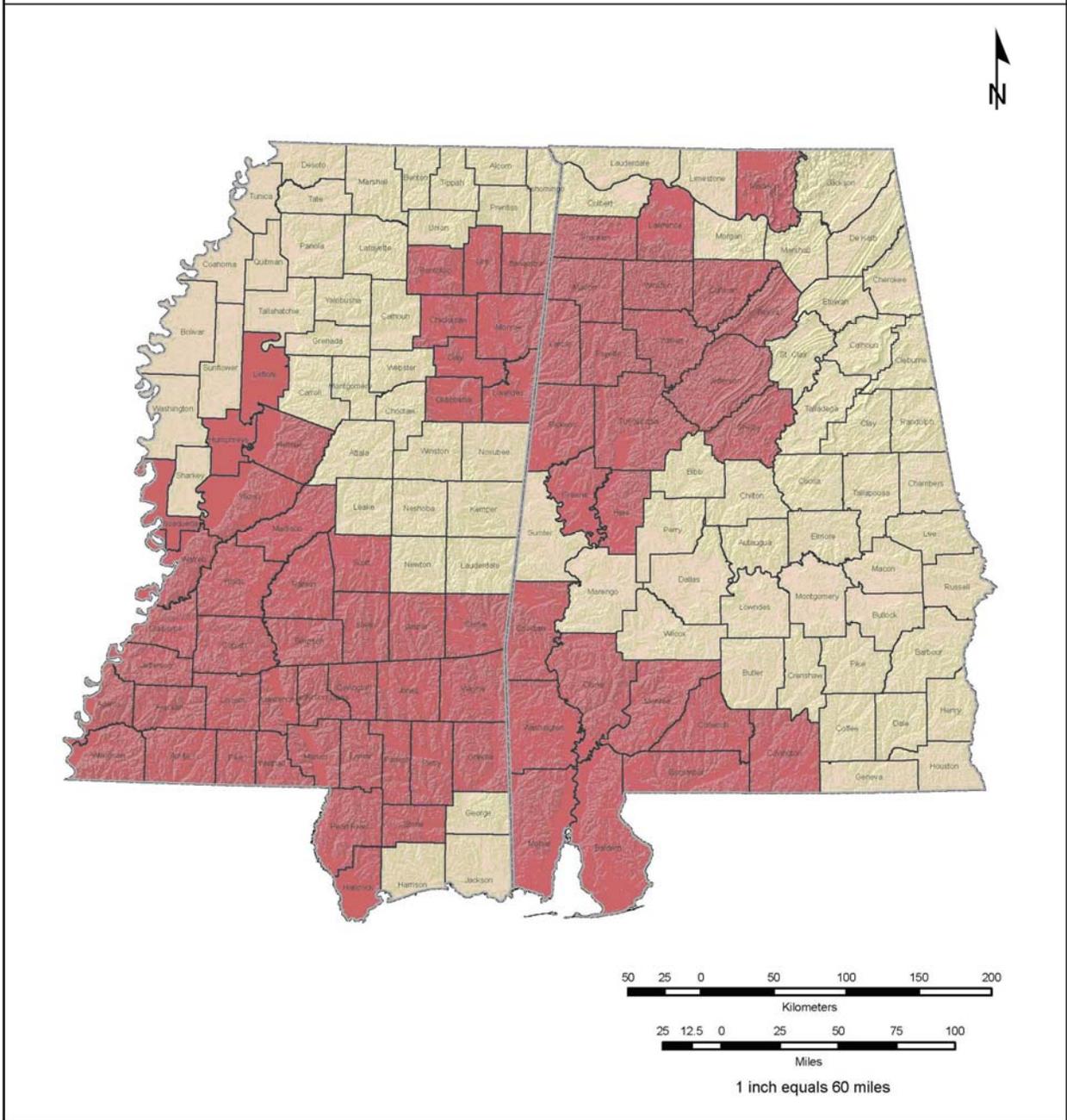
Oil and gas exploration began in Alabama in 1884 with the drilling of the Trowbridge #1 well near Bladen Springs in Choctaw County. This first well was a dry hole with a depth of 1,345 feet. Eighteen

years later (1902), the New York–Alabama Oil Company discovered the Huntsville Gas Field, which started the commercial extraction of oil and gas in the southeastern States. As of April 2005, there were 31 active oil and gas wells on BLM-administered, non-USFS FMO according to data from the Automated Fluid Mineral Management System.

According to available data from the Alabama Oil and Gas Board on Alabama oil and gas production from 1992 to 2002, oil production steadily decreased from 19,328,444 barrels to 8,631,227 barrels. During the same period, gas production increased from 336,129,406 thousand cubic feet (mcf) in 1992 to 388,631,710 mcf in 2002. Gas production peaked in 1995 at 438,838,497 mcf. As of April 2005, 136 Federal leases are authorized in Alabama. There are 30 existing leases on non-USFS FMO and 106 existing leases on USFS FMO.

Map 3-2 shows counties in Alabama with historical oil and gas production. Reasonable foreseeable development is anticipated in the areas of historical oil and gas production (BLM 2004b). The areas of historical production are the Warrior Basin and the southern Alabama Basin. The BLM projects that 20 wells accessing non-USFS FMO in Alabama would be drilled over the next 20 years (BLM 2004b).

Map 3-2: Oil and Gas Production
Alabama-Mississippi RMP-EIS



Oil and Gas Production

- Counties Where Production Has Occurred
- Counties Where Production Has Not Occurred
- County Boundary
- State Boundary

Both states are considered high potential for oil and gas.

Projection: UTM, Zone 16 North
Datum: North American Datum of 1983 (NAD83)

Sources: BLM, Jackson Field Office
Environmental Systems Research Institute
USGS - National Elevation Data



No warranty is made by the Bureau of Land Management as to the accuracy, reliability, or completeness of this data for individual use or aggregate use with other data.

Warrior Basin²

The roughly triangle-shaped Warrior Basin covers approximately 35,000 square miles in parts of Alabama, Arkansas, Georgia, Mississippi, and Tennessee. The northern boundary of the Warrior Basin is formed by the Ozark Uplift to the northwest and the Nashville Dome to the northeast. To the east and southeast, the basin is bound by the Appalachian system, and the Ouachita Fold and thrust belt bound the basin on the west and southwest.

Most of the oil and gas production is from the Mississippian and Pennsylvanian strata. The basin has a variety of trapping mechanisms with possibilities for multiple pay zones, which has led to a success rate of more than 50 percent. The Carter Sandstone of the Parkwood Formation is the most prolific oil- and gas-producing reservoir; however, a considerable amount of petroleum is produced from the Chandler and Nason Sandstones of the Pottsville Formation.

The major targets for coalbed natural gas production are the major coal groups in the Warrior Coal Field. These groups are the Black Creek, Mary Lee, and Pratt coal groups. However, all the coals can be potential sources of coalbed natural gas (BLM 2004b). Most of the coalbed natural gas wells in this area are producing from coals between 15 to 25 feet thick and at depths between 500 and 3,000 feet. The median product per well is 82 mcf per day.

Southern Alabama Basin

These lands are in an area dominated by the Gulf Coast geosyncline. This large basin was formed in the Jurassic period with a southward downwarping. The basin has accumulated sedimentary deposits as much as 30,000 feet thick. Zones of faults parallel the basin hinge line and can trap hydrocarbons (Murray 1964). Other structural features, such as small basement highs, also trap hydrocarbons.

The deposits in the major geologic units of southern Alabama mainly consist of alternating layers of sand and clay, with occasional beds of carbonates and anhydrite. Permeable horizons exist in all formations, and oil and gas are produced from each horizon in the region, with the Haynesville, Smackover, and Norphlet Formations having more importance (Cate 1982; Poe 1979; May 1974; Moore 1971; Dinkins 1968).

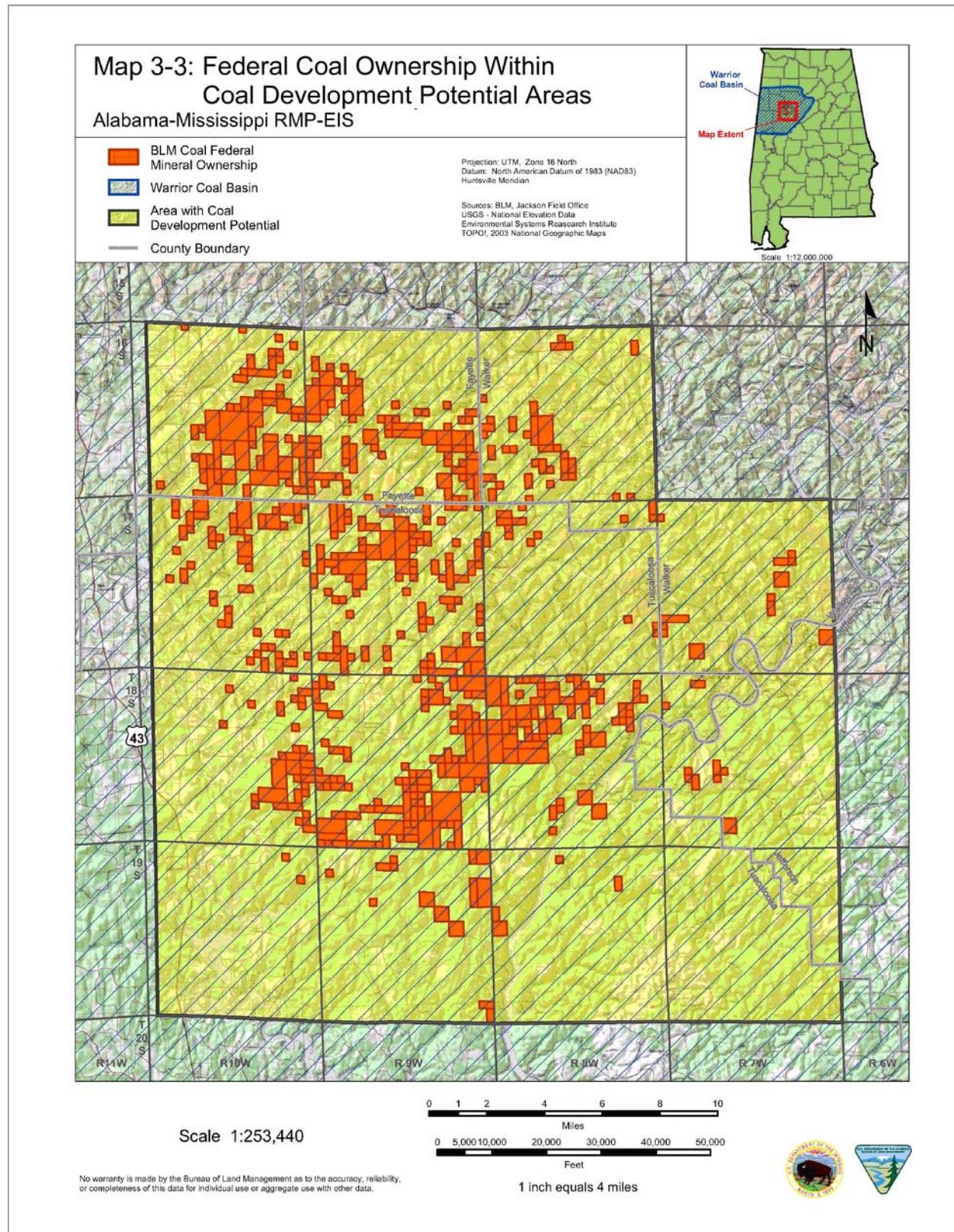
Leasable Minerals—Coal

There are three major coal fields in Alabama: the Coosa Coal Field, Cahaba Coal Field, and Warrior Coal Field. Farthest to the southeast, the Coosa Coal Field covers approximately 134,400 acres in Jefferson, Shelby, and St. Clair Counties in an elongated syncline along the trend of the Appalachian Mountains. Southwest of the Coosa Field and separated by the Cahaba Valley, the Cahaba Field includes approximately 230,400 acres of Bibb, Shelby, St. Clair, and Jefferson Counties. The largest of the three coal fields in Alabama, the Warrior Coal Field, includes approximately 2,324,470 acres in Walker, Fayette, Jefferson, and Tuscaloosa Counties.

Consideration of Alabama coal leasing in this RMP is limited to the Warrior Coal Field. Coal leasing potential within the planning area is limited to the Warrior Basin in Alabama because of the distinctive presence of the appropriate geological conditions (e.g., continuity of coal beds, thickness of coal, quality of coal seams) and existing infrastructure (e.g., existing subsurface mining operations and access roads) for development of coal resources. Non-USFS FMO available for coal leasing is located in Walker, Fayette, Jefferson, and Tuscaloosa Counties.

² The term “Warrior Basin” is a geologic province. The Black Warrior Basin is the drainage area of the Black Warrior River.

Within the Warrior Coal Field, the BLM retains 70,610 acres of coal mineral rights, 45,950 acres of which have been identified as high potential for development in the reasonably foreseeable development scenario (RFDS). It is anticipated that 9,000 acres of new Federal coal leases and 18.8 million tons of Federal coal would be produced (an average of 1.9 million tons per year) as part of existing underground mines with no new surface disturbance. This field includes two regions, the Plateau coal region and the Warrior coal basin (Map 3-3). The Plateau coal region is composed of several coal-bearing areas in the upland regions of northeastern Alabama. Federal coal ownership in the Plateau coal region is limited to the Talladega National Forest. The Plateau coal region is the largest of the Alabama coal fields, covering an area greater than all the other coal fields combined (2,880,000 acres). The Warrior Basin is the most productive and covers 2,240,000 acres in Tuscaloosa, Jefferson, Lamar, Marion, Winston, Fayette, Cullman, Blount, and Walker Counties. These coalbeds in the Plateau coal region and the Warrior coal basin are the major targets for the recovery of coalbed natural gas in the area, but all the coals can be sources of potential coalbed natural gas reserves (BLM 2004b). There is no BLM-administered surface in the Warrior coal basin. The Warrior coal basin contains more than 20 coalbeds, some of which are known to extend into the BLM-administered, non-USFS FMO of Mississippi. Most coal in the Warrior Basin is high-volatile "A" bituminous. Coal thickness generally varies from a few inches to about 75 inches, with ash content ranging between 3 and 15 percent and the sulfur from 1.1 to 3 percent. The thickest and most economically valuable coals within the Warrior coal basin are located in Tuscaloosa, Walker, Fayette, and Jefferson Counties. Coal is also present to a lesser degree in Marion and Winston Counties, but the development of Federal coal in these counties is unlikely. However, because of the depth of the mines and the availability of other easily obtainable resources such as oil and gas, much of the coal resources within the Warrior coal field have yet to be developed (Tew and Mancini 1986). On the basis of current information on and availability of other fuel resources, coal development will likely continue at the current rate.



3.2.11 Recreation and Travel Management

Recreation encompasses various human activities that affect and are affected by resources and other resource uses. Dispersed recreation is characterized by unstructured activities that are not confined to specific locations (such as developed recreation sites). Dispersed recreation can involve various activities, which on the Alabama surface tracts can include the following:

- Saltwater beach activities
- Hunting
- Fishing
- Bicycle riding
- Horseback riding
- Nature study
- Boating
- Picnicking
- Freshwater swimming
- Hiking
- Rock climbing.

The BLM-administered, non-USFS FMO includes the mineral estate where the surface is managed by another Federal surface managing agency. These properties and installations managed by other Federal agencies as well as non-Federal agencies, such as private, State, or county, are summarized in Table 3-8 and shown on Map 1-1 and Map 1-2.

For those tracts where the surface is managed by other surface management agencies and where public access for recreation and oil and gas leasing are permitted, recreation experiences and resulting benefits could be affected by the BLM-allowable uses and management actions proposed in this RMP. Information on public recreation and minerals leasing on other Federal surface management agencies is shown in Table 3-8.

Table 3-8. BLM-administered, non-USFS Federal Mineral Ownership¹ by Surface Managing Agency in Alabama

| Surface Managing Agency | Installations/Areas | Public Access for Recreation (Yes/No) ² | Mineral Leasing (Open/Closed) ² |
|-------------------------|--|--|--|
| USFWS | Bon Secour NWR | Yes | Closed |
| | Wheeler NWR | Yes | Closed |
| DoD | Barin Field (Navy) | ND | Open |
| | Summerdale Outlying Landing Field (Navy) | ND | Open |
| | Silverhill Outlying Landing Field (Navy) | ND | Open |
| | Fort Rucker Military Reservation (Army) | Yes | Open |
| | Fort McClellan Military Reservation (Army, Closed) | Yes | Open |
| | Anniston Army Depot (Army) | No | Open |
| | Redstone Arsenal (Army) | No | Open |
| | Lake Tholocco (Army Corps of Engineers) | Yes | Open |

| Surface Managing Agency | Installations/Areas | Public Access for Recreation (Yes/No) ² | Mineral Leasing (Open/Closed) ² |
|---|--|--|--|
| | Coffeeville Lake (Army Corps of Engineers) | Yes | Open |
| | William Dannelly Reservoir (Army Corps of Engineers) | Yes | Open |
| | Maxwell Air Force Base (Air Force) | No | Closed |
| NPS | Little River Canyon Preserve | Yes | Closed |
| Other | Areas managed by other Federal agencies | No | Varies |
| ND means no information was available from the surface managing agency. 1 Does not reflect BLM FMO for BLM surface tracts (159 acres). 2 Closed means closed to new leases. Existing leases could be present on areas currently closed. | | | |

The BLM administration of travel resources in Alabama is limited to access routes and associated access/maintenance routes for ROW such as transmission lines. Public travel routes are administered and maintained by other Federal, State, and local agencies. Some surface tracts are adjacent to these travel routes. Information on tract-specific travel resources are contained in Section 3.3.

3.2.12 Lands and Realty

The goals of the lands and realty program are to manage the public lands to support the goals and objectives of other resource programs, provide for uses of public lands in accordance with regulations and compatibility with other resources, and improve management of the public lands through land tenure adjustments. The lands and realty program is a support program to all other resources to help ensure that BLM-administered lands are managed to benefit the public. Current conditions of lands and realty on the BLM-administered surface tracts are discussed in Section 3.3.

3.2.13 Social and Economic

The affected environment in Alabama centers on the counties in the coal region where energy minerals development could occur. Over the last 10 to 20 years, oil and gas development has occurred primarily in the counties with high potential for coal (BLM 2004b). Therefore, the socioeconomic description is limited to the counties with high potential for coal: Tuscaloosa, Walker, Fayette, and Jefferson Counties.

Demographic, economic, and service data were collected from the U.S. Census, Bureau of Economic Analysis (BEA) and Bureau of Labor Statistics (BLS) from 1990 to 2002.

Economic Characteristics

Household and Personal Income

Median household income information for the four-county study area was obtained from the U.S. Census Bureau. In 2003, Jefferson County's median household income of \$38,558 is slightly higher than the median household income estimated for Alabama, which is \$36,131. The median household incomes for Fayette, Walker, and Tuscaloosa Counties (\$30,133, \$31,201, and \$35,192, respectively) are slightly lower than Jefferson County and the State in 2003.

Information on per capita income was obtained from BEA. Jefferson and Tuscaloosa Counties reported higher per capita incomes (\$36,041 and \$28,833, respectively) than Walker and Fayette Counties

(\$24,734 and \$22,073, respectively) for 2004. Jefferson and Tuscaloosa Counties' per capita incomes are higher than those of the State (\$27,695) for 2004. Trend information on per capita income was also obtained from BEA and adjusted for inflation (Figure G-5, Appendix G). Jefferson County's per capita income averaged \$33,065 over the 15-year period and has been consistently higher than the State average (\$26,594). Over this same time period, the average per capita income for Tuscaloosa County (\$27,136) has been similar to the State average, while Walker and Fayette Counties have had lower average per capita income (\$24,221 and \$21,902, respectively) than the State average.

