

**PART I**  
**PLAN ALTERNATIVES**

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# CHAPTER 2

## PART I - PLAN ALTERNATIVES

### INTRODUCTION

This chapter describes a reasonable<sup>1</sup> range of alternatives selected for analysis in this Oil and Gas Management Plan/Environmental Impact Statement (Plan/EIS). The Interdisciplinary planning team considered every alternative that was identified during internal and public scoping, and those that were considered reasonable were selected for further analysis. A discussion of the alternatives that were eliminated from further consideration, including the reasons why they were eliminated, is presented at the end of Part I of this chapter. This is a programmatic management plan that establishes a general framework for managing oil and gas operations. By itself, it does not authorize any on-the-ground activities. The National Park Service will authorize specific projects by reviewing and approving operator-submitted plans of operations or special use permit applications. Before doing so, the NPS will conduct further analysis in accordance with the National Environmental Policy Act of 1969, the National Historic Preservation Act of 1966, the Endangered Species Act of 1973, and other applicable federal laws.

Background material that is necessary to understand the alternatives is presented at the beginning of this chapter. A Reasonably Foreseeable Development (RFD) Scenario has been formulated that projects the extent of operations that could occur to develop the projected nonfederal oil and gas resources in the Preserve. This scenario is used to assess the impacts of each alternative presented in this Plan/EIS. Special Management Areas proposed under Alternatives B and C of this Plan to protect specific resources are also described in this section.

All of the alternatives presented in this Plan/EIS are subject to Current Legal and Policy Requirements (CLPR) and the NPS requirement to not impair park resources. Table 1.1 lists the legal and policy mandates that apply to nonfederal oil and gas operations in the Preserve. Part II of this chapter describes these legal and policy mandates, NPS management policies, and performance standards for each resource that could be adversely affected by oil and gas development in the Preserve. Part III lists the operating stipulations and mitigation measures that can be used to avoid or minimize impacts on natural and cultural resources, to protect visitor uses and experiences, and to provide for human health and safety.

Operating stipulations and mitigation measures have specific meaning in this Plan/EIS. Operating stipulations are mandatory resource protection methods founded in law, regulation, and/or policy that the operator must use during operations to protect Preserve resources and values. An example would be the operating standards listed in 36 CFR § 9.41. In contrast, mitigation measures are voluntary resource protection methods that an oil and gas operator may use while conducting oil and gas operations to avoid, minimize, or reduce adverse impacts on Preserve resources and values. "Voluntary" implies that the mitigation measures are designed by the operator, not the NPS. The NPS defines specific resource protection objectives and determines whether an operator's proposed mitigation measures meet those objectives. Baseline mitigation would be required under all of the alternatives, but in most cases, the specific methods are up to the discretion of the operator, as long as

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<sup>1</sup> Alternatives must be reasonable to be included in an EIS (40 CFR – CEQ 40 Most Asked Questions). Reasonable alternatives are economically and technically feasible, and show evidence of common sense. If an alternative could not be implemented if chosen, or does not resolve the need for action, and fulfill the stated purposes to a large degree, it must be eliminated from further consideration. If an alternative is feasible and reasonable to the NPS but unreasonable to an outside applicant, it still must be included in the range of alternatives considered in the EIS.

they are “least damaging methods” pursuant to 36 CFR 9B § 9.37(a)(1), and comply with other applicable laws and regulations.

Further information on the regulatory framework that governs nonfederal oil and gas operations can be found in Appendix A – Public Law 93-439, Big Thicket National Preserve Enabling Act, Appendix B – NPS Nonfederal Oil and Gas Rights Regulations, 36 CFR Part 9B, and Appendix C – Federal Laws, Regulations, Executive Orders, Policies and Guidelines that Apply to Nonfederal Oil and Gas Operations.

The alternatives in this Plan/EIS represent three reasonable strategies for managing exploration, drilling, production, and transportation of nonfederal oil and gas resources in the Preserve. Each alternative differs in the amount of surface use that would be permitted for these operations.

- Alternative A, the No Action alternative, is required under the National Environmental Policy Act (NEPA) and establishes a baseline for comparison with the two action alternatives, B and C. The No Action alternative is based on Current Legal and Policy Requirements and is a continuation of current oil and gas management direction in the Preserve. Protected Areas have been designated to protect research and monitoring plots and visitor use, administrative, and other use areas. There has been no formalized Preserve-wide oil and gas management plan and specific resource protection goals (called performance standards) and operating stipulations would continue to be applied on a case-by-case basis. Geophysical exploration may be permitted on 91 percent of the Preserve (80,670 acres) year-round while 59 percent (52,272 acres) would have timing stipulations (Hunting Areas and Birding Hot Spots); and drilling and production operations may be permitted on 91 percent of the Preserve (80,639 acres). No operations would be permitted within 500 feet of waterways (unless specifically authorized in an approved plan of operations).
- Alternative B, the agency Preferred Alternative, defines Preserve-wide resource-specific performance standards that would be applied to all existing and new oil and gas operations. Specific resource areas, called Special Management Areas (SMAs), in this Plan/EIS would be formally designated for areas where park resources and values are particularly susceptible to adverse impacts from oil and gas development. Operating stipulations would be applied in these SMAs to protect Preserve resources and values. Nonfederal oil and gas operations could be permitted under CLPR in all other areas of the Preserve that are not designated as SMAs. Geophysical exploration operations may be permitted on 87 percent of the Preserve (76,620 acres) year-round while 59 percent (52,272 acres) would have timing stipulations (Hunting Areas and Birding Hot Spots); and drilling and production operations may be permitted on approximately 47 percent of the Preserve (41,859 acres). No operations would be permitted within 500 feet of waterways (unless specifically authorized in an approved plan of operations).
- Alternative C, the Environmentally Preferred Alternative, also defines park-wide resource-specific performance standards that would be applied to all existing and new oil and gas operations. Similar to Alternative B, SMAs would be designated with specific operating stipulations for oil and gas operations. However, oil and gas operations would be prohibited in most of the designated SMAs. Geophysical exploration may be permitted on 55 percent of the Preserve (48,475 acres) year-round, while 59 percent (52,272 acres) would have timing stipulations (Hunting Areas and Birding Hot Spots); and drilling and production operations may be permitted on 47 percent of the Preserve (41,859 acres). No operations would be permitted within 500 feet of waterways (unless specifically authorized in an approved plan of operations).

## **FUTURE MODIFICATIONS TO THE OIL AND GAS MANAGEMENT PLAN**

New or revised regulations, policies, and approved planning documents may be implemented in the future to protect park resources and values; avoid conflicts with visitor use and enjoyment; and provide for human health and safety. These changes may require updating and supplementing the information presented in this plan. Significant changes in the content or direction of this plan would require a supplemental EIS or the preparation of a new Oil and Gas Management Plan/EIS.

## **APPLICABILITY OF THIS PLAN IF THE BOUNDARIES OF THE PRESERVE ARE MODIFIED, PARK FACILITIES ARE CONSTRUCTED, OR AREAS CHANGE IN RESPONSE TO DYNAMIC ENVIRONMENTAL PROCESSES**

If additional lands or waters are added to Big Thicket National Preserve in the future, or new facilities are constructed within the Preserve, management of these areas would be guided by all applicable legal and policy requirements, resource-specific performance standards, operating stipulations in the Special Management Areas, and mitigation measures described in this plan.

Three units in the Preserve – Canyonlands Unit, Big Sandy Creek Corridor Unit, and Village Creek Corridor Unit lie within the legislated boundary of the Preserve, but currently none of these lands are under federal ownership. The 36 CFR 9B regulations are predicated on access on, across or through federal lands or waters, so oil and gas operations in these units currently lie outside the reach of the regulations. The 36 CFR 9B regulations will be applicable once the federal government acquires lands in these units.

Big Thicket National Preserve is subject to dynamic changes from environmental and geologic processes. Storm events such as hurricanes and flooding could change the configuration of the resources in the designated Special Management Areas. River migration could alter the location and configuration of the stream network and associated riparian vegetation. If these or other changes were to occur, the resource and Special Management Area maps would be revised to reflect the current conditions and the provisions in this plan.

## **APPLICABILITY OF THIS PLAN TO CURRENT NONFEDERAL OIL AND GAS OPERATIONS**

Current Legal and Policy Requirements, performance standards, operating stipulations, and mitigation measures presented in this plan would also apply to previously-approved nonfederal oil and gas operations in the Preserve. Where these operations are not in compliance with the requirements approved in this plan, modifications to the operations would be necessary. In addition, all ongoing nonfederal oil and gas operations in SMAs would be evaluated to ensure the protection of the resources and values in these areas.

## **EXEMPTIONS FROM THIS PLAN**

The designation of Protected Areas, which is a component of all three alternatives, and the proposal in Alternatives B and C to designate Special Management Areas and apply operating stipulations are not intended to result in a taking of private property rights. Regulations at 36 CFR Part 9, Subpart B (9B regulations), were written to encourage technological innovation (§ 9.37(a)(1)). If an operator can demonstrate that a particular technology could reduce the potential for impact on resources in the



Preserve, the operator may be exempted from specific operating stipulations described in this plan. All requests for an exemption must be presented in a Plan of Operations and must describe how replacing the plan requirements with a technological innovation would protect park resources and values. Approval of an exemption would be documented in the accompanying NEPA document (Environmental Assessment/Finding of No Significant Impact or Environmental Impact Statement/Record of Decision) for a proposed Plan of Operations. Therefore, in the event that an operator cannot explore for or develop nonfederal oil and gas from a surface location outside of an SMA with the “No Surface Use” stipulation, the National Park Service will work with the operator, and in consultation with other state and federal agencies as required under applicable laws and regulations, to develop reasonable mitigation measures so as to allow the proposed operations surface use within the SMA. However, as noted on page 2-64, if the Service determines that the proposed mineral development would impair park resources, values, or purposes, or does not meet approval standards under applicable NPS regulations and cannot be sufficiently modified to meet those standards, the Service will seek to extinguish the associated mineral right through acquisition, unless otherwise directed by Congress.

## **TYPES OF OIL AND GAS OPERATIONS**

This section provides a brief description of geophysical exploration, and drilling and production activities in and adjacent to the Preserve. This description was used to estimate the surface disturbance that could occur to develop the oil and gas resources underlying the Preserve, presented in the next section titled “Reasonably Foreseeable Development Scenario.” For more information on the types of oil and gas operations that may occur in the Preserve, the reader is referred to Appendix D, Types of Oil and Gas Operations. The historic drilling activity in the Preserve is further described in the Nonfederal Oil and Gas Operations section in Chapter 3.

### **Geophysical Exploration**

Since the 1940s, numerous 2-D and 3-D seismic surveys have been conducted within and adjacent to the Preserve to help delineate oil and gas drilling prospects (see Figure 3.1). Previous survey methods included operations where only seismic receivers (recording devices) were placed in the Preserve and the seismic source points (shotholes) were located outside its boundaries. Within the last decade, 3-D “mini-hole” seismic surveys have been conducted in the Jack Gore Baygall, Neches Bottom, Lower Neches River Corridor, Beaumont, and Lance Rosier Units. These previous 3-D surveys used the mini-hole pattern and were satisfactory in imaging the shallow plays (i.e., the Yegua and Wilcox). More recent 3-D seismic surveys focused on imaging the deeper Woodbine and Jurassic plays. The latest 3-D seismic survey conducted in 2004 by Seismic Assistants, Ltd., covered over 17,000 acres within the Big Sandy Creek, Menard Creek Corridor, and Hickory Creek Savannah Units of the Preserve used single 80-foot deep shotholes loaded with 5.5 pound explosive charges. This single shothole configuration was used to derive better imaging of the deeper hydrocarbon plays up to depths of 23,000 feet, while also providing a more accurate image of shallower objectives. The NPS has recently received proposals to conduct seismic surveys in the Upper and Lower Neches River Corridor Units of the Preserve. It is anticipated that over the next five to ten years, 3-D seismic surveys will be conducted throughout the Preserve. Since many seismic surveys are proprietary data, it is possible that more than one survey may be conducted in the same area of the Preserve.

Three-dimensional seismic surveys typically include selectively cutting vegetation up to a width of 3 to 6 feet along source and receiver lines, drilling shotholes in increments of 110 to 440 feet, placing explosives in the bottom of each shothole, and then detonating the explosives and recording the seismic waves generated from the detonation. The pattern (grid) for the seismic survey is designed to optimize

imaging geologic information in the subsurface. Source lines are usually placed perpendicular (or at an angle) to the receiver lines. In many cases, there may be up to 2,000 feet between source lines, and 660 to 2,400 feet between receiver lines. In order to image shallow hydrocarbon plays, oil and gas operators typically drill 5 to 10 “mini-holes” up to 10 feet deep at a single shotpoint and load each shothole with approximately ½-pound of explosives. Where an operator wants to image deeper drilling targets, single shotholes are drilled 80 to 100 feet deep and are loaded with 5 pounds or more of explosives.

Three-dimensional seismic surveys are the primary exploratory tool that is expected to be used during the life of this Plan/EIS. Nevertheless, new technologies may be developed in the future to delineate drilling locations and characterize oil and gas reservoirs. Surface disturbances and potential impacts from these techniques cannot be determined in this planning effort and therefore have not been assessed in this Plan/EIS.

## **Drilling and Production Operations**

Surface disturbances for drilling and production operations included in the next section, Reasonably Foreseeable Development (RFD) Scenario, have been estimated using information derived from wells that have been drilled primarily from surface locations outside of the Preserve. In most cases, wellpad and access road dimensions would be smaller in the Preserve because the NPS directs operators to minimize surface disturbance (and impacts) on Preserve resources. Because of this, the RFD scenario represents an upper estimate of activities and surface disturbance, most of which are likely to occur on lands outside of the Preserve.

In the RFD scenario, a drilling pad for a single well would measure 300 feet by 350 feet (2.4 acres). If there is no access road to the wellsite, a road up to one mile in length may be built to the wellsite. Construction of a wellpad typically consists of clearing vegetation, constructing a ring ditch and levee around the perimeter of the wellpad, leveling the site, and installing an impermeable liner to collect spills or releases during drilling. Once drilling is completed, there is the potential for partial reclamation of the wellsite because of reduced area needs for production operations.

## **REASONABLY FORESEEABLE DEVELOPMENT SCENARIO**

The United States Geological Survey (USGS) and the National Park Service (NPS) collaborated during the EIS planning process to estimate the undiscovered hydrocarbon resources in the Preserve and to develop a projection of the type and extent of operations that could occur to develop these resources. Utilizing available drilling, production, and other geologic data for the area surrounding the Preserve, the USGS estimated the remaining hydrocarbon potential beneath Big Thicket National Preserve. The USGS assessment resulted in a range of probabilities of discovering oil and gas in the Preserve. USGS estimated a high probability (95 percent) of discovering approximately 400,000 barrels of oil and 20 billion cubic feet of gas. The USGS estimated that there is a low probability (5 percent) that up to 2 million barrels of oil and 150 billion cubic feet of gas could be discovered. Appendix E – Remaining Oil and Gas Resources Beneath Big Thicket National Preserve Assessment Methodology, summarizes USGS’ assessment methodology, geologic framework, target formations (plays), traps, seals, and a range of probabilities of discovering hydrocarbons within the Preserve.

Based on the USGS assessment, the NPS prepared a reasonably foreseeable development (RFD) scenario that projects the types of activities and the amount of surface disturbance that could occur to explore for and produce the remaining oil and gas resources underlying the Preserve.

The purpose of the RFD scenario is to provide a reasonable basis for analyzing the potential effects of oil and gas related operations within and outside the Preserve for the alternatives presented in this Plan/EIS. The number of wells and the acres of disturbance projected in the RFD scenario do not represent a benchmark or decision point for acceptable level of activity that could occur to develop the oil and gas underlying the Preserve. Rather, they are meant to provide the interdisciplinary team, public, and NPS decision-makers with an understanding of the types and extent of oil and gas exploration and production operations expected under this Plan/EIS. The NPS will track the number of wells and the acres of disturbance for nonfederal oil and gas operations in the Preserve. If the number of wells or the acres of disturbance presented in the RFD scenario, or the impacts (context, intensity, and duration) from future oil and gas projects exceed those anticipated in this Plan/EIS, then the NPS will re-examine whether to supplement the Plan/EIS as required by the NEPA and NPS Director's Order and Handbook – Conservation Planning, Environmental Impact Analysis and Decision-Making.

When preparing the RFD scenario for the Draft Plan/EIS, the NPS used USGS's mean probability (average) of undiscovered oil and gas resources of approximately 3 million barrels oil and natural gas liquids and 70 billion cubic feet of gas. In the Draft Plan/EIS, it was estimated that over the next 15 to 20 years, 29 wells could be drilled which could disturb up to 153 acres within and outside of the Preserve. Since the NPS prepared the RFD scenario in 1999, 19 wells have been drilled to explore for and produce the hydrocarbons underlying the Preserve. Even though 29 wells have not been drilled to-date, it is possible that these estimates could be attained in the near future. Conversely, it is possible that drilling may slow down and the RFD scenario in the Draft Plan/EIS may still be valid for the life of the Plan/EIS.

**Due to the public comments received on the Draft Plan/EIS and the current increase in drilling activity, the NPS has decided to develop a revised RFD scenario for the Final Plan/EIS.** Since it is unlikely that USGS's upper estimate (5 percent probability) would be discovered over the life of this Plan/EIS, the NPS has decided to use the 25 percent probability estimate in the revised RFD scenario. The NPS contacted oil and gas operators who have recently drilled wells in and adjacent to the Preserve to verify the assumptions used in the RFD scenario. Information collected from these operators included drilling success rates, well status, and area of surface disturbance for access roads and wellpads. This information was used in conjunction with the USGS 25 percent probability distribution to develop a revised estimate of the oil and gas activities and surface disturbances that could occur to develop the hydrocarbons underlying the Preserve.

The Revised Reasonably Foreseeable Development Scenario is based on the following assumptions:

- Using USGS's 25 percent probability distribution, approximately 4 million barrels of oil and natural gas liquids and 94 billion cubic feet of natural gas could be discovered over the next 15 – 20 years from Tertiary and Upper Cretaceous-age reservoirs under the Preserve. The USGS assessment includes all oil and gas reservoirs that are currently producing or have the potential to produce hydrocarbons in the Preserve.
- In order to delineate drilling prospects, 3-D seismic surveys would be conducted throughout the Preserve and would reduce the number of dry holes (unproductive) wells drilled.
- Information obtained from 3-D seismic surveys would result in an exploratory drilling success rate of approximately 50 percent (1 hydrocarbon discovery for every 2 wells drilled). The probability of success of encountering hydrocarbons in subsequent development (production) wells would be approximately 75 percent.
- The demand, price, and availability of domestically produced hydrocarbons would support the oil and gas development presented in the RFD scenario.

- Because of the complex nature of the subsurface geology in the Preserve, oil and gas production from the Tertiary and Upper Cretaceous formations (plays) is not likely in the same wells. This would require drilling of separate exploratory and production wells to produce hydrocarbons from the different geologic plays.

The RFD drilling scenario in the Preserve includes:

- Approximately 40 wells would be drilled over the next 15 – 20 years to produce the estimated hydrocarbons in Big Thicket National Preserve.
- Twenty-seven of the wells would be commercially successful oil and gas wells, and thirteen wells would be dry holes. Upon completion of drilling, the 13 dry holes would be plugged and the disturbed area reclaimed within 6 months.

There is a reasonable expectation that surface disturbances in the Preserve associated with drilling and production operations would be substantially reduced or eliminated with the following mitigation measures:

- Most of the potential bottomhole locations inside the Preserve could be reached by directionally drilling from a surface location outside the boundaries of the Preserve. Directional drilling is technologically feasible in the narrow corridor units and at the perimeters of the larger nonlinear units. Operators will likely continue to favor drilling wells outside of the Preserve in upland areas due to the logistical constraints of drilling wells in flood-prone areas and reduced regulatory requirements outside of the Preserve. However, it may be necessary to drill in the interior of larger units such as Big Sandy, Beech Creek, Jack Gore Baygall/Neches Bottom, Turkey Creek, Lance Rosier and Beaumont Units. The last well drilled inside of the Preserve was drilled in 1997, and all subsequent oil and gas wells have been directionally drilled from surface locations outside of the Preserve;
- Drilling and producing multiple wells from a single wellpad;
- Utilizing existing abandoned drilling sites or other previously disturbed areas for drilling and production operations;
- Re-entering and redrilling lateral extensions from existing wellbores; and
- Directionally drilling flowlines and gathering lines under designated areas/proposed Special Management Areas.

Table 2.1 summarizes the amount of surface disturbance associated with nonfederal oil and gas operations in the Preserve that is anticipated over the next 15 – 20 years.

**Table 2.1. Projected Surface Disturbance Associated with the Reasonably Foreseeable Development Scenario**

TYPE OF OPERATION	SURFACE DISTURBANCE <sup>1</sup>
<b>Geophysical Exploration<sup>1</sup></b> -Survey and selectively cut vegetation along source and receiver lines. -Drill up to 6 shotholes per shotpoint, with 210' spacing between shotpoints).	465 acres 9072 square feet =.2 acres Total = 465 acres
<b>Drilling and Production Operations<sup>2</sup></b> -Construct up to 40 new access road extensions from existing roadways (30' wide x 1 mile long). -Construct up to 40 drilling pads (300' x 350' or 2.4 acres / wellpad). -Gathering lines and flowlines would be placed within road corridor or within previously disturbed areas.	145 acres  96 acres  Total = 241 acres

<sup>1</sup> These estimates assume that 3-D seismic surveys would be conducted Preserve-wide, all surveys would be done using conventional land survey equipment, vegetation would be selectively cut by hand, and up to 6 shotholes may be drilled at each shotpoint location. Even though future surveys may utilize a single shothole at each shotpoint, this RFD scenario would represent the maximum amount of surface disturbance that could occur from either a mini-hole or single shothole configuration. The source and receiver line spacing is based on a 3-D seismic survey conducted in the Preserve in 2004 by Seismic Assistants, Ltd., and includes; 1760 feet between source and receiver lines and selectively cutting vegetation along all source lines to a width of up to 6 feet and up to a width of 3.5 feet on receiver lines. It is also possible that surface disturbance could occur from the use of tracked drilling equipment in certain areas of the Preserve and from the detonation of underground explosives.

<sup>2</sup> Surface disturbances in the Preserve from drilling and production operations could range from no surface disturbance (all wells directionally drilled from outside the Preserve or drilled on previously disturbed lands), to an intermediate estimate where multiple wells are drilled from a common pad or are drilled from outside the Preserve, to the maximum acreage presented above where all wells are drilled from surface locations inside the Preserve.

In summary, if all of the activities in the RFD scenario occur in the Preserve, there could be up to 465 acres of vegetation selectively cut to conduct 3-D seismic operations, less than one acre of surface disturbance from drilling shotholes, and up to 241 acres of new surface disturbance to construct access roads and wellpads. Drilling operations could occur over the next 15 to 20 years but are expected to closely follow completion of 3-D seismic surveys. Of the 40 wells drilled, 27 would produce commercial quantities of hydrocarbons. After wells are drilled, the wellpads would be reduced in size to the minimum area necessary to support the production operations. Reclamation of up to 13 wellpads and 13 miles of access roads (comprising 78 acres), would begin within 6 months of plugging the dry holes. If Preserve management determines that some of the access roads constructed in the Preserve are necessary for administrative purposes, they would not be removed and reclaimed. Flowlines would be placed within road corridors or other disturbed areas to transport the hydrocarbons. Production operations would have a life expectancy of 20 to 30 years. The total amount of new surface disturbance would not occur at the same time because as some operations are being proposed, others would be plugged, abandoned, and reclaimed.

The RFD drilling scenario presented in this Plan/EIS is based on the collaborative work of the USGS and the NPS. Seismic and other proprietary data available only to oil and gas companies was not used in the preparation of the Reasonably Foreseeable Development Scenario. An assessment of the growth potential of existing oil and gas fields is not included in this RFD scenario. It is possible that the drilling success rate may deviate from the NPS projection, oil and gas prices may continue to climb resulting in accelerated drilling activity, and it may take fewer or more wells to develop the oil and gas resources underlying the Preserve. Any of these or other factors could result in a different RFD scenario than is presented in this Plan/EIS.

## SPECIAL MANAGEMENT AREAS

During internal and public scoping and subsequent analyses, the interdisciplinary planning team identified those resources and values that are particularly susceptible to adverse impacts from oil and gas operations or are essential to maintain the ecological integrity of the Preserve. Certain areas of the Preserve, called Special Management Areas (SMAs) in this Plan/EIS, have been proposed under Alternatives B and C to protect these resources and values. Specific operating stipulations have been developed for each of these SMAs to protect park resources and values from adverse impacts from oil and gas operations.

Another objective for designating SMAs and identifying operating stipulations is to give the operator more complete information to assist them through the planning and development phases of their operations. Through the plan of operations or permit process, the National Park Service may attach additional operating stipulations to address specific circumstances not identified through this planning process.

