CHAPTER 4—ENVIRONMENTAL CONSEQUENCES

4.1 INTRODUCTION

This chapter evaluates potential environmental impacts that could occur from implementing management actions included in each of the alternatives discussed in Chapter 2 for Bureau of Land Management (BLM)-administered surface tracts and non-U.S. Forest Service (non-USFS) Federal mineral ownership (FMO) in Alabama and Mississippi[1]. Potential impacts considered in this chapter include ecological (such as the effects on natural resources and on the components, structures, and functioning of affected ecosystems), aesthetic, historic, cultural, economic, social, and health (40 Code of Federal Regulations [CFR] §1508.8) impacts. The baseline used for determining the potential impacts is the current resource condition described in Chapter 3. Resources are discussed in the same order that they are presented in Chapter 3.

The analysis focuses on impacts that could eventually result in on-the-ground changes by planning for uses on surface and non-USFS FMO tracts over the next 20 years. Some BLM management actions may affect only certain resources and only under certain alternatives. Some impacts may be from actions that are common to all alternatives. If an activity or action is not addressed in a given section, no impacts are expected or the impact is expected to be minimal.

4.1.1 How to Read This Chapter

This chapter is divided into four sections:

- **Introduction (Section 4.1).** This section provides direction on How to Read This Chapter (Section 4.1.1), presents the approach to the analysis including types of effects (Section 4.1.2), and discusses availability of data and incomplete information (Section 4.1.3).
- **Direct and Indirect Impacts from BLM Management Actions in Alabama (Section 4.2).** This section discusses potential impacts anticipated from implementation of management actions under each alternative for the Coosa River, Fort Morgan Beach, Fort Morgan Highway, Fowl River, Geneva, and Jordan Lake tracts in Alabama and 313,819 acres of non-USFS FMO in 57 Alabama counties, mostly composed of split-estate.
- **Direct and Indirect Impacts from BLM Management Actions in Mississippi (Section 4.3).** This section discusses the potential impacts anticipated from implementation of the management actions under each alternative for the Hancock County tract in Mississippi and for non-USFS FMO on about 517,934 acres in 79 Mississippi counties, mostly composed of split-estate. Impacts from the allowable uses and management actions proposed for the Hancock County tract are analyzed if the Recreation and Public Purposes (R&PP) patent held by the University of Mississippi were to revert to the BLM.

1 In those areas where (1) the Federal land surface is administered by the USFS, and (2) planning decisions for surface management and for mineral leasing, pursuant to the Federal Onshore Oil and Gas Leasing Reform Act of 1987 and Federal regulation (36 CFR 228.102), are the responsibility of USFS, and (3) BLM has responsibility for issuing and administering mineral leases; the RMP will not include management decisions for the Federal minerals on these lands, and BLM will carry out its minerals management responsibilities under the guidance of USFS land use plans. At the same time, surface and minerals management actions and development activities anticipated on these lands will be taken into account for purposes of cumulative impact analysis.

- **Cumulative Impacts (Section 4.4).** This section discusses the potential cumulative impacts anticipated from implementation of the BLM management actions proposed for Alabama and Mississippi in the context of other actions occurring across the State, including other Federal agency and non-Federal actions.

4.1.2 Approach to the Analysis

This section provides the basic framework used in the impacts analysis. Definitions of types of effects and terminology, general types of impacts analyzed for each resource, analytical assumptions, and cumulative projects and activities considered in the analysis are further discussed in the following subsections.

Types of Effects

The analysis of the alternatives focused on identifying types of impacts and estimating their potential significance. Throughout this chapter, the terms "impact" and "effect" are synonymous. Although impacts may be perceived as positive (beneficial) or negative (adverse), those determinations are left for the reader of this document to make. An overview of impacts is presented in Table 4-1.

Table 4-1. Types of Impacts

Type	Description
Direct Impacts	These are effects caused by the action and occur at the same time and place. For example, elimination of original land use through erection of a structure. Direct impacts may cause indirect impacts, such as ground disturbance resulting in resuspension of dust.
Indirect Impacts	These are effects that are caused by the action but occur later in time or are further removed in distance but are still reasonably foreseeable and related to the action by a chain of cause and effects. Indirect impacts may reach beyond the natural and physical environment (e.g., environmental impact) to include growth-inducing effects and other effects related to induced changes to resource users (e.g., social impact).
Cumulative Impacts	These are effects that result from the incremental impact of the action when it is added to other past, present, and reasonably foreseeable future actions, regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions that take place over time.

For ease of reading, impacts presented are direct, broad (occurring within the larger planning area), and long term, unless otherwise noted as indirect, localized, or short term/temporary. Potential significant impacts are identified as they arise, and analysis of why an impact is considered significant is explained. The concept of significance requires consideration of the context, intensity, and duration of the impact. Context relates to environmental circumstances at the location of the impact and in the immediate vicinity, as well as the interests that are potentially affected. Intensity refers to the severity or extent of the impact or magnitude of change from existing conditions. Duration refers to the permanence and longevity of the impacts, which is depicted as short term or long term. Short term is defined as anticipated to begin and end within the first 5 years after the action is implemented. Long term is defined as lasting beyond 5 years to the end of or beyond the 20-year planning time frame addressed in the Resource Management Plan (RMP).

4.1.3 Availability of Data and Incomplete Information

As is typical in programmatic planning efforts, site-specific data is used to the extent possible and may not be entirely available. The best available information that is pertinent to management actions was used in developing the Proposed RMP and Final Environmental Impact Statement (FEIS). Considerable effort has been taken to acquire and convert resource data into digital format for use in the plan—both from BLM sources and from outside sources, such as the Natural Heritage Program and the National Resources Conservation Service (NRCS).

Certain information was unavailable for use in developing this plan, usually because inventories were not conducted or complete. Some of the major types of unavailable data include Native American traditional use areas; cultural surveys; data collection of visitor use trends; visual resource inventory (VRI); field inventory of soils and water conditions; and field inventory of wildlife, vegetation, and special status species.

As a result, some impacts cannot be quantified given the proposed management actions. Where this gap occurs, impacts are projected in qualitative terms or, in some instances, are described as unknown. Subsequent project-level analysis will provide the opportunity to collect and examine site-specific inventory data required to determine appropriate application of RMP-level guidance. In addition, ongoing inventory efforts by the BLM and other agencies within the planning area would be used to continue to update and refine information used to implement this plan.

4.2 DIRECT AND INDIRECT IMPACTS FROM BLM MANAGEMENT ACTIONS IN ALABAMA

This section discusses potential impacts anticipated from implementation of management actions under each alternative for the Coosa River, Fort Morgan Beach, Fort Morgan Highway, Fowl River, Geneva, and Jordan Lake tracts in Alabama and 313,819 acres of non-USFS FMO in 57 Alabama counties, mostly composed of split-estate.

The section is organized by alternative, and then by resource. Under each resource, each management action is discussed, including vegetative communities, fish and wildlife habitat, minerals, recreation and travel, and lands and realty. A discussion of cumulative impacts for each resource is contained in Section 4.4.1.

4.2.1 Alternative 1 (No Action)

Air Quality

Under this alternative, there is a potential for wildfire which could lead to air emissions. Since all fires would be suppressed, these occurrences would be short term and localized and not be anticipated to individually deteriorate air quality conditions. Certain BLM-authorized activities within the planning area, such as oil and gas development, construction activities, vehicle travel, and mechanical hand tools or prescribed burning used in vegetation and wildlife habitat manipulation, would produce emissions considered to be greenhouse gases (GHG), particularly carbon dioxide (CO_2). However, due to the anticipated dispersed and infrequent nature of these activities, the project emissions would not have any noticeable or measurable effect and, therefore, the total contribution of GHGs from authorized activities would be small as well. Other BLM activities may help offset any emissions and sequester carbon, such as maintaining vegetative and forested cover, which may help build organic carbon in soils and function as “carbon sinks”.

Impacts from Vegetative Communities Management Actions

No specific vegetative communities management actions are proposed under this alternative. Actions proposed under standard management common to all alternatives, which would allow vegetation manipulation to meet resources objectives, would not be anticipated to involve ground-disturbing activities of a severity or extent that would deteriorate air quality conditions. Prescribed burning conducted to meet vegetation resource objectives would be short term and localized and not be anticipated to individually deteriorate air quality conditions.

Impacts from Fish and Wildlife Habitat Management Actions

No specific fish and wildlife management actions are proposed under this alternative. Actions proposed under standard management common to all alternatives, which would provide habitat improvements and protections under State wildlife conservation strategies, including control of invasive plant species, use of prescribed fire, and wetland enhancements, would not be anticipated to involve ground-disturbing activities of a severity or extent that would deteriorate air quality conditions. Prescribed burning conducted to meet habitat objectives would be short term and localized and not be anticipated to individually deteriorate air quality conditions.

Impacts from Minerals Management Actions

Combustion processes, construction activities, and vehicle travel associated with potential oil and gas development and coal mining produce air emissions. Estimated emissions from the development of 20 wells over the next 20 years on BLM-administered, non-USFS FMO would produce considerably less emissions than the combined emissions from total planned oil and gas developments in the State (presented in Table 4-2). Those emissions would likely occur over a dispersed geographic area and would, therefore, not cause any noticeable or measurable effect.

Potential oil and gas leasing on BLM-administered, non-USFS FMO are in close proximity to the Sipsey Wilderness and the Birmingham nonattainment area. These emissions could potentially deteriorate wilderness air quality values and jeopardize ambient air quality attainment. Since emissions would be dispersed over a large geographic area, air quality impacts would not be anticipated.

On the basis of a conservative estimate, it is anticipated that 1.9 million tons of Federal coal would be produced annually over the next 20 years (BLM 2005b). The results are shown in Table 4-3. Since the analysis is qualitative and coal production data are limited throughout the State, a comparison with best available data from the Warrior Basin is provided. As shown in Table 4-3, BLM-proposed coal mining activities are less in comparison to the Warrior Basin activities and will, therefore, produce much less emissions.

Table 4-2. Maximum Potential Oil and Gas Air Emissions for BLM and Non-BLM Activities in Alabama (tons per year)[1, 2]

Well Locations	Emission Type/Pollutant				
	Nitrogen Oxides (NO_x)	Sulfur Dioxide (SO_2)	Particulate Matter (PM_{10})	Carbon Monoxide (CO)	Volatile Organic Compounds (VOC)
BLM-administered, non-USFS FMO Estate in Alabama	110	1.7	35.1	111	67.1
Other Mineral Estate Across Alabama	21,460	332	6,815	21,761	13,947

1. Using conservative assumptions typical of liquid mineral wells on BLM lands.
2. Assumption that 25 percent of wells are conventional natural gas wells and 75 percent wells are coalbed natural gas wells (BLM 2005a).

Table 4-3. Maximum Potential Coal Mining Air Emissions for BLM and Non-BLM Activities in Alabama (tons per year) [1, 2]

Mine Locations	Emission Type/Pollutant				
	NO_x	SO_2	PM_{10}	CO	VOC
BLM-administered, non-USFS FMO Estate in Alabama	61.2	6.8	48.6	108.0	5.7
Warrior Basin	684	76	5,433	1,207	64

1. Using Environmental Protection Agency (EPA)-approved emissions factors and conservative assumptions typical of western surface mines, because emission factors do not exist for eastern surface mining. Assumption that all emissions eventually are introduced into the environment (EPA 1995 and BLM 2004a).

Impacts from Recreation and Travel Management Actions

Short-term, localized increases in dust and emissions could potentially occur from recreation activities and travel on unpaved roads. Given the small amount and scattered nature of surface ownership, these activities would not be anticipated to individually deteriorate air quality conditions.

Impacts from Lands and Realty Management Actions

Short-term, localized increases in dust and emissions would occur from use of trucks and heavy equipment (bulldozers, etc.) in right-of-way (ROW) development. These actions would be conducted in accordance with the Alabama State Implementation Plan (SIP) and local dust control regulations; however, given the small amount and scattered nature of surface ownership, lands and realty management actions would not be anticipated to individually deteriorate air quality conditions or violate air quality standards or regulations.

Soil Resources

Impacts from Vegetative Communities Management Actions

No specific vegetative communities management actions are proposed under this alternative. Actions proposed under standard management common to all alternatives, which would allow vegetation manipulation to meet resources objectives, would not be anticipated to involve ground-disturbing activities of a severity or extent that would result in disturbance or loss of soils.

Impacts from Fish and Wildlife Habitat Management Actions

No specific fish and wildlife management actions are proposed under this alternative. Actions proposed under standard management common to all alternatives, which would provide habitat improvements and protections under State wildlife conservation strategies, including control of invasive plant species, use of prescribed fire, and wetland enhancements, would not be anticipated to involve ground-disturbing activities of a severity or extent that would result in disturbance or loss of soils.

Impacts from Minerals Management Actions

Mineral exploration, development, and operations on non-USFS FMO would include ground-disturbing and potential contaminant-introducing activities that could impact soils. Oil and gas development operations—specifically, construction of drilling pads, reserve pits, and access roads—would disturb topsoils and alter surface soil characteristics, which could result in both a slight decline in soil productivity and an increase in surface runoff. Shallow coalbed methane wells generally require small 1- to 2-acre wellpads. Because much of the Black Warrior River Basin has very rolling terrain, up to 3 acres could be needed to construct a suitably flat drillpad. Cut and fill areas to support these pads and access routes can contribute to local soil erosion, especially when heavy or persistent rains typical of this region exacerbate the situation. Ground-disturbing activities in areas where the soils are classified as no or slight to moderate erosion hazard do not generally accelerate soil erosion. Since future coal development is anticipated to be subsurface and use existing infrastructure, these activities would not disturb the soils on the surface.

Except for 8,179 acres closed to leasing by other surface management agencies, non-USFS FMO would be open to leasing subject to standard lease terms and conditions (305,640 acres). The estimated 20 wells to be developed on non-USFS FMO in Alabama over the next 20 years would disturb approximately 105 acres. Both Federal and State laws would require the reclamation of mined lands concurrently with

mining operations; therefore, the required reclamation and the minimal surface that might be disturbed would produce only localized effects on soils.

Operation of the oil and gas wells could also impact the surrounding soils by potential contamination from accidental spills or improper management of hazardous materials or waste; however, Federal, State, and local regulations would require site characterization and corrective action to restore soil integrity and productivity.

In a few locations, there are prime or unique farmlands on non-USFS FMO. Though not likely, it is possible that some of the 105 acres of soil disturbance could be on prime or unique farmland. In the event that development is proposed in such an area, the BLM would implement appropriate mitigation measures to avoid or minimize impacts as described in Section 2.3.3.

Impacts from Recreation and Travel Management Actions

Allowing recreation activities, including motorized vehicle use on the surface tracts, could result in short-term and site-specific increases in erosion. Given the limited interest in recreation and travel on the surface tracts, any potential effects would be minor and localized.

Impacts from Lands and Realty Management Actions

If construction were to occur in new or existing ROWs, soils could be impacted by vegetation-clearing activities and ground disturbance. Wind and water erosion, and subsequent loss in soil productivity would occur in disturbed areas where revegetation does not occur. These effects would be localized and short term in areas where revegetation is enhanced or permitted. The effect would be long term if roads or structures were constructed on the tracts, but they would be localized.

Water Resources

Impacts from Vegetative Communities Management Actions

No specific vegetative communities management actions are proposed under this alternative. Actions proposed under standard management common to all alternatives, which would allow vegetation manipulation to meet resources objectives, would not be anticipated to involve ground-disturbing activities of a severity or extent that would result in impacts to water quality.

Impacts from Fish and Wildlife Habitat Management Actions

No specific fish and wildlife management actions are proposed under this alternative. Actions proposed under standard management common to all alternatives, which would provide habitat improvements and protections under State wildlife conservation strategies (including control of invasive plant species, use of prescribed fire, and wetland enhancements), would not be anticipated to involve ground-disturbing activities of a severity or extent that would result in impacts to water quality.

Impacts from Minerals Management Actions

Except for 8,179 acres closed to leasing by other surface management agencies, non-USFS FMO would be open to leasing subject to standard lease terms and conditions (305,640 acres). The estimated development of 20 wells in Alabama over the next 20 years would disturb approximately 105 non-USFS FMO acres. Both Federal and State laws would require the reclamation of mined lands concurrently with mining operations; therefore, the required reclamation and the minimal surface that might be disturbed would result in only localized effects on water resources.

Mineral exploration, development, and operations would include ground-disturbing activities that increase surface runoff, which increases nutrient levels and turbidity and decreases water quality. These activities could also introduce hazardous waste or result in accidental spills that could also deteriorate surface water quality. Leakage of drill fluids, hazardous waste spills, or leakage from reserve pits could be introduced into the ground water as well. Although Federal, State, and local regulations would require site characterization and corrective action for hazardous waste and spills, impacts to the water quality could be localized but long term and especially affect nonflowing water bodies (e.g., small ponds or wetlands) and ground water resources. Additionally, access roads and wellpads can alter the local hydrology, reducing surface flow to mesic areas and diverting or degrading surface water. Installation of culverts and diverting existing drainages around wellpads can help to maintain existing hydrologic systems, but the disturbance causes local sedimentation and can retard sheet flow.

The preferred method of disposal of water produced from oil and gas production would be underground injection. Reinjection of produced water would prevent impacts to surface water quality; however, a critical aspect of underground injection is finding a permanent formation with a concentration of total dissolved solids (TDS) greater than 10,000 mg/L (Geological Survey of Alabama [GSA] 2005). In order to reinject produced water, an oil and gas operator must obtain a permit as required by the Onshore Oil and Gas Order No. 7. The Environmental Potection Agency (EPA) has granted the State of Alabama primacy over the permitting of underground injection wells. The underground injection regulations address the siting, construction, operation, monitoring, and closing of an injection well. These requirements are designed to prevent contamination of surface and underground drinking water sources.

At present, stream discharge is the most common method of water disposal produced from oil and gas production in the Warrior Basin.[2] Although the surface discharge of produced water into water systems could potentially increase the salinity of surface waters and increase flow rates, resulting in increased soil erosion, operators must obtain a National Pollutant Discharge Elimination System (NPDES) permit (administered by Alabama Department of Environmental Management [ADEM]) to discharge produced water into streams in Alabama. The type of permit currently offered is a Tier II permit. This permit requires the monitoring of water quality in streams and limits instream TDS concentrations to 230 mg/L (GSA 2005). Because surface discharge of produced water would be a permitted activity requiring standards of water quality, direct impacts to water quality from the disposal of water produced from oil and gas production on non-USFS FMO would be minimized. Also, methods of disposing produced water, other than by reinjection, would be considered but would require preparation of additional National Environmental Policy Act of 1969 (NEPA) analysis that would identify conditions of approval (COA) or best management practices (BMP) to alleviate the potential for extensive harm to water quality.

Impacts on ground water from coal mining operations would also occur. Approximately 9,000 acres of new coal leases in the Warrior Basin coal field would yield an estimated average of 1.9 million tons of coal per year over the next 20 years. Coal development in the Warrior Basin would involve mining of existing underground coal mines, which would further increase the potential for ground water contamination. Migration of contaminants into the surrounding soils and aquifers could degrade ground water quality and, thereby, affect wells and springs that may serve household and domestic uses.

Impacts from Recreation and Travel Management Actions

Managing the surface tracts as open to recreation and motorized vehicle use could result in short-term and site-specific increases in erosion and surface runoff, which increases nutrient levels and turbidity and decreases water quality. Given the limited interest in recreation and travel on the surface tracts, any potential effects would be minor and localized.

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

Impacts from Lands and Realty Management Actions

If construction were to occur in new or existing ROWs, vegetation-clearing activities and construction ground disturbance would increase soil erosion and surface runoff, which increases nutrient levels and turbidity and decreases water quality. Impacts would be short term in areas where revegetation was enhanced or permitted. The effect would be long term, if roads or structures were constructed on the tracts, but would be localized.

Vegetative Communities

Impacts from Vegetative Communities Management Actions

No specific vegetative communities management actions are proposed in this alternative. Under standard management common to all alternatives, allowing vegetation manipulation to meet resources objectives would be allowed; however, lack of specific areas and species being managed could increase the potential for exotic, invasive species to become established or spread on the BLM surface tracts. Chinese privet is present and likely to continue to spread on the Coosa River tracts. The Fort Morgan Highway tracts are vulnerable to both cogon grass and Chinese tallow. Cogon grass in particular, once established, would displace native herbaceous plant species and ultimately could reduce some shrub and tree components by increasing the frequency of wildfires and crowding out seedlings.

Impacts from Fish and Wildlife Habitat Management Actions

No specific fish and wildlife habitat management actions are proposed in this alternative. Under standard management common to all alternatives, providing habitat improvements and protections under State wildlife conservation strategies, including control of invasive plant species, use of prescribed fire, and wetland enhancements, would be allowed; however, lack of specific areas and species being managed could result in the same impacts discussed under Impacts from Vegetative Communities Management Actions.

Impacts from Minerals Management Actions

Impacts to vegetation from oil and gas development in Alabama are dependent on the location and design of wellpads, roads, and production facilities. Since 1983, all of the wells drilled on non-USFS FMO in Alabama have been in the Black Warrior River Basin, almost all in Tuscaloosa County. Typically vegetation in this area is dominated by oak/hickory/pine forests, much of it secondary growth managed as commercial timberlands. Older growth is most often found in steeper, more protected terrain, areas that could harbor mesic forests. Shallow coalbed methane wells generally require small 1- to 2-acre wellpads. Because much of the Black Warrior River Basin has very rolling terrain, up to 3 acres can be needed to construct a suitably flat drillpad. Cut and fill areas can contribute to local erosion and heavy or persistent rains typical of this region exacerbate the situation. This erosion can degrade the adjacent vegetation communities by burying herbaceous growth and stressing or killing trees by burying surface roots. Some sites require the installation of erosion blankets on slopes over 3:1, particularly if an adequate cover planting cannot be established or the wellpad is close to or above a creek, river, or wetland.

During a routine wellpad installation, saleable timber would be removed from the site if logs are commercially viable, but otherwise it is cut and left onsite. Vegetation debris piles are stored along the edges of the construction site and may be buried onsite, burned, or left in place after drilling operations are completed. Vegetation debris is not permitted in the reserve pit, as it can disrupt future monitoring.

During interim reclamation, the reserve pit area is graded and the surface is fertilized, seeded, and mulched. Although the operators are encouraged to use native seed, the final mix and tree planting are

approved by the private landowner or surface managing agency. By policy, the BLM excludes invasive species, although non-native grasses, particularly annual rye, Bahia, and Bermuda grass are used to establish a quick cover on disturbed slopes. These sites typically progress through "old field" stage as opportunistic pioneer plant species become established. Within a few years, young sapling pine and hardwoods become established. Faster growing pines generally dominate the site until gradually overtaken by longer lived hardwoods. It may take 100 years or more to reestablish hardwood forests with similar structure and even longer before species diversity returns to near pre-disturbance levels.

Surface-disturbing activities have the potential to introduce or promote the spread of invasive, exotic plant species. Impacts are dependent on the species planted during restoration activities and the management of the site during and following restoration. Restoration activities typically include seeding non-native grasses, such as annual rye (during the winter months) and Bahia or Bermuda grass (during the summer months) to provide a quick cover for disturbed soils. Including native species in the mix increases diversity and provides a more natural structure. If these areas are mowed following abandonment, these non-native grasses are expected to persist and dominate the site; however, if the sites are replanted in pine or left unmowed, the areas can be expected to progress through old field type growth, which is dominated by opportunistic native and non-native species alike. Ultimately, both Bahia and Bermuda grass are expected to become shaded out as a tree or heavy shrub layer becomes established. Japanese honeysuckle and Chinese privet can both persist in shaded situations.

Throughout the State, some plant communities, embedded in the larger forested landscape, are particularly sensitive to disruption and are difficult to restore after surface-disturbing activities. Many of these are restricted to a narrow range of soil types such as glades and prairies; others are sensitive to changes in hydrography, such as bogs, forested wetlands, and seepage slope communities. Construction activities in these plant communities generally alter the site sufficiently to preclude the reestablishment of these communities in the foreseeable future. Also, because of the limited acreage of these vegetation communities, loss of even the small acreages from BLM-permitted oil and gas activities has a disproportionate effect on the plant diversity in an area.

Impacts from Recreation and Travel Management Actions

The coastal dune habitat associated with the Fort Morgan Beach and Highway tracts could experience localized vegetation damage as a result of public foot traffic at traditional beach access points at Veterans Road and Mobile Road. Repetitive use erodes the dunes and keeps dune vegetation from becoming established, excluding use by Alabama beach mouse.

At the Coosa River, Fowl River, and Geneva tracts, which contain sensitive wetland and riverine habitat, dispersed recreational use is primarily boat-related and is not expected to have substantial impacts on vegetation. Heavier recreation use on the southern portion of the Jordan Lake tract occurs as a result of the adjacent camps and keeps shrubs and forbs from establishing a natural riparian zone along this portion of Jordon Lake.

Impacts from Lands and Realty Management Actions

New ROWs for access roads and utilities could occur on the Fort Morgan Highway or Beach tracts, where new disturbance is likely to total less than an acre. This is most likely to occur in upland scrub or flatwood communities. In addition, maintenance activities in existing ROW are likely to keep native plant communities from establishing a shrub or tree component and would foster the spread of invasive, exotic plant species, particularly cogon grass and Chinese tallow, both of which occur on or near the BLM highway tracts.

Fish and Wildlife

Impacts from Vegetative Communities Management Actions

No vegetative communities management actions are proposed in this alternative. Under standard management common to all alternatives, allowing vegetation manipulation to meet resources objectives would be allowed; however, lack of specific areas and species being managed could result in habitat degradation on any of the BLM surface tracts. The maritime forests, scrubs, and flatwoods on the Fort Morgan Highway tracts are particularly vulnerable to cogon grass and Chinese tallow. Cogon grass could displace native grasses and forbs that provide foraging habitat for migratory and resident birds and would increase susceptibility of coastal scrub habitats to wildfire.

Impacts from Fish and Wildlife Habitat Management Actions

No specific fish and wildlife habitat management actions are proposed in this alternative. Under standard management common to all alternatives, providing habitat improvements and protections under State wildlife conservation strategies, including control of invasive plant species, use of prescribed fire, and wetland enhancements, would be allowed; however, lack of specific areas and species being managed could result in the same impacts discussed under Impacts from Vegetative Communities Management Actions.

Impacts from Minerals Management Actions

Oil and gas development on non-USFS FMO is expected to result in the disturbance of 105 acres. Impacts would include the direct loss of habitat from the construction of drillpads, production facilities, pipelines and roads, from degradation of nearby aquatic or wetland habitats through sedimentation or changes in hydrology, and from the surface discharge of water produced from coalbed methane wells. These impacts could occur in any of the oil and gas potential areas in the State, but have in the past been concentrated in Jefferson and Walker Counties in the Black Warrior River Basin. Wherever wells are constructed, impacts to general wildlife are dependent on the wellpad location, design, and need for additional access roads.

Impacts to many wildlife species from oil and gas development are localized and temporary. Most common game species and other mobile wildlife species avoid the wellpad areas during construction. Less mobile species are directly impacted and during the spring and early summer; this can include nesting neotropical birds. Habitat generalists, including most game species, tend to return to surrounding habitats after the well is completed and construction activities have ceased; however, construction in high-value habitats or in areas with more narrowly adapted wildlife species can alter the overall species diversity. Wells and roads in areas of contiguous forests increase habitat fragmentation, reducing the suitability of the area for interior nesting birds and making nests more susceptible to predation and parasitism. Older-growth forests which provide habitat for interior forest nesting birds and a wider diversity of amphibians and reptiles are often located in riparian/wetland zones left as buffers during logging operations or in steeper, less accessible slopes.

Oil and gas drilling continues for 24 hours a day until the well is completed. During this time, most wildlife, including waterfowl and many songbirds, are expected to avoid the immediate area; however, once drilling is completed, reserve pits with water can become a hazard for waterfowl and other birds which can become soiled by drilling fluids. If the well is put into production, there is documentation that birds and bats may use open-vent stacks for roosting or perching. Once in these stacks, animals can become trapped or asphyxiated. While much of the work documenting this problem has occurred in western States, the situation in Alabama is expected to be similar.

Access roads and wellpads can alter the local hydrography and reduce surface flow to mesic areas and divert or degrade surface water supporting wetland habitats. Installation of culverts and diversion of existing drainages around wellpads help maintain existing hydrologic systems, but the disturbance causes local sedimentation and can retard sheet flow to wetland habitats. Amphibians and many reptiles associated with wetland communities are vulnerable to disturbance, as they are not highly mobile and tend to have narrow habitat requirements.

For impacts from disposal of coalbed methane produced waters, see the special status species discussion.

Impacts from Recreation and Travel Management Actions

The coastal dune habitat associated with the Fort Morgan Beach and Highway tracts could experience localized vegetation damage and habitat loss as a result of frequent dispersed recreation use and lack of active recreation management. Noise and human presence associated with beach recreation could displace foraging shorebirds and result in reduced nesting efforts or success by beach nesting birds. Dispersed recreation use currently occurs on the Coosa River, Fowl River, and Geneva tracts, which contain sensitive wetland and riverine habitat. If recreation use became more frequent on these tracts in the long term, species susceptible to disturbance could be affected (such as freshwater snails, mussels, turtles, amphibians, migratory and shorebirds, and nesting species, as well as terrestrial wildlife, avifauna, and aquatic species). Recreational fishing on the Jordan Lake tract could result in surface disturbance resulting in damage to riparian/wetland areas and trampling of the understory that could further disturb riparian/wetland and aquatic species in the adjacent river.

Impacts from Lands and Realty Management Actions

New or expanded ROWs on the Fort Morgan Highway tracts are anticipated to result in less than an acre of new disturbance. This acreage is expected to be near or on existing maintained ROW, and is likely to occur in coastal scrub habitats. This activity could be particularly disruptive during spring and fall migrations, when this narrow band of vegetation can support high numbers of migrating songbirds.

Special Status Species

Impacts from Vegetative Communities Management Actions

No specific vegetative communities management actions are proposed in this alternative. Under standard management common to all alternatives, allowing vegetation manipulation to meet resources objectives would be allowed; however, lack of specific areas and species being managed could increase the potential for exotic, invasive species to become established or spread on the BLM surface tracts. Cogon grass at the Fort Morgan Highway tracts, in particular, has the potential to alter Alabama beach mouse critical habitat as it forms dense stands displacing native herbaceous plants and potentially increasing fire frequency and intensity.

Under this alternative, the BLM would not actively promote the restoration of coastal dunes following damage by major storm events, which would promote sand deposition and facilitate the return of habitat conditions suitable for Alabama beach mouse.

Impacts from Fish and Wildlife Habitat Management Actions

No specific fish and wildlife habitat management actions are proposed in this alternative. Under standard management common to all alternatives, providing habitat improvements and protections under State wildlife conservation strategies (including control of invasive plant species, use of prescribed fire, and wetland enhancements) would be allowed; however, lack of specific areas and species being managed

could result in the same impacts discussed under Impacts from Vegetative Communities Management Actions.

Impacts from Minerals Management Actions

Oil and gas development on non-USFS FMO in Alabama is expected to result in the disturbance of 105 acres, any of which could occur in habitats supporting special status species. Historically, oil and gas drilling on non-USFS FMO has occurred in the Black Warrior River Basin, but drilling on non-USFS FMO could occur anywhere in the State (outside of the 10 southeastern counties that do not contain non-USFS FMO). Development interests are prompted by new oil and gas finds in the State, improvements in drilling and extraction technologies, and high prices. Because of this, there is some potential to impact almost any of the special status species in the State. Impacts to special status species could include the direct loss of habitat from the construction of drilling pads, production facilities, pipelines and roads; from degradation of nearby aquatic or wetland habitats through contamination, sedimentation, or changes in hydrology; and from the surface discharge of water produced from coalbed methane wells. The following discussion focuses on the potential for these activities to affect habitats that support the majority of the State's special status species. In addition, individual species with established management guidelines, such as gopher tortoise, red-cockaded woodpecker, and bald eagle are also discussed. No development is anticipated on the BLM surface tracts, many of which support Federally listed species and contain designated critical habitat; however, the non-USFS FMO under those tracts could be developed through directional drilling.

Given the high number and wide distribution of special status species in aquatic and wetland habitats in Alabama, all oil and gas activity near rivers, creeks, or wetland habitats has a high potential of affecting special status species in the immediate area or downstream of the disturbance. Impacts to aquatic and wetland habitats would occur through degradation of water quality through increased sedimentation or turbidity, contamination, direct loss of habitat, and changes in local hydrography. Disposal of water produced by coalbed methane wells in the Black Warrior River Basin also has the potential to affect special status species by increasing salinity and introducing other contaminants. Some special status species cannot tolerate increases in human activity and could be impacted directly by increases in vehicle activity and construction activities.

Sedimentation and increased turbidity are a current threat to most of Alabama's mussels and special status fish species. Increases in sedimentation to streams and wetlands by oil and gas development are a factor of wellpad design, erodibility of the soils, proximity of the disturbance, slope, and the intervening vegetation. The potential for sedimentation increases with prolonged or heavy rains that are typical in this area. Before protective plant covers have been established, cut and fill slopes are particularly vulnerable to erosion. Intact vegetation along riparian/wetland zones and around wetlands can substantially buffer these areas. Research has shown that a minimum of a 30-foot buffer of vegetation is needed to control sediments and maintain stream temperature; however, 100-foot buffers may be needed to protect stream invertebrates, and 1,000 feet or more may be needed to protect some amphibians, reptiles, and forest-interior birds (Wenger 1999). Sediments deposited in intermittent drainages and headwater streams would be transported downstream during periods of high water, increasing turbidity and burying aquatic invertebrates in higher order streams.

Filling wetlands (including bogs, seepage slopes, wet flatwoods, and forested swamps) generally alters the site sufficiently to preclude the reestablishment of these communities in the foreseeable future and could result in direct habitat loss for a wide variety of special status species that use these habitats. Because so many of these species have limited ranges, the list of species potentially affected would vary by location. Generally, because of the limited acreage of these vegetation communities, loss from even the small amount of disturbance associated with BLM-permitted oil and gas activities has the potential to

destroy or degrade habitat for special status species. For instance, there are up to 12 special status crayfish across the State that are vulnerable to habitat disturbance in bogs and wet flatwoods. Henslow's sparrow wintering habitat and breeding habitat for Bachman's sparrow could be lost by construction in or near grassy bogs or wet flatwoods. Construction activities, and particularly linear disturbances related to new roads and pipelines, can disrupt the local hydrography supporting seepage slopes or sheet flow to bogs and swamps degrading these habitats.

In the Black Warrior River Basin, water produced from coalbed methane wells is typically disposed of through surface discharge. The chemical makeup of produced waters can vary by well with salinity, measured as TDS, being the most limiting factor. TDS in the Black Warrior Basin varies from less than 1,000 mg/L to more than 43,000 mg/L (U.S. Department of Energy 2003). Produced water is stored in ponds to precipitate out metals and to lower pH prior to discharge. NPDES permits issued by the State limit in-stream TDS concentrations to 230 mg/L. This threshold is approved by the EPA for general wildlife habitat and is met by discharging into rivers with sufficient flow to dilute and meet the in-stream thresholds. NPDES permits require monitoring of pH, iron, manganese, biochemical oxygen demand, oil and grease, and dissolved oxygen; additional monitoring requirements for conductivity, chlorides, and effluent toxicity are included. Dischargers are required to install a diffuser on the end of their discharge pipes to minimize scouring and are required to implement a BMP plan. Other elements, such as trace amounts of metals, are not routinely monitored under NPDES permits. Thresholds for most mussels have not been studied, and there is concern that the existing thresholds may not be sufficient to protect these bottom-dwelling species.

Karst formations support cave habitats with high numbers of special status species, including many endemic crayfish, salamanders, and bats, and are particularly sensitive to oil and gas development. In caves, even minor alterations in temperature, humidity, and water quality or quantity can result in irreversible impacts. Caves by their nature are isolated and support highly endemic faunas often with extremely narrow habitat requirements. Wells drilled through cave/karst resources can result in contaminants, such as drilling fluids and cements, draining into the cave/karst system. Karst habitats can be degraded by hydrocarbons from spills or leaks from well casings, storage tanks, reserve pits, pipelines, and production facilities that may enter into the cave/karst systems. Additionally, cementing operations could affect portions of underground drainage systems by restricting ground water flow and introducing pollutants into karst systems. Other possible impacts are vented or escaped gases collecting in sinkholes and caves. These gases can cause a die-off of plant and animal life that use the special habitat created by the microclimate of the cave entrances or sinkhole.

Along the Alabama coast, there are 365 acres of non-USFS FMO within the designated critical habitat for Alabama beach mouse. Portions of this acreage also contain coastal beaches used by nesting loggerhead sea turtles and potentially by green sea turtle and Kemp's Ridley sea turtle, as well as piping plover, snowy plover, and Wilson's plover. Any disturbance of the surface from oil and gas development in this area is likely to adversely affect Federally listed species. Section 7 consultations with the U.S. Fish and Wildlife Service (USFWS) would be required prior to BLM permitting any action that could adversely affect these Federally listed species or designated habitat. Subsequent actions would comply with the conditions established by any subsequent biological opinions (BO). Although it is unlikely that oil and gas development would occur on the BLM surface tracts, non-USFS FMO could be used to consolidate acreage to meet State spacing requirements, prompting oil and gas activity in suitable or occupied Alabama beach mouse and nesting sea turtle habitat.

In the coastal plain areas, gopher tortoise could be affected by oil and gas activity in upland habitats. Tortoises could be impacted by the loss or damage to burrows, destruction of foraging habitat, and tortoises could be killed during construction or by service vehicles. Construction activities and roads within 600-feet of burrows could isolate individuals and reduce reproductive potential within a

population. In many cases, the presence of gopher tortoises indicates that habitat is suitable for a host of species associated with dry longleaf pine forests, including the black pine snake (*Pituophis melanoleucus lodingi*).