Employment and Compensation

Information on employment by industry for the study area was obtained from BEA and U.S. Census County Business Patterns.³ There were 610,890 estimated jobs in the study area in 2004, which represent 24.9 percent of the Alabama labor force. The 610,890 jobs were distributed among the industries shown in Figure G-7 (Appendix G). Government and government enterprises (15.1 percent) composed the largest percentage of jobs. Retail trade (12.0 percent), health care (9.7 percent), and manufacturing (7.5 percent) were the next largest employers.

Unemployment trends information for the non-USFS FMO study area and the State of Alabama was obtained from BLS and are summarized in Figure G-4 (Appendix G). The unemployment rates in Tuscaloosa and Jefferson Counties have remained below the State unemployment rate from 1990 to 2005. Walker and Fayette Counties' unemployment rates were generally higher than the State's rate for the same time period. Overall, the unemployment trends of the four counties generally mirror the trend of the State, although Fayette County unemployment trends have greater magnitude in their movements.

In the four-county study area, the BLM administers the leasing of coal resources, allowing for the production of 1.9 millions tons of coal per year from these BLM minerals. In Alabama, mining (non oil and gas) accounts for approximately 6,773 employees and employee compensation of \$482,361,000 (BEA 2005). Currently coal produced from BLM-administered minerals accounts for approximately 10 percent of the total amount of coal produced in the State, 19.5 million tons of coal (Energy Information Agency 1999). If 10 percent of this employment and employee compensation can be attributed to BLM-administered minerals, this activity provides for 677 employees in mining, with total mining employee compensation of \$48,236,100. The average annual employee compensation for these workers is \$71,218, compared with average annual compensation from all industries in the State of \$34,877 (BEA 2005). Mining in the four-county study area likely provides fiscal revenues to local and State governments, supporting community and emergency services, schools, and infrastructure.

Oil and gas also provides employment and income within the four-county study area. However, over the past 20 years, the BLM has permitted 17 wells of a total of 8,068 wells permitted within the State. Therefore, although these BLM-administered oil and gas resources do contribute to employment and earnings in this area, it is a fairly small amount.

Social Characteristics

Demographics

Population trend data were obtained from BEA. Data for the non-USFS FMO study area between 1990 and 2004 are summarized in Figure G-1 (Appendix G). Total population in the combined study area in 2004 was 913,707 and comprised 20.2 percent of the population of Alabama. Jefferson County's

³ U.S. Census County Business Patterns data was used to estimate employment by industry data that were not disclosed by the BEA.

population was the largest in 2004 with 658,468 residents. For the same year, Tuscaloosa County (167,178), Walker County (69,876), and Fayette County (18,185) populations were considerably smaller. All four counties experienced small population growth over the 15-year period. The total population in the combined study area increased by 2.8 percent from 888,982 in 1990 to 913,707 in 2002. The median age of the combined study area population in 2000 was estimated to be 35.6—slightly lower than the State median of 35.8 (U.S. Census 2000).

Housing

The average number of people per household in Walker County (2.46), Jefferson County (2.45), Fayette County (2.42), and Tuscaloosa County (2.42) are similar. The average number of people per family in Jefferson County (3.04), Tuscaloosa County (3.00), Walker County (2.93), and Fayette County (2.92) are also similar (BEA 2000). In the study area, 91 percent of the 363,639 housing units were occupied in 2000. Homeowners occupied 67 percent of the total housing units.

All four counties in the study area have low homeowner vacancy rates: 1.9 percent in Jefferson County, 1.8 percent in Walker County, and 1.7 percent in Fayette and Tuscaloosa Counties. Rental vacancy rates are somewhat higher: 14.1 percent in Walker County, 12.3 percent in Tuscaloosa County, 11.1 percent in Fayette County, and 10.2 percent in Jefferson County (U.S. Census 2000). The median value of owner-occupied housing units for Tuscaloosa and Jefferson Counties (\$106,600 and \$90,700, respectively) were higher than the State median (\$85,100). Walker and Fayette Counties' median value of owner-occupied housing units (\$66,700 and \$64,100, respectively) were lower than the State's median (U.S. Census 2000).

Educational Attainment

Educational attainment of the population that is 25 years of age and older varies between the four counties in the study area. In Jefferson County, 80.9 percent of the population has graduated high school or higher and 24.6 percent hold a bachelor's degree or higher (U.S. Census 2000). Tuscaloosa County has a similar populace, with 78.8 percent graduating high school or higher and 24.0 percent with a bachelor's degree or higher. The percentage of the population graduating from high school or higher for Walker and Fayette Counties is 67.2 percent and 66.1 percent, respectively, and those having a bachelor's degree or higher is 9.1 percent and 9.2 percent, respectively. The educational attainment in figures in Walker and Fayette Counties are lower than those in Jefferson and Tuscaloosa Counties.

Attitudes and Beliefs of Alabama Stakeholders

In Alabama, the BLM has responsibility for a number of issues and decisions that could be important to stakeholders and their beliefs, including Federal land disposal, mineral development, including coal and oil and gas. This section will briefly describe stakeholders' attitudes and beliefs related to these specific issues to provide a social context for these decisions.

Public lands are important in providing a natural resource base for economic activities. Oil and gas, as well as coal, development will be supported by some stakeholders and not by others. Stakeholders who support mineral development believe that domestic production of resources provides products on which the public relies heavily, generating economic and social benefits. Without the availability and access for development of these resources, stakeholders feel that many adverse impacts could occur, including trade gaps, increasing prices, and strategic vulnerabilities. Additionally, the mineral industries have contributed to the tax base of both counties and the State, providing funds for local, regional, and State governments, infrastructure, schools, and other community services. Many people believe that this funding is vital to the economy of Alabama counties and the State. Some stakeholders will support these mining activities due

to the economic benefits in income, jobs, and government revenues, while others will be concerned that the economic benefit may not offset the risks to environmental and water resources from the activity.

Conservation-focused stakeholders may not support mineral development or might support conditions and stipulations on development and production to reduce negative impacts to the surface and subsurface. These environmental stakeholders are concerned about erosion and water quality impacts associated with road and wellpad construction as well as water disposal in the production process. Some stakeholders believe that the potential long-term environmental risks of development are considerable compared to the short-term benefit of the resource extracted. Additionally, these types of stakeholders believe that mineral development impacts such as increased road building, associated road traffic, dust, and noise add to the negative impacts associated with this type of development.

Public land disposal may also be a contentious issue with the public. The BLM in Alabama manages a number of pocket properties scattered across the State, totaling 159 acres. Preservation-oriented stakeholders are concerned about protecting open spaces and limiting development on these lands, often to maintain a quality of life that the property provides. For example, quality of life attributes could include recreation, such as bird-watching or walking, solitude, and the knowledge that the property provides important wildlife habitat. Therefore, these types of stakeholders believe that keeping the surface lands in Federal ownership is preferable or selling these lands to organizations interested in preserving the lands. Developers might be interested in purchasing these lands for their economic value due to their location on the coast if the lands are buildable. Additionally, some people may feel that disposing of Federal lands provides important fiscal revenues as private property taxes can be collected.

Environmental Justice

Environmental justice is another component of the community that considers minority or low-income populations to determine whether or not any of the proposed alternatives have a disproportionately high and adverse human health or environmental effect on those populations. Environmental justice analysis is conducted in compliance with Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations. On the basis of Council on Environmental Quality (CEQ) guidance, minority populations should be identified where (a) the minority population of the area exceeds 50 percent, or (b) the minority population percentage of the affected area is significantly greater than the minority population percentage in the general population or other appropriate unit of geographic analysis.⁴ Low-income populations are defined as those below the Federal poverty thresholds. Those populations are identified using statistical poverty thresholds from the Bureau of Census—\$17,463 for a family of four (U.S. Census 2000). EPA identifies a low-income community as an area with a significantly greater population of low-income families than a statistical reference area.⁵ For the purposes of this socioeconomic analysis, a low-income population area will be defined as an area where the low-income population exceeds 20 percent poverty or one where isolated pockets of large low-income populations are present.

The poverty levels in three of the four counties (Fayette, Tuscaloosa, and Walker Counties) are higher than the statewide estimate of 16.1 percent, as summarized in Figure G-2 (Appendix G). Fayette County has the largest percentage of the population below the poverty level (17.3 percent). Jefferson County has the smallest percentage of the population below the poverty level (14.8 percent). The poverty levels in all four counties are below the set threshold of 20 percent for low-income populations and, therefore, do not

⁴ Council on Environmental Quality, *Environmental Justice Guidance Under the National Environmental Policy Act, 1997*.

⁵ Environmental Protection Agency, *Final Guidance for Incorporating Environmental Justice Concerns in EPA's NEPA Compliance Analysis, 1998*.

represent environmental justice populations. In comparison, in 2004, there were 19 of a total of 67 counties in Alabama that had populations that were greater than 20 percent in poverty status.

The ethnicity data for the study area in Figure G-3 (Appendix G) were also obtained from the U.S. Census Bureau. The four-county study area is predominantly white (62.4 percent). The remaining race distribution in the study area includes Black or African American (34.3 percent), Hispanic or Latino (1.4 percent), Asian (0.8 percent), two or more races (0.7 percent), American Indian or Native Alaskan (0.2 percent), other race (0.1 percent), and Native Hawaiian or other Pacific Islander (0.0 percent). The ethnic representation in the study area is similar to race distribution for the State, but has higher Black or African American estimates. The overall percentages of minority populations in Walker County (8.3 percent) and Fayette County (13.5 percent) are lower than the minority percentage for Alabama (29.7 percent), whereas the minority percentages for Tuscaloosa County (32.5 percent) and Jefferson County (42.6 percent) are higher than the State's percentage. However, the minority percentages for all four counties are below the CEQ threshold of 50 percent and not significantly higher than the State average of 29.7 percent.

3.2.14 Hazardous Materials

BLM-administered public lands and minerals provide opportunities for a variety of commercial uses in addition to resource management. Both activities can lead to releases of hazardous substances and creation of hazardous waste sites. The BLM engages in hazardous material emergency response actions, site evaluations, and prioritization of cleanups in accordance with laws and regulations. This involves working with the EPA, State environmental quality departments, counties, and potentially responsible parties (both public and private) to fund and expedite the cleanup of hazardous sites. Those sites that are an imminent threat to public health and safety, as well as those sites that are under a consent order and can therefore generate penalties and fines, are a priority for the Bureau. There are no known hazardous, toxic, or unapproved solid waste sites on public lands within the planning area.

3.3 ALABAMA SURFACE TRACT DESCRIPTION

The surface tract descriptions in this section include available detail on each of the surface tract groupings described in Chapter 2. General information and tract-specific information on soil resources, water resources, vegetative communities, fish and wildlife, special status species, cultural resources, visual resources, recreation and travel management, and lands and realty are provided for each tract grouping. Air quality, wildland fire ecology and management, minerals, and social and economic conditions are discussed in Section 3.2.

General. This section provides basic location and size of the surface tracts, as well as available background information.

Soil Resources. This section provides a table of the soils present at the tracts, the erosion hazard potential as indicated by NRCS, and the presence of prime or unique farmlands (defined in Section 0).

Water Resources. This section describes which drainage basin the surface tract is within.

Vegetative Communities. This section summarizes the vegetative communities related to the tracts. An analysis of the available GAP data was used to delineate the vegetative communities on the surface tracts. The GAP is coordinated by the Biological Resources Division of the U.S. Geological Survey (USGS).

Fish and Wildlife. This section summarizes the fish and wildlife species associated with the tracts. GAP provides geographic information on the status and location of species and their habitat. The GAP is coordinated by the Biological Resources Division of USGS.

Special Status Species. This section summarizes the special status species associated with the tracts. GAP provides geographic information on the status and location of species and their habitat. The GAP is coordinated by the Biological Resources Division of USGS. Available special status species occurrences on the tracts are discussed. Appendix E provides additional information on special status species in the areas around the surface tracts.

Cultural Resources. This section summarizes the known sites and cultural resources survey information for the surface tracts.

Visual Resources. This section addresses the visual setting of BLM-administered surface tracts. The surface tracts are not currently classified according to a VRM system. VRM classifications are described in Section 3.2.9. The surface tracts in Alabama have not been inventoried for VRM classification.

Recreation and Travel Management. This section addresses the existing recreational and travel management activities on BLM-administered surface tracts.

Lands and Realty. This section addresses the lands and realty actions associated with surface tracts, including withdrawals, disposals, and ROW actions.

3.3.1 Coosa River Tracts

General

The Coosa River tracts are 12 island tracts totaling approximately 42 acres in Calhoun, Coosa, Shelby, and Talladega Counties. These tracts are Federally owned, surveyed islands that have never been patented to private ownership. The islands range from water level to only a few feet above water level.

Soil Resources

There is no soil classification for this tract. The tracts are characterized as vegetated islands in the middle of the Coosa River.

Water Resources

All the Coosa River tracts are located within the Coosa River drainage basin.

Vegetative Communities

The Coosa River islands are located in areas inundated by a series of three dams constructed along the Coosa River between 1914 and the 1960s. The larger islands reflect the vegetation communities found in adjacent areas, primarily dry hardwood forest, with pine interspersed in the interior on the larger islands, in Mitchell Lake. On these islands, the hardwood component tends to be more diverse around the lower elevations of the islands and includes hickory (*Carya* spp.), common persimmon (*Diospyros virginiana*), sweetgum (*Liquidambar styraciflua*), southern hackberry (*Celtis occidentalis*), eastern sycamore (*Platanus occidentalis*), southern red oak (*Quercus falcata*), water oak (*Quercus nigra*), and loblolly pine (*Pinus taeda*). The interiors of the islands are generally dominated by larger water oak and loblolly pine with diameters up to 24 inches and 70–80 inches tall. The understory is relatively clear with young red maple (*Acer rubrum*), common wax myrtle (*Myrica cerifera*), blueberry (*Vaccinium* spp.), American beautyberry (*Callicarpa americana*) and bracken (*Pteridium aquilina*). There are some burn scars on larger pine, indicating past burns on some of the islands. Big Rock Island in Mitchell Lake rises approximately 120 feet above the lake and, as its name denotes, has sheer rock faces around much of the island, with seepage areas, ferns, and Spanish moss draping these areas. Smith and Prince Islands above Mitchell Lake tend to be flatter, lower, and dominated by mature water oak, with the additional species such as silver maple (*Acer saccharinum*), ashleaf maple (*Acer negundo*), and southern catalpa (*Catalpa bignonioides*). The leading edges of the smaller islands in the main river channel show signs of eroding, with downed trees and bare soils. The most northerly of the Coosa River tracts in Calhoun County was not visited, but from aerial photos it appears to be a sandbar with little or no vegetation.

Chinese privet (*Ligustrum sinense*), Japanese honeysuckle (*Lonicera japonica*), and mimosa tree (*Albizia julibrissin*) are present on most of the islands. Chinese privet occurs on the edges of the flatter islands north of Mitchell Lake and particularly frequently on the eroding leading edges of some islands. The Alabama Power Company treats aquatic invasive plant species throughout much of Coosa River. In 2002, over 200 acres were treated for emergent and submersed aquatic invasives in Lay, Jordan/Bouldin, and Mitchell Lakes, including alligator weed (*Alternanthera philoxeroides*), floating water hyacinth (*Eichhornia crassipes*), parrot-feather (*Myriophyllum aquaticum*), and spinyleaf naiad (*Najas minor*) (http://www.southerncompany.com/alpower/hydro/pdfs/E7_Issue_Recommendations.pdf).

Fish and Wildlife

The Coosa River islands provide a variety of shoreline habitats for resident and migratory wading birds, including great blue heron (*Ardea herodias*), black-crowned night heron (*Nycticorax nycticorax*), and little blue heron (*Egretta caerulea*). The wetland and upland habitats on the islands provide nesting habitat for neotropical migrants, such as prothonotary warbler (*Protonotaria citrea*), summer tanager (*Piranga rubra*) and solitary vireo (*Vireo solitarius*), and year-round residents such as belted kingfisher (*Megaceryle alcyon*), rufous-sided towhee (*Pipilo erythrophthalmus*), Carolina wren (*Thryothorus ludovicianus*), and downy woodpecker (*Picoides pubescens*). Typical reptiles include midland water snake (*Nerodia sipedon pleuralis*) and common five-lined skink (*Eumeces fasciatus*). Those tracts outside of Mitchell Lake, particularly the Calhoun County tract, could provide basking areas and even nesting sites for river turtles. Typical mammals would include otter (*Lutra canadensis*), mink (*Mustela vison*), and raccoon (*Procyon lotor*), while armadillo (*Dasypus novemcinctus*) are common in the upland areas of larger islands.

Special Status Species

A bald eagle nest was located on these islands in 2005. Most of the larger islands support suitable nesting trees and roosting habitat, and the Coosa River provides optimal foraging habitat. The islands do not provide suitable nesting habitat for red-cockaded woodpecker, although some of the larger islands provide marginally suitable foraging habitat.

There are no known records of Federally listed plants on the Coosa River islands; however, there have been no surveys of the tracts.

Cultural Resources

The Coosa River tracts have not been surveyed. However, two cultural sites are located within one-half mile of four tracts: the single tract in Calhoun County and three tracts in Talladega County.

Visual Resources

The islands that make up the Coosa River tracts are visible from the shore; there is little or no development or other human activity on the shores opposite the islands, except for residences opposite Prince Island.

Recreation and Travel Management

The Coosa River tracts are used for dispersed recreation. Opportunities for recreation on the islands, however, are limited by their small size and the fact that they are only accessible through travel by water. Fishing, picnicking, rest stops of boaters and canoeists, and wildlife observation are examples of recreation opportunities on the islands.

Although use on the islands is limited, they are identified as supporting water-based recreation opportunities by the Coosa River Recreation Plan (Alabama Power Co. 2005). The lakes that surround these islands (Mitchell Lake, Lay Lake, and H. Neely Henry Lake) are all popular for recreation activities such as boat fishing, pleasure boating, swimming, and picnicking. In 2000, these three developments combined to support 1,134,400 recreation days. Boat fishing was by far the most popular activity with 989,100 recreation days. Lay Lake hosted the 2007 Bassmasters Classic fishing tournament, and smaller tournaments are regularly held on these lakes.

Lands and Realty

All of the Coosa River islands are within areas impounded for hydroelectric purposes. Big Rock Island, Little Rock Island, and the Foshee Islands are in Mitchell Lake; Smith Island and Prince Island are in Lay Lake; and the unnamed island is within H. Neely Henry Lake. These projects are licensed under the authority of the Federal Water Power Act of 1920, which created the Federal Power Commission (FPC), now the Federal Energy Regulatory Commission (FERC). Mitchell Dam was originally licensed as Project No. 82, and Lay Dam and H. Neely Henry Dam were included in Project No. 2146. Now, these projects are combined for licensing purposes as Project No. 2146-111.

Public domain lands within project areas were withdrawn for water power purposes. After projects were completed, FPC often relinquished the withdrawal of the lands no longer needed for project purposes. In the case of the Coosa River islands, this generally included relinquishment of the land above the water level. For example, in 1955, the land withdrawn for the Mitchell Dam (Project No. 82) was modified to include only the land below the 360-foot elevation contour.

There are historical records of application to acquire some of the Coosa River islands. In 1959, for example, the State of Alabama Department of Conservation applied for Big Rock Island, Little Rock Island, and the Foshee Islands under the Recreation and Public Purposes (R&PP) Act, but the application was later withdrawn. In addition, several color-of-title applications were submitted in the 1950s, but all were rejected.