The designation of Special Management Areas would protect park resources and values through the application of operating stipulations for nonfederal oil and gas operations. There are two categories of Special Management Areas proposed in this plan. In some areas of the Preserve, oil and gas operations may be permitted, with specific operating stipulations to protect park resources and values. In other areas, no surface uses (NSU) for new operations would be permitted. In some cases where the NSU requirement would apply, there are distance setbacks from the boundary of the SMA. For example, No Surface Use with a 500- to 1,500-foot setback in the Visitor Use, Administrative and Other Use Areas SMAs means that surface uses associated with nonfederal oil and gas operations would not be permitted within 500 – 1,500 feet of the perimeter of the designated SMA. In these SMAs, the setback is variable, and is dependant upon the mitigation measures employed to protect natural soundscapes, visual quality, and human health and safety. Timing stipulations would be applied to some operations during the hunting season (October 1<sup>st</sup> through January 15<sup>th</sup>) and during periods of bird nesting and migration (March 1<sup>st</sup> through May 30<sup>th</sup> and from September 1<sup>st</sup> through November 30<sup>th</sup>) and other wildlife (such as threatened and endangered species and other species of special concern). Operators may conduct geophysical exploration operations when the timing stipulations are not in effect, and drilling and production operations may occur year-round in the hunting areas. If, however, an operator can demonstrate a compelling reason why it must conduct geophysical operations in a hunting area when the timing stipulations are in effect, the right of the oil and gas operator to access the federally-owned surface will take precedence over the hunting privilege.

Prior to the development of this Plan/EIS, Special Management Areas were not formally designated, and operating stipulations and mitigation measures were applied in the Preserve on a case-by-case basis. Areas of the Preserve protected under current Legal and Policy Requirements are called “Protected Areas” under Alternative A, No Action; and would continue to receive the same protection under Alternatives B and C. As an example, these include areas of the Preserve where a 500 foot offset from waterways and visitor use, administrative and other use areas are required pursuant to 36 CFR § 9.41(a), unless specifically authorized in an approved plan of operations, and areas where surface use and timing stipulations would apply (Royal Fern Bog, hunting areas, and birding hot spots) that have been delineated prior to this planning effort. Table 2.2 describes the justification for the Special Management Areas that are proposed under Alternative B and C. A description of the resources that comprise the SMAs is included in Chapter 3 – Affected Environment.

**Table 2.2. Basis for Proposed Designation of Special Management Areas in Big Thicket National Preserve under Alternatives B and C.**

**NOTE:** A description of the proposed operating stipulations for the SMAs proposed under Alternatives B and C are presented in Table 2.4 – Summary of Alternatives. In addition to the overall protection of biodiversity in the Preserve, the protection of specific resources and values in designated SMAs is mandated under federal statutes, regulations, executive orders, and NPS policies shown in Table 1.1.

RESOURCE/ VALUE	PROPOSED SPECIAL MANAGEMENT AREAS (SMA)	BASIS FOR SMA DESIGNATION
<b>Floodplains</b>	<ul style="list-style-type: none"> <li>• <b>Riparian Corridors SMA</b> includes: <ul style="list-style-type: none"> <li>-Floodplain Hardwood Forests</li> <li>-Floodplain Hardwood Pine Forests</li> <li>-SMA consists of complexes of these vegetation types, and up to 300' from banks of major streams where not defined by the above vegetation types</li> </ul> </li> </ul>	<p>Riparian corridors are critical in maintaining the ecological integrity of the Preserve. Integral to preserving riparian corridors is the protection of floodplain functions and uses, plant and animal species diversity and composition, water quality, and other park resources and values in riparian areas which could be adversely impacted from oil and gas operations.</p>
<b>Vegetation</b>	<ul style="list-style-type: none"> <li>• <b>Ecological Research and Monitoring Plots SMA</b> includes: <ul style="list-style-type: none"> <li>-fire monitoring plots</li> <li>-long-term monitoring plots</li> </ul> </li> <li>• <b>Rare Vegetation Communities SMA</b> includes: <ul style="list-style-type: none"> <li>-Upland Pine Forests</li> <li>-Beech-Magnolia-Loblolly Pine Forests</li> <li>-Sandhill Pine Forests</li> <li>-Old Growth Trees</li> </ul> </li> </ul>	<p>Ecological research and monitoring plots have been established in the Preserve and are protected from potential impacts so that researchers can gain an understanding of the effects of fire suppression, wind throw, insect infestations, and other disturbances; to determine the nature and extent of global climatic change; to understand the effects of invasive exotic plant species; and to enable researchers to learn more about the trends in forest ecology such as recruitment and succession.</p> <p>Vegetation communities in the Preserve that are proposed for SMA designation are rare, are necessary to maintain the biodiversity in the Preserve, contain habitat for species of special concern, and could be adversely affected by oil and gas operations.</p>
<b>Wetlands</b>	<ul style="list-style-type: none"> <li>• <b>Rare Forested Wetland Communities SMA</b> includes: <ul style="list-style-type: none"> <li>-Wetland Baygall Shrub Thickets</li> <li>-Swamp Cypress-Tupelo Forests</li> <li>-Wetland Pine Savannas</li> <li>-Old Growth Trees</li> </ul> </li> <li>• <b>Ecological Research and Monitoring Plots SMA</b> includes: <ul style="list-style-type: none"> <li>-Royal Fern Bog Research Plot</li> </ul> </li> </ul>	<p>Forested wetland communities are rare and/or unique in the Preserve and their integrity could be adversely affected by oil and gas operations. Public access in the Royal Fern Bog Research Plot is limited to NPS staff and researchers due to its unique character, rare occurrences of the regal fern, and long-term monitoring efforts occurring in the plot.</p>
<b>Visitor Use, Administrative and Other Use Areas</b>	<ul style="list-style-type: none"> <li>• <b>Visitor Use, Administrative and other Use Areas SMA</b> includes: <ul style="list-style-type: none"> <li>-<b>Day Use Areas</b> (26 areas: boat ramps, picnic areas, parking areas)</li> <li>-<b>Hiking Trails</b> (9 trails)</li> <li>-<b>Canoe Routes</b> (Village Creek, Turkey Creek from Gore Store Road to Village Creek, Franklin Lake to Johns Lake, and Cook's Lake to Scatterman Lake Loop)</li> <li>-<b>Administrative Areas</b> (Big Thicket Visitor Information Station, Big Thicket Visitor Center, Maintenance and Meeting Facility, and Turkey Creek Ranch House)</li> <li>-<b>Cemeteries</b> (3)</li> <li>-<b>Private residential home sites with use and occupancy terms</b> (2 sites)</li> </ul> </li> </ul>	<p>Visitor experiences and values (enjoyment of plant and animal biodiversity, visual quality, natural quiet, night sky etc.) occurring in limited visitor use areas of the Preserve must be protected from all potential impacts, including oil and gas operations.</p> <p>Preserve facilities and private in-holdings within the Preserve, and human health and safety of park visitors and staff must also be protected from all activities occurring in the Preserve, including nonfederal oil and gas operations.</p>

RESOURCE/ VALUE	PROPOSED SPECIAL MANAGEMENT AREAS (SMA)	BASIS FOR SMA DESIGNATION
	<ul style="list-style-type: none"> <li>• <b>Birding Hot Spots SMA</b> (8 areas)</li> <li>• <b>Hunting Areas SMA</b> (5 units) includes designated lands in: <ul style="list-style-type: none"> <li>-Big Sandy Creek Unit</li> <li>-Beech Creek Unit</li> <li>-Lance Rosier Unit</li> <li>-Beaumont Unit</li> <li>-Neches Bottom and Jack Gore Baygall Unit</li> </ul> </li> </ul>	

In recognition of the broad-scale information used in this document, and the surface and subsurface complexities of the Preserve, a modification of any SMA operating stipulation may be considered by the NPS if site-specific information (such as engineering, geological, biological, or other studies) warrant the change, or if an operator can demonstrate that their proposed operation would meet the goals of protecting resources and values in the SMA.

## DESCRIPTION OF THE ALTERNATIVES

The three alternatives presented below describe strategies for the long-term management of nonfederal oil and gas operations in Big Thicket National Preserve. These alternatives were developed because they meet the stated objectives of this plan to a large degree and provide a reasonable range of options to manage exploration, drilling, production and transportation of nonfederal oil and gas within the Preserve. Alternative A – No Action is required by the National Environmental Policy Act (NEPA) and describes the continued management of oil and gas operations in the Preserve under Current Legal and Policy Requirements (CLPR). Alternatives B and C were developed using Special Management Areas, performance standards, and mitigation measures to protect specific resources and values in the Preserve, consistent with the purposes and values of the Preserve and state and federal resource protection mandates. Alternatives B and C have been developed to formalize and improve upon current oil and gas management practices in the Preserve, which are described in Alternative A, No Action. Alternatives B and C, if implemented, would provide consistent guidance to oil and gas operators and help to ensure the long-term protection of Preserve resources and values by formalizing the Protected Areas identified under Alternative A, identifying and designating additional sensitive resources areas as Special Management Areas, and clearly articulating legal and policy requirements, operating standards, operating stipulations and mitigation measures for oil and gas development. Alternative B is the NPS's preferred alternative. Alternative C is the environmentally preferred alternative.

All of the proposed alternatives are subject to Current Legal and Policy Requirements (CLPR), including operating standards (called operating stipulations in this Plan/EIS) required under 36 CFR § 9.41. When applicable, oil and gas operators in the Preserve must employ mitigation measures to fulfill the resource protection requirements of the NPS's Nonfederal Oil and Gas Rights Regulations at 36 CFR Part 9 Subpart B. These requirements are included in Plans of Operations and Directional Drilling Applications, or attached as Conditions of Approval during the review and approval process for a Plan or Application. The Current Legal and Policy Requirements are listed in Table 1.1 and Chapter 2, Part II, and are described in Appendix B – National Park Service Nonfederal Oil and Gas Rights Regulations at 36 CFR Part 9B, and Appendix C – Federal Laws, Regulations, Executive Orders, Policies and Guidelines that Apply to Nonfederal Oil and Gas Operations.

The three alternatives are described on the following pages. Table 2.3 describes how well each alternative meets the planning objectives presented in this Plan/EIS. Table 2.4, Summary of Alternatives, lists each of the topics evaluated in this Plan/EIS, the Protected Areas and Special



Management Areas, and the operating stipulations that would apply in each area for geophysical operations and drilling and production operations. Table 2.5, Summary of Operating Stipulations under Each Alternative, lists the operating stipulations and acreages for Protected Areas under Alternative A, and Special Management Areas under Alternatives B and C. Table 2.17 is a summary of environmental impacts. Tables 2.6 through 2.16 list the acreage for Protected Areas under Alternative A, and SMAs under Alternatives B and C, for each Unit in the Preserve. These tables provide the total acreages for Protected Areas and SMAs in each Unit without overlap. Figures 2.7 through 2.17 are maps depicting protected areas and SMAs for Alternatives A, B, and C, for each Unit in the Preserve. There is no table or figure for the Loblolly Unit because it has no Protected Areas or Special Management Areas.

Some of the Special Management Areas shown in Figures 2.7 through 2.17 overlap with each other. As an example, portions of the Ecological Research and Monitoring SMA covers portions of the Rare Vegetation Communities SMA. Where SMAs overlap, the SMA with the most restrictive stipulation(s) would apply. For example, if an operation is proposed in a Hunting Area SMA (where timing stipulations would apply) overlaps with the Rare Forested Wetland Communities SMA (where No Surface Use would be permitted), the NSU stipulation would apply.

The boundaries of the proposed “vegetation” SMAs (Riparian Corridors, Rare Vegetation Communities, and Rare Forested Wetland Communities SMAs) are based on broad-scale reconnaissance information. Therefore, it is possible that the site-specific vegetation may differ (or may be absent) from what is depicted on the vegetation maps.

## **Alternative A, No-Action/Current Management**

- All nonfederal oil and gas operations are subject to Current Legal and Policy Requirements,
- Operating stipulations are applied on a case-by-case basis,
- Protected Areas have been designated in limited areas of the Preserve, and
- All other areas of the Preserve may be available for nonfederal oil and gas operations.
- Geophysical exploration could be permitted on 91 percent (80,670 acres) and drilling and production operations on 91 percent (80,639 acres) of the Preserve.

Alternative A provides the baseline for analysis and describes current management strategies for oil and gas management in the Preserve. In the past, there has been no formalized, comprehensive Preserve-wide management plan to guide nonfederal oil and gas operations. Instead, oil and gas operations have been managed on a case-by-case basis, with operating stipulations applied during Plan of Operations development and through the NPS permitting process.

Special Management Areas have not been formally designated under Alternative A. However, limited areas of the Preserve have been designated “Protected Areas” and surface use and timing stipulations to protect resources and values in these areas have been implemented for different types of nonfederal oil and gas operations. A 500’ offset (unless specifically authorized in an approved plan of operations) from visitor use and administrative areas; and perennial, intermittent, or ephemeral watercourses required under 36 CFR § 9.41(a) would apply to all phases of nonfederal oil and gas operations.

Geophysical exploration (3-D seismic surveys) could be allowed in all areas of the Preserve, with the exception of Ecological Research, and Long-term Monitoring Plots, and Visitor Use, Administrative and Other Uses Protected Areas. Timing Stipulations for geophysical exploration would apply in the Hunting and Birding Hot Spots Protected Areas. Exploration operations would not be permitted under Current Legal and Policy Requirements on 7,462 acres and on 52,272 acres during specified times.

Drilling and production operations could be permitted throughout the Preserve with the exception of the Ecological Research and Long-term Monitoring Plots, and Visitor Use, Administrative, and Other Uses Protected Areas. Drilling and production operations would not be permitted under Current Legal and Policy Requirements on 7,493 acres in the designated Protected Areas.

Currently there is no formal protection provided for rare vegetation communities (including Sandhill Pine Forest, Upland Pine Forest, American Beech-Southern Magnolia-Loblolly Pine Forest, and old growth trees) during nonfederal oil and gas development in the Preserve. Variations in protection of these resources may occur under Alternative A, resulting in different interpretations and applications of policy. In addition, the interpretation and application of Current Legal and Policy Requirements to protect floodplains, wetlands, riparian corridors, fish and wildlife, and cultural resources could also result in variations in how, where, and to what extent resource protection is applied.

Threatened and endangered species habitat and National Register-eligible or listed cultural resource areas have not been formally designated as SMAs in this plan. Based on Current Legal and Policy Requirements and in consultation with the appropriate regulatory authority, timing or surface use stipulations would be imposed on nonfederal oil and gas operations to avoid adverse impacts to these resources.

The Reasonably Foreseeable Development scenario presented in this Plan/EIS would apply to Alternative A. Geophysical exploration (3-D seismic surveys) could be conducted throughout the Preserve and up to 40 wells (13 dry holes, 27 productive wells) could be drilled in the Preserve over the next 15 – 20 years. New surface disturbances in the Preserve can be minimized by using directional drilling techniques and utilizing previously-disturbed areas.

## **Alternative B, Preferred Alternative**

- All nonfederal oil and gas operations are subject to Current Legal and Policy Requirements;
- Performance Standards are developed and applied Preserve-wide to protect resources and values;
- Special Management Areas are formally designated and include timing and surface use stipulations; and
- All other areas of the Preserve may be available for nonfederal oil and gas operations.
- Geophysical exploration could be permitted on up to 87 percent (76,620 acres) and drilling and production operations on approximately 47 percent (41,859 acres) of the Preserve.

Under Alternative B, an oil and gas management plan that clearly articulates the Current Legal and Policy Requirements applicable to the exploration, production, and transportation of nonfederal oil and gas resources in the Preserve to help ensure the long-term protection of Preserve resources and values would be implemented. Performance standards, mitigation measures, and operating stipulations articulated in this Plan/EIS would provide information, and consistent direction to operators during project planning and compliance with federal, state, and local resource protection mandates.

Special Management Areas would be formally designated for areas of the Preserve where park resources and values would be particularly susceptible to adverse impacts from oil and gas operations or in areas where certain resources are critical to maintaining the ecological integrity of the Preserve. Under this alternative, surface use and timing stipulations would be developed in the SMAs for different types of nonfederal oil and gas operations.

Geophysical exploration (3-D seismic surveys) with specified surface use stipulations could be allowed in all of the SMAs except for Ecological and Research Monitoring Plots, and Visitor Use, Administrative and Other Use Areas SMAs. Timing Stipulations for geophysical exploration would apply in the Hunting Area and Birding Hot Spots SMAs. Exploration operations would not be permitted during any time of the year on 11,512 acres and during specified times on 52,272 acres.

Drilling and production operations would not be permitted in SMAs, with the exception of the Hunting Areas and Riparian Corridors SMAs. The No Surface Use stipulation would apply for drilling and production operations in all Ecological Research and Monitoring Plots, Rare Vegetation and Wetland Communities, and Visitor Use and Administrative Areas SMAs. Within the Riparian Corridors SMA, no new roads could be constructed, and subject to NPS floodplain management guidelines, surface uses for drilling and production operations could only be permitted adjacent to existing roadways and within previously disturbed areas. Drilling and production operations would not be permitted during any time of the year on up to 46,273 acres. All other areas of the Preserve could be available for drilling and production operations, including the placement of associated access roads and flowlines.

Threatened and endangered species habitat and National Register-eligible or listed cultural resource areas have not been formally designated as SMAs in this Plan/EIS. Based on Current Legal and Policy Requirements and in consultation with the appropriate regulatory authority, timing or surface use stipulations would be imposed on nonfederal oil and gas operations to avoid adverse impacts to these resources.

The Reasonably Foreseeable Development scenario presented in this Plan/EIS would apply to Alternative B – Preferred Alternative. Geophysical exploration (3-D seismic surveys) could be conducted throughout the Preserve and up to 40 wells (13 dry holes, 27 productive wells) could be drilled in all areas of the Preserve (except in certain designated SMAs) over the next 15 – 20 years. New surface disturbances in the Preserve can be minimized by using directional drilling techniques and utilizing previously-disturbed areas.

Alternative B was chosen as the preferred alternative over Alternative C, the environmentally preferred alternative, because it would meet the planning objectives better than Alternative C (shown on Table 2.3, Description of the Extent that Each Alternative Meets the Planning Objectives Presented in this Plan/EIS). The NPS believes Alternative B would fulfill its park protection mandates while allowing nonfederal oil and gas operators to exercise their property interests.

## **Alternative C, Maximum Resource Protection**

- All nonfederal oil and gas operations are subject to Current Legal and Policy Requirements;
- Performance Standards are developed and applied Preserve-wide to protect Preserve resources and values;
- Special Management Areas are formally designated and surface use is not permitted for any type of oil and gas operation, with the exception of the Birding Hotspots and Hunting Area SMAs during designated times; and
- All other areas of the Preserve may be available for nonfederal oil and gas operations.
- Geophysical exploration could be permitted on 55 percent (48,475 acres) and drilling and production operations on 47 percent (41,859 acres) of the Preserve.

The same as Alternative B, an oil and gas management plan would be implemented that clearly articulates the Current Legal and Policy Requirements applicable to the exploration, production, and transportation of nonfederal oil and gas resources in the Preserve. Performance standards, mitigation

measures, and operating stipulations described in this Plan would provide information, and consistent direction for operators during project planning and compliance with federal, state, and local resource protection mandates.

This alternative emphasizes widespread resource protection in areas of the Preserve where resources are susceptible to adverse impacts from oil and gas operations or where certain resources and values are essential to maintain the ecological integrity of the Preserve. Special Management Areas designated under this alternative with the “No Surface Use” stipulation are more widespread than for Alternatives A and B.

Geophysical exploration would not be permitted in SMAs with the exception of the Birding Hot Spots and Hunting Areas SMAs during specified times. Where geophysical exploration would not be permitted in the SMAs, the modification of project designs could concentrate these operations outside of the SMAs. Exploration operations would not be permitted during any time of the year on 39,657 acres and during specified times on 52,272 acres.

Drilling and production operations would not be permitted in SMAs, with the exception of the Hunting Areas SMA. Drilling and production operations would not be permitted during any time of the year on 46,273 acres. Under most, if not all of the SMAs, nonfederal oil and gas could be developed using directional drilling methods. All other areas of the Preserve not designated as a SMA could be available for drilling and production operations, including associated access roads and flowlines.

Threatened and endangered species habitat and National Register-eligible or listed cultural resource areas have not been formally designated as SMAs in this plan. Based on Current Legal and Policy Requirements and in consultation with the appropriate regulatory authority, timing or surface use stipulations would be imposed on nonfederal oil and gas operations to avoid adverse impacts to these resources.

The Reasonably Foreseeable Development scenario presented in this Plan/EIS would apply to Alternative C. Geophysical exploration (3-D seismic surveys) could be conducted throughout the Preserve and up to 40 wells (13 dry holes, 27 productive wells) could be drilled in the Preserve over the next 15 – 20 years. Drilling and production operations would not be permitted in any of the SMAs (with the exception of the Hunting Areas SMA), and directional drilling techniques would be required to develop nonfederal oil and gas reserves underlying these areas. New surface disturbances in the Preserve can be minimized by using directional drilling techniques and utilizing previously-disturbed areas.

## **ENVIRONMENTALLY PREFERRED ALTERNATIVE**

Based on the analyses presented in this document, the planning team has determined that Alternative C is the environmentally preferred alternative in this Plan/EIS. Alternative C would result in the least damage to the biological and physical environment and best protects, preserves, and enhances the historic, cultural, and natural resources in Big Thicket National Preserve.

Of the three alternatives presented in this Plan/EIS, Alternative C would best promote the following policies that are expressed in the National Environmental Policy Act (42 U.S.C. §§ 4321 *et seq.* section 101 (b)):

- 1) Fulfill the responsibilities of each generation as trustee of the environment for succeeding generations.

- 2) Ensure for all Americans safe, healthful, productive, and esthetically and culturally pleasing surroundings.
- 3) Attain the widest range of beneficial uses of the environment without degradation, risk of health or safety, or other undesirable and unintended consequences.
- 4) Preserve important historic, cultural, and natural aspects of our natural heritage and maintain, wherever possible, an environment that supports diversity and variety of individual choice.
- 5) Achieve a balance between population and resource use that will permit high standards of living and a wide sharing of life's amenities.
- 6) Enhance the quality of renewable resources and approach the maximum attainable recycling of depletable resources.

Under all of the alternatives, nonfederal oil and gas operations may be permitted in areas throughout the Preserve, based on Current Legal and Policy Requirements and operating stipulations described in this Plan/EIS. The total anticipated surface disturbance would be the same for all alternatives. There could be up to 465 acres of selective vegetation removal to conduct 3-D seismic operations, less than one acre of surface disturbance from drilling shotholes, and up to 241 acres of new surface disturbance to construct access roads and wellpads. The development of Special Management Areas for Alternatives B and C (see Tables 2.6 through 2.16) would ensure that Preserve resources and values would be better protected than under the No Action Alternative (Alternative A). Alternative A would be less likely to meet these policies because each operation is evaluated on a case by case basis with less overall consistency for protection of resources, values and human health and safety. Alternative C is most likely to meet these criteria because more of the Preserve is protected with the No Surface Use stipulation than the other two alternatives presented in this Plan/EIS.

## **ALTERNATIVES CONSIDERED BUT ELIMINATED FROM DETAILED ANALYSIS**

In developing alternatives for this Plan/EIS, nine alternatives were initially considered by the planning team. Six of the alternatives were eliminated from further detailed evaluation because they did not meet the stated objectives of the plan to a large degree, could not be implemented for technical or logistical reasons, did not meet park mandates, or were outside the scope of this planning effort. The alternatives and the reasons why they were dismissed are described below.

### **Nonfederal Oil and Gas Exploration, Drilling and Production Would Not be Allowed in Big Thicket National Preserve**

The proposal to eliminate all nonfederal oil and gas operations at Big Thicket National Preserve was considered by the interdisciplinary planning team and eliminated from further consideration. Under this alternative, exploration, production, and transportation of nonfederal oil and gas resources would not be permitted within the Preserve. Alternatives that are carried forward for analysis must meet all of the planning goals and objectives that were developed for this Plan/EIS to a large degree. This alternative would protect, preserve, and interpret resources and values and avoid conflicts with visitor use, enjoyment, and human health and safety, but would create significant conflicts with private property rights. It would also not meet the goal of permitting access for geophysical exploration, drilling, and production/transportation of nonfederal oil and gas resources, to the extent it does not compromise the ecological integrity of the Preserve. NPS regulations at 36 CFR Part 9B provide for reasonable controls on nonfederal oil and gas exploration, production, and transportation to assure park resource and visitor protection. A blanket elimination of those activities is inconsistent with the regulations and is outside the scope of this Plan/EIS.

## **Nonfederal Oil and Gas Drilling and Production Operations Would Not be Allowed in Big Thicket National Preserve**

An alternative was proposed during project scoping that would allow nonfederal oil and gas operations to occur from outside the Preserve, while applying "No Surface Use" stipulations inside the Preserve. Under this scenario, operators could obtain geophysical data in the Preserve through application of least damaging methods, however siting of roads, drilling or production facilities, flowlines and other facilities associated with drilling or production activities would not be permitted inside the Preserve. This alternative meets the planning goals to protect, preserve, and interpret resources and values and avoid conflicts with visitor use, enjoyment, and safety. However, for the same reasons described above, this alternative would fall short of the planning goal to permit reasonable access for exploratory drilling, production, and transportation of nonfederal oil and gas resources. If this alternative were implemented, certain areas of Big Thicket National Preserve, particularly the larger nonlinear units may not be accessible via directional drilling techniques from outside of the Preserve, thereby precluding the extraction of some nonfederal oil and gas resources.