Red-cockaded woodpecker could be affected by oil and gas development on 888 acres of non-USFS FMO. Red-cockaded woodpeckers could be affected by the loss of nesting habitat within existing clusters and the loss of current or potential foraging habitat within 0.5 mile of existing clusters, particularly on non-USFS FMO near the Talladega and Conecuh National Forests, which support most of the State's population.

Throughout the State, breeding and wintering bald eagles could be affected by drilling near large rivers or reservoirs. Bald eagles are particularly sensitive when courting, nesting, and fledging young. In Alabama, this typically occurs between December 1 and August 1. Construction activities within 1.5 miles of nest sites could result in nest abandonment depending on factors such as visibility and tolerance of individual pairs.

Impacts from Recreation and Travel Management Actions

The coastal dune habitat associated with the Fort Morgan Beach tracts would continue to be trampled at traditional beach access points as Veterans Road and Mobile Street, damaging habitat for the Alabama beach mouse. Recreational use can flush foraging shorebirds and result in reduced nesting efforts or success by beach nesting birds. Unmanaged recreational use of beaches could also hamper or deter nesting attempts by sea turtles and interfere with incubating egg clutches and the sea approach of hatchlings (National Marine Fisheries Service and USFWS 1991). The Fort Morgan Highway tracts, also designated as critical habitat, could experience loss or damage to vegetation as a result of continuing to be managed as open to recreation use. Dispersed recreation use of the Coosa River tracts has the potential to cause bald eagles to abandon nest sites.

Impacts from Lands and Realty Management Actions

New ROWs for access roads and utilities could occur on the Fort Morgan Highway or Beach tracts, where new disturbance is likely to total less than an acre. These tracts are designated critical habitat for Alabama beach mouse. Any surface disturbance, mowing, or other vegetation management activities could adversely affect the Alabama beach mouse, destroying burrows or removing plants that could provide a seed source. Because these tracts are within designated critical habitat for Alabama beach mouse, plantings to stabilize disturbed soils would be limited to locally occurring native species.

Wildland Fire Ecology and Management

Suppressing all wildland fires, unless an in-place site-specific plan determines otherwise, would minimize immediate threats and damage to life, public safety, and developments in the wildland-urban interface (WUI) and to natural resource values. Allowing prescribed burning on a case-by-case basis would allow for a reduction in hazardous fuel conditions, improving the ability to suppress wildfires while maintaining disturbance levels to which vegetation communities have adapted. Fire response and fuels treatments would apply to the 159 acres of BLM-administered surface land.

Impacts from Vegetative Communities Management Actions

Although no specific vegetative communities actions are proposed, allowing vegetation manipulation to meet resources objectives under standard management common to all alternatives would serve to decrease vegetation density and cover (fuel load) and maintain natural fuel conditions across the surface tracts.

This would maintain natural disturbance regimes which would be easier to manage through prescribed fire or other treatments. This would also decrease the frequency and intensity of wildland fires and allow fires to be more easily controlled, better protecting life, public safety, and property and resource values. However, lack of specific areas and species being managed could result in invasions and fuel accumulations that would increase the frequency and intensity of wildland fires.

Impacts from Fish and Wildlife Habitat Management Actions

No specific fish and wildlife habitat management actions are proposed under this alternative. Actions proposed under standard management common to all alternatives, which would provide habitat improvements and protections under State wildlife conservation strategies, including control of invasive plant species, use of prescribed fire, and wetland enhancements, would result in similar impacts as discussed under Impacts from Vegetative Communities Management Actions.

Impacts from Minerals Management Actions

Minerals development activities would introduce additional ignition sources throughout the non-USFS FMO, increasing the potential of wildland fire occurrence. Disturbance of 105 acres associated with the development of 20 wells on non-USFS FMO could provide increased accessibility for fire suppression equipment and provide fuel breaks in the case of wildland fire events. In addition, the infrastructure associated with the 20 new wells would require protection in wildland fire events. Impacts from mineral-development activities would not occur on the 8,179 acres closed to oil and gas development.

Impacts from Recreation and Travel Management Actions

Continuing to manage the surface tracts as open to recreation use would allow for dispersed recreation use, which could introduce additional ignition sources and increase the probability of wildland fire occurrence. This would be more prevalent in areas that are more accessible.

Impacts from Lands and Realty Management Actions

Development of above-ground ROWs on the surface tracts, which would be managed as open to ROW development, would require additional efforts by firefighters to protect these areas in wildland fire events. Development of ROWs would also result in clearing vegetation to make way for linear features such as roads, pipelines, and transmission lines. ROWs could provide fuel breaks, which could help prevent the spread of wildland fires. ROWs could also provide firefighters with increased accessibility for fire suppression equipment. While more ROWs could increase suppression costs, the aspects of ROW development related to vegetation clearing and the potential for increased accessibility could reduce suppression costs.

Cultural Resources

Management of cultural resources provides protection from the potentially damaging effects of surface-disturbing activities through implementation of existing laws and policy, such as Section 106 of the National Historic Preservation Act (NHPA) and the Federal Lands Policy and Management Act of 1976 (FLPMA). Federal undertakings typically require cultural resource inventories that would result in the identification of cultural resource sites and determination of eligibility to the National Register of Historic Places (NRHP). The cultural resources data acquired through inventories and evaluations would increase knowledge of cultural resources on BLM-administered lands and minerals in the State. Following site-specific inventories, mitigation measures would be prescribed as necessary for eligible properties. Any cultural sites discovered may be considered for further evaluation to assess its eligibility for listing on the NRHP. Through this process, significant impacts on cultural sites eligible for the NRHP would be

avoided or mitigated. Avoidance is the BLM's preferred measure to eliminate potential adverse effects. Avoidance preserves the cultural resource in place. If this is not possible under reasonable circumstances, scientifically valid excavation and data recovery is an alternative mitigation method. Scientifically valid excavation would be used as a final measure, and the extent of excavation would be determined through BLM consultation with the State Historic Preservation Officer (SHPO) and tribes.

Data recovery preserves as much of the cultural record as possible through archaeological methods. Any mitigation effort requiring archaeological data recovery is subject to the terms outlined in a Data Recovery Plan and documented through a signed Memorandum of Understanding (MOU) with the SHPO, tribes, and other consulting parties. While data recovery preserves as much data as possible, the excavated portions of the property would be lost or damaged. Removing cultural resources from a site using current scientific methods also reduces future scientific value if more accurate methods of analysis are developed. Mitigation through data recovery also reduces or eliminates other uses of cultural resources sites, such as traditional, public, conservation, or experimental use. The inventory and avoidance procedures conducted in conjunction with surface-disturbing actions would protect most cultural resources from significant impacts.

Despite the best efforts to identify all cultural resources, there remains a potential for inadvertent impacts to previously undiscovered sites, especially buried sites with no surface indications. Following discovery of cultural resources, activities would stop to allow for mitigation to minimize further damage to cultural resources. There is a set process through Section 106 for identifying, evaluating, and treating the effects of inadvertent discoveries to reduce potential impacts from these discoveries.

Wildfire and prescribed fire could impact cultural resource sites, including the eligibility characteristics of sites that are listed or eligible for listing on the NRHP. Impacts would be limited to the Coosa River tracts, as the Geneva tract contains small amounts of vegetation that maintains foliage year-round. The other tracts have been inventoried for cultural resources and no sites were identified.

Prehistoric and historic resources potentially affected by wildfire may be inorganic or organic. Generally speaking, organic materials are more at risk as they tend to burn or alter at lower temperatures than inorganic materials. Wildfire impacts on inorganic cultural resources include fracturing, shattering, and changes in color and internal luster, which might reduce an artifact's ability to render information about the past. As a general rule, fire would not affect buried cultural materials. Studies show that even a few centimeters of soil cover (4 inches) are sufficient to protect cultural materials (Oster N.D.). Wildfires that burn hot and fast through a site may have less of an effect on certain types of cultural materials than fires that smolder in the duff or burn for a long time period, allowing heat from the fire to penetrate the surface. In addition, heat from wildland fires could change the physical nature of the ground, making it harder to identify cultural resources. The isolated nature of vegetation on the Coosa River tracts would limit the potential for ignition or spread of wildland fire, and decrease the potential impacts to cultural resources.

Impacts from Vegetative Communities Management Actions

No specific vegetative communities management actions are proposed under this alternative. Actions proposed under standard management common to all alternatives would allow vegetation manipulation to meet resources objectives and would require cultural resource clearances before any activities were to occur. Therefore, impacts would not be anticipated.

Impacts from Fish and Wildlife Habitat Management Actions

No specific fish and wildlife habitat management actions are proposed under this alternative. Actions proposed under standard management common to all alternatives, which would provide habitat

improvements and protections under State wildlife conservation strategies (including control of invasive plant species, use of prescribed fire, and wetland enhancements), would require cultural resource clearances before any activities were to occur. Therefore, impacts would not be anticipated.

Impacts from Minerals Management Actions

Cultural resources on 305,640 acres of non-USFS FMO in Alabama managed as open to leasing and subject to standard lease terms and conditions could be impacted by oil and gas development. Based on the RFDS, oil and gas developments within these areas would impact 105 acres through the development of 20 wells over 20 years. Development on these acres would typically be subject to Class III cultural resource inventories and evaluation on a project-by-project basis prior to allowing disturbance. This would result in the identification and potential excavation of cultural sites. Cultural sites on 8,179 acres closed to leasing would be protected from oil and gas development.

Sixty-eight known cultural resources sites exist within non-USFS FMO in the coal potential area, and 66 known sites are within one-half mile of the tracts. Based on the RFDS, production of 37.6 million tons of coal from preexisting underground mines over 20 years would not result in new surface disturbance; therefore, no impacts to cultural resources would be anticipated from coal development.

Impacts from Recreation and Travel Management Actions

Recreation activities on the surface tracts could result in inadvertent damage and vandalism to cultural sites on tracts that contain cultural resources. Although the tracts are not anticipated to be used extensively for recreation, many surface tracts are located in rivers, wetlands, and beach areas that are desirable locations for recreation and there is a high potential for cultural resources to be found. Impacts from travel management actions would not be anticipated because the Coosa River and Geneva tracts that have not been surveyed for cultural resources are only accessible by boat and no cultural resources were found on all the other tracts that have been surveyed.

Impacts from Lands and Realty Management Actions

Ground-disturbing activities associated with ROW construction and maintenance could impact cultural resources. If a permitted ROW for an access road, utility tower, or bridge pier were approved on a surface tract, an appropriate level of cultural resource survey would need to be conducted. Approved activities in areas not previously surveyed, or in areas surveyed prior to 1996, would be subject to a ground survey and consultation requirements with the SHPO under NHPA Section 106 regulations prior to construction.

A cultural resource survey would also be required if existing ROWs on the Fort Morgan Highway and Jordan Lake tracts were expanded or modified. Construction projects could result in inadvertent damage if cultural resources that were undetected during surveys were unearthed during ground-disturbing activities. Following discovery of cultural resources, activities would stop in accordance with the ROW grant which would minimize further damage to cultural resources. Therefore, impacts to cultural resources would be anticipated to be minimal.

Visual Resources

Impacts from Vegetative Communities Management Actions

No specific vegetative communities management actions are proposed under this alternative. Actions proposed under standard management common to all alternatives, which would allow vegetation manipulation to meet resources objectives, would not be anticipated to involve ground-disturbing activities of a severity or extent that would result in impacts to visual quality. Although visual quality

would deteriorate in the short term, visual quality would improve in the long term once vegetation has reestablished to meet VRM class objectives.

Impacts from Fish and Wildlife Habitat Management Actions

No specific fish and wildlife management actions are proposed under this alternative. Actions proposed under standard management common to all alternatives, which would provide habitat improvements and protections under State wildlife conservation strategies (including control of invasive plant species, use of prescribed fire, and wetland enhancements), would not be anticipated to involve ground-disturbing activities of a severity or extent that would result in impacts to visual quality. Although visual quality would deteriorate in the short term, visual quality would improve in the long term once vegetation has reestablished to meet VRM class objectives.

Impacts from Minerals Management Actions

Mineral exploration and development on non-USFS FMO tracts (313,819 acres) would result in impacts to visual resources on 105 acres from 20 wells. Removal of vegetation and construction of wells and wellpads and introduction of other equipment would impact visual quality. The BLM does not manage the surface for non-USFS FMO tracts; however, the BLM can place COAs or best practices to minimize impacts to visual resources in accordance with the guidance and procedures defined in VRM Handbook H-8431-1 Visual Resource Contrast Rating. Impacts would not be anticipated on the 8,179 non-USFS FMO acres closed to leasing. Since no mineral-development activities would occur on the surface tracts, there would be no violations of VRM class objectives.

Impacts from Recreation and Travel Management Actions

Allowing recreation activities and motorized vehicle use on the surface tracts could impact visual quality over time from changes to existing natural or manmade landforms and scenic vistas through vegetation and soil loss, particularly on tracts that are in undeveloped areas. Since the surface tracts are not anticipated to be used extensively for recreation and travel, these impacts would be minimal.

Impacts from Lands and Realty Management Actions

If the existing ROWs that bisect the Fort Morgan Highway and Jordan Lake tracts were expanded or otherwise modified, visual quality would be impacted. No existing utility and road ROWs exist on the Coosa River, Fort Morgan Beach, Geneva, and Fowl River tracts. If a new road or utility ROW were authorized on these tracts, visual quality would be impacted if the ROW were to dominate the view of the casual observer.

Minerals

Impacts from Vegetative Communities Management Actions

Vegetative communities management actions would not restrict or preclude mineral development and exploration; therefore, impacts are not anticipated.

Impacts from Fish and Wildlife Habitat Management Actions

Fish and wildlife management actions would not restrict or preclude mineral development and exploration; therefore, impacts are not anticipated.

Impacts from Minerals Management Actions

Under this alternative, 305,640 non-USFS FMO acres would be open to leasing, subject to standard lease terms and conditions; 8,179 non-USFS FMO acres would be closed to leasing due to restrictions placed by other Federal surface management agencies. No impacts to oil and gas minerals exploration and development would be anticipated from management of non-USFS FMO tracts.

No impacts to coal leasing and development in the Warrior Basin would be anticipated. Coal production would continue at historical rates.

Impacts from Recreation and Travel Management Actions

Recreation and travel management actions would not restrict or preclude mineral development and exploration; therefore, impacts are not anticipated.

Impacts from Lands and Realty Management Actions

Lands and realty management actions would not restrict or preclude mineral development and exploration; therefore, impacts are not anticipated. The BLM would only dispose of non-USFS FMO with no suspected value and, therefore, there would be no loss of opportunity.

Recreation and Travel Management

Impacts from Vegetative Communities Management Actions

No specific vegetative communities management actions are proposed under this alternative. Actions proposed under standard management common to all alternatives, which would allow vegetation manipulation to meet resources objectives, would not be anticipated to involve ground-disturbing activities of a severity or extent that would result in impacts to recreation. Recreationists could be displaced from vegetation treatment areas until revegetation occurs; however, the vegetation treatments would benefit recreationists by improving the long-term aesthetics of an area.

Impacts from Fish and Wildlife Habitat Management Actions

No specific fish and wildlife habitat management actions are proposed under this alternative. Actions proposed under standard management common to all alternatives, which would provide habitat improvements and protections under State wildlife conservation strategies (including control of invasive plant species, use of prescribed fire, and wetland enhancements), would not be anticipated to involve ground-disturbing activities of a severity or extent that result in impacts to recreation. Recreationists could be displaced from protected areas or treated areas until revegetation occurs; however, the habitat improvements and protections would benefit recreationists by improving the long-term aesthetics and wildlife viewing of an area.

Impacts from Minerals Management Actions

Oil and gas development on non-USFS FMO tracts with surface management by other Federal agencies that are open to the public for recreation, as identified in Table 3-17, could be affected by the leasing of Federal minerals by the BLM. Those areas or installations not open to recreation or leasing would not be affected, including National Park Service (NPS) and USFWS lands. Oil and gas development could provide additional opportunities for travel due to the construction of access roads.

Since approximately 105 acres of vegetation removal and construction activities would result from the development of 20 oil and gas wells on non-USFS FMO, there could be a decrease in nature-based recreational opportunities due to conflicts with the developments or in areas where the public were excluded. Mineral leasing in recreational areas could result in the removal of vegetation; construction of access roads, wellpads, and other infrastructure; introduction of drilling equipment; and associated noise and dust emissions. Effects would include a less-enjoyable recreational environment, though travel management opportunities could improve due to the construction of access roads. Stipulations applied under this alternative by other surface management agencies could indirectly protect the recreational resources in areas where development would be precluded (8,179 acres).

Since future coal development is anticipated to occur at underground sites without additional infrastructure, additional impacts to recreation would not be anticipated.

Impacts from Recreation and Travel Management Actions

Allowing recreation activities and motorized vehicle use on the surface tracts would maintain existing recreation and travel opportunities. Allowing motorized travel uses on all surface tracts could result in conflicts between motorized recreationists and recreationists seeking a more natural setting or experience.

Impacts from Lands and Realty Management Actions

Although Lots 73 and 74 of the Fort Morgan Beach tracts would be transferred to the USFWS, these lots would remain within the boundaries of the Bon Secour National Wildlife Refuge (NWR) (where they are currently, but are not managed by the USFWS). After transfer, these lots would be managed according to their Comprehensive Conservation Plan. Since all surface tracts would remain in Federal ownership, access to recreation activity in a generally undeveloped setting would be maintained.

If existing utility and road ROWs that bisect the Fort Morgan Highway and Jordan Lake tracts were expanded or otherwise modified, the recreation experience could be impacted as a result of construction activity, ground disturbance, and introduction of new infrastructure. No existing utility and road ROWs exist on the Coosa River, Fort Morgan Beach, Geneva, and Fowl River tracts. If a new road or utility ROW were authorized on these tracts, the recreation experience could be impacted as a result of construction activity, ground disturbance, and introduction of new infrastructure. These actions could provide additional opportunities for travel due to the construction of access roads.

Lands and Realty

Lands and realty is a resource use rather than an environmental component and impacts on lands and realty are a direct result of their management. Therefore, the following discussion is limited to impacts from lands and realty management actions for the 159 acres of BLM-administered surface ownership in Alabama. Impacts from disposal of FMO are discussed under Impacts to Minerals from Lands and Realty Actions.

Under Alternative 1, all 159 acres of the surface tracts in Alabama would remain open to ROW applications; therefore, no impacts would be anticipated to lands and realty actions. Retaining the surface tracts under the BLM administration would not allow for opportunities for other Federal agency or non-Federal ownership. Transferring Lots 73 and 74 of the Fort Morgan Beach tracts to the USFWS as part of the Bon Secour NWR would facilitate Federal management of the lots.

Social and Economic

Definitions and descriptions of potential Environmental Justice populations, including low income and ethnicity statistics, were provided in Section 3.2.13. Since this four-county study area where mineral development is anticipated does not encompass Environmental Justice populations as defined, there would likely be no disproportionate effect on those populations under each alternative. Since the specific location of the oil and gas development is yet to be determined, Environmental Justice population locations should be further considered at the implementation level to minimize the potential for disproportionate impacts to Environmental Justice populations and to identify any possible mitigation measures that may be required to reduce impacts (e.g., dust, noise, traffic, ground water quality) to these populations.

Impacts from Vegetative Communities Management Actions

Impacts to social and economic conditions would not be anticipated from vegetative communities management actions, since no actions are proposed under this alternative. Under standard management common to all alternatives, allowing vegetation manipulation to meet resources objectives would not be anticipated to be of an extent that would result in impacts to economic or social conditions.

Impacts from Fish and Wildlife Habitat Management Actions

Impacts to social and economic conditions would not be anticipated from fish and wildlife habitat management actions, since no actions are proposed under this alternative. Under standard management common to all alternatives, providing habitat improvements and protections under State wildlife conservation strategies, including control of invasive plant species, use of prescribed fire, and wetland enhancements, would not be anticipated to involve ground-disturbing activities of a severity or extent that would result in impacts to economic or social conditions.

Impacts from Minerals Management Actions

Since only 20 fluid mineral wells would likely be drilled with standard lease terms and conditions over the next 20 years, there would be minimal economic impacts from these activities. This type of BLM mineral development is consistent with the development that occurred in the past, including 17 applications for permits to drill between 1983 and 2004. Therefore, there would be minimal changes. The potential minimal changes include a slight increase in employment or income. Social indicators such as housing, education, and cost of living would not be anticipated to change under this alternative from oil and gas activities.

With continued development of oil and gas resources, 105 acres of surface disturbance are anticipated for wellpads, roads, and pipeline over the next 20 years. Disturbances from oil and gas development could *potentially* include slight increases in air emissions from construction of wellpads and roads, noise from construction activities and trucking, contamination of soils and vegetation, habitat impacts, and ground water contamination. Stakeholders who believe oil and gas activity should be constrained with conditions and stipulations to protect wetlands and aquatic habitat would likely feel that this alternative does not do enough to ensure protection of these types of resources. Additionally, oil and gas industry stakeholders, as well as others who value maintaining access to Federal minerals for oil and gas development, would likely prefer this alternative over the others.

The anticipated amount of coal to be produced under this alternative for the next 20 years (1.9 million tons per year) is consistent with coal development over the last 10 years. 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). In Alabama, mining (non–oil and gas) accounts for approximately 6,773 employees and employee compensation of $482,361,000 (Bureau of Economic Analysis [BEA] 2005). 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 where mineral development is possible likely provides fiscal revenues to local and State governments, supporting community and emergency services, school, and infrastructure. Impacts on stakeholder groups from mining activities are likely similar to those stated in the previous paragraph concerning socioeconomic oil and gas impacts. 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.

Impacts from Recreation and Travel Management Actions

Recreation and travel management actions would not cause changes in the economic characteristics (employment, income, and industries) or quality of social assets (housing, education, values, and attitudes) in the four-county study area where mineral development is possible, as there are no anticipated changes in recreation and travel management actions under this alternative.

Impacts from Lands and Realty Management Actions

All the BLM lands under this alternative would remain in Federal ownership. Additionally, new ROW may be developed on the surface tracts. Lands and realty management actions would not cause changes in the economic characteristics (employment, income, and industries) as there are very little changes anticipated under this alternative. Quality of social assets (demographics, housing, cost of living, education) in local communities linked with the remote and scattered BLM surface tracts are not likely to be affected by retaining these lands in Federal ownership. Stakeholders who would like to see these BLM surface tracts sold to either private developers or non-profit organizations for a change in management and use would be adversely impacted by this alternative, while those stakeholders who believe that retention of the Federal lands is important to maintain open space and current management would feel this alternative is consistent with their values.

Hazardous Materials

BLM-authorized activities on surface tracts and non-USFS FMO could include the use of hazardous materials, substances, and waste (including storage, transportation, and spills). Such activities include oil and gas development, coal development, and application of pesticides to improve vegetative communities and wildlife habitat. These activities are conducted in compliance with 29 CFR 1910, 49 CFR 100–185, 40 CFR 100–400, Comprehensive Environmental Response Compensation and Liability Act (CERCLA), Resource Conservation and Recovery Act (RCRA), Superfund Amendment Reauthorization Act (SARA), Toxic Substances Control Act (TSCA), and the Clean Water Act (CWA) and other Federal and State regulations and policies regarding hazardous materials management. Therefore, if a release were to occur, it would be immediately addressed and remediated in accordance with regulation.

4.2.2 Alternative 2

Air Quality

Under this alternative, there is a potential for wildfires, which could lead to air emissions. Since all fires would be suppressed, these occurrences would be short term and localized and not be anticipated to individually deteriorate air quality conditions. Certain BLM-authorized activities within the planning area, such as oil and gas development, construction activities, vehicle travel, and mechanical hand tools or prescribed burning used in vegetation and wildlife habitat manipulation, would produce emissions considered to be GHGs, particularly CO_2. However, due to the anticipated dispersed and infrequent nature of these activities, the project emissions would not have any noticeable or measurable effect and, therefore, the total contribution of GHGs from authorized activities would be small as well. Other BLM activities may help offset any emissions and sequester carbon, such as maintaining vegetative and forested cover, which may help build organic carbon in soils and function as “carbon sinks”.

Impacts from Vegetative Communities Management Actions

Vegetation treatments, including prescribed fire, and associated use of trucks and heavy equipment would cause short-term, localized increases in dust and emissions. Given the small amount and scattered nature of surface ownership, these activities would not be anticipated to individually deteriorate air quality conditions.

Impacts from Fish and Wildlife Habitat Management Actions

Use of trucks and heavy equipment associated with proposed fish and wildlife habitat improvements, such as constructing dune walkovers on the Fort Morgan Beach tract and conducting prescribed burns to improve habitat on the Fort Morgan Highway tract, would cause short-term, localized increases in dust and emissions. Given the small amount and scattered nature of surface ownership, these activities would not be anticipated to individually deteriorate air quality conditions.

Impacts from Minerals Management Actions

Anticipated levels of oil and gas (20 wells over the next 20 years) and coal development (1.9 million tons produced annually over the next 20 years) and associated air emissions would be the same as Alternative 1.

Impacts from Recreation and Travel Management Actions

Motorized travel would be closed or limited to designated routes on all tracts under this alternative. However, the level of activity contributing to emissions and associated air quality impacts would not be anticipated to change compared to Alternative 1 since these tracts are not anticipated to be used extensively for recreation or travel.

Impacts from Lands and Realty Management Actions

Since the Coosa River, Fort Morgan Beach, Fowl River, and Geneva tracts (a total of 114 acres or 71 percent BLM surface ownership in Alabama) would be managed as ROW avoidance areas, there would be less potential for emissions associated with the use of trucks and heavy equipment (bulldozers, etc.) for ROW development compared to Alternative 1. Impacts from potential ROW development on the Jordan Lake and Fort Morgan Highway tracts would be the same as Alternative 1.

Soil Resources

Impacts from Vegetative Communities Management Actions

Vegetative communities management actions, such as removing invasive species and conducting prescribed fire, on surface tracts could increase site-specific erosion in the short term. Sand deposition would be facilitated by planting native coastal dune vegetation as part of dune restoration activities after damage by major storms. Over the long term, improving vegetation communities would reduce erosion and overland flows.

Impacts from Fish and Wildlife Habitat Management Actions

Actions proposed under standard management common to all alternatives, which would provide habitat improvements and protections under State wildlife conservation strategies, including control of invasive plant species, use of prescribed fire, and wetland enhancements, would not be anticipated to involve ground-disturbing activities of a severity or extent that would result in disturbance or loss of soils. In addition under this alternative, there would be minimal short-term soil disturbance from the construction of dune walkovers on the Fort Morgan Beach tracts and conducting prescribed burns to improve habitat on the Fort Morgan Highway tracts. These soils are not prone to compaction, and the construction is not expected to alter the soil horizons in the long term.

Impacts from Minerals Management Actions

Anticipated levels of oil and gas development and associated impacts on 105 acres would be the same as Alternative 1. Applying the stipulations in Appendix D would increase the area where seasonal, controlled surface use (CSU) (91,702 acres), and no surface occupancy (NSO) (94,589 acres) restrictions would be implemented, which reduces disturbance to soils within the protected areas. Impacts to prime or unique farmlands would be the same as described for Alternative 1.

Impacts from Recreation and Travel Management Actions

Motorized travel would be closed or limited to designated routes on all tracts under this alternative. However, the level of activity that could increase erosion and associated impacts to soils would not be anticipated to change compared to Alternative 1, since these tracts are not anticipated to be used extensively for recreation or travel.

Impacts from Lands and Realty Management Actions

Since the Coosa River, Fort Morgan Beach, Fowl River, and Geneva tracts (a total of 114 acres or 71 percent BLM surface ownership in Alabama) would be managed as ROW avoidance areas, there would be less potential for ground disturbance and increased erosion associated with ROW development compared to Alternative 1. Impacts from potential ROW development on the Jordan Lake and Fort Morgan Highway tracts would be the same as Alternative 1.

Water Resources

Impacts from Vegetative Communities Management Actions

Vegetative communities management actions, such as removing invasive species and conducting prescribed fire, on surface tracts would increase site-specific erosion, which increases nutrient levels and turbidity and decreases water quality in the short term. Over the long term, improving vegetation communities would reduce erosion and overland flows.

Impacts from Fish and Wildlife Habitat Management Actions

Fish and wildlife habitat management actions, such as constructing dune walkovers on the Fort Morgan Beach tracts and conducting prescribed burns to improve habitat on the Fort Morgan Highway tracts, could increase erosion and runoff, which increases nutrient levels and turbidity and decreases water quality in the short term. Over the long term, improving and protecting fish and wildlife habitats would reduce erosion and overland flows.

Impacts from Minerals Management Actions

Anticipated levels of oil and gas development and associated impacts on 105 acres would be the same as Alternative 1. A 1,000-foot NSO buffer around aquatic habitats and applying the stipulations in Appendix D would increase the area where seasonal, CSU (91,702 acres), and NSO (94,589 acres) restrictions would be implemented, which would reduce disturbance to water resources within the protected areas. This stipulation could be applied to an estimated 90,930 acres or 29 percent of the non-USFS FMO available for leasing in Alabama. This buffer is expected to prevent construction activities from increasing the sedimentation of local drainages and wetlands.

Impacts from coal mining would be the same as Alternative 1.

Impacts from Recreation and Travel Management Actions

Motorized travel would be closed or limited to designated routes on all tracts under this alternative. However, the level of activity that could impact water resources would not be anticipated to change compared to Alternative 1 since these tracts are not anticipated to be used extensively for recreation or travel.

Impacts from Lands and Realty Management Actions

Since the Coosa River, Fort Morgan Beach, Fowl River, and Geneva tracts (a total of 114 acres or 71 percent BLM surface ownership in Alabama) would be managed as ROW avoidance areas, there would be less potential for ground disturbance and impacts to water resources associated with ROW development compared to Alternative 1. No coastal wetland habitats or water bodies occur on or adjacent to the Fort Morgan Highway tracts. Development of additional transportation routes and ROWs on the Jordan Lake tract could contribute to the already degrading water quality of the Coosa River, located adjacent to the tract, as well as Jordan Lake, located about 10 miles downstream. Impacts contributing to decreased water quality could result from decreased soil stability and increased surface runoff caused by vegetation-clearing activities and construction ground disturbance.

Vegetative Communities

Impacts from Vegetative Communities Management Actions

Early detection and removal of exotic plant species from the Fowl River and Coosa River tracts would safeguard the wetland emergent vegetation and wet flatwoods communities on this tract. On the Fort Morgan Highway tracts, woody exotic, invasive species such as Chinese tallow and Chinese privet would be removed by hand and stump treated with approved herbicides. Selective hand spraying of cogon grass may be required where it is established. More active management of vegetation communities would provide better vegetation composition on all surface tracts than under Alternative 1.

Impacts from Fish and Wildlife Habitat Management Actions

For the Fort Morgan Beach tracts, the construction of dune walkovers would funnel foot traffic across sensitive dune habitats and allow sand to accrete and native dune vegetation to reestablish. On the Fort Morgan Highway tracts, forbs and native grasses would benefit from periodic prescribed burns of wet flatwoods and wetlands conducted in coordination with the Bon Secour NWR.

Impacts from Minerals Management Actions

In addition to the impacts from standard management common to all alternatives discussed under Alternative 1, oil and gas activities would be excluded from a 1,000-foot buffer around wetlands and aquatic habitats, karst areas, shoreline habitats, and habitats like naturally occurring prairies and glades with special status species under this alternative. Buffering these areas would provide additional protection for high-value plant communities from potential sedimentation or contamination from surface runoff or inadvertent leaching from the reserve pit.

Impacts from Recreation and Travel Management Actions

In attempt to offset the impacts discussed under Alternative 1 on the Fort Morgan Beach and Highway tracts, this alternative would construct two dune walkovers at Veterans Road and Mobile Road to funnel visitors across sensitive dune habitat, allowing dune vegetation to reestablish at these traditional access points. Plantings of native coastal dune vegetation would restore several acres of dunes trampled at these beach access points. Impacts to the Coosa River, Fowl River, and Geneva tracts would be the same as Alternative 1.

Impacts from Lands and Realty Management Actions

All surface tracts except the Fort Morgan Highway and Jordan Lake tracts would be managed as ROW avoidance areas. No new disturbance would be allowed in the existing ROW corridors on the Fort Morgan Highway tracts; however, maintenance activities would be permitted. These existing utility ROWs have been repeatedly disturbed and maintained in an early seral stage dominated by grasses and herbaceous growth. The continued maintenance of these utility corridors prevents the establishment of the scrub vegetation characteristic of this elevation. In addition, these disturbed sites are prone to the establishment of exotic, invasive plant species, particularly cogon grass and Chinese tallow which are common along the Highway 180 corridor. Cogon grass is very difficult to eradicate and establishes dense stands that displace native vegetation communities.

Fish and Wildlife

Impacts from Vegetative Communities Management Actions

Dune restoration activities, such as planting sea oats and other dune-stabilizing natives at Fort Morgan would benefit a wide variety of shorebirds by providing additional areas for loafing and potential nesting sites. At all sites, wildlife would benefit from removal of exotic invasive plant species. Early detection and removal reduces the overall impact to wildlife species by limiting the amount of change to the habitat structure that can occur when large woody invasives are removed and by eliminating or reducing the amount of herbicide needed to control herbaceous invasives.

Impacts from Fish and Wildlife Habitat Management Actions

Many of the benefits discussed under the special status species and vegetation impacts sections would also benefit general wildlife values. At the Fort Morgan Beach tracts, dune-nesting shorebirds would

benefit from actions to enhance and protect coastal dunes. The construction of dune walkovers on the Fort Morgan Beach tracts would protect sensitive dune habitats from foot traffic and allow additional habitat to develop at these traditional public access points. Shorebirds benefit from funneling foot traffic across these sensitive habitats by reducing human intrusions on loafing and nesting areas. On all tracts, wildlife would benefit from early detection and removal of exotic invasive weed species, which once established can substantially alter habitats.

Impacts from Minerals Management Actions

General impacts to wildlife are expected to be the same as Alternative 1; however, under this alternative oil and gas activities would be excluded from high-value wildlife habitats. This includes a 1,000-foot buffer around wetlands and aquatic habitats, avoidance of karst areas, shoreline habitats, and habitats like naturally occurring prairies and glades with special status species.

BMPs would be applied under this alternative to reduce potential impacts to bats, songbirds, and waterfowl. Reserve pits still containing water 10 days after a well is completed would be netted to exclude migratory birds. Other approved methods could also be used to exclude birds. Open-vent equipment, such as heater-treaters, separators, and dehydration units would be covered with anti-perching cones to exclude cavity-nesting birds and bats. Any power lines would be built using approved raptor-safe designs to prevent electrocution.

Impacts from Recreation and Travel Management Actions

Limiting vehicle access to existing roads and authorized ROW would eliminate new use patterns from developing which could degrade habitats on the BLM surface tracts. This would particularly benefit the Fort Morgan Beach tracts where even occasional vehicle use would damage dunes and destroy dune-stabilizing vegetation.

Impacts from Lands and Realty Management Actions

All surface tracts except the Fort Morgan Highway and Jordan Lake tracts would be managed as ROW avoidance areas. No new disturbance would be allowed in the existing ROW corridors on the Fort Morgan Highway tracts; however, maintenance activities would be permitted. These existing utility ROWs have been repeatedly disturbed and maintained in an early seral stage dominated by grasses and herbaceous growth. The continued maintenance of these utility corridors prevents the establishment of the scrub vegetation characteristic of this elevation. In addition, these disturbed sites are prone to the establishment of exotic, invasive plant species, particularly cogon grass and Chinese tallow which are common along the Highway 180 corridor. Cogon grass is very difficult to eradicate and establishes dense stands that displace native vegetation communities. Maintenance activities, as well as invasive exotic species in the utility corridors, would deteriorate wildlife habitat.

Special Status Species

Impacts from Vegetative Communities Management Actions

Alabama beach mouse and nesting shorebirds would benefit from plantings of native coastal dune vegetation on the Fort Morgan Beach tracts after damaging storms. These plantings promote sand deposition and help to reestablish the dunes more quickly. On the Fowl River, Coosa River, and Fort Morgan Highway tracts, woody exotic, invasive species such as Chinese tallow and Chinese privet would be removed by hand and stump treated with approved herbicides. Selective hand spraying of herbaceous growth, especially cogon grass, may be required where it has become established. Early detection and

control of invasive plant species would reduce the amount of native vegetation displaced and minimize changes to structure that occurs when large amounts of invasive woody material is removed.

Impacts from Fish and Wildlife Habitat Management Actions

Alabama beach mouse and nesting shorebirds at the Fort Morgan Beach tracts would benefit from the installation of two dune walkovers that would eliminate damaging foot traffic and allow dunes and vegetation to recover at traditional public access areas at Veterans Road and Mobile Road. Prescribed fire could be used to increase herbaceous species in flatwoods or wetlands on the Fort Morgan highway tracts. These burns would be conducted only in conjunction with prescribed burns on adjacent lands managed by the Bon Secour NWR to benefit endemic species. These actions would improve habitat for special status species.

Impacts from Minerals Management Actions

Although the number of wells (20) and acres disturbed (105) would remain the same under this alternative as compared to Alternative 1, lease stipulations would shift surface-disturbing activities away from sensitive habitats with potential to support special status species. This is accomplished with NSO buffers or seasonal restrictions.

To protect special status species occurring in aquatic or wetland habitats, all oil and gas development activities would be excluded from a 1,000-foot buffer around these habitats. In areas with slopes less than 10 percent, the 1,000-foot buffer could be reduced to a minimum of 100 feet if the adjacent waterway or wetlands have been surveyed and no special status species occur within 100 yards upstream and 300 yards downstream of the site. This stipulation could be applied to an estimated 90,930 acres or 29 percent of the non-USFS FMO available for leasing in Alabama. In most cases, this buffer is expected to prevent construction activities from increasing the sedimentation of local drainages and wetlands.

A 250-foot NSO buffer around known caves, fractures, and sinkholes would reduce the chances of drilling through karst formations, providing protection for cave endemics, such as Alabama cave shrimp, Alabama cave fish, gray myotis, Indiana bat, and others. Some potential remains for inadvertently drilling through unknown karst formations and damaging connected cave habitats through introduction of lost drilling fluids and muds, altering temperature and moisture regimes and modifying the hydrology supporting the karst system. The 3,044 acres of FMO within 0.5 mile of caves known to be occupied by gray myotis or Indiana bat would be excluded from surface occupancy, protecting these species and their habitats from disturbance associated with oil and gas activity.