There are no BLM-authorized ROW or other uses on the Coosa River islands. A power line, however, crosses the southern end of Prince Island (with no ground supports on the island).

3.3.2 Fort Morgan Beach Tracts

General

Seven tracts in Baldwin County totaling 28.7 acres comprise the Fort Morgan Beach tracts. These tracts provide access to recreation activities on the Gulf and its beaches, which were severely damaged by Hurricane Ivan in 2004. Boardwalks partially destroyed by Ivan may be rebuilt. These tracts fall within the CZM Program.

Soil Resources

The soil classification for this tract is displayed in Table 3-9.

Table 3-9. Soil Classification for the Fort Morgan Beach Tracts

| Soil Type | Description | Erosion Hazard | Prime Farmland |
|-----------------|--|----------------|----------------|
| Coastal beaches | Moderately deep and poorly drained to excessively drained soils that border saltwater and freshwater lakes | None | No |

Water Resources

The Fort Morgan Beach tracts are located within the Mobile River drainage basin.

Vegetative Communities

The Fort Morgan Beach tracts border the Gulf of Mexico and include back beach, primary dunes, and in some cases extend landward sufficiently to encompass secondary dunes. Throughout these tracts, the dominant species is sea oats (*Uniola paniculata*). Other species characteristic of this habitat include marsh-elder (*Iva frutescens*), and Gulf bluestem (*Schizachyrium maritimum*), sandhill rosemary (*Ceratiola ericoides*), woody goldenrod (*Chrysoma pauciflosculosa*), beach sand-squares (*Paronychia erecta*), and Gulf rockrose (*Helianthemum arenicola*). These tracts, along with the rest of the Fort Morgan peninsula, were heavily impacted by Hurricane Ivan in 2004, when storm surges inundated much of the peninsula. Coastal dunes throughout this area were destroyed and dune vegetation was obliterated. These dunes are dynamic systems adapted to these storm cycles. Since Hurricane Ivan and other major storms that hit this coastline in 2005, these dunes have continued to accrete, accelerated by pioneering sea oats. There are no known exotic plant species identified on the Fort Morgan Beach tracts.

Fish and Wildlife

The coastal dunes and back beach areas of the Fort Morgan Beach tracts provide important foraging habitat for a host of shorebirds, gulls, terns and others, such as Wilson's plover (*Charadrius wilsonia*), willet (*Catoptrophorus semipalmatus*), sanderling (*Calidris alba*), short-billed dowitcher (*Limnodromus griseus*), ring-billed gull (*Larus delawarensis*), royal tern (*Sterna maxima*), and black skimmer (*Rynchops niger*). Feral and domestic cats are a management concern in this area because of predation on beach mice and nesting shorebirds.

Special Status Species

All of the Fort Morgan Beach tracts are designated critical habitat for Alabama beach mouse and contain primary dunes, the preferred habitat for this species. Populations are recovering after Hurricane Ivan inundated much of this area in 2004, and Alabama beach mouse was found on the BLM beach tracts in early February 2007 (Matt Falcey personal communication). The tracts also provide nesting habitat for loggerhead sea turtle (*Caretta caretta*), and potentially green sea turtle (*Chelonia mydas*) and Kemp's Ridley sea turtle (*Lepidochelys kempii*). The adjacent Bon Secour NWR has documented loggerhead nests to be 4.5 to 5 nests per mile, higher than many areas along the Gulf Coast (USFWS 2004). The tracts also provide habitat for wintering piping plover (*Charadrius melodus*), likely a mixture of the threatened Atlantic Coast and endangered Great Lakes populations, although the designated critical habitat for wintering piping plover at Fort Morgan is west of the BLM tracts. Snowy plover (*Charadrius alexandrinus*), Wilson's plover (*Charadrius wilsonia*), and American oystercatcher (*Haematopus palliatus*) are known to nest on the refuge. There are no known records of Federally listed plants on these tracts.

Cultural Resources

The Fort Morgan Beach tracts have been surveyed. Four cultural sites are located within one-half mile of three of the beach tracts.

Visual Resources

Visual features of the Fort Morgan Beach tracts include sand dunes, beach and open sea, mixed vegetation, boardwalks, and adjacent residential and other development.

Recreation and Travel Management

The Fort Morgan Beach tracts provide access for recreational use of the beach, including saltwater fishing. There are no developments on the tracts, but some parking is available on adjacent roadways. In 2004, the vast majority of recreational use of similar tracts on the nearby Bon Secour NWR was classified as either beach/water use or saltwater fishing. There were a total of 53,395 visits for these two activities with 32,721 of the visits by residents, defined as people living within 30 miles.

Lands and Realty

In the early 1950s, much of the remaining public domain land on the Fort Morgan Peninsula was classified (by Alabama Small Tract Classification Orders No. 1 and 2) for disposal pursuant to the Small Tract Act of 1938. This land was subdivided into about 190 lots ranging in size from 0.72 to 2.61 acres. By 1960, the BLM had sold most of the lots, many to World War II veterans who were given a statutory preference.

The lots identified in this document as the Fort Morgan Beach tracts were not classified for disposal and were specifically “set aside” by the classification orders “and reserved as recreation areas for use by the general public.” The classification orders also reserved “a 33-foot ROW for roads and public utilities” on the border of each lot, and some of these are partially on the Fort Morgan Beach tracts. The legacy of the Small Tract Act is still evident in the land use patterns in the area immediately surrounding the Fort Morgan Beach tracts. Other than the ROW reserved by the small tract classifications, there are no authorized uses on the Fort Morgan Beach tracts.

3.3.3 Fort Morgan Highway Tracts

General

The Fort Morgan Highway tracts are located in Baldwin County along the Dixie-Graves Highway (SH 180), which provides access to the end of the Fort Morgan Peninsula. There are five tracts totaling approximately 41 acres within this tract group. High-density development and highway expansion near these tracts could be planned for the future.

Soil Resources

The soil classification for the Fort Morgan Highway tracts is provided in Table 3-10.

Table 3-10. Soil Classification for the Fort Morgan Highway Tracts

| Soil Type | Description | Erosion Hazard | Prime Farmland |
|---------------------------------------|--|---|----------------|
| Leon sand | Deep, poorly drained, nearly level soils on uplands; sandy surface layers and sandy and loamy subsoils | Slight | No |
| St. Lucie sand, 0 to 5 percent slopes | Deep, excessively drained, nearly level to steep soils on undulating ridges and short side slopes on uplands; sandy surface layers and underlying material | Very Severe | No |
| St. Lucie–Leon–Muck complex | Deep, poorly drained, nearly level soils on uplands; sandy surface layers and sandy loamy subsoils | None to Severe, depending on water saturation | No |

Water Resources

The Fort Morgan Highway tracts are located within the Mobile River drainage basin.

Vegetative Communities

The narrow Fort Morgan Highway tracts are dominated by a sand pine/oak scrub plant community with scattered clusters of slash pine. Pine coverage is generally 10 to 15 percent, and trees are generally 5 to 10 inches diameter at breast height. In the more xeric sites, the shrub layer is dominated by 8 to 12 feet tall scrub oak species, including scrub live oak (*Quercus geminata*) and myrtle oak (*Quercus myrtifolia*). Other understory species include rosemary (*Conradina canescens*), gopher apple (*Licania michauxii*), St. John's wort (*Hypericum crux-andreae*), and saw palmetto (*Serenoa repens*). Reindeer lichen (*Cladonia rangifera*) and British soldier (*Cladonia cristella*) occur as a ground cover in protected areas of the scrub.

These highway tracts were inundated by Hurricane Ivan's storm surge in the fall of 2004. Although direct damage from wind was minimal, low areas where brackish waters stood for extended periods resulted in die-offs of pine and saw palmetto. A 30-foot utility corridor has been cleared on the southern edge of the tracts and contains more ruderal species, including blackberry/dewberry (*Rubus* spp.), groundsel-tree (*Baccharis halimifolia*), and common wax myrtle (*Myrica cerifera*).

In Lots 5 and 15, there are a small series of isolated wetlands dominated by sawgrass (*Cladium jamaicense*) with scattered patches of needlerush (*Juncus roemerianus*) and fringed by saw palmetto (*Serenoa repens*). Wild hibiscus (*Hibiscus grandiflora*), arrowhead (*Sagittaria lancifolia*), and titi (*Cyrilla racemiflora*) are also common in these low-lying areas. Both of these tracts show evidence of a previous burn.

Cogon grass (*Imperata cylindrical*) and Chinese tallow both occur sporadically along disturbed edges of the Fort Morgan Highway tracts.

Fish and Wildlife

Fort Morgan Peninsula, and the Bon Secour NWR in particular, provide the best remaining stopover and staging habitats for neotropical migratory songbirds along the Alabama coastline. In addition, the area is famous for its fall hawk migration. Over 370 species of birds have been identified at the Bon Secour NWR during migration seasons (USFWS 2007). Both the Bon Secour NWR and the nearby Fort Morgan State Park are designated Globally Important Bird Areas by the American Bird Conservancy. Several locations on the Fort Morgan Peninsula are listed on the Alabama Coastal Birding Trail, including several close to the BLM tracts.

Wetlands on Lots 5 and 15 of the Fort Morgan Highway tracts provide habitat for reptiles, amphibians, wading birds, and furbearers such as muskrat, mink, raccoon, and rabbit. The refuge has documented at least 15 species of turtles, 9 species of lizards, more than 30 species of snakes, and the American alligator (*Alligator mississippiensis*) in the area.

Special Status Species

The original critical habitat designation for Alabama beach mouse was recently modified to include the higher elevation scrub habitats determined to be important for the mouse during and after hurricane

events (Federal Register, Vol. 71, No. 21, Wednesday, February 1, 2006). This expanded critical habitat includes all of the Fort Morgan Beach tracts.

Cultural Resources

The Fort Morgan Highway tracts have been surveyed. Four cultural sites are located within one-half mile of five of the highway tracts.

Visual Resources

The Fort Morgan Highway tracts are forested with pine and scrub vegetation and are generally flat. The visual setting is dominated by human activity.

Recreation and Travel Management

Recreation use on the Fort Morgan Highway tracts is primarily associated with Highway 180 and the parkway corridor, which is designated as part of the Alabama Scenic Byway. Activities along the highway corridor include driving, sightseeing, bicycling, and hiking. Several hiking trails on the Bon Secour NWR can be accessed from the parkway corridor. Historic Fort Morgan State Park at the end of the peninsula is a popular destination.

Lands and Realty

The Fort Morgan Highway tracts are within the same small tract area as the Fort Morgan Beach tracts. The plats of survey for the small tract area, however, made separate lots of the public domain lands within the 330-foot wide Dixie Graves Parkway (Highway 180). These lots are referred to in this document as the Fort Morgan Highway tracts and were exempted from disposal by the small tract classification orders. In addition to Highway 180, there are also some utilities and driveways on the lots. While the BLM plats of survey identified the parkway as separate lots, there is no record that the BLM granted any ROW or other authorized uses within the parkway lots.

3.3.4 Fowl River Tract

General

There is no legal vehicle access to the 41.73-acre Fowl River tract in Mobile County. Adjacent land is privately owned. Bellingrath Gardens, a 65-acre estate with formal gardens, is located just north, and the Dauphin Island lies to the south. There are some homes adjacent to the tract, and a Shell oil refinery is located across the river about one-half mile east of the tract.

Soil Resources

The soil classification for the Fowl River tract is provided in Table 3-11.

Table 3-11. Soil Classification for the Fowl River Tract

| Soil Type | Description | Erosion Hazard | Prime Farmland |
|---|---|----------------|----------------|
| Bayou-Escambia association, gently undulating | Deep, moderately well-drained, nearly level soils on uplands and stream terraces; loamy and sandy surface layers and loamy subsoils low in clay | Slight | No |
| Lafitte muck, 0 to 1 percent slopes | Level, very poorly drained, moderately, and rapidly permeable soils; in brackish marshes adjacent to the Gulf of Mexico | Slight | No |
| Pactolus loamy sand, 0 to 2 percent slopes | Deep, moderately well-drained, and somewhat poorly drained, nearly level to gently sloping soils on uplands; sandy throughout | Moderate | No |

Water Resources

The Fowl River tract is located within the Mobile River drainage basin.

Vegetative Communities

This tract is located on the western bank of the Fowl River and contains four wetland plant communities. These include an emergent wetland composed of black needlerush (*Juncus roemerianus*) and a scrub-shrub wetland dominated by black titi (*Cliftonia monophylla*), inkberry (*Ilex glaba*), common wax myrtle (*Myrica cerifera*), fetter-bush (*Lyonia lucida*), and several species of pitcher plants and ferns. Portions of the tract are seasonally flooded, hardwood-pine forest composed of sweet bay magnolia (*Magnolia virginiana*); sweetgum; loblolly bay (*Gordonia lasianthus*); Florida maple (*Acer barbatum*); various oak species such as water oak and laurel oak (*Quercus laurifolia*); and flowering dogwood (*Cornus florida*); and saw palmetto (*Serona repens*); with grasses as the principal ground covers. A fourth type is a slash pine flatwoods with dahoon holly (*Ilex cassine*), gallberry (*Ilex coriacea*), and saw palmetto.

This tract was not surveyed for exotic/invasive plant species, but Chinese privet, tallow tree, mimosa, and Japanese honeysuckle occur in the area.

Fish and Wildlife

This wetland tract provides habitat for a variety of species in association with the adjacent river, wetland habitats, and flatwoods. The tract provides suitable foraging habitat for wading birds such as the great blue heron, black-crowned night heron, and snowy egret. The wetland habitats provide foraging and nesting habitat for both resident and neotropical migratory songbirds. Southern water snake (*Nerodia fasciata*) and cottonmouth water moccasin (*Agkistrodon piscivorus*) are likely common on the tracts. Mammals are expected to include river otter (*Lutra canadensis*), raccoon (*Procyon lotor*), mink (*Mustela vison*), and gray fox (*Urocyon cinereoargenteus*).

Special Status Species

This tract could provide habitat for the endangered red-belly turtle (*Pseudemys alabamensis*). There are no known records of Federally listed plants on this tract.

Cultural Resources

The Fowl River tract was surveyed for cultural resources in 1983 (Jackson Field Office files). No cultural artifacts were found during shovel testing. One cultural site is located within one-half mile of the tract.

Visual Resources

The geography of the Fowl River tract is low lying and consists of several types of wetlands and associated forest and scrub vegetation. The visual setting is low-lying wetlands with relatively dense vegetation and some human activity.

Recreation and Travel Management

The Fowl River tract lies on the western side of the Fowl River. A portion of the tract is a wetland and is intermittently flooded. The tract may be accessed from the river, but there is no terrestrial access for the general public. Neither Delchamps Road, which formerly crossed the southern end of the tract, nor the power line ROW, provide public access. The tract is likely used by local residents for dispersed recreation such as fishing, canoeing, and kayaking.

In the 1960s, the tract was proposed as a recreation site and was transferred to the Alabama Department of Conservation for recreation purposes. The tract reverted to the BLM, however, because development as a recreation site proved to be infeasible.

Lands and Realty

On April 7, 1964, the Fowl River tract was patented to the State of Alabama, Department of Conservation for recreation purposes, under the R&PP Act. Under the terms of the patent, the site was required to be developed as a public recreation site. On October 8, 1976, the title to the tract was revested in the United States because the planned development had not occurred.

In 1983, the BLM proposed the Fowl River tract for sale, but the tract did not sell. The fact that the sale was subject to a “covenant running with the land” to restrict use in floodplains may have been a contributing factor to the fact that the tract was not sold.

In 1990, the BLM granted a power line ROW across the tract, running from west to east in the southern portion (Lot 5) of the tract. There are no other BLM ROW or use authorizations on the tract.

3.3.5 Geneva Tract

General

The Geneva County tract consists of an approximately 1-acre sandbar in the bend of Choctawhatchee River (near the Florida State line).

Soil Resources

There is no soil classification for this tract. It is a sandbar adjacent to the river.

Water Resources

The Geneva tract is located within the Choctawhatchee River drainage basin.

Vegetative Communities

This very small (0.95 acres) tract is located on a bend on the East Fork of the Choctawhatchee River. As mapped, this tract is primarily a sandbar or open water. A 1997 aerial photo of the area shows the area dominated by pine, including a clear-cut on the opposite side of the river.

There are no exotic invasive plant species known to occur on the tract at this time.

Fish and Wildlife

This tract is likely used by wading birds and nesting river turtles.

Special Status Species

This portion of the Choctawhatchee River has been designated as critical habitat for the Gulf sturgeon (*Acipenser oxyrinchus desotoi*).

Cultural Resources

The Geneva tract has not been surveyed. Three cultural sites are located within one-half mile of the tract.

Visual Resources

The visual setting of the Geneva tract is a river sandbar adjacent to dense forest vegetation.

Recreation and Travel Management

Because the Geneva County tract is remote and inaccessible, its value for public recreation is very limited. Any recreational use would probably be related to the use of the river and include activities such as canoeing, kayaking, and fishing.

Lands and Realty

According to subdivision of sections by a survey approved December 9, 1890, the Geneva County tract is identified as Lot 4 in the northeast corner of Section 22, west of the Choctawhatchee River. It is apparent that change of the river's course has affected the boundaries of Lot 4, which now may be at least partially in the channel of the river. There are no approved use authorizations on this tract, and no requests are expected.

3.3.6 Jordan Lake Tract

General

This 4.3-acre tract, located in Chilton County on the Coosa River below the Mitchell Dam (on the bank of Jordan Lake), is a steep, rocky slope with mixed hardwoods. The Coosa River Wildlife Management Area is located to the north and east of the tract.

Soil Resources

There is no soil classification for this tract. It is characterized as a rocky, steep slope adjacent to the lake.

Water Resources

The Jordan Lake tract is located within the Coosa River drainage basin.

Vegetative Communities

The Jordan Lake tract is a very narrow strip of land on the west bank of Jordan Lake. North of State Highway 22, the steep shoreline is dominated by hardwoods, typically hickory, persimmon, sweetgum, hackberry, sycamore, southern red oak, water oak, and scattered loblolly pine. South of the highway, the tract is flatter with mature trees and little understory.

Fish and Wildlife

General wildlife use is similar to the Coosa Island tracts discussed above. The presence of multiple campsites in the area limits use of the area by more reclusive species.

Special Status Species

There are no records of Federally listed plants or animals on this tract.

Cultural Resources

The Jordan Lake tract has been surveyed. Three cultural sites are located within one-half mile of the tract.

Visual Resources

The Jordan Lake tract sits high above the river and is visible from the highway as well as from the homes across the river.

Recreation and Travel Management

This long, narrow tract is bisected by State Highway 22. The recreation opportunity of the Jordan Lake tract is primarily as an access to Jordan Lake for swimming and fishing. Due to the tract's location and size, however, its value as a public recreation site is very limited. The owners of the adjacent small tracts and their guests undoubtedly use the tract for travel access to the lake.

In 1966, the tract was transferred to Chilton County under the R&PP Act to be used for recreational purposes. Because of difficulty in managing the tract for recreation, the County filed a quitclaim deed in 2000 to revert the tract to the United States.