## **Amending NPS Nonfederal Oil and Gas Regulations - 36 CFR Part 9B**

A scenario that included Alternative B, the Preferred Alternative, and a second phase that included revising the NPS Nonfederal Oil and Gas Regulations at 36 CFR Part 9B was considered by the interdisciplinary team. The public suggested revising the regulations to simplify the process for preparing and approving Plans of Operations and to expand the types of situations where a waiver from Plan of Operations requirements would be permissible. Revising the 36 CFR Part 9B regulations is outside the scope of this planning effort because it is not a part of the stated management goals and objectives of this plan and is a function of the rulemaking process under the Administrative Procedures Act. In addition, the 9B regulations apply to oil and gas operations throughout the National Park System and should be revised as a coordinated effort with all of the parks that would be affected by the changes. Through a separate rulemaking process, the NPS would provide the public an opportunity to review and comment on proposed changes. The NPS must also comply with the National Environmental Policy Act as part of any effort to revise the 9B regulations. For these reasons, this alternative was eliminated from further detailed analysis.

## **Oil and Gas Operations would be Subject Only to State Regulation**

An alternative was suggested where oil and gas operations would be subject solely to state regulation. The oil and gas operations covered in this plan are located on federal lands and are bound by all applicable federal, state, and local laws and regulations, including NPS oil and gas rights regulations at 36 CFR 9B. This alternative would not comply with these legal and policy mandates and would not meet the objectives of the plan to ensure protection of park resources and values and human health and safety. Therefore, this alternative was eliminated from further consideration.

## **Purchase the Nonfederal Mineral Rights in the Preserve**

Two alternatives were proposed to acquire a portion of or all of the nonfederal mineral rights in the Preserve. One proposal was to purchase mineral rights in specific areas of the Preserve. The criteria for selecting where mineral rights would be purchased would depend on the sensitivity of Preserve resources to adverse impacts from oil and gas operations. Big Thicket National Preserve's enabling legislation (Public Law 93-439 § 2(a)) states that "The Secretary [of the Interior] shall, immediately after

the publication of the boundaries of the preserve, commence negotiations for the acquisition of the lands located therein: *Provided*, that he shall not acquire the mineral estate in any property or existing easements for public utilities, pipelines or railroads without the consent of the owner unless, in his judgment, he first determines that such property or estate is subject to, or threatened with, uses which are, or would be, detrimental to the purposes and objectives of this Act..." The planning team determined that this proposal is a component of all of the alternatives and eliminated it from further consideration. The NPS currently has the authority to acquire the nonfederal mineral rights on a case-by-case basis if it determines that an oil and gas operation poses a significant threat to park resources and values, and the operation cannot be modified to ensure the protection of park resources and values.

Another alternative proposed eliminating all oil and gas operations at the Preserve and purchasing the nonfederal mineral rights Preserve-wide. After a preliminary analysis by the planning team, this alternative was eliminated from further consideration. This alternative would protect park resources and values and avoid conflicts with visitor use, enjoyment, and human health and safety, but would create significant conflicts with private property rights. It would also not meet the objective of permitting reasonable access for exploration and development of nonfederal oil and gas resources. NPS regulations at 36 CFR Part 9B governing nonfederal oil and gas operations in parks provide for reasonable controls on nonfederal oil and gas exploration, production, and transportation to assure park resource and visitor protection. As described above, the NPS has the authority to purchase the nonfederal mineral rights on a case-case basis. It would be unnecessary and cost prohibitive to purchase all of the mineral rights throughout the Preserve; therefore, this alternative was eliminated from further detailed analysis.

**Table 2.3. Description of the Extent that Each Alternative Meets the Planning Objectives Presented in this Plan/EIS**

<b>PLANNING OBJECTIVE</b>	<b>ALTERNATIVE A – NO ACTION/CURRENT MANAGEMENT</b>	<b>ALTERNATIVE B – PREFERRED ALTERNATIVE</b>	<b>ALTERNATIVE C – MAXIMUM RESOURCE PROTECTION</b>
<b>1. Identify Preserve resources and values susceptible to adverse impacts from oil and gas operations.</b>	<b>Meets objective? NO</b> Resource protection has been applied on a case-by-case basis for oil and gas operations. Resources susceptible to adverse impacts from oil and gas operations have not been identified throughout the Preserve.	<b>Meets objective? YES</b> Specific Preserve resources susceptible to adverse impacts from oil and gas operations have been identified in this Plan/EIS and would be protected in designated SMAs throughout the parks.	<b>Meets objective? YES</b> Same as Alternative B.
<b>2. Establish performance standards and impact mitigation measures for oil and gas operations to protect and prevent impairment to Preserve resources and values from adverse impacts from oil and gas operations.</b>	<b>Meets objective? PARTIALLY</b> Resource protection has been applied on a case-by-case basis for oil and gas operations. Resources susceptible to adverse impacts from oil and gas operations have not been identified throughout the Preserve.	<b>Meets objective? YES</b> Specific Preserve resources susceptible to adverse impacts from oil and gas operations have been identified in this Plan/EIS and would be protected in designated SMAs throughout the Preserve.	<b>Meets Objective? YES</b> Same as Alternative B.
<b>3. Establish performance standards and impact mitigation measures for oil and gas operations to avoid or minimize impacts from oil and gas operations on visitor use and enjoyment, and human health and safety.</b>	<b>Meets objective? PARTIALLY</b> In accordance with CLPR, oil and gas operations have for the most part avoided visitor use areas, but variability in protection is possible by applying CLPR on a case-by-case basis. Visitor use and enjoyment may be affected by noise, visual intrusions, resource degradation, and damage to resources and values from accidental leaks and spills of hazardous and contaminating substances during oil and gas operations. Resource degradation and the potential for spills of hazardous and contaminating substances would continue to pose a threat	<b>Meets objective? YES</b> In accordance with CLPR, oil and gas operations would avoid visitor use areas. The designation of SMAs, and the application of performance goals, and operating stipulations developed in this Plan/EIS would protect visitor use and enjoyment, and human health and safety while minimizing adverse impacts on Preserve resources and values. Performance goals and specific operating stipulations would be required in this Plan/EIS to protect human health and safety in the Preserve.	<b>Meets objective? YES</b> Same as Alternative B. In addition, applying the No Surface use stipulation in more SMAs would minimize future damage to Preserve resources and values in those areas susceptible to adverse impacts from oil and gas operations, and reduce conflicts with visitor use and enjoyment. Same as Alternative B, performance goals and specific operating stipulations that would be required in this Plan/EIS would protect human health and safety in the Preserve.



PLANNING OBJECTIVE	ALTERNATIVE A – NO ACTION/CURRENT MANAGEMENT	ALTERNATIVE B – PREFERRED ALTERNATIVE	ALTERNATIVE C – MAXIMUM RESOURCE PROTECTION
	to human health and safety in the Preserve.		
4. Provide holders of oil and gas rights reasonable access for exploration and development.	<b>Meets objective? YES</b> In accordance with CLPR, oil and gas operators may conduct operations throughout the Preserve.	<b>Meets objective? YES</b> In accordance with CLPR and operating stipulations in Special Management Areas, operators may conduct operations throughout the Preserve.	<b>Meets objective? PARTIALLY</b> Increasing the No Surface Use stipulation in SMAs may limit an operator's ability to conduct operations in the Preserve.
5. Provide pertinent information to oil and gas operators to facilitate planning and compliance with NPS and other applicable regulations.	<b>Meets objective? PARTIALLY</b> There is no comprehensive plan describing CLPR, performance standards, SMAs, and operating stipulations that would guide oil and gas operations in the parks. Project development has been done on a case-by-case basis.	<b>Meets objective? YES</b> This Plan/EIS would provide the operator consistent guidance prior to project planning and would describe CLPR, performance standards, SMAs, operating stipulations, and recommended mitigation measures.	<b>Meets objective? YES</b> Same as Alternative B.

**Table 2.4. Summary of Alternatives**

Note: For definitions and additional information, see footnotes at the end of this table. Also note that the acreage numbers provided are total acres for each Protected Area or SMA. Because these areas overlap, if the acreages were add together, they would exceed the total area of the Preserve.

IMPACT TOPICS	ALTERNATIVE A NO ACTION/CURRENT MANAGEMENT	ALTERNATIVE B PREFERRED ALTERNATIVE	ALTERNATIVE C MAXIMUM RESOURCE PROTECTION
<b>BIG THICKET NATIONAL PRESERVE – 88,132 Acres<sup>1</sup></b>			
<p><b>OVERVIEW:</b> Current Legal and Policy Requirements (CLPR<sup>2</sup>) are summarized for the 12 impact topics presented in this Plan/EIS. Special Management Areas (SMAs<sup>3</sup>) are formally designated under Alternatives B and C, and specific protection measures would be applied.</p>	<p>-Special Management Areas (SMAs) are not formally designated. Some areas of the Preserve called Protected Areas in this Plan/EIS have specific resource protection measures applied under Current Legal and Policy Requirements (CLPR). For other areas of the Preserve, resource protection measures are applied on a case-by-case basis by applying other CLPR.</p> <p>- Current Legal and Policy Requirements (CLPR) would apply in all areas of the Preserve and gas operations would be evaluated on a case-by-case basis.</p> <p>-CLPR could result in applying “No Surface Use” (NSU) or “No Surface Use with Timing Stipulations” in areas where cultural resources, threatened and endangered species and their habitat, and floodplains or wetlands are identified during plan of operations development.</p> <p>-In all areas of the Preserve, nonfederal oil and gas operations would be evaluated on a case-by-case basis, using Current Legal and Policy Requirements (CLPR).</p>	<p>-Special Management Areas (SMAs) would be formally designated, and applying “No Surface Use” (NSU<sup>3</sup>) or “No Surface Use with Timing Stipulations” for nonfederal oil and gas operations would provide specific resource protection.</p> <p>-Current Legal and Policy Requirements (CLPR) would apply in all areas of the Preserve.</p> <p>-“No Surface Use” (NSU) or “NSU with Timing Stipulations” would be applied in all designated SMAs.</p> <p>-In all other areas of the Preserve not designated as a SMA, nonfederal oil and gas operations would be evaluated on a case-by-case basis, using Current Legal and Policy Requirements (CLPR).</p>	<p>-Special Management Areas (SMAs) would be formally designated, and “No Surface Use” (NSU) would be applied to all geophysical exploration, drilling, and production operations, except in the Hunting Areas SMA. Directional drilling from surface locations outside SMAs to reach bottomhole locations under SMAs, and for placement of flowlines and gathering lines, could be permitted.</p> <p>- Current Legal and Policy Requirements (CLPR) would apply in all areas of the Preserve.</p> <p>-“No Surface Use” would be applied in all designated SMAs, except in the Hunting Areas SMA.</p> <p>-Same as Alternative B.</p>
1. <b>NONFEDERAL OIL AND GAS DEVELOPMENT</b>	-Nonfederal oil and gas operations could be permitted, based on CLPR.	-CLPR would apply throughout the Preserve with additional stipulations in all designated SMAs.	- CLPR would apply throughout the Preserve with NSU in all designated SMAs, except the Hunting Area SMA.
2. <b>AIR QUALITY</b>	-CLPR would result in applying mitigation measures to protect local and regional air quality and related values.	-Same as Alternative A.	-Same as Alternative A.
3. <b>GEOLOGIC RESOURCES</b>	-Nonfederal oil and gas operations could be permitted, based on CLPR.	-Same as Alternative A.	- Same as Alternative A .
4. <b>WATER RESOURCES</b>	-CLPR with 500' foot offset from perennial, intermittent, or ephemeral watercourses, unless specifically authorized by an approved plan of operations (36 CFR § 9.41(a)).	-Same as Alternative A.	-Same as Alternative A.

IMPACT TOPICS	ALTERNATIVE A NO ACTION/CURRENT MANAGEMENT	ALTERNATIVE B PREFERRED ALTERNATIVE	ALTERNATIVE C MAXIMUM RESOURCE PROTECTION
<p><b>5. FLOODPLAINS,</b> Including Riparian Corridors SMA<sup>7</sup></p> <p>Riparian Corridors SMA includes: -Floodplain Hardwood Forests -Floodplain Hardwood Pine Forests -complexes of these vegetation types, and up to 300' from banks of major streams where not defined by the above vegetation types</p>	<p>-Geophysical exploration could be permitted within the 100-year floodplain with 500' foot offset from perennial, intermittent, or ephemeral watercourses, unless specifically authorized by an approved plan of operations (36 CFR § 9.41(a)). Staging areas would not be permitted unless there is no practicable alternative, and vehicle use would not be permitted on or across saturated or flooded soils in hydrologic soil classes<sup>8</sup> "C" and "D" (DO-77-2). -Drilling and production pads would not be permitted within the 500-year floodplain unless there is no practicable alternative (documented in Statement of Findings (SOF) (DO 77-2)). -Drilling and production access roads, pads, flowlines, and gathering lines would not be permitted in the 100-year floodplain unless there is no practicable alternative (DO 77-2).</p> <p><b>Area:</b> No formal SMA designation <b>Geophysical Exploration<sup>5</sup>:</b> CLPR, as described above. <b>Drilling &amp; Production:</b> CLPR as described above.</p>	<p>-Same as Alternative A.</p> <p>-Same as Alternative A. NSU in Riparian Corridors SMA with exceptions.</p> <p>-Same as Alternative A. NSU in Riparian Corridors SMA with exceptions.</p> <p><b>Area:</b> 25,539 acres/30% of analysis area <b>Geophysical Exploration:</b> Same as Alternative A. <b>Drilling &amp; Production:</b> NSU, except drilling and production operations could be permitted adjacent to existing roadways, within previously disturbed areas, subject to CLPR. No new roads would be permitted. Associated flowlines and gathering lines could be located within previously disturbed areas.</p>	<p>-Same as Alternative A with NSU in the Riparian Corridors SMA.</p> <p>-Same as Alternative A, with NSU in the Riparian Corridors SMA.</p> <p>-Same as Alternative A, with NSU in the Riparian Corridors SMA.</p> <p><b>Area:</b> 25,539 acres/30% of analysis area <b>Geophysical Exploration:</b> NSU. <b>Drilling &amp; Production:</b> NSU.</p>
<p><b>6. VEGETATION,</b> including Ecological Research and Monitoring Plots and Rare Vegetation Communities SMAs</p> <p>Ecological Research and Monitoring Plots SMA includes: -fire monitoring plots</p>	<p>-Nonfederal oil and gas operations could be permitted, based on CLPR.</p> <p><b>Area:</b> 1.38 acres/.002% of analysis area <b>Geophysical Exploration:</b> NSU.</p>	<p>-Same as Alternative A, with additional stipulations in designated SMAs.</p> <p><b>Area:</b> 3.6 acres/.004% of analysis area <b>Geophysical Exploration:</b> NSU with 50' offset for seismic shotholes.</p>	<p>-Same as Alternative A, with NSU in designated SMAs.</p> <p><b>Area:</b> 3.6 acres/.004% of analysis area <b>Geophysical Exploration:</b> Same as Alternative B.</p>

IMPACT TOPICS	ALTERNATIVE A NO ACTION/CURRENT MANAGEMENT	ALTERNATIVE B PREFERRED ALTERNATIVE	ALTERNATIVE C MAXIMUM RESOURCE PROTECTION
<p>-long-term monitoring plots</p> <p>All monitoring plots:</p> <p>Rare Vegetation Communities SMA includes:</p> <ul style="list-style-type: none"> <li>-Upland Pine Forests</li> <li>-Beech-Magnolia-Loblolly Pine Forests</li> <li>-Sandhill Pine Forests</li> <li>-Old Growth Trees</li> </ul>	<p><b>Area:</b> 55 acres/1% of analysis area -NSU.</p> <p><b>Area:</b> 74 acres/1% of analysis area <b>Drilling &amp; Production:</b> NSU.</p> <p><b>Area:</b> No formal SMA designation <b>Geophysical Exploration:</b> CLPR.</p> <p><b>Drilling &amp; Production:</b> CLPR.</p>	<p><b>Area:</b> 55 acres/1% of analysis area -NSU with 150' offset for seismic shotholes.</p> <p><b>Area:</b> 74 acres/1% of analysis area <b>Drilling &amp; Production:</b> NSU with 150' offset.</p> <p><b>Area:</b> 2,948 acres/3.4% of analysis area <b>Geophysical Exploration:</b> Same as Alternative A.</p> <p><b>Drilling &amp; Production:</b> NSU.</p>	<p><b>Area:</b> 55 acres/1% of analysis area -Same as Alternative B.</p> <p><b>Area:</b> 74 acres/1% of analysis area <b>Drilling &amp; Production:</b> Same as Alternative B.</p> <p><b>Area:</b> 2,948 acres/3.4% of analysis area <b>Geophysical Exploration:</b> NSU.</p> <p><b>Drilling &amp; Production:</b> Same as Alternative B.</p>
<p><b>7. WETLANDS,</b> including Rare Forested Wetland Communities and Ecological Research and Monitoring Plots SMAs</p> <p>Rare Forested Wetland Communities SMA includes:</p> <ul style="list-style-type: none"> <li>-Wetland Baygall Shrub Thickets</li> <li>-Swamp Cypress-Tupelo Forests</li> <li>-Wetland Pine Savannas</li> <li>-Old Growth Trees</li> </ul> <p>Ecological Research and Monitoring Plots SMA includes:</p> <ul style="list-style-type: none"> <li>-Royal Fern Bog Research Plot</li> </ul>	<p>-Geophysical exploration could be permitted under CLPR (DO 77-1); with no vehicle use permitted on or across saturated or flooded soils in hydrologic soil classes<sup>8</sup> "C" and "D".</p> <p>-Drilling and production operations (including access roads and placement of flowlines and gathering lines) would not be permitted in wetlands unless there is no practicable alternative (DO 77-1).</p> <p><b>Area:</b> No formal SMA designation <b>Geophysical Exploration:</b> CLPR, as described above.</p> <p><b>Drilling &amp; Production:</b> CLPR, as described above.</p> <p><b>Area:</b> 168 acres/.2% of analysis area <b>Geophysical Exploration:</b> NSU.</p> <p><b>Drilling &amp; Production:</b> NSU.</p>	<p>-Same as Alternative A.</p> <p>-Same as Alternative A., with NSU in designated SMAs.</p> <p><b>Area:</b> 5,087 acres/6% of analysis area <b>Geophysical Exploration:</b> Same as Alternative A.</p> <p><b>Drilling &amp; Production:</b> NSU.</p> <p><b>Area:</b> 191 acres/.2% of analysis area <b>Geophysical Exploration:</b> NSU with 150' offset.</p> <p><b>Drilling &amp; Production:</b> NSU with 150' offset.</p>	<p>-Same as Alternative A, with NSU in designated SMAs.</p> <p>-Same as Alternative B, with NSU in designated SMAs.</p> <p><b>Area:</b> 5,087 acres/6% of analysis area <b>Geophysical Exploration:</b> NSU.</p> <p><b>Drilling &amp; Production:</b> Same as Alternative B.</p> <p><b>Area:</b> 191 acres/.2% of analysis area <b>Geophysical Exploration:</b> Same as Alternative B.</p> <p><b>Drilling &amp; Production:</b> Same as Alternative B.</p>
<p><b>8. FISH AND WILDLIFE</b></p>	<p>-CLPR would result in applying mitigation measures to protect fish and wildlife and their habitat.</p>	<p>-Same as Alternative A.</p>	<p>-Same as Alternative A.</p>

IMPACT TOPICS	ALTERNATIVE A NO ACTION/CURRENT MANAGEMENT	ALTERNATIVE B PREFERRED ALTERNATIVE	ALTERNATIVE C MAXIMUM RESOURCE PROTECTION
<b>9. THREATENED AND ENDANGERED SPECIES</b>	-CLPR would result in applying surface use and Timing Stipulations to protect threatened, endangered, and sensitive species and their habitat (ESA).	-Same as Alternative A.	-Same as Alternative A.
<b>10. CULTURAL RESOURCES</b>	-CLPR would result in applying operating stipulations in areas where cultural resources are identified during plan of operations development (NHPA and DO-28).	-Same as Alternative A.	-Same as Alternative A.
<b>11. VISITOR USE, ADMINISTRATIVE &amp; OTHER USE AREAS,</b> Including designated visitor use and administrative areas SMAs.  Visitor Use, Administrative, and other Use Areas SMA includes: -Day Use Areas (27 areas) includes: boat ramps, picnic areas, and parking areas  -Hiking Trails (9 trails) -Canoe Routes includes: Village Creek, Turkey Creek from Gore Store Road to Village Creek, Franklin Lake to Johns Lake, and Cook's Lake to Scatterman Lake Loop -Administrative Areas includes: Visitor Information Station, Big Thicket Maintenance and Meeting Facility, and Turkey Creek Ranch House -Cemeteries (3 sites)  -Private Residences includes: 2 residential homesites with use and occupancy terms	CLPR would result in NSU with 500' offset for all geophysical exploration, drilling, and production operations from any structure or facility (excluding roads) used for unit interpretation, public recreation or for administration of the unit, unless specifically authorized by an approved plan of operations (36 CFR § 9.41(a)).  <b>Geophysical Exploration:</b> NSU with 500' offset, unless specifically authorized by an approved plan of operations. <b>Drilling &amp; Production:</b> NSU with 500' offset, unless specifically authorized in an approved plan of operations. <b>Area:</b> 509 acres/.6% of analysis area <b>Area:</b> 5,357 acres/6% of analysis area <b>Area:</b> 2,323 acres/3% of analysis area  <b>Area:</b> 54 acres/.06% of analysis area  <b>Area:</b> 73 acres/.08% of analysis area  <b>Area:</b> 56 acres/.06% of analysis area	-Same as Alternative A.  <b>Geophysical Exploration:</b> Same as Alternative A.  <b>Drilling &amp; Production:</b> NSU with 1500' offset.  <b>Area:</b> 3,092 acres/4% of analysis area <b>Area:</b> 13,681 acres/16% of analysis area <b>Area:</b> 5,528 acres/6% of analysis area  <b>Area:</b> 313 acres/.4% of analysis area  <b>Area:</b> 482 acres/.6% of analysis area  <b>Area:</b> 255 acres/.3% of analysis area	-Same as Alternative A.  <b>Geophysical Exploration:</b> Same as Alternative A.  <b>Drilling &amp; Production:</b> Same as Alternative B.  <b>Area:</b> 3,092 acres/4% of analysis area <b>Area:</b> 13,681 acres/16% of analysis area <b>Area:</b> 5,528 acres/6% of analysis area  <b>Area:</b> 313 acres/.4% of analysis area  <b>Area:</b> 482 acres/.6% of analysis area  <b>Area:</b> 255 acres/.3% of analysis area

IMPACT TOPICS	ALTERNATIVE A NO ACTION/CURRENT MANAGEMENT	ALTERNATIVE B PREFERRED ALTERNATIVE	ALTERNATIVE C MAXIMUM RESOURCE PROTECTION
Birding Hot Spots SMA (8 areas)	<b>Area:</b> 135 acres/.2% of analysis area <b>Geophysical Exploration:</b> NSU from 3/1–5/30 & 9/1–11/30 with 500' offset, unless specifically authorized by an approved plan of operations. <b>Drilling &amp; Production:</b> NSU with 500' offset, unless specifically authorized by an approved plan of operations.	<b>Area:</b> 993 acres/1.1% of analysis area <b>Geophysical Exploration:</b> Same as Alternative A.  <b>Drilling &amp; Production:</b> NSU with 1,500' offset.	<b>Area:</b> 993 acres/1.1% of analysis area <b>Geophysical Exploration:</b> Same as Alternative A.  <b>Drilling &amp; Production:</b> Same as Alternative B.
Hunting Areas SMA (5 units) includes designated lands in : -Big Sandy Creek Unit -Beech Creek Unit -Lance Rosier Unit -Beaumont Unit -Neches Bottom and Jack Gore Baygall Unit	<b>Area:</b> 52,272 acres/61% of analysis area <b>Geophysical Exploration:</b> NSU from 10/1-1/15.  <b>Drilling &amp; Production:</b> CLPR.	<b>Area:</b> 52,272 acres/61% of analysis area <b>Geophysical Exploration:</b> Same as Alternative A.  <b>Drilling &amp; Production:</b> Same as Alternative A.	<b>Area:</b> 52,272 acres/61% of analysis area <b>Geophysical Exploration:</b> Same as Alternative A.  <b>Drilling &amp; Production:</b> Same as Alternative A.
<b>12. ADJACENT LAND USES AND RESOURCES</b>	-Nonfederal oil and gas operations could be permitted outside the Preserve, based on CLPR (36 CFR §9.32(e)).	Same as Alternative A.	Same as Alternative A.

<sup>1</sup>**88,132 acres** – The total acreage within the legislated boundary of the Preserve is 98,735 acres. However, 88,132 acres is used for the analysis in this Plan/EIS because the NPS has not acquired 10,602 acres within the boundary of the Preserve. All percentage calculations in this table (and document) are based on the 88,132 acre figure.