Under this alternative, the 365 acres of non-USFS FMO associated with suitable and designated critical habitat for the Alabama beach mouse, including upland scrub sites, would be excluded from leasing. This would avoid potential impacts to Alabama beach mouse, nesting sea turtles, piping plover, and other coastal special status species, including least tern, American oystercatcher, and Wilson’s plover.

Areas with suitable soils and at least 10 percent open pine forest in southern Alabama counties, including Choctaw, Washington, Mobile, Baldwin, Barbour, Bullock, Butler, Clarke, Crenshaw, Coffee, Conecuh, Covington, Dale, Escambia, Geneva, Henry, Houston, Monroe, Montgomery, Pike, and Wilcox Counties would require a survey for gopher tortoises prior to any surface-disturbing activities. No disturbance would be permitted within 600 feet of a gopher tortoise burrow. This buffer is expected to protect any breeding populations of gopher tortoise and maintain habitat for associated species, including black pine snake. It would also protect habitat values in areas suitable for eastern indigo snake.

Under this alternative, NSO would be permitted within 0.5 mile of a red-cockaded woodpecker cluster. This stipulation would be applied to 888 acres of FMO within known clusters and would be applied as needed to potential or occupied habitat identified during site assessments conducted prior to leasing. This buffer is expected to contain all foraging habitat required to maintain the red-cockaded woodpecker cluster. There are options for oil and gas activity to occur within suitable foraging habitat, if the foraging requirements for the cluster are met elsewhere (e.g., clusters maintained on National Forests). This exception would require a concurrence from the USFWS and the State of Alabama. A concurrence would cause disturbance within the suitable foraging habitat, but if granted, would not be anticipated to affect local populations.

Under this alternative, NSO would be permitted within 1,500 feet of a bald eagle nest and/or communal roost site, and no surface-disturbing activities would be permitted within 1.5 miles of bald eagle nests during the nesting season from December 1 through August 1. This stipulation is expected to avoid potential impacts to bald eagles. This buffer may be modified as needed in the future to comply with the most current Federal guidelines. The no surface occupancy stipulation could apply to an estimated 30 acres of FMO within 1,500 feet of known bald eagle nests, and the seasonal restriction would apply to an estimated 848 acres of FMO within 1.5 miles of known bald eagle nests. These stipulations could be applied to additional acreage, if new nests or communal roosts are identified during site assessments conducted prior to leasing.

Leases containing potential habitat for specials status plant species, including Federally listed and candidate species, as well as those ranked as critically imperiled (S-1) and imperiled (S-2) by the Alabama Natural Heritage Program (ANHP) would require botanical surveys prior to surface-disturbing activities. Operations would be excluded from areas supporting these special status plant species. This stipulation is expected to protect most naturally occurring glades, prairies, and other habitats which support special status plant species. This stipulation is estimated to apply to 103 acres of FMO. This is based on known occurrences of special status plants on FMO, and because most of the private land overlaying FMO has not been inventoried for special status plants, this stipulation is expected to be applied more broadly at the lease stage based on site assessments conducted prior to leasing.

Impacts from Recreation and Travel Management Actions

Closing tracts to motorized use or restricting public vehicle use to designated roads and authorized ROWs (depending on tract) would prevent habitat damage to occupied Alabama beach mouse habitat, as well as sea turtle nesting habitat and important shorebird loafing and foraging areas. These closures or restrictions would be consistent with Florida Department of Environmental Management requirements that require permits for use of vehicles on State beaches, and they would allow the BLM to sign and more effectively enforce vehicle closures and restrictions.

Impacts from Lands and Realty Management Actions

Under this alternative, two Fort Morgan Beach tract lots (Lots 73 and 74) would be transferred to USFWS for inclusion in the Bon Secour NWR. No new disturbance would be allowed for ROWs on the BLM surface tracts. This would include the existing ROW corridors on the Fort Morgan Highway tracts, which are designated as critical habitat for Alabama beach mouse, although maintenance of these existing ROWs would be permitted. The existing utility ROWs on the Fort Morgan Beach tracts have been repeatedly disturbed and maintained in an early seral stage dominated by grasses and herbaceous growth. The continued maintenance of these utility corridors prevents the establishment of the scrub vegetation characteristic of this elevation. In addition, these disturbed sites are prone to the establishment of exotic, invasive plant species, particularly cogon grass and Chinese tallow which are common along the Highway 180 corridor. Cogon grass is very difficult to eradicate and establishes dense stands that displace native

vegetation communities. Maintenance activities may introduce additional invasive exotic species in the utility corridors, which would adversely affect Alabama beach mouse critical habitat. Additional work may be needed to assess the role that modified areas play in Alabama beach mouse habitat and to determine BMPs regarding the maintenance of this ROW corridor.

Wildland Fire Ecology and Management

Impacts from suppressing all wildland fires and allowing prescribed burning on a case-by-case basis would be the same as Alternative 1.

Impacts from Vegetative Communities Management Actions

Vegetative communities management actions, such as removing invasive species and conducting prescribed fire, on surface tracts would reduce the potential for changes in the vegetation communities from invasive species. As a result, the natural fire regimes would be maintained or restored. This would improve the ability to manage wildland fire in its natural role through application of prescribed fires.

Impacts from Fish and Wildlife Habitat Management Actions

Fish and wildlife habitat management actions, such as conducting prescribed burns to improve habitat, would reduce the potential for changes in the vegetation communities from invasive species. Treatments to improve habitat conditions would maintain or restore natural fire regimes through removal of decadent vegetation or invasive species. This would improve the ability to manage wildland fire in its natural role through application of prescribed fires.

Impacts from Minerals Management Actions

Impacts to wildland fire ecology and management from anticipated oil and gas development and associated disturbance of 105 acres would be the same as Alternative 1; however, impacts would not occur on the closed (8,297 acres) and NSO (94,589 acres) areas created through applying the stipulations in Appendix D.

Impacts from Recreation and Travel Management Actions

The potential for increased wildland fire occurrence would decrease compared to Alternative 1 because travel on the surface tracts would be designated as closed or limited to designated routes. This would decrease the ease of accessibility to these areas and reduce the potential for additional ignition sources through increased human use.

Impacts from Lands and Realty Management Actions

Since the Coosa River, Fort Morgan Beach, Fowl River, and Geneva tracts would be managed as avoidance areas (a total of 114 acres or 71 percent BLM surface ownership in Alabama), there would be less potential for wildfire impacts associated with ROW development compared to Alternative 1. This would decrease infrastructure needing protection but would also decrease improvements in accessibility to fires and providing fire-breaks on these tracts. Impacts from potential ROW development on the Jordan Lake and Fort Morgan Highway tracts would be the same as Alternative 1.

Cultural Resources

Impacts from cultural resources management and wildland fire management actions would be the same as Alternative 1.

Impacts from Vegetative Communities Management Actions

Vegetative communities management actions, such as removing invasive species and conducting prescribed fire, on surface tracts would increase ground disturbance and associated potential impacts to cultural resources. Activities to control noxious and invasive plant species on the Coosa River and Geneva tracts could result in surface and shallow subsurface disturbance, which could introduce organic materials to lower soil layers, contaminating shallow subsurface cultural resource sites containing early historic or prehistoric datable organics. Surface and shallow subsurface effects could also include horizontal and vertical displacement of the upper portion of soils, which could compromise depositional context and integrity, and causing artifact damage. Surveys completed prior to treatments would result in the identification of cultural sites. Weed control with non-disturbing methods would have no impacts. There would be no impact to cultural resources on the Fort Morgan Beach, Fort Morgan Highway, Fowl River, and Jordan Lake tracts as these areas have been inventoried and do not contain cultural sites.

Impacts from Fish and Wildlife Habitat Management Actions

Fish and wildlife habitat management actions, such as conducting prescribed burns, would increase ground disturbance and associated potential impacts to cultural resources similar to that discussed under Impacts from Vegetative Management Actions. Wildlife habitat manipulation would require cultural resource inventories and clearance prior to ground disturbance to identify the presence of any cultural sites and to avoid or mitigate any potential damage.

Impacts from Minerals Management Actions

Cultural resource impacts could occur from managing 119,231 acres of non-USFS FMO as open to leasing subject to standard lease terms and conditions and 91,702 acres of non-USFS FMO as CSU. Based on the RFDS, oil and gas developments within these areas would impact 105 acres through the development of 20 wells over 20 years. Development on these acres would typically be subject to Class III cultural resource inventories and evaluation on a project-by-project basis prior to allowing disturbance, resulting in the identification and potential excavation of cultural sites. Stipulations and BMPs applied under this alternative would protect and preserve cultural resources on the 94,589 acres managed as NSO and in areas where surface disturbance would be precluded (8,297 acres).

Impacts to cultural resources from coal development would be the same as Alternative 1.

Impacts from Recreation and Travel Management Actions

Although surface tracts would be closed or limited to motorized use under this alternative, the level of activity that could impact cultural resources would not be anticipated to change compared to Alternative 1 since these tracts are not anticipated to be used extensively for recreation or travel.

Impacts from Lands and Realty Management Actions

Since the Coosa River, Fort Morgan Beach, Fowl River, and Geneva tracts (a total of 114 acres or 71 percent BLM surface ownership in Alabama) would be managed as ROW avoidance areas, there would be less potential for ground disturbance and impacts to cultural resources associated with ROW development compared to Alternative 1. If a ROW were proposed on the Fort Morgan Highway and Jordan Lake tracts, an appropriate level of cultural resource survey and consultation with the SHPO under NHPA Section 106 regulations would need to be conducted prior to approval. A cultural resource survey would also be required if existing ROWs on the Fort Morgan Highway and Jordan Lake tracts were expanded or modified. Construction projects could result in inadvertent damage if cultural resources that were undetected during surveys were unearthed during ground-disturbing activities. Following discovery

of cultural resources, activities would stop in accordance with terms and conditions in the ROW grant, which would minimize further damage to cultural resources. Collocating ROWs where possible would reduce the amount of surface disturbance and potential for inadvertent damage.

Visual Resources

Impacts from Vegetative Communities Management Actions

Undertaking actions to improve vegetation communities, such as removing invasive species, on the surface tracts would temporarily diminish visual quality. Visual quality would be improved in the long term as the conditions of vegetation communities improve to meet VRM class objectives.

Impacts from Fish and Wildlife Habitat Management Actions

Undertaking actions to improve fish and wildlife habitat on the surface tracts, such as prescribed burning, would temporarily diminish visual quality. Visual quality would be improved in the long term as wildlife-related recreation and habitat conditions were improved to meet VRM class objectives.

Constructing dune walkover structures and installing sand fencing to enhance and protect existing dune habitat on the Fort Morgan Beach tract would introduce developments in previously undeveloped areas and, thereby, altering the visual quality if the developments were to dominate the view of the casual observer. Any potential impacts could be mitigated through careful placement in low-lying areas and applying treatments to blend any structures in with the natural setting in accordance with the guidance and procedures defined in VRM Handbook H-8431-1 Visual Resource Contrast Rating.

Impacts from Minerals Management Actions

Since approximately 105 acres of vegetation removal and construction activities would result from the development of 20 oil and gas wells (as with Alternative 1), impacts would be the same as Alternative 1. Stipulations applied under this alternative could indirectly protect visual resources on the 94,589 acres managed as NSO and in areas where development would be precluded (8,297 acres). Since no mineral-development activities would occur on the surface tracts, there would be no violations of VRM class objectives.

Impacts from Recreation and Travel Management Actions

Continuing to allow recreation use on the surface tracts would result in impacts similar to those described under Alternative 1. Since the tracts would be managed as limited or closed to motorized vehicle use, impacts to visual quality would be reduced under this alternative compared to Alternative 1 as there would be less potential for vegetation and soil removal from these activities. Furthermore, because the surface tracts are not currently used extensively for recreation, anticipated impacts would be minimal.

Impacts from Lands and Realty Management Actions

Managing the Coosa River, Fort Morgan Beach, Fowl River, and Geneva tracts (a total of 114 acres or 71 percent BLM surface ownership in Alabama) as ROW avoidance areas would retain the visual quality on these tracts since ROWs would not be approved on the tract unless it met resource objectives. Making the Fort Morgan Highway and Jordan Lake tracts available for ROWs could further diminish visual resource qualities if the ROWs were to dominate the view of the casual observer; however, collocating ROWs could reduce the extent of impacts to visual quality.

Minerals

Impacts from Vegetative Communities Management Actions

Vegetative communities management actions would not restrict or preclude mineral development and exploration; therefore, impacts are not anticipated.

Impacts from Fish and Wildlife Habitat Management Actions

Fish and wildlife management actions would not restrict or preclude mineral development and exploration; therefore, impacts are not anticipated.

Impacts from Minerals Management Actions

Applying the lease stipulations and BMPs in Appendix D could restrict or preclude oil and gas development and exploration. Impacts would not be anticipated on approximately 119,231 acres open to leasing subject to standard lease terms and conditions. Managing approximately 91,702 acres as open to leasing subject to minor constraints and 94,589 acres as open to leasing subject to major constraints would allow for recovery of resources and could increase development costs. Allowing for exceptions, waivers, and modifications to these stipulations could create opportunities for the discovery of new oil and gas resources. Closing 8,297 acres to oil and gas leasing would preclude oil and gas development and exploration in these areas.

Impacts to coal leasing and development would be the same as Alternative 1.

Impacts from Recreation and Travel Management Actions

Recreation and travel management actions would not restrict or preclude mineral development and exploration; therefore, impacts are not anticipated.

Impacts from Lands and Realty Management Actions

Lands and realty management actions would not restrict or preclude mineral development and exploration; therefore, impacts are not anticipated.

Recreation and Travel Management

Impacts from Vegetative Communities Management Actions

Undertaking actions to improve vegetation communities on the surface tracts, such as removing invasive species, would temporarily diminish the recreation experience since recreationists could be displaced from vegetation treatment areas until revegetation occurs. The recreation experience would be improved in the long term as the condition of vegetation communities improves by improving the long-term aesthetics of an area.

Impacts from Fish and Wildlife Habitat Management Actions

Undertaking actions to improve wildlife habitat on the surface tracts, such as prescribed burning, would temporarily diminish the recreation experience since recreationists could be displaced from protected areas or treated areas until revegetation occurs. The recreation experience would be improved in the long term as wildlife-related recreation and habitat conditions are improved by improving the long-term aesthetics and wildlife viewing of an area.

Constructing dune walkover structures and installing sand fencing to enhance and protect existing dune habitat on the Fort Morgan Beach tract would enhance the recreation experience. Installing walkovers and fencing would introduce developments in previously undeveloped areas. It would also introduce intrusions to the natural setting. While this could reduce some recreationists' experience, these facilities are generally accepted by the public. Any potential impacts could be mitigated through applying treatments to blend any structures in with the natural setting.

Impacts from Minerals Management Actions

Since approximately 105 acres of vegetation removal and construction activities would result from the development of 20 oil and gas wells on non-USFS FMO (as with Alternative 1), impacts would be the same as Alternative 1. Stipulations applied under this alternative could indirectly protect the recreational opportunities on the 94,589 acres managed as NSO and in areas where development would be precluded (8,297 acres) by precluding ground disturbance and infrastructure associated with oil and gas development.

Impacts from Recreation and Travel Management Actions

Since motorized vehicle use would be limited or closed on the surface tracts under this alternative, more non-motorized recreation opportunities would increase, while there could be a loss of travel opportunities. Since surface tracts are not currently used extensively for motorized travel, the anticipated impact would be minimal.

Impacts from Lands and Realty Management Actions

Impacts from the transfer of Lots 73 and 74 of the Fort Morgan Beach tracts to the USFWS would be the same as Alternative 1. Managing the Coosa River, Fort Morgan Beach, Fowl River, and Geneva tracts (a total of 114 acres or 71 percent BLM surface ownership in Alabama) as ROW avoidance areas would retain the recreation experience on these tracts. Making the Fort Morgan Highway and Jordan Lake tracts available for ROWs could diminish the quality of the recreation experience. These actions could provide additional opportunities for travel due to the construction of access roads.

Lands and Realty

Under Alternative 2, the Coosa River, Fort Morgan Beach, Fowl River, and Geneva tracts (a total of 114 acres or 71 percent BLM surface ownership in Alabama) would be managed as avoidance areas for ROW. This could impose design and siting requirements and associated costs on new ROWs or amended or renewed ROW at existing sites. There would be an increased potential for requests for new or amended and renewed ROW at existing sites to be denied. Making the Fort Morgan Highway and Jordan Lake tracts available for ROW would accommodate access and efficient energy supply (by allowing pipelines and transmission lines) and would minimize additional costs; however, new ROW would be restricted to the existing ROW corridor on the Fort Morgan Highway tract and ROWs would be collocated if possible on the Jordan Lake tract. This would affect desired placement of facilities on these tracts.

Retaining the surface tracts under the BLM administration and pursuing partnerships with other agencies and organizations could allow for management opportunities for other agencies and organizations but would not allow for non-Federal ownership opportunities. Partnerships would allow for more efficient and comprehensive resource management of the surface tracts.

Social and Economic

Impacts from Vegetative Communities Management Actions

This alternative includes the removal of invasive species on three BLM land tracts and the planting of dune vegetation on the Fort Morgan Beach tract. Impacts from these actions on the economic indicators would not be anticipated from these types of vegetation management actions. Stakeholders who value access may be impacted by restrictions to the Fort Morgan Beach tracts from planting activities.

Impacts from Fish and Wildlife Habitat Management Actions

Impacts to social and economic conditions from fish and wildlife habitat management actions would be the same as impacts identified under Impacts from Vegetative Communities Management Actions.

Impacts from Minerals Management Actions

The same number of wells and acres of surface disturbance as Alternative 1 are anticipated under this alternative. This alternative would apply leasing stipulations to protect sensitive species and their habitats, including buffers for wetland and aquatic resources. Relative to Alternative 1, the exploration and development costs could increase, while the availability for locations for wellpads could decrease. This alternative would also provide for the greatest amount of protection for wetland resources. Since the number of wells anticipated is small relative to total wells in the area, there would be minimal changes, with possibly slight increases in employment or income (and the same as Alternative 1). Social indicators such as housing, education, and cost of living would not be anticipated to change under this alternative.

Similar disturbances from oil and gas development would occur as compared to Alternative 1, although potential impacts to wetlands, soils, vegetation, habitat, and wildlife would be anticipated to be reduced under this alternative due to the implementation of seasonal, NSO, CSU stipulations. Oil and gas development and production can have implications for visual and scenic qualities as well as property values, as described under Alternative 1. These impacts are likely less than those under Alternative 1, as there are more conditions and constraints on wellpad locations under Alternative 2. Industry costs and availability for wellpad locations would likely increase under this alternative, which would result in adverse impacts for the oil and gas industry.

Under this alternative, impacts would be the same as Alternative 1 for coal development.

Impacts from Recreation and Travel Management Actions

Under this alternative, surface tracts would be open to recreational use but designated as limited for off-highway vehicles (OHV), and vehicle use is only allowed on public roads and authorized ROW. Minimal changes in recreation and travel management are anticipated; however, OHV users would likely be adversely impacted if trails and roads are closed to this type of motorized use.

Impacts from Lands and Realty Management Actions

Although the Coosa River, Fort Morgan Beach, Fowl River, and Geneva tracts would be managed as ROW avoidance areas, impacts to social and economic conditions would be the same as Alternative 1.

Hazardous Materials

Impacts would be the same as Alternative 1.

4.2.3 Alternative 3 (Proposed RMP)

Air Quality

Under this alternative, there is a potential for wildfire which could lead to air emissions. Since all fires would be suppressed, these occurrences would be short term and localized and not be anticipated to individually deteriorate air quality conditions. Certain BLM-authorized activities within the planning area, such as oil and gas development, construction activities, vehicle travel, and mechanical hand tools or prescribed burning used in vegetation and wildlife habitat manipulation, would produce emissions considered to be GHGs, particularly CO_2. However, due to the anticipated dispersed and infrequent nature of these activities, the project emissions would not have any noticeable or measurable effect and, therefore, the total contribution of GHGs from authorized activities would be small as well. Other BLM activities may help offset any emissions and sequester carbon, such as maintaining vegetative and forested cover, which may help build organic carbon in soils and function as “carbon sinks”.

Impacts from Vegetative Communities Management Actions

Vegetative communities management actions and associated impacts would be the same as Alternative 2.

Impacts from Fish and Wildlife Habitat Management Actions

Fish and wildlife habitat management actions and associated impacts would be the same as Alternative 2.

Impacts from Minerals Management Actions

Anticipated levels of oil and gas and coal development and associated air emissions would be the same as Alternative 1.

Impacts from Recreation and Travel Management Actions

Although surface tracts would be closed or limited to motorized use under this alternative, the level of activity contributing to emissions would not change compared to Alternative 1 since these tracts are not used extensively for recreation or travel.

Impacts from Lands and Realty Management Actions

Since the Coosa River, Fort Morgan Beach, Fowl River, and Geneva tracts (a total of 114 acres or 71 percent of BLM surface ownership in Alabama) would be managed as ROW avoidance areas, there would be less potential for emissions associated with the use of trucks and heavy equipment (bulldozers, etc.) for ROW development compared to Alternative 1. Impacts from potential ROW development on the Jordan Lake and Fort Morgan Highway tracts would be the same as Alternative 1.

Soil Resources

Impacts from Vegetative Communities Management Actions

Vegetative communities management actions and associated impacts would be the same as Alternative 2.

Impacts from Fish and Wildlife Habitat Management Actions

Fish and wildlife habitat management actions and associated impacts would be the same as Alternative 2.

Impacts from Minerals Management Actions

Anticipated levels of oil and gas development and associated impacts on 105 acres would be the same as Alternative 1. Applying the stipulations in Appendix D would increase the area where seasonal, CSU (117,506 acres), and NSO (43,239 acres) restrictions would be implemented, which would reduce disturbance to soils within the protected areas. Under this alternative, the NSO area around aquatic habitats identified in Alternative 2 would be reduced to 250 feet, which would reduce protections to soils within these areas as compared to Alternative 2. In most cases, this buffer is expected to prevent construction activities from increasing erosion to the point that sedimentation of local drainages and wetlands increases. In areas with slopes over 25 percent, additional measures may be needed to stabilize disturbed soils. Impacts to prime or unique farmlands would be the same as described for Alternative 1.

Impacts from Recreation and Travel Management Actions

Although surface tracts would be closed or limited to motorized use under this alternative, the level of activity and associated impacts to soil resources would not be anticipated to change compared to Alternative 1 since these tracts are not used extensively for recreation or travel.

Impacts from Lands and Realty Management Actions

Disposing the surface tracts under the condition that uses would be consistent with the resource management goals and objectives and allowable uses and management actions established under this alternative would limit or restrict activities that impact soils. Although development once the tracts are disposed could result in soil impacts from vegetation-clearing activities and construction ground disturbance, limitations for habitat protection and resource management would be likely to reduce the potential for erosion or loss in soil productivity. The effects from ground disturbance during construction, vegetation treatments, or habitat improvements would be short term. If permanent roads or structures are constructed on the tracts, the effects would be long term but localized.

ROW management actions and associated impacts to soils would be the same as Alternative 2.

Water Resources

Impacts from Vegetative Communities Management Actions

Vegetative communities management actions and associated impacts would be the same as Alternative 2.

Impacts from Fish and Wildlife Habitat Management Actions

Fish and wildlife habitat management actions and associated impacts would be the same as Alternative 2.

Impacts from Minerals Management Actions

Anticipated levels of oil and gas development and associated impacts on 105 acres would be the same as Alternative 1. Applying the stipulations in Appendix D would increase the area where seasonal, CSU (117,506 acres), and NSO (43,239 acres) restrictions would be implemented, which would reduce disturbance to water resources within the protected areas. Under this alternative, the NSO area around aquatic habitats identified in Alternative 2 would be reduced to 250 feet, which would allow development to occur in close proximity to water resources and the potential for impacts to occur. In most cases, this buffer is expected to prevent construction activities from increasing the sedimentation of local drainages and wetlands. In areas with slopes over 25 percent, additional measures may be needed to stabilize

disturbed soils above wetlands or aquatic habitats to the point they are not impacted by increased sedimentation.

Impacts from coal mining would be the same as Alternative 1.

Impacts from Recreation and Travel Management Actions

Although surface tracts would be closed or limited to motorized use under this alternative, the level of activity and associated impacts to water resources would not be anticipated to change compared to Alternative 1 since these tracts are not used extensively for recreation or travel.

Impacts from Lands and Realty Management Actions

Disposing the surface tracts under the condition that uses would be consistent with the resource management goals and objectives and allowable uses and management actions established under this alternative would limit or restrict activities that impact water resources. Although development of the tracts could involve vegetation-clearing activities and construction ground disturbance that could increase surface runoff and degrade water quality, limitations for habitat protection and resource management would be likely to reduce the potential for these impacts. The effects from ground disturbance during construction, vegetation treatments, or habitat improvements would be short term. If permanent roads or structures are constructed on the tracts, the effects would be long term but localized.

ROW management actions and associated impacts to water resources would be the same as Alternative 2.

Vegetative Communities

Impacts from Vegetative Communities Management Actions

Vegetative communities management actions and associated impacts would be the same as Alternative 2.

Impacts from Fish and Wildlife Habitat Management Actions

Fish and wildlife habitat management actions and associated impacts would be the same as Alternative 2.

Impacts from Minerals Management Actions

Under this alternative, oil and gas development would be excluded from a 250-foot buffer around wetland and aquatic habitats and could be extended up to 600 feet where slopes exceed 10 percent. This buffer could be reduced to 100 feet where slopes are less than 10 percent, where there are no special status species issues. This buffer is expected to be adequate to protect most riparian zones and wetland habitats. It is estimated that this stipulation would apply to 38,111 acres or about 12 percent of the FMO, versus 90,930 or approximately 29 percent of the FMO in Alabama.

Impacts from Recreation and Travel Management Actions

Recreation and travel management actions and associated impacts would be the same as Alternative 2.

Impacts from Lands and Realty Management Actions

Impacts from ROWs would be the same as Alternative 2. Under this alternative, the Fort Morgan, Fowl River, and Coosa River tracts would be available for transfer to other agencies or groups, but future management would be constrained by the management objectives outlined in this plan. All of the Fort

Morgan Beach and Highway tracts would be transferred to the Bon Secour NWR and would be managed as part of that refuge. The Geneva County and Jordan Lake tracts would be available for transfer out of Federal ownership. Impacts to vegetation on the Fort Morgan, Fowl River, and Coosa River tracts would be the same as Alternative 2. The sale of the Geneva County tract is not expected to change the current uses, and no impacts to vegetation are anticipated.

Fish and Wildlife

Impacts from Vegetative Communities Management Actions

Vegetative communities management actions and associated impacts would be the same as Alternative 2.

Impacts from Fish and Wildlife Habitat Management Actions

Fish and wildlife habitat management actions and associated impacts would be the same as Alternative 2.

Impacts from Minerals Management Actions

The acreage disturbed would be the same under all alternatives, and wells would be shifted away from sensitive habitats, although, under this alternative, the buffer would be reduced to 250 feet, with the option of increasing it to 600 feet where needed because of steep slopes or erosive soils. The buffer could be reduced to 100 feet where slopes are less than 10 percent and there are no special status species issues. These buffers are expected to be sufficient for most wildlife species using wetland and aquatic habitats, but interior forest-nesting birds and some amphibians and reptiles may be impacted by this reduced buffer through habitat disturbance. Karst habitats and most naturally occurring prairies and glades would be protected under this alternative.

Under this alternative, the coastal no-lease areas would be replaced with an NSO buffer. This change has some potential to promote offsite drilling. Disturbance of maritime habitats would contribute to the loss of important foraging habitats for migrating songbirds and shorebirds nesting in nearby dunes.

Impacts from Recreation and Travel Management Actions

Recreation and travel management actions and associated impacts would be the same as Alternative 2.

Impacts from Lands and Realty Management Actions

Impacts from ROWs would be the same as Alternative 2. No impacts to wildlife are anticipated from the disposal of the Geneva County tract because no land use changes are expected.

Special Status Species

Impacts from Vegetative Communities Management Actions

Vegetative communities management actions and associated impacts would be the same as Alternative 2.

Impacts from Fish and Wildlife Habitat Management Actions

Fish and wildlife habitat management actions and associated impacts would be the same as Alternative 2.

Impacts from Minerals Management Actions

The number of wells (20) and acres disturbed (105) would remain the same under this alternative, and impacts would be the same as Alternative 2, except in the following situations.

The aquatic and wetland buffer would be reduced to 250 feet. In areas where slopes exceed 10 percent, the buffer could be extended up to 600 feet to provide adequate protection. In areas with slopes less than 10 percent, the 250-foot buffer could be reduced to a minimum of 100 feet, if the adjacent waterway or wetlands have been surveyed and no special status species occur within 100 yards upstream and 300 yards downstream of the site. This stipulation could be applied to an estimated 38,111 acres or 12 percent of the non-USFS FMO available for leasing in Alabama. In most cases, this buffer is expected to prevent construction activities from increasing the sedimentation of local drainages and wetlands. In areas with slopes over 25 percent, additional measures may be needed to stabilize disturbed soils above wetlands or aquatic habitats.

Under this alternative, the coastal no-lease areas would be replaced with an NSO buffer. This change could affect nesting sea turtles, piping plover, and critical habitat for Alabama beach mouse, including adjacent upland scrub habitats. Although no surface disturbance would occur on non-USFS FMO or the BLM surface tracts, offsite directional drilling to target these Federal minerals would be permitted under this alternative. Any directional wells targeting non-USFS FMO that may affect Federally listed species or critical habitat would require coordination with the USFWS.

Impacts from Recreation and Travel Management Actions

Recreation and travel management actions and associated impacts would be the same as Alternative 2.

Impacts from Lands and Realty Management Actions

Impacts from ROW would be the same as Alternative 2. Under this alternative, the Fort Morgan, Fowl River, and Coosa River tracts would be available for transfer to other agencies or groups, but future management would be constrained by the management objectives outlined in this plan. All of the Fort Morgan Beach and Highway tracts would be transferred to the Bon Secour NWR and would be managed as part of that refuge. Alabama beach mouse, piping plover, and snowy plover would benefit from the same activities discussed under Alternative 2.

Under this alternative, the Geneva and Jordan Lake tracts would be transferred out of Federal ownership. This tract is adjacent to Gulf sturgeon critical habitat, but no changes of use are anticipated. At the Jordan Lake tract, there may be opportunities to construct boat docks or other lake access facilities, but the tract may be too narrow to prompt the construction of additional camps. In both cases, the overall use pattern is not expected to change, and no adverse effects to special status species are anticipated.

Wildland Fire Ecology and Management

Impacts from suppressing all wildland fires and allowing prescribed burning on a case-by-case basis would be the same as Alternative 1.

Impacts from Vegetative Communities Management Actions

Vegetative communities management actions and associated impacts would be the same as Alternative 2.

Impacts from Fish and Wildlife Habitat Management Actions

Fish and wildlife habitat management actions and associated impacts would be the same as Alternative 2.

Impacts from Minerals Management Actions

Impacts to wildland fire ecology and management from anticipated oil and gas development and associated disturbance of 105 acres would be the same as Alternative 1. Impacts would not occur on the closed (8,179 acres) and NSO (43,239 acres) areas created through applying the stipulations in Appendix D.

Impacts from Recreation and Travel Management Actions

Recreation and travel management actions and associated impacts would be the same as Alternative 2.

Impacts from Lands and Realty Management Actions

ROW management actions and associated impacts would be the same as Alternative 2.

Cultural Resources

Impacts from cultural resources management and wildland fire management actions would be the same as Alternative 1.

Impacts from Vegetative Communities Management Actions

Vegetative communities management actions and associated impacts would be the same as Alternative 2.

Impacts from Fish and Wildlife Habitat Management Actions

Fish and wildlife habitat management actions and associated impacts would be the same as Alternative 2.

Impacts from Minerals Management Actions

Impacts to cultural resources from management of non-USFS FMO would be the same as Alternative 2, except 144,895 acres would be managed as open to leasing subject to standard lease terms and conditions, 117,506 acres as CSU, 43,239 acres as NSO, and 8,179 acres as closed. The 105 acres of disturbance resulting from the anticipated 20 wells could impact cultural resources within areas managed as open to leasing subject to standard lease terms and conditions or CSU. Impacts to cultural resources are not anticipated in areas managed as NSO or closed since surface disturbance would be precluded.

Impacts to cultural resources from coal development would be the same as Alternative 1.

Impacts from Recreation and Travel Management Actions

Although surface tracts would be closed or limited to motorized use under this alternative, the level of activity and associated impacts to cultural resources would not be anticipated to change compared to Alternative 1 since these tracts are not used extensively for recreation or travel.

Impacts from Lands and Realty Management Actions

Making the surface tracts available for disposal could result in the removal of cultural properties from Federal ownership and the associated protection by laws, regulations, and policies. Before any transfer of management responsibilities or ownership, an appropriate level of cultural resource survey and consultation with the SHPO under NHPA Section 106 regulations would need to be conducted. Disposing the property from Federal ownership would remove protection of any cultural resources under Federal law; however, by applying conditions and restrictive covenants on management and use after disposal, damage to previously undetected cultural resources could be mitigated.

Management actions and impacts associated with ROW development would be the same as Alternative 2.

Visual Resources

Impacts from Vegetative Communities Management Actions

Vegetative communities management actions and associated impacts would be the same as Alternative 2.

Impacts from Fish and Wildlife Habitat Management Actions

Fish and wildlife habitat management actions and associated impacts would be the same as Alternative 2.

Impacts from Minerals Management Actions

Since approximately 105 acres of vegetation removal and construction activities would result from the development of 20 oil and gas wells (as with Alternative 1), removal of vegetation and construction of wells and wellpads and introduction of other equipment would decrease visual quality. However, stipulations applied under this alternative could preclude oil and gas development thereby protecting visual resources on the 43,239 acres managed as NSO and in areas where development would be precluded (8,179 acres). Since no mineral-development activities would occur on the surface tracts, there would be no violations of VRM class objectives.

Impacts from Recreation and Travel Management Actions

Recreation and travel management actions and associated impacts to visual resources would be the same as Alternative 2.

Impacts from Lands and Realty Management Actions

Although the Coosa River, Fort Morgan Beach (Lots 13, 14, 24, 54, and 55), Fort Morgan Highway, Fowl River, Geneva, and Jordan Lake tracts would be available for disposal from Federal ownership, specified conditions on management and use after disposal to meet resource objectives would protect visual quality.

ROW management actions and associated impacts would be the same as Alternative 2.

Minerals

Impacts from Vegetative Communities Management Actions

Vegetative communities management actions would not restrict or preclude mineral development and exploration; therefore, impacts are not anticipated.

Impacts from Fish and Wildlife Habitat Management Actions

Fish and wildlife management actions would not restrict or preclude mineral development and exploration; therefore, impacts are not anticipated.

Impacts from Minerals Management Actions

Applying the lease stipulations and BMPs in Appendix D could restrict or preclude oil and gas development and exploration. Under this alternative, the NSO area around aquatic habitats identified in Alternative 2 would be reduced to 250 feet and the no-lease stipulation for Alabama beach mouse habitat would be NSO. Impacts would not be anticipated on approximately 144,895 acres open to leasing subject to standard lease terms and conditions. Managing approximately 117,506 acres as open to leasing subject to minor constraints and 43,239 acres as open to leasing subject to major constraints could increase development costs. Allowing for exceptions, waivers, and modifications to these stipulations could create opportunities for the discovery of new oil and gas resources.

Impacts to coal leasing and development would be the same as Alternative 1.

Impacts from Recreation and Travel Management Actions

Recreation and travel management actions would not restrict or preclude mineral development and exploration; therefore, impacts are not anticipated.

Impacts from Lands and Realty Management Actions

Lands and realty management actions would not restrict or preclude mineral development and exploration; therefore, impacts are not anticipated.

Recreation and Travel Management

Impacts from Vegetative Communities Management Actions

Vegetative communities management actions and associated impacts to recreation and travel would be the same as Alternative 2.

Impacts from Fish and Wildlife Habitat Management Actions

Fish and wildlife management actions and associated impacts to recreation and travel would be the same as Alternative 2.

Impacts from Minerals Management Actions

Since approximately 105 acres of vegetation removal and construction activities would result from the development of 20 oil and gas wells (as with Alternative 1), impacts would be the same as Alternative 1. Stipulations applied under this alternative could indirectly protect the recreational opportunities on the 43,239 acres managed as NSO and in areas where development would be precluded (8,179 acres) by eliminating associated ground disturbances, noise, and infrastructure.

Impacts from Recreation and Travel Management Actions

Recreation and travel management actions and associated impacts would be the same as Alternative 2.

Impacts from Lands and Realty Management Actions

Impacts from the transfer of Lots 73 and 74 of the Fort Morgan Beach tracts to the USFWS would be the same as Alternative 1. Although the Coosa River, Fort Morgan Beach (Lots 13, 14, 24, 54, and 55), Fort Morgan Highway, Fowl River, Geneva, and Jordan Lake tracts would be available for disposal from Federal ownership, specified conditions on management and use after disposal to meet resource objectives could protect recreational settings, although access could be reduced if not specifically included in the conditions for use or restrictive covenants.

ROW management actions and associated impacts would be the same as Alternative 2.

Lands and Realty

ROW management actions and associated impacts to lands and realty would be the same as Alternative 2. Under Alternative 3, the Coosa River and Fowl River tracts would be available for disposal under the condition that uses would be consistent with the resource management goals and objectives and allowable uses and management actions established under this alternative. This would allow opportunities for other Federal agency or non-Federal ownership but would restrict future use of the tracts. All of the Fort Morgan Beach (including Lots 73 and 74) and Fort Morgan Highway tracts would be available for transfer to the USFWS as part of the Bon Secour NWR. This would facilitate Federal management of the tracts but would not allow opportunities for other Federal agency or non-Federal ownership. The Geneva and Jordan Lake tracts would be available for disposal from Federal ownership, which would allow for opportunities for other Federal agency or non-Federal ownership without specified conditions on future use of the tracts.