Lands and Realty

The Jordan Lake tract is an extremely narrow strip of land on the west side of Jordan Lake. This narrow strip was created by a peculiar set of circumstances. The fractional portion of Section 14, west of the Coosa River, was withdrawn from the public domain by Power Site Classification No. 7, Alabama No. 1, approved July 30, 1921, (FPC Project 82). When the FPC relinquished withdrawal of lands above the 290-foot contour, the BLM completed a resurvey in 1956 to subdivide the lands for disposal. The Jordan Lake tract (Lot 1), because it was still withdrawn, had to be separated from the lands that were to be disposed. A 16.16-acre portion south of State Highway 22 was subdivided into 10 lots and classified for disposal under the Small Tract Act of 1938. By 1960, all of the small tracts had sold, and several small houses, or fishing camps, were built on these lots adjacent to the BLM Jordan Lake tract.

By 1966, the FPC allowed the BLM to convey the Jordan Lake tract to Chilton County, Alabama, subject to a reservation under Section 24 of the Water Power Act. The Jordan Lake tract was patented to Chilton County under the R&PP Act to be used for recreational purposes only and subject to reversion to the United States. The reversionary clause was invoked on April 17, 2000, when Chilton County filed a quitclaim deed to reconvey the tract back to the United States.

The ROW for State Highway 22 was granted as a Federal Aid Highway under the Act of November 9, 1921 (42 Stat. 212). This highway crosses the narrow Jordan Lake tract (less than 100 feet wide at this point) at the west side of the bridge that crosses the lake. There are no other ROW or authorized uses on the Jordan Lake tract.

3.4 MISSISSIPPI STATEWIDE PERSPECTIVE

3.4.1 Air Quality

Mississippi has a humid, subtropical climate characterized by temperate winters; long, hot summers; and an evenly distributed annual rainfall. The region is subject to periods of drought and flood, and the climatic conditions are rarely average. A feast-or-famine situation attributed to weather conditions is typically expected as the climate delivers energy and moisture in subtropical latitudes between a large landmass to the north and the Gulf of Mexico to the south (SERCC 2005).

Normal mean annual temperatures range from about 60°F in the north to 70°F along the coast. Temperatures regularly exceed 100°F throughout Mississippi and drop to zero or lower an average of once a year. Freezing temperatures reach the Gulf Coast almost every winter. Normal precipitation ranges from about 50 to 65 inches across the State from north to south (NOAA 2007a).

Air Quality Meteorology

Surface wind speeds vary depending on terrain and proximity to the coast. Average wind speeds vary from 6 to 10 miles per hour in most locations and follow water drainage features of the land or are driven by sea breezes. Dispersion can also be related to the NOAA Stagnation Index, which primarily focuses on ozone (NOAA 2005). On the basis of this index, Mississippi was prone to air stagnation on 25 to 50 percent of the days from May through September from 2002–2004. This dispersion index compares moderately to other areas in the country.

Baseline Air Quality

Ambient Air Quality. EPA has established ambient air quality standards for criteria pollutants considered harmful to public health and the environment. The ambient air quality measurements in Mississippi for SO₂, NO₂, CO, O₃, and PM₁₀ and PM_{2.5} are shown in Table 3-12. Ambient air quality measurements made by the Mississippi Department of Environmental Quality (MDEQ) indicate that ambient air quality is within standards, and are in attainment. Ozone is formed from the chemical reactions of nitrogen oxides, VOCs, and sunlight. No exceedances of ambient air quality standards are noted.

Table 3-12. Recent Highest Ambient Air Quality Measurements in Mississippi^{1,2}

| Pollutant | Averaging Time | Highest Measured Value (ppm ³) | Location | National Ambient Air Quality Standard (ppm ³) |
|-----------------|----------------|--|----------------|---|
| SO ₂ | 1 year | 0.002 | Pascagoula | 0.03 |
| | 24 hours | 0.019 | Pascagoula | 0.14 |
| | 3 hours | 0.035 | Pascagoula | 0.50 |
| NO ₂ | 1 year | 0.004 | Hancock County | 0.053 |
| CO | 8 hours | 3.9 | Jackson | 9.0 |
| | 1 hour | 5.0 | Jackson | 35.0 |
| O ₃ | 8 hours | 0.096 | Hancock County | 0.080 |

| Pollutant | Averaging Time | Highest Measured Value (ppm ³) | Location | National Ambient Air Quality Standard (ppm ³) |
|---|----------------|--|----------------|---|
| | 1 hour | 0.112 | Hancock County | 0.120 |
| PM ₁₀ | 1 year | 18.0 | Jackson County | 50.0 µg/m ³ |
| | 24 hours | 41.0 | Jackson County | 150.0 µg/m ³ |
| PM _{2.5} | 1 year | 13.6 | Hattiesburg | 15.0 µg/m ³ |
| | 24 hours | 36.2 | Hattiesburg | 65.0 µg/m ³ |
| 1 MDEQ Annual Data Summary 2003 (MDEQ 2004). 2 One-year maximum—this is not technically a violation until the fourth-highest value exceeds the design value of 0.085 ppm. 3 ppm = parts per million | | | | |

Visibility and Atmospheric Deposition. Visibility and atmospheric deposition measurements are not available for Mississippi.

Area Air Quality Designations

PSD of areas meeting the ambient air quality standards are divided into three categories: Class I for areas of restricted growth, Class II for areas of moderate growth, and Class III for industrialized areas (Clean Air Act of 1977, as amended). All of Mississippi is designated as PSD Class II.

In addition to this area designation for the entire State, other nearby Class I areas (within 100 kilometers of the potential development activities) include the Breton NWR off the coast of Louisiana (managed by USFWS) and the Sipsey Wilderness Area in northwestern Alabama.

Climate Change

Ongoing scientific research has identified the potential effects of pollutants considered to be GHG emissions (including CO₂, CH₄, N₂O, water vapor, and several trace gasses) on global climate. Through complex interactions on a regional and global scale, these pollutants cause a net warming effect of the atmosphere, making surface temperatures suitable for life on earth, primarily by decreasing the amount of heat energy radiated by the earth back into space. Although GHG levels have varied for millennia, with corresponding variations in climatic conditions, recent industrialization and burning of fossil carbon sources have caused CO₂ concentrations to increase dramatically, and have been shown to contribute to overall climatic changes, typically referred to as global warming or climate change. Increasing CO₂ concentrations also lead to preferential fertilization and growth of specific plant species.

Some pollutants considered to be GHGs, such as CO₂, occur naturally and are emitted to the atmosphere through both natural processes and human activities, while others are created and emitted solely through human activities. The principal pollutants considered to be GHGs that enter the atmosphere because of human activities include CO₂, emitted through the burning of fossil fuels, solid waste, trees and wood products; CH₄ emitted during the production and transport of coal, natural gas, oil extraction, livestock production, deforestation, and other agricultural practices; N₂O emitted during agricultural and industrial activities and during the combustion of fossil fuels and solid waste; and fluorinated gases that are emitted from a variety of industrial processes (EPA 2008).

The assessment of GHG emissions and climate change is in its formative phase, and it is not yet possible to know with confidence the net impact to climate. Observed climatic changes may be caused by GHG

emissions, or may reflect natural fluctuations (U.S. GAO 2007). It is known that in the past, the earth has gone through a number of ice ages with periods of warming and droughts between the periods. The most recent Ice Age ended around 13,000 years ago and the climate has warmed and dried since then. The warming and drying has not been continuous. However, the rate at which atmospheric CO₂ concentrations have risen in the past 100 years is unprecedented, and corresponds with observed temperature changes. The Intergovernmental Panel on Climate Change (IPCC 2007) concluded that “Warming of the climate system is unequivocal” and “Most of the observed increase in globally average temperatures since the mid-20th century is very likely due to the observed increase in anthropogenic [man-made] greenhouse gas concentrations.”

Global mean surface temperatures have increased nearly 1.8°F (1.0°C) from 1890 to 2006 (Goddard Institute for Space Studies 2007). However, both observations and predictive models indicate that average temperature changes are likely to be greater in the Northern Hemisphere. The Goddard Institute for Space Studies (2007) data indicated that northern latitudes (above 24° N) have exhibited temperature increases of nearly 2.1°F (1.2°C) since 1900, with nearly a 1.8°F (1.0°C) increase since 1970 alone. Without additional meteorological monitoring systems, it is difficult to determine the spatial and temporal variability and change of climatic conditions, but increasing concentrations of GHG are likely to accelerate the rate of climate change. In 2001, the IPCC indicated that by the year 2100, global average surface temperatures will rise 2.5 to 10.4°F (1.4 to 5.8°C) above 1990 levels. The National Academy of Sciences (2006) has confirmed these findings, but also indicated there are uncertainties how climate change will affect different regions. Computer model predictions indicate that increases in temperature will not be equally distributed, but are likely to be accentuated at higher latitudes. Warming during the winter months is expected to be higher than during the summer.

According to the *EPA Inventory of U.S. Greenhouse Gas Emissions and Sinks* (2008), the total U.S. GHGs were estimated at 7,054.2 Tg CO₂ Eq.⁶ in 2006. Overall, total U.S. emissions have risen by 14.7 percent from 1990 to 2006. The primary GHG emitted by human activities in the U.S. was CO₂, representing approximately 84.8 percent of total GHG emissions. The largest source of CO₂, and of overall GHG emissions, was fossil fuel combustion. Conversely, U.S. GHG emissions were partly offset by carbon sequestration in forests, trees in urban areas, and agricultural soils, which, in aggregate, offset 12.5 percent of total emissions in 2006 (EPA 2008).

In the Southeast and Gulf Coast, potential impacts on the resources and environment from climate change could occur from sea level rise and a warmer climate, resulting in higher summer heat and reduced winter cold stress. The IPCC suggests that a two foot rise in sea level would eliminate approximately 10,000 square miles of land nationwide and, by 2080, sea level rise could convert as much as 33 percent of the world’s coastal wetlands to open water (IPCC 2007). Some of the BLM-administered surface and mineral estate may become completely submerged. Coastal erosion, loss of barrier islands and wetlands, flooding, storm surge, and extreme precipitation events could greatly affect the biological resources within the planning area. For example, wildlife species could move northward and to higher elevations and extinction of endemic threatened/endangered plants may be accelerated. Due to loss of habitat, or due to competition from other species whose ranges may shift northward, the population of some animal species may be reduced. Additionally, the character of vegetation resources that provide wildlife habitat could change as disturbances (e.g., fire and insect outbreaks) increase (IPCC 2007). In the future, as tools for predicting climate changes in the planning area improve and/or changes in climate affect resources and necessitate changes in how resources are managed, BLM may be able to re-evaluate decisions made as part of this planning process and adjust management accordingly.

⁶ Carbon comprises 12/44ths of carbon dioxide by weight. One teragram is equal to 10¹² grams or one million metric tons.

Certain BLM-authorized activities within the planning area would produce pollutants considered to be GHGs, particularly CO₂. For example, oil and gas development, construction activities, vehicle travel, and mechanical hand tools or prescribed burning used in vegetation and wildlife habitat manipulation generate CO₂ and CH₄. These activities would impact the same resources in the planning area that could also be affected by climate change. Other activities may help sequester carbon, such as maintaining vegetative and forested cover, which may help build organic carbon in soils and function as “carbon sinks”. BLM recognizes the importance of climate change and the potential effects it may have on the natural environment. However, BLM does not have an established mechanism to accurately predict the effect of resource management-level decisions from this planning effort on global climate change. The lack of scientific tools designed to predict climate change on regional or local scales limits the ability to quantify potential future impacts. A general discussion on the types of actions that would potentially impact climate change is presented in Chapter 4.

3.4.2 Soil Resources

Physiographic Regions and Soil Types

The State of Mississippi is located entirely within the Coastal Plain Physiographic Province (Fenneman 1938). Most of the State is located within the East Gulf Coastal Plain section of the province, and the remainder is found within the Mississippi Alluvial Plain section. Within the East Gulf Coastal Plain, the physiography is characterized by a distinctive series of belts that largely reflect the underlying geology. Nine of the 10 physiographic regions are belts of the East Gulf Coastal Plain: Loess Hills, Flatwoods, Pontotoc Ridge, Black Prairie, Tombigbee Hills, Jackson Prairie, Longleaf Pine Belt, Coastal Pine Meadows, and North Central Hills. The tenth physiographic region is the Yazoo Basin, which is part of the Mississippi Alluvial Plain.

Eight of the 12 soil orders (broad soil groups) recognized in the United States are found in Mississippi, which has great soil diversity (Pettry 2004). Soils in Mississippi are largely correlated with the State’s topographic regions, due in part to effects that parent material and relief have on the soil formation process.

From an agricultural perspective, the two most productive soil areas of Mississippi are the Mississippi Delta (the Yazoo Basin physiographic region) and the Blackland Prairies (the Jackson Prairie and Blackbelt Prairie physiographic regions). Appendix F briefly describes the major parent soil units and their locations.

The characteristics of soils in BLM-administered, non-USFS FMO areas are described in Appendix F.

Prime and Unique Farmlands

The Farmland Protection Policy Act requires the identification of proposed actions that would affect any lands classified as prime and unique farmlands. NRCS administers this act to preserve farmland.

Prime farmland is defined as having the availability and best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops. Its soil quality, growing season, and moisture supply can produce economically sustained high yields of crops when treated and managed according to acceptable farming methods, including water management. In general, prime farmlands have an adequate and dependable water supply from precipitation or irrigation, a favorable temperature and growing season, acceptable acidity or alkalinity, acceptable salt and sodium content, and few or no rocks. The land is permeable to water and air. Prime farmlands are not excessively erodible or saturated with water for a long period of time, and they neither flood nor require protection from flooding.

Prime farmlands occur throughout most of Mississippi. Counties in Mississippi with oil and gas development likely include soil units that have been identified as prime farmland by NRCS. Appendix F includes prime farmland classification information that is available for soils within non-USFS FMO.

3.4.3 Water Resources

Surface Water

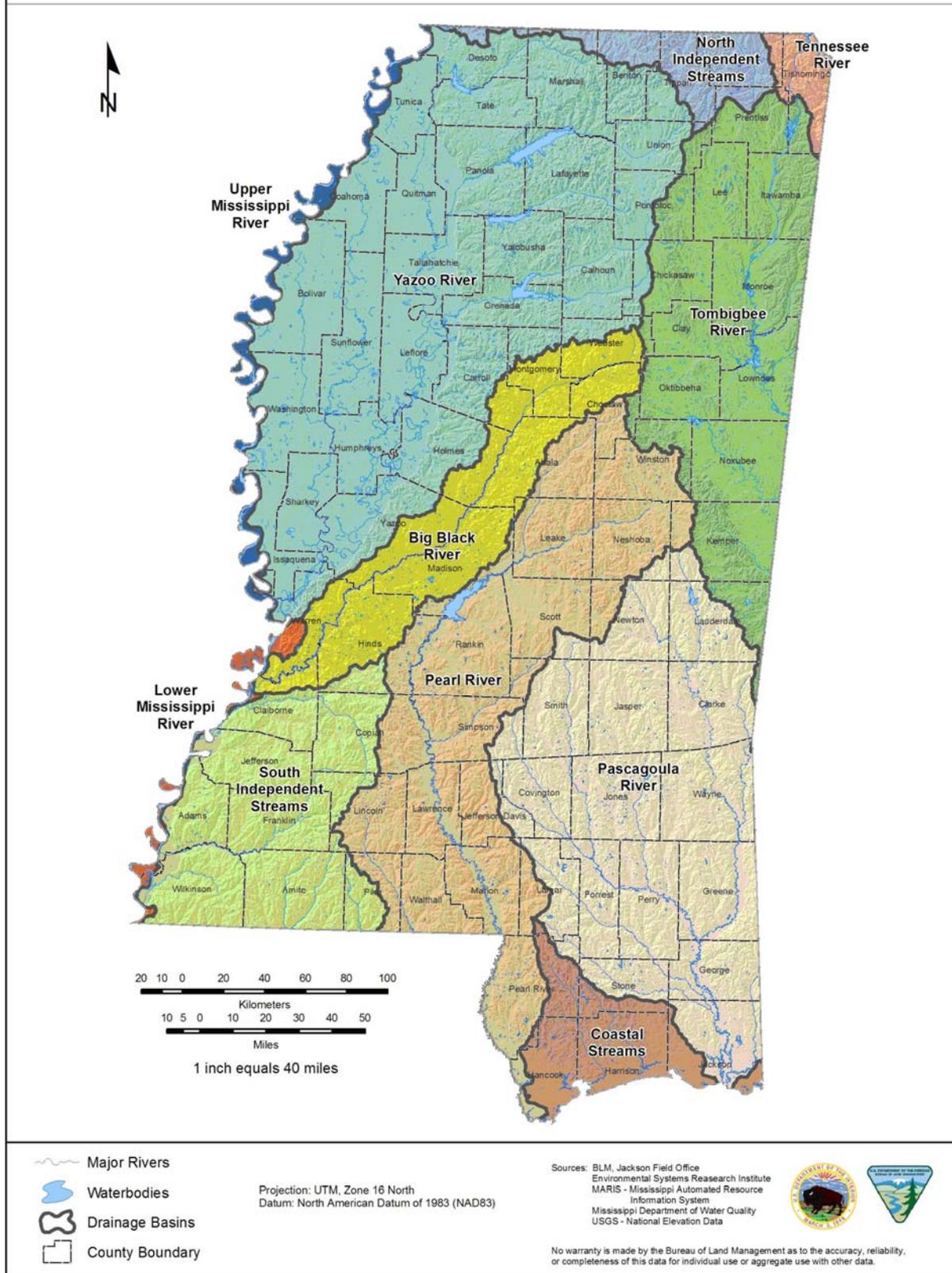
The surface waters of the State of Mississippi are divided into 10 major drainage areas or river basins: the Big Black River Basin, Coastal Streams Basin, Mississippi River Basin, North Independent Streams Basin, Pascagoula River Basin, Pearl River Basin, South Independent Streams Basin, Tennessee River Basin, Tombigbee River Basin, and Yazoo River Basin (Map 3-4). Appendix H briefly describes each of these major river basins.

Wetlands occupy an estimated 4 million acres in Mississippi. Since the 1800s, almost 6 million acres of wetlands (including 10,000 acres of coastal wetlands) have been lost. Historically, loss was mainly the result of converting wetlands to agricultural lands. Today, wetland loss is primarily associated with residential and commercial development (MDEQ 2005).

The surface water quality of most of Mississippi's approximately 84,000 miles of rivers fully or partially supports designated uses. The major cause of impaired water quality is nonpoint agricultural runoff. Minor causes are industrial and municipal point-source discharges and runoff from nonagricultural nonpoint sources (USGS 2003b).

About 47 river miles are within BLM-administered, non-USFS FMO areas in Mississippi. Oil and gas leases exist on about 0.6 river mile. About 32,000 lake acres occur within non-USFS FMO areas. NWI data are limited for Mississippi. Because available digital data for freshwater wetlands in Mississippi is lacking, the non-USFS FMO acreage in freshwater wetland areas in Mississippi could not be estimated.

Map 3-4: Major Drainage Basins of Mississippi
Alabama-Mississippi RMP-EIS



- Major Rivers
- Waterbodies
- Drainage Basins
- County Boundary

Projection: UTM, Zone 16 North
Datum: North American Datum of 1983 (NAD83)

Sources: BLM, Jackson Field Office
Environmental Systems Research Institute
MARIS - Mississippi Automated Resource
Information System
Mississippi Department of Water Quality
USGS - National Elevation Data



No warranty is made by the Bureau of Land Management as to the accuracy, reliability, or completeness of this data for individual use or aggregate use with other data.