<sup>2</sup>**CLPR** = “Current Legal and Policy Requirements” – Nonfederal oil and gas operations could be permitted under “Current Legal and Policy Requirements” which include federal and state laws, regulations, federal executive orders, NPS policies, and applicable direction provided in park planning documents.

<sup>3</sup>**Modification of any SMA stipulation** may be considered if an operator can demonstrate that new technology or site-specific information (such as engineering, geological, biological, or other information or studies) would meet the goals of protecting resources, values, and uses in the SMA. Some of the SMAs overlap so the total SMA acreage will be greater than the total area of the Preserve. For example, overlap occurs between the Ecological Research and Monitoring Plots SMA and the Rare Vegetation Communities SMA, since some plots are located within the rare vegetation communities. A breakdown of SMAs by Preserve Unit is presented along with the SMA maps in Tables 2.6 through 2.16, and Figures 2.7 through 2.17.

<sup>4</sup>**NSU** = “No Surface Use” – Access across the surface or use of the surface for nonfederal oil and gas operations would be limited or not permitted in SMAs. Operations include, but are not limited to: gathering information for development of a plan of operations; geophysical exploration; construction or use of roads or other means of access; construction or use of drilling pads and well pads, well completion and production; use of production equipment and facilities; well servicing and workover operations, construction or use of flowlines and gathering lines; transport or processing of petroleum products; and inspection, monitoring or maintenance of wells and equipment. Under this constraint, operators may produce and develop the oil and gas resources beneath the Preserve by directionally drilling from sites outside the NSU area. NSU is also used with an offset or distance stipulation, or timing stipulation. For example, the “NSU with 150' offset,” as applied to the Royal Fern Bog Research Plot, means to completely avoid (i.e., no surface access and No Surface Use) the plot itself, and offset operations 150 feet from the perimeter of the plot. Similarly, the “NSU from 10/1-1/15” stipulation for hunting areas means that geophysical exploration would not be permitted (i.e., no surface access and No Surface Use) in designated hunting areas during the Preserve’s hunting season, typically from October 1 through January 15, inclusive.

<sup>5</sup>**Geophysical Exploration** primarily consists of 3-D seismic operations and typically involves selective cutting of vegetation along source and receiver lines, drilling shot holes along source lines, placing explosives at the bottom of each shot hole, placing cables and other recording equipment along receiver lines, and detonating explosives.

<sup>6</sup>**Drilling & Production** includes construction or use of roads or other means of access; construction or use of drilling pads and well pads; drilling for oil and gas; well completion; use of production equipment and facilities; well servicing and workover operations, construction or use of flowlines and gathering lines; transport or processing of petroleum products; and inspection, monitoring or maintenance of wells and equipment.

<sup>7</sup>**Riparian Corridors SMA** is defined as consisting of two distinct biological communities: the bottomland hardwood forest community located on the floodplain terrace adjacent to major streams; and the aquatic community present within the stream. Two vegetation types, Floodplain Hardwood Forests and Floodplain Hardwood Pine Forests, best represent bottomland hardwood forests located on floodplain terraces adjacent to major streams. In addition, complexes (or extensive intermingling) of these vegetation types define the riparian corridor. Where the riparian corridor is not defined by these vegetation types, or complexes of these types, the corridor width is defined as up to 300 feet from the banks of major streams, whichever area is greater. Where operations are permitted in this SMA, appropriate mitigation measures must be taken to floodproof or elevate the site to minimize structural and environmental risks associated with flooding.

<sup>8</sup>**Hydrologic soil classes** – In general, soils in hydrologic soil classes “C” and “D” are clayey textured, are found in floodplains and wetlands, have a high water table, and over 50 percent of these soils are occasionally to frequently flooded.

**Table 2.5. Summary of Operating Stipulations under Each Alternative**

(Acreage totals exclude overlapping areas for each Protected Area/SMA.)

<b>Big Thicket National Preserve</b>		<b>Total Area: 88,132 Acres</b>	
<b>ALTERNATIVES</b>	<b>PROTECTED AREAS under ALTERNATIVE A</b>	<b>SMAs under ALTERNATIVE B</b>	<b>SMAs under ALTERNATIVE C</b>
<b>Total Area with Operating Stipulations<sup>1</sup></b>	56,538 acres <sup>2</sup>	<75,293 acres <sup>3</sup>	75,293 acres
<b>GEOPHYSICAL EXPLORATION OPERATIONS – NO SURFACE USE</b>			
<b>Total area</b>	7,462 acres <sup>2</sup>	11,512 acres	39,657 acres
<b>Designated Areas</b>	Fire Monitoring Plots with no offset Long-term Monitoring Plots with no offset Royal Fern Bog Research Plot w/no offset Visitor Use, Administrative and Other Use Areas with 500' offset <sup>1</sup> Waterways with 500' offset <sup>1</sup>	Fire Monitoring Plots with 50' offset Long-term Monitoring Plots with 150' offset Royal Fern Bog Research Plot with 150' offset Visitor Use, Administrative and Other Use Areas with 500' offset <sup>1</sup> Waterways with 500' offset <sup>1</sup>	Fire Monitoring Plots with 50' offset Long-term Monitoring Plots with 150' offset Royal Fern Bog Research Plot with 150' offset Visitor Use, Administrative and Other Use Areas with 500' offset <sup>1</sup> Waterways with 500' offset <sup>1</sup> Riparian Corridors Rare Vegetation Communities Rare Forested Wetland Communities
<b>GEOPHYSICAL EXPLORATION OPERATIONS – TIMING STIPULATIONS</b>			
<b>Total area</b>	52,272 acres <sup>2</sup>	52,272 acres	52,272 acres
<b>Designated Areas</b>	Birding Hot Spots with 500' offset <sup>1</sup> (3/1-5/30 and 9/1- 11/30) Hunting Areas (10/1-1/15)	Birding Hot Spots with 500' offset <sup>1</sup> (3/1-5/30 and 9/1- 11/30) Hunting Areas (10/1-1/15)	Birding Hot Spots with 500' offset <sup>1</sup> (3/1-5/30 and 9/1- 11/30) Hunting Areas (10/1-1/15)
<b>DRILLING AND PRODUCTION OPERATIONS – NO SURFACE USE</b>			
<b>Total area</b>	7,493 acres <sup>2</sup>	<46,273 <sup>3</sup>	46,273 acres
<b>Designated Areas</b>	Fire Monitoring Plots with no offset Long-term Monitoring Plots with no offset Royal Fern Bog Research Plot with no offset Visitor Use, Administrative and Other Use Areas with 500' offset <sup>1</sup> Birding Hot Spots with 500' offset <sup>1</sup> Waterways with 500' offset <sup>1</sup>	Fire Monitoring Plots with 150' offset Long-term Monitoring Plots with 150' offset Royal Fern Bog Research Plot with 150' offset Visitor use, Administrative and Other Use Areas with 1500' offset Birding Hot Spots with 1500' offset Waterways with 500' offset <sup>1</sup> Riparian Corridors <sup>3</sup> Rare Vegetation Communities Rare Forested Wetland Communities	Fire Monitoring Plots with 150' offset Long-term Monitoring Plots with 150' offset Royal Fern Bog Research Plot with 150' offset Visitor Use, Administrative and Other Use Areas with 1500' offset Birding Hot Spots with 1500' offset Waterways with 500' offset <sup>1</sup> Riparian Corridors Rare Vegetation Communities Rare Forested Wetland Communities

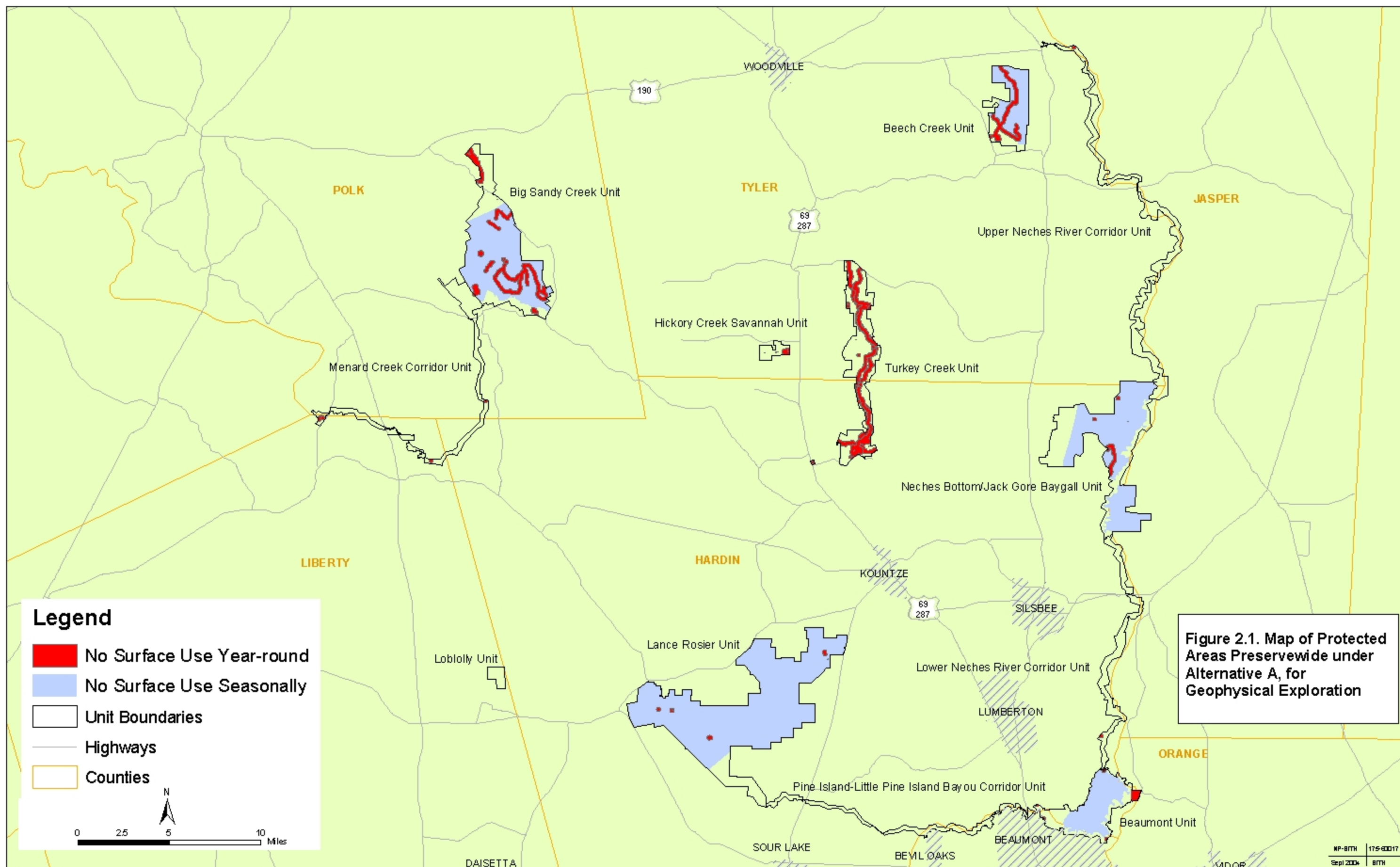
<sup>1</sup>Nonfederal oil and gas operations may not be conducted within 500 feet from perennial, intermittent, or ephemeral watercourses, or within 500 feet of any structure or facility (excluding roads) used for unit interpretation, public recreation or for administration of the unit, unless specifically authorized by an approved plan of operations, as per CLPR at 36 CFR § 9.41(a). The area covered by this operating stipulation from waterways has not been mapped and will be determined on a case-by-case basis during project scoping and the preparation of a Plan of Operations.

<sup>2</sup>The Protected Areas denoted under Alternative A are not formally designated as SMAs, but the “No Surface Use” and “Timing Stipulations” have been applied on a case-by-case basis.

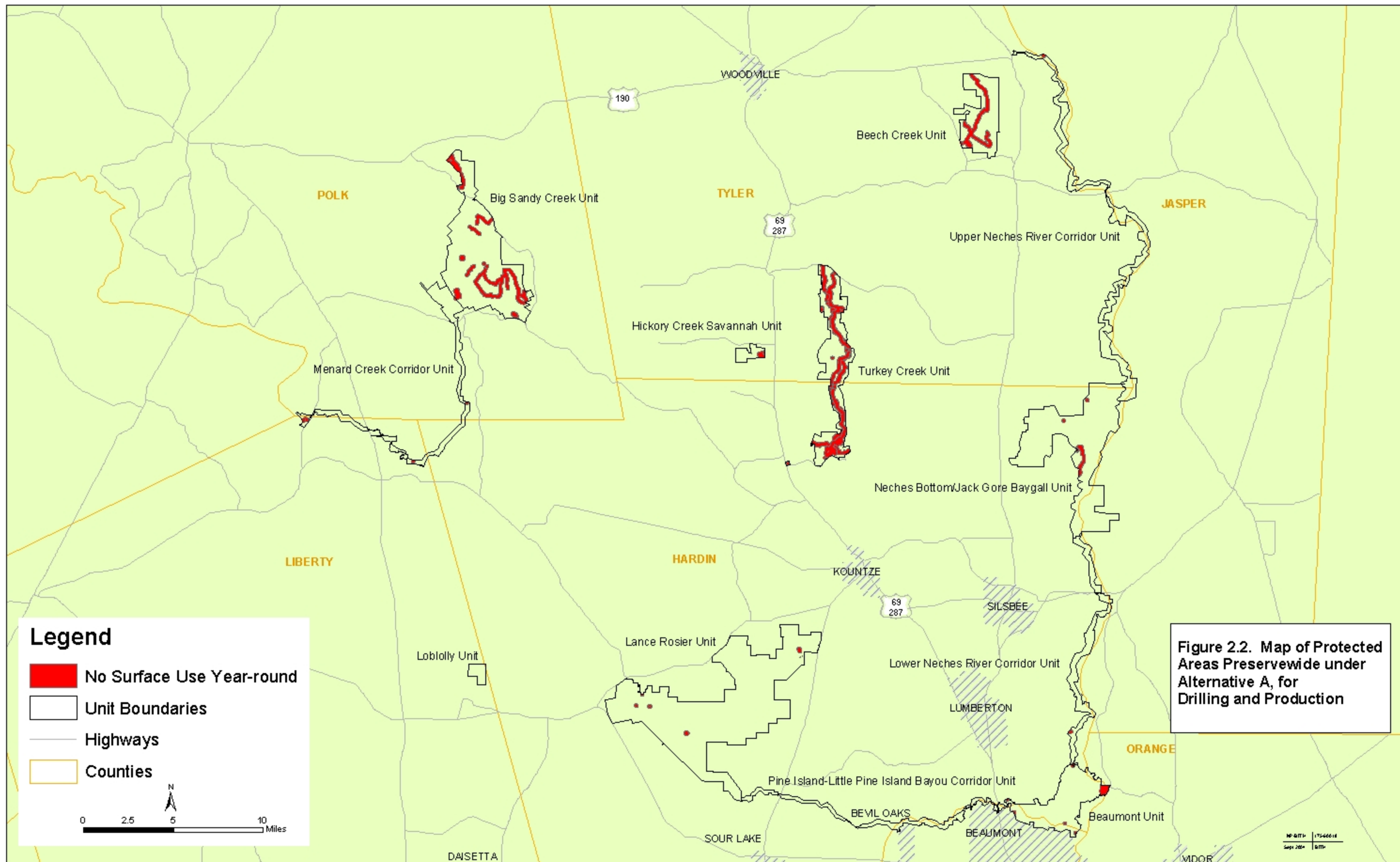
<sup>3</sup>The Riparian Corridor SMA under Alternative B would be NSU, except drilling and production could be permitted adjacent to existing roadways and within previously disturbed areas, subject to CLPR (including NPS Floodplain Management Guidelines and 36 CFR § 9.41(a)). No new roads would be permitted. Associated flowlines and gathering lines could be located within previously disturbed areas, with a minimum 500' offset from perennial, intermittent, or ephemeral watercourses, unless specifically authorized by an approved plan of operations.



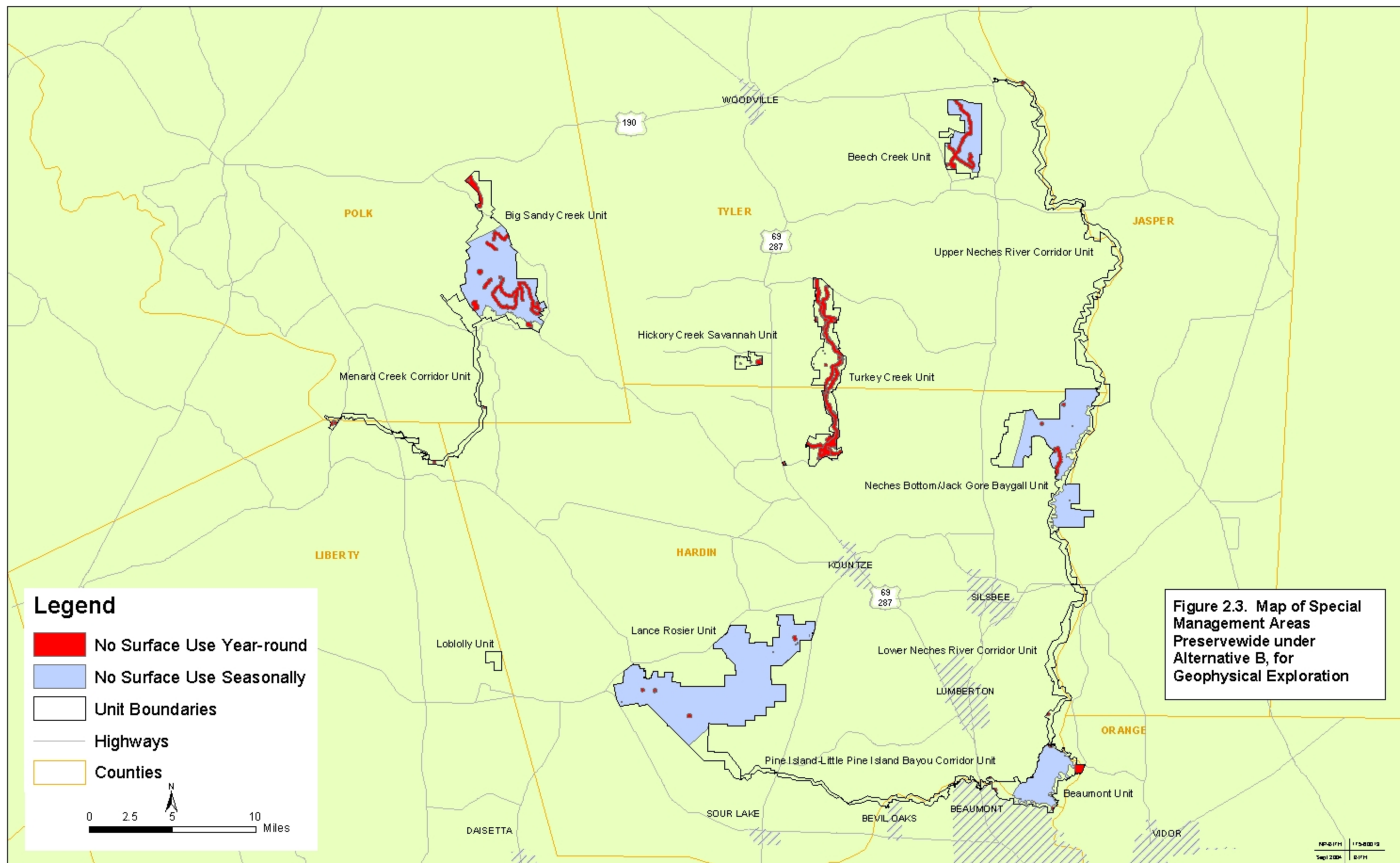
**Figure 2.1. Map of Protected Areas Preservewide under Alternative A, for Geophysical Exploration**



**Figure 2.2. Map of Protected Areas Preservewide under Alternative A, for Drilling and Production**

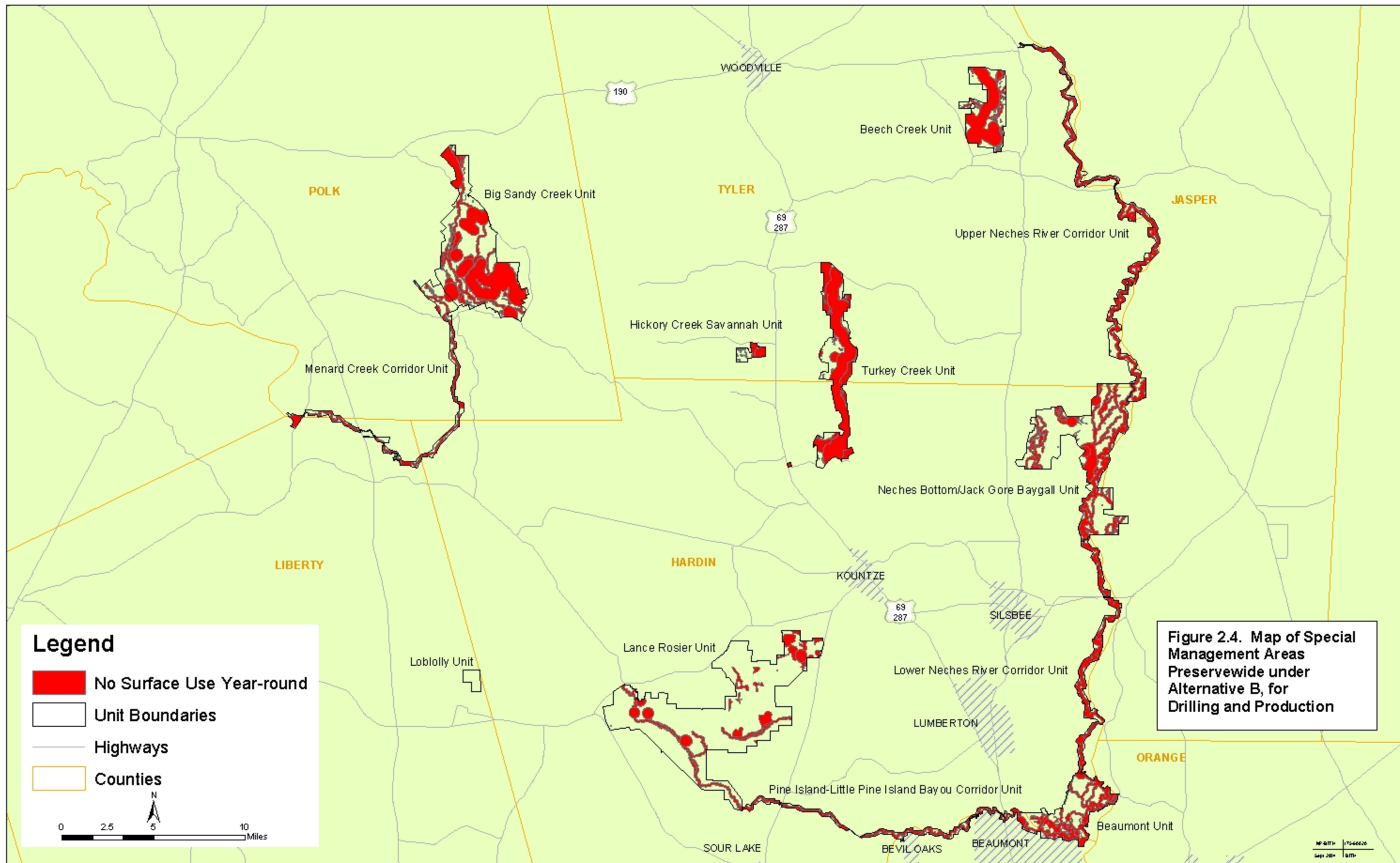


**Figure 2.3. Map of Special Management Areas Preservewide under Alternative B, for Geophysical Exploration**



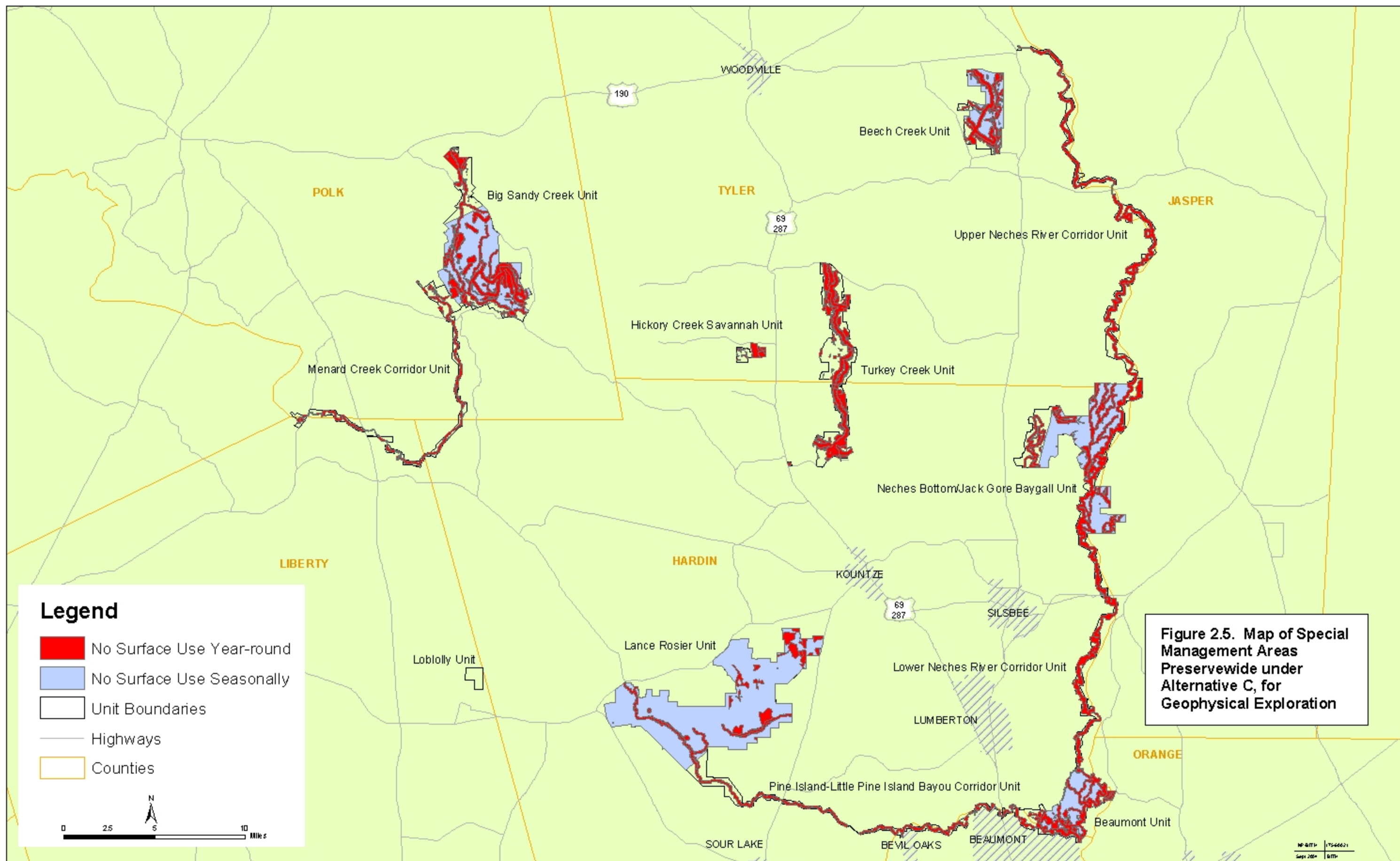
**Figure 2.4. Map of Special Management Areas Preservewide under Alternative B, for Drilling and Production**