Social and Economic

Impacts from Vegetative Communities Management Actions

Vegetative communities management actions and associated impacts to social and economic conditions would be the same as Alternative 2.

Impacts from Fish and Wildlife Habitat Management Actions

Impacts to social and economic conditions from fish and wildlife habitat management actions would be the same as impacts identified under Impacts from Vegetative Communities Management Actions.

Impacts from Minerals Management Actions

The same number of wells and acres of surface disturbance as Alternative 1 is anticipated under this alternative; however, this alternative places leasing stipulations to protect sensitive species and their habitats, including buffers for wetland and aquatic resources. Relative to Alternative 1, the exploration and development costs could increase while the availability for locations of wellpads could decrease, which would result in adverse impacts to the oil and gas industry. Since the number of wells anticipated is small relative to total wells in the area, there would be minimal social and economic changes, possibly slight increases in employment or income, as compared with the current situation. Oil and gas development and production can have implications for visual and scenic qualities as well as property values. These impacts are likely less than those under Alternative 1, as there are more conditions and constraints on wellpad locations under Alternative 3. Social indicators such as housing, education, and cost of living would not be anticipated to change under this alternative.

Under Alternative 3, impacts would be the same as Alternative 1 for coal development.

Impacts from Recreation and Travel Management Actions

Under Alternative 3, socioeconomic impacts would be the same as those identified under Alternative 2.

Impacts from Lands and Realty Management Actions

Under Alternative 3, Lots 73 and 74 of the Fort Morgan Beach tracts would be transferred to the USFWS and a number of dispersed BLM surface land tracts would be available for disposal from Federal ownership with specified conditions on management and use after disposal to meet prescribed resource objectives. Although development could be allowed on these properties, it would be limited or restricted to activities that are consistent with prescribed resource management objectives. Since the types of activities on these lands are not likely to considerably change, there would be minimal impact to social and economic conditions under this alternative.

Hazardous Materials

Impacts would be the same as Alternative 1.

4.2.4 Alternative 4

Air Quality

Under this alternative, there is a potential for wildfire which could lead to air emissions. Since all fires would be suppressed, these occurrences would be short term and localized and not be anticipated to individually deteriorate air quality conditions. Certain BLM-authorized activities within the planning area, such as oil and gas development, construction activities, vehicle travel, and mechanical hand tools or prescribed burning used in vegetation and wildlife habitat manipulation, would produce emissions considered to be GHGs, particularly CO_2. However, due to the anticipated dispersed and infrequent nature of these activities, the project emissions would not have any noticeable or measurable effect and, therefore, the total contribution of GHGs from authorized activities would be small as well. Other BLM activities may help offset any emissions and sequester carbon, such as maintaining vegetative and forested cover, which may help build organic carbon in soils and function as “carbon sinks”.

Impacts from Vegetative Communities Management Actions

No specific vegetative communities management actions are proposed under this alternative. Actions proposed under standard management common to all alternatives, which would allow vegetation manipulation to meet resources objectives, would not be anticipated to involve ground-disturbing activities of a severity or extent that would deteriorate air quality conditions. Prescribed burning conducted to meet vegetation resource objectives would be short term and localized and not be anticipated to individually deteriorate air quality conditions.

Impacts from Fish and Wildlife Habitat Management Actions

No specific fish and wildlife management actions are proposed under this alternative. Actions proposed under standard management common to all alternatives, which would provide habitat improvements and protections under State wildlife conservation strategies (including control of invasive plant species, use of prescribed fire, and wetland enhancements), would not be anticipated to involve ground-disturbing activities of a severity or extent that would deteriorate air quality conditions. Prescribed burning conducted to meet habitat objectives would be short term and localized and not be anticipated to individually deteriorate air quality conditions.

Impacts from Minerals Management Actions

Anticipated levels of oil and gas and coal development and associated air emissions would be the same as Alternative 1.

Impacts from Recreation and Travel Management Actions

Although surface tracts would be closed or limited to motorized use under this alternative, the level of activity contributing to emissions would not change compared to Alternative 1 since these tracts are not used extensively for recreation or travel.

Impacts from Lands and Realty Management Actions

Since the Coosa River, Fort Morgan Beach, Fowl River, and Geneva tracts (a total of 114 acres or 71 percent of BLM surface ownership in Alabama) would be managed as ROW avoidance areas, there would be less potential for emissions associated with the use of trucks and heavy equipment (bulldozers, etc.) for

ROW development compared to Alternative 1. Impacts from potential ROW development on the Jordan Lake and Fort Morgan Highway tracts would be the same as Alternative 1.

Soil Resources

Impacts from Vegetative Communities Management Actions

No specific vegetative communities management actions are proposed under this alternative. Actions proposed under standard management common to all alternatives, which would allow vegetation manipulation to meet resources objectives, would not be anticipated to involve ground-disturbing activities of a severity or extent that would result in disturbance or loss of soils.

Impacts from Fish and Wildlife Habitat Management Actions

No specific fish and wildlife management actions are proposed under this alternative. Actions proposed under standard management common to all alternatives, which would provide habitat improvements and protections under State wildlife conservation strategies (including control of invasive plant species, use of prescribed fire, and wetland enhancements), would not be anticipated to involve ground-disturbing activities of a severity or extent that would result in disturbance or loss of soils.

Impacts from Minerals Management Actions

Impacts to soil resources from minerals management, including oil and gas and coal development, would be the same as Alternative 3.

Impacts from Recreation and Travel Management Actions

Although surface tracts would be closed or limited to motorized use under this alternative, the level of activity that could impact soil resources would not be anticipated to change compared to Alternative 1 since these tracts are not used extensively for recreation or travel.

Impacts from Lands and Realty Management Actions

Disposing the tracts from Federal ownership with no restrictive covenants could increase chances for subsequent development and associated impacts to soil resources. This could result in impacts to soils from vegetation-clearing activities and construction ground disturbance, which could increase surface runoff and erosion. The effects from ground disturbance during construction, vegetation treatments, or habitat improvements would be short term. If permanent roads or structures are constructed on the tracts, the effects would be long term but localized.

ROW management actions and associated impacts to soil resources would be the same as Alternative 2.

Water Resources

Impacts from Vegetative Communities Management Actions

No specific vegetative communities management actions are proposed under this alternative. Actions proposed under standard management common to all alternatives, which would allow vegetation manipulation to meet resources objectives, would not be anticipated to involve ground-disturbing activities of a severity or extent that would result in impacts to water quality.

Impacts from Fish and Wildlife Habitat Management Actions

No specific fish and wildlife management actions are proposed under this alternative. Actions proposed under standard management common to all alternatives, which would provide habitat improvements and protections under State wildlife conservation strategies (including control of invasive plant species, use of prescribed fire, and wetland enhancements), would not be anticipated to involve ground-disturbing activities of a severity or extent that would result in impacts to water quality.

Impacts from Minerals Management Actions

Impacts to water resources from minerals management, including oil and gas and coal development, would be the same as Alternative 3.

Impacts from Recreation and Travel Management Actions

Although surface tracts would be closed or limited to motorized use under this alternative, the level of activity that could impact water resources would not be anticipated to change compared to Alternative 1 since these tracts are not used extensively for recreation or travel.

Impacts from Lands and Realty Management Actions

Disposing the tracts from Federal ownership with no restrictive covenants could increase chances for subsequent development and associated impacts to water resources, as described under the Soil Resources section.

ROW management actions and associated impacts to water resources would be the same as Alternative 2.

Vegetative Communities

Impacts from Vegetative Communities Management Actions

No specific vegetative communities management actions are proposed in this alternative. Under standard management common to all alternatives, allowing vegetation manipulation to meet resources objectives would be allowed; however, lack of specific areas and species being managed could increase the potential for exotic, invasive species to become established or spread on the BLM surface tracts. Chinese privet is likely to continue to spread on the Coosa River tracts, and the Fort Morgan Highway tracts are vulnerable to both cogon grass and Chinese tallow. Cogon grass in particular, once established, would displace native herbaceous plant species and ultimately could reduce some shrub and tree components by increasing the frequency of wildfires and crowding out seedlings.

Impacts from Fish and Wildlife Habitat Management Actions

No specific fish and wildlife habitat management actions are proposed in this alternative. Under standard management common to all alternatives, providing habitat improvements and protections under State wildlife conservation strategies (including control of invasive plant species, use of prescribed fire, and wetland enhancements), would be allowed; however, lack of specific areas and species being managed could result in the same impacts discussed under Impacts from Vegetative Communities Management Actions.

Impacts from Minerals Management Actions

Impacts from minerals management, including oil and gas and coal development, would be the same as Alternative 3.

Impacts from Recreation and Travel Management Actions

Recreation and travel management actions and associated impacts would be the same as Alternative 2.

Impacts from Lands and Realty Management Actions

Following disposal, it is assumed that the Fort Morgan and Fowl River tracts would be developed for residential or recreational use and that recreational facilities would be constructed on the Coosa River and Jordan Lake tracts. It is expected that there would be some short-term and long-term loss of vegetation at all of these sites depending on the extent of the development as a result of vegetation removal, conversion to development, and introduction of invasive species. No impacts to vegetation are anticipated at the Geneva County tract as changes of use are not anticipated.

Fish and Wildlife

Impacts from Vegetative Communities Management Actions

No vegetative communities management actions are proposed in this alternative. Under standard management common to all alternatives, allowing vegetation manipulation to meet resources objectives would be allowed; however, lack of specific areas and species being managed could result in habitat degradation on any of the BLM surface tracts. The maritime forests, scrubs, and flatwoods on the Fort Morgan Highway tracts are particularly vulnerable to cogon grass and Chinese tallow.

Impacts from Fish and Wildlife Habitat Management Actions

No specific fish and wildlife habitat management actions are proposed in this alternative. Under standard management common to all alternatives, providing habitat improvements and protections under State wildlife conservation strategies (including control of invasive plant species, use of prescribed fire, and wetland enhancements), would be allowed; however, lack of specific areas and species being managed could result in the same impacts discussed under Impacts from Vegetative Communities Management Actions.

Impacts from Minerals Management Actions

Impacts from minerals management, including oil and gas and coal development, would be the same as Alternative 3.

Impacts from Recreation and Travel Management Actions

Recreation and travel management actions and associated impacts would be the same as Alternative 2.

Impacts from Lands and Realty Management Actions

Impacts from ROW actions would be the same as Alternative 2. After transfer to private ownership, the Fort Morgan and Fowl River tracts are expected to be developed for residential and recreational use. At Fort Morgan, private development of the beach tracts could result in the loss of up to 28.7 acres of habitat for nesting and wintering shorebirds. Additional development of the Fort Morgan Highway tracts could

result in the loss of up to 41.28 acres of maritime forest, scrub, and wetland habitats. These tracts are part of a narrow band of habitat that provides crucial refuge for migrating songbirds as well as resident wading birds, songbirds, and a wide variety of reptiles and amphibians, including alligators and up to eight native frog species.

Development of the Fowl River tract would likely result in the loss of wetland habitats and increased public use that would exclude more secretive wildlife, including many species of wading birds. Recreational development of the Jordon Lake and Coosa River tracts is not expected to alter species diversity or patterns of use at those tracts since the Jordan Lake tract is already developed for recreation and the Coosa River tracts are generally inaccessible islands.

Special Status Species

Impacts from Vegetative Communities Management Actions

No specific vegetative communities management actions are proposed in this alternative. Under standard management common to all alternatives, allowing vegetation manipulation to meet resources objectives would be allowed; however, lack of specific areas and species being managed could increase the potential for exotic, invasive species to become established or spread on the BLM surface tracts. Cogon grass at the Fort Morgan Highway tracts, in particular, has the potential to alter Alabama beach mouse critical habitat as it forms dense stands displacing native herbaceous plants and potentially increasing fire frequency and intensity.

Under this alternative, the BLM would not actively promote the restoration of coastal dunes through plantings/sand fence installation projects following damage by major storm events. These dune restoration projects promote sand deposition and facilitate the return of habitat conditions suitable for Alabama beach mouse. Without these projects, it is likely to take longer for sand to accumulate and for dune vegetation to become reestablished, postponing the reestablishment of Alabama beach mouse populations after catastrophic events.

Impacts from Fish and Wildlife Habitat Management Actions

No specific fish and wildlife habitat management actions are proposed in this alternative. Under standard management common to all alternatives, providing habitat improvements and protections under State wildlife conservation strategies (including control of invasive plant species, use of prescribed fire, and wetland enhancements), would be allowed; however, lack of specific areas and species being managed could result in the same impacts discussed under Impacts from Vegetative Communities Management Actions.

Impacts from Minerals Management Actions

Impacts from minerals management, including oil and gas and coal development, would be the same as Alternative 3.

Impacts from Recreation and Travel Management Actions

Recreation and travel management actions and associated impacts would be the same as Alternative 2.

Impacts from Lands and Realty Management Actions

The transfer of the BLM surface tracts to private ownership is likely to result in loss of habitat for the Alabama beach mouse, piping plover, snowy plover, and bald eagle, as well as potential habitat for

Alabama red-belly turtle. Any development of the Fort Morgan Beach tracts would result in the direct loss of occupied critical habitat for the Alabama beach mouse. Development of the highway tracts are likely to result in the loss of important scrub habitats designated as critical habitat. Because the Fort Morgan Beach and Highway tracts are designated critical habitat, USFWS would have to authorize a taking permit through the Section 7 process of the Endangered Species Act before such transfers could be approved.

Recreational development of the Coosa River tracts could result in abandonment of the existing bald eagle nest and exclude future nesting, depending on the location of facilities and intensity of public use. No impacts to special status species are expected as a result of anticipated development on the Fowl River, Jordon Lake, or Geneva County tracts. At Fowl River, it is unlikely that any future development of the site would substantially alter the wetland characteristics of the site and render it unsuitable for Alabama red-belly turtle. The Jordon Lake tract does not support any known populations of special status species. No development is expected to occur on the Geneva County tract, which is adjacent to critical habitat for the Gulf sturgeon.

Wildland Fire Ecology and Management

Impacts from suppressing all wildland fires and allowing prescribed burning on a case-by-case basis would be the same as Alternative 1.

Impacts from Vegetative Communities Management Actions

Although no specific vegetative communities actions are proposed, allowing vegetation manipulation to meet resources objectives under standard management common to all alternatives would serve to decrease vegetation density and cover (fuel load) and maintain natural fuel conditions across the surface tracts. This would maintain natural disturbance regimes which would be easier to manage through prescribed fire or other treatments. This would also decrease the frequency and intensity of wildland fires and allow fires to be more easily controlled, better protecting life, public safety, and property and resource values. However, lack of specific areas and species being managed could result in invasions and fuel accumulations that would increase the frequency and intensity of wildland fires.

Impacts from Fish and Wildlife Habitat Management Actions

No specific fish and wildlife habitat management actions are proposed under this alternative; therefore, no impacts would be anticipated. Under standard management common to all alternatives, providing habitat improvements and protections under State wildlife conservation strategies (including control of invasive plant species, use of prescribed fire, and wetland enhancements), would result in impacts similar to those discussed under Impacts from Vegetative Communities Management Actions.

Impacts from Minerals Management Actions

Minerals management actions and associated impacts to wildland fire ecology and management would be the same as Alternative 3.

Impacts from Recreation and Travel Management Actions

Impacts to wildland fire ecology and management from recreation and travel management actions would be the same as Alternative 2 because travel designations would be the same for this alternative.

Impacts from Lands and Realty Management Actions

ROW management actions and associated impacts would be the same as Alternative 2.

Cultural Resources

Impacts from cultural resources management and wildland fire management actions would be the same as Alternative 1.

Impacts from Vegetative Communities Management Actions

No specific vegetative communities management actions are proposed under this alternative. Actions proposed under standard management common to all alternatives, which would allow vegetation manipulation to meet resources objectives, would require cultural resource clearances before activity were to occur; therefore, impacts would not be anticipated.

Impacts from Fish and Wildlife Habitat Management Actions

No specific fish and wildlife management actions are proposed under this alternative. Actions proposed under standard management common to all alternatives, which would provide habitat improvements and protections under State wildlife conservation strategies (including control of invasive plant species, use of prescribed fire, and wetland enhancements), would require cultural resource clearances before activity were to occur; therefore, impacts would not be anticipated.

Impacts from Minerals Management Actions

Impacts to cultural resources from minerals management, including oil and gas and coal development, would be the same as Alternative 3.

Impacts from Recreation and Travel Management Actions

Although surface tracts would be closed or limited to motorized use under this alternative, the level of activity and associated potential impacts to cultural resources would not be anticipated to change compared to Alternative 1 since these tracts are not used extensively for recreation or travel.

Impacts from Lands and Realty Management Actions

Making the Coosa River, Fort Morgan Beach (Lots 13, 14, 24, 54, and 55), Fort Morgan Highway, Fowl River, Geneva, and Jordan Lake tracts available for disposal could result in the removal of cultural properties from Federal ownership and the associated protection by laws, regulations, and policies. Before any transfer of management responsibilities or ownership, an appropriate level of cultural resource survey and consultation with the SHPO under NHPA Section 106 regulations would need to be conducted. Disposing the property from Federal ownership would remove protection of any cultural resources under Federal law. Disposing the tracts without any specified management or use would increase the potential for damage or loss of previously undetected cultural resources after the transfer.

Management actions and impacts associated with ROW development would be the same as Alternative 2.

Visual Resources

Impacts from Vegetative Communities Management Actions

No specific vegetative communities management actions are proposed under this alternative. Actions proposed under standard management common to all alternatives, which would allow vegetation manipulation to meet resources objectives, would not be anticipated to involve ground-disturbing activities of a severity or extent that would result in impacts to visual quality. Although visual quality would deteriorate in the short term, visual quality would improve in the long term once vegetation has reestablished to meet VRM class objectives.

Impacts from Fish and Wildlife Habitat Management Actions

No specific fish and wildlife management actions are proposed under this alternative. Actions proposed under standard management common to all alternatives, which would provide habitat improvements and protections under State wildlife conservation strategies, including control of invasive plant species, use of prescribed fire, and wetland enhancements, would not be anticipated to involve ground-disturbing activities of a severity or extent that would result in impacts to visual quality. Although visual quality would deteriorate in the short term, visual quality would improve in the long term once vegetation has reestablished to meet VRM class objectives.

Impacts from Minerals Management Actions

Minerals management, including oil and gas and coal development, and associated impacts to visual resources would be the same as Alternative 3.

Impacts from Recreation and Travel Management Actions

Recreation and travel management actions and associated impacts to visual resources would be the same as Alternative 2.

Impacts from Lands and Realty Management Actions

Making the Coosa River, Fort Morgan Beach (Lots 13, 14, 24, 54, and 55), Fort Morgan Highway, Fowl River, Geneva, and Jordan Lake tracts available for disposal from Federal ownership without conditions could result in changes to existing natural or manmade landforms, which would diminish visual quality if the use were to dominate the view of the casual observer. Following disposal, private development actions could create visually intrusive development.

ROW management actions and associated impacts would be the same as Alternative 2.

Minerals

Impacts from Vegetative Communities Management Actions

Vegetative communities management actions would not restrict or preclude mineral development and exploration; therefore, impacts are not anticipated.

Impacts from Fish and Wildlife Habitat Management Actions

Fish and wildlife management actions would not restrict or preclude mineral development and exploration; therefore, impacts are not anticipated.

Impacts from Minerals Management Actions

Mineral management actions for oil and gas and coal and associated impacts would be the same as Alternative 3.

Impacts from Recreation and Travel Management Actions

Recreation and travel management actions would not restrict or preclude mineral development and exploration; therefore, impacts are not anticipated.

Impacts from Lands and Realty Management Actions

Lands and realty management actions would not restrict or preclude mineral development and exploration; therefore, impacts are not anticipated.

Recreation and Travel Management

Impacts from Vegetative Communities Management Actions

No specific vegetative communities management actions are proposed under this alternative. Actions proposed under standard management common to all alternatives, which would allow vegetation manipulation to meet resources objectives, would not be anticipated to involve ground-disturbing activities of a severity or extent that would result in impacts to recreation.

Impacts from Fish and Wildlife Habitat Management Actions

No specific fish and wildlife habitat management actions are proposed under this alternative. Actions proposed under standard management common to all alternatives, which would provide habitat improvements and protections under State wildlife conservation strategies (including control of invasive plant species, use of prescribed fire, and wetland enhancements), would not be anticipated to involve ground-disturbing activities of a severity or extent that would result in impacts to recreation.

Impacts from Minerals Management Actions

Minerals management actions and associated impacts to recreation and travel would be the same as Alternative 3.

Impacts from Recreation and Travel Management Actions

Recreation and travel management actions and associated impacts would be the same as Alternative 2.

Impacts from Lands and Realty Management Actions

Impacts from the transfer of Lots 73 and 74 of the Fort Morgan Beach tracts to the USFWS would be the same as Alternative 1. Making the Coosa River, Fort Morgan Beach (Lots 13, 14, 24, 54, and 55), Fort Morgan Highway, Fowl River, Geneva, and Jordan Lake tracts available for disposal from Federal ownership without conditions could result in reduced access for recreation and travel opportunities. Following disposal, tracts could be made unavailable for public recreation and inaccessible to travel.

ROW management actions and associated impacts would be the same as Alternative 2.

Lands and Realty

ROW management actions and associated impacts to lands and realty would be the same as Alternative 2. Transferring Lots 73 and 74 of the Fort Morgan Beach tracts to the USFWS as part of the Bon Secour NWR would facilitate Federal management of the lots. Under Alternative 4, the Coosa River, Fort Morgan Beach, Fort Morgan Highway, and Fowl River tracts would be available for disposal from Federal ownership with no restrictive covenants. This would allow for opportunities for other Federal agency or non-Federal ownership without specified conditions on future use of the tracts; however, disposal would not be allowed if it would jeopardize Federally listed species or designated critical habitat, which could limit some disposals. The Geneva and Jordan Lake tracts would be available for disposal from Federal ownership, which would allow for opportunities for other Federal agency or non-Federal ownership without specified conditions on future use of the tracts.

Social and Economic

Impacts from Vegetative Communities Management Actions

Impacts to social and economic conditions would not be anticipated from vegetative communities management actions since no actions are proposed under this alternative. Standard management actions common to all alternatives, which would allow vegetation manipulation to meet resource objectives, would not be anticipated to be of an extent that would result in impacts to economic or social conditions.

Impacts from Fish and Wildlife Habitat Management Actions

Impacts to social and economic conditions would not be anticipated from fish and wildlife habitat management actions since no actions are anticipated. Standard management actions common to all alternatives, which would provide habitat improvements and protections under State wildlife conservation strategies (including control of invasive plant species, use of prescribed fire, and wetland enhancements), would not be anticipated to be of a severity or extent that would result in impacts to economic or social conditions.

Impacts from Minerals Management Actions

Minerals management actions, including oil and gas and coal development, and associated impacts to social and economic conditions would be the same as Alternative 3.

Impacts from Recreation and Travel Management Actions

Under Alternative 4, socioeconomic impacts would be the same as those identified under Alternative 2.

Impacts from Lands and Realty Management Actions

Under Alternative 4, Lots 73 and 74 of the Fort Morgan Beach tracts would be transferred to the USFWS and a number of dispersed BLM surface land tracts would be available for disposal from Federal ownership without conditions on management and use after disposal. This could result in reduced access for recreational activities on these lands and changes to the existing natural landscape. Additionally, private recreational or residential development could impact visual resources, habitat quality, and wildlife populations. Since development could be allowed on these properties, it is possible that the property tax revenues to the local counties would increase more than the Federal Payments in Lieu of Taxes, economically benefiting the counties and the State. It is possible that the private development of these tracts could slightly increase employment and income in these areas. Social indicators, such as housing, education, and cost of living are not expected to be influenced by the minimal development.

Hazardous Materials

Impacts would be the same as Alternative 1.

4.3 DIRECT AND INDIRECT IMPACTS FROM BLM MANAGEMENT ACTIONS IN MISSISSIPPI

This section discusses the potential impacts anticipated from implementation of the management actions under each alternative for the Hancock County tract in Mississippi and for non-USFS FMO on about 517,934 acres in 79 Mississippi counties. Impacts from the allowable uses and management actions proposed for the Hancock County tract are analyzed if the R&PP patent held by the University of Mississippi were to revert to the BLM.

This section is organized by alternative, then by resource. Under each resource, each management action is discussed, including vegetative communities, fish and wildlife habitat, minerals, recreation and travel, and lands and realty. A discussion of cumulative impacts for each resource is contained in Section 4.4.2.

4.3.1 Alternative 1 (No Action)

Air Quality

Under this alternative, there is a potential for wildfire which could lead to air emissions. Since all fires would be suppressed, these occurrences would be short term and localized and not be anticipated to individually deteriorate air quality conditions. Certain BLM-authorized activities within the planning area, such as oil and gas development, construction activities, vehicle travel, and mechanical hand tools or prescribed burning used in vegetation and wildlife habitat manipulation, would produce emissions considered to be GHGs, particularly CO_2. However, due to the anticipated dispersed and infrequent nature of these activities, the project emissions would not have any noticeable or measurable effect and, therefore, the total contribution of GHGs from authorized activities would be small as well. Other BLM activities may help offset any emissions and sequester carbon, such as maintaining vegetative and forested cover, which may help build organic carbon in soils and function as “carbon sinks”.

Impacts from Vegetative Communities Management Actions

No specific vegetative communities management actions are proposed under this alternative. Actions proposed under standard management common to all alternatives, which would allow vegetation manipulation to meet resources objectives, would not be anticipated to involve ground-disturbing activities of a severity or extent that would deteriorate air quality conditions. Prescribed burning conducted to meet vegetation resource objectives would be short term and localized and not be anticipated to individually deteriorate air quality conditions.

Impacts from Fish and Wildlife Habitat Management Actions

No specific fish and wildlife management actions are proposed under this alternative. Actions proposed under standard management common to all alternatives, which would provide habitat improvements and protections under State wildlife conservation strategies (including control of invasive plant species, use of prescribed fire, and wetland enhancements), would not be anticipated to involve ground-disturbing activities of a severity or extent that would deteriorate air quality conditions. Prescribed burning conducted to meet habitat objectives would be short term and localized and not be anticipated to individually deteriorate air quality conditions.

Impacts from Minerals Management Actions

Combustion processes, construction activities, and vehicle travel associated with potential oil and gas development produce air emissions. Estimated emissions from the development of 10 wells over the next 20 years on BLM-administered, non-USFS FMO would produce considerably less emissions than the total planned oil and gas developments in the State (presented in Table 4-4). Those emissions would likely occur over a dispersed geographic area and would not cause any noticeable or measurable effect.

Potential oil and gas leasing on BLM-administered, non-USFS FMO is in close proximity to the Sipsey Wilderness Area in Alabama and the Breton NWR in Louisiana. These emissions could potentially deteriorate wilderness air quality values and ambient air quality attainment. Since emissions would be dispersed over a large geographic area, air quality impacts would not be anticipated.

Table 4-4. Maximum Potential Oil and Gas Air Emissions for BLM and Non-BLM Activities in Mississippi (tons per year)[1, 2]

Well Locations	Emission Type/Pollutant				
	NO_x	SO_2	PM_{10}	CO	VOC
BLM-administered, non-USFS FMO Estate in Mississippi	27.5	0.3	7.8	32.9	27.5
Other Mineral Estate Across Mississippi	33,028	360	9,368	39,513	33,028

1. Using conservative assumptions typical of liquid mineral wells on BLM land.
2. Assumption that all wells are conventional natural gas wells (BLM 2005a).

Impacts from Recreation and Travel Management Actions

Short-term, localized increases in dust and emissions could potentially occur from recreation activities and motorized travel. Given the small amount and marsh nature of the Hancock County tract, these activities would not be anticipated to individually deteriorate air quality conditions.

Impacts from Lands and Realty Management Actions

Short-term, localized increases in dust and emissions would occur from use of trucks and heavy equipment (bulldozers, etc.) in ROW development. These actions would be conducted in accordance with the Mississippi SIP and local dust control regulations and, given the small amount and marsh nature of the Hancock County tract, would not be anticipated to individually deteriorate air quality conditions or violate air quality standards or regulations.

Soil Resources

Impacts from Vegetative Communities Management Actions

No specific vegetative communities management actions are proposed under this alternative. Actions proposed under standard management common to all alternatives, which would allow vegetation manipulation to meet resources objectives, would not be anticipated to involve ground-disturbing activities of a severity or extent that would result in disturbance or loss of soils.

Impacts from Fish and Wildlife Habitat Management Actions

No specific fish and wildlife habitat management actions are proposed under this alternative; therefore, there would be no impacts to soil resources. Under standard management common to all alternatives, providing habitat improvements and protections under State wildlife conservation strategies, including control of invasive plant species, use of prescribed fire, and wetland enhancements, would not be anticipated to involve ground-disturbing activities of a severity or extent that would result in disturbance or loss of soils.

Impacts from Minerals Management Actions

Mineral exploration, development, and operations on non-USFS FMO would include ground-disturbing and potential contaminant-introducing activities that could impact soils. Oil and gas development operations—specifically, construction of drilling pads, reserve pits, and access roads—would disturb topsoils and alter surface soil characteristics, which could result in both a slight decline in soil productivity and an increase in surface runoff. Increases in erosion and loss of soils due to oil and gas development are a factor of wellpad design, slope, erodibility of the soils, proximity of the disturbance, and the intervening vegetation. The potential for erosion increases with prolonged or heavy rains that are typical in this area. Cut and fill slopes are particularly vulnerable before protective plant covers have been established.

Except for 63,004 acres closed to leasing by other surface management agencies, non-USFS FMO would be open to leasing subject to standard lease terms and conditions (454,930 acres). The estimated 10 wells to be developed on non-USFS FMO in Mississippi over the next 20 years would disturb approximately 55 acres. Both Federal and State laws would require the reclamation of mined lands concurrently with mining operations; therefore, the required reclamation and the minimal surface that might be disturbed would result in only localized effects on soils. Operation of the oil and gas wells could also affect the surrounding soils by potential contamination from accidental spills or improper management of hazardous materials or waste. Federal, State, and local regulations would require site characterization and corrective action that would restore soil integrity and productivity.

In a few locations, there are prime or unique farmlands on non-Forest Service FMO. Though not likely, it is possible that some of the 105 acres of soil disturbance could be on prime or unique farmland. In the event development is proposed in such an area, the BLM would implement appropriate mitigation measures to avoid or minimize impacts as described in Section 2.3.3.

Impacts from Recreation and Travel Management Actions

Allowing recreation activities, including motorized vehicle use on the Hancock County tract, could result in short-term and site-specific increases in erosion; however, given the limited interest in recreation and travel on the tract, any potential effects would be minor and localized.

Impacts from Lands and Realty Management Actions

If new ROW construction were to occur, soils could be impacted by vegetation-clearing activities and ground disturbance. Wind and water erosion and subsequent loss in soil productivity would occur in disturbed areas where revegetation does not occur. These effects would be localized and short term in areas where revegetation is enhanced or permitted. The effect would be long term but localized if roads or structures were constructed on the tracts.

Water Resources

Impacts from Vegetative Communities Management Actions

No specific vegetative communities management actions are proposed under this alternative. Actions proposed under standard management common to all alternatives, which would allow vegetation manipulation to meet resources objectives, would not be anticipated to involve ground-disturbing activities of a severity or extent that would result in impacts to water quality.

Impacts from Fish and Wildlife Habitat Management Actions

No specific fish and wildlife management actions are proposed under this alternative. Actions proposed under standard management common to all alternatives, which would provide habitat improvements and protections under State wildlife conservation strategies (including control of invasive plant species, use of prescribed fire, and wetland enhancements), would not be anticipated to involve ground-disturbing activities of a severity or extent that would result in impacts to water quality.

Impacts from Minerals Management Actions

Except for 63,004 acres closed to leasing by other surface management agencies, non-USFS FMO would be open to leasing subject to standard lease terms and conditions (454,930 acres). The estimated development of 10 wells on non-USFS FMO in Mississippi over the next 20 years would disturb approximately 55 acres. Increases in sedimentation to streams and wetlands by oil and gas development are a factor of wellpad design, slope, erodibility of the soils, proximity of the disturbance, and the vegetation composition. The potential for sedimentation increases with prolonged or heavy rains that are typical in this area. Sediments deposited in intermittent drainages during construction can be transported downstream during periods of high water, increasing turbidity in higher order streams and potentially affecting water quality substantial distances from the construction site. Both Federal and State laws would require the reclamation of mined lands concurrently with mining operations; therefore, the required reclamation and the minimal surface that might be disturbed would result in only localized effects on water resources.

Mineral exploration, development, and operations would include ground-disturbing activities that increase surface runoff, which increases nutrient levels and turbidity and decreases water quality. These activities could also introduce hazardous waste or result in accidental spills that could also deteriorate surface water quality. Leakage of drill fluids, hazardous waste spills, or leakage from reserve pits could be introduced into the ground water as well. Although Federal, State, and local regulations would require site characterization and corrective action for hazardous waste and spills, impacts to the water quality could be localized but long term, especially affecting nonflowing water bodies (e.g., small ponds or wetlands) and ground water resources. Additionally, access roads and wellpads could alter the local hydrology, reducing surface flow to mesic areas and diverting or degrading surface water. Installation of culverts and diverting existing drainages around wellpads help to maintain existing hydrologic systems, but the disturbance causes local sedimentation and could retard sheet flow.

Impacts from Recreation and Travel Management Actions

Managing the surface tracts as open to recreation and motorized vehicle use could result in short-term and site-specific increases in erosion and surface runoff, which increases nutrient levels and turbidity and decreases water quality; however, given the limited interest in recreation and travel on the Hancock County tract, any potential effects would be minor and localized.

Impacts from Lands and Realty Management Actions

If new ROW construction were to occur on the Hancock County tract, vegetation-clearing activities and construction ground disturbance could increase soil erosion and surface runoff, which increase nutrient levels and turbidity and decrease water quality. Impacts would be short term in areas where revegetation was enhanced or permitted. The effect would be long term but localized if roads or structures were constructed on the tracts. The hydric soils associated with the wetlands that encompass most of the tract could be affected by development or construction activities that would dredge or fill the wetlands, compacting soils and hindering natural flow through the wetlands and potentially resulting in the loss of these emergent wetlands.

Vegetative Communities

Impacts from Vegetative Communities Management Actions

No specific vegetative communities management actions are proposed in this alternative. Under standard management common to all alternatives, allowing vegetation manipulation to meet resources objectives would be allowed; however, lack of specific areas and species being managed could result in increased potential for invasive/exotic species becoming established or spreading. This is particularly true of the higher elevations of the Hancock County tract located on Point Clear Island. Cogon grass and Chinese tallow are both known to occur in the area and, if uncontrolled, could substantially alter these maritime habitats by displacing native species and increasing the susceptibility to wildfire.

Impacts from Fish and Wildlife Habitat Management Actions

No specific fish and wildlife habitat management actions are proposed in this alternative. Under standard management common to all alternatives, providing habitat improvements and protections under State wildlife conservation strategies, including control of invasive plant species, use of prescribed fire, and wetland enhancements, would be allowed; however, lack of specific areas and species being managed could result in the same impacts discussed under Impacts from Vegetative Communities Management Actions.

Impacts from Minerals Management Actions

Oil and gas development is expected to disturb 55 acres of vegetation under this alternative. The effect this disturbance would have on vegetation would be dependent on the location and design of wellpads, roads, and production facilities. In recent years, most wells on non-USFS FMO have been located in the Maxie Field in Forrest County. Typically, the vegetation most likely to be affected in this area is pine plantations or commercial pine forests, often loblolly pine. Understory species vary depending on how the stand has been managed. Once young pine plantations shade out “old field growth” at about 10 to 15 years of age, the midstory and ground cover are generally very limited. After thinning, shrubs and young hardwoods become established. Use of prescribed fire in these stands favors an increase in grasses and native forbs.

During a routine wellpad installation, saleable timber would be removed from the site if the stand is commercially viable, but it is otherwise cut and left onsite. Vegetation debris piles are stored along the edges of the construction site and may be buried onsite, burned, or left in place after drilling operations are completed. Vegetation debris is not permitted in the reserve pit, as it can disrupt any future monitoring of the pit contents.

During interim reclamation, the reserve pit area is graded and the surface fertilized, seeded, and mulched. Although the operators are encouraged to use native seed, the final mix and tree planting are approved by

the private landowner or surface managing agency. The BLM, by policy, excludes invasive species, although non-native grasses, particularly annual rye (during the winter months) and Bahia or Bermuda grass (during the summer months) are often used to provide a quick cover for disturbed soils. These sites typically progress through "old field" stage as opportunistic pioneer plant species become established. Within a few years, young sapling pine and hardwoods become established. Faster growing pines generally dominate the site for several decades. Outside of the pine belt, pines would gradually be overtaken by longer lived hardwoods. In areas where mature hardwood forests are removed, it may take 100 years or more to reestablish hardwood forests with similar structure and even longer before species diversity returns to near pre-disturbance levels.

Surface-disturbing activities have the potential to introduce or promote the spread of invasive, exotic plant species. Impacts are dependent on the species planted during restoration activities and the management of the site during and following restoration. Cogon grass is a particular concern because it is very difficult to control and because of its ability to degrade native plant communities and commercial forests. Cogon grass displaces native species and can crowd out pine seedlings and increase susceptibility to wildfire. Including native species in the mix increases diversity and provides a more natural structure. If these areas are mowed following abandonment, these non-native grasses are expected to persist and dominate the site. If, however, the sites are replanted in pine or left unmowed, the areas would progress through old field-type growth, which is dominated by opportunistic native and non-native species alike. Ultimately, both Bahia and Bermuda grass are expected to become shaded out as a tree or heavy shrub layer becomes established. Japanese honeysuckle and Chinese privet can both persist in shaded situations.