Ground Water

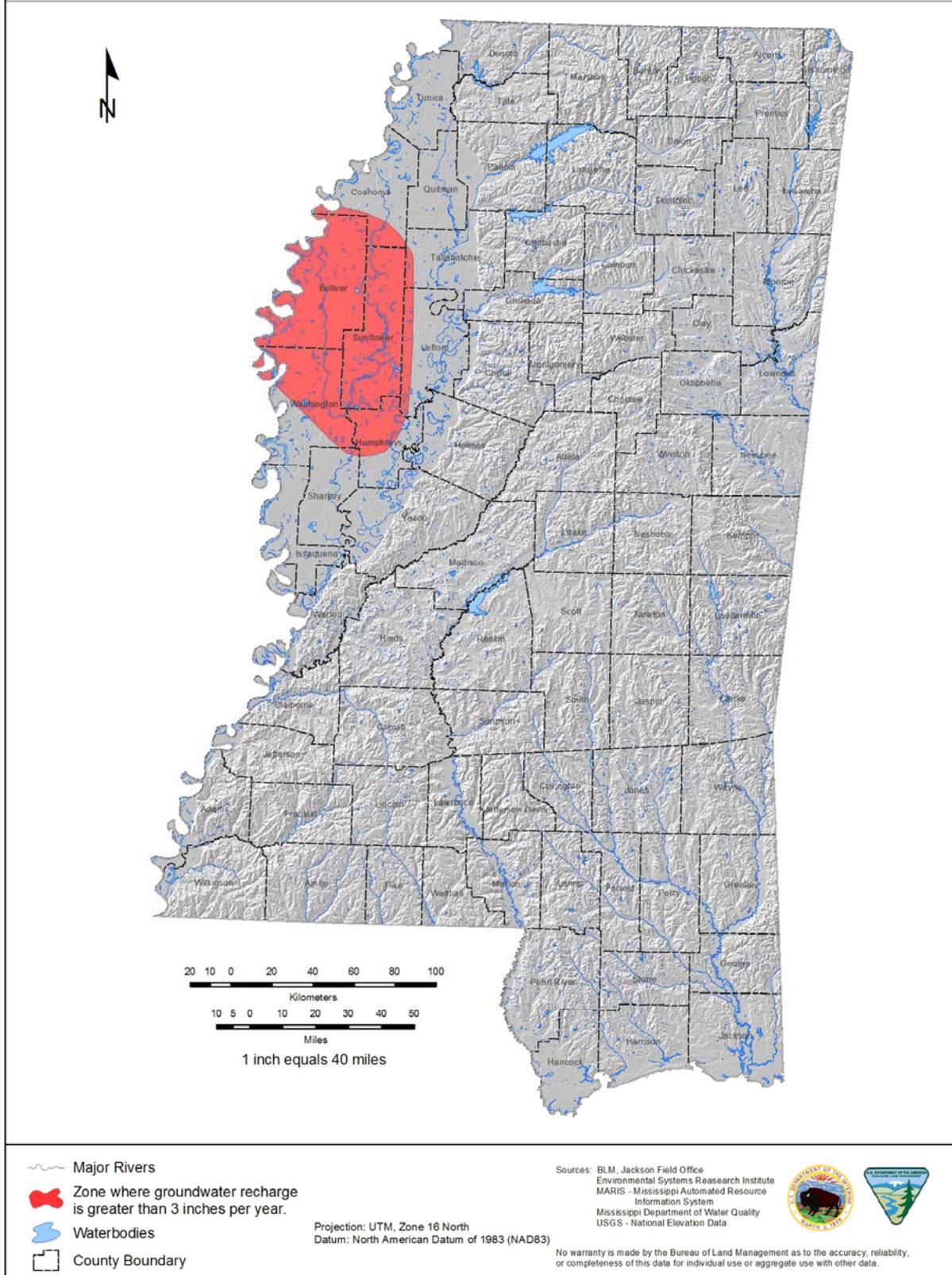
Mississippi has 15 major aquifers that provide 80 percent of its public water supply for domestic and commercial, industrial, mining, thermoelectric power, and agricultural users (USGS 1998). Only two municipalities, Jackson and Tupelo, receive some public water from surface water sources. Mississippi has an abundant supply of ground water, which at some locations occurs at depths exceeding 3,000 feet (USGS 1998).

Ground water withdrawals are concentrated in the urbanized and industrialized areas of Mississippi and in the Mississippi River Alluvial Plain in northwestern Mississippi, where large withdrawals are made for crop irrigation and catfish production. These withdrawals have resulted in significant, long-term declines in water levels in some areas. Declining ground water levels and the ability of the aquifers to meet the increasing demand for water continue to be an important water resources concern in the State. For example, in central Mississippi, Cockfield and Sparta are two major aquifers. Water levels in the Cockfield Formation have slightly decreased at selected sites, whereas levels in a few wells near pumping centers have decreased by 1 to 4 feet. Some wells screened in the Sparta Sand indicated declines of 2 to 6 feet (USGS 2003b).

Precipitation is the ultimate source of water that recharges the major aquifers in Mississippi. Studies show that less than 50 percent of the annual precipitation ends up in stream runoff. Only a small amount of water recharges aquifers that are either exposed or buried to shallow depths, and an even smaller amount percolates downward and enters the deep-flow system (USGS 1998).

Map 3-5 presents the areas that are primary ground water recharge zones in Mississippi. On the basis of a rough geospatial analysis, 4,470 acres of non-USFS FMO occur in primary ground water recharge zones (defined as recharge greater than 3 inches per year).

Map 3-5: Primary Groundwater Recharge Zones in Mississippi
Alabama-Mississippi RMP-EIS



Coastal Zone

The National CZM Program is a voluntary partnership between the Federal Government and U.S. coastal States and territories authorized by the Coastal Zone Management Act of 1972. The Coastal Programs Division, within NOAA's Office of Ocean and Coastal Resource Management, administers the program at the Federal level and works with State CZM partners. The Mississippi CZM Program (MSCZMP) focuses primarily upon coastal wetlands below the watermark of the ordinary high tide and adjacent wetlands. The Hancock County tracts, in addition to BLM-administered, non-USFS FMO, fall within the MSCZMP.

The Mississippi Gulf Coast encompasses 370 miles of shoreline and nearly 56,000 acres of emergent wetlands. The coastal wetlands habitat of Mississippi is among the most ecologically diverse systems in the country. This system provides for ecological functions such as pollution filtering, sediment trapping, and flood control and is an important nursery area that increases the productivity of an abundant fishery resource. These ecological functions also provide economic benefits through commercial and recreational fisheries, hunting, trapping, and many other forms of recreation and commerce (MPA 2005). The Mississippi Department of Marine Resources (DMR) is preparing a Comprehensive Resource Management Plan (CRMP) that will include management and protection applications for coastal wetlands and marine resources in the six coastal counties of Mississippi (including Hancock County, where a BLM surface tract is located) by coordinating Agency efforts, developing the necessary partnerships among public and private entities, and integrating wetlands protection and management into the lifestyle of the coastal community. The Mississippi CRMP was unavailable for reference in this plan.

On the basis of the rough geospatial analysis, about 32,440 acres of BLM-administered, non-USFS FMO are within Mississippi coastal wetlands. However, about 24,000 of these acres are within 10 miles of the Stennis Space Center, one of NASA's primary centers for rocket propulsion testing, and are not likely to be developed. Of about 8,380 acres of non-USFS FMO in wetlands, 990 acres are in high-potential areas for future mineral development.

3.4.4 Vegetative Communities

For this planning effort, GAP was used to delineate land cover types on non-USFS FMO in Mississippi. This land cover map is based on Landsat-7 satellite imagery using the NLCD, which includes 21 very broad land cover classifications. The decision to use this data set was based on its statewide application and availability in a geographical information system format at the time this planning effort was initiated. Analysis of the GAP land cover map resulted in the identification of eight dominant cover types on non-USFS FMO lands in Mississippi. The dominant vegetation cover types on non-USFS FMO within Mississippi include evergreen forest/woodland (23 percent), wetland forest/shrub land (14 percent), deciduous forest/woodland (11 percent), row/crops (10 percent), grassland/herbaceous (9 percent), open water (9 percent), pasture/hay (6 percent), and mixed forest/woodland (4 percent). Several less dominant communities (14 percent) are not discussed herein. A brief description of each community follows.

- **Evergreen Forests/Woodlands (23 percent).** This classification delineates areas where 75 percent or more of the tree species are evergreen. In Mississippi, the dominant pine species are loblolly, longleaf, slash, and shortleaf. This classification includes commercial pine plantations, where loblolly is the most commonly planted pine species. An additional species, sand pine, dominates a narrow band of scrub habitats behind the coastal dune systems along the Gulf of Mexico.
- **Wetland Forest/Shrub Land (14 percent).** This classification is dominated by bottomland hardwood vegetation that is periodically inundated by water and encompasses diverse

communities ranging from forested swamps and bogs to coastal marshes. Common vegetation in seasonally flooded forests include sweet bay, southern magnolia, sweetgum, wax myrtle, various oaks, and titi. Typical wetland or bog species include pitcher plants, various rushes, sedges, arrowhead, and St. John's wort. Typical species of coastal marshes include sawgrass, needlerush, and bulrush.

- **Deciduous Forests/Woodlands (11 percent).** This classification is dominated by trees of which 75 percent or more are hardwoods. Common trees in these areas include a wide variety of oak and hickory species, maple, ash, hackberry, yellow poplar, beech, elm, sweetgum, persimmon, and cherry.
- **Row/Crops (10 percent).** This classification includes areas being actively cultivated.
- **Grassland/Herbaceous (9 percent).** Grassland/Herbaceous communities are composed of dry systems dominated by low herbaceous vegetation and are absent of woodlands.
- **Open Water (9 percent).** This classification denotes water and does not support terrestrial vegetation species.
- **Pasture/Hay (6 percent).** Vegetation in this community is largely composed of introduced grasses, legumes, or grass-legume mixtures planted for livestock grazing or the production of hay crops.
- **Mixed Forests/Woodlands (4 percent).** This classification delineates areas where neither hardwood nor pine species represent more than 75 percent of the cover. These mixed hardwood/pine areas are typically dominated by loblolly, shortleaf, slash, and/or longleaf pine, with a wide variety of oak and hickory species, plus hackberry, elm, sweetgum, persimmon, and yellow poplar.

Mississippi Invasive/Exotic Species

The Mississippi Exotic Pest Plant Council lists the top ten worst invasive plants as tallowtree (*Triadica sebifera*), Chinese privet (*Ligustrum sinense*), Japanese honeysuckle (*Lonicera japonica*), tropical soda apple (*Solanum viarum*), purple loosestrife (*Lythrum salicaria*), kudzu (*Pueraria montana* var. *lobata*), cogon grass (*Imperata cylindrica*), Johnson grass (*Sorghum halepense*), water hyacinth (*Eichornia crassipes*), alligator weed (*Alternanthera philoxeroides*), and Eurasian milfoil (*Myriophyllum spicatum*). To date, Chinese tallow, Chinese privet, Japanese honeysuckle, kudzu, and cogon grass have been the most frequent exotic species occurring on BLM non-USFS FMO. Cogon grass, in particular, has the potential to affect future land use practices because of its ability to alter natural fire regimes, its thick growth habit that excludes other vegetation, and the difficulty to control it. Chinese privet is a common invasive along edges and disturbed sites throughout the State. Chinese tallow tree is often found near wetlands and disturbed areas including fence rows and roads.

3.4.5 Fish and Wildlife

Game Species

Mississippi has abundant and diverse game populations actively managed across the State. The State supports the highest white-tailed deer density in the nation with the population estimated at 1.75 million. The wild turkey population is estimated at 300,000. Both species were brought back by extensive restocking efforts during the 1950s and 1960s. Mourning dove is common throughout farms, woodlots, agricultural fields, and grasslands. Small game species include rabbit, gray squirrel, and fox squirrel.

Naturalized populations of wild hog are now found in at least 65 of Mississippi's 82 counties. Mississippi is part of the Mississippi Flyway; reservoirs, ponds and swamps across the State provide important winter habitat for waterfowl that are produced in the Prairie Pothole Region and Great Lakes States. In most years, Mississippi winters significant numbers of mallards and wood ducks across the State. Historically, flooded forests in the Delta region of northwestern Mississippi provided reliable, high-quality habitat for millions of mallards, wood ducks, and other waterfowl. This region is the focus of major waterfowl conservation efforts, including the Lower Mississippi Joint Venture program.

Neotropical Migratory Birds

According to the Mississippi Ornithological Society, 396 bird species have been seen in Mississippi. The State is an important migration route for many migratory songbirds. The Mississippi Gulf Coast is a key staging area for migrants as they replenish fat reserves for the trans-Gulf flight during the fall and provides the first landfall for tired migrants during spring migrations.

3.4.6 Special Status Species

For the purposes of this document, special status species are defined as all Federal and State-listed, species occurring in the State, species proposed or candidates for Federal or State listing, and those species identified by the BLM as sensitive species. The BLM Eastern State's policy designates as "BLM sensitive" those additional species that are considered to be critically imperiled (S-1) or imperiled (S-2) by the State Natural Heritage programs, as well as potentially affected bird species included on the USFWS Birds of Conservation Concern and Game Birds Below Desired Condition lists. The USFWS lists 39 Federally listed species, which currently or historically occurred in Mississippi. The Mississippi Natural Heritage Program (MNHP) inventory lists 339 species ranked as either critically imperiled (S-1) or imperiled (S-2) in the State. A list of S-1 and S-2 species being tracked by MNHP is included in Appendix E. A complete list of the wildlife species of conservation concern in the State is available in the Mississippi CWCS (2005).

This discussion of special status species takes a statewide perspective, even though management of the BLM's scattered surface acreage and oil and gas development would probably directly affect less than 229 acres in total. Oil and gas leasing of non-USFS FMO in particular could occur anywhere in the State, and future oil and gas development has the potential to affect aquatic systems downstream from locations, substantially increasing the area potentially affected. Therefore, a statewide perspective is needed to cover the full geographic range of potential impacts.

Overview

The State of Mississippi covers four ecoregions: the East Gulf Coastal Plain, the Upper East Gulf Coastal Plain, the Mississippi Alluvial Plain, and the Northern Gulf Coastal Plain (see Section 0). The following discussions highlight the special status issues in each of these ecoregions.

The **East Gulf Coastal Plain** is one of the most biologically rich ecoregions in the country. Many of the special status species in this area are associated with the vast longleaf pine forests and embedded wetland bogs that once stretched across much of the southern United States. Longleaf forests are now found on about three percent of the original acreage, much of it converted to commercial pine plantations for loblolly and slash pine. What acreage remains is often degraded by exclusion from the frequent fires that historically maintained this system and by habitat fragmentation. Species endemic to the ecoregion, many of which were never common, have been further imperiled by these changes (Mississippi CWCS 2005). Keystone species in this habitat are the red-cockaded woodpecker and gopher tortoise, both Federally and

State-listed. Others include the highly restricted Mississippi gopher frog found only in a handful of ponds in Harrison and Jackson Counties.

Wet savannas in the East Gulf Coastal Plain are estimated to be reduced to less than 5 percent of their original acreage (Mississippi CWCS 2005). Most of the largest patches of this habitat are located in the Sandhill Crane NWR. This region's pitcher bogs and pine seeps support an exceptionally diverse flora and endemic crawfish species, including one Federally listed crayfish and six other crayfish listed as imperiled or critically imperiled.

Two large and biologically important river systems flow through this portion of the East Gulf Coastal Plain: the Pearl River and the Pascagoula River. Both are considered vulnerable (Mississippi CWCS 2005). The lower Pearl River is affected by impoundment at the Ross Barnett Reservoir, as well as channelization and increased sediments from surrounding land uses. The Pascagoula is America's longest unencumbered river and one of the most intact in the southeast (Mississippi CWCS 2005). These river systems support 13 Federally or State-listed species and 19 other special status species, mostly fish and mussels. The rivers and major tributaries are designated critical habitat for Gulf sturgeon.

The **Mississippi River Alluvial Plain** bordered by the Mississippi River on the west is dominated by bottomland hardwood forests. These rich frequently flooded forests and associated habitats support over 240 fish species, 45 species of reptiles and amphibians, and 37 species of mussels. In addition, 50 species of mammals and approximately 60 percent of all bird species in the contiguous United States currently utilize this ecoregion (Mississippi CWCS 2005). This area is important to the recovery of the endangered Louisiana black bear, and recently supported one of the two litters recorded in the State in over 30 years. Old-growth hardwoods are crucial habitat for 11 of 18 bat species in the southeast (Mississippi CWCS 2005). At least four Federally listed species and seven other special status species occur in this area.

The **Upper East Gulf Coastal Plain** in Mississippi ranges from the northern edge of the longleaf pine forests grading to the north through oak-hickory-pine forests to oak-hickory forests. Many of the most vulnerable special status species occurring in this area are associated with the river systems, wetland habitats, and prairie opening scattered through Jackson and larger Black Belts. This region supports a large number of endemic crayfish, mussel species, and fish. Key rivers include the Tombigbee, Yazoo, and Big Black Rivers, all of which have been substantially altered by impoundments and channelization. Tributaries and streams in this area have been subjected to increased sedimentation from agricultural and forestry. The Mississippi CWCS (2005) lists 45 crayfish, fish and mussel special status species as critically imperiled (S-1) or imperiled (S-2) in the Tombigbee River system, this in addition to 13 Federally listed species. Six of these mussel species in Tombigbee are presumed or expected to be extirpated from the State. Karst areas in Mississippi are primarily associated with the "Vicksburg Group" of soils in Clark, Jasper, and Wayne Counties in east central Mississippi, and Union and Tishomingo Counties. About 65 caves covering less than 100 acres support several special status species, including cave salamander, spring salamander, and many of the State's bat species.

The **Mississippi Northern Gulf Coastal Plain** includes barrier islands with beaches, coastal marshes, and maritime scrub and woodlands. At the coastline, these habitats grade through salt marshes to productive estuaries (Mississippi CWCS 2005). Mississippi has established an 83,000-acre coastal preserve system to protect and enhance coastal wetlands and barrier islands. The system is dominated by coastal wetlands that support a number of special status shorebirds, including the piping plover, American oystercatcher, and Wilson's plover; wading birds, such as reddish egret and white ibis; and others such as the brown pelican. They also support the Mississippi diamondback terrapin. Natural beaches in the State tend to be mud shores often associated with the estuaries of larger rivers and provide important foraging areas for wading birds and shorebirds. Maritime woodlands dominated by live oak, laurel oak, and saw palmetto provide crucial staging areas for neotropical migrants to rest and build or replenish fat reserves,

particularly during inclement weather and for exhausted birds making landfall. This habitat is considered critically imperiled due to its extreme rarity and because of the threats of urbanization and exotic weeds.

Species Accounts

The following Federally listed or candidate species are known to occur or to have potential to occur on BLM non-USFS FMO (Natureserve 2006). A list of species ranked by MNHP as critically imperiled (S-1) or imperiled (S-2) is provided in Appendix E.

Mammals

Louisiana black bear (Ursus americanus luteolus), Federally listed as endangered, State-listed as endangered

The Louisiana black bear prefers forested areas with dense understory vegetation, particularly bottomland hardwoods which include hard and soft mast, escape cover, denning sites, corridor habitat, and distance from humans. Escape cover is especially critical for bears that live in fragmented habitat and close to humans. Access to a variety of habitat is consistent with the black bear's need for a seasonal assortment of foods during the year. Louisiana black bears have been known to travel long distances in search of food, habitat, and mates. Modification and loss of habitat are the primary reasons for the decline of the black bear (USFWS 1995). There are an estimated 50 Louisiana black bears in Mississippi. Recent litters in Washington County and in the Mississippi Delta are the first recorded in 30 years.