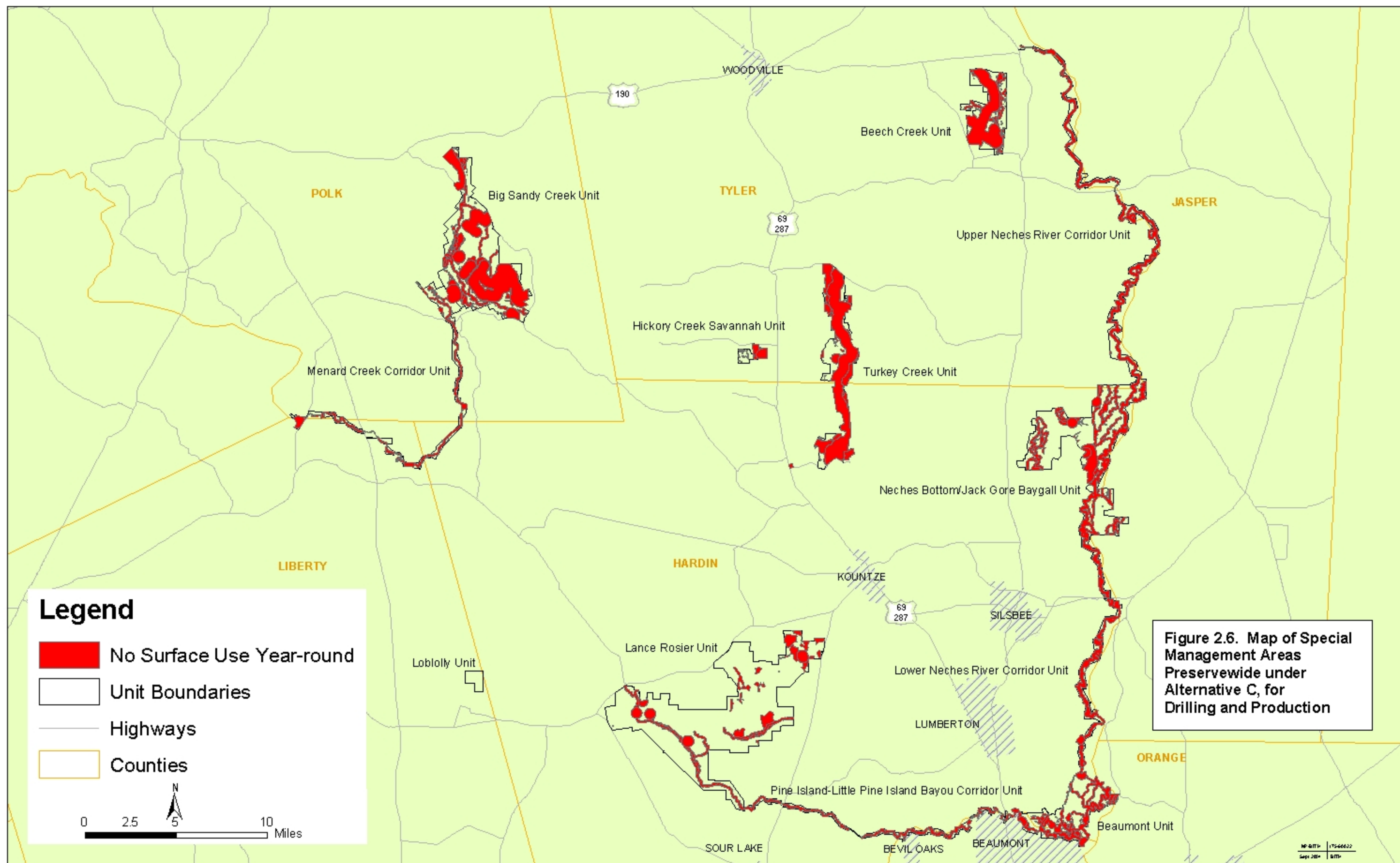




**Figure 2.5. Map of Special Management Areas Preservewide under Alternative C, for Geophysical Exploration**



**Figure 2.6. Map of Special Management Areas Preservewide under Alternative C, for Drilling and Production**



**Table 2.6. Summary of Operating Stipulations, Beaumont Unit**

Beaumont Unit		Total Unit Acres: 6,289 acres	
Acreage totals exclude overlapping areas for each Protected Area/SMA.			
ALTERNATIVES	ALTERNATIVE A	ALTERNATIVE B	ALTERNATIVE C
Total Area with Operating Stipulations <sup>1</sup>	4,258 acres <sup>2</sup>	<5,547 acres <sup>3</sup>	5,547 acres
GEOPHYSICAL EXPLORATION OPERATIONS – NO SURFACE USE			
Total area	226 acres <sup>2</sup>	239 acres	3,112 acres
Designated Areas	Royal Fern Bog Research Plot SMA Day Use Areas	Royal Fern Bog Research Plot SMA Day Use Areas SMA	Royal Fern Bog Research Plot SMA Day Use Areas SMA Rare Forested Wetland Communities SMA Riparian Corridors SMA
GEOPHYSICAL EXPLORATION OPERATIONS – TIMING STIPULATIONS			
Total area	4,038 acres <sup>2</sup>	4,038 acres	4,038 acres
	Hunting Areas Birding Hot Spots	Hunting Areas SMA Birding Hot Spots SMA	Hunting Areas SMA Birding Hot Spots SMA
DRILLING AND PRODUCTION OPERATIONS – NO SURFACE USE			
Total area	244 acres <sup>2</sup>	<3,258 acres <sup>3</sup>	3,258 acres
Designated Areas	Royal Fern Bog Research Plot Day Use Areas Birding Hot Spots	Royal Fern Bog Research Plot SMA Day Use Areas SMA Birding Hot Spots SMA Rare Forested Wetland Communities SMA Riparian Corridors SMA <sup>3</sup>	Royal Fern Bog Research Plot SMA Day Use Areas SMA Birding Hot Spots SMA Rare Forested Wetland Communities SMA Riparian Corridors SMA
DRILLING AND PRODUCTION OPERATIONS – TIMING STIPULATIONS			
Total area	0 acres	0 acres	0 acres
Designated Areas	None	None	None

<sup>1</sup>Nonfederal oil and gas operations may not be conducted within 500 feet from perennial, intermittent, or ephemeral watercourses, or within 500 feet of any structure or facility (excluding roads) used for unit interpretation, public recreation or for administration of the unit, unless specifically authorized by an approved plan of operations, as per CLPR at 36 CFR § 9.41(a). The 500' area from waterways covered by this operating stipulation has not been mapped and will be determined on a case-by-case basis during project scoping and the preparation of a Plan of Operations.

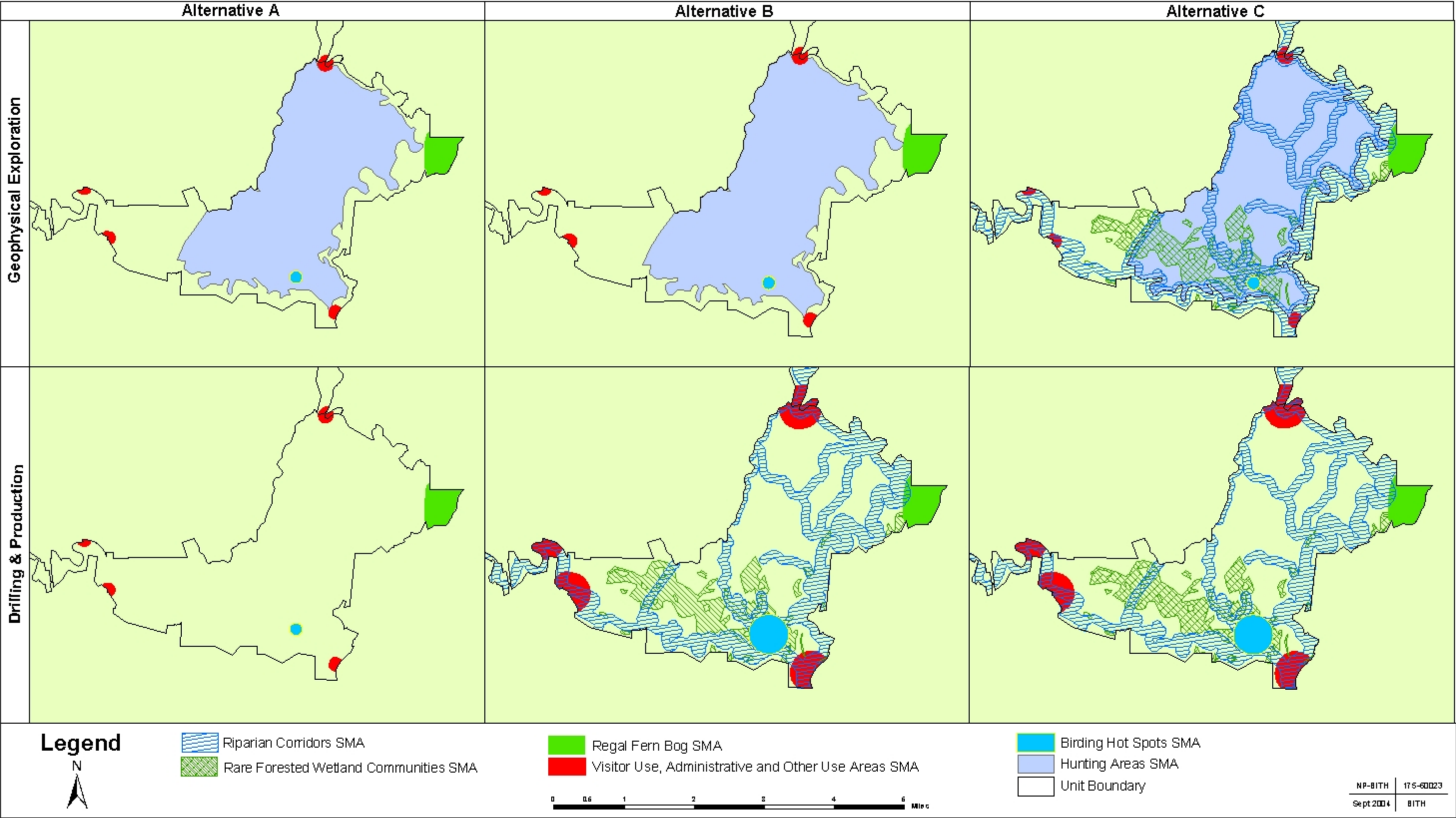
<sup>2</sup>The Protected Areas denoted under Alternative A are not formally designated as SMAs, but the "No Surface Use" and "Timing Stipulations" have been applied on a case-by-case basis.

<sup>3</sup>The Riparian Corridor SMA under Alternative B would be NSU, except drilling and production could be permitted adjacent to existing roadways and within previously disturbed areas, subject to CLPR (including NPS Floodplain Management Guidelines and 36 CFR § 9.41(a)). No new roads would be permitted. Associated flowlines and gathering lines could be located within previously disturbed areas, with a minimum 500' offset from perennial, intermittent, or ephemeral watercourses, unless specifically authorized by an approved plan of operations.

**Figure 2.7. Map of Protected Areas under Alternative A, and Special Management Areas under Alternatives B and C, in the Beaumont Unit**



Figure 2.7. Map of Protected Areas under Alternative A, and Special Management Areas under Alternatives B and C, in the Beaumont Unit



**Table 2.7. Summary of Operating Stipulations, Beech Creek Unit**

Beech Creek Unit		Total Unit Acres: 5,097 acres	
Acreage totals exclude overlapping areas for each Protected Area/SMA.			
ALTERNATIVES	ALTERNATIVE A	ALTERNATIVE B	ALTERNATIVE C
Total Area with Operating Stipulations <sup>1</sup>	4,210 acres <sup>2</sup>	<4,753 acres <sup>3</sup>	4,753 acres
GEOPHYSICAL EXPLORATION OPERATIONS – NO SURFACE USE			
Total area	1,058 acres <sup>2</sup>	1,058 acres	2,412 acres
Designated Areas	Day Use Areas Hiking Trails	Day Use Areas SMA Hiking Trails SMA	Day Use Areas SMA Hiking Trails SMA Rare Vegetation Communities SMA Rare Forested Wetland Communities SMA Riparian Corridors SMA
GEOPHYSICAL EXPLORATION OPERATIONS – TIMING STIPULATIONS			
Total area	3,930 acres <sup>2</sup>	3,930 acres	3,930 acres
Designated Areas	Hunting Areas	Hunting Areas SMA	Hunting Areas SMA
DRILLING AND PRODUCTION OPERATIONS – NO SURFACE USE			
Total area	1,058 acres <sup>2</sup>	<3,561 acres <sup>3</sup>	3,561 acres
Designated Areas	Day Use Areas Hiking Trails	Day Use Areas SMA Hiking Trails SMA Rare Vegetation Communities SMA Rare Forested Wetland Communities SMA Riparian Corridors SMA <sup>3</sup>	Day Use Areas SMA Hiking Trails SMA Rare Vegetation Communities SMA Rare Forested Wetland Communities SMA Riparian Corridors SMA
DRILLING AND PRODUCTION OPERATIONS – TIMING STIPULATIONS			
Total area	0 acres	0 acres	0 acres
Designated Areas	None	None	None

<sup>1</sup>Nonfederal oil and gas operations may not be conducted within 500 feet from perennial, intermittent, or ephemeral watercourses, or within 500 feet of any structure or facility (excluding roads) used for unit interpretation, public recreation or for administration of the unit, unless specifically authorized by an approved plan of operations, as per CLPR at 36 CFR § 9.41(a). The 500' area from waterways covered by this operating stipulation has not been mapped and will be determined on a case-by-case basis during project scoping and the preparation of a Plan of Operations.

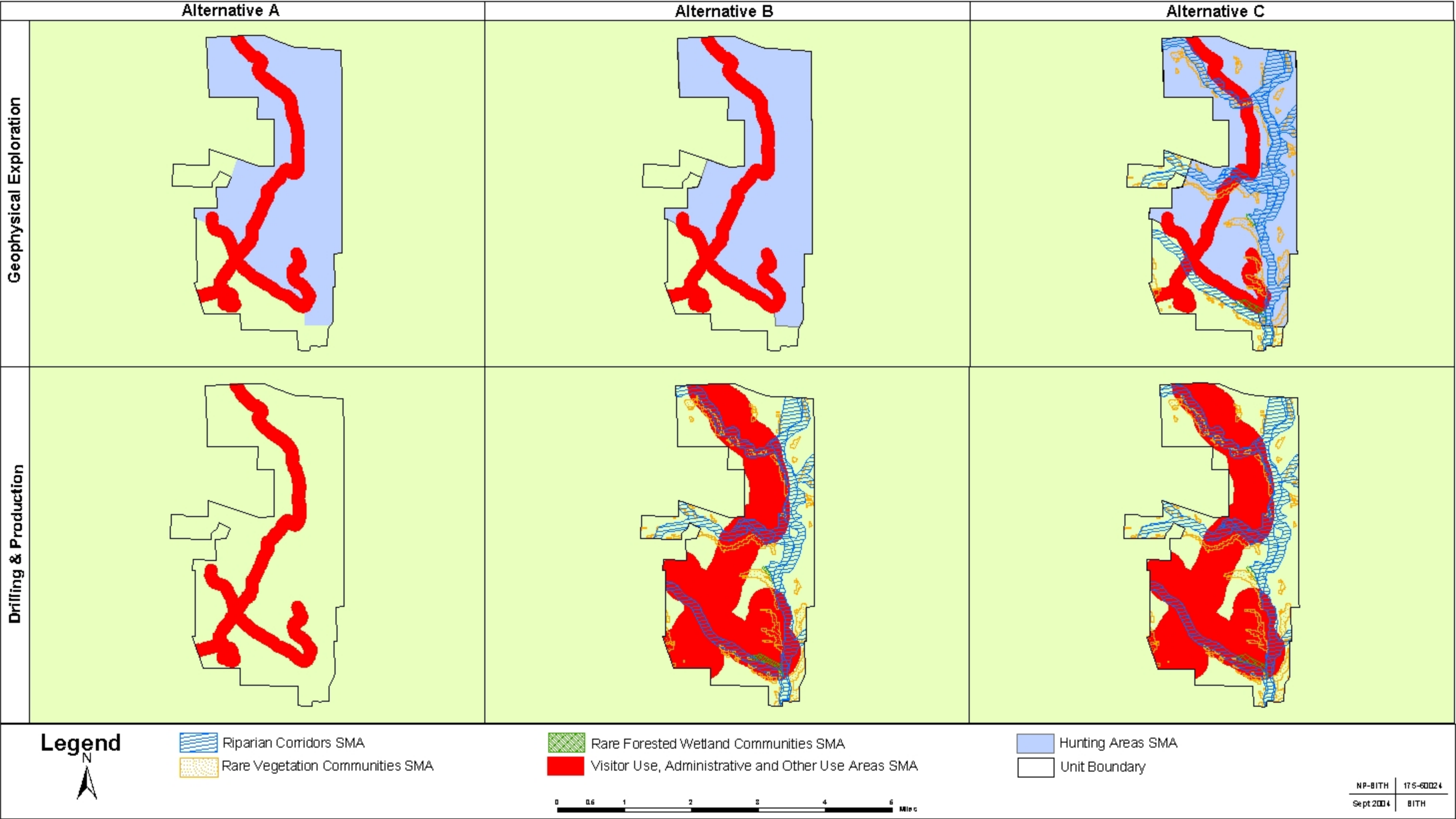
<sup>2</sup>The Protected Areas denoted under Alternative A are not formally designated as SMAs, but the "No Surface Use" and "Timing Stipulations" have been applied on a case-by-case basis.

<sup>3</sup>The Riparian Corridor SMA under Alternative B would be NSU, except drilling and production could be permitted adjacent to existing roadways and within previously disturbed areas, subject to CLPR (including NPS Floodplain Management Guidelines and 36 CFR § 9.41(a)). No new roads would be permitted. Associated flowlines and gathering lines could be located within previously disturbed areas, with a minimum 500' offset from perennial, intermittent, or ephemeral watercourses, unless specifically authorized by an approved plan of operations.



**Figure 2.8. Map of Protected Areas under Alternative A, and Special Management Areas under Alternatives B and C, in the Beech Creek Unit**

Figure 2.8. Map of Protected Areas under Alternative A, and Special Management Areas under Alternatives B and C, in the Beech Creek Unit



**Table 2.8. Summary of Operating Stipulations, Big Sandy Creek Unit**

Big Sandy Creek Unit		Total Unit Acres: 14,227 acres	
Acreage totals exclude overlapping areas for each Protected Area/SMA.			
ALTERNATIVES	ALTERNATIVE A	ALTERNATIVE B	ALTERNATIVE C
Total Area with Operating Stipulations <sup>1</sup>	11,392 acres <sup>2</sup>	<12,608 acres <sup>3</sup>	12,608 acres
GEOPHYSICAL EXPLORATION OPERATIONS – NO SURFACE USE			
Total area	2,284 acres <sup>2</sup>	2,284.43 acres	6,118 acres
Designated Areas	Day Use Areas Hiking Trails Cemeteries Private Residence Fire Monitoring Plots Long-term Monitoring Plots	Day Use Areas SMA Hiking Trails SMA Cemeteries SMA Private Residential SMA Fire Monitoring Plots SMA Long-term Monitoring Plots SMA	Day Use Areas SMA Hiking Trails SMA Cemeteries SMA Private Residential SMA Fire Monitoring Plots SMA Long-term Monitoring Plots SMA Rare Vegetation Communities SMA Pine Forests Rare Forested Wetland Communities SMA Riparian Corridors SMA
GEOPHYSICAL EXPLORATION OPERATIONS – TIMING STIPULATIONS			
Total area	10,990 acres <sup>2</sup>	10,990 acres	10,990 acres
Designated Areas	Hunting Areas Birding Hot Spots	Hunting Areas SMA Birding Hot Spots SMA	Hunting Areas SMA Birding Hot Spots SMA
DRILLING AND PRODUCTION OPERATIONS – NO SURFACE USE			
Total area	2,286 acres <sup>2</sup>	<8,552 acres <sup>3</sup>	8,552 acres
Designated Areas	Day Use Areas Hiking Trails Birding Hotspots Cemeteries Private Residence Fire Monitoring Plots Long-term Monitoring Plots	Day Use Areas SMA Hiking Trails SMA Birding Hot Spots SMA Cemeteries SMA Private Residential SMA Fire Monitoring Plots SMA Long-term Monitoring Plots SMA Rare Vegetation Communities SMA Rare Forested Wetland Communities SMA Riparian Corridors <sup>3</sup>	Day Use Areas SMA Hiking Trails SMA Birding Hot Spots SMA Cemeteries SMA Private Residential SMA Fire Monitoring Plots SMA Long-term Monitoring Plots SMA Rare Vegetation Communities SMA Rare Forested Wetland Communities SMA Riparian Corridors SMA
DRILLING AND PRODUCTION OPERATIONS – TIMING STIPULATIONS			
Total area	0 acres	0 acres	10,768 acres
Designated Areas	None	None	Hunting Areas SMA

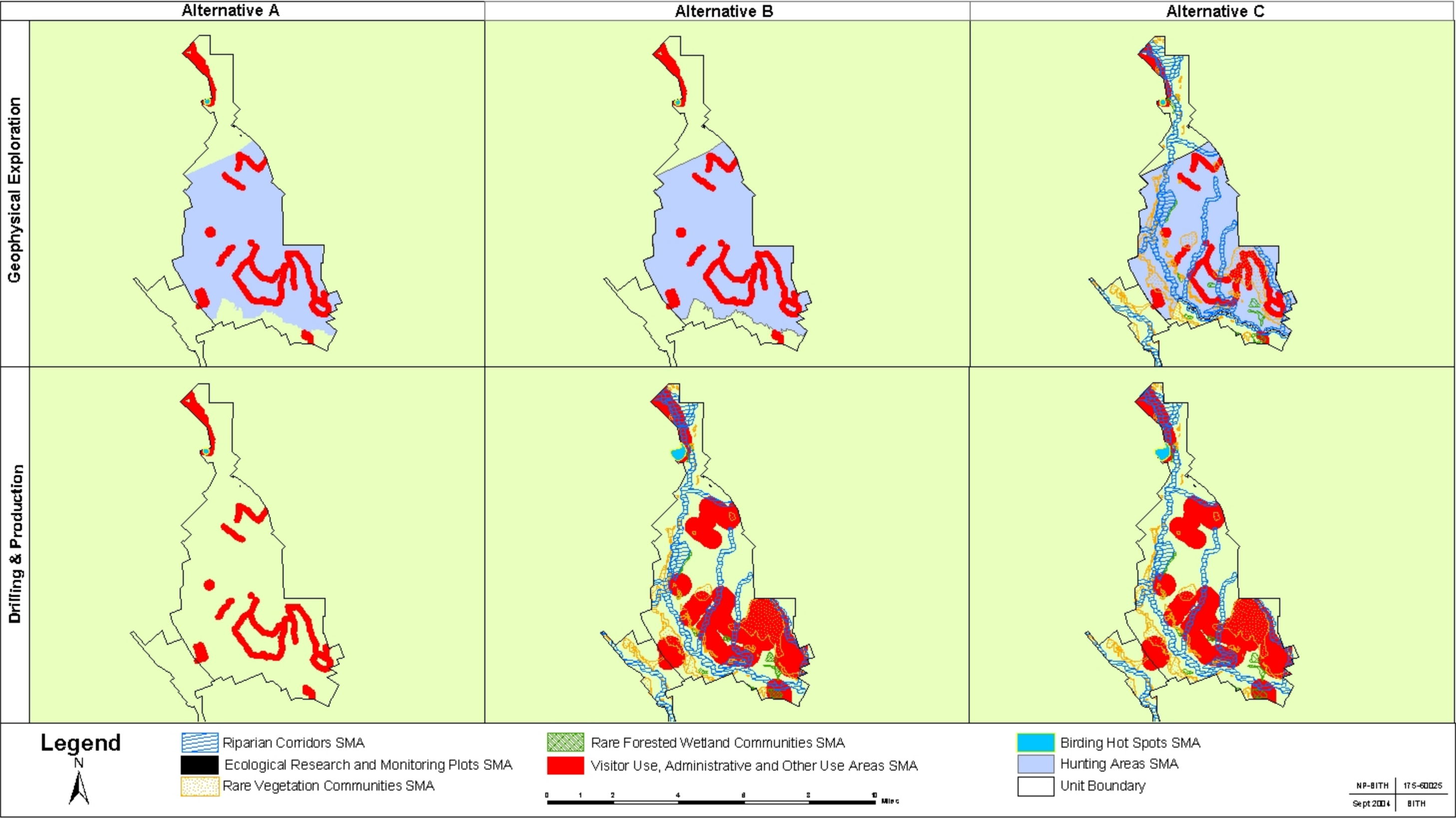
<sup>1</sup>Nonfederal oil and gas operations may not be conducted within 500 feet from perennial, intermittent, or ephemeral watercourses, or within 500 feet of any structure or facility (excluding roads) used for unit interpretation, public recreation or for administration of the unit, unless specifically authorized by an approved plan of operations, as per CLPR at 36 CFR § 9.41(a). The 500' area from waterways covered by this operating stipulation has not been mapped and will be determined on a case-by-case basis during project scoping and the preparation of a Plan of Operations.