Throughout the State, some plant communities, embedded in the larger forested landscape, are particularly sensitive to disruption and are difficult to restore after surface-disturbing activities. Many of these are restricted to a narrow range of soil types, such as glades and prairies; others are sensitive to changes in hydrography, such as bogs, forested wetlands, and seepage slope communities. Construction activities in or near these plant communities can alter the site sufficiently to preclude the reestablishment of these communities in the foreseeable future. Also, because of the limited acreage of these vegetation communities, loss of even the small acreages from BLM-permitted oil and gas activities has a disproportionate effect on the plant diversity in an area.

Impacts from Recreation and Travel Management Actions

The Hancock County tract would be open to recreation. Although the Hancock County tract is accessible only by boat, the site would remain open for vehicle use. In the unlikely event that four-wheelers were transported to Point Clear Island, substantial damage could be done on this sensitive barrier island in a very short time. Repetitive use on these sandy soils would damage herbaceous growth and young shrubs and could introduce or promote the spread of exotic plants, particularly Chinese tallow and cogon grass. Repetitive use on Point Clear would substantially degrade the maritime forest, a critically imperiled plant community in Mississippi.

Impacts from Lands and Realty Management Actions

The Hancock County tract would remain open to ROW applications. Any ROW development could damage sensitive maritime forests and scrubs through ground disturbance, vegetation removal, and introduction of invasive species.

Fish and Wildlife

Impacts from Vegetative Communities Management Actions

No specific vegetative communities management actions are proposed in this alternative. Under standard management common to all alternatives, allowing vegetation manipulation to meet resources objectives would be allowed; however, lack of specific areas and species being managed could degrade habitats for migratory birds and other wildlife on Point Clear Island by displacing native vegetation and increasing susceptibility to wildfire.

Impacts from Fish and Wildlife Habitat Management Actions

No specific fish and wildlife habitat management actions are proposed in this alternative. Under standard management common to all alternatives, providing habitat improvements and protections under State wildlife conservation strategies, including control of invasive plant species, use of prescribed fire, and wetland enhancements, would be allowed; however, lack of specific areas and species being managed could result in the same impacts discussed under Impacts from Vegetative Communities Management Actions.

Impacts from Minerals Management Actions

Oil and gas development on non-USFS FMO is expected to result in the loss of 55 acres of habitat. The effect on general wildlife resources is dependent on the wellpad location, design, and need for additional access roads. Impacts would include the direct loss of habitat from the construction of drilling pads, production facilities, pipelines and roads, and from degradation of nearby aquatic or wetland habitats through sedimentation or changes in hydrology. These impacts could occur anywhere on non-USFS FMO in the State, but have in the past occurred primarily in Forrest County. Impacts to many wildlife species from oil and gas development are localized and temporary. Most common game species and other mobile wildlife species avoid the wellpad areas during construction. Less mobile species are directly impacted, and during the spring and early summer this can include nesting neotropical birds. Habitat generalists, including most game species, tend to return to surrounding habitats after the well is completed and construction activities have ceased. However, construction in high-value habitats or in areas with more narrowly adapted wildlife species can alter the overall species diversity. Wells and roads in areas of contiguous forests increase habitat fragmentation, reducing the suitability of the area for interior nesting birds and making nests more susceptible to predation and parasitism. Older growth forests, which provide habitat for interior forest nesting birds and a wider diversity of amphibians and reptiles, are often located in riparian/wetland zones. These areas have been set aside as buffers during logging operations or in steeper, less accessible slopes.

Oil and gas drilling continues for 24 hours a day until the well is completed; during this time, most wildlife, including waterfowl and many songbirds, are expected to avoid the immediate area. However, once drilling is completed, reserve pits with water can become a hazard for waterfowl and other birds, which can become soiled by drilling fluids. If the well is put into production, there is documentation that birds and bats may use open-vent stacks for roosting or perching. Once in these stacks, animals can become trapped or asphyxiated. While much of the work documenting this problem has occurred in western States, the situation in Mississippi is expected to be similar.

Access roads and wellpads can alter the local hydrography, reducing surface flow to mesic areas and diverting or degrading surface water supporting wetland habitats. Installation of culverts and diverting existing drainages around wellpads help to maintain existing hydrologic systems, but the disturbance causes local sedimentation and can retard sheet flow to wetland habitats. Amphibians and many reptiles

associated with wetland communities are vulnerable to disturbance, as they are not highly mobile and tend to have narrow habitat requirements.

Impacts from Recreation and Travel Management Actions

Point Clear and the surrounding marshes provide secluded areas for nesting shorebirds, wading birds, and songbirds. Although unlikely, the use of any vehicles, such as four-wheelers, during the spring and summer months is expected to increase nest/chick abandonment and could result in the loss of ground-nesting bird nests. During the rest of the year, vehicle use is likely to flush foraging and loafing wading birds and shorebirds and could reduce their use of this critically imperiled plant community.

Impacts from Lands and Realty Management Actions

The Hancock County tract would remain open to ROW applications. Any ROW development could damage sensitive maritime forests and scrubs through ground disturbance, vegetation removal, and introduction of invasive species, which a variety of wildlife species are dependent upon. Depending on the time of year, development activities could cause nesting shorebirds to abandon nests and could change use patterns of foraging shorebirds.

Special Status Species

Impacts from Vegetative Communities Management Actions

No specific vegetative communities management actions are proposed in this alternative. Under standard management common to all alternatives, allowing vegetation manipulation to meet resources objectives would be allowed; however, lack of specific areas and species being managed could result in increased potential for invasive/exotic species becoming established or spreading. This is particularly true of the higher elevations of the Hancock County tract located on Point Clear Island. Cogon grass and Chinese tallow are both known to occur in the area and, if uncontrolled, could substantially alter the habitats supporting Mississippi diamondback terrapin and tiny-leaved buckthorn. Dense stands of cogon grass would displace native vegetation and could make the island and adjacent marshes more vulnerable to frequent wildfires.

Impacts from Fish and Wildlife Habitat Management Actions

No specific fish and wildlife habitat management actions are proposed in this alternative. Under standard management common to all alternatives, providing habitat improvements and protections under State wildlife conservation strategies (including control of invasive plant species, use of prescribed fire, and wetland enhancements), would be allowed; however, lack of specific areas and species being managed could result in the same impacts discussed under Impacts from Vegetative Communities Management Actions.

Impacts from Minerals Management Actions

Oil and gas development on non-USFS FMO in Mississippi is expected to result in the direct loss of 55 acres. Based on previous oil and gas activity, the Federally listed species most likely to be affected are gopher tortoise, red-cockaded woodpecker, and black pine snake in the East Gulf Coastal Plain, and bald eagles associated with reservoirs and rivers in the northern portion of the State. Drilling could occur outside of these areas and there is some potential to affect small acreages supporting special status species anywhere in the State, outside of three northwestern counties which do not contain non-USFS FMO: Coahoma, DeSoto, and Sunflower. There is potential statewide to affect Federal- and State-listed aquatic species.

Gopher tortoise could be impacted by oil and gas activity in upland areas of the East Gulf Coastal Plain where forest practices on private lands have maintained at least a marginally suitable habitat. Foraging habitat for tortoise could also be affected on non-USFS FMO associated with private holdings in the Chickasawhay, De Soto, and Homochitto National Forests, which support substantial tortoise populations. During construction of wellpads, access roads, and production facilities, gopher tortoises could be impacted by the loss of or damage to burrows, destruction of foraging habitat, or killed during construction or by service vehicles. Construction activities and roads within 600 feet of burrows could isolate individuals and reduce reproductive potential within a population. In many cases, the presence of gopher tortoises indicates that habitat is suitable for a host of species associated with dry longleaf pine forests, many of them special status species such as the black pine snake (*Pituophis melanoleucus lodingi*), which could also be impacted by oil and gas activities.

Red-cockaded woodpecker could be affected by oil and gas development through the loss of nesting habitat within existing clusters and through the loss of current or potential foraging habitat within 0.5 mile of existing clusters. Non-USFS FMO in areas supporting red-cockaded woodpecker is generally privately owned and often managed for commercial timber production. Harvest rotations on these properties are typically too short to sustain suitable nesting habitat for red-cockaded woodpeckers; however, there is potential to impact suitable foraging habitat, particularly on non-USFS FMO near the Chickasawhay, De Soto, and Homochitto National Forests or Noxubee NWR, areas that support most of the State's population. This stipulation would be applied to the estimated 11,710 acres of non-USFS FMO within 0.5 mile of known red-cockaded woodpecker clusters.

Throughout the State, breeding and wintering bald eagles could be affected by drilling near large rivers or reservoirs. Bald eagles are particularly sensitive during courting, nesting, and fledging young; in Mississippi this typically occurs between December 1 and August 1. Construction activities within 1.5 miles of nest sites could result in nest abandonment depending on factors such as visibility and tolerance of individual pairs.

Throughout the State, oil and gas development has the potential to impact aquatic and wetland habitats. This could result in degradation of water quality through contamination and increased sedimentation, direct loss of habitat, and changes in the local hydrography supporting these systems. Increases in sedimentation to streams and wetlands by oil and gas development are a factor of wellpad design, slope, erodibility of the soils, proximity of the disturbance, and the intervening vegetation. The potential for sedimentation increases with prolonged or heavy rains that are typical in this area. Cut and fill slopes are particularly vulnerable before protective plant covers have been established. While intact vegetation along riparian/wetland zones and around wetlands can substantially buffer these areas, the steepness of the intervening slopes, particularly over 25 percent, can reduce the effectiveness of buffers. Research has shown that a minimum of a 30-foot buffer of vegetation is needed to control sediments; however, construction activities within 100 feet can reduce stream invertebrates, and 1,000 feet or more may be needed to protect some amphibians, reptiles, and forest interior birds (Wenger 1999). Sediments deposited in intermittent drainages during construction can be transported downstream during periods of high water, increasing turbidity and burying aquatic invertebrates in higher order streams and potentially affecting special status species substantial distances from the construction site, including Louisiana quillwort (*Isoetes louisianensis*), listed as Federally endangered.

Filling wetlands, including bogs, seepage slopes, wet flatwoods, and forested swamps, generally alters the site sufficiently to preclude the reestablishment of these communities in the foreseeable future and could result in direct habitat loss for a wide variety of special status species. Because of the limited acreage of these vegetation communities, loss of even the small acreages associated with BLM-permitted oil and gas activities has a high potential of destroying or degrading habitat for special status species. Many of these species have limited ranges, so the list of species potentially affected varies by location. For example, the

Mississippi Comprehensive Wildlife Conservation Strategy (CWCS) notes 14 special status species are associated with pine seeps and pitcher plant bogs, including eight special status crayfish, five of which are endemic. Henslow's sparrow wintering habitat and breeding habitat for Bachman's sparrow could be lost by construction in or near grassy bogs or wet flatwoods. Construction activities, and particularly linear disturbances related to new roads and pipelines, can disrupt the local hydrography supporting seepage slopes or sheet flow to bogs and swamps, degrading these habitats.

There are estimated to be 65 caves in Mississippi located in the northeast corner and east central portions of the State. Caves by their nature are isolated and support highly endemic faunas often with extremely narrow habitat requirements. In Mississippi, this includes two State-listed salamanders and a number of bat species. Although the potential to affect these areas is low, caves are particularly sensitive to oil and gas development. Even minor alterations in temperature, humidity, and water quality or water quantity can result in irreversible impacts. Drilling through cave/karst resources can result in contaminants, such as drilling fluids and cements, draining into the cave/karst system. Karst habitats can be degraded by hydrocarbons from spills or leaks from well casings, storage tanks, reserve pits, pipelines, and production facilities that may enter into the cave/karst systems. Additionally, cementing operations could affect portions of underground drainage systems by restricting ground water flow and introducing pollutants into karst systems.

Drilling in coastal areas would affect the 18 special status species that are associated with coastal marshes and maritime scrub and woodlands, including brown pelican, Wilson's plover, Mississippi diamondback terrapin, and saltmarsh topminnow. At least one special status plant species, tiny-leaved buckthorn (*Sageretia minutiflora*), occurs on coastal shell mounds in this area, but the potential for oil and gas wells being located on non-USFS FMO in these areas is low.

Impacts from Recreation and Travel Management Actions

Because this tract is not accessible by road, few impacts are anticipated by designating the tract open to recreation and vehicles; however, use of four-wheelers on remote upland areas, such as Point Clear Island, could damage sensitive maritime forests and scrubs. Depending on the time of year, any vehicle use could cause nesting shorebirds to abandon nests and could change use patterns of foraging shorebirds, like piping plover, snowy plover, and American oystercatcher.

Impacts from Lands and Realty Management Actions

The Hancock County tract would remain open to ROW applications. Any ROW development could damage sensitive maritime forests and scrubs through ground disturbance, vegetation removal, and introduction of invasive species. Depending on the time of year, development activities could cause nesting shorebirds to abandon nests and could change use patterns of foraging shorebirds, like piping plover, snowy plover, and American oystercatcher or damage their habitats.

Wildland Fire Ecology and Management

Suppressing all wildland fires, unless an in-place, site-specific plan determines otherwise, would minimize immediate threats and damage to life, public safety, and developments in the WUI and to natural resource values. Allowing prescribed burning on a case-by-case basis would allow for a reduction in hazardous fuel conditions, improving the ability to suppress wildfires while maintaining disturbance levels to which vegetation communities have adapted. Fire response and fuel treatments would apply to the 174 acres of BLM-administered surface land.

Impacts from Vegetative Communities Management Actions

Although no specific vegetative communities management actions are proposed, allowing vegetation manipulation to meet resources objectives under standard management common to all alternatives would generally serve to decrease vegetation density and cover (fuel load) and maintain natural fuel conditions across the Hancock County tract. This would maintain natural disturbance regimes which would be easier to manage through prescribed fire or other treatments. This would also decrease the frequency and intensity of wildland fires and allow fires to be more easily controlled, better protecting life, public safety, and property and resource values. However, lack of specific areas and species being managed could result in invasions and fuel accumulations that would increase the frequency and intensity of wildland fires.

Impacts from Fish and Wildlife Habitat Management Actions

No specific fish and wildlife habitat management actions are proposed under this alternative. Actions proposed under standard management common to all alternatives, which would provide habitat improvements and protections under State wildlife conservation strategies (including control of invasive plant species, use of prescribed fire, and wetland enhancements), would result in impacts similar to those discussed under Impacts from Vegetative Communities Management Actions.

Impacts from Minerals Management Actions

Minerals development activities would introduce additional ignition sources throughout the non-USFS FMO, increasing the potential of wildland fire occurrence. Disturbance of 55 acres associated with development of 10 wells on non-USFS FMO could provide increased accessibility for fire suppression equipment and provide fuel breaks in the case of wildland fire events. In addition, the infrastructure associated with the 10 new wells would require protection in wildland fire events. Impacts from mineral-development activities would not occur on the 63,004 acres closed to oil and gas development.

Impacts from Recreation and Travel Management Actions

Continuing to manage the Hancock County tract as open to recreation use would allow for dispersed recreation use, which could introduce additional ignition sources and increase the probability of wildland fire occurrence. This would be more prevalent in areas of the tract that are more easily accessible.

Impacts from Lands and Realty Management Actions

Managing the Hancock County surface tract as open for ROW applications could result in the development of ROWs. Development of above-ground ROWs on the Hancock County tract would require additional efforts by firefighters to protect these areas in wildland fire events. Development of ROWs would also result in clearing vegetation to make way for linear features. ROWs could provide fuel breaks, which could help prevent the spread of wildland fires. ROWs could also provide firefighters with increased accessibility for fire suppression equipment. While more ROWs could increase suppression costs, the aspects of ROW development related to vegetation clearing and the potential for increased accessibility could reduce suppression costs.

Cultural Resources

Management of cultural resources provides protection from the potentially damaging effects of surface-disturbing activities through implementation of existing laws and policy, such as Section 106 of the NHPA and FLPMA. Federal undertakings typically require cultural resource inventories that would result in the identification of cultural resource sites and determination of eligibility to the NRHP. The cultural resources data acquired through inventories and evaluations would increase knowledge of cultural

resources on BLM-administered lands and minerals in the State. Following site-specific inventories, mitigation measures would be prescribed as necessary for eligible properties. Any cultural sites discovered may be considered for further evaluation to assess its eligibility for listing on the NRHP. Through this process, significant impacts on cultural sites eligible for the NRHP would be avoided or mitigated. Avoidance is the BLM's preferred measure to eliminate potential adverse effects. Avoidance preserves the cultural resource in place. If this is not possible under reasonable circumstances, scientifically valid excavation and data recovery is an alternative mitigation method. Scientifically valid excavation would be used as a final measure, and the extent of excavation would be determined through BLM consultation with the SHPO and tribes.

Data recovery preserves as much of the cultural record as possible through archaeological methods. Any mitigation effort requiring archaeological data recovery is subject to the terms outlined in a Data Recovery Plan and documented through a signed MOU with the SHPO, tribes, and other consulting parties. While data recovery preserves as much data as possible, the excavated portions of the property would be lost or damaged. Removing cultural resources from a site using current scientific methods also reduces future scientific value if more accurate methods of analysis are developed. Mitigation through data recovery also reduces or eliminates other uses of cultural resources sites, such as traditional, public, conservation, or experimental use. The standard inventory and avoidance procedures conducted in conjunction with surface-disturbing actions would protect most cultural resources from significant impacts.

Despite the best efforts to identify all cultural resources, there remains a potential for inadvertent impacts to previously undiscovered sites, especially buried sites with no surface indications. There is a set process through Section 106 for identifying, evaluating, and treating the effects of inadvertent discoveries, reducing potential impacts from these discoveries.

Wildfire, wildfire suppression efforts, and prescribed fire could impact cultural resource sites within the Hancock County tract, including the eligibility characteristics of sites that are listed or eligible for listing on the NRHP. Impacts from wildland fire vary, depending on the temperature and duration of exposure to heat. Generally, higher temperatures and/or longer duration of exposure to heat increase the potential for damage to cultural resources. The nature of wetland vegetation in this tract would result in low-intensity wildland fires. Prehistoric and historic resources potentially affected by wildfire may be inorganic (e.g., lithic/rock, ceramics, cans, glass) or organic (e.g., textiles, leathern works, wooden structures). Generally speaking, organic materials are more at risk as they tend to burn or alter at lower temperatures than inorganic items. Wildfire impacts on inorganic cultural resources include fracturing, shattering, and changes in color and internal luster, which might reduce an artifact's ability to render information about the past. As a general rule, fire would not affect buried cultural materials. Studies show that even a few centimeters of soil cover (4 inches) is sufficient to protect cultural materials (Oster N.D.). Wildfires that burn hot and fast through a site may have less of an effect on certain types of cultural materials than fires that smolder in the duff or burn for a long time period, allowing heat from the fire to penetrate the surface. In addition, heat from wildland fires could change the physical nature of the ground, making it harder to identify cultural resources.

Often, cultural resources are more at risk of impact due to fire suppression activities than from wildland fire. Potential impacts from the use of retardants would include rapid cooling and subsequent damage (e.g., breakage, spalling, corrosion, staining, rusting) to archaeological materials. Discoloration or warping of metallic surfaces could also occur. Consultation with a cultural resource specialist during suppression activities in areas containing sensitive cultural resources would help to minimize impacts. Prescribed fire typically burns at a lower temperature and duration than wildfire events, so potential impacts would be less severe than unmanaged wildland fire. Prescribed fire events are managed to obtain

a smaller, more manageable, and less intense planned burn. The potential impacts from prescribed fires would typically have less long-term impacts than those from an unmanaged wildland fire event.

Impacts from Vegetative Communities Management Actions

No specific vegetative communities management actions are proposed under this alternative. Actions proposed under standard management common to all alternatives, which would allow vegetation manipulation to meet resources objectives, would require cultural resource clearances before any activities were to occur; therefore, impacts would not be anticipated.

Impacts from Fish and Wildlife Habitat Management Actions

No specific fish and wildlife habitat management actions are proposed under this alternative. Actions proposed under standard management common to all alternatives, which would provide habitat improvements and protections under State wildlife conservation strategies (including control of invasive plant species, use of prescribed fire, and wetland enhancements), would require cultural resources clearances before any activities were to occur; therefore, impacts would not be anticipated.

Impacts from Minerals Management Actions

Cultural resources on 454,930 acres of non-USFS FMO in Mississippi that are open to leasing subject to standard lease terms and conditions could be impacted by oil and gas development. Based on the RFDS, oil and gas developments within these areas would impact 55 acres through the development of 10 wells over 20 years. Development on these acres would typically be subject to Class III cultural resource inventories and evaluation on a project-by-project basis prior to allowing disturbance, resulting in the identification and potential excavation of cultural sites. Cultural sites on 63,004 acres closed to leasing would be protected from oil and gas development.

Impacts from Recreation and Travel Management Actions

Recreation activities on the Hancock County tract, including motorized vehicle use, could result in inadvertent damage and vandalism to previously undetected cultural sites. Although the tract would not be used extensively for recreation, the tract is located in wetlands with a high potential for cultural resources to occur, which could increase the potential for inadvertent damage and vandalism.

Impacts from Lands and Realty Management Actions

Ground-disturbing activities associated with ROW construction and maintenance could inadvertently damage cultural resources. Because the Hancock County tract has not been previously surveyed, approved activities would be subject to a ground survey and consultation requirements with SHPO under NHPA Section 106 regulations before construction. Therefore, impacts to cultural resources would be anticipated to be minimal.

Visual Resources

Impacts from Vegetative Communities Management Actions

No specific vegetative communities management actions are proposed under this alternative. Actions proposed under standard management common to all alternatives, which would allow vegetation manipulation to meet resources objectives, would not be anticipated to involve ground-disturbing activities of a severity or extent that would result in impacts to visual quality. Although visual quality

would deteriorate in the short term, visual quality would improve in the long term once vegetation has reestablished to meet VRM class objectives.

Impacts from Fish and Wildlife Habitat Management Actions

No specific fish and wildlife management actions are proposed under this alternative. Actions proposed under standard management common to all alternatives, which would provide habitat improvements and protections under State wildlife conservation strategies (including control of invasive plant species, use of prescribed fire, and wetland enhancements), would not be anticipated to involve ground-disturbing activities of a severity or extent that would result in impacts to visual quality. Although visual quality would deteriorate in the short term, visual quality would improve in the long term once vegetation has reestablished to meet VRM class objectives.

Impacts from Minerals Management Actions

Mineral exploration and development on non-USFS FMO tracts (517,934 acres) would result in impacts to visual resources on 55 acres from 10 wells. Removal of vegetation and construction of wells and wellpads and introduction of other equipment would impact visual quality. The BLM does not manage the surface for non-USFS FMO tracts; however, the BLM can place COAs or best practices to minimize impacts to visual resources as needed and in accordance with the guidance and procedures defined in VRM Handbook H-8431-1 Visual Resource Contrast Rating. Impacts from these activities would not be anticipated on 63,004 non-USFS FMO acres closed to leasing. Since no mineral-development activities would occur on the surface tracts, there would be no violations of VRM class objectives.

Impacts from Recreation and Travel Management Actions

Allowing recreation activities, including motorized vehicle use, on the Hancock County tract could result in impacts to visual quality over time from changes to existing natural or manmade landforms and scenic vistas through vegetation and soil loss, particularly on tracts that are in undeveloped areas. Since the surface tracts would not be used extensively for recreation, these impacts are anticipated to be minimal.

Impacts from Lands and Realty Management Actions

If a new ROW were authorized on the currently undeveloped Hancock County tract, visual quality would be impacted if the ROW were to dominate the view of the casual observer.

Minerals

Impacts from Vegetative Communities Management Actions

Vegetative communities management actions would not restrict or preclude mineral development and exploration; therefore, impacts are not anticipated.

Impacts from Fish and Wildlife Habitat Management Actions

Fish and wildlife management actions would not restrict or preclude mineral development and exploration; therefore, impacts are not anticipated.

Impacts from Minerals Management Actions

Under this alternative, 454,930 acres of non-USFS FMO would be open to leasing, subject to standard lease terms and conditions; 63,004 acres of non-USFS FMO would be closed to leasing. No impacts to oil

and gas minerals exploration and development would be anticipated from management of non-USFS FMO tracts.

Impacts from Recreation and Travel Management Actions

Recreation and travel management actions would not restrict or preclude mineral development and exploration; therefore, impacts are not anticipated.

Impacts from Lands and Realty Management Actions

Lands and realty management actions would not restrict or preclude mineral development and exploration; therefore, impacts are not anticipated. The BLM would only dispose of non-USFS FMO with no suspected value and, therefore, there would be no loss of opportunity.

Recreation and Travel Management

Impacts from Vegetative Communities Management Actions

No specific vegetative communities management actions are proposed under this alternative. Actions proposed under standard management common to all alternatives, which would allow vegetation manipulation to meet resources objectives, would not be anticipated to involve ground-disturbing activities of a severity or extent that would result in impacts to recreation. Recreationists could be displaced from vegetation treatment areas until revegetation occurs; however, the vegetation treatments would benefit recreationists by improving the long-term aesthetics of an area.

Impacts from Fish and Wildlife Habitat Management Actions

No specific fish and wildlife habitat management actions are proposed under this alternative. Actions proposed under standard management common to all alternatives, which would provide habitat improvements and protections under State wildlife conservation strategies (including control of invasive plant species, use of prescribed fire, and wetland enhancements), would not be anticipated to involve ground-disturbing activities of a severity or extent that would result in impacts to recreation. Recreationists could be displaced from protected areas or treated areas until revegetation occurs; however, the habitat improvements and protections would benefit recreationists by improving the long-term aesthetics and wildlife viewing of an area.

Impacts from Minerals Management Actions

Oil and gas development on non-USFS FMO tracts with surface management by other Federal agencies that are open to the public for recreation, as identified in Table 3-17, could be impacted by the leasing of Federal minerals by the BLM or in areas where the public were excluded. Those areas and installations not open to recreation or leasing, which include NPS and USFWS lands, would not be affected. Since approximately 55 acres of vegetation removal and construction activities would result from the development of 10 oil and gas wells on non-USFS FMO, there could be a decrease in nature-based recreational opportunities due to conflicts with the developments. Mineral leasing in recreational areas could result in the removal of vegetation; construction of access roads, wellpads, and other infrastructure; drilling equipment; and associated noise and dust emissions. Impacts from these activities would include decreased quality of the recreational experience of the non-USFS FMO tracts; however, stipulations applied under this alternative by other surface management agencies could indirectly protect the recreational resources in areas where development would be precluded (63,004 acres). Oil and gas development could provide additional opportunities for travel due to the construction of access roads.

Impacts from Recreation and Travel Management Actions

Allowing recreation activities, including motorized vehicle use, on the Hancock County tract would maintain existing recreation and travel opportunities; however, allowing motorized travel could result in conflicts between motorized recreationists and recreationists seeking a more natural setting or experience. Since the tract is not currently used extensively for recreation or travel, these impacts are anticipated to be minimal.

Impacts from Lands and Realty Management Actions

If a new road or utility ROW were authorized on the currently undeveloped Hancock County tract, the largely natural recreational experiences available would be impacted as a result of construction activity, ground disturbance, and introduction of new infrastructure; however, these actions could provide additional opportunities for travel due to the construction of access roads.

Lands and Realty

Lands and realty is a resource use rather than an environmental component and impacts on lands and realty are a direct result of their management. Therefore, the following discussion is limited to impacts from lands and realty management actions for the 174 acres of BLM-administered surface ownership in Hancock County, Mississippi. Impacts from disposal of FMO are discussed under Impacts to Minerals from Lands and Realty actions.

Under Alternative 1, the 174-acre Hancock County tract would remain open to ROW applications; therefore, no impacts would be anticipated to lands and realty actions. Retaining the Hancock County tract under the BLM administration would not allow for opportunities for other Federal agency or non-Federal ownership.

Social and Economic

Definitions and descriptions of potential Environmental Justice populations, including low income and ethnicity statistics, were provided in Section 3.4.13. Since the locations of specific BLM oil and gas activities could not be identified, the Environmental Justice analysis identified low-income populations and high minority populations in counties across the State. Environmental Justice population locations should be further considered at the implementation level to minimize the potential for disproportionate impacts to Environmental Justice populations and to identify any possible mitigation measures that may be required to reduce impacts (e.g., dust, noise, traffic, ground water quality) to these populations.

Impacts from Vegetative Communities Management Actions

Impacts to social and economic conditions would not be anticipated from vegetative communities management actions under this alternative. The proposed standard management actions common to all alternatives, allowing vegetation manipulation to meet resources objectives, would not be anticipated to be of an extent that would result in impacts to economic or social conditions.

Impacts from Fish and Wildlife Habitat Management Actions

Impacts to social and economic conditions would not be anticipated from fish and wildlife habitat management actions since no actions are anticipated. The proposed standard management actions common to all alternatives would provide habitat improvements and protections under State wildlife conservation strategies, including control of invasive plant species, use of prescribed fire, and wetland

enhancements, which would not be anticipated to be of an extent that would result in impacts to economic or social conditions.

Impacts from Minerals Management Actions

Since only 10 fluid mineral wells (with standard lease terms and conditions) would likely be drilled over the next 20 years, there would be minimal economic impacts from these activities. This type of BLM mineral development is consistent with the development that occurred in the past, including seven applications for permits to drill between 1983 and 2004. Therefore, there would be minimal yet slight increases in employment or income. For example, over the past 20 years, there have been 7,632 wells drilled and completed (382 wells drilled per year), with a 5-year annual employment average of 3,089 employees in the support sector for mining and oil and gas. If we assume that most of this support goes to the drilling and development of the oil and gas wells, there are approximately 8 employees (3089/382) supported annually per well drilled on the BLM-administered minerals. Therefore, over the next 20 years, an additional 10 BLM-administered wells will contribute to the employment of 80 people in these support industries. Social impacts, such as housing, education, and cost of living, would not be anticipated to change as a result of this activity.

Oil and gas development and production can have implications for visual and scenic qualities as well as property values. Although the BLM does not own much of the surface land in Alabama on which wells will be drilled, the permitting of these split-estate lands could impact a number of socioeconomic factors. The recreation literature indicates that visitors are likely to pay to view less development or development infrastructure in their recreation experience (Brookshire *et al* 1979; Boyle and Bishop 1984). Since the FMO-administered wells are mostly located on private or State lands, there could be visual impacts, but they would likely be borne by residents, not visitors. Additionally, decreases in property values have been associated with the drilling phase (more dramatic) as well as the existence of operating wells (BBC Research and Consulting 2001, 2006). Because these socioeconomic impacts are associated with mineral development, these impacts are likely greatest under Alternative 1, where standard lease conditions apply as compared to Alternatives 1, 2, and 3, where there are more conditions and constraints on wellpad locations.

Impacts from Recreation and Travel Management Actions

The BLM surface tract is open to dispersed recreational use, including hunting, fishing, hiking, and nature study, and no construction of recreational facilities is expected. Recreation and travel management actions provide for quality of life benefits (i.e., recreation, solitude, open space, scenic values) to local residents and visitors, which are often difficult to quantify. These types of limited recreation and travel management actions do not provide significant economic benefits in terms of employment and income and will not affect social assets, such as housing, education, and crime rates, in the area. Under Alternative 1, these types of socioeconomic impacts are assumed to continue.

Impacts from Lands and Realty Management Actions

Under Alternative 1, the Hancock County tract would remain in Federal ownership. Lands and realty management actions would not cause changes in the economic characteristics (employment, income, and industries) as there are very little changes anticipated under this alternative. The quality of social assets (demographics, housing, cost of living, education) in Hancock County is not likely to be affected by retaining these lands in Federal ownership.

Hazardous Materials

BLM-authorized activities on surface tracts and non-USFS FMO could include the use of hazardous materials, substances, and waste (including storage, transportation, and spills). Such activities include oil and gas development, coal development, and application of pesticides to improve vegetative communities and wildlife habitat. These activities are conducted in compliance with 29 CFR 1910, 49 CFR 100–185, 40 CFR 100–400, CERCLA, RCRA, SARA, TSCA, and CWA, and other Federal and State regulations and policies regarding hazardous materials management. Therefore, if a release were to occur, it would be immediately addressed and remediated in accordance with regulation.

4.3.2 Alternative 2

Air Quality

Under this alternative, there is a potential for wildfire which could lead to air emissions; however, since all fires would be suppressed, these occurrences would be short term and localized and not be anticipated to individually deteriorate air quality conditions. Certain BLM-authorized activities within the planning area, such as oil and gas development, construction activities, vehicle travel, and mechanical hand tools or prescribed burning used in vegetation and wildlife habitat manipulation, would produce emissions considered to be GHGs, particularly CO_2. However, due to the anticipated dispersed and infrequent nature of these activities, the project emissions would not have any noticeable or measurable effect and, therefore, the total contribution of GHGs from authorized activities would be small as well. Other BLM activities may help offset any emissions and sequester carbon, such as maintaining vegetative and forested cover, which may help build organic carbon in soils and function as “carbon sinks”.

Impacts from Vegetative Communities Management Actions

Undertaking actions to remove invasive plant species on the Hancock County tract and associated use of trucks and heavy equipment would cause short-term, localized increases in dust and emissions. Given the small amount and remote nature of surface ownership, these activities would not be anticipated to individually deteriorate air quality conditions.

Impacts from Fish and Wildlife Habitat Management Actions

Conducting prescribed burns to improve habitat on the Hancock County tract would cause short-term, localized increases in dust and emissions. Given the small amount and remote nature of the tract, these activities would not be anticipated to individually deteriorate air quality conditions.

Impacts from Minerals Management Actions

Anticipated levels of oil and gas development and associated air emissions would be the same as Alternative 1.

Impacts from Recreation and Travel Management Actions

Although the tract would be limited to motorized boating, impacts would be the same as Alternative 1 since this tract is not anticipated to be used extensively for recreation or travel.

Impacts from Lands and Realty Management Actions

Since the Hancock County tract (a total of 174 acres or 100 percent of BLM surface ownership in Mississippi) would be managed as a ROW avoidance area, there would be less potential for emissions associated with the use of trucks and heavy equipment (bulldozers, etc.) for ROW development compared to Alternative 1.

Soil Resources

Impacts from Vegetative Communities Management Actions

Undertaking actions to remove invasive plant species on the Hancock County tract could increase site-specific erosion in the short term. Over the long term, improving vegetation communities would reduce erosion and overland flows.

Impacts from Fish and Wildlife Habitat Management Actions

The impacts from standard management common to all alternatives would be the same as discussed under Alternative 1. In addition, conducting prescribed burns to improve habitat on the Hancock County tract could increase site-specific erosion in the short term. Over the long term, improving marsh health would reduce erosion.

Impacts from Minerals Management Actions

Anticipated levels of oil and gas development and associated impacts on 55 acres would be the same as Alternative 1. Applying the stipulations in Appendix D would increase the area where seasonal, CSU (123 acres), and NSO (184,192 acres) restrictions would be implemented, which would reduce disturbance to soils within the protected areas. In addition to the stipulations in Appendix D, areas within 1,000 feet of aquatic habitats would be managed with an NSO stipulation, which would eliminate impacts to soils in these areas. Impacts to prime or unique farmlands would be the same as described for Alternative 1.

Impacts from Recreation and Travel Management Actions

Motorized travel would be closed or limited to designated routes on all tracts under this alternative. However, the level of activity that could increase erosion and associated impacts to soils would not be anticipated to change compared to Alternative 1 since these tracts are not anticipated to be used extensively for recreation or travel.

Impacts from Lands and Realty Management Actions

Since the Hancock County tract (a total of 174 acres or 100 percent of BLM surface ownership in Mississippi) would be managed as a ROW avoidance area, there would be less potential for impacts to soils associated with ROW development compared to Alternative 1.

Water Resources

Impacts from Vegetative Communities Management Actions

Undertaking actions to remove invasive plant species on the Hancock County tract could increase site-specific erosion, which could increase nutrient levels and turbidity and decrease water quality in the short term. Over the long term, these actions would maintain the emergent wetlands, water quality, and ground water recharge.

Impacts from Fish and Wildlife Habitat Management Actions

Conducting prescribed burns to improve habitat on the Hancock County tract would increase erosion and runoff, which increases nutrient levels and turbidity and decreases water quality in the short term. Over the long term, improving and protecting fish and wildlife habitats would reduce erosion and overland flows.

Impacts from Minerals Management Actions

Anticipated levels of oil and gas development and associated impacts on 55 acres would be the same as Alternative 1. A 1,000-foot NSO buffer around aquatic habitats and applying the stipulations in Appendix D would increase the area where seasonal, CSU (123 acres), and NSO (184,192 acres) restrictions would be implemented. This would reduce disturbance to water resources within the protected areas. This

stipulation could be applied to an estimated 168,383 acres or 33 percent of the non-USFS FMO available for leasing in Mississippi. This buffer is expected to prevent construction activities from increasing the sedimentation of local drainages and wetlands.

Impacts from Recreation and Travel Management Actions

Motorized travel would be closed or limited to designated routes on all tracts under this alternative. However, the level of activity that could affect water resources would not be anticipated to change compared to Alternative 1 since these tracts are not anticipated to be used extensively for recreation or travel.

Impacts from Lands and Realty Management Actions

Since the Hancock County tract (a total of 174 acres or 100 percent of BLM surface ownership in Mississippi) would be managed as a ROW avoidance area, there would be less potential for impacts to water resources associated with ROW development compared to Alternative 1.

Vegetative Communities

Impacts from Vegetative Communities Management Actions

The Hancock County tract would benefit from removal of woody exotic, invasive species such as Chinese tallow and Chinese privet, which would be removed by hand and stump treated with approved herbicides. Selective hand spraying of cogon grass may be required where it is established. Any removal and treatment of exotic, invasive plants on this tract would be coordinated with the Hancock County Marshes staff and/or The Nature Conservancy to improve removal of invasive species and minimize impacts to the marshes.

Impacts from Fish and Wildlife Habitat Management Actions

Natural fire is infrequent in these coastal marshes, and the use of prescribed fires is expected to be infrequent and closely coordinated as part of an overall fire plan for the Hancock County Marshes Preserve.