Gray myotis (Myotis grisescens), Federally listed as endangered, State-listed as endangered

Gray myotis roost almost exclusively in caves, generally utilizing different caves for summer and winter hibernaculum. Gray bats were last documented in Mississippi in 1967 in the northeastern corner of Tishomingo County. A male was found on private property in Tishomingo County on September 20, 2004. The location is approximately 90 km southwest of the closest known gray bat maternal colony, located at Blowing Springs Cave, Alabama (Sherman and Martin 2006).

Indiana bat (Myotis sodalis), Federally listed as endangered, State-listed as endangered

Indiana bats hibernate in caves, typically limestone with pools where the mean midwinter temperature is 4–8 degrees Celsius. During the summer, their habitat consists of wooded or semiwooded areas, often but not always along streams. Indiana bats roost in hollow trees or under loose bark during the summer, including the season for rearing their young. Foraging habitats include riparian areas, upland forests, ponds, and fields (Menzel *et al* 2001). There are no known hibernacula in Mississippi, but there is potential for this species to occur in Tishomingo County, utilizing summer habitats.

Birds

Southeastern snowy plover (Charadrius alexandrinus tenuirostris), State-listed as endangered

This species occurs year-round on the coastal beaches, dry mud or salt flats, and sandy shores of rivers, lakes, and ponds. The species nest on the ground on broad open beaches or salt or dry mud flats, where vegetation is sparse or absent (small clumps of vegetation are used for cover by chicks); nests are found beside or under objects or in the open.

Interior least tern (Sterna antillarum athalassos), Federally listed as endangered, State-listed as endangered

This population is Federally listed where it occurs along sandbars and beaches along the Mississippi River.

Mississippi sandhill crane (*Grus canadensis pulla*), Federally listed as endangered, State-listed as endangered

This non-migrating subspecies is currently restricted to an area in southern Jackson County, Mississippi, extending from the Pascagoula River west to the Jackson County line, south to Simmons Bayou, north latitude about 4 miles north of Vancleave; part of this area is within the Mississippi Sandhill Crane NWR. Typical habitat is open savannas, swamp edges, young pine plantations, and wetlands along edges of pine forests; associated trees and shrubs include longleaf pine, slash pine, bald cypress, gallberry, wax myrtle, black gum, sweet bay, and yaupon. Approximately 26,000 acres have been designated as critical habitat for the Mississippi Sandhill Crane in Jackson County, Mississippi.

Bewick's wren (*Thryomanes bewickii*), State-listed as endangered

An extremely rare bird east of the Mississippi River, Bewick's wrens are seen occasionally in Mississippi during the winter, rarely breeding in the State.

Piping plover (*Charadrius alexandrinus*), Atlantic Coast and Great Plains populations Federally listed as threatened, and Great Lakes populations Federally listed as endangered, State-listed as endangered

All three populations of piping plover winter along the southern Atlantic and Gulf Coasts where they are classified as threatened. On July 3, 2001, USFWS designated 165,211 acres along 1,798 miles of coastline in eight southern States as critical habitat for the wintering population of piping plover. This includes much of the Mississippi coastline. Wintering birds are present from August to May, but numbers peak during the winter months.

Bald eagle (*Haliaeetus leucocephalus*), Federally listed as threatened, proposed for delisting, State-listed as endangered

Bald eagles are found throughout the State primarily along larger rivers and numerous reservoirs. In 2006, there were 31 active nests in the State being monitored with up to 62 chicks, and the possibility of 13 additional nests (Nick Winstead personal communication).

Wood stork (*Mycteria americana*), under status review by U.S. Fish and Wildlife Service, State-listed as endangered

The wetlands of the Coastal Plain of Mississippi provide important foraging habitat for wood storks that disperse from breeding areas in Florida, Georgia, and South Carolina in late summer and early fall. Primarily habitats are marshes, swamps, lagoons, ponds, and flooded fields and ditches. During extended drought, depressions in marshes and brackish wetlands have increased importance. In Mississippi, wood storks occur primarily in the coastal counties, including Hancock, Jackson, and Harrison Counties.

Brown pelican (*Pelecanus occidentalis*), Federally listed as endangered, although under status review for delisting (Federal Register, May 24, 2006), State-listed as endangered

The brown pelican is a coastal species that makes extensive use of sand spits, offshore sandbars, and islets for nocturnal roosting and daily loafing, especially by nonbreeders and during the non-nesting season. Dry roosting sites are essential. Some roosting sites eventually may become nesting areas.

Red-cockaded woodpecker (*Picoides borealis*), Federally listed as endangered, State-listed as endangered

Red-cockaded woodpeckers require open pine woodlands and savannahs with large old pines for nesting and roosting habitat. Large old pines are required as cavity trees and are typically in open stands with little or no hardwood midstory and few or no overstory hardwoods. Hardwood encroachment resulting from fire suppression is a well-known cause of cluster abandonment. Suitable foraging habitat typically

consists of mature pines with an open canopy, low densities of small pines, little or no hardwood or pine midstory, few or no overstory hardwoods, and abundant native bunchgrass, and forb ground covers. The Federal threshold for minimally suitable foraging habitat is stands of at least 50 percent pine, where the dominant trees are pines over 30 years of age. Minimum criteria for nesting habitat is pines 60 years or older, which may be dispersed among younger stands, located within 0.5 miles of suitable foraging habitat.

Reptiles

Black pine snake (Pituophis melanoleucus lodingi), a Federal candidate for listing, State-listed as endangered

Black pine snake habitat is characterized as sandy, well-drained soils with an overstory of longleaf pine, a fire-suppressed midstory, and dense herbaceous ground cover. In Mississippi, there are recent records in nine out of 14 counties with historic records (Forrest, George, Greene, Harrison, Jones, Lamar, Marion, Pearl River, Perry, Stone, and Wayne). The distribution of populations within these counties has become highly restricted due to the fragmentation of the remaining longleaf pine habitat. In seven of the nine occupied Mississippi counties, populations of black pine snakes are concentrated in the DeSoto National Forest. In the remaining occupied Mississippi counties, one population is known from the Marion County Wildlife Management Area, and one occurs on private land.

Loggerhead sea turtle (Caretta caretta), Federally listed as threatened, State-listed as endangered

The most common nesting sea turtle in Mississippi, loggerheads nest on open sandy beaches above high-tide mark, seaward of well-developed dunes primarily on barrier islands. Nesting normally occurs from early May through August, with the majority of nests being laid during June and July. Females lay three to five nests, and sometimes more, during a single nesting season. The eggs incubate approximately 2 months before hatching sometime between late June and mid-November.

Rainbow snake (Farancia erythrogramma) State-listed as endangered

The Rainbow snake lives primarily in or near rivers, creeks, swamps, springs, and open marshes, including brackish tidal areas; in some areas hibernation occurs in uplands near water. In Mississippi, there are records for this snake in Forrest, Hancock, Jackson, and Lamar Counties.

Gopher tortoise (Gopherus polyphemus), Federally listed as threatened, State-listed as endangered

In Mississippi, gopher tortoise populations are restricted to the well-drained sandy soil that once supported the vast longleaf forests across the State and much of the southeast. Gopher tortoise occur in suitable habitats south of the city of Jackson and east of the Pearl River. Research has shown that gopher tortoises move up to 600 feet between burrows for breeding purposes, and two or more burrows within 600 feet of each other can be defined as a population (McDearman personal communication)

Yellow-blotched map turtle (Graptemys flavimaculata), Federally listed as threatened, State-listed as endangered

The yellow-blotched map turtle is found only in the Pascagoula River system, including its tributaries: the Leaf, Chickasawhay, and Escatawpa Rivers in southern Mississippi.

Black-knobbed map turtle (Graptemys nigrinoda), State-listed as endangered

Black-knobbed map turtle habitat consists of rivers and streams with moderate current, sand or clay bottom, and logs and other basking sites in northeastern Mississippi in Clay, Lowndes, and Monroe Counties.

Ringed map turtle (Graptemys oculifera), Federally listed as threatened, State-listed as endangered

Typical habitat is medium-size streams and rivers with moderate to fast current, numerous basking logs, nearby sand and gravel bars, and a channel wide enough to allow sun to reach basking logs from 10:00 a.m. to 4:00 p.m. (McCoy and Vogt 1980, Dickerson and Reine 1996). This species requires high water quality to support main food sources. Eggs are laid in nests dug in sandy beaches or gravel bars. In Mississippi, the ringed map turtle is found in the Pearl River system from the vicinity of Philadelphia, Neshoba County, downstream in the Pearl (including Ross Barnett Reservoir) and West Pearl rivers to near the town of Pearl River. Distribution includes habitats in Copiah, Hinds, Lawrence, Leake, Madison, Marion, Neshoba, Pearl River, Rankin, Scott, and Simpson Counties.

Green sea turtle (Chelonia mydas), Federally listed as threatened, State-listed as endangered

The green sea turtle may be an occasional visitor to Mississippi waters, but is not known to nest in the State.

Kemp's Ridley sea turtle (Lepidochelys kempii), Federally listed as endangered, State-listed as endangered

Kemp's Ridley sea turtle is an occasional visitor to Mississippi waters, where it is sometimes caught in shrimp nets. Almost the entire population nests in Mexico and southern Texas.

Leatherback sea turtle (Dermochelys coriacea), Federally listed as endangered, State-listed as endangered

The leatherback sea turtle is an occasional visitor to Mississippi waters, but not known to nest in the State.

Eastern indigo snake (Drymarchon couperi), Federally listed as threatened, State-listed as endangered

The historical range of the eastern indigo snake was from the east coast of South Carolina through southern Georgia, Florida, into southern Alabama and southwest Mississippi, often associated with gopher tortoises. Particularly outside of southern Florida, gopher tortoise burrows provide important refugia from temperature extremes. Naturally occurring populations are now found only in southern Georgia and Florida. Indigo snakes were historically found in the lower coastal plain along with the burrowing gopher tortoise. This species is very rare and possibly extirpated in Mississippi.

Hawksbill sea turtle (Eretmochelys imbricata), Federally listed as endangered, State-listed as endangered

Hawksbill sea turtles may be an occasional visitor to Mississippi waters, but are not known to nest in the State.

Southern hognose snake (Heterodon simus), State-listed as endangered

Historically this snake occurred in open, xeric habitats with well-drained, sandy soils in the Coastal Plain from eastern North Carolina to southern Florida, west to southeastern Mississippi. It is now presumed to be extirpated in Mississippi and possibly extirpated in Alabama.

Amphibians

One-toed amphiuma (Amphiuma pholeter), State-listed as endangered

This species is found in deep, organic, liquid muck in alluvial swamps of low-gradient second or third order streams, spring runs, and occasionally floodplain swampy terrace streams. There are records from Jackson County in Mississippi.

Mississippi gopher frog (Rana sevosa), Federally listed as endangered, State-listed as endangered

This species once existed in the longleaf pine forests of the lower coastal plain from east of the Mississippi River in Louisiana to the Mobile River delta in Alabama. It has not been seen in Louisiana since 1967 or in Alabama since 1922. It is currently known to exist in four locations in Mississippi. The largest and best known population is at Glen's Pond located in Harrison County, Mississippi, on the De Soto National Forest. Two other occupied ponds were found in 2004; one pond is owned by the State of Mississippi, and the other is on private land in Jackson County. An additional pond has been established to assist with the recovery of the species.

Green salamander (Aneides aeneus), State-listed as endangered

This salamander is limited to northeastern Mississippi with records from Tishomingo County. It prefers damp (but not wet) crevices in shaded rock outcrops and ledges. It sometimes reaches high population densities in logged areas where tree tops are left.

Cave salamander (Eurycea lucifuga), State-listed as endangered

This salamander is found in caves (usually limestone); also rocky streams and springs, and wooded areas and fields, usually near caves or limestone outcrops in northern Mississippi. There are records from Tishomingo County.

Spring salamander (Gyrinophilus porphyriticus) State-listed as endangered

This salamander is found in small, clear upland streams; clear springs; caves; shaded seepages; occasionally in swamps and lake margins, sometimes also in forested wet areas away from streams, especially during rainy periods. There are records of this salamander from Tishomingo County.

Fish

Gulf sturgeon (Acipenser oxyrinchus desotoi), Federally listed as threatened, State-listed as endangered

Adult Gulf sturgeon migrate into large river systems between late March and early April to spawn, sometimes moving as much as 140 miles upstream. Adults and subadults return to the Gulf of Mexico in late fall. The young generally stay in the river mouth through winter and spring. Critical habitat has been designated and in Mississippi includes the Pearl and Pascagoula Rivers and their major tributaries.

Pallid sturgeon (Scaphirhynchus albus), Federally listed as endangered, State-listed as endangered

The pallid sturgeon is a species of large, turbid, free-flowing rivers and occurs in strong current over firm gravel or sandy substrate. In Mississippi, records are from the Mississippi River and Sunflower River/Yazoo Rivers.

Crystal darter (Crystallaria asprella), State-listed as endangered

The crystal darter is found in large creeks and rivers with extensive clean sand and gravel raceways. In Mississippi, crystal darters may be extirpated from the Tombigbee River, as they have not been collected since shortly after it was completed. There are other records from Pearl River system and Bayou Pierre.

Bayou darter (Etheostoma rubrum), Federally listed as threatened, State-listed as endangered

The bayou darter distribution is very localized and found in Bayou Pierre and its tributaries in Copiah County. The largest concentrations occur in sections of Bayou Pierre and Foster Creek, north of State Highway 548. Bayou darter prefers stable, moderately swift riffles of large gravel and rock in creeks and small to medium rivers.

Pearl Darter (Percina aurora), candidate for Federal listing

The Pearl darter are thought to be extirpated from the Pearl River, but is extant in the Pascagoula River system, including the Leaf River. Records occur in a variety of habitats ranging from silt, gravel, and cobble substrates, in shallow to deep water.

Ironcolor shiner (Notropis chalybaeus), State-listed as endangered

This shiner occurs in low gradient coastal streams along the Atlantic and Gulf Coasts. In Mississippi, surveys in 1995–1996 did not find any ironcolor shiners at 15 historic locations. During this survey, a new locality was recorded in extreme southeastern Mississippi in the Escatawapa River (Albanese and Slack 1998).

Frecklebelly madtom (Noturus munitus), State-listed as endangered

This fish occurs chiefly in rocky riffles in medium to large rivers. In Mississippi, the current range is restricted to the Tombigbee and Pearl River systems.

Greenside darter (Etheostoma blennioides), State-listed as endangered

Habitat preferences are variable; often in medium to large creeks and small to medium rivers with gravel- or rubble-strewn riffles, although they also occur in silt-free, shallow bedrock pools with steady current, and sometimes inhabit relatively quiet lake shores. In Mississippi, records are from the northeastern corner of the State in Tishomingo County.

Saltmarsh topminnow (Fundulus jenkinsi) Federal candidate for listing

This coastal species is found in cord grass marshes. During a recent survey, 90 percent of the saltmarsh topminnow was found in water with less than or equal to 12 percent salinity. In Mississippi, there are scattered records along the coast, including the Simmons Bay, Old Fort Bayou, Biloxi Bay, and Bay St. Louis.

Bigeye shiner (Notropis boops), State-listed as endangered

This fish is generally confined to upland streams in the Mississippi River Basin from the Tennessee and Ohio River Basins west to Missouri and Arkansas. In Mississippi, there are records from the Tennessee River system in the northeastern portion of the State.

Slenderhead darter (Percina phoxocephala), State-listed as endangered

This species is found in runs and riffles of creeks and small to medium rivers with moderate to strong flow and gravel, rubble, or bedrock substrate. In Mississippi, records are from Tishomingo County in the northeast corner of the State.

Suckermouth minnow (*Phenacobius mirabilis*) State-listed as endangered

This bottom-feeding minnow is found in low-gradient and moderate-gradient rivers and large creeks. In Mississippi, there are records in Tishomingo County.

Southern redbelly dace (*Phoxinus erythrogaster*) State-listed as endangered

This dace is generally found in headwater streams and upland creeks. In Mississippi, there are records from Tallahatchie, Tishomingo, Warren, Wilkinson, and Yazoo Counties.

Slender madtom (*Noturus exilis*) State-listed as endangered

This species uses a wide range of depths and current velocities. In Mississippi, there are records from Tishomingo County.

Mussels

The following mussel species are Federally or State-listed in Mississippi.

Table 3-13. Federally and State-listed Mussel Species in Mississippi

| Federally and State listed Mussel Species in Mississippi | Federal Status | State Status | Critical Habitat Designated | County Occurrence Records |
|--|----------------|--------------|-----------------------------|---|
| Alabama moccasinshell (<i>Medionidus acutissimus</i>) | T | E | Yes | Lowndes and Monroe Counties |
| Black clubshell (<i>Pleurobema curtum</i>) | E | E | Yes | Monroe County |
| Delicate spike (<i>Elliptio arctata</i>) | | E | No | George, Leake, Lowndes, Monroe, and Simpson Counties |
| Fat pocketbook (<i>Potamilus (=Proptera) capax</i>) | E | E | No | Adams, Issaquena, and Jefferson Counties |
| Flat pigtoe (<i>Pleurobema marshalli</i>) | E | E | Yes | Lowndes County |
| Heavy pigtoe (<i>Pleurobema taitianum</i>) | E | E | Yes | Lowndes and Itawamba Counties |
| Inflated heelsplitter (<i>Potamilus inflatus</i>) likely extirpated from the State | T | E | Yes | NA (Pearl and Tombigbee Rivers) |
| Kidneyshell (<i>Ptychobranthus fasciolaris</i>) | | E | No | Tishomingo County |
| Monkeyface (<i>Quadrula metanevra</i>) | | E | No | Clay, Lowndes and Monroe Counties |
| Orange-nacre mucket (<i>Lampsilis perovalis</i>) | T | E | Yes | Itawamba, Lowndes, and Monroe Counties |
| Ovate clubshell (<i>Pleurobema perovatum</i>) | E | E | Yes | Clay, Itawamba, Lowndes, and Monroe Counties, potential habitat in those counties bordering the Mississippi River |
| Pyramid pigtoe (<i>Pleurobema rubrum</i>) | | E | No | Coahoma, Hinds, Humphreys, Sunflower, Warren, and Washington Counties |
| Sheepnose mussel (<i>Plethobasus cyphus</i>) | | E | No | Sunflower County |

| Federally and State listed Mussel Species in Mississippi | Federal Status | State Status | Critical Habitat Designated | County Occurrence Records |
|--|----------------|--------------|-----------------------------|--|
| | | | | |
| Slabside pearlymussel (<i>Lexingtonia dolabelloides</i>) | | E | No | NA (Lake Pontchartrain) |
| Snuffbox (<i>Epilblasma triquetra</i>) | | E | No | Tishomingo County |
| Southern clubshell (<i>Pleurobema decisum</i>) | E | E | Yes | Clay, Itawamba, Lowndes, and Monroe Counties |
| Southern combshell (<i>Epioblasma penita</i>) | E | E | Yes | Clay, Itawamba, Lowndes, and Monroe Counties |
| Spike (<i>Elliptio dilatata</i>) | | E | No | Benton and Sunflower Counties |
| Stirrupshell (<i>Quadrula stapes</i>) | E | E | Yes | Lowndes County |

Crayfish

***Camp Shelby burrowing crawfish (Fallicambarus gordonii)*, a Federal candidate for listing, State-listed as endangered**

This crayfish is restricted to bogs in pitcher plant wetlands in the Leaf River watershed, in the De Soto National Forest in Perry County, Mississippi.

Insects

***Mitchell's satyr butterfly (Neonympha mitchellii mitchellii)*, Federally listed as endangered**

There are recent records of this butterfly in Prentiss and Tishomingo Counties in northeastern Mississippi.