<sup>2</sup>The Protected Areas denoted under Alternative A are not formally designated as SMAs, but the "No Surface Use" and "Timing Stipulations" have been applied on a case-by-case basis.

<sup>3</sup>The Riparian Corridor SMA under Alternative B would be NSU, except drilling and production could be permitted adjacent to existing roadways and within previously disturbed areas, subject to CLPR (including NPS Floodplain Management Guidelines and 36 CFR § 9.41(a)). No new roads would be permitted. Associated flowlines and gathering lines could be located within previously disturbed areas, with a minimum 500' offset from perennial, intermittent, or ephemeral watercourses, unless specifically authorized by an approved plan of operations.

**Figure 2.9. Map of Protected Areas under Alternative A, and Special Management Areas under Alternatives B and C, in the Big Sandy Creek Unit**

Figure 2.9. Map of Protected Areas under Alternative A, and Special Management Areas under Alternatives B and C, in the Big Sandy Creek Unit



**Table 2.9. Summary of Operating Stipulations, Hickory Creek Savannah Unit**

Hickory Creek Savannah Unit		Total Unit Acres: 705 acres	
Acreage totals exclude overlapping areas for each Protected Area/SMA.			
ALTERNATIVES	ALTERNATIVE A	ALTERNATIVE B	ALTERNATIVE C
Total Area with Operating Stipulations <sup>1</sup>	85 acres <sup>2</sup>	<395 acres <sup>3</sup>	395 acres
GEOPHYSICAL EXPLORATION OPERATIONS – NO SURFACE USE			
Total area	85 acres <sup>2</sup>	104 acres	394 acres
Designated Areas	Day Use Areas Hiking Trails Fire Monitoring Plots Long-term Monitoring Plots	Day Use Areas SMA Hiking Trails SMAs Fire Monitoring Plots SMA Long-term Monitoring Plots SMA	Day Use Areas SMA Hiking Trails SMA Fire Monitoring Plots SMA Long-term Monitoring Plots SMA Rare Forested Wetland Communities SMA Riparian Corridors SMA
GEOPHYSICAL EXPLORATION OPERATIONS – TIMING STIPULATIONS			
Total area	18 acres <sup>2</sup>	18 acres	18 acres
Designated Areas	Birding Hot Spots	Birding Hot Spots SMA	Birding Hot Spots SMA
DRILLING AND PRODUCTION OPERATIONS – NO SURFACE USE			
Total area	85 acres <sup>2</sup>	<395 acres <sup>3</sup>	395 acres
Designated Areas	Day Use Areas Hiking Trails Birding Hotspots Fire Monitoring Plots Long-term Monitoring Plots	Day Use Areas SMA Hiking Trails SMA Birding Hot Spots SMA Fire Monitoring Plots SMA Long-term Monitoring Plots SMA Rare Forested Wetland Communities SMA Riparian Corridors SMA <sup>3</sup>	Day Use Areas SMA Hiking Trails SMA Birding Hot Spots SMA Fire Monitoring Plots SMA Long-term Monitoring Plots SMA Rare Forested Wetland Communities SMA Riparian Corridors SMA
DRILLING AND PRODUCTION OPERATIONS – TIMING STIPULATIONS			
Total area	0 acres	0 acres	0 acres
Designated Areas	None	None	None

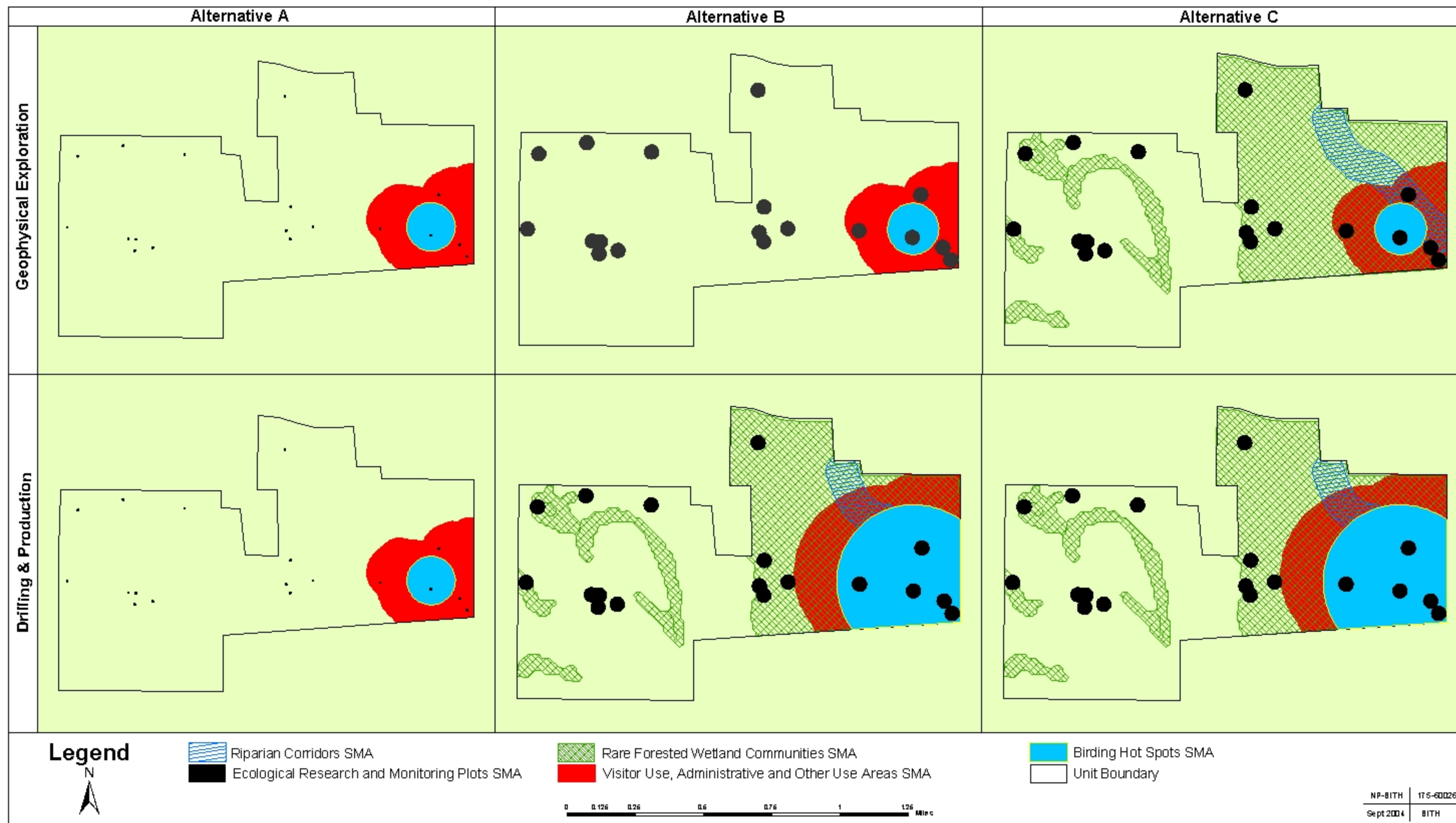
<sup>1</sup>Nonfederal oil and gas operations may not be conducted within 500 feet from perennial, intermittent, or ephemeral watercourses, or within 500 feet of any structure or facility (excluding roads) used for unit interpretation, public recreation or for administration of the unit, unless specifically authorized by an approved plan of operations, as per CLPR at 36 CFR § 9.41(a). The 500' area from waterways covered by this operating stipulation has not been mapped and will be determined on a case-by-case basis during project scoping and the preparation of a Plan of Operations.

<sup>2</sup>The Protected Areas denoted under Alternative A are not formally designated as SMAs, but the "No Surface Use" and "Timing Stipulations" have been applied on a case-by-case basis.

<sup>3</sup>The Riparian Corridor SMA under Alternative B would be NSU, except drilling and production could be permitted adjacent to existing roadways and within previously disturbed areas, subject to CLPR (including NPS Floodplain Management Guidelines and 36 CFR § 9.41(a)). No new roads would be permitted. Associated flowlines and gathering lines could be located within previously disturbed areas, with a minimum 500' offset from perennial, intermittent, or ephemeral watercourses, unless specifically authorized by an approved plan of operations.

**Figure 2.10. Map of Protected Areas under Alternative A, and Special Management Areas under Alternatives B and C, in the Hickory Creek Savannah Unit**

Figure 2.10. Map of Protected Areas under Alternative A, and Special Management Areas under Alternatives B and C, in the Hickory Creek Savannah Unit





**Table 2.10. Summary of Operating Stipulations, Lance Rosier Unit**

Lance Rosier Unit		Total Area 24,752 acres	
Acreage totals exclude overlapping areas for each Protected Area/SMA.			
ALTERNATIVES	ALTERNATIVE A	ALTERNATIVE B	ALTERNATIVE C
Total Area with Operating Stipulations <sup>1</sup>	23,110 acres <sup>2</sup>	<23,515 acres <sup>3</sup>	23,515 acres
GEOPHYSICAL EXPLORATION OPERATIONS – NO SURFACE USE			
Total area	131 acres <sup>2</sup>	138 acres	3,618 acres
Designated Areas	Day Use Areas Cemeteries Fire Monitoring Plots Long-term Monitoring Plots	Day Use Areas SMA Cemeteries SMA, Fire Monitoring Plots SMA Long-term Monitoring Plots SMA	Day Use Areas SMA Cemeteries SMA Fire Monitoring Plots SMA Long-term Monitoring Plots SMA Rare Forested Wetland Communities SMA Riparian Corridors SMA
GEOPHYSICAL EXPLORATION OPERATIONS – TIMING STIPULATIONS			
Total area	23,110 acres <sup>2</sup>	23,110 acres	23,110 acres
Designated Areas	Hunting Areas Birding Hot Spots	Hunting Areas SMA Birding Hot Spots SMA	Hunting Areas SMA Birding Hot Spots SMA
DRILLING AND PRODUCTION OPERATIONS – NO SURFACE USE			
Total area	142 acres <sup>2</sup>	<4,212 acres <sup>3</sup>	4,212 acres
Designated Areas	Day Use Areas Birding Hot Spots Cemeteries Fire Monitoring Plots Long-term Monitoring Plots	Day Use Areas SMA Birding Hot Spots SMA Cemeteries SMA Fire Monitoring Plots SMA Long-term Monitoring Plots SMA Rare Forested Wetland Communities SMA Riparian Corridors SMA <sup>3</sup>	Day Use Areas SMA Birding Hot Spots SMA Cemeteries SMA Fire Monitoring Plots SMA Long-term Monitoring Plots SMA Rare Forested Wetland Communities SMA Riparian Corridors SMA
DRILLING AND PRODUCTION OPERATIONS – TIMING STIPULATIONS			
Total area	0 acres	0 acres	23,079 acres
Designated Areas	None	None	Hunting Areas SMA

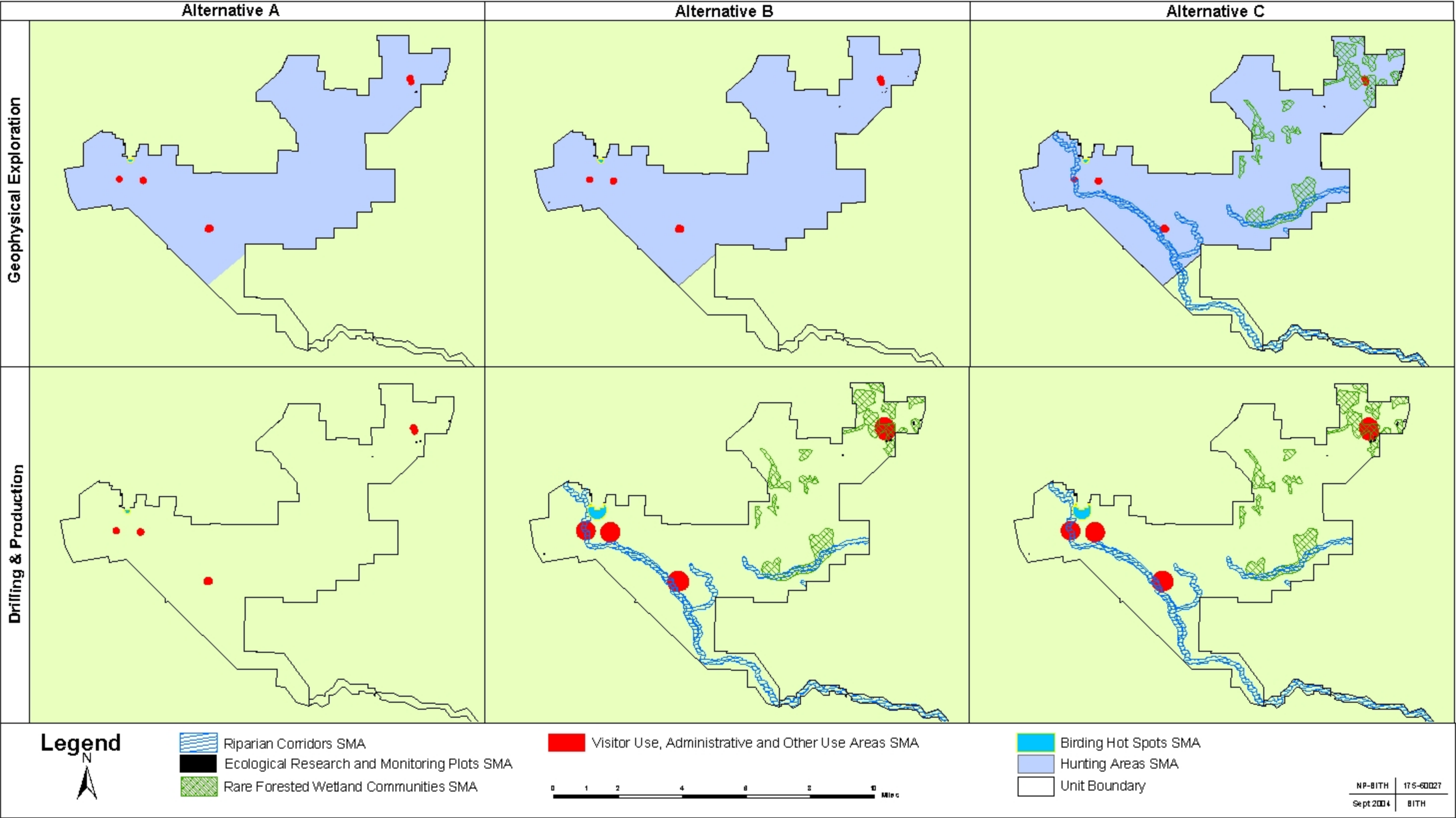
<sup>1</sup>Nonfederal oil and gas operations may not be conducted within 500 feet from perennial, intermittent, or ephemeral watercourses, or within 500 feet of any structure or facility (excluding roads) used for unit interpretation, public recreation or for administration of the unit, unless specifically authorized by an approved plan of operations, as per CLPR at 36 CFR § 9.41(a). The 500' area from waterways covered by this operating stipulation has not been mapped and will be determined on a case-by-case basis during project scoping and the preparation of a Plan of Operations.

<sup>2</sup>The Protected Areas denoted under Alternative A are not formally designated as SMAs, but the "No Surface Use" and "Timing Stipulations" have been applied on a case-by-case basis.

<sup>3</sup>The Riparian Corridor SMA under Alternative B would be NSU, except drilling and production could be permitted adjacent to existing roadways and within previously disturbed areas, subject to CLPR (including NPS Floodplain Management Guidelines and 36 CFR § 9.41(a)). No new roads would be permitted. Associated flowlines and gathering lines could be located within previously disturbed areas, with a minimum 500' offset from perennial, intermittent, or ephemeral watercourses, unless specifically authorized by an approved plan of operations.

**Figure 2.11. Map of Protected Areas under Alternative A, and Special Management Areas under Alternatives B and C, in the Lance Rosier Unit**

Figure 2.11. Map of Protected Areas under Alternative A, and Special Management Areas under Alternatives B and C, in the Lance Rosier Unit



**Table 2.11. Summary of Operating Stipulations, Lower Neches River Corridor Unit**

Lower Neches River Corridor Unit		Total Unit Acres: 3,291 acres	
Acreage totals exclude overlapping areas for each Protected Area/SMA.			
ALTERNATIVES	ALTERNATIVE A	ALTERNATIVE B	ALTERNATIVE C
Total Area with Operating Stipulations <sup>1</sup>	30 acres <sup>2</sup>	<2,544 acres <sup>3</sup>	2,544 acres
GEOPHYSICAL EXPLORATION OPERATIONS – NO SURFACE USE			
Total area	30 acres <sup>2</sup>	30 acres	2,510 acres
Designated Areas	Day Use Areas	Day Use Areas SMA	Day Use Areas SMA Riparian Corridors SMA
GEOPHYSICAL EXPLORATION OPERATIONS – TIMING STIPULATIONS			
Total area	0 acres <sup>2</sup>	0 acres	0 acres
Designated Areas	None	None	None
DRILLING AND PRODUCTION OPERATIONS – NO SURFACE USE			
Total area	30 acres <sup>2</sup>	<2,544 acres <sup>3</sup>	2,544 acres
Designated Areas	Day Use Areas	Day Use Areas SMA Riparian Corridors SMA <sup>3</sup>	Day Use Areas SMA Riparian Corridors SMA
DRILLING AND PRODUCTION OPERATIONS – TIMING STIPULATIONS			
Total area	0 acres	0 acres	0 acres
Designated Areas	None	None	None

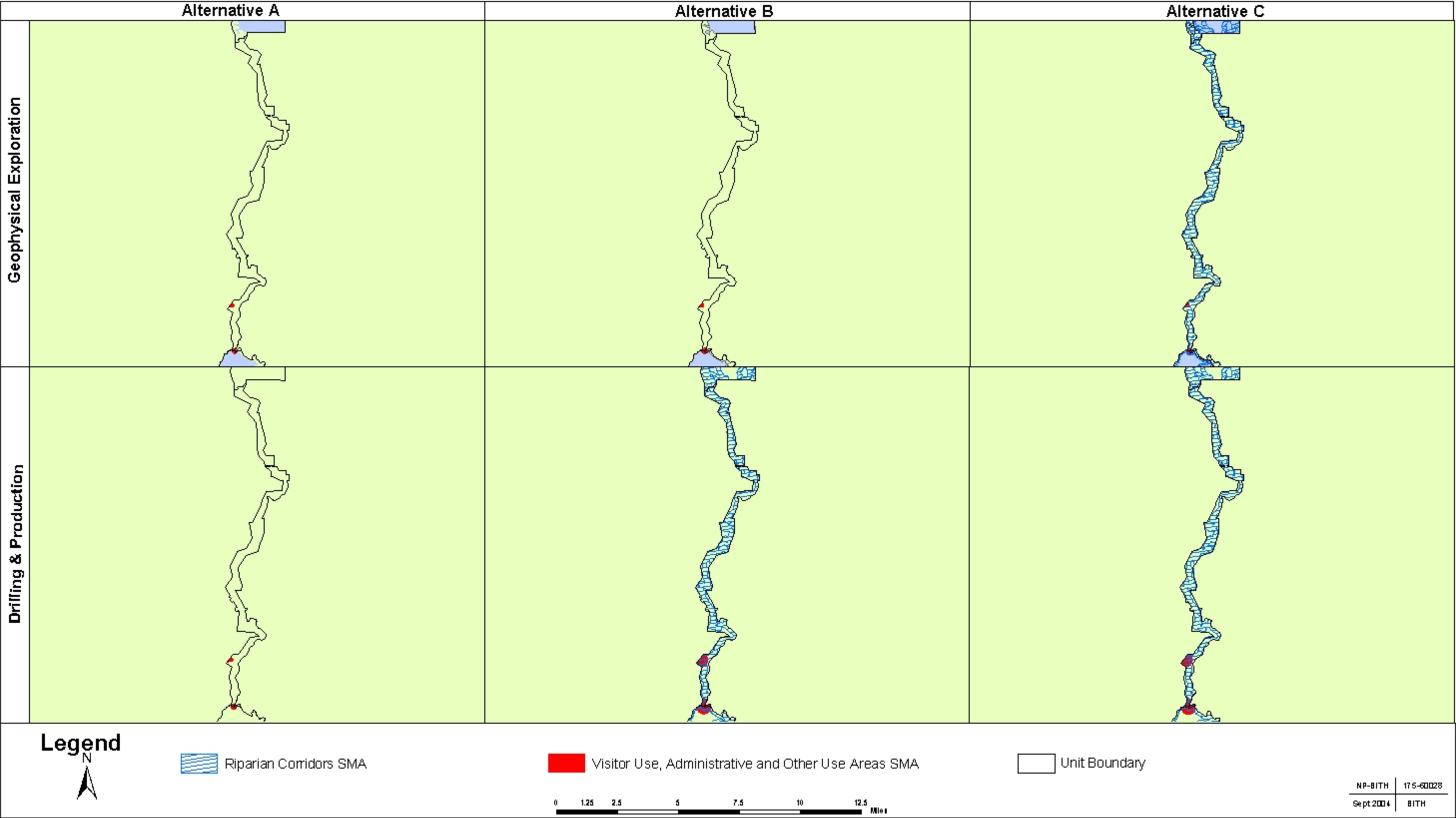
<sup>1</sup>Nonfederal oil and gas operations may not be conducted within 500 feet from perennial, intermittent, or ephemeral watercourses, or within 500 feet of any structure or facility (excluding roads) used for unit interpretation, public recreation or for administration of the unit, unless specifically authorized by an approved plan of operations, as per CLPR at 36 CFR § 9.41(a). The 500' area from waterways covered by this operating stipulation has not been mapped and will be determined on a case-by-case basis during project scoping and the preparation of a Plan of Operations.

<sup>2</sup>The Protected Areas denoted under Alternative A are not formally designated as SMAs, but the "No Surface Use" and "Timing Stipulations" have been applied on a case-by-case basis.

<sup>3</sup>The Riparian Corridor SMA under Alternative B would be NSU, except drilling and production could be permitted adjacent to existing roadways and within previously disturbed areas, subject to CLPR (including NPS Floodplain Management Guidelines and 36 CFR § 9.41(a)). No new roads would be permitted. Associated flowlines and gathering lines could be located within previously disturbed areas, with a minimum 500' offset from perennial, intermittent, or ephemeral watercourses, unless specifically authorized by an approved plan of operations.