Impacts from Minerals Management Actions

The estimated 55 acres of disturbance from oil and gas development would impact vegetation; however, under this alternative, oil and gas activities would be excluded from a 1,000-foot buffer around wetlands and aquatic habitats, karst areas, shoreline habitats, and habitats like naturally occurring prairies and glades with special status species. This alternative provides additional protection for riparian/wetland areas and reduces the potential for contaminants to leach into wetland communities. Impact to exotic invasive plant species would be the same as in Alternative 1.

Impacts from Recreation and Travel Management Actions

Limiting the Hancock County tract to motorized boating would prevent damage to vegetative communities by reducing travel and access to recreation opportunities.

Impacts from Lands and Realty Management Actions

Since the Hancock County tract (a total of 174 acres or 100 percent of BLM surface ownership in Mississippi) would be managed as a ROW avoidance area, there would be less potential for impacts to vegetative communities associated with ROW development compared to Alternative 1.

Fish and Wildlife

Impacts from Vegetative Communities Management Actions

Wildlife would benefit from control of invasive exotic plant species, which could substantially alter upland areas on Point Clear Island. Invasive species control would foster native vegetation and habitats that support wildlife species.

Impacts from Fish and Wildlife Habitat Management Actions

There may be some benefits to wildlife by burning heavy mats of flotsam left by Hurricane Katrina, where it is hampering restoration of marsh and upland habitats. This would foster native vegetation and habitats that support wildlife species.

Impacts from Minerals Management Actions

Oil and gas development on non-USFS FMO is expected to result in the loss of 55 acres of habitat; however, under this alternative, oil and gas activities would be excluded from higher value wildlife habitats, including a 1,000-foot buffer around wetlands and aquatic habitats, shoreline habitats, and habitats like naturally occurring prairies and glades with special status species.

BMPs would be applied under this alternative to reduce impacts to bats, songbirds, and waterfowl. All pits containing water 10 days after a well is completed would be netted to exclude migratory birds. Other approved methods could also be used to exclude birds. Open-vent equipment, such as heater-treaters, separators, and dehydration units, will be covered with anti-perching cones to exclude cavity nesting birds and bats. Any power lines would be built using approved raptor-safe designs to prevent electrocution hazards.

Impacts from Recreation and Travel Management Actions

Designating the Hancock County tract as limited to motorized boating would benefit wildlife using these remote marshes and the uplands on Point Clear Island by limiting disturbance to species and their habitats. Any vehicle use on the narrow sand islands would flush foraging and loafing shorebirds and could cause abandonment of nests.

Impacts from Lands and Realty Management Actions

Since the Hancock County tract (a total of 174 acres or 100 percent of BLM surface ownership in Mississippi) would be managed as a ROW avoidance area, there would be less potential for impacts to fish and wildlife associated with ROW development compared to Alternative 1.

Special Status Species

Impacts from Vegetative Communities Management Actions

Removing exotic invasive plant species, particularly cogon grass, could improve habitat conditions for the tiny-leaved buckthorn and Mississippi diamondback terrapin. Early detection and control of invasive plant species would reduce the amount of native vegetation displaced and minimize changes to structure that occurs when large amounts of invasive woody material is removed.

Impacts from Fish and Wildlife Habitat Management Actions

Prescribed burns could be used to remove wood debris and flotsam left from Hurricane Katrina that create hazards for wildlife and degrade marshes. Since natural fire is infrequent in these coastal marshes, the use of prescribed fires is expected to be infrequent (to mimic natural conditions) and closely coordinated as part of an overall fire plan for the Hancock County Marshes Preserve.

Impacts from Minerals Management Actions

Although the number of wells (10) and acres disturbed (55) would remain the same under this alternative as compared to Alternative 1, lease stipulations would shift surface-disturbing activities away from sensitive habitats with potential to support special status species. This is accomplished with NSO buffers or seasonal restrictions. These stipulations could be applied to 211,605 acres or about 41 percent of the non-USFS FMO in Mississippi.

To protect special status species occurring in aquatic or wetland habitats, all oil and gas development activities would be excluded from a 1,000-foot buffer around these habitats. In areas where slopes exceed 10 percent, the buffer could be extended up to 600 feet to provide adequate protection. In areas with slopes less than 10 percent, the 250-foot buffer could be reduced to a minimum of 100 feet, if the adjacent waterway or wetlands have been surveyed and no special status species occur within 100 yards upstream and 300 yards downstream of the site. This stipulation could be applied to an estimated 168,383 acres or about 33 percent of the non-USFS FMO available for leasing in Mississippi. In most cases, this buffer is expected to prevent construction activities from increasing the sedimentation of local drainages and wetlands. In areas with slopes over 25 percent, additional measures may be needed to stabilize disturbed soils above wetlands or aquatic habitats.

A 250-foot buffer around known caves, fractures, and sinkholes would reduce the chances of drilling through karst formations, providing protection for cave endemics, such as cave salamander and spring salamander. Some potential remains for inadvertently drilling through unknown karst formations and damaging connected cave habitats through introduction of lost drilling fluids and muds, altering temperature and moisture regimes and modifying the hydrology supporting the karst systems. This habitat is extremely limited in Mississippi; less than 100 acres, according the Mississippi CWCS, so potential for impacting these areas in Mississippi is low.

Under this alternative, NSO stipulations would be applied to coastal shorelines. This buffer would be applied to 4,237 acres of non-USFS FMO in Mississippi located within 100 feet of mean high tide. Wintering piping plover, snowy plover, brown pelican, least tern, and Mississippi diamondback terrapin are among the many coastal species that would benefit from this buffer. Offsite directional drilling to target these Federal minerals would be permitted under this alternative. Any directional wells that may affect Federally listed species or critical habitat would require coordination with the USFWS.

Areas with suitable soils in southern Mississippi counties would require a survey for gopher tortoises prior to any surface-disturbing activities. No disturbance would be permitted within 600 feet of a gopher tortoise burrow. This buffer is expected to protect any breeding populations of gopher tortoise and maintain habitat for associated species, including black pine snake. It would also protect habitat values in areas suitable for eastern indigo snake and mimic glass lizard.

Under this alternative, NSO would be permitted within 0.5 mile of a red-cockaded woodpecker cluster. This stipulation could be applied to 11,710 acres of non-USFS FMO within 0.5 mile of known clusters and could be applied to additional areas as needed to protect new clusters or potential habitat identified during site assessments prior to leasing. This buffer is expected to contain all foraging habitat required to maintain the red-cockaded woodpecker cluster. There are options for oil and gas activity to occur within suitable foraging habitat if the foraging requirements for the cluster are met elsewhere, for example, clusters maintained on National Forests. This exception would require a concurrence from the USFWS and the State of Mississippi. A concurrence would cause disturbance within the suitable foraging habitat, but if granted would not be anticipated to affect local populations.

Under this alternative, NSO would be permitted within 1,500 feet of a bald eagle nest and/or communal roost site, and no surface-disturbing activities would be permitted within 1.5 miles during the nesting season from December 1 through August 1. This buffer complies with the current Federal guidelines for bald eagle protection. Based on the known nest sites in Mississippi, this stipulation could be applied to 1,089 acres of non-USFS FMO. Oil and gas activity complying with these parameters is not expected to adversely affect bald eagles. New protocols have been drafted that reflect the ongoing recovery of this species. When finalized, the new guidelines would reduce the buffer to 660 feet for construction activities, although existing activities could be conducted within 330 feet of the nest outside of a more refined nesting season (December 15 through June 30).

Leases containing potential habitat for special status plant species, including Federally listed and candidate species as well as those ranked as critically imperiled (S-1) and imperiled (S-2) by the Mississippi Natural Heritage Program (MNHP), would require botanical surveys prior to surface-disturbing activities. Operations would be excluded from areas supporting these special status plant species. This stipulation is expected to protect most naturally occurring glades, prairies, and other habitats which support special status plant species. The potential acreage affected by this stipulation is not available. This stipulation would be applied on a case-by-case basis based on site inspections conducted prior to leasing.

Impacts from Recreation and Travel Management Actions

Limiting the Hancock County tract to motorized boating would prevent damage to sensitive coastal habitats for tiny-leaved buckthorn and Mississippi diamondback terrapin by limiting disturbance to species and their habitats. It would also retain the secluded nature of this barrier island and allow for undisturbed nesting and foraging of special status shorebirds, including royal tern.

Impacts from Lands and Realty Management Actions

Since the Hancock County tract (a total of 174 acres or 100 percent of BLM surface ownership in Mississippi) would be managed as a ROW avoidance area, there would be less potential for impacts to special status species associated with ROW development compared to Alternative 1.

Wildland Fire Ecology and Management

Impacts from suppressing all wildland fires and allowing prescribed burning on a case-by-case basis would be the same as Alternative 1.

Impacts from Vegetative Communities Management Actions

Undertaking actions to remove invasive plant species on the Hancock County tract would reduce the potential for changes in the marsh vegetation communities from invasive species. As a result, the natural fire regimes would be maintained or restored. This would improve the ability to manage wildland fire in its natural role through application of prescribed fires, as necessary. Undesired wildfires in the marsh vegetation communities that are within their natural fire regimes would also be safer and less expensive to suppress.

Impacts from Fish and Wildlife Habitat Management Actions

Conducting prescribed burns to improve habitat on the Hancock County tract would promote marsh health and allow for the reintroduction of wildland fire as a natural process and maintain or restore the natural fire regimes. Undesired wildfires in the marsh vegetation communities that are within their natural fire regimes would also be safer and less expensive to suppress.

Impacts from Minerals Management Actions

Impacts to wildland fire ecology and management from anticipated oil and gas development and associated disturbance of 55 acres would be the same as Alternative 1. Impacts would not occur on the closed (63,004 acres) and NSO (184,192 acres) areas created through applying the stipulations in Appendix D.

Impacts from Recreation and Travel Management Actions

The Hancock County tract would be limited to motorized boating under this alternative. However, impacts would be the same as Alternative 1 because the potential for increased probability of wildland fire occurrence associated with travel ignition sources in easily accessible areas would remain.

Impacts from Lands and Realty Management Actions

Since the Hancock County tract (a total of 174 acres or 100 percent of BLM surface ownership in Mississippi) would be managed as an avoidance area, there would be less potential for wildfire impacts associated with ROW development compared to Alternative 1. This would decrease infrastructure needing protection, but would also decrease improvements in accessibility to fires and providing fire-breaks on these tracts.

Cultural Resources

Impacts from cultural resources management and wildland fire management actions would be the same as Alternative 1.

Impacts from Vegetative Communities Management Actions

Undertaking actions to remove invasive plant species on the Hancock County tract would increase the potential for damage to cultural resource sites. Mechanical treatments are more likely to impact cultural resources than low intensity treatments such as chemical treatments or hand treatments. Vegetative

communities management actions would require cultural resource inventories and clearance prior to ground disturbance to identify the presence of any cultural sites and avoid or mitigate any potential damage.

Impacts from Fish and Wildlife Habitat Management Actions

Conducting prescribed burns to improve habitat on the Hancock County tract would increase ground disturbance and associated potential impacts to cultural resources. Wildlife habitat manipulation would require cultural resource inventories and clearance prior to ground disturbance to identify the presence of any cultural sites and avoid or mitigate any potential damage.

Impacts from Minerals Management Actions

Cultural resources could be impacted by managing 270,615 acres of non-USFS FMO as open to leasing subject to standard lease terms and conditions and 123 acres of non-USFS FMO as CSU. Based on the RFDS, oil and gas developments within these areas would impact 55 acres through the development of 10 wells over 20 years. Development on these acres would typically be subject to Class III cultural resource inventories and evaluation on a project-by-project basis prior to allowing disturbance, resulting in the identification and potential excavation of cultural sites. Stipulations and BMPs applied under this alternative would protect and preserve cultural resources on the 184,192 acres managed as NSO and in areas where surface disturbance would be precluded (63,004 acres).

Impacts from Recreation and Travel Management Actions

Although the tract would be limited to motorized boating under this alternative, the level of activity that could impact cultural resources would not be anticipated to change compared to Alternative 1 since the tract is not anticipated to be used extensively for recreation or travel.

Impacts from Lands and Realty Management Actions

Managing the Hancock County tract as a ROW avoidance area would reduce the potential for ground disturbance and potential impacts to cultural resources associated with ROW development compared to Alternative 1. Construction of development within a ROW could result in inadvertent damage if cultural resources that were undetected during surveys were unearthed during ground-disturbing activities. Following discovery of cultural resources, activities would stop in accordance with terms and conditions in the ROW grant which would minimize further damage to cultural resources.

Visual Resources

Impacts from Vegetative Communities Management Actions

Undertaking actions to improve vegetation communities on the Hancock County tract, such as removing invasive species, would temporarily diminish visual quality. Visual quality would be improved in the long term as the conditions of vegetation communities improve to meet VRM class objectives in accordance with the guidance and procedures defined in VRM Handbook H-8431-1 Visual Resource Contrast Rating.

Impacts from Fish and Wildlife Habitat Management Actions

Undertaking actions to improve fish and wildlife habitat on the Hancock County tract, such as prescribed burning, would temporarily diminish visual quality if the developments were to dominate the view of the casual observer. Visual quality would be improved in the long term as wildlife-related recreation and habitat conditions were improved.

Impacts from Minerals Management Actions

Since approximately 55 acres of vegetation removal and construction activities would result from the development of 10 oil and gas wells (as with Alternative 1), impacts would be the same as Alternative 1. Stipulations applied under this alternative could protect visual resources on the 184,192 acres managed as NSO and in areas where development would be precluded (63,004 acres).

Impacts from Recreation and Travel Management Actions

Since the tract would be managed as limited to motorized boating, impacts to visual quality would occur under this alternative as there would be less potential for vegetation and soil removal from these activities. Furthermore, because the tract is not currently used extensively for recreation, this impact would be minimal.

Impacts from Lands and Realty Management Actions

Managing the Hancock County tract as a ROW avoidance area would retain the visual quality in the undeveloped wetland setting since ROWs would not be approved on the tract unless it met resource objectives.

Minerals

Impacts from Vegetative Communities Management Actions

Vegetative communities management actions would not restrict or preclude mineral development and exploration; therefore, impacts are not anticipated.

Impacts from Fish and Wildlife Habitat Management Actions

Fish and wildlife management actions would not restrict or preclude mineral development and exploration; therefore, impacts are not anticipated.

Impacts from Minerals Management Actions

Applying the lease stipulations and BMPs in Appendix D could restrict or preclude oil and gas development and exploration. Impacts would not be anticipated on approximately 270,615 acres open to leasing subject to standard lease terms and conditions. Managing approximately 123 acres as open to leasing subject to minor constraints and 184,192 acres as open to leasing subject to major constraints could increase development costs. Closing 63,004 acres to leasing would not affect oil and gas leasing because approximately 5 percent of the closed areas would be in areas of historical oil and gas production. Allowing for exceptions, waivers, and modifications to these stipulations could create opportunities for the discovery of new oil and gas resources.

Impacts from Recreation and Travel Management Actions

Recreation and travel management actions would not restrict or preclude mineral development and exploration; therefore, impacts are not anticipated.

Impacts from Lands and Realty Management Actions

Lands and realty management actions would not restrict or preclude mineral development and exploration; therefore, impacts are not anticipated.

Recreation and Travel Management

Impacts from Vegetative Communities Management Actions

Undertaking actions to improve vegetation communities, such as removing invasive species, on the Hancock County tract would temporarily diminish the recreation experience or eliminate the recreation opportunity since recreationists could be displaced from vegetation treatment areas until revegetation occurs. The recreation experience and opportunity would be improved in the long term as the conditions of vegetation communities improve by improving the long-term aesthetics of an area.

Impacts from Fish and Wildlife Habitat Management Actions

Undertaking actions to improve wildlife habitat on the Hancock County tract, such as prescribed burning, would temporarily diminish or eliminate the recreation experience and opportunities for travel since recreationists could be displaced from protected areas or treated areas until revegetation occurs. The recreation experience would be improved in the long term as wildlife-related recreation and habitat conditions are improved by improving the long-term aesthetics and wildlife viewing of an area.

Impacts from Minerals Management Actions

Since approximately 55 acres of vegetation removal and construction activities would result from the development of 10 oil and gas wells (as with Alternative 1), impacts would be the same as Alternative 1. Stipulations applied under this alternative could protect the recreational opportunities on the 184,192 acres managed as NSO and in areas where development would be precluded (63,004 acres) by precluding ground disturbance and infrastructure associated with oil and gas development.

Impacts from Recreation and Travel Management Actions

Since motorized vehicle use would be limited to motorized boating, motorized recreation opportunities would be maintained. Since the tract is not currently used extensively for recreation or motorized travel, this anticipated impact would be minimal.

Impacts from Lands and Realty Management Actions

Managing the Hancock County tract as a ROW avoidance area would retain the recreation experience in the undeveloped wetland setting since ROWs would not be approved on the tract unless they met resource objectives.

Lands and Realty

Under Alternative 2, the 174-acre Hancock County tract would be managed as a ROW avoidance area. This could impose design and siting requirements and associated costs on new ROW. There would be an increased potential for requests for new ROW to be denied if the ROW did not meet resource objectives of the tract.

Retaining the Hancock County tract under the BLM administration and pursuing partnerships with other agencies and organizations could allow for management opportunities for other agencies and organizations but would not allow for non-Federal ownership opportunities. Partnerships would allow for more efficient and comprehensive resource management of the surface tracts.

Social and Economic

Impacts from Vegetative Communities Management Actions

This alternative includes the removal of invasive species on the Hancock County tract. Impacts from these actions on the socioeconomic indicators would not be anticipated from these types of vegetative communities management actions.

Impacts from Fish and Wildlife Habitat Management Actions

Impacts to social and economic conditions from fish and wildlife habitat management actions would be the same as impacts identified from vegetative communities management actions.

Impacts from Minerals Management Actions

The same number of wells and acres of surface disturbance is anticipated under this alternative; however, this alternative would apply leasing stipulations to protect sensitive species and their habitats, including buffers for wetland and aquatic resources. Relative to Alternative 1, the exploration and development costs could increase while the availability for locations for wellpads could decrease. This alternative would also provide for the greatest amount of protection for wetland resources. Since the number of wells anticipated is small relative to total wells in the area, there would be minimal changes as compared with the current situation, possibly slight increases in employment or income (and the same as Alternative 1). Social indicators such as housing, education, and cost of living would not be anticipated to change under this alternative.

Similar disturbances from oil and gas development would occur as compared to Alternative 1, although potential impacts to wetlands, soils, vegetation, habitat, and wildlife would be anticipated to be reduced under this alternative due to the implementation of NSO conditions on oil and gas leasing. Oil and gas development and production can have implications for visual and scenic qualities as well as property values. These impacts are likely less than those under Alternative 1, as there are more conditions and constraints on wellpad locations under Alternative 2. Industry costs and availability for wellpad locations would likely increase under this alternative, which would result in adverse impacts for the oil and gas industry.

Impacts from Recreation and Travel Management Actions

Under this alternative, the surface tract would be open to recreational use, but designated as limited to motorized boating. Minimal changes in recreation and travel management are anticipated; however, OHV users would likely be adversely impacted since the tract would not be available for this type of motorized use.

Impacts from Lands and Realty Management Actions

ROW management actions and associated impacts to social and economic conditions would be the same as Alternative 1.

Hazardous Materials

Impacts would be the same as Alternative 1.

4.3.3 Alternative 3 (Proposed RMP)

Air Quality

Under this alternative, there is a potential for wildfire which could lead to air emissions. Since all fires would be suppressed, these occurrences would be short term and localized and not be anticipated to individually deteriorate air quality conditions. Certain BLM-authorized activities within the planning area, such as oil and gas development, construction activities, vehicle travel, and mechanical hand tools or prescribed burning used in vegetation and wildlife habitat manipulation, would produce emissions considered to be GHGs, particularly CO_2. However, due to the anticipated dispersed and infrequent nature of these activities, the project emissions would not have any noticeable or measurable effect and, therefore, the total contribution of GHGs from authorized activities would be small as well. Other BLM activities may help offset any emissions and sequester carbon, such as maintaining vegetative and forested cover, which may help build organic carbon in soils and function as “carbon sinks”.

Impacts from Vegetative Communities Management Actions

Vegetative communities management actions and associated impacts would be the same as Alternative 2.

Impacts from Fish and Wildlife Habitat Management Actions

Fish and wildlife habitat management actions and associated impacts would be the same as Alternative 2.

Impacts from Minerals Management Actions

Anticipated levels of oil and gas development and associated air emissions would be the same as Alternative 1.

Impacts from Recreation and Travel Management Actions

Recreation and travel management actions and associated impacts would be the same as Alternative 2.

Impacts from Lands and Realty Management Actions

ROW management actions and associated impacts would be the same as Alternative 2.

Soil Resources

Impacts from Vegetative Communities Management Actions

Vegetative communities management actions and associated impacts would be the same as Alternative 2.

Impacts from Fish and Wildlife Habitat Management Actions

Fish and wildlife management actions and associated impacts would be the same as Alternative 2.

Impacts from Minerals Management Actions

Anticipated levels of oil and gas development and associated impacts on 55 acres would be the same as Alternative 1. Applying the stipulations in Appendix D would increase the area where seasonal, CSU (3,021 acres), and NSO (92,269 acres) restrictions would be implemented, which would reduce disturbance to soils within the protected areas. Under this alternative, the NSO area around aquatic

habitats identified in Alternative 2 would be reduced to 250 feet, which would reduce protections to soils within these areas as compared to Alternative 2. Impacts to prime or unique farmlands would be the same as described for Alternative 1.

Impacts from Recreation and Travel Management Actions

Although travel management would be limited to motorized boating under this alternative, the level of activity that could increase erosion would not be anticipated to change compared to Alternative 1 since these tracts are not used extensively for recreation or travel.

Impacts from Lands and Realty Management Actions

Since the Hancock County tract (a total of 174 acres or 100 percent of BLM surface ownership in Mississippi) would be managed as a ROW avoidance area, there would be less potential for impacts to soils associated with ROW development compared to Alternative 1.

Water Resources

Impacts from Vegetative Communities Management Actions

Vegetative communities management actions and associated impacts would be the same as Alternative 2.

Impacts from Fish and Wildlife Habitat Management Actions

Fish and wildlife management actions and associated impacts would be the same as Alternative 2.

Impacts from Minerals Management Actions

Anticipated levels of oil and gas development and associated impacts on 55 acres would be the same as Alternative 1. Applying the stipulations in Appendix D would increase the area where seasonal, CSU (3,021 acres), and NSO (92,269 acres) restrictions would be implemented, which would reduce disturbance to water resources within the protected areas. Under this alternative, the NSO area around aquatic habitats identified in Alternative 2 would be reduced to 250 feet, which would allow development to occur in close proximity to water resources and the potential for impacts to water resources to occur.

Impacts from Recreation and Travel Management Actions

Although travel management would be limited to motorized boating under this alternative, the level of activity that could impact water resources would not be anticipated to change compared to Alternative 1. Therefore, the impacts would be the same as Alternative 1.

Impacts from Lands and Realty Management Actions

Since the Hancock County tract (a total of 174 acres or 100 percent of BLM surface ownership in Mississippi) would be managed as an avoidance area, there would be less potential for impacts to water resources associated with ROW development compared to Alternative 1.

Vegetative Communities

Impacts from Vegetative Communities Management Actions

Vegetative communities management actions and associated impacts would be the same as Alternative 2.

Impacts from Fish and Wildlife Habitat Management Actions

Fish and wildlife habitat management actions and associated impacts would be the same as Alternative 2.

Impacts from Minerals Management Actions

In addition to the impacts from standard management common to all alternatives discussed under Alternative 1, under this alternative, oil and gas activities would be excluded from a 250-foot buffer around wetlands and aquatic habitats, karst areas, shoreline habitats and habitats like naturally occurring prairies and glades with special status species. There is the option of increasing the buffer to 600 feet where needed because of slopes over 10 percent or erosive soils. The buffer under this alternative is expected to be sufficient to protect wetland and riparian vegetation and most naturally occurring glades and prairies. Impacts to exotic invasive plant species would be the same as in Alternative 1.

Impacts from Recreation and Travel Management Actions

Recreation and travel management actions and associated impacts would be the same as Alternative 2.

Impacts from Lands and Realty Management Actions

Under this alternative, the Hancock County tract would be available for disposal; however, future management of the tract would be constrained to meet the same resource objectives as under Alternative 2, so impacts to vegetative communities are not anticipated.

Since the Hancock County tract (a total of 174 acres or 100 percent of BLM surface ownership in Mississippi) would be managed as a ROW avoidance area, there would be less potential for impacts to vegetative communities associated with ROW development compared to Alternative 1.

Fish and Wildlife

Impacts from Vegetative Communities Management Actions

Vegetative communities management actions and associated impacts would be the same as Alternative 2.

Impacts from Fish and Wildlife Habitat Management Actions

Fish and wildlife habitat management actions and associated impacts would be the same as Alternative 2.

Impacts from Minerals Management Actions

The acreage disturbed (55) from minerals development would be same under all alternatives, but wells would be shifted away from sensitive habitats. Under this alternative, the buffer would be reduced to 250 feet, with the option of increasing it to 600 feet where needed because of steep slopes or erosive soils. The buffer could be reduced to 100 feet where slopes are less than 10 percent and there are no special status species issues. These buffers are expected to be sufficient for most wildlife species utilizing wetland and aquatic habitats, but interior forest nesting birds and some amphibians and reptiles that range farther from the riparian/wetland zone would be adversely impacted by this reduced buffer through habitat disturbance. Karst habitats and most naturally occurring prairies and glades would be protected under this alternative.

Under this alternative, the coastal no-lease areas, including sea turtle nesting habitat and shorelines suitable for least tern, piping plover, and snowy plover, would be replaced with an NSO buffer. This

change has some potential to promote offsite drilling. Loss of even small acreages of maritime forests or shrub lands would result in the loss of important foraging habitats for migrating songbirds, wading birds and shorebirds, as well as other species associated with these critically imperiled habitats.

Impacts from Recreation and Travel Management Actions

Recreation and travel management actions and associated impacts would be the same as Alternative 2.

Impacts from Lands and Realty Management Actions

Under this alternative, the Hancock County tract would be available for disposal; however, future management of the tract would be constrained to meet the same resource objectives as under Alternative 2 and so impacts to fish and wildlife are not anticipated.

Since the Hancock County tract (a total of 174 acres or 100 percent of BLM surface ownership in Mississippi) would be managed as a ROW avoidance area, there would be less potential for impacts to fish and wildlife associated with ROW development compared to Alternative 1.

Special Status Species

Impacts from Vegetative Communities Management Actions

Vegetative communities management actions and associated impacts would be the same as Alternative 2.

Impacts from Fish and Wildlife Habitat Management Actions

Fish and wildlife habitat management actions and associated impacts would be the same as Alternative 2.

Impacts from Minerals Management Actions

The number of wells (10) and acres disturbed (55) would remain the same under this alternative and impacts would be the same as Alternative 2, except in the following situations. The aquatic and wetland buffer would be reduced to 250 feet. In areas where slopes exceed 10 percent, the buffer could be extended up to 600 feet to provide adequate protection. In areas with slopes less than 10 percent, the 250-foot buffer could be reduced to a minimum of 100 feet, if the adjacent waterway or wetlands have been surveyed and no special status species occur within 100 yards upstream and 300 yards downstream of the site. This stipulation could be applied to an estimated 68,656 acres or 13 percent of the non-USFS FMO available for leasing in Mississippi. In most cases, this buffer is expected to prevent construction activities from increasing the sedimentation of local drainages and wetlands. In areas with slopes over 25 percent, additional measures may be needed to stabilize disturbed soils above wetlands or aquatic habitats.

Under this alternative, the no-lease area along the coast would be replaced with an NSO buffer. Although no surface disturbance would occur on non-USFS FMO or the BLM surface tracts within this buffer, offsite directional drilling to target these Federal minerals would be permitted under this alternative. Any directional drilling targeting non-USFS FMO may affect Federally or State-listed species using this coastal area, including piping plover, snowy plover, Wilson’s plover, and American oystercatcher.

Impacts from Recreation and Travel Management Actions

Recreation and travel management actions and associated impacts would be the same as Alternative 2.

Impacts from Lands and Realty Management Actions

Since the Hancock County tract (a total of 174 acres or 100 percent of BLM surface ownership in Mississippi) would be managed as a ROW avoidance area, there would be less potential for impacts to special status species associated with ROW development compared to Alternative 1.

Wildland Fire Ecology and Management

Impacts from suppressing all wildland fires and allowing prescribed burning on a case-by-case basis would be the same as Alternative 1.

Impacts from Vegetative Communities Management Actions

Vegetative communities management actions and associated impacts would be the same as Alternative 2.

Impacts from Fish and Wildlife Habitat Management Actions

Fish and wildlife habitat management actions and associated impacts would be the same as Alternative 2.

Impacts from Minerals Management Actions

Impacts to wildland fire ecology and management from anticipated oil and gas development and associated disturbance of 55 acres would be the same as Alternative 1. Impacts would not occur on the closed (63,004 acres) and NSO (92,269 acres) areas created through applying the stipulations in Appendix D.

Impacts from Recreation and Travel Management Actions

Recreation and travel management actions and associated impacts would be the same as Alternative 2.

Impacts from Lands and Realty Management Actions

ROW management actions and associated impacts would be the same as Alternative 2.

Cultural Resources

Impacts from cultural resources management and wildland fire management actions would be the same as Alternative 1.

Impacts from Vegetative Communities Management Actions

Vegetative communities management actions and associated impacts would be the same as Alternative 2.

Impacts from Fish and Wildlife Habitat Management Actions

Fish and wildlife habitat management actions and associated impacts would be the same as Alternative 2.

Impacts from Minerals Management Actions

Impacts to cultural resources from management of non-USFS FMO would be the same as Alternative 2, except 259,640 acres would be managed as open to leasing subject to standard lease terms and conditions, 3,021 acres as CSU, 92,269 acres as NSO, and 63,004 acres as closed. The 55 acres of disturbance

resulting from the anticipated 10 wells could impact cultural resources within areas managed as open to leasing subject to standard lease terms and conditions or CSU. Impacts to cultural resources are not anticipated in areas managed as NSO or closed since surface disturbance would be precluded.

Impacts from Recreation and Travel Management Actions

Although the Hancock County tract would be managed as limited to motorized boating under this alternative, the level of activity and associated impacts to cultural resources would not be anticipated to change compared to Alternative 1 since the tract is not used extensively for recreation or travel.

Impacts from Lands and Realty Management Actions

Management actions and impacts associated with ROW development would be the same as Alternative 2.

Visual Resources

Impacts from Vegetative Communities Management Actions

Vegetative communities management actions and associated impacts would be the same as Alternative 2.

Impacts from Fish and Wildlife Habitat Management Actions

Fish and wildlife habitat management actions and associated impacts would be the same as Alternative 2.

Impacts from Minerals Management Actions

Since approximately 55 acres of vegetation removal and construction activities would result from the development of 10 oil and gas wells (as with Alternative 1), impacts would be the same as Alternative 1. However, stipulations applied under this alternative could preclude oil and gas development thereby protecting visual resources on the 92,269 acres managed as NSO and in areas where development would be precluded (63,004 acres). Since no mineral-development activities would occur on the surface tracts, there would be no violations of VRM class objectives.

Impacts from Recreation and Travel Management Actions

Recreation and travel management actions and associated impacts to visual resources would be the same as Alternative 2.

Impacts from Lands and Realty Management Actions

ROW management actions and associated impacts would be the same as Alternative 2.

Minerals

Impacts from Vegetative Communities Management Actions

Vegetative communities management actions would not restrict or preclude mineral development and exploration; therefore, impacts are not anticipated.

Impacts from Fish and Wildlife Habitat Management Actions

Fish and wildlife management actions would not restrict or preclude mineral development and exploration; therefore, impacts are not anticipated.

Impacts from Minerals Management Actions

Applying the lease stipulations and BMPs in Appendix D could restrict or preclude oil and gas development and exploration. Under this alternative, the NSO area around aquatic habitats identified in Alternative 2 would be reduced to 250 feet and the no-lease stipulation for Alabama beach mouse habitat would be NSO. Impacts would not be anticipated on approximately 259,640 acres open to leasing subject to standard lease terms and conditions. Managing approximately 3,021 acres as open to leasing subject to minor constraints and 92,269 acres as open to leasing subject to major constraints could increase development costs. Closing 63,004 acres to leasing would not affect oil and gas leasing because approximately 5 percent of the closed areas would be in areas of historical oil and gas production. Allowing for exceptions, waivers, and modifications to these stipulations (Appendix D) could create opportunities for the discovery of new oil and gas resources.

Impacts from Recreation and Travel Management Actions

Recreation and travel management actions would not restrict or preclude mineral development and exploration; therefore, impacts are not anticipated.

Impacts from Lands and Realty Management Actions

Lands and realty management actions would not restrict or preclude mineral development and exploration; therefore, impacts are not anticipated.

Recreation and Travel Management

Impacts from Vegetative Communities Management Actions

Vegetative communities management actions and associated impacts to recreation and travel would be the same as Alternative 2.

Impacts from Fish and Wildlife Habitat Management Actions

Fish and wildlife management actions and associated impacts to recreation and travel would be the same as Alternative 2.

Impacts from Minerals Management Actions

Since approximately 55 acres of vegetation removal and construction activities would result from the development of 10 oil and gas wells (as with Alternative 1), impacts would be the same as Alternative 1. Stipulations applied under this alternative could indirectly protect the recreational opportunities on the 92,269 acres managed as NSO and in areas where development would be precluded (63,004 acres) by eliminating associated ground disturbances, noise, and infrastructure.

Impacts from Recreation and Travel Management Actions

Recreation and travel management actions and associated impacts would be the same as Alternative 2.

Impacts from Lands and Realty Management Actions

ROW management actions and associated impacts to recreation and travel would be the same as Alternative 2.

Lands and Realty

Lands and realty management actions and associated impacts to lands and realty would be the same as Alternative 2.

Social and Economic

Impacts from Vegetative Communities Management Actions

Vegetative communities management actions and associated impacts to social and economic conditions would be the same as Alternative 2.

Impacts from Fish and Wildlife Habitat Management Actions

Impacts to social and economic conditions from fish and wildlife habitat management actions would be the same as impacts identified from vegetative communities management actions.

Impacts from Minerals Management Actions

The same number of wells and acres of surface disturbance as Alternative 1 is anticipated under this alternative; however, this alternative applies leasing stipulations to protect sensitive species and their habitats, including buffers for wetland and aquatic resources. Relative to Alternative 1, the exploration and development costs could increase while the availability for locations of wellpads could decrease, resulting in adverse impacts to the oil and gas industry. Since the number of wells anticipated is small relative to total wells in the area, there would be minimal social and economic changes, possibly slight increases in employment or income, as compared with the current situation. Oil and gas development and production can have implications for visual and scenic qualities as well as property values. These impacts are likely less than those under Alternative 1, as there are more conditions and constraints on wellpad locations under Alternative 3. Social indicators such as housing, education, and cost of living would not be anticipated to change under this alternative.

Impacts from Recreation and Travel Management Actions

Under Alternative 3, socioeconomic impacts would be the same as those identified under Alternative 2.

Impacts from Lands and Realty Management Actions

ROW management actions and associated impacts to social and economic conditions would be the same as Alternative 1.

Hazardous Materials

Impacts would be the same as Alternative 1.

4.3.4 Alternative 4

Air Quality

Under this alternative, there is a potential for wildfire which could lead to air emissions. Since all fires would be suppressed, these occurrences would be short term and localized and not be anticipated to individually deteriorate air quality conditions. Certain BLM-authorized activities within the planning area, such as oil and gas development, construction activities, vehicle travel, and mechanical hand tools or prescribed burning used in vegetation and wildlife habitat manipulation, would produce emissions considered to be GHGs, particularly CO_2. However, due to the anticipated dispersed and infrequent nature of these activities, the project emissions would not have any noticeable or measurable effect and, therefore, the total contribution of GHGs from authorized activities would be small as well. Other BLM activities may help offset any emissions and sequester carbon, such as maintaining vegetative and forested cover, which may help build organic carbon in soils and function as “carbon sinks”.

Impacts from Vegetative Communities Management Actions

No specific vegetative communities management actions are proposed under this alternative. Actions proposed under standard management common to all alternatives, which would allow vegetation manipulation to meet resources objectives, would not be anticipated to involve ground-disturbing activities of a severity or extent that would deteriorate air quality conditions. Prescribed burning conducted to meet vegetation resource objectives would be short term and localized and not be anticipated to individually deteriorate air quality conditions.

Impacts from Fish and Wildlife Habitat Management Actions

No specific fish and wildlife habitat management actions are proposed under this alternative. Actions proposed under standard management common to all alternatives, which would provide habitat improvements and protections under State wildlife conservation strategies (including control of invasive plant species, use of prescribed fire, and wetland enhancements), would not be anticipated to involve ground-disturbing activities of a severity or extent that would deteriorate air quality conditions. Prescribed burning conducted to meet habitat objectives would be short term and localized and not be anticipated to individually deteriorate air quality conditions.

Impacts from Minerals Management Actions

Anticipated levels of oil and gas development and associated air emissions would be the same as Alternative 1.

Impacts from Recreation and Travel Management Actions

Recreation and travel management actions and associated impacts would be the same as Alternative 2.

Impacts from Lands and Realty Management Actions

ROW management actions and associated impacts would be the same as Alternative 2.

Soil Resources

Impacts from Vegetative Communities Management Actions

No specific vegetative communities management actions are proposed under this alternative. Actions proposed under standard management common to all alternatives, which would allow vegetation manipulation to meet resources objectives, would not be anticipated to involve ground-disturbing activities of a severity or extent that would result in disturbance or loss of soils.

Impacts from Fish and Wildlife Habitat Management Actions

No specific fish and wildlife management actions are proposed under this alternative. Actions proposed under standard management common to all alternatives, which would provide habitat improvements and protections under State wildlife conservation strategies (including control of invasive plant species, use of prescribed fire, and wetland enhancements), would not be anticipated to involve ground-disturbing activities of a severity or extent that would result in disturbance or loss of soils.

Impacts from Minerals Management Actions

Impacts to soil resources from oil and gas development would be the same as Alternative 3.