Plants

***Louisiana quillwort (Isoetes louisianensis)*, Federally listed as threatened**

Louisiana quillwort is restricted to shallow blackwater streams in riparian woodland and bayhead forest areas of pine flatwoods. The plants are found on stable sand and gravel bars, moist overflow channels with silty sand substrates, and on low, sloping banks near and below water level. In Mississippi, there are records from Jackson and Perry Counties.

***Pondberry (Lindera melissifolia)*, Federally listed as endangered**

Pondberry habitat is characterized as seasonally flooded wetlands, such as floodplain hardwood forests and forested swales. Pondberry is usually found in shade but tolerates full sun. In Mississippi, there are records of approximately 204 colonies, primarily in the Delta National Forest (192 colonies in the Delta National Forest and 12 colonies on private lands approximately 65 miles north of the Forest) (GSRC 2002).

***Price's potato bean (Apios priceana)*, Federally listed as threatened**

Price's potato bean is an herbaceous twining perennial vine typically located under mixed hardwoods or in associated forest clearings, often where bluffs or ravine slopes meet creek or river bottoms. Soils are generally well-drained and loamy, formed on alluvium or over calcareous boulders. Several populations extend onto road or powerline ROWs. There are four populations in Mississippi located in three counties: Clay, Oktibbeha, and Lee (Norquist 1990).

American chaffseed (*Schwalbea americana*), Federally listed as endangered

American chaffseed is a perennial member of the figwort family found in acidic, sandy, or peaty soils in open pine flatwoods, pitch pine lowland forests, seepage bogs, palustrine pine savannahs, and other grass- and sedge-dominated plant communities. It frequently grows in ecotonal areas between peaty wetlands and xeric sandy soils. In these situations, individuals sometimes extend well into the drier communities but seldom into the areas that support species characteristic of wetter soils. Surrounding plant communities are typically rich in species diversity. There are historic records from Jackson County.

3.4.7 Wildland Fire Ecology and Management

Characteristics of wildfire in southeastern States are discussed in Section 3.2.7; however, the southern one-third of Mississippi generally tends to have the most wildland fire activity (Southern Group of State Foresters 2004). Mississippi's forests and associated species are adapted to regular wildland fire. However, changing land use practices, urban sprawl, land fragmentation, natural disasters such as hurricanes, increasing land values, population increases, and the transition from urban to rural populations results in a buildup of fuels and a need to increase fuels management and wildland fire activities (Southern Group of State Foresters 2004). Through the course of an average year in Mississippi, there are 3,635 individual wildland fires that burn 47,597 acres per year over the last 5 years (fiscal years 2000–2004) (MFC 2004). The average wildfire size is approximately 10 acres per fire (MFC 2004).

Although Mississippi has WUI areas across the State, relatively few homes and structures are lost to wildland fires annually. An average of 12 homes and eight other structures are lost each year to wildland fires. There are usually 15 vehicles damaged or destroyed by wildland fire each year (Southern Group of State Foresters 2004).

The Mississippi Forestry Commission (MFC) is responsible for protecting 14.8 million acres of private non-industrial forestland within the State (Southern Group of State Foresters 2004). MFC provides forest protection through the placement of county fire crews and by working closely with Federal agencies through cooperative agreements and Memoranda of Understanding (MOU) (Southern Group of State Foresters 2004). On Federally managed lands (9.8 percent of the forestland base), the MFC has mutual aid agreements to support Federal wildland fire suppression efforts. Timber companies suppress wildland fires on their property and at times assist in suppression efforts on private lands (Southern Group of State Foresters 2004).

Since forestlands and species in Mississippi are adapted to regular disturbance by wildland fires to maintain forest health, but suppression activities limit the role of natural wildland fires, managed fuels treatments are needed to maintain forest health. Table 3-14 shows the fuels treatments completed in Mississippi by Department of the Interior agencies and USFS. The BLM did not conduct any fuels treatments in Mississippi over these 4 years. Over 95 percent of these treatments were completed by the USFS using prescribed fires approximately 80 percent of the time. Over 96 percent of Federal fuels treatments were applied in WUI areas.

Table 3-14. DOI and USDA Fuels Treatment Accomplishments for Mississippi (Acres)

| Year | Wildland-Urban Interface | | | Other | | | Total |
|------|--------------------------|------------|---------|--------|------------|--------|---------|
| | Fire | Mechanical | Total | Fire | Mechanical | Total | |
| 2006 | 101,385 | 117,052 | 218,437 | 2,847 | 846 | 3,693 | 222,130 |
| 2005 | 256,138 | 18,879 | 275,017 | 10,312 | 27 | 10,339 | 285,356 |
| 2004 | 251,924 | 10,496 | 262,420 | 16,820 | 672 | 17,492 | 279,912 |

| Year | Wildland-Urban Interface | | | Other | | | Total |
|--|--------------------------|------------|---------|-------|------------|-------|---------|
| | Fire | Mechanical | Total | Fire | Mechanical | Total | |
| 2003 | 264,855 | 605 | 265,460 | 6,598 | 466 | 7,064 | 272,524 |
| Source: http://www.fireplan.gov/overview/States/ms.html , accessed March 2, 2007 | | | | | | | |

Fuels treatments, including prescribed fire, are also implemented by the MFC on the private and State-owned forests. In addition, the MFC provides training and permitting to ensure that fuels treatments in these areas, and prescribed fire in particular, are completed in a manner that protects firefighter and public safety, as well as capital improvements and natural resources.

3.4.8 Cultural Resources

Mississippi surface and non-USFS FMO tracts have not been fully surveyed for cultural resources. The surveys that have been conducted were usually initiated by project proponents on a project-specific basis, such as for oil and gas, coal mining, transportation, or water projects, to comply with the requirements of Section 106 of NHPA, 36 CFR Part 800, described in Section 3.2.8.

A cultural resources literature and records search was conducted for the BLM surface and non-USFS FMO tracts in the State of Mississippi. The results of the research are presented in an overview (Panamerican Consultants, Inc. 2005a) that is on file at the BLM office in Jackson. The following cultural resource information was taken from Panamerican Consultants Inc. (2005b), unless otherwise noted. Descriptions of the prehistoric periods are provided in Table 3-5. Cultural resources from any of these time periods may be present on BLM-administered surface and non-USFS FMO.

Prehistory

A variety of cultural resource site types attributed to a range of culturally distinct chronological periods from 10,000-plus years ago to the present day have been recorded in the Southeast. The cultural periods represented include Paleoindian, Archaic, Gulf Formational, Woodland, Mississippian, and Protohistoric. Descriptions of the prehistoric periods and general types of cultural materials associated with each one are provided in Table 3-5 in Section 3.2.8.

History

A wealth of Mississippi history is associated with American Indian inhabitants, European exploration, multiple battles, and the evolution of Southern culture. These events, discussed below, provide the context and relative importance of the cultural site types that may be encountered on BLM-administered surface and non-USFS FMO.

From the 16th to the 19th century, Spain, France, and England fought for domination and possession of the territories and resources in the southeastern United States. European exploration of this area was discussed in Section 3.2.8. Mississippi was home to many American Indian groups during this time, but European disease epidemics and Chickasaw slave raids greatly reduced their populations (Galloway 1995). The three best known American Indian groups in Mississippi are the Choctaw, Chickasaw, and Natchez (Cushman 1899). The Choctaw, who had the largest population, occupied most of southeastern Mississippi and a portion of western Alabama. The Chickasaw occupied the northeastern section of Mississippi and claimed western Tennessee as a hunting ground. The Natchez occupied the loess bluffs overlooking the Mississippi River in southwestern Mississippi. If any cultural material potentially tied to

these Indian Nations is encountered, Federally recognized Native American tribes will need to be consulted before any undertaking, as discussed in Section 3.2.8.

After the American Revolution, the lands east of the Mississippi River became part of the United States. The Mississippi Territory was created in 1798, and Mississippi became a State in 1817 (Bettersworth 1959; Haynes 1973). The largest population growth and county organization in Mississippi history occurred between 1832 and 1854 (Gonzales 1973). Numerous railroads were chartered, seagoing steamboats came upriver to Natchez, and many domestic travel improvements were made. Land development, the rise of cotton as a major cash crop, and easier means of transporting goods contributed to the State's growing prosperity. Slavery played a vital role in the growth and production of cotton and became a contentious issue in Mississippi and the other States. The pro-slavery States began to move toward secession from the Union, and in 1861, Mississippi voted to secede (Bettersworth 1959). The Mississippi River was of great importance to the Union because it kept the Midwest commerce moving and was a major focus for Northern generals during the Civil War. In 1865, the war ended and the slaves were emancipated, which dramatically affected Southern agriculture and economics. Sharecropping and tenant farming became the common mode of farming after the abolition of slavery.

In the late 1800s, manufacturing in the State was in the form of textile mills. The lumber industry became a growing economic force, as did the cottonseed and fertilizer industries (Bettersworth 1959). Mississippi's centennial celebration was overshadowed by the entry of the United States into World War I. Camp Shelby, near Hattiesburg, was made a major training camp. One of the few air bases in the country was located near the town of Columbus (Bettersworth 1959). Following World War I, the Mississippi River Flood of 1927 covered nearly half of the delta with 30 feet of water for months (Barry 1998; Bettersworth 1959). Nearly 300,000 Black Americans migrated to northern cities as a result of this flood. Another result was the creation of several large flood-control steps by the U.S. Army Corps of Engineers in Vicksburg (Barry 1998). The Depression followed the flood, and Mississippi's economy was once again shattered (Emmerich 1973). World War II and military mobilization brought significant change to the State's economy.

Cultural Sites

As discussed in Section 3.2.8, prehistoric or historic cultural resource sites, structures, or objects listed on or eligible for listing on NRHP are protected and managed as directed by 36 CFR 800. Cultural resources found ineligible for NRHP require no further archaeological work and are not protected by law. Sites are identified as undetermined/unknown when additional work is required to determine the site's eligibility. The nature and location of any archaeological resources are protected under ARPA (also discussed in Section 3.2.8).

Records were searched for 3,698 non-USFS FMO tracts in Mississippi. The records revealed 601 sites, of which 28 sites were considered eligible for NRHP. Most of the tracts have never been surveyed, and there is a high potential for finding additional archaeological sites. There are two sites listed on NRHP that are located near BLM-administered, non-USFS FMO tracts.

Records were searched for the BLM surface tract in Mississippi, which cover 174 acres in Hancock County. This tract does not contain any previously recorded sites; however, there are three cultural sites recorded within one-half mile of the tract. There are 20 NRHP-listed properties in Hancock County (NRHP 2004), but only one NRHP-listed archaeological site is located within 800 meters of the tract. Cultural sites on adjacent lands could provide information on the potential for the occurrence and types of sites that could be discovered on the BLM surface tracts; however, these sites are not affected by BLM activities and management. Table 3-15 summarizes the cultural sites identified.

Table 3-15. Cultural Sites on BLM Surface and Non-USFS FMO Tracts in Mississippi

| Tract Type | Total Sites | NRHP Status | | |
|--|-------------|-----------------------------------|--------------|----------------------|
| | | Potentially Eligible/ Eligible | Not Eligible | Undetermined/Unknown |
| Non-USFS FMO Tracts | 601 | 28 | 173 | 400 |
| Hancock County Surface Tract | 0 | 0 | 0 | 0 |
| Areas Adjacent to the Surface Tract ¹ | 3 | 3 | 0 | 0 |

1 One NRHP-listed archaeological site is located within 800 meters of the surface tract.

3.4.9 Visual Resources

Visual resources consist of the natural and manmade features that contribute to a particular environment's aesthetics. These features may be natural (e.g., canyon views) or manmade (e.g., city skyline). Together, they form the overall impression of an area referred to as the landscape character. Visual resources also have a social setting, which includes public values, awareness, and concern about visual quality. VRM classifications are established for public lands so that visual resource values can be maintained through informed management decisions. Current conditions of visual character on the BLM-administered surface tracts are discussed in Section 3.5.

The visual resource inventory process contained in BLM Handbook H-8410-1 provides the BLM managers guidance for determining visual values. The inventory consists of scenic quality evaluation, sensitivity level analysis, and delineation of distance zones. Based on these three factors, BLM-administered lands are placed into one of four visual resource inventory classes. These inventory classes represent the relative value of the visual resource: Classes I and II are the most valued, Class III represents a moderate value, and Class IV has the least value. Management objectives have been assigned to each class. An area may be inventoried as VRM Class III, but a decision may be made to manage it as VRM Class IV, or vice versa. Cultural modifications may detract from the scenery, complement it, or improve the overall scenic quality of an area. Cultural modifications in landform/water and vegetation values and addition of structures will be considered in examining proposed resource management actions.

The following VRM Class definitions from BLM Handbook H-8410-1 have been amended for the purpose of developing and implementing this RMP. Amendments incorporate the visual resource values provided by existing cultural features that are significant to the character of the landscape in Mississippi.

- **VRM Class I Objective.** The objective of this class is to preserve the existing natural and cultural character of the landscape. This class provides for natural ecological changes; however, it does not preclude very limited management activity. The level of change to the characteristic landscape should be very low and must not detract from the existing landscape character.
- **VRM Class II Objective.** The objective of this class is to retain the existing natural and cultural character of the landscape. The level of change to the characteristic should be low. Management activities may be visible but should not attract the attention of the casual observer. Any changes must repeat the basic elements of form, line, color, and texture found in the predominant natural and/or cultural features of the characteristic landscape.

- **VRM Class III Objective.** The objective of this class is to partially retain the existing natural and cultural character of the landscape. The level of change to the characteristic landscape should be moderate. Management activities may be visible but should not dominate the view of the casual observer. Changes should blend with the natural environment.
- **VRM Class IV Objective.** The objective of this class is to provide for management activities that require significant modification of the existing landscape or the existing character of the natural and cultural landscape. The level of change to the characteristic landscape can be high. These management activities may dominate the view and be the major focus of the casual observer's attention; however, every attempt should be made to minimize the impact of these activities through selective location, minimal disturbance, and repetition of basic elements.

3.4.10 Minerals

There are 517,934 acres of BLM-administered, non-USFS FMO in Mississippi that underlie various surface ownership. Surface owners include the BLM, DoD, NPS, USFWS, and other Federal agencies. Table 3-16 shows BLM-administered FMO by surface ownership in Mississippi.

Table 3-16. BLM-administered Federal Mineral Ownership by Surface Ownership

| Surface Ownership | Federal Mineral Ownership in Mississippi (Acres) |
|----------------------------------|--|
| BLM | 174 |
| DoD | 40,580 |
| NPS | 2,797 |
| USFWS | 60,207 |
| Other Federal Agencies | 12,766 |
| Non-Federal surface | 401,410 |
| TOTAL non-USFS FMO | 517,934 |
| USFS | 1,055,227 |
| TOTAL FMO (includes USFS) | 1,573,161 |

Minerals—Oil and Gas

The first oil and gas exploration in Mississippi was undertaken in 1903. The Alabama-Mississippi Investment and Development Company in Enterprise, Mississippi, drilled the first well just east of Enterprise in Clarke County. It was a dry hole that was drilled to 1,842 feet. The first commercial discovery occurred near Amory, Mississippi, in Monroe County in October 1926, when gas flowed from the 2,404-foot Amory Petroleum Company Carter Oil #1 well. As of April 2005, there are 27 active oil and gas wells on BLM non-USFS FMO according to data from the Automated Fluid Mineral Management System.

Mississippi oil and gas production data from the Mississippi Oil and Gas Board were available for the period 1951–2004. The number of wells increased from 1,780 in 1951 to 4,307 in 2003. The number of wells peaked at 4,530 wells in 1990. Oil production decreased from 27,494,492 barrels in 1990 to 17,238,528 barrels in 2004. Oil production was at its lowest in 2004 and peaked at 65,119,072 barrels in 1970. Gas production decreased from 200,980,232 mcf in 1990 to 174,438,213 mcf in 2004. As of April

2005, 1,223 Federal leases are authorized in Mississippi. There are 42 existing leases on non-USFS FMO and 1,181 leases on USFS FMO.

Map 3-1 shows counties in Mississippi with historical oil and gas production. Reasonable foreseeable development is anticipated in the areas of historical oil and gas production (BLM 2004b). The areas of historical production are the salt basin and the coastal plain. The BLM projects that 10 wells accessing non-USFS FMO in Mississippi will be drilled over the next 20 years (BLM 2004b).

Salt Basin

The salt basin is part of the Gulf Coast geosyncline that contains more than 50 piercement-type salt domes (Spiers and Gandl 1980). The individual salt domes evolved from the uprising of salt from the extensive Jurassic Louann Salt Formation through the overlying sediments. These piercement structures have deformed the younger units. Oil and gas have been found on the dome flanks in the past 20 years.

The oldest rocks in the area penetrated by drilling are those of the Louann Salt. The salt is overlaid by Upper Jurassic sandstones, followed by a thick sequence of cretaceous deposits, which consist primarily of sandstone, limestone, and shale. The Cretaceous deposits are overlain by Tertiary deltaic deposits and alluvium of Quaternary or Recent age.

Coastal Plain

The coastal plain is a continuation of the same feature in the southern Alabama Basin. These lands are in an area dominated by the Gulf Coast geosyncline. This large basin formed in the Jurassic period with a southward downwarping. The basin has accumulated sedimentary deposits as thick as 30,000 feet. Fault zones parallel the basin hingeline and can trap hydrocarbons (Murray 1964). Other structural features, such as small basement highs, also trap hydrocarbons in this area.

The deposits in the major geologic units mainly consist of alternating layers of sand and clay, with occasional beds of carbonates and anhydrite. Permeable horizons exist in all formations, and oil and gas are produced from each horizon in the region, with the Haynesville, Smackover, and Norphlet Formations being important (Cate 1982; Poe 1979; May 1974; Moore 1971; Dinkins 1968).

Leasable Minerals – Coal

Coal resources in Mississippi are not described because consideration of coal leasing in this Proposed RMP-FEIS is limited to the Warrior coal basin in Alabama. Development of Federal coal resources in Mississippi over the next 20 years is not economically viable because of the depth to the coal.

3.4.11 Recreation and Travel Management

Recreation encompasses various human activities that affect and are affected by resources and other resource uses. Dispersed recreation is characterized by unstructured activities that are not confined to specific locations (such as developed recreation sites). Dispersed recreation can involve various activities, which on the Mississippi surface tract can include saltwater marsh activities such as hunting, fishing, nature study, and boating.

There are no roads on the Hancock County tract. The only effective means of transportation is by watercraft.

The BLM-administered, non-USFS FMO includes the mineral estate where the surface is managed by another Federal surface managing agency. These properties and installations managed by other Federal agencies as well non-Federal agencies such as private, State, or county are summarized in Table 3-17 and shown on Map 1-1 and Map 1-2.

For those tracts where the surface is managed by another surface managing agency, and where public access for recreation and oil and gas leasing are permitted, recreation experiences and resulting benefits could be affected by the BLM management actions. Information on public recreation and minerals leasing on other Federal surface management agencies is listed in Table 3-17.