**Figure 2.12. Map of Protected Areas under Alternative A, and Special Management Areas under Alternatives B and C, in the Lower Neches River Corridor Unit**

Figure 2.12. Map of Protected Areas under Alternative A, and Special Management Areas under Alternatives B and C, in the Lower Neches River Corridor Unit



**Table 2.12. Summary of Operating Stipulations, Menard Creek Corridor Unit**

Menard Creek Corridor Unit		Total Unit Acres: 3,999 acres	
Acreage totals exclude overlapping areas for each Protected Area/SMA.			
ALTERNATIVES	ALTERNATIVE A	ALTERNATIVE B	ALTERNATIVE C
Total Area with Operating Stipulations <sup>1</sup>	98 acres <sup>2</sup>	<2,025 acres <sup>3</sup>	2,025 acres
GEOPHYSICAL EXPLORATION OPERATIONS – NO SURFACE USE			
Total area	98 acres <sup>2</sup>	92 acres	1,797 acres
Designated Areas	Day Use Areas	Day Use Areas SMA	Day Use Areas SMA Rare Vegetation Communities SMA Riparian Corridors SMA
GEOPHYSICAL EXPLORATION OPERATIONS – TIMING STIPULATIONS			
Total area	18 acres <sup>2</sup>	18 acres	18 acres
Designated Areas	Birding Hot Spots	Birding Hot Spots SMA	Birding Hot Spots SMA
DRILLING AND PRODUCTION OPERATIONS – NO SURFACE USE			
Total area	98 acres <sup>2</sup>	<2,023 acres <sup>3</sup>	2,023 acres
Designated Areas	Day Use Areas Birding Hot Spots	Day Use Areas SMA Birding Hot Spots SMA Rare Vegetation Communities SMA Riparian Corridors SMA <sup>3</sup>	Day Use Areas SMA Birding Hot Spots SMA Rare Vegetation Communities SMA Riparian Corridors SMA
DRILLING AND PRODUCTION OPERATIONS – TIMING STIPULATIONS			
Total area	0 acres	0 acres	0 acres
Designated Areas	None	None	None

<sup>1</sup>Nonfederal oil and gas operations may not be conducted within 500 feet from perennial, intermittent, or ephemeral watercourses, or within 500 feet of any structure or facility (excluding roads) used for unit interpretation, public recreation or for administration of the unit, unless specifically authorized by an approved plan of operations, as per CLPR at 36 CFR § 9.41(a). The 500' area from waterways covered by this operating stipulation has not been mapped and will be determined on a case-by-case basis during project scoping and the preparation of a Plan of Operations.

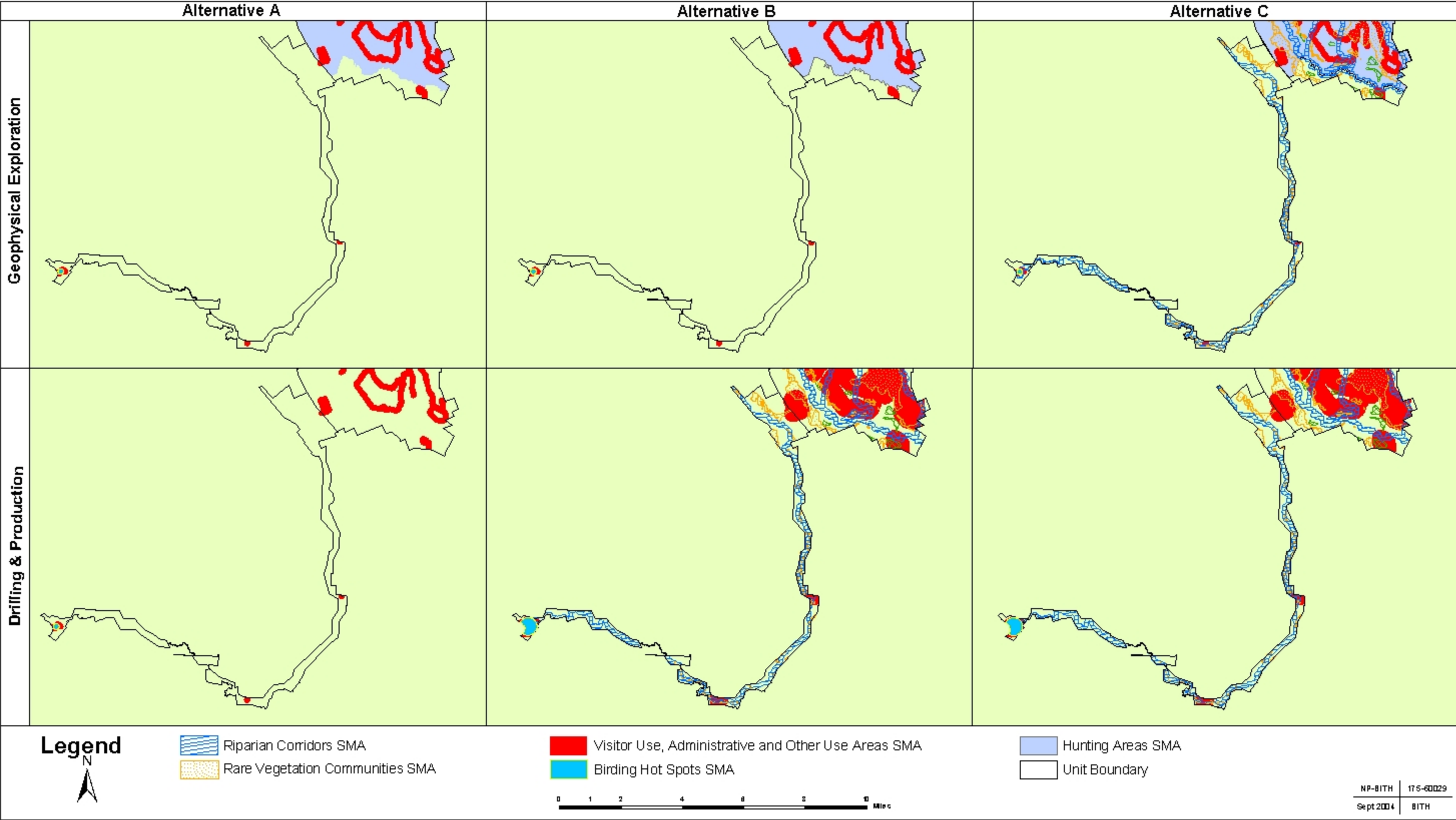
<sup>2</sup>The Protected Areas denoted under Alternative A are not formally designated as SMAs, but the "No Surface Use" and "Timing Stipulations" have been applied on a case-by-case basis.

<sup>3</sup>The Riparian Corridor SMA under Alternative B would be NSU, except drilling and production could be permitted adjacent to existing roadways and within previously disturbed areas, subject to CLPR (including NPS Floodplain Management Guidelines and 36 CFR § 9.41(a)). No new roads would be permitted. Associated flowlines and gathering lines could be located within previously disturbed areas, with a minimum 500' offset from perennial, intermittent, or ephemeral watercourses, unless specifically authorized by an approved plan of operations.

**Figure 2.13. Map of Protected Areas under Alternative A, and Special Management Areas under Alternatives B and C, Menard Creek Corridor Unit**



Figure 2.13. Map of Protected Areas under Alternative A, and Special Management Areas under Alternatives B and C, in the Menard Creek Corridor Unit



**Table 2.13. Summary of Operating Stipulations, Neches Bottom/Jack Gore Baygall Unit**

Neches Bottom and Jack Gore Baygall Unit		Total Unit Acres: 13,712 acres	
Acreage totals exclude overlapping areas for each Protected Area/SMA.			
ALTERNATIVES	ALTERNATIVE A	ALTERNATIVE B	ALTERNATIVE C
Total Area with Operating Stipulations <sup>1</sup>	10,115 acres <sup>2</sup>	<11,981 acres <sup>3</sup>	11,981 acres
GEOPHYSICAL EXPLORATION OPERATIONS – NO SURFACE USE			
Total area	310 acres <sup>2</sup>	315 acres	5,354 acres
Designated Areas	Day Use Areas Canoe Routes Fire Monitoring Plots Long-term Monitoring Plots	Day Use Areas SMA Canoe Routes SMA Fire Monitoring Plots SMA Long-term Monitoring Plots SMA	Day Use Areas SMA Canoe Routes SMA Fire Monitoring Plots SMA Long-term Monitoring Plots SMA Rare Vegetation Communities SMA Rare Forested Wetland Communities SMA Riparian Corridors SMA
GEOPHYSICAL EXPLORATION OPERATIONS – TIMING STIPULATIONS			
Total area	10,115 acres <sup>2</sup>	10,115 acres	10,115 acres
Designated Areas	Hunting Areas	Hunting Areas SMA	Hunting Areas SMA
DRILLING AND PRODUCTION OPERATIONS – NO SURFACE USE			
Total area	310 acres <sup>2</sup>	<5,803 acres <sup>3</sup>	5,803 acres
Designated Areas	Day Use Areas Canoe Routes Fire Monitoring Plots Long-term Monitoring Plots	Day Use Areas SMA Canoe Routes Long-term Monitoring Plots SMA Rare Vegetation Communities SMA Rare Forested Wetland Communities SMA Riparian Corridors SMA <sup>3</sup>	Day Use Areas SMA Canoe Routes Long-term Monitoring Plots SMA Rare Vegetation Communities SMA Rare Forested Wetland Communities SMA Riparian Corridors SMA
DRILLING AND PRODUCTION OPERATIONS – TIMING STIPULATIONS			
Total area	0 acres	0 acres	0 acres
Designated Areas	None	None	None

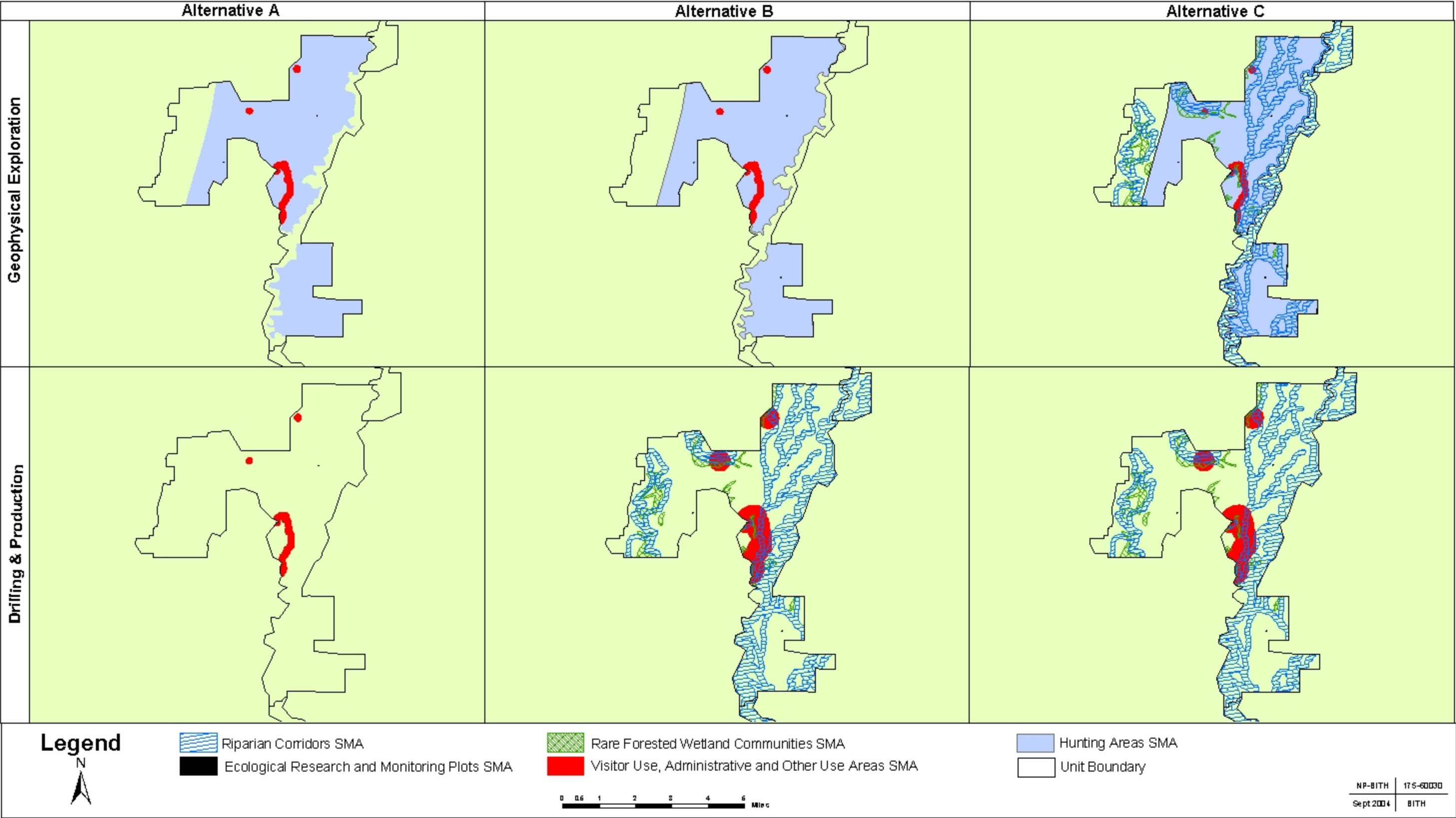
<sup>1</sup>Nonfederal oil and gas operations may not be conducted within 500 feet from perennial, intermittent, or ephemeral watercourses, or within 500 feet of any structure or facility (excluding roads) used for unit interpretation, public recreation or for administration of the unit, unless specifically authorized by an approved plan of operations, as per CLPR at 36 CFR § 9.41(a). The 500' area from waterways covered by this operating stipulation has not been mapped and will be determined on a case-by-case basis during project scoping and the preparation of a Plan of Operations.

<sup>2</sup>The Protected Areas denoted under Alternative A are not formally designated as SMAs, but the “No Surface Use” and “Timing Stipulations” have been applied on a case-by-case basis.

<sup>3</sup>The Riparian Corridor SMA under Alternative B would be NSU, except drilling and production could be permitted adjacent to existing roadways and within previously disturbed areas, subject to CLPR (including NPS Floodplain Management Guidelines and 36 CFR § 9.41(a)). No new roads would be permitted. Associated flowlines and gathering lines could be located within previously disturbed areas, with a minimum 500' offset from perennial, intermittent, or ephemeral watercourses, unless specifically authorized by an approved plan of operations.

**Figure 2.14. Map of Protected Areas under Alternative A, and Special Management Areas under Alternatives B and C, in the Neches Bottom/Jack Gore Baygall Unit**

Figure 2.14. Map of Protected Areas under Alternative A, and Special Management Areas under Alternatives B and C, in the Neches Bottom/Jack Gore Baygall Unit



**Table 2.14. Summary of Operating Stipulations, Pine Island – Little Pine Island Bayou Corridor Unit**

Pine Island-Little Pine Island Bayou Corridor Unit		Total Unit Acres: 2,209.21 acres	
Acreage totals exclude overlapping areas for each Protected Area/SMA.			
ALTERNATIVES	ALTERNATIVE A	ALTERNATIVE B	ALTERNATIVE C
Total Area with Operating Stipulations <sup>1</sup>	0 acres <sup>2</sup>	<1528 acres <sup>3</sup>	1,528 acres
GEOPHYSICAL EXPLORATION OPERATIONS – NO SURFACE USE			
Total area	0 acres <sup>2</sup>	0 acres	1,528 acres
Designated Areas	None	None	Riparian Corridors SMA
GEOPHYSICAL EXPLORATION OPERATIONS – TIMING STIPULATIONS			
Total area	0 acres <sup>2</sup>	0 acres	0 acres
Designated Areas	None	None	None
DRILLING AND PRODUCTION OPERATIONS – NO SURFACE USE			
Total area	0 acres <sup>2</sup>	<1,528 acres <sup>3</sup>	1,528 acres
Designated Areas		Riparian Corridors SMA	Riparian Corridors SMA
DRILLING AND PRODUCTION OPERATIONS – TIMING STIPULATIONS			
Total area	0 acres	0 acres	0 acres
Designated Areas	None	None	None

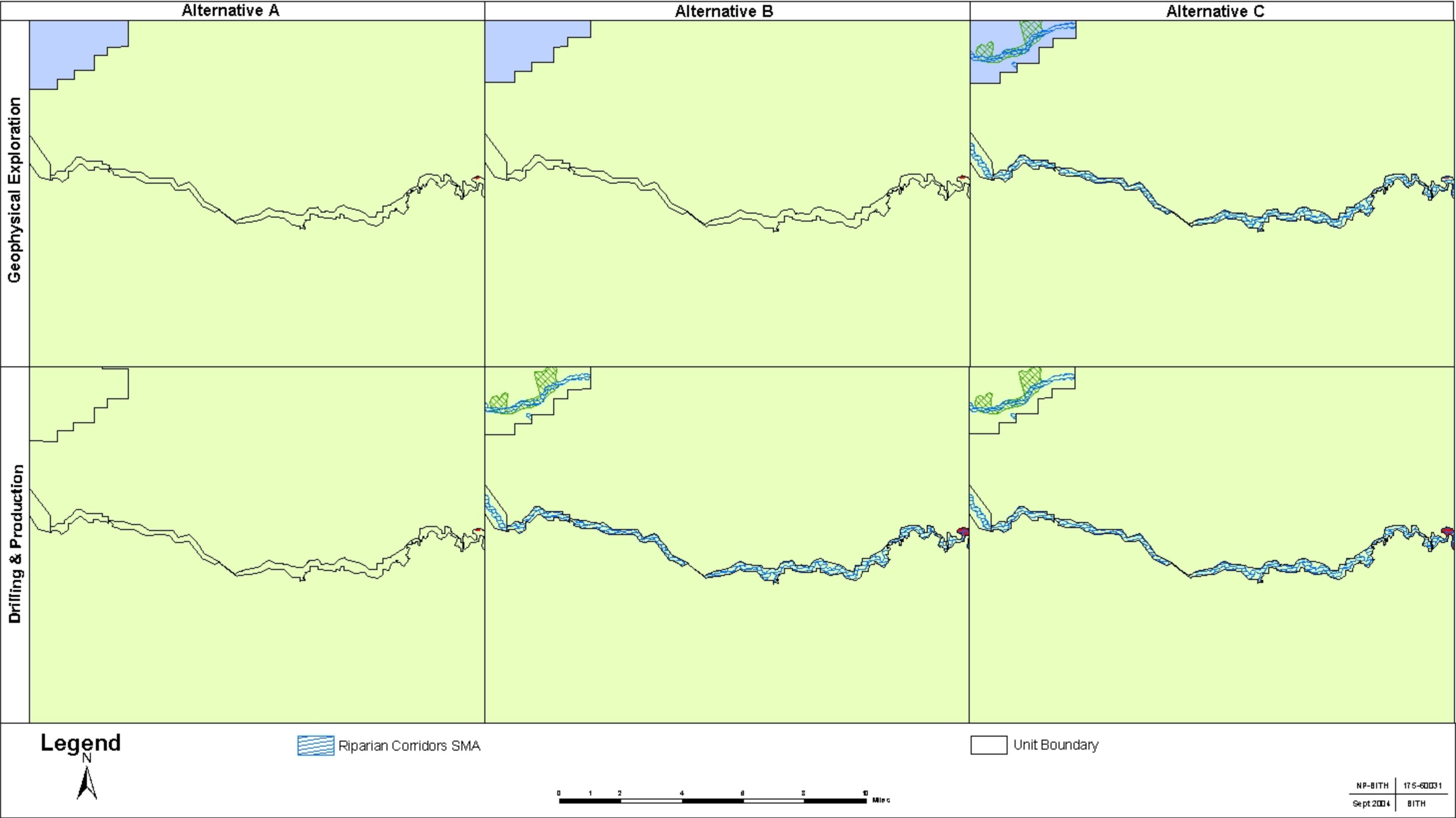
<sup>1</sup>Nonfederal oil and gas operations may not be conducted within 500 feet from perennial, intermittent, or ephemeral watercourses, or within 500 feet of any structure or facility (excluding roads) used for unit interpretation, public recreation or for administration of the unit, unless specifically authorized by an approved plan of operations, as per CLPR at 36 CFR § 9.41(a). The 500' area from waterways covered by this operating stipulation has not been mapped and will be determined on a case-by-case basis during project scoping and the preparation of a Plan of Operations.

<sup>2</sup>The Protected Areas denoted under Alternative A are not formally designated as SMAs, but the “No Surface Use” and “Timing Stipulations” have been applied on a case-by-case basis.

<sup>3</sup>The Riparian Corridor SMA under Alternative B would be NSU, except drilling and production could be permitted adjacent to existing roadways and within previously disturbed areas, subject to CLPR (including NPS Floodplain Management Guidelines and 36 CFR § 9.41(a)). No new roads would be permitted. Associated flowlines and gathering lines could be located within previously disturbed areas, with a minimum 500' offset from perennial, intermittent, or ephemeral watercourses, unless specifically authorized by an approved plan of operations.

**Figure 2.15. Map of Protected Areas under Alternative A, and Special Management Areas under Alternatives B and C, in the Pine Island–Little Pine Island Bayou Corridor Unit**

Figure 2.15. Map of Protected Areas under Alternative A, and Special Management Areas under Alternatives B and C, in the Pine Is.- Little Pine Is. Bayou Corridor Unit



**Table 2.15. Summary of Operating Stipulations, Turkey Creek Unit**

Turkey Creek Unit		Total Unit Acres: 7,978 acres	
Acreage totals exclude overlapping areas for each Protected Area/SMA.			
ALTERNATIVES	ALTERNATIVE A	ALTERNATIVE B	ALTERNATIVE C
Total Area with Operating Stipulations <sup>1</sup>	3,219 acres <sup>2</sup>	<6,439 acres <sup>3</sup>	6,439 acres
GEOPHYSICAL EXPLORATION OPERATIONS – NO SURFACE USE			
Total area	3,219 acres <sup>2</sup>	3,231 acres	4,881 acres
Designated Areas	Day Use Areas Hiking Trails Canoe Routes Administrative Areas Cemeteries Fire Monitoring Plots Long-term Monitoring Plots	Day Use Areas SMA Hiking Trails SMAs Canoe Routes SMAs Administrative Areas SMA Cemeteries SMA Fire Monitoring Plots SMA Long-term Monitoring Plots SMA	Day Use Areas SMA Hiking Trails SMA Canoe Routes SMA Administrative Areas SMA Cemeteries SMA Fire Monitoring Plots SMA Long-term Monitoring Plots SMA Rare Vegetation Communities SMA Rare Forested Wetland Communities SMA Riparian Corridors SMA
GEOPHYSICAL EXPLORATION OPERATIONS – TIMING STIPULATIONS			
Total area	36 acres <sup>2</sup>	36 acres	36 acres
Designated Areas	Birding Hot Spots	Birding Hot Spots SMA	Birding Hot Spots SMA
DRILLING AND PRODUCTION OPERATIONS – NO SURFACE USE			
Total area	3,219 acres <sup>2</sup>	<6,439 acres <sup>3</sup>	6,439 acres
Designated Areas	Day Use Areas Hiking Trails Birding Hot Spots Canoe Routes Administrative Areas Cemeteries Fire Monitoring Plots Long-term Monitoring Plots	Day Use Areas SMA Hiking Trails SMA Birding Hot Spots SMA Canoe Routes SMA Administrative Areas SMA Cemeteries SMA Fire Monitoring Plots SMA Long-term Monitoring Plots SMA Rare Vegetation Communities SMA Rare Forested Wetland Communities SMA Riparian Corridors SMA <sup>3</sup>	Day Use Areas SMA Hiking Trails SMA Birding Hot Spots SMA Canoe Routes SMA Administrative Areas SMA Cemeteries SMA Fire Monitoring Plots SMA Long-term Monitoring Plots SMA Rare Vegetation Communities SMA Rare Forested Wetland Communities SMA Riparian Corridors SMA
DRILLING AND PRODUCTION OPERATIONS – TIMING STIPULATIONS			
Total area	0 acres	0 acres	0 acres
Designated Areas	None	None	None

<sup>1</sup>Nonfederal oil and gas operations may not be conducted within 500 feet from perennial, intermittent, or ephemeral watercourses, or within 500 feet of any structure or facility (excluding roads) used for unit interpretation, public recreation or for administration of the unit, unless specifically authorized by an approved plan of operations, as per CLPR at 36 CFR § 9.41(a). The 500' area from waterways covered by this operating stipulation has not been mapped and will be determined on a case-by-case basis during project scoping and the preparation of a Plan of Operations.