Impacts from Recreation and Travel Management Actions

Although the Hancock County tract would be limited to motorized boating under this alternative, the level of activity that increases erosion would not be anticipated to change compared to Alternative 1 since the tract is not used extensively for recreation or travel.

Impacts from Lands and Realty Management Actions

Disposing the tract from Federal ownership with no restrictive covenants could increase chances for subsequent development and associated impacts to soil resources. However, given this tract's remoteness and location in the Hancock County Marshes Coastal Preserve, development would not be anticipated.

Since the Hancock County tract (a total of 174 acres or 100 percent of BLM surface ownership in Mississippi) would be managed as a ROW avoidance area, there would be less potential for impacts to soils associated with ROW development compared to Alternative 1.

Water Resources

Impacts from Vegetative Communities Management Actions

No specific vegetative communities management actions are proposed under this alternative. Actions proposed under standard management common to all alternatives, which would allow vegetation manipulation to meet resources objectives, would not be anticipated to involve ground-disturbing activities of a severity or extent that would result in impacts to water quality.

Impacts from Fish and Wildlife Habitat Management Actions

No specific fish and wildlife management actions are proposed under this alternative. Actions proposed under standard management common to all alternatives, which would provide habitat improvements and protections under State wildlife conservation strategies (including control of invasive plant species, use of

prescribed fire, and wetland enhancements), would not be anticipated to involve ground-disturbing activities of a severity or extent that would result in impacts to water quality.

Impacts from Minerals Management Actions

Impacts to water resources from minerals management, including oil and gas and coal development, would be the same as Alternative 3.

Impacts from Recreation and Travel Management Actions

Although the Hancock County tract would be limited to motorized boating under this alternative, the level of activity that impacts water resources would not be anticipated to change compared to Alternative 1 since the tract is not used extensively for recreation or travel.

Impacts from Lands and Realty Management Actions

Disposing the tract from Federal ownership with no restrictive covenants could increase chances for subsequent development and associated impacts to water resources. However, given this tract's remoteness and location in the Hancock County Marshes Coastal Preserve, development would not be anticipated.

Since the Hancock County tract (a total of 174 acres or 100 percent of BLM surface ownership in Mississippi) would be managed as a ROW avoidance area, there would be less potential for impacts to water resources associated with ROW development compared to Alternative 1.

Vegetative Communities

Impacts from Vegetative Communities Management Actions

No specific vegetative communities management actions are proposed in this alternative. Under standard management common to all alternatives, allowing vegetation manipulation to meet resources objectives would be allowed; however, lack of specific areas and species being managed could result in increased potential for invasive/exotic species becoming established or spreading. This is particularly true of the higher elevations of the Hancock County tract located on Point Clear Island. Cogon grass and Chinese tallow are both known to occur in the area and if uncontrolled could substantially alter the vegetative communities. Dense stands of cogon grass would displace native vegetation and could make the island and adjacent marshes more vulnerable to frequent wildfires.

Impacts from Fish and Wildlife Habitat Management Actions

No specific fish and wildlife habitat management actions are proposed in this alternative. Under standard management common to all alternatives, providing habitat improvements and protections under State wildlife conservation strategies (including control of invasive plant species, use of prescribed fire, and wetland enhancements), would be allowed; however, lack of specific areas and species being managed could result in the same impacts discussed under Impacts from Vegetative Communities Management Actions.

Impacts from Minerals Management Actions

Minerals management actions and associated impacts would be the same as Alternative 3.

Impacts from Recreation and Travel Management Actions

Recreation and travel management actions and associated impacts would be the same as Alternative 2.

Impacts from Lands and Realty Management Actions

Disposing the tract from Federal ownership with no restrictive covenants could increase chances for subsequent development and associated impacts to vegetative communities. However, given this tract's remoteness and location in the Hancock County Marshes Coastal Preserve, development would not be anticipated.

Fish and Wildlife

Impacts from Vegetative Communities Management Actions

No specific vegetative communities management actions are proposed in this alternative. Under standard management common to all alternatives, allowing vegetation manipulation to meet resources objectives would be allowed; however, lack of specific areas and species being managed could result in habitat degradation on any of the BLM surface tracts. The Hancock County tract located on Point Clear Island is particularly vulnerable to cogon grass and Chinese tallow.

Impacts from Fish and Wildlife Habitat Management Actions

No specific fish and wildlife habitat management actions are proposed in this alternative. Under standard management common to all alternatives, providing habitat improvements and protections under State wildlife conservation strategies (including control of invasive plant species, use of prescribed fire, and wetland enhancements), would be allowed; however, lack of specific areas and species being managed could result in the same impacts discussed under Impacts from Vegetative Communities Management Actions.

Impacts from Minerals Management Actions

Minerals management actions and associated impacts would be the same as Alternative 3.

Impacts from Recreation and Travel Management Actions

Recreation and travel management actions and associated impacts would be the same as Alternative 2.

Impacts from Lands and Realty Management Actions

Disposing the tract from Federal ownership with no restrictive covenants could increase chances for subsequent development and associated impacts to vegetative communities. However, given this tract's remoteness and location in the Hancock County Marshes Coastal Preserve, development would not be anticipated. Management of wildlife values is expected to continue in coordination with the Mississippi Coastal Preserve System.

Special Status Species

Impacts from Vegetative Communities Management Actions

No specific vegetative communities management actions are proposed in this alternative. Under standard management common to all alternatives, allowing vegetation manipulation to meet resources objectives

would be allowed; however, lack of specific areas and species being managed could result in increased potential for invasive/exotic species becoming established or spreading. This is particularly true of the higher elevations of the Hancock County tract located on Point Clear Island. Cogon grass and Chinese tallow are both known to occur in the area and if uncontrolled could substantially alter the habitats supporting Mississippi diamondback terrapin and tiny-leaved buckthorn. Dense stands of cogon grass would displace native vegetation and could make the island and adjacent marshes more vulnerable to frequent wildfires.

Impacts from Fish and Wildlife Habitat Management Actions

No specific fish and wildlife habitat management actions are proposed in this alternative. Under standard management common to all alternatives, providing habitat improvements and protections under State wildlife conservation strategies (including control of invasive plant species, use of prescribed fire, and wetland enhancements), would be allowed; however, lack of specific areas and species being managed could result in the same impacts discussed under Impacts from Vegetative Communities Management Actions.

Impacts from Minerals Management Actions

Minerals management actions and associated impacts would be the same as Alternative 3.

Impacts from Recreation and Travel Management Actions

Recreation and travel management actions and associated impacts would be the same as Alternative 2.

Impacts from Lands and Realty Management Actions

Under this alternative, the Hancock County tract would be available for disposal from Federal ownership. The effect this has on special status species is not known. Its location at the center of the Hancock County Marsh Preserve and the presence of extensive wetlands would make development of the tract difficult. It is likely that special status species would continue to benefit from the tract being managed in coordination with the Mississippi Coastal Preserve System.

Wildland Fire Ecology and Management

Impacts from suppressing all wildland fires and allowing prescribed burning on a case-by-case basis would be the same as Alternative 1.

Impacts from Vegetative Communities Management Actions

Although no specific vegetative communities management actions are proposed, allowing vegetation manipulation to meet resources objectives under standard management common to all alternatives would generally serve to decrease vegetation density and cover (fuel load) and maintain natural fuel conditions across the Hancock County tract. This would maintain natural disturbance regimes which would be easier to manage through prescribed fire or other treatments. This would also decrease the frequency and intensity of wildland fires and allow fires to be more easily controlled, better protecting life, public safety, and property and resource values. However, lack of specific areas and species being managed could result in invasions and fuel accumulations that would increase the frequency and intensity of wildland fires.

Impacts from Fish and Wildlife Habitat Management Actions

No specific fish and wildlife habitat management actions are proposed under this alternative; therefore, no impacts would be anticipated. Under standard management common to all alternatives, providing habitat improvements and protections under State wildlife conservation strategies (including control of invasive plant species, use of prescribed fire, and wetland enhancements), would result in impacts similar to those discussed under Impacts from Vegetative Communities Management Actions.

Impacts from Minerals Management Actions

Minerals management actions and associated impacts to wildland fire ecology and management would be the same as Alternative 3.

Impacts from Recreation and Travel Management Actions

Impacts to wildland fire ecology and management from recreation and travel management actions would be the same as Alternative 2 because travel designations would be the same for this alternative.

Impacts from Lands and Realty Management Actions

ROW management actions and associated impacts would be the same as Alternative 2.

Cultural Resources

Impacts from cultural resources management and wildland fire management actions would be the same as Alternative 1.

Impacts from Vegetative Communities Management Actions

No specific vegetative communities management actions are proposed under this alternative. Actions proposed under standard management common to all alternatives, which would allow vegetation manipulation to meet resources objectives, would require cultural resource clearances before activity were to occur; therefore, impacts would not be anticipated.

Impacts from Fish and Wildlife Habitat Management Actions

No specific fish and wildlife management actions are proposed under this alternative. Actions proposed under standard management common to all alternatives, which would provide habitat improvements and protections under State wildlife conservation strategies (including control of invasive plant species, use of prescribed fire, and wetland enhancements), would require cultural resource clearances before activity were to occur; therefore, impacts would not be anticipated.

Impacts from Minerals Management Actions

Minerals management actions and associated impacts to cultural resources would be the same as Alternative 3.

Impacts from Recreation and Travel Management Actions

Although the Hancock County tract would be limited to motorized boating under this alternative, the level of activity and associated potential impacts to cultural resources would not be anticipated to change compared to Alternative 1 since these tracts are not used extensively for recreation or travel.

Impacts from Lands and Realty Management Actions

Making the Hancock County tract available for disposal without any specified management or use conditions could have impacts if the property contained previously undetected, potentially eligible NRHP cultural sites. Disposing the property from Federal ownership would remove the protection of any cultural resources under Federal law, and not applying management or use conditions would increase the potential for damage of previously undetected cultural resources. Before any transfer of management responsibilities or ownership, a cultural resource survey and consultation with SHPO under NHPA Section 106 regulations would be required, mitigating this impact.

Management actions and impacts associated with ROW development would be the same as Alternative 2.

Visual Resources

Impacts from Vegetative Communities Management Actions

No specific vegetative communities management actions are proposed under this alternative. Actions proposed under standard management common to all alternatives, which would allow vegetation manipulation to meet resources objectives, would not be anticipated to involve ground-disturbing activities of a severity or extent that would result in impacts to visual quality. Although visual quality would deteriorate in the short term, visual quality would improve in the long term once vegetation has reestablished to meet VRM class objectives.

Impacts from Fish and Wildlife Habitat Management Actions

No specific fish and wildlife management actions are proposed under this alternative. Actions proposed under standard management common to all alternatives, which would provide habitat improvements and protections under State wildlife conservation strategies (including control of invasive plant species, use of prescribed fire, and wetland enhancements), would not be anticipated to involve ground-disturbing activities of a severity or extent that would result in impacts to visual quality. Although visual quality would deteriorate in the short term, visual quality would improve in the long term once vegetation has reestablished to meet VRM class objectives.

Impacts from Minerals Management Actions

Minerals management actions and associated impacts to visual resources would be the same as Alternative 3.

Impacts from Recreation and Travel Management Actions

Recreation and travel management actions and associated impacts to visual resources would be the same as Alternative 2.

Impacts from Lands and Realty Management Actions

Making the Hancock County tract available for disposal from Federal ownership without any specified management or use conditions if the R&PP were revoked could result in changes to the existing natural or manmade landforms, which would diminish visual quality if the use were to dominate the view of the casual observer. Following disposal, private development actions could create visually intrusive development.

ROW management actions and associated impacts would be the same as Alternative 2.

Minerals

Impacts from Vegetative Communities Management Actions

Vegetative communities management actions would not restrict or preclude mineral development and exploration; therefore, impacts are not anticipated.

Impacts from Fish and Wildlife Habitat Management Actions

Fish and wildlife management actions would not restrict or preclude mineral development and exploration; therefore, impacts are not anticipated.

Impacts from Minerals Management Actions

Mineral management actions for oil and gas and associated impacts would be the same as Alternative 3.

Impacts from Recreation and Travel Management Actions

Recreation and travel management actions would not restrict or preclude mineral development and exploration; therefore, impacts are not anticipated.

Impacts from Lands and Realty Management Actions

Lands and realty management actions would not restrict or preclude mineral development and exploration; therefore, impacts are not anticipated.

Recreation and Travel Management

Impacts from Vegetative Communities Management Actions

No specific vegetative communities management actions are proposed under this alternative. Actions proposed under standard management common to all alternatives, which would allow vegetation manipulation to meet resources objectives, would not be anticipated to involve ground-disturbing activities of a severity or extent that would result in impacts to recreation.

Impacts from Fish and Wildlife Habitat Management Actions

No specific fish and wildlife habitat management actions are proposed under this alternative. Actions proposed under standard management common to all alternatives, which would provide habitat improvements and protections under State wildlife conservation strategies (including control of invasive plant species, use of prescribed fire, and wetland enhancements), would not be anticipated to involve ground-disturbing activities of a severity or extent that would result in impacts to recreation.

Impacts from Minerals Management Actions

Minerals management actions and associated impacts to recreation and travel would be the same as Alternative 3.

Impacts from Recreation and Travel Management Actions

Recreation and travel management actions and associated impacts would be the same as Alternative 2.

Impacts from Lands and Realty Management Actions

Making the Hancock County tract available for disposal from Federal ownership without any specified management or use conditions if the R&PP were revoked could result in reduced access for recreation and travel opportunities. Following disposal, the tract could be made unavailable for public recreation and become inaccessible.

Lands and Realty

ROW management actions and associated impacts to lands and realty would be the same as Alternative 2. Under Alternative 4, the 174-acre Hancock County tract would be available for disposal from Federal ownership with no restrictive covenants. This would allow for opportunities for other Federal agency or non-Federal ownership without specified conditions on future use of the tract; however, disposal would not be allowed if it would jeopardize Federally listed species or designated critical habitat, which could limit some disposals.

Social and Economic

Impacts from Vegetative Communities Management Actions

Impacts to social and economic conditions would not be anticipated from vegetative communities management actions since no actions are proposed under this alternative. Standard management actions common to all alternatives, which would allow vegetation manipulation to meet resource objectives, would not be anticipated to be of an extent that would result in impacts to economic or social conditions.

Impacts from Fish and Wildlife Habitat Management Actions

Impacts to social and economic conditions would not be anticipated from fish and wildlife habitat management actions since no actions are anticipated. Standard management actions common to all alternatives, which would provide habitat improvements and protections under State wildlife conservation strategies (including control of invasive plant species, use of prescribed fire, and wetland enhancements), would not be anticipated to be of an extent that would result in impacts to economic or social conditions.

Impacts from Minerals Management Actions

Minerals management actions and the associated impacts to social and economic conditions would be the same as those under Alternative 3.

Impacts from Recreation and Travel Management Actions

Under Alternative 4, socioeconomic impacts would be the same as those identified under Alternative 2.

Impacts from Lands and Realty Management Actions

Under Alternative 4, the Hancock County tract would be available for disposal from Federal ownership without conditions on management and use after disposal. This could result in reduced access for recreational opportunities on these lands. Since development could be allowed on these properties, it is possible that the property tax revenues to the local counties would increase more than the Federal Payments in Lieu of Taxes, economically benefiting Hancock County and the State. It is possible that the private development of this tract could slightly increase employment and income in these areas. Social indicators, such as housing, education, and cost of living are not expected to be influenced by the minimal development.

Hazardous Materials

Impacts would be the same as Alternative 1.

4.4 CUMULATIVE IMPACTS

Cumulative impacts analysis considers the alternatives in the context of the broader human environment—specifically, actions that occur outside the scope and geographic area covered by the Proposed RMP-FEIS. The following factors are considered in the cumulative impact assessment: Federal, non-Federal, and private actions; the potential for synergistic effects or synergistic interaction among or between effects; the potential for effects to cross political and administrative boundaries; other spatial and temporal characteristics of each affected resource; and the comparative scale of cumulative impacts across alternatives.

Past, present, and potential future actions are considered in the analysis to identify whether the environment has been degraded or enhanced, and to what extent; whether ongoing activities are causing impacts; and trends for activities and impacts in the area. Projects and activities are evaluated on the basis of proximity, connection to the same environmental systems, potential for subsequent impacts or activity, similar impacts, the likelihood a project will occur, and whether the project is reasonably foreseeable. Projects and activities considered in the cumulative analysis were identified through discussions with agency officials and review of publicly available materials and websites. The following projects and activities were identified:

- **Mineral Development.** Between 1983 and 2004, 8,068 wells have been completed in Alabama. Of those, 17 wells were drilled to BLM-administered, non-USFS FMO. The BLM currently oversees 30 active leases on BLM-administered, non-USFS FMO and 106 active leases on USFS FMO in Alabama. An estimated 20 wells (105 acres of surface disturbance) could be developed on BLM-administered, non-USFS FMO lands in Alabama over the next 20 years. An estimated 4,000 wells (20,811 acres of surface disturbance) could be developed on non-Federal and USFS lands in Alabama over the next 20 years. Future anticipated well development in Alabama is shown in Table 4-5.

Table 4-5. Future Anticipated Well Development In Alabama

	Federal (non-USFS)	Federal (USFS)	Non-Federal	Total
Number of Wells	20	12	3,988	4,020
Total Acres of Surface Disturbance	105	61	20,750	20,916

Between 1983 and 2004, 7,362 wells have been completed in Mississippi. Of those, seven wells were drilled to BLM-administered, non-USFS FMO, two of which were drilled from other Federal agency surface ownership and five from non-Federal surface ownership. The BLM currently oversees 42 active leases on BLM-administered, non-USFS FMO and 1,181 active leases on USFS FMO in Mississippi. An estimated 10 wells (55 acres of surface disturbance) could be developed on BLM-administered, non-USFS FMO lands in Mississippi over the next 20 years. An estimated 12,000 wells (59,745 acres of surface disturbance) could be developed on non-Federal and USFS lands in Mississippi over the next 20 years. Future anticipated well development in Mississippi is shown in Table 4-6.

Table 4-6. Future Anticipated Well Development In Mississippi

	Federal (non-USFS)	Federal (USFS)	Non-Federal	Total
Number of Wells	10	350	11,650	12,010
Total Acres of Surface Disturbance	55	1,925	57,820	59,800

- **Coal Development.** For the purposes of this analysis, new Federal coal leases of 9,000 acres could be anticipated. Approximately 37.6 million tons of Federal coal would be produced over the next 20 years (avg. 1.9 tons/yr.) as part of preexisting underground mines with no new surface disturbance.

- **Potential Development after Disposal of the Surface Tracts.** For the purposes of the cumulative impact analysis, assumptions were made as to the potential development of the surface tracts following disposal for Alternatives 3 and 4.

  Under Alternative 3, the Jordan Lake tract would likely be developed as a recreation camp following disposal. No development would be expected following disposal of the Geneva County tract.

  Under Alternative 4, the Fort Morgan Beach, Fort Morgan Highway, and Fowl River tracts would be developed for residential or recreational use. The Coosa River and Jordan Lake tracts would be developed as recreation camps following disposal. No development would be expected following disposal of the Geneva County tract.

  Under Alternatives 3 and 4, the Hancock Country tract in Mississippi would continue to be used for recreation and research site purposes with no expected development.

- **Fuels Treatments.** Table 4-7 shows the fuels treatments completed in Alabama by Department of the Interior (DOI) agencies and USFS. The BLM did not conduct any fuels treatments in Alabama over these 4 years. Over 98 percent of these treatments were completed by the USFS using prescribed fires approximately 90 percent of the time; the remainder were completed with mechanical treatments. Over 97 percent of Federal fuels treatments were applied in WUI areas.

Table 4-7. 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
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							

Table 4-8 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; the remainder were completed with mechanical treatments. Over 96 percent of Federal fuels treatments were applied in WUI areas.

Table 4-8. 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
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							

- **Soil Disturbance and Vegetation Loss from Construction Projects.** Other construction projects across the State, including private development and transportation projects, create soil disturbance and vegetation loss. The 1997 and 2003 National Resources Inventories (NRI) provide for estimates of land use conversion over time. Surface disturbance for oil and gas development would be comparable to the NRI category of "Developed Land." Comparison with the NRI data will put the proposed actions of the Proposed RMP (e.g. the oil and gas RFDS) in context for cumulative impact analysis. The information from the 1997 NRI (including data for the period 1982–1997) and the 2003 NRI is briefly described below and is shown in Table 4-9. The increase in developed land over time can be seen by scanning down the "Developed" land column.

  The 1997 NRI data indicates that the acres of developed land in Alabama increased by 635,700 acres from 1982 to 1997, an average of 42,380 acres per year. The 2003 NRI shows that developed land increased to 2,273,900 acres in Alabama by 2003. This is an increase of 471,600 acres for the 6-year period, 1997–2003, an annual average of 78,600 acres.

  The 1997 NRI data indicates that the acres of developed land in Mississippi increased by 353,800 acres from 1982–1997, an average of 23,587 acres per year. The 2003 NRI shows that developed land increased to 1,676,300 acres in Mississippi by 2003. This is an increase of 202,300 acres for the 6-year period, 1997–2003, an annual average of 33,717 acres.

Table 4-9. Developed Surface Area of Non-Federal and Federal Land and Water Areas, by State and Year (data per 1,000 acres)

State	Year	Federal Land	Water Areas	Non Federal Land			Total Surface Area
				Developed	Rural	Total	
Alabama	1982	949.3	1,166.8	1,616.6	29,691.1	31,307.7	33,423.8
	1987	950.1	1,181.4	1,807.2	29,485.1	31,292.3	33,423.8
	1992	970.0	1,201.0	1,937.0	29,315.8	31,252.8	33,423.8
	1997	997.9	1,223.2	2,252.3	28,950.4	31,202.7	33,423.8
	2003	997.9	1,281.4	2,723.9	28,420.6	31,144.5	33,423.8
Mississippi	1982	1,634.6	720.5	1,120.2	27,052.0	28,172.2	30,527.3

State	Year	Federal Land	Water Areas	Non Federal Land			Total Surface Area
				Developed	Rural	Total	
	1987	1,673.5	791.4	1,193.1	26,869.3	28,062.4	30,527.3
	1992	1,751.9	829.8	1,267.6	26,678.0	27,945.6	30,527.3
	1997	1,769.7	855.0	1,474.0	26,428.6	27,902.6	30,527.3
	2003	1,794.8	884.3	1,676.3	26,171.9	27,848.2	30,527.3

Notes: The following are definitions from the NRI:
Developed Land. A combination of land cover/use categories, large urban and built-up areas, small built-up areas, and rural transportation land.
Large Urban and Built-up Areas. A land cover/use category composed of developed tracts of at least 10 acres—meeting the definition of urban and built-up areas.
Rural Transportation Land. A land cover/use category which consists of all highways, roads, railroads, and associated ROW outside urban and built-up areas; also includes private roads to farmsteads or ranch headquarters, logging roads, and other private roads (field lanes are not included).
Small Built-up Areas. A land cover/use category consisting of developed land units of 0.25 to 10 acres, which meet the definition of urban and built-up areas.
Urban and Built-up Areas. A land cover/use category consisting of residential, industrial, commercial, and institutional land; construction sites; public administrative sites; railroad yards; cemeteries; airports; golf courses; sanitary landfills; sewage treatment plants; water control structures and spillways; other land used for such purposes; small parks (less than 10 acres) within urban and built-up areas; and highways, railroads, and other transportation facilities if they are surrounded by urban areas. Also included are tracts of less than 10 acres that do not meet the above definition but are completely surrounded by urban and built-up land. Two size categories are recognized in the NRI: areas of 0.25 acre to 10 acres, and areas of at least 10 acres.

Sources: USDA 2000, USDA 2007

4.4.1 Cumulative Impacts from BLM Management Actions in Alabama

Air Quality

The cumulative impacts on air quality are evaluated by comparing the BLM site emissions with regionwide emissions. For the State of Alabama, comprehensive emissions are only available for NO_X, CO, and VOCs in the major urbanized areas. These emissions can be obtained from the ADEM. Using the best available information from ADEM, Table 4-10 shows a comparison between the Birmingham Non-Attainment Area and the BLM induced emissions. Based on this data, emissions from activities associated with potential oil and gas development and minerals mining on BLM-administered, non-USFS FMO tracts proposed in this RMP would not considerably contribute to cumulative air quality emissions within the region (presented in Table 4-10). Over the next 20 years, emissions from 20 wells would compose less than 1 percent of the emissions associated with the estimated 4,000 wells that could be developed on non-Federal and USFS lands in Alabama. These impacts would be the same for all alternatives.

BLM-authorized activities would have small contributions to GHG emissions in comparison to the estimated U.S. emissions of CO_2 in 2006 (5,983.1 Tg CO_2 Eq.[3] (EPA 2008). These impacts would be the same for all alternatives. As discussed in Chapter 3, 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).

[3] Carbon comprises 12/44ths of carbon dioxide by weight. One teragram is equal to 10^{12} grams or one million metric tons.

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.

Table 4-10. Comparison of Potential BLM Emissions with Cumulative Emissions for Alabama (tons per year) [1, 2]

Well and Mine Locations	Emission Type/Pollutant		
	NO_x	CO	VOC
BLM-administered FMO Estate in Alabama	171	219	73
Birmingham NAA	578,799	2,902,972	448,946

1. Compared with best available 2002 data from the Alabama Department of Environmental Management (ADEM 2005).
2. A combination of oil and gas and coal mining.

Soil Resources

In Alabama, the disturbance of a maximum of 105 acres from oil and gas development across the State of Alabama composes less than one percent of the 20,811 acres of surface disturbance anticipated from oil and gas development on non-Federal and USFS lands over the next 20 years. Although more than 8,000 wells have been completed in Alabama since 1983, the minimal number of 20 additional wells identified in the reasonably foreseeable development scenario (RFDS) would have no long-term impacts to soil productivity and, therefore, would not contribute to significant cumulative effects. These impacts would be the same for all alternatives.

Possible soil impacts associated with vegetative communities, fish and wildlife habitat, and lands and realty management actions, including ROW development and potential development after disposal on the 159 acres of surface tracts, compose less than one percent of the 78,600 acres disturbed annually (1997–2003) from other construction projects across the State, including private development and transportation projects (as estimated by the NRI data). There would be more potential for soil disturbance impacts associated with vegetative communities and fish and wildlife habitat management actions proposed under Alternatives 2 and 3 as opposed to Alternatives 1 and 4, which do not propose any actions beyond standard management common to all alternatives. There would be more potential for soil disturbance impacts associated with ROW management actions under Alternative 1, which allows ROW development on all surface tracts, than Alternatives 2, 3, and 4, which designate 114 acres or 71 percent BLM surface ownership in Alabama as ROW avoidance areas. There would be more potential for soil disturbance impacts associated with potential development after disposal without conditions under Alternative 4 than Alternatives 1, 2, and 3, which either retain the tracts (Alternatives 1 and 2) or place restrictive covenants on the use after disposal (Alternative 3).

Water Resources

Water resources located on or adjacent to Alabama surface tracts could experience change as a result of mineral exploration and development or construction activities. However, the BMPs and stipulations identified in Appendix D would minimize irreversible and irretrievable commitment of resources and unavoidable adverse impacts. Impacts to water quality associated with possible ROW development and the disturbance of a maximum of 105 acres from oil and gas development across the State of Alabama compose less than one percent of the 20,811 acres of surface disturbance anticipated from oil and gas development on non-Federal agency and USFS lands. However, the minimal number of 20 additional wells identified in the RFDS would have no long-term impacts to soil stability or water quality and would limit the likelihood of leakage of drill fluids, hazardous waste spills, or leakage from reserve pits (if established) that could impact surface water and ground water quality. The cumulative impact of brine waste reinjection into aquifers beneath Federal and non-Federal lands over the next 20 years could be significant because by the year 2027, the number of new wells on non-federal lands is estimated to be 4,020 in Alabama and 12,010 in Mississippi. However, the minimal number of 20 additional wells identified in the RFDS would have no long-term cumulative impacts from waste brine reinjection. Thus, significant cumulative impacts would not be anticipated. In order to reinject produced water from federal and nonfederal, an oil and gas operator must obtain a permit as required by the Onshore Oil and Gas Order No. 7, which is intended to minimize the potential for cumulative impacts. EPA has granted the State of Alabama primacy over the permitting of underground injection wells. The underground injection regulations address the siting, construction, operation, monitoring, and closing of an injection well. These requirements are designed to prevent contamination of surface and underground drinking water sources and would reduce cumulative impacts. Potential development after disposal on the 159 acres of surface tracts composes less than one percent of the 78,600 acres disturbed annually (1997–2003) from other construction projects across the State, including private development and transportation projects (as estimated by the NRI data).

Coal mining activities within the Warrior Basin would be expanded to include 9,000 acres of new coal leases that would yield an estimated average of 1.9 million tons of coal per year over the next 20 years. Although this increased mining would be limited to existing underground coal mines, the potential for ground water contamination would cumulatively increase as a result of the increased mining activities. Migration of contaminants into the surrounding soils and aquifers could degrade ground water quality and thereby affect wells and springs that may serve household and domestic uses. These impacts would be the same for all alternatives.

Vegetative Communities

The continuation of mineral development (totaling approximately 4,000 wells with 20,811 acres of surface disturbance) and soil disturbance and vegetation loss from other construction projects in the State (approximately 78,600 acres of surface disturbance annually) has a high potential of affecting vegetative communities, such as glades and prairies, that are sensitive to disruption and difficult to restore after surface-disturbing activities. These activities also have the potential to introduce and promote the spread of invasive, exotic plant species.

Throughout the State, some vegetative communities, embedded in the larger forested landscape, are particularly sensitive to disruption and are difficult to restore after surface-disturbing activities. Many of these are restricted to a narrow range of soil types such as glades and prairies; others are sensitive to changes in hydrography, such as bogs, forested wetlands, and seepage slope communities. Construction activities in these plant communities generally alter the site sufficiently to preclude the reestablishment of these communities in the foreseeable future. Also, because of the limited acreage of these vegetative communities, loss of even small acreages has a disproportionate effect on the plant diversity in an area.

Surface-disturbing activities have the potential to introduce or promote the spread of invasive, exotic plant species. Impacts are dependent on the species planted during restoration activities and the management of the site during and following restoration. Restoration activities typically include seeding non-native grasses, such as annual rye (during the winter months) and Bahia or Bermuda grass (during the summer months), to provide a quick cover for disturbed soils. Including native species in the mix increases diversity and provides a more natural structure. If these areas are mowed following abandonment, these non-native grasses are expected to persist and dominate the site. If, however, the sites are replanted in pine or left unmowed, the areas can be expected to progress through old field-type growth, which is dominated by opportunistic native and non-native species alike. Ultimately, both Bahia and Bermuda grass are expected to become shaded out as a tree or heavy shrub layer becomes established. Japanese honeysuckle and Chinese privet can both persist in shaded situations.

Although effects to vegetative communities from surface-disturbing activities and the introduction of invasive, exotic plant species would likely occur as a result of the reasonably foreseeable actions identified for this analysis, BLM activities would have a minimal contribution to these effects on plant communities due to the small amount of acreage that would be disturbed under the BLM management alternatives and the BLM policies on BMPs for mineral development reclamation and control of noxious, exotic species.

Fish and Wildlife

The continuation of mineral development (totaling approximately 4,000 wells with 20,811 acres of surface disturbance) and soil disturbance and vegetation loss from other construction projects across the State (approximately 78,600 acres of surface disturbance annually) has a high potential of affecting wildlife and associated habitat through displacement, habitat degradation, and direct habitat loss.

Impacts to many wildlife species from oil and gas development are localized and temporary. Most common game species and other mobile wildlife species avoid the wellpad areas during construction and maintenance. Less mobile species are directly impacted and, during the spring and early summer, this can include nesting neotropical birds. Habitat generalists, including most game species, tend to return to surrounding habitats after the well is completed and construction and maintenance activities have ceased. Intermittent maintenance and inspection activities conducted on the established pad for the life of the well are not expected to alter the overall use of the area by wildlife. However, construction in high-value habitats or in areas with more narrowly adapted wildlife species can alter the overall species diversity. Wells and roads in areas of contiguous forests increase habitat fragmentation, reducing the suitability of the area for interior nesting birds and making nests more susceptible to predation and parasitism. Older growth forests, which provide habitat for interior forest nesting birds and a wider diversity of amphibians and reptiles, are often located in riparian zones left as buffers during logging operations or in steeper, less accessible slopes.

Oil and gas drilling continues for 24 hours a day until the well is completed. During this time, most wildlife, including waterfowl and many songbirds, are expected to avoid the immediate area. However, once drilling is completed, reserve pits with water (which can become soiled by drilling fluids) can become a hazard for waterfowl and other birds. If the well is put into production, there is documentation of birds and bats using open-vent stacks for roosting or perching. Once in these stacks, animals can become trapped or asphyxiated. While much of the work documenting this problem has occurred in western States, the situation in Alabama is expected to be similar.

Roads and other construction projects across the State can alter the local hydrography, reducing surface flow to mesic areas and diverting or degrading surface water supporting wetland habitats. Installation of culverts and diverting existing drainages help to maintain existing hydrologic systems, but the disturbance

causes local sedimentation and can retard sheet flow to wetland habitats. Amphibians and many reptiles associated with wetland communities are vulnerable to disturbance, as they are not highly mobile and tend to have narrow habitat requirements.

Impacts would also include the direct loss of habitat from the general construction projects, including private development and transportation projects, from degradation of nearby aquatic or wetland habitats through sedimentation or changes in hydrology.

Although significant habitat degradation and loss would likely occur as a result of the reasonably foreseeable actions identified for this analysis, the BLM activities would have a minimal contribution to these effects on wildlife due to management protection provided under all alternatives, with Alternatives 2, 3, and 4 providing more stringent protection than Alternative 1. In the long term, depending on the location and intensity of construction and minerals development, it is likely that public lands containing viable habitats for wildlife would continue to be utilized by these species.

Special Status Species

Given the high number and dispersed distribution of special status species in aquatic and wetland habitats in Alabama, the continuation of mineral development (totaling approximately 4,000 wells with 20,811 acres of surface disturbance) and soil disturbance and vegetation loss from other construction projects across the State (approximately 78,600 acres of surface disturbance annually) near rivers, creeks, or wetland habitats has a high potential of affecting special status species in the immediate area or downstream of the disturbance.

Impacts to aquatic and wetland habitats would occur through degradation of water quality through increased sedimentation or turbidity, contamination, direct loss of habitat, and changes in local hydrography. Sedimentation and increased turbidity are listed as current threats to most of Alabama's mussels and special status fish species. The potential for sedimentation increases with prolonged or heavy rains that are typical in this area. Cut and fill slopes associated with other construction projects across the State are particularly vulnerable before protective plant covers have been established. Intact vegetation along riparian zones and around wetlands could substantially buffer these areas. Sediments deposited in intermittent drainages and headwater streams would be transported downstream during periods of high water, increasing turbidity and burying aquatic invertebrates in higher order streams.

Filling wetlands, including bogs, seepage slopes, wet flatwoods, and forested swamps, for construction and maintenance of wellpads for oil and gas development and/or other construction projects across the State generally alters the site sufficiently to preclude the reestablishment of these communities in the foreseeable future, and could result in direct habitat loss for a wide variety of special status species that use these habitats. Because so many of these species have limited ranges, the list of species potentially affected varies by location. Generally, because of the limited acreage of these vegetation communities, loss from even the small amount of disturbance has the potential of destroying or degrading habitat for special status species. Construction and maintenance activities and other construction projects across the State could disrupt the local hydrography supporting seepage slopes or sheet flow to bogs and swamps degrading these habitats.

Karst formations support cave habitats with high numbers of special status species, including many endemic crayfish, salamanders, and bats and are particularly sensitive to oil and gas development. In caves, even minor alterations in temperature, humidity, and water quality or water quantity could result in irreversible impacts. Caves, by their nature, are isolated and support highly endemic faunas often with extremely narrow habitat requirements. Wells drilled through cave/karst resources could result in contaminants, such as drilling fluids and cements, draining into the cave/karst system. Karst habitats

could be degraded by hydrocarbons from spills or leaks from well casings, storage tanks, reserve pits, pipelines, and production facilities that may enter into the cave/karst systems. Additionally, cementing operations could affect portions of underground drainage systems by restricting ground water flow and introducing pollutants into karst systems. Other possible impacts are vented or escaped gases collecting in sinkholes and caves. These gases could cause a die-off of plant and animal life that use the special habitat created by the microclimate of the cave entrances or sinkhole.

Although significant habitat degradation and loss would likely occur as a result of the reasonably foreseeable actions identified for this analysis, the BLM activities would have a minimal contribution to these effects on special status species due to the minimal numbers of oil and gas development anticipated (20 wells) and management protection provided for these species under all alternatives, with Alternatives 2, 3, and 4 providing more stringent protection than Alternative 1. The BLM would also be required to consult with USFWS to identify and establish specific conservation actions that could be taken to mitigate the potential effects of land management activities.

Wildland Fire Ecology and Management

In addition to the ignition sources associated with development of 20 new oil and gas wells noted in the impact analysis, there are over 8,000 existing oil and gas wells throughout Alabama. An additional 4,000 oil and gas wells would be developed on non-Federal and USFS FMO over the next 20 years. Cumulatively, the potential increases in wildland fires from the addition of 20 wells compared to 12,000 existing and potential wells would not significantly increase the risk of fire in Alabama. Likewise, the infrastructure associated with oil and gas or ROW developments would not significantly improve access or provide fuels breaks compared to the cumulative developments and current rate of 78,600 acres of land developed annually (1997–2003) in Alabama.

The cumulative effect of proposed vegetation treatments on the 159 acres of surface tracts would be in addition to 86,154 acres of vegetation treatments by other Federal agencies, as well as prescribed burns performed by State and local agencies and private or corporate forestry operations. The proposed treatments would help maintain or restore small areas to their natural regimes as well as improve the ability to protect WUI areas from wildfire. Cumulatively, the implementation of all these treatments would reduce the cost of suppressing wildfires.