Table 3-17. BLM-administered, non-USFS Federal Mineral Ownership¹ by Surface Managing Agency in Mississippi

| Surface Managing Agency | Installations/Areas | Public Access for Recreation (Yes/No) ² | Mineral Leasing (Open/Closed) ² |
|---|---|--|--|
| USFWS | Grand Bay NWR | Yes | Closed |
| | Mississippi Sandhill Crane NWR | No | Closed |
| | Bogue Chitto NWR | Yes | Closed |
| | Panther Swamp NWR | Yes | Closed |
| | Hillside NWR | Yes | Closed |
| | Noxubee NWR | Yes | Closed |
| DoD | Meridian Naval Air Station (Navy) | ND | Open |
| | Alpha Naval Auxiliary Station (Navy) | ND | Open |
| | Multipurpose Target Range (Navy) | ND | Open |
| | Aliceville Lake (Army Corps of Engineers) | Yes | Open |
| | Columbus Lake (Army Corps of Engineers) | Yes | Open |
| | Aberdeen Lake (Army Corps of Engineers) | Yes | Open |
| | Grenada Lake (Army Corps of Engineers) | Yes | Open |
| | Enid Lake (Army Corps of Engineers) | Yes | Open |
| | Sardis Lake (Army Corps of Engineers) | Yes | Open |
| NPS | Vicksburg National Military Park | Yes | Closed |
| | Natchez-Trace National Parkway | Yes | Closed |
| | Gulf Island National Seashore | Yes | Closed |
| | Other small NPS sites | Yes | Closed |
| Other | Areas Managed by Other Federal Agencies | No | Varies |
| ND means no information was available from the surface managing agency. ¹ Does not reflect BLM FMO for BLM surface tracts (174 acres). ² Closed means closed to new leases. Existing leases could be present on areas currently closed. | | | |

The BLM administration of travel resources in Mississippi is limited to access routes and associated access/maintenance routes for ROW such as transmission lines. Public travel routes are administered and maintained by other Federal, State, and local agencies. Information on tract-specific travel resources is contained in Section 3.5.

3.4.12 Lands and Realty

The goals of the lands and realty program are to manage the public lands to support the goals and objectives of other resource programs, provide for uses of public lands in accordance with regulations and compatibility with other resources, and improve management of the public lands through land tenure adjustments. The lands and realty program is a support program to all other resources to help ensure that BLM-administered lands are managed to benefit the public. Current conditions of lands and realty on the BLM-administered surface tracts are discussed in Section 3.5.

3.4.13 Social and Economic

The BLM surface lands for this planning effort in Mississippi are located in an isolated section of Hancock County. BLM-managed, non-USFS FMO is scattered throughout the State. Thus, the description of affected environment for Mississippi will focus on general socioeconomic information for the State, in addition to descriptions of notable statistics in counties within the State.

Economic Characteristics

Household and Personal Income

Median household income for Mississippi was \$32,397 in 2003 (U.S. Census Bureau). Information on per capita income was obtained from U.S. Census Bureau and indicates that average per capita income reported for 2004 in Mississippi was \$24,518. Gross State Product in 2003 was \$72 billion (BEA). In 2005, Mississippi ranked fiftieth in the United States in per capita income (including the District of Columbia). According to BEA, Mississippi per capita income is 71 percent of the national average of \$36,608 (2006 dollars).

Some of the nation's poorest counties are located in Mississippi, with approximately 13 counties that are within the 100 poorest counties in the nation in terms of per capita income. The counties and their associated average per capita income are located in Figure G-7 (Appendix G). These counties are located primarily along the western border of the State. In contrast, Mississippi does not have any counties that are within the wealthiest 100 counties in the nation. Rankin County, encompassing many of the suburbs of Jackson, has the highest per capita income of \$30,849 in 2006 dollars.

Employment and Compensation

Employment for the State was 1.5 million in 2005 (BLS 2005). Figure F-8 (Appendix F) summarizes the employment by industry for 2005. In 2005, there were three large employers in Mississippi: Government (18 percent), manufacturing (12 percent), and retail trade (11 percent), comprising 41 percent of the total employment for the State. Other industries in the State include health care, accommodation and food service, and construction. Table 3-18 summarizes the employment by industry between 2000 and 2005.

Table 3-18. Employment by Industry, 2000–2005

| Industries | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | Percent Change 2000 2005 |
|----------------|---------|---------|---------|---------|---------|---------|--------------------------------|
| Retail Trade | 171,882 | 171,104 | 170,592 | 172,291 | 172,384 | 174,166 | -1 |
| Transportation | 51,141 | 50,901 | 49,587 | 49,506 | 48,992 | 50,193 | 2 |

| Industries | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | Percent Change 2000 2005 |
|------------------------------------|------------------|------------------|------------------|------------------|------------------|------------------|--------------------------------|
| Finance and Insurance | 47,734 | 47,357 | 47,282 | 47,530 | 47,128 | 47,986 | -1 |
| Real Estate | 38,092 | 35,730 | 32,986 | 32,833 | 32,070 | 32,089 | 19 |
| Professional Services | 56,268 | 52,825 | 50,148 | 48,683 | 48,081 | 46,980 | 20 |
| Administrative and Waste Services | 68,605 | 63,810 | 59,262 | 57,212 | 54,206 | 57,252 | 20 |
| Health Care | 124,422 | 122,515 | 120,171 | 116,127 | 111,908 | 108,386 | 15 |
| Accommodation and Food Services | 118,503 | 119,166 | 117,468 | 114,441 | 106,631 | 106,168 | 12 |
| Other Services | 84,969 | 84,979 | 80,702 | 80,009 | 76,930 | 75,441 | 13 |
| Government | 277,404 | 281,982 | 281,442 | 277,815 | 275,254 | 273,722 | 1 |
| Farming | 50,367 | 50,874 | 51,031 | 53,668 | 53,062 | 54,955 | -8 |
| Construction | 90,915 | 85,724 | 85,348 | 86,899 | 86,020 | 88,129 | 3 |
| Manufacturing | 183,425 | 184,519 | 183,613 | 192,715 | 205,517 | 224,759 | -18 |
| Wholesale Trade | 39,751 | 39,250 | 38,667 | 38,814 | 39,102 | 41,262 | -4 |
| Other | 101,789 | 102,410 | 102,265 | 104,382 | 112,102 | 111,184 | -8 |
| Total Employment | 1,505,277 | 1,493,146 | 1,470,564 | 1,472,925 | 1,469,614 | 1,492,672 | 6 |
| Source: Bureau of Labor Statistics | | | | | | | |

Government, retail trade, and construction industries have remained relatively stable over the past several years, while the manufacturing industry has decreased its employment in the State by 18 percent and the health care and accommodation and food services industries have increased employment by 15 and 12 percent, respectively.

The unemployment rate in Mississippi has been consistently above the national average, as depicted in Figure G-9 (Appendix G). The employment rate peaked to 8.8 percent in 2005, likely as a result of the devastation of Hurricane Katrina. Figure G-10 (Appendix G) shows a map of Mississippi unemployment rates by county and indicates that the highest unemployment rates are in Jefferson, Sharkey, Humphreys, Holmes, and Noxubee Counties.

Oil and gas also provide employment and income within the State. However, over the past 20 years, the BLM has permitted 7 wells of a total of 7,362 wells permitted within the State. Therefore, although these BLM-administered oil and gas resources do contribute to employment and earnings in this area, it is a fairly small amount.

Social Characteristics

Demographics

Population trend data were obtained from the Census Bureau. Figure G-11 (Appendix G) shows the State's population trend between 2000 and 2005, a percentage change of 3 percent over the 6-year time period. The densest counties include Hinds and Rankin, both comprising the Jackson metropolitan area,

as well as Harrison and Jackson Counties, on the southeastern coast. De Soto County, comprising the suburbs of Memphis, Tennessee, also has a relatively dense population. Counties that have fairly low population densities relative to the other counties in the State include Webster, Choctow, Quitman, Franklin, Jefferson, Issaquena, and Benton. Counties experiencing very high growth rates between 2000 and 2005 include De Soto (26 percent), Lamar (13 percent), and Rankin (13 percent). On the other hand, Issaquena and Sharkey Counties are decreasing in population: 15 and 9 percent, respectively. The median age of the State population in 2000 was estimated to be 33.8, which is slightly lower than the nation's median of 35.3 (U.S. Census 2000).

Housing

In the State, 90.1 percent of the 1.1 million housing units were occupied in 2000. Homeowners inhabited 72.3 percent of the total occupied housing units. The State has a low homeowner vacancy rate, 1.6 percent, indicating that most of the owner-occupied homes in Mississippi are occupied by owners and are not second homes. The average household size for owner-occupied units is 2.67 people, as compared to 2.52 for rental-occupied units (U.S. Census Bureau 2000). In 2000, the median value of a housing unit was \$71,400, 59 percent of the national median value of \$119,600. Although the personal income is less than the national average (71 percent), the cost of housing is significantly lower (59 percent), indicating that the cost of living in Mississippi is likely lower than the nation, on average.

Education

Of the State's population above age 25, 72.9 percent has graduated from high school and 16.9 percent holds a bachelor's degree (U.S. Census 2000). This is lower than the national average for high school graduates (80.4 percent) and bachelor's degree (24.4 percent). Ninety-six percent of the State's population speaks English at home.

Attitudes and Beliefs of Mississippi Stakeholders

In Mississippi, the BLM has responsibility for a number of issues and decisions that could be important to stakeholders and their beliefs, including Federal land disposal and oil and gas development. This section will briefly describe stakeholders' attitudes and beliefs related to these specific issues to provide a social context for these decisions.

Public lands are important in providing a natural resource base for economic activities. The potential additional oil and gas development will be supported by some stakeholders and not by others. Stakeholders who support oil and gas development believe that domestic production of resources will reduce the nation's dependency on foreign oil and gas sources and potentially affect prices. Additionally, the oil and gas industry has contributed to the tax base of both counties and the State, providing funds for local, regional, and State governments, infrastructure, schools, and other community services. Many people believe that this funding is vital to the economy of Mississippi counties and the State.

Conservation-focused stakeholders may not support oil and gas development or might support conditions and stipulations on development and production to reduce negative impacts to the surface and subsurface. These environmental stakeholders are concerned about erosion and water quality impacts associated with road and wellpad construction and water disposal in the production process. Some stakeholders believe that the potential long-term environmental risks of development are considerable compared to the short-term benefit of the resource extracted. Additionally, these types of stakeholders believe that oil and gas impacts such as increased road building, associated road traffic, dust, and noise add to the negative impacts associated with this type of development.

Public land disposal may also be a contentious issue with the public. The BLM in Mississippi manages one pocket property, the Hancock County tract, located on the southern coast of Mississippi. Preservation-oriented stakeholders are concerned about protecting open spaces and limiting development on these lands, often to maintain a quality of life that the property provides. For example, quality of life attributes could include recreation, such as bird-watching or walking, solitude, and the knowledge that the property provides important wildlife habitat. Therefore, these types of stakeholders believe that keeping the surface lands in Federal ownership is preferable or selling these lands to organizations interested in preserving the lands. Developers might be interested in purchasing these lands for their economic value due to their location on the coast if the lands are buildable. Additionally, some people may feel that disposing of Federal lands provides fiscal revenues as private property taxes can be collected.

Environmental Justice

The environmental justice purpose and threshold criteria are provided in Section 3.2.13.

Poverty level estimates for the State were estimated to be 19.9 percent, compared to the national average of 12.5 percent, as shown in Figure G-12 (Appendix G). The poverty levels in the State are below the set threshold of 20 percent for low-income populations. Table 3-19 shows the ten poorest counties in Mississippi and the associated percentage of the population below poverty, located primarily along the western border of the State.

Table 3-19. Poorest Counties in Mississippi

| Countries | Percent of Population Below Poverty |
|--------------------------------|-------------------------------------|
| Wilkinson County | 28.1 |
| Jefferson County | 28.2 |
| Coahoma County | 28.4 |
| Washington County | 28.5 |
| Leflore County | 29.5 |
| Sharkey County | 29.5 |
| Issaquena County | 29.6 |
| Humphreys County | 30.2 |
| Sunflower County | 30.5 |
| Holmes County | 32.4 |
| Source: Bureau of Census, 2000 | |

Ethnicity information for the State was obtained from the U.S. Census Bureau and is summarized in Figure G-13 (Appendix G). In 2005, the State was predominantly Caucasian (61.2 percent). The remaining race distribution is Black or African American (36.9 percent), Hispanic or Latino (1.7 percent), Asian (0.7 percent), two or more races (0.6 percent), American Indian or Native Alaskan (0.4 percent), and Native Hawaiian or other Pacific Islander (0 percent). The ethnic representation in Mississippi indicates that on average Mississippi has fewer minorities than the rest of the nation. There are obvious variations in ethnicity across the State. In 2000, 24 of the 82 counties in Mississippi have Black or African American populations of greater than 50 percent (Bureau of Census 2000). Sixteen counties in Mississippi have Blacks or African Americans representing 60 percent or greater of the population. These 16 counties and the percentage of Black and African Americans are shown in Table 3-20.

Table 3-20. Mississippi Counties with Black or African American Populations, 2000

| Counties | Percent of County Representing Black or African American Ethnicity |
|--------------------------------|---|
| Bolivar | 65.1 |
| Claiborn | 84.1 |
| Coahoma | 69.2 |
| Hinds | 61.1 |
| Holmes | 78.7 |
| Humphreys | 71.5 |
| Issaquena | 62.8 |
| Jefferson | 86.5 |
| Leflore | 67.6 |
| Noxubee | 69.3 |
| Quitman | 68.8 |
| Sharkey | 69.3 |
| Sunflower | 69.9 |
| Tunica | 70.2 |
| Washington | 64.6 |
| Wilkinson | 68.2 |
| Source: Bureau of Census, 2000 | |

3.4.14 Hazardous Materials

BLM-administered public lands and minerals provide opportunities for a variety of commercial uses in addition to resource management. Both activities can lead to releases of hazardous substances and creation of hazardous waste sites. The BLM engages in hazardous material emergency response actions, site evaluations, and prioritization of cleanups in accordance with laws and regulations. This involves working with the EPA, State environmental quality departments, counties, and potentially responsible parties (both public and private) to fund and expedite the cleanup of hazardous sites. Those sites that are an imminent threat to public health and safety, as well as those sites that are under a consent order and can, therefore, generate penalties and fines, are a priority for the Bureau. There are no known hazardous, toxic, or unapproved solid waste sites on public lands within the planning area.

3.5 MISSISSIPPI SURFACE TRACT DESCRIPTION

The surface tract descriptions in this section include available detail on the Hancock County tract described in Chapter 2. General information and tract-specific information on soil resources, water resources, vegetative communities, fish and wildlife, special status species, cultural resources, visual resources, recreation and travel management, and lands and realty are provided. Air quality, wildland fire ecology and management, minerals, and social and economic conditions are discussed in Section 3.4.

General. This section provides basic location and size of the surface tract, as well as available background information.

Soil Resources. This section provides a table of the soils present at the tract, the erosion hazard potential as indicated by NRCS, and the presence of prime or unique farmlands (defined in Section 0).

Water Resources. This section describes which drainage basin the surface tract is within.

Vegetative Communities. This section summarizes the vegetative communities related to the tract. An analysis of the available GAP data was used to delineate the vegetative communities on the surface tracts. The GAP is coordinated by the Biological Resources Division of USGS.

Fish and Wildlife. This section summarizes the fish and wildlife species associated with the tract. GAP provides geographic information on the status and location of species and their habitat. The GAP is coordinated by the Biological Resources Division of USGS.

Special Status Species. This section summarizes the special status species associated with the tract. GAP provides geographic information on the status and location of species and their habitat. The GAP is coordinated by the Biological Resources Division of USGS. Available special status species occurrences on the tracts are discussed. Appendix E provides additional information on special status species in the areas around the surface tract.

Cultural Resources. This section summarizes the known sites and cultural resources survey information for the surface tract.

Visual Resources. This section addresses the visual setting of the surface tract. The surface tract is currently classified according to a VRM system. VRM Classifications are described in Section 0. The Hancock County tract has not been inventoried for VRM classification.

Recreation and Travel Management. This section addresses the existing recreational and travel management activities on the surface tract.

Lands and Realty. This section addresses the lands and realty actions associated with the surface tract, including withdrawals, disposals, and ROW actions.

3.5.1 Hancock County Tract

General

One tract comprising about 174 acres in Hancock County, Mississippi, was patented to the University of Mississippi in 1961 under the R&PP Act; however, the patent contains a reversionary clause. This

Proposed RMP-FEIS provides for management of these tracts should the patent be revoked and the tracts returned to the BLM administration.

Soil Resources

The soil classification for the Hancock County tract is provided in Table 3-21.

Table 3-21. Soil Classification for the Hancock County Tract

| Soil Type | Description | Erosion Hazard | Prime Farmland |
|--|---|----------------|----------------|
| Eustis loamy fine sand, 2 to 5 percent slope | Somewhat excessively drained soils, nearly level to steep areas of coastal plain; surface and subsurface consisting of sands and subsoils consisting of a fine loamy sand | Slight | No |
| Handsboro association | Very poorly drained soils in tidal marshes; surface layers of mucky silt loam | None | No |

Water Resources

The Hancock County tract is located within the Coastal Streams drainage basin.

Vegetative Communities

The 174-acre Hancock County tract is located in the Hancock Marshes Coastal Preserve, part of a State-designated 83,000-acre estuarine preserve system bordering the Mississippi Sound from the Pearl River to Point Clear. The 13,570-acre Hancock County Marshes unit protects the second largest continuous marsh area in the State. These coastal marshes include several low ridges and small hammocks, the most prominent in this unit being Point Clear Island and Campbell Island. These elevated sandy areas have characteristics similar to the barrier islands and include forested areas supporting slash pine with redcedar and sand live oak (*Quercus geminata*). The BLM tract is located in the center of the preserve and is bordered by Bryan Bayou to the north. The very southeastern corner of the tract includes a portion of Point Clear Island. The bulk of the tract is part of a needlerush marsh that dominates the area between Bayou Caddy/Bryan Bayou and Point Clear Island. Hurricane Katrina deposited substantial amounts of flotsam in some areas of the marshes.

No exotic invasive species are known to occur on this tract, but cogon grass and torpedo grass are a concern in the area of Point Clear Island.

Fish and Wildlife

The marsh area is well known for an abundance of waterfowl and wading birds, including white-faced ibis and black-crowned night heron. Swallowtail kite numbers are high during the summer months.

Special Status Species

The special status species utilizing the Hancock County Marshes include mottled duck (*Anas fulvigula*), royal tern (*Sterna maxima*), Mississippi diamondback terrapin (*Malaclemys terrapin pilea*), Gulf salt snake (*Nerodia clarkii clardii*), brown pelican (*Pelecanus occidentalis*), least tern (*Sterna antillarum*),

American oystercatcher (*Haematopus palliatus*), and gull-billed tern (*Sterna nilotica*). The islands of this marsh support several rare plant species, including the tiny-leaved buckthorn (*Sageretia minutiflora*), which in this area is restricted to rare shell middens.

Cultural Resources

The Hancock County tract has not been surveyed. However, three cultural sites are recorded within one-half mile of the tracts.

Visual Resources

The Hancock County tract is remote and not visible from residential or other types of development. The visual character is low-lying wetlands with relatively dense vegetation and limited human activity.

Recreation and Travel Management

The Hancock County tract is patented to the University of Mississippi for the purposes of research and recreation. The tract is used for dispersed recreation, but it is primarily wetland and is not easily accessible to the public. Travel to the area is generally by boaters and anglers on an occasional and seasonal basis for fishing and waterfowl hunting.

Lands and Realty

The Hancock County tract was patented to the University of Mississippi in 1961, under the authority of the R&PP Act. The tract is still owned by the University. Under terms of the patent, the tract is to be used only for recreational and research site purposes. The patent contains a clause stating that ownership of the surface estate will revert to the United States if the land is devoted to a use other than that for which the land was conveyed. It is expected that the University will relinquish this tract and that title will revert to the United States. In anticipation of the title transfer, this tract is being considered BLM-managed surface estate for land use planning purposes. There are no ROWs on the tract, and no request for ROW or other uses are expected in this relatively remote area.

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