Cultural Resources

While cultural resources on USFS FMO and non-USFS FMO enjoy legal protection, similar protection from surface-disturbing activities does not apply to cultural resources from private actions on private lands. Oil and gas development in areas with private surface and FMO still require compliance with cultural resource laws. However, oil and gas development in areas of private surface and private mineral ownership, or non-mineral developments in areas with private surface FMO, could result in cumulative impacts to cultural resources throughout Alabama. This could result in unmitigated damage and loss of cultural sites and artifacts in areas of private surface and mineral ownership where oil and gas wells are developed. Cumulatively, Alternative 2 provides the greatest level of protection from cumulative impacts due to the largest number of closed and NSO acres. Alternatives 3 and 4 provide the next greatest level of protection. In these areas, the potential for inadvertent damage and loss of cultural resources is the lowest.

An additional 105 acres associated with development of 20 wells on non-USFS FMO and 20,811 acres associated with development of an estimated 4,000 additional wells on non-Federal mineral estate and USFS FMO would be added to the existing disturbance from development of over 8,000 oil and gas wells in Alabama over the past 20 years. Acreage developed on USFS FMO would receive protections from Federal law, regulation, and policy. Developments in those areas would be required to comply with

NHPA and Archaeological Resources Protection Act (ARPA) in inventorying areas and determining eligibility of sites for the NRHP. Additional developments on USFS FMO would result in the identification of more cultural sites during inventories. Excavation of sites as part of mitigating impacts from development on USFS FMO would enable scientific retrieval and study of cultural resources, using today's technology and methodology. While data recovery preserves as much data as possible, the excavated portions of the property would be lost or damaged. Removing cultural resources from a site using current scientific methods also reduces future scientific value if more accurate methods of analysis are developed.

Combined with disturbance from mineral development, other Federal agencies perform over 86,000 acres of vegetation treatments throughout Alabama annually. Approximately 92 percent of the treated acres (79,219 acres) would be treated by prescribed fire. Additional acreages would be treated by State and local agencies and private individuals. Treatments by Federal agencies would require cultural inventories prior to implementation, identifying and protecting cultural sites. However, treatments by State and local agencies and private individuals could impact cultural resources through burning and suppression efforts. Cumulatively, the alternatives would have little effect on these impacts as the levels of treatment and the BLM surface acreage are very small in comparison, although Alternatives 3 and 4 would have the greatest cumulative effect as they propose the greatest levels of vegetation treatment to support other resources.

Development of the BLM surface tracts would not be permitted until disposal, which would only occur under Alternatives 3 and 4. Protection measures in Alternative 3 would protect cultural resource sites from damage or loss. However, under Alternative 4, it is assumed that the Coosa River, Fort Morgan Beach, Fort Morgan Highway, Fowl River, and Jordan Lake tracts would all be developed. All the tracts except the Coosa River tracts have been inventoried, so potential impacts would be limited to those 42 acres. Following disposal, developments on these tracts would no longer require cultural inventories or mitigation, which could result in the damage or loss of cultural sites. Cumulatively, this would be in addition to an approximate 78,600 acres of development per year on private land, which could similarly impact cultural sites.

The number of sites anticipated to be cumulatively damaged resulting from actions proposed in this RMP combined with other cumulative projects and activities is unknown because most areas have not been surveyed for cultural resources.

Visual Resources

Cumulative impacts on visual resources would occur primarily from activities that affect the visual quality of the area. Such impacts would result from mineral-development activities, ROW development, increased recreational activity, and actions associated with management of vegetative communities and fish and wildlife habitat. Surface-disturbing activities associated with mineral development and ROWs would create visual intrusions that could alter the landscape setting and degrade visual quality. The possible ROW development and disturbance of a maximum of 105 acres from oil and gas development across the State of Alabama composes less than one percent of the 20,811 acres of surface disturbance anticipated from oil and gas development on non-Federal and USFS lands. Although more than 8,000 wells have been completed in Alabama since 1983, the minimal number of 20 additional wells identified in the RFDS would not significantly diminish visual quality. Closing or limiting areas to motorized recreation uses and implementing restrictions designed to protect sensitive resources would help to maintain the visual quality in restricted areas. Efforts to maintain and improve vegetative communities and fish and wildlife habitat would indirectly enhance visual quality through improvement of the visual landscape.

Cumulative impacts would be similar among the four alternatives, as the same level of development is expected under all alternatives. However, Alternatives 2, 3, and 4 provide for specific actions to improve vegetative communities and fish and wildlife habitat, thereby enhancing visual quality. In addition, implementing an NSO stipulation within 1,000 feet of aquatic habitats under Alternative 2 would preserve the visual quality within these areas. Impacts would likely be greatest under Alternative 4, as development of the tract is expected to occur subsequent to disposal, which would add to the visual intrusions of development on adjacent lands for some tracts, such as the Fort Morgan tracts.

Minerals

In Alabama, no cumulative impacts would be anticipated to minerals exploration and development as a result of BLM-administered surface tract and non-USFS FMO land use allocations and management actions since the RMP would not restrict or preclude mineral development and exploration. An irretrievable commitment of oil and gas and coal would result from mineral extraction via 20 wells developed over the next 20 years in Alabama and continued leasing of 1.9 million tons of coal per year over the next 20 years (37.6 million tons of Federal coal) on non-USFS FMO in the Warrior Basin. These impacts would be the same for all alternatives.

Recreation and Travel Management

Most of Alabama is not managed by the Federal Government, and recreation and travel opportunities are often dependent on whether the private landowner allows access to the private surface. Therefore, maintaining Federal ownership of public lands under Alternatives 1 and 2 would maintain limited opportunities for public recreation and travel. Under Alternatives 3 and 4, opportunities for travel and recreation could be precluded after disposal, cumulatively adding to the current restrictions on private lands throughout the State. Although the BLM management actions and disposal actions under the alternatives could have localized impacts to recreation experience and travel opportunities, no significant cumulative impacts would be anticipated because of the small size and scattered nature of BLM-administered surface tracts. Much of the access to the scattered BLM tracts is controlled by other surface owners. Cumulative projects and activities (continued mineral development and other construction projects) could lead to more travel opportunities associated with increased route construction to support mineral development, but there would also be a reduction in primitive/non-motorized recreation opportunities. Minerals development on non-USFS FMO lands open to recreation and leasing could result in unavoidable adverse impacts to recreation through detracting from the recreational setting. Mineral exploration and development activities would have short-term effects on the quality of the setting because of drilling equipment and long-term impacts from road construction and vegetation removal.

Development assumed to occur on disposed tracts under Alternative 4 could change the recreation opportunities from dispersed in nature to more developed on the Coosa River, Jordan Lake, Fort Morgan Beach and Highway, and Fowl River tracts. In these areas, recreational developments would reduce opportunities for dispersed recreation, as well as reducing travel in these areas of private development. Under Alternative 3, this impact would be limited to the Jordan Lake tract.

Lands and Realty

Increasing development leads to a greater demand for lands and realty actions, creating the need for additional ROWs for roads, pipelines, and power lines. Restrictions on ROWs under Alternatives 2, 3, and 4 would have a negligible cumulative effect by reducing routing options and possibly increasing construction costs for ROW development since there are only 159 acres of BLM-administered lands scattered across the State. Increasing development also leads to a greater demand for additional available land.

Social and Economic

BLM-administered minerals comprise a very small proportion of oil and gas development in Alabama. Twenty new oil and gas wells in Alabama constitute less than one percent (0.5 percent) of the 4,000 anticipated oil and gas wells on USFS and non-Federal agencies lands. Historically, the BLM has permitted 17 wells on BLM-administered FMO in Alabama, representing 0.2 percent of the 8,068 total wells permitted over the past 20 years. In Alabama, with the anticipated well projections, BLM FMO would represent slightly more of the total wells, compared to the previous 20 years; however, the BLM-administered FMO wells are half of one percent and still relatively a very small percentage.

Overall, the rate of oil and gas development in Alabama is expected to decrease, from 8,068 wells (average of 403 wells per year) to 4,000 anticipated over the next 20 years (average of 200 wells per year). This is a decrease in oil and gas development by 50 percent (from the last 20 years to the next 20 years).

Many of the cumulative socioeconomic impacts associated with oil and gas development are already occurring in the region and would be perpetuated in the future. For instance, oil and gas activity is generating employment opportunities and labor earnings for communities that support these types of activities. However, the employment and income from BLM-administered oil and gas are likely very low since it represents such a small proportion of the total development and production in Alabama. Overall, however, with slight decreases in oil and gas development expected to occur across the State, there would be decreases in tax revenue to local, State, and Federal Government entities. With the decreases in overall oil and gas development in the State, socioeconomic characteristics and trends, such as infrastructure and community services, may be slightly decreasing as a result of decreasing fiscal revenues that often support these types of services within the State.

In general, the pace and timing of mineral-development activities is dependent on a variety of factors beyond the management decisions of the BLM. This includes national and international energy demand and prices, production factors within the planning area and business strategies of operators. Because the pace of development in the planning area is only an estimate, actual cumulative impacts may vary if the oil and gas activity across the State changes over the planning period.

Coal development is expected to only occur on the Alabama BLM-administered minerals, with potential development of 1.9 million tons of coal produced per year, in essence an extension of the BLM coal production rates that have occurred in the past 10 years. The existing two leases are expected to be mined out, while new development could occur on four additional leases. In 1999, the 1.9 million tons of coal produced from BLM-administered minerals represented 9.7 percent of the coal produced in Alabama of 19.5 million tons (Energy Information Agency). Between 1990 and 1999, coal production in the State decreased by an average annual rate of 4.3 percent. If this decreasing production continues in the future, coal production from BLM-administered minerals would likely represent a larger portion of the total coal produced from the State. Coal production supports employment and employee compensation in the State (677 employees and $48 million in employee compensation); with decreasing production across Alabama, it is likely that overall, employment and earnings are also decreasing in the coal mining industry and in industries that support coal mining. This also suggests that royalty revenues from BLM-administered coal mining may be increasing as a proportion of total coal mining, which could influence the relocation of industries that support coal development closer to these BLM-administered minerals. There are likely some slight fiscal revenue declines since the production levels are decreasing across the State, which could also have impacts for infrastructure, social services, school funding, and other related government services.

A number of the alternatives in this Proposed RMP-FEIS consider Federal disposal of various tracts of surface lands. Under Alternative 4, there are three tracts (Fort Morgan Beach, Fort Morgan Highway, and Fowl River) available for recreational or residential development in Alabama comprising 117 acres, while one additional tract (Jordan Lake) could be developed as recreational camps (4 acres). In total, 121 acres could potentially be developed for recreational or residential use in Alabama. The State of Alabama comprises 33.5 million acres of surface land, of which the BLM manages 159 acres (less than one percent) and the USFS manages 667,000 acres (2 percent). The disposal of these 159 acres and subsequent development of 117 acres of surface lands is not likely to have cumulative socioeconomic impacts as the disposal acres represent such a small portion of the BLM lands, Federal lands, and private lands within the State. For the socioeconomic impacts of the individual alternatives, please see Section 4.2.

Environmental Justice

There were no Environmental Justice populations identified within the four-county area where mineral development is anticipated in Alabama. Therefore, there would be no anticipated cumulative impacts on these populations. Since the additional expected oil and gas activity locations for the BLM-administered FMO have not been specified, impacts to these populations should be considered at the time of implementation.

Hazardous Materials

BLM-authorized activities on surface tracts and non-USFS FMO could include use of hazardous materials, substances, and waste (including storage, transportation, and spills). Such activities include oil and gas development, coal development, and application of pesticides to improve vegetative communities and wildlife habitat. These activities are conducted in compliance with 29 CFR 1910, 49 CFR 100–185, 40 CFR 100–400, CERCLA, RCRA, SARA, TSCA, and the CWA, and other Federal and State regulations and policies regarding hazardous materials management. Therefore, if any release was to occur, it would be immediately addressed and remediated in accordance with regulation, and cumulative impacts are not anticipated. Contribution of hazardous materials, substances, and waste could occur from other sources on adjacent lands that could lead to cumulative impacts on the BLM lands.

4.4.2 Cumulative Impacts from BLM Management Actions in Mississippi

Air Quality

The cumulative impacts of air quality are evaluated by comparing the BLM site emissions with regionwide emissions. For the State of Mississippi, comprehensive emissions are only available for NO_X, CO, and VOCs. These emissions can be obtained from the Mississippi Department of Environmental Quality (MDEQ). Using the best available data from MDEQ, Table 4-11 shows a comparison between the statewide sources and the BLM-induced emissions. Based on this data, emissions from activities associated with potential oil and gas development and minerals mining on BLM-administered, non-USFS FMO tracts proposed in this RMP would not considerably contribute to cumulative air quality emissions within the region (presented in Table 4-11). Over the next 20 years, emissions from 10 wells would compose less than 1 percent of the emissions associated with the estimated 12,000 wells that could be developed on non-Federal and USFS lands in Mississippi. These impacts would be the same for all alternatives.

BLM-authorized activities would have small contributions to GHG emissions in comparison to the estimated U.S. emissions of CO_2 in 2006 (5,983.1 Tg CO_2 Eq.[4] (EPA 2008). These impacts would be the same for all alternatives. As discussed in Chapter 3, 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.

Table 4-11. Comparison of Potential BLM Emissions with Cumulative Emissions for Mississippi (tons per year) [1, 2]

Well and Mine Locations	Emission Type/Pollutant		
	NO_x	CO	VOC
BLM-administered FMO Estate in Mississippi	89	141	23
Other Mineral Estate Across Mississippi	295,456	1,301,914	272,897

1. Compared to best available 2002 data from the Mississippi Department of Environmental Quality (MDEQ 2005).
2. Combination of oil and gas and coal mining.

Soil Resources

In Mississippi, the disturbance of a maximum of 55 acres from oil and gas development across the State of Mississippi composes less than one percent of the 59,745 acres of surface disturbance anticipated from oil and gas development on non-Federal and USFS lands over the next 20 years. Although more than 7,000 wells have been completed in Mississippi since 1983, the minimal number of 10 additional wells identified in the RFDS would have no long-term impacts to soil productivity and, therefore, would not contribute to significant cumulative effects. These impacts would be the same for all alternatives.

Possible soil impacts associated with vegetative communities, fish and wildlife habitat, and lands and realty management actions, including ROW development and potential development after disposal on the 174-acre Hancock County tract, composes less than one percent of the 33,717 acres disturbed annually (1997–2003) from other construction projects across the State, including private development and transportation projects (as estimated by the NRI data). There would be more potential for soil disturbance impacts associated with vegetative communities and fish and wildlife habitat management actions proposed under Alternatives 2 and 3 as opposed to Alternatives 1 and 4, which do not propose any actions

[4] Carbon comprises 12/44ths of carbon dioxide by weight. One teragram is equal to 10^{12} grams or one million metric tons.

beyond standard management common to all alternatives. There would be more potential for soil disturbance impacts associated with ROW management actions under Alternative 1, which allows ROW development on the Hancock County tract, than Alternatives 2, 3, and 4, which designate the tract as a ROW avoidance area. The potential for soil disturbance impacts associated with lands and realty disposal actions would be the same under all alternatives, since the Hancock Country tract would continue to be used for recreation and research site purposes with no expected development.

Water Resources

The emergent wetlands that comprise the Hancock County tract would change as a result of mineral exploration and development or construction activities. However, BMPs and stipulations identified in Appendix D would minimize irreversible and irretrievable commitment of resources and unavoidable adverse impacts. The disturbance of a maximum of 55 acres from oil and gas development across the State of Mississippi composes less than one percent of the 59,745 acres of surface disturbance anticipated from oil and gas development on non-Federal and USFS lands. However, the minimal additional 10 wells identified in RFDS would have no long-term impacts to water resources. The cumulative impact of brine waste reinjection into aquifers beneath Federal and non-Federal lands over the next 20 years could be significant because by the year 2027, the number of new wells on non-federal lands is estimated to be 4,020 in Alabama and 12,010 in Mississippi. However, the minimal number of 10 additional wells in Mississippi identified in the RFDS would have no long-term cumulative impacts from waste brine reinjection. Thus, significant cumulative impacts would not be anticipated. In order to reinject produced water from federal and nonfederal, an oil and gas operator must obtain a permit as required by the Onshore Oil and Gas Order No. 7, which is intended to minimize the potential for cumulative impacts. EPA has granted the State of Mississippi primacy over the permitting of underground injection wells. The underground injection regulations address the siting, construction, operation, monitoring, and closing of an injection well. These requirements are designed to prevent contamination of surface and underground drinking water sources and would reduce cumulative impacts. These impacts would be the same for all alternatives.

Vegetative Communities

The continuation of mineral development (totaling approximately 12,000 wells with 59,745 acres of surface disturbance) and soil disturbance and vegetation loss from other construction projects across the State (approximately 33,717 acres of surface disturbance annually) has a high potential of affecting plant communities, such as glades and prairies, that are sensitive to disruption and difficult to restore after surface-disturbing activities. These activities also have the potential to introduce and promote the spread of invasive, exotic plant species.

Throughout the State, some plant communities, embedded in the larger forested landscape, are particularly sensitive to disruption and are difficult to restore after surface-disturbing activities. Many of these are restricted to a narrow range of soil types, such as glades and prairies; others are sensitive to changes in hydrography, such as bogs, forested wetlands, and seepage slope communities. Construction activities in these plant communities generally alter the site sufficiently to preclude the reestablishment of these communities in the foreseeable future. Also, because of the limited acreage of these vegetation communities, loss of even small acreages has a disproportionate effect on the plant diversity in an area.

Surface-disturbing activities have the potential to introduce or promote the spread of invasive, exotic plant species. Impacts are dependent on the species planted during restoration activities and the management of the site during and following restoration. Restoration activities typically include seeding non-native grasses, such as annual rye (during the winter months) and Bahia or Bermuda grass (during the summer months), to provide a quick cover for disturbed soils. Including native species in the mix

increases diversity and provides a more natural structure. If these areas are mowed following abandonment, these non-native grasses are expected to persist and dominate the site. If, however, the sites are replanted in pine or left unmowed, the areas can be expected to progress through old field-type growth, which is dominated by opportunistic native and non-native species alike. Ultimately, both Bahia and Bermuda grass are expected to become shaded out as a tree or heavy shrub layer becomes established. Japanese honeysuckle and Chinese privet can both persist in shaded situations.

Although effects to vegetative communities from surface-disturbing activities and the introduction of invasive, exotic plant species would likely occur as a result of the reasonably foreseeable actions identified for this analysis, the BLM activities would have a minimal contribution to these effects on plant communities due to the small amount of acreage that would be disturbed under the BLM management alternatives and the BLM policies on BMPs for mineral development reclamation and control of noxious, exotic species.

Fish and Wildlife

The continuation of mineral development (totaling approximately 12,000 wells with 59,745 acres of surface disturbance) and soil disturbance and vegetation loss from other construction projects across the State (approximately 33,717 acres of surface disturbance annually) has a high potential of affecting fish and wildlife and associated habitat through displacement, habitat degradation, and direct habitat loss.

Impacts to many wildlife species from oil and gas development are localized and temporary. Most common game species and other mobile wildlife species avoid the wellpad areas during construction and maintenance. Less mobile species are directly impacted and, during the spring and early summer, this can include nesting neotropical birds. Habitat generalists, including most game species, tend to return to surrounding habitats after the well is completed and construction and maintenance activities have ceased. Intermittent maintenance and inspection activities conducted on the established pad for the life of the well are not expected to alter the overall use of the area by wildlife. However, construction in high-value habitats or in areas with more narrowly adapted wildlife species can alter the overall species diversity. Wells and roads in areas of contiguous forests increase habitat fragmentation, reducing the suitability of the area for interior nesting birds and making nests more susceptible to predation and parasitism. Older growth forests, which provide habitat for interior forest nesting birds and a wider diversity of amphibians and reptiles, are often located in riparian zones left as buffers during logging operations or in steeper, less accessible slopes.

Oil and gas drilling continues for 24 hours a day until the well is completed. During this time, most wildlife, including waterfowl and many songbirds, are expected to avoid the immediate area. However, once drilling is completed, reserve pits with water (which can become soiled by drilling fluids) can become a hazard for waterfowl and other birds. If the well is put into production, there is documentation of birds and bats using open-vent stacks for roosting or perching. Once in these stacks, animals can become trapped or asphyxiated. While much of the work documenting this problem has occurred in western states, the situation in Mississippi is expected to be similar.

Roads and other construction projects across the State can alter the local hydrography, reducing surface flow to mesic areas and diverting or degrading surface water supporting wetland habitats. Installation of culverts and diverting existing drainages help to maintain existing hydrologic systems, but the disturbance causes local sedimentation and can retard sheet flow to wetland habitats. Amphibians and many reptiles associated with wetland communities are vulnerable to disturbance, as they are not highly mobile and tend to have narrow habitat requirements.

Impacts would also include the direct loss of habitat from the general construction projects, including private development and transportation projects, from degradation of nearby aquatic or wetland habitats through sedimentation or changes in hydrology.

Although significant habitat degradation and loss would likely occur as a result of the reasonably foreseeable actions identified for this analysis, the BLM activities would have a minimal contribution to these effects on wildlife due to management protection provided under all alternatives, with Alternatives 2, 3, and 4 providing more stringent protection than Alternative 1. In the long term, depending on the location and intensity of construction and minerals development, it is likely that public lands containing viable habitats for wildlife would continue to be utilized by these species.

Special Status Species

The continuation of mineral development (totaling approximately 12,000 wells with 59,745 acres of surface disturbance) and soil disturbance and vegetation loss from other construction projects across the State (approximately 33,717 acres of surface disturbance annually) has a high potential of affecting special status species through habitat loss or degradation and species displacement.

The Federally listed species most likely to be affected are gopher tortoise, red-cockaded woodpecker, and black pine snake in the East Gulf Coastal Plain, as well as the recently delisted (as of August 2007)~~and~~ bald eagles associated with reservoirs and rivers in the northern portion of the State. There is some potential to affect the small acreages supporting special status species anywhere in the State, and a potential statewide to affect Federal- and State-listed aquatic species.

Gopher tortoise could be impacted by surface-disturbing activities, including mineral exploration and development and other construction projects across the State, in upland areas of the East Gulf Coastal Plain where forest practices on private lands have maintained at least marginally suitable habitat. Foraging habitat for tortoise could also be affected on non-USFS FMO associated with private holdings in the Chickasawhay, De Soto, and Homochitto National Forests, which support substantial tortoise populations. During general construction projects across the State, including private development and transportation projects, and construction of wells pads, access roads, and production facilities, gopher tortoises could be impacted by the loss or damage to burrows, destruction of foraging habitat, or killed during construction or by service vehicles. Construction activities and roads within 600 feet of burrows could isolate individuals and reduce reproductive potential within a population. In many cases, the presence of gopher tortoises indicates that habitat is suitable for a host of species associated with dry longleaf pine forests, many of them special status species such as the black pine snake (*Pituophis melanoleucus lodingi*), which could also be impacted by activities.

Red-cockaded woodpecker could be affected by oil and gas development and other general construction projects across the State, including private development and transportation projects, through the loss of nesting habitat within existing clusters and through the loss of current or potential foraging habitat within 0.5 mile of existing clusters. Non-USFS FMO in areas supporting red-cockaded woodpecker is generally privately owned and often managed for commercial timber production. Harvest rotations on these properties are typically too short to sustain suitable nesting habitat for red-cockaded woodpeckers; however, there is potential to impact suitable foraging habitat, particularly on non-USFS FMO near the Chickasawhay, De Soto, and Homochitto National Forests or Noxubee NWR areas, which support most of the State's population.

Throughout the State, breeding and wintering bald eagles could be affected by drilling and other general construction projects across the State, including private development and transportation projects, near large rivers or reservoirs. Bald eagles are particularly sensitive during courting, nesting, and fledging

young; in Mississippi this typically occurs between December 1 and August 1. Construction activities within 1.5 miles of nest sites could result in nest abandonment depending on factors such as visibility and tolerance of individual pairs.

Throughout the State, oil and gas development and other general construction projects, including private development and transportation projects, have the potential to impact aquatic and wetland habitats. These could result in degradation of water quality through contamination and increased sedimentation, direct loss of habitat, and changes in the local hydrography supporting these systems. Increases in sedimentation to streams and wetlands by oil and gas development are a factor of wellpad design, slope, erodibility of the soils, proximity of the disturbance, and the intervening vegetation. The potential for sedimentation increases with prolonged or heavy rains that are typical in this area. Cut and fill slopes associated with other construction projects across the State are particularly vulnerable before protective plant covers have been established. While intact vegetation along riparian zones and around wetlands could substantially buffer these areas, the steepness of the intervening slopes, particularly over 25 percent can reduce the effectiveness of buffers. Research has shown that a minimum of a 30-foot buffer of vegetation is needed to control sediments. However, construction activities within 100 feet can reduce stream invertebrates, and 1,000 feet or more may be needed to protect some amphibians, reptiles, and forest interior birds (Wenger 1999). Sediments deposited in intermittent drainages during construction can be transported downstream during periods of high water, increasing turbidity and burying aquatic invertebrates in higher order streams and potentially affecting special status species substantial distances from the construction site, including Louisiana quillwort (*Isoetes louisianensis*), listed as Federally endangered.

Filling wetlands, including bogs, seepage slopes, wet flatwoods, and forested swamps for construction and maintenance of wellpads for oil and gas development and/or other construction projects across the State generally alters the site sufficiently to preclude the reestablishment of these communities in the foreseeable future and could result in direct habitat loss for a wide variety of special status species. Because of the limited acreage of these vegetation communities, loss of even the small acreages has a high potential of destroying or degrading habitat for special status species. Many of these species have limited ranges so the list of species potentially affected varies by location. For example, the Mississippi CWCS (2005) notes 14 special status species are associated with pine seeps and pitcher plant bogs, including eight special status crayfish, five of which are endemic. Henslow's sparrow wintering habitat and breeding habitat for Bachman's sparrow could be lost by construction in or near grassy bogs or wet flatwoods. Construction and maintenance activities and other construction projects across the State could disrupt the local hydrography supporting seepage slopes or sheet flow to bogs and swamps degrading these habitats.

There are estimated to be 65 caves in Mississippi located in the northeast corner and east central portions of the State. Caves by their nature are isolated and support highly endemic faunas often with extremely narrow habitat requirements. In Mississippi, this includes two State-listed salamanders and a number of bat species. Although the potential to affect these areas is low, caves are particularly sensitive to oil and gas development. Even minor alterations in temperature, humidity, and water quality or water quantity could result in irreversible impacts. Drilling through cave/karst resources could result in contaminants, such as drilling fluids and cements, draining into the cave/karst system. Karst habitats could be degraded by hydrocarbons from spills or leaks from well casings, storage tanks, reserve pits, pipelines, and production facilities that may enter into the cave/karst systems. Additionally, cementing operations could affect portions of underground drainage systems by restricting ground water flow and introducing pollutants into karst systems.

Construction in coastal areas could affect the 18 special status species that are associated with coastal marshes and maritime scrub and woodlands, including brown pelican, Wilson's plover, Mississippi

diamondback terrapin, and saltmarsh topminnow. Impacts would occur from direct habitat loss, destruction of foraging and nesting habitat, and habitat abandonment.

Although significant habitat degradation and loss would likely occur as a result of the reasonably foreseeable actions identified for this analysis, the BLM activities would have a minimal contribution to these effects on special status species due to the minimal numbers of oil and gas development anticipated (10 wells) and management protection provided for these species under all alternatives, with Alternatives 2, 3, and 4 providing more stringent protection than Alternative 1. The BLM would also be required to consult with USFWS to identify and establish specific conservation actions that can be taken to mitigate the potential effects of land management activities.

Wildland Fire Ecology and Management

In addition to the ignition sources associated with development of 10 new oil and gas wells noted in the impact analysis, there are over 7,362 existing oil and gas wells throughout Mississippi. An additional 12,000 oil and gas wells would be developed on non-Federal and USFS FMO over the next 20 years. Cumulatively, the potential increases in wildland fires from the addition of 10 wells compared to 19,362 existing and potential wells would not significantly increase the risk of fire in Mississippi. Likewise, the infrastructure associated with oil and gas or ROW developments would not significantly improve access or provide fuel breaks compared to the cumulative developments and current (1997–2003) rate of 33,717 acres of land developed annually in Mississippi.

The cumulative effect of proposed vegetation treatments on the 174 acres of the Hancock County tract would be in addition to 264,981 acres of vegetation treatments by other Federal agencies, as well as prescribed burns performed by State and local agencies and private or corporate forestry operations. The proposed treatments would help maintain or restore small areas to their natural regimes as well as improve the ability to protect WUI areas from wildfire. Cumulatively, the implementation of all these treatments would reduce the cost of suppressing wildfires.

Cultural Resources

As noted in the Alabama cumulative impacts, cultural resources on private surface do not enjoy the same legal protections as sites on USFS FMO and non-USFS FMO. As such, oil and gas development in areas of private surface and private mineral ownership, or non-mineral developments in areas with private surface and FMO, could result in cumulative impacts to cultural resources throughout Mississippi. This could result in unmitigated damage and loss of cultural sites and artifacts in areas of private surface and mineral ownership where oil and gas wells are developed. Cumulatively, Alternative 2 provides the greatest level of protection from cumulative impacts due to the largest number of closed and NSO acres. Alternatives 3 and 4 provide the next greatest level of protection. In these areas, the potential for inadvertent damage and loss of cultural resources is the lowest.

An additional 55 acres associated with development of 10 wells on non-USFS FMO and 59,745 acres associated with development of an estimated 12,000 additional wells on non-Federal mineral estate and USFS FMO would be added to the existing disturbance from development of over 7,000 oil and gas wells in Mississippi over the past 20 years. Acreage developed on USFS FMO would receive protections from Federal law, regulation, and policy. Developments in those areas would be required to comply with NHPA and ARPA in inventorying areas and determining eligibility of sites for the NRHP. Additional developments on USFS FMO would result in the identification of more cultural sites during inventories. Excavation of sites as part of mitigating impacts from development on USFS FMO would enable scientific retrieval and study of cultural resources, using today's technology and methodology. While data recovery preserves as much data as possible, the excavated portions of the property would be lost or

damaged. Removing cultural resources from a site using current scientific methods also reduces future scientific value if more accurate methods of analysis are developed.

Combined with disturbance from mineral development, other Federal agencies perform approximately 227,720 acres of vegetation treatments throughout Mississippi annually. Approximately 86 percent of the treated acres (227,720 acres) would be treated by prescribed fire. Additional acreages would be treated by State and local agencies and private individuals. Treatments by Federal agencies would require cultural inventories prior to implementation, identifying and protecting cultural sites. However, treatments by State and local agencies and private individuals could impact cultural resources through burning and suppression efforts. Cumulatively, the alternatives would have little effect on these impacts as the levels of treatment and the BLM surface acreage are very small in comparison, although Alternatives 2 and 3 would have the greatest cumulative effect as they propose the greatest levels of vegetation treatment to support other resources.

Development throughout Mississippi disturbs approximately 33,717 acres annually. Disposal and development of the BLM surface tract in Hancock County would only be permitted in Alternative 4, although it would have to be managed in a manner to protect Federally listed species and associated wetland/aquatic habitat. The potential to disturb, damage, or lose cultural resources would be low in these instances, but there would be no protections specifically for cultural resources if transferred from Federal ownership. Cumulatively, however, management of a disposed Hancock County tract would not result in significant additions to the annual disturbances throughout Mississippi. Alternatives 1, 2, and 3 would protect any cultural sites in the Hancock County tract.

The number of sites anticipated to be cumulatively damaged resulting from actions proposed in this RMP combined with other cumulative projects and activities is unknown because most areas have not been surveyed for cultural resources.

Visual Resources

Cumulative impacts on visual resources would occur primarily from activities that affect the visual quality of the area. Such impacts would result from mineral-development activities, ROW development, increased recreational activity, and actions associated with management of vegetative communities and fish and wildlife habitat. Surface-disturbing activities associated with mineral and ROW development would create visual intrusions that could alter the landscape setting and degrade visual quality. The disturbance of a maximum of 55 acres across 517,934 acres of Mississippi FMO and possible ROW development as a result of management actions would not contribute to significant cumulative impacts. Although more than 7,000 wells have been completed in Mississippi since 1983, the minimal number of 10 additional wells identified in the RFDS would not significantly diminish visual quality. Closing or limiting areas to motorized recreation uses and implementing restrictions designed to protect sensitive resources would help to maintain the visual quality in restricted areas. Efforts to maintain and improve vegetative communities and fish and wildlife habitat would indirectly enhance visual quality through improvement of the visual landscape.

Cumulative impacts would be similar among the four alternatives, as the same level of development is expected under any of the alternatives. However, Alternatives 2 and 3 provide for specific actions to improve vegetative communities and fish and wildlife habitat, thereby enhancing visual quality. In addition, implementing an NSO stipulation within 1,000 feet of aquatic habitats under Alternative 2 would preserve the visual quality within these areas. No visual impacts are anticipated under all alternatives from lands and realty disposal actions since the Hancock Country tract would continue to be used for recreation and research site purposes with no expected development. Given the remote marsh

nature of the tract, any development on adjacent lands would be minimal and the disposal would not cumulatively contribute to land development in the area.

Minerals

In Mississippi, no cumulative impacts would be anticipated to minerals exploration and development as a result of BLM-administered surface tract and non-USFS FMO land use allocations and management actions since the RMP would not restrict or preclude mineral development and exploration. In addition, an irretrievable commitment of oil and gas would occur from mineral extraction from 10 wells developed over the next 20 years in Mississippi. These impacts would be the same for all alternatives.

Recreation and Travel Management

Most of Mississippi is not managed by the Federal Government, and recreation and travel opportunities are often dependent on whether the private landowner allows access to the private surface. Therefore, maintaining Federal ownership of public lands under Alternatives 1, 2, and 3 would maintain limited opportunities for public recreation and travel. Under Alternative 4, opportunities for travel and recreation could be precluded after disposal, cumulatively adding to the current restrictions on private lands throughout the State. Although the BLM management actions and disposal actions under the alternatives could have localized impacts to recreation experience and travel opportunities, no significant cumulative impacts would be anticipated because of the small size of the BLM-administered surface tract. Cumulative projects and activities (continued mineral development and other construction projects) could lead to more travel opportunities associated with increased route construction to support mineral development, but there would also be a reduction in primitive/non-motorized recreation opportunities. Minerals development on non-USFS FMO lands open to recreation and leasing would result in unavoidable adverse impacts to recreation through detracting from the recreational setting. Mineral exploration and development activities could have short-term effects on the quality of the setting because of drilling equipment and long-term impacts from road construction and vegetation removal.

Lands and Realty

Increasing development leads to a greater demand for lands and realty actions, creating the need for additional ROWs for roads, pipelines, and power lines. Restrictions on ROWs under Alternatives 2, 3, and 4 would have a negligible cumulative effect by reducing routing options and possibly increasing construction costs for ROW development since there are only 174 acres of BLM-administered lands scattered across the State. Increasing development also leads to a greater demand for additional available land.

Social and Economic

The greatest potential for cumulative socioeconomic impacts is associated with increasing oil and gas development throughout Mississippi. The following information indicates that, overall, Mississippi is expected to experience an increase in oil and gas development of 63 percent (between the last 20 years and the next 20 years). Overall, there were 7,362 wells permitted over the past 20 years (average of 368 wells per year) to an anticipated 12,000 total wells over the next 20 years (average of 600 wells per year).

In Mississippi, the estimated development of 10 new oil and gas wells from the BLM-administered FMO constitute less than a tenth of one percent (0.08 percent) of the total wells projected for the State over the 20-year planning period. Historically, the BLM-administered wells in Mississippi have comprised about the same percentage (0.09 percent), indicating a relatively constant although very small proportion of oil and gas development over time. Since the BLM-administered FMO oil and gas wells compose so little of

the total wells in the Mississippi, there are very little cumulative socioeconomic impacts that could be attributed with this anticipated BLM development.

Many of the cumulative socioeconomic impacts associated with oil and gas development are already occurring in the State and would be perpetuated in the future. For instance, oil and gas activity is generating employment opportunities and labor earnings for communities that support these types of activities. However, the employment and income from BLM-administered oil and gas is likely very low since it represents such a small proportion of the total development and production in Mississippi. With the increases in overall oil and gas development, socioeconomic characteristics and trends, such as infrastructure and community services, may be slightly increasing and better funded as fiscal revenues often support these types of services within the State.

The pace and timing of mineral-development activities is dependent on a variety of factors beyond the management decisions of the BLM. This includes national and international energy demand and prices, production factors within the planning area, and business strategies of operators. Because the pace of development in the planning area is only an estimate, actual cumulative impacts may vary if the oil and gas activity across the two States changes over the planning period.

Alternative 4 in this Proposed RMP-FEIS considers Federal disposal of the 174-acre Hancock County tract, and this tract is likely to be used for recreation and research site purposes, with limited to no development occurring. The disposal of this tract of land would not likely have cumulative socioeconomic impacts as the acres represent such a small portion of total lands within the State, and the general management of the lands is not expected to change. For the socioeconomic impacts of the individual alternatives, please see Section 4.13.

Environmental Justice

Since the additional expected oil and gas activity locations for the BLM-administered, non-USFS FMO have not been specified, impacts to these populations should be considered at the time of implementation. For Mississippi, Section 3.4.13 in Chapter 3 indicates the counties that compose the largest low-income and minority populations. Once oil and gas development locations have been specified, Environmental Justice population locations should be revisited to assess any potential cumulative impacts to these populations.

Hazardous Materials

BLM-authorized activities on surface tracts and non-USFS FMO could include use of hazardous materials, substances, and waste (including storage, transportation, and spills). Such activities include oil and gas development, coal development, and application of pesticides to improve vegetative communities and wildlife habitat. These activities are conducted in compliance with 29 CFR 1910, 49 CFR 100–185, 40 CFR 100–400, CERCLA, RCRA, SARA, TSCA, and the CWA, and other Federal and State regulations and policies regarding hazardous materials management. Therefore, if any release was to occur, it would be immediately addressed and remediated in accordance with regulation, and cumulative impacts are not anticipated. Contribution of hazardous materials, substances, and waste could occur from other sources on adjacent lands that could lead to cumulative impacts on the BLM lands.

This page intentionally left blank.