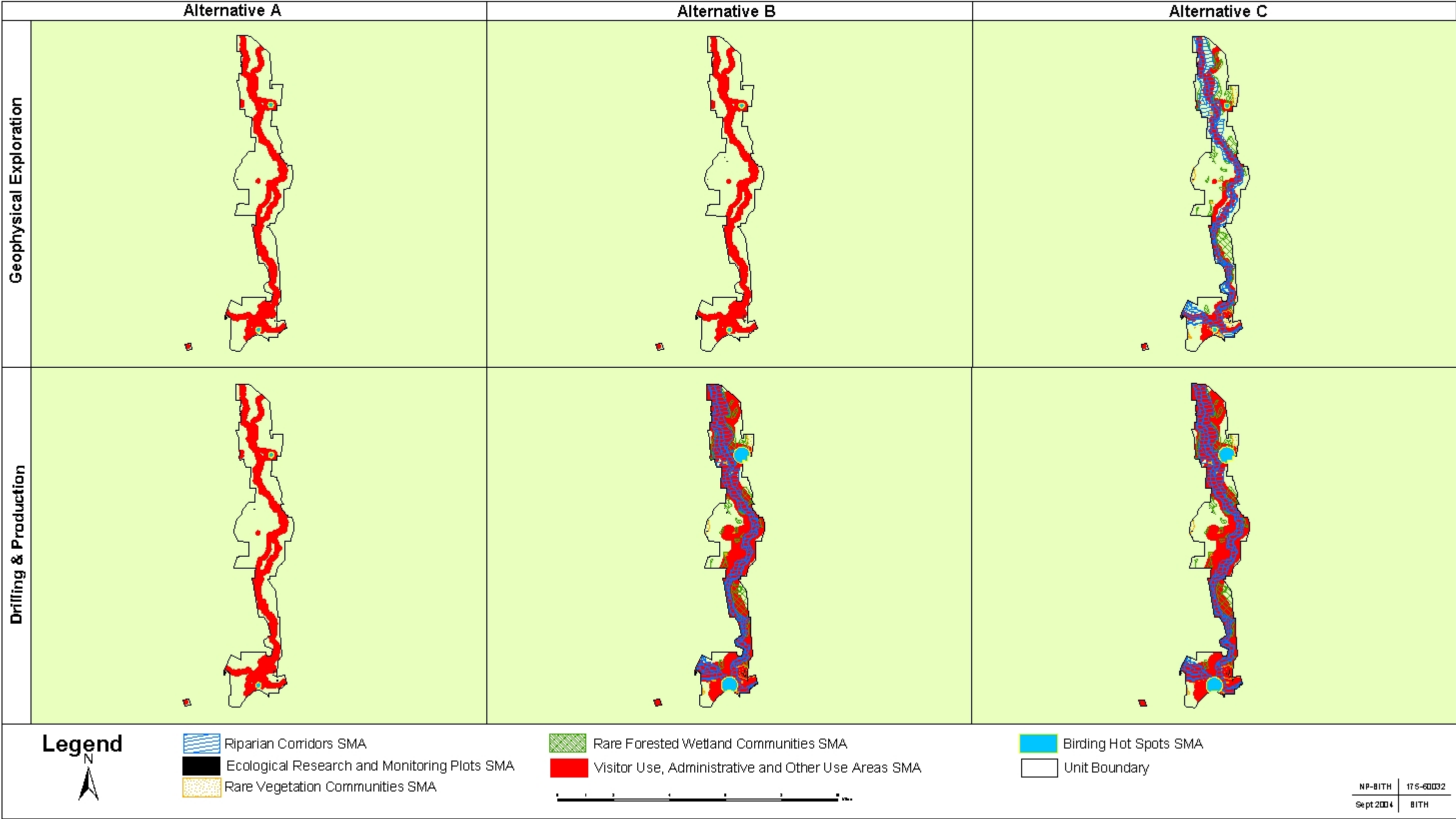
<sup>2</sup>The Protected Areas denoted under Alternative A are not formally designated as SMAs, but the "No Surface Use" and "Timing Stipulations" have been applied on a case-by-case basis.

<sup>3</sup>The Riparian Corridor SMA under Alternative B would be NSU, except drilling and production could be permitted adjacent to existing roadways and within previously disturbed areas, subject to CLPR (including NPS Floodplain Management Guidelines and 36 CFR § 9.41(a)). No new roads would be permitted. Associated flowlines and gathering lines could be located within previously disturbed areas, with a minimum 500' offset from perennial, intermittent, or ephemeral watercourses, unless specifically authorized by an approved plan of operations.



**Figure 2.16. Map of Protected Areas under Alternative A, and Special Management Areas under Alternatives B and C, in the Turkey Creek Unit**

Figure 2.16. Map of Protected Areas under Alternative A, and Special Management Areas under Alternatives B and C, in the Turkey Creek Unit



**Table 2.16. Summary of Operating Stipulations, Upper Neches River Corridor Unit**

Upper Neches River Corridor Unit		Total Unit Acres: 5,902 acres	
Acreage totals exclude overlapping areas for each Protected Area/SMA.			
ALTERNATIVES	ALTERNATIVE A	ALTERNATIVE B	ALTERNATIVE C
Total Area with Operating Stipulations <sup>1</sup>	21 acres <sup>2</sup>	<3,958 acres <sup>3</sup>	3,958 acres
GEOPHYSICAL EXPLORATION OPERATIONS – NO SURFACE USE			
Total area	21 acres <sup>2</sup>	21 acres	3,939 acres
Designated Areas	Day Use Areas	Day Use Areas SMA	Day Use Areas SMA Rare Vegetation Communities SMA Riparian Corridors SMA
GEOPHYSICAL EXPLORATION OPERATIONS – TIMING STIPULATIONS			
Total area	17 acres <sup>2</sup>	17 acres	17 acres
Designated Areas	Birding Hot Spots	Birding Hot Spots SMA (1)	Birding Hot Spots SMA (1)
DRILLING AND PRODUCTION OPERATIONS – NO SURFACE USE			
Total area	21 acres <sup>2</sup>	<3,958 acres <sup>3</sup>	3,958 acres
Designated Areas	Day Use Areas	Day Use Areas SMA Rare Vegetation Communities SMA Riparian Corridors SMA <sup>3</sup>	Day Use Areas SMA Birding Hot Spots SMA Rare Vegetation Communities SMA Riparian Corridors SMA
DRILLING AND PRODUCTION OPERATIONS – TIMING STIPULATIONS			
Total area	0 acres	0 acres	0 acres
Designated Areas	None	None	None

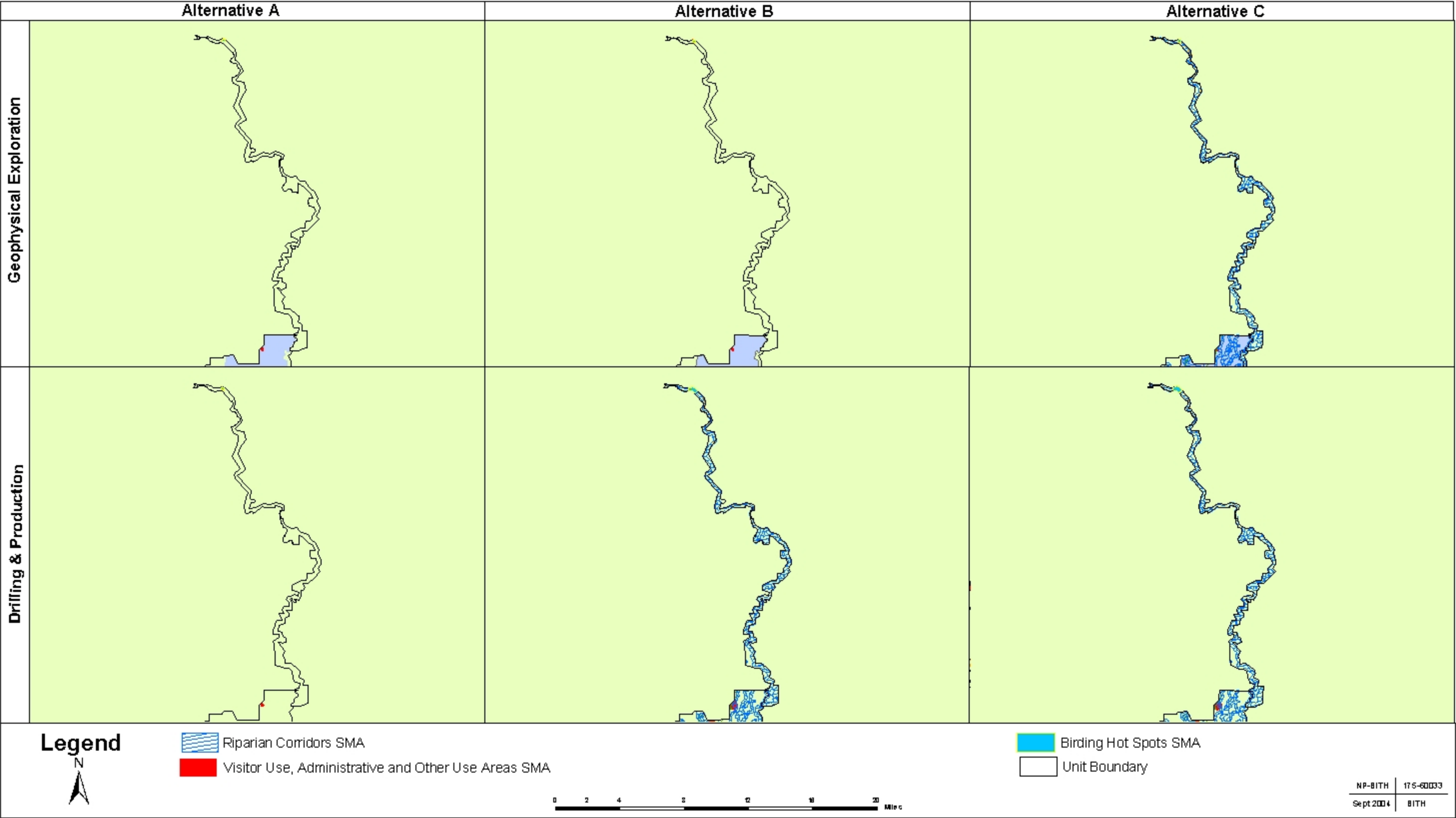
<sup>1</sup>Nonfederal oil and gas operations may not be conducted within 500 feet from perennial, intermittent, or ephemeral watercourses, or within 500 feet of any structure or facility (excluding roads) used for unit interpretation, public recreation or for administration of the unit, unless specifically authorized by an approved plan of operations, as per CLPR at 36 CFR § 9.41(a). The 500' area from waterways covered by this operating stipulation has not been mapped and will be determined on a case-by-case basis during project scoping and the preparation of a Plan of Operations.

<sup>2</sup>The Protected Areas denoted under Alternative A are not formally designated as SMAs, but the "No Surface Use" and "Timing Stipulations" have been applied on a case-by-case basis.

<sup>3</sup>The Riparian Corridor SMA under Alternative B would be NSU, except drilling and production could be permitted adjacent to existing roadways and within previously disturbed areas, subject to CLPR (including NPS Floodplain Management Guidelines and 36 CFR § 9.41(a)). No new roads would be permitted. Associated flowlines and gathering lines could be located within previously disturbed areas, with a minimum 500' offset from perennial, intermittent, or ephemeral watercourses, unless specifically authorized by an approved plan of operations.

**Figure 2.17. Map of Protected Areas under Alternative A, and Special Management Areas under Alternatives B and C, in the Upper Neches River Corridor Unit**

Figure 2.17. Map of Protected Areas under Alternative A, and Special Management Areas under Alternatives B and C, in the Upper Neches River Corridor Unit



**Table 2.17. Summary of Impacts**

The following terms are used in this impact summary chart:

**Short-term** – up to 3 years duration   **Long-Term** – up to 20 years or more   **CLPR** – Current Legal and Policy Requirements   **NSU** – No Surface Use

Alternative A No Action/Current Management	Alternative B Preferred Alternative	Alternative C Maximum Resource Protection
SUMMARY OF ALTERNATIVES		
<p><b>Geophysical Exploration</b> would not occur in Protected Areas where CLPR would not permit operations on 7,462 acres; or within 500 feet of waterways. In addition to the areas where the NSU stipulation would apply year-round, surface uses for geophysical exploration operations would not be permitted in hunting areas (52,272 acres) or within 500 feet of birding hot spots (135 acres) during specified times. In all other areas of the Preserve, exploration operations could be permitted on up to 465 acres.</p> <p><b>Drilling and production operations</b> would not occur in Protected Areas where operations would not be permitted under Current Legal and Policy Requirements on 7,493 acres; or within 500 feet of waterways. Operations on 989 acres including existing (24.2 acres) and abandoned (unreclaimed sites comprising 376 acres) operations, and transpark pipelines (589 acres) would continue to adversely impact geologic resources in the Preserve. In all other areas of the Preserve, up to 40 new wells could be located on up to 241 acres.</p> <p><b>Plugging/Abandonment/Reclamation:</b> There would be no new operations to plug, abandon or reclaim in areas where exploration, drilling and production would not be permitted in Protected Areas. In all other areas of the Preserve where exploration, drilling and production operations could be permitted, there is a potential for up to 465 acres to be reclaimed in association with exploration operations, and up to 241 acres to be reclaimed in association with new drilling and production operations. In addition, there are operations on 989 acres including existing (24.2 acres) and abandoned (unreclaimed sites comprising 376 acres) operations, and transpark pipelines (589 acres) located throughout the Preserve that would be reclaimed in the future, some of which are in Protected Areas.</p>	<p><b>Geophysical Exploration</b> would not occur in SMAs where the No Surface Use stipulation would be applied on 11,512 acres, or within 500 feet of waterways. In addition to the areas where the NSU stipulation would apply year-round, surface uses for geophysical exploration operations would not be permitted in the Hunting Areas SMA (52,272 acres) or within 500 feet of Birding Hot Spots (135 acres) during specified times. In all other areas of the Preserve, exploration operations could be permitted on up to 465 acres.</p> <p><b>Drilling and Production</b> would not occur in designated SMAs where the No Surface Use stipulation is applied on up to 46,273 acres, or within 500 feet of waterways. Drilling and production operations may be permitted in the Hunting Areas SMA (52,272 acres). Operations on 989 acres including existing (24.2 acres) and abandoned (unreclaimed sites comprising 376 acres) operations, and transpark pipelines (589 acres) would continue to adversely impact geologic resources in the Preserve. In all other areas of the Preserve, up to 40 new wells could be located on up to 241 acres.</p> <p><b>Plugging/Abandonment/Reclamation:</b> There would be no new operations to plug, abandon or reclaim in areas where exploration, drilling and production would not be permitted in SMAs. In all other areas of the Preserve where exploration, drilling and production operations could be permitted, there is a potential for up to 465 acres to be reclaimed in association with exploration operations, and up to 241 acres to be reclaimed in association with new drilling and production operations. In addition, there are operations on 989 acres including existing (24.2 acres) and abandoned (unreclaimed sites comprising 376 acres) operations, and transpark pipelines (589 acres) located throughout the Preserve that would be reclaimed in the future, some of which are in SMAs.</p>	<p><b>Geophysical Exploration</b> would not occur in SMAs where the No Surface Use stipulation would be applied on 39,657 acres, or within 500 feet of waterways. In addition to the areas where the NSU stipulation would apply year-round, surface uses for geophysical exploration operations would not be permitted in the Hunting Areas SMA (52,272 acres) or within 500 feet of Birding Hot Spots (135 acres) during specified times. In all other areas of the Preserve, exploration operations could be permitted on up to 465 acres.</p> <p><b>Drilling and Production</b> would not occur in designated SMAs where the No Surface Use stipulation is applied on 46,273 acres, or within 500 feet of waterways. Drilling and production operations may be permitted in the Hunting Areas SMA (52,272 acres). Operations on 989 acres including existing (24.2 acres) and abandoned (unreclaimed sites comprising 376 acres) operations, and transpark pipelines (589 acres) would continue to adversely impact geologic resources in the Preserve. In all other areas of the Preserve, up to 40 new wells could be located on up to 241 acres.</p> <p><b>Plugging/Abandonment/Reclamation:</b> There would be no new operations to plug, abandon or reclaim in areas where exploration, drilling and production would not be permitted in SMAs. In all other areas of the Preserve where exploration, drilling and production operations could be permitted, there is a potential for up to 465 acres to be reclaimed in association with exploration operations, and up to 241 acres to be reclaimed in association with new drilling and production operations. In addition, there are operations on 989 acres including existing (24.2 acres) and abandoned (unreclaimed sites comprising 376 acres) operations, and transpark pipelines (589 acres) located throughout the Preserve that would be reclaimed in the future, some of which are in SMAs.</p>

Alternative A No Action/Current Management	Alternative B Preferred Alternative	Alternative C Maximum Resource Protection
<b>1. IMPACTS ON NONFEDERAL OIL AND GAS DEVELOPMENT</b>		
<p><b>Project Planning</b> – minor, beneficial impacts.</p> <p><b>Geophysical Exploration</b> – minor to moderate, adverse impacts.</p> <p><b>Drilling and Production</b> – minor to moderate, adverse impacts.</p> <p><b>Plugging/Abandonment/Reclamation</b> – minor to moderate, adverse impacts.</p> <p><b>Cumulative Impacts</b> – negligible, adverse impacts.</p>	<p><b>Project Planning</b> – minor to moderate, beneficial impacts.</p> <p><b>Geophysical Exploration</b> – similar to Alternative A.</p> <p><b>Drilling and Production</b> – similar to Alternative A.</p> <p><b>Plugging/Abandonment/Reclamation</b> – minor, adverse impacts.</p> <p><b>Cumulative Impacts</b> – negligible, adverse impacts.</p>	<p><b>Project Planning</b> – same as Alternative B.</p> <p><b>Geophysical Exploration</b> – minor to major, adverse impacts.</p> <p><b>Drilling and Production</b> – minor to major, adverse impacts.</p> <p><b>Plugging/Abandonment/Reclamation</b> – same as Alternative B.</p> <p><b>Cumulative Impacts</b> – negligible, adverse impacts.</p>
<b>2. IMPACTS ON AIR QUALITY</b>		
<p>Impacts could be localized, as well as contribute to regional air quality impacts.</p> <p><b>Geophysical Exploration</b> – short-term, negligible, adverse impacts.</p> <p><b>Drilling and Production</b> – short- to long-term, negligible to minor, adverse impacts from operations in the Preserve; and ranging from no affect to short- to long-term, minor, adverse impacts from wells directionally drilled and produced from outside the Preserve.</p> <p><b>Plugging/Abandonment/Reclamation</b> – short-term, negligible, adverse impacts from operations in the Preserve; and ranging from no affect to short-term, negligible, adverse impacts from wells directionally drilled and produced from outside the Preserve.</p> <p><b>Cumulative Impacts</b> – moderate adverse impacts on the regional airsheds. But, with adherence to state and Federal standards and requirements, regional airsheds are expected to be maintained or improved.</p> <p><b>Impairment Analysis</b> – no impairment.</p>	<p><b>Geophysical Exploration</b> – similar to Alternative A, except that air quality in designated SMAs would be better protected.</p> <p><b>Drilling and Production</b> – similar to Alternative A, except that air quality in designated SMAs would be better protected.</p> <p><b>Plugging/Abandonment/Reclamation</b> – similar to Alternative A, except that air quality in designated SMAs would be better protected.</p> <p><b>Cumulative Impacts</b> – same as Alternative A, except that designation of SMAs with the NSU stipulation would provide consistent protection of air quality in these areas of the Preserve.</p> <p><b>Impairment Analysis</b> – no impairment.</p>	<p><b>Geophysical Exploration</b> – similar to Alternative B, except that air quality in designated SMAs would be better protected.</p> <p><b>Drilling and Production</b> – same as Alternative B.</p> <p><b>Plugging/Abandonment/Reclamation</b> – similar to Alternative B, except that air quality in designated SMAs would be better protected.</p> <p><b>Cumulative Impacts</b> – same as Alternatives A and B, except that designation SMAs over a larger area with the NSU stipulation would ensure widespread protection of air quality in these areas of the Preserve.</p> <p><b>Impairment Analysis</b> – no impairment.</p>
<b>3. IMPACTS ON GEOLOGIC RESOURCES</b>		
<p><b>Geophysical Exploration</b> – localized, short-term, negligible to minor, adverse impacts.</p> <p><b>Drilling and Production</b> – localized, short- to long-term, negligible to moderate, adverse impacts from operations in the Preserve; and ranging from no affect to indirect, localized to widespread, short- to long-term, moderate, adverse impacts from wells directionally drilled and produced from outside the Preserve.</p> <p><b>Plugging/Abandonment/Reclamation</b> – localized, short-term, negligible to minor, adverse impacts from operations in the Preserve; and ranging from no affect to</p>	<p><b>Geophysical Exploration</b> – similar to Alternative A, except that geologic resources in designated SMAs would be better protected.</p> <p><b>Drilling and Production</b> – similar to Alternative A, except that geologic resources in designated SMAs would be better protected.</p> <p><b>Plugging/Abandonment/Reclamation</b> – similar to Alternative A, except that geologic resources in designated SMAs would be better protected.</p>	<p><b>Geophysical Exploration</b> – similar to Alternative B, except that geologic resources in designated SMAs would be better protected.</p> <p><b>Drilling and Production</b> – same as Alternative B.</p> <p><b>Plugging/Abandonment/Reclamation</b> – similar to Alternative B, except that geologic resources in designated SMAs would be better protected.</p>

Alternative A No Action/Current Management	Alternative B Preferred Alternative	Alternative C Maximum Resource Protection
<p>indirect, localized to widespread, short-term, minor, adverse impacts from wells directionally drilled and produced from outside the Preserve.</p> <p><b>Cumulative Impacts</b> – negligible, beneficial impacts in the Preserve; and negligible to minor, adverse impacts on geologic resources in the Lower Neches River Watershed.</p> <p><b>Impairment Analysis</b> – no impairment.</p>	<p><b>Cumulative Impacts</b> – same as Alternative A, except that designation of SMAs with the NSU stipulation would provide consistent protection of geologic resources in these areas of the Preserve.</p> <p><b>Impairment Analysis</b> – no impairment.</p>	<p><b>Cumulative Impacts</b> – same as Alternative A and B, except that NSU designation in all SMAs except the Hunting Areas SMA would ensure widespread protection of geologic resources in the Preserve.</p> <p><b>Impairment Analysis</b> – no impairment.</p>
<b>4. IMPACTS ON WATER RESOURCES</b>		
<p><b>Geophysical Exploration</b> – localized, short-term, negligible to minor, adverse impacts.</p> <p><b>Drilling and Production</b> – localized short- to long-term, negligible to moderate, adverse impacts from operations in the Preserve; and ranging from no affect to indirect, localized to widespread, short- to long-term, moderate, adverse impacts from wells directionally drilled and produced from outside the Preserve.</p> <p><b>Plugging/Abandonment/Reclamation</b> – localized, short-term, negligible to moderate, adverse impacts from operations in the Preserve; and ranging from no affect to indirect, localized to widespread, short- to long-term, minor, adverse impacts from wells directionally drilled and produced from outside the Preserve.</p> <p><b>Cumulative Impacts</b> – negligible, beneficial impacts in the Preserve; and minor to moderate, adverse impacts in the Lower Neches River Watershed.</p> <p><b>Impairment Analysis</b> – no impairment.</p>	<p><b>Geophysical Exploration</b> – similar to Alternative A, except that water resources in designated SMAs would be better protected.</p> <p><b>Drilling and Production</b> – similar to Alternative A, except that water resources in designated SMAs would be better protected.</p> <p><b>Plugging/Abandonment/Reclamation</b> – similar to Alternative A, except that water resources in designated SMAs would be better protected. Indirect effects from wells directionally drilled and produced from outside the Preserve would range from no affect to localized to widespread, short- to long-term, moderate, adverse impacts.</p> <p><b>Cumulative Impacts</b> – same as Alternative A, except that designation of SMAs with the NSU stipulation would provide consistent protection of water resources in these areas of the Preserve.</p> <p><b>Impairment Analysis</b> – no impairment.</p>	<p><b>Geophysical Exploration</b> – similar to Alternative B, except that water resources in designated SMAs would be better protected.</p> <p><b>Drilling and Production</b> – same as Alternative B.</p> <p><b>Plugging/Abandonment/Reclamation</b> – similar to Alternative B, except that water resources in designated SMAs would be better protected.</p> <p><b>Cumulative Impacts</b> – same as Alternatives A and B, except that designation of SMAs over a larger area with the NSU stipulation would ensure widespread protection of water resources in the Preserve.</p> <p><b>Impairment Analysis</b> – no impairment.</p>
<b>5. IMPACTS ON FLOODPLAINS</b>		
<p><b>Geophysical Exploration</b> – localized, short-term, negligible to minor, adverse impacts.</p> <p><b>Drilling and Production</b> – localized, short- to long-term, negligible to moderate, adverse impacts from operations in the Preserve; and ranging from no affect to indirect, localized to widespread, short- to long-term, moderate, adverse impacts from wells directionally drilled and produced from outside the Preserve.</p> <p><b>Plugging/Abandonment/Reclamation</b> – localized, short-term, negligible to minor, adverse impacts from operations in the Preserve; and ranging from no affect to indirect, localized to widespread, short- to long-term, moderate, adverse impacts from wells directionally drilled and produced from outside the Preserve.</p>	<p><b>Geophysical Exploration</b> – similar to Alternative A, except that floodplains in designated SMAs would be better protected.</p> <p><b>Drilling and Production</b> – similar to Alternative A, except that floodplains in designated SMAs would be better protected.</p> <p><b>Plugging/Abandonment/Reclamation</b> – similar to Alternative A, except that floodplains in designated SMAs would be better protected.</p>	<p><b>Geophysical Exploration</b> – localized, short-term, negligible adverse impacts.</p> <p><b>Drilling and Production</b> – indirect, short - to long-term, negligible to minor, adverse impacts from operations in the Preserve; and ranging from no affect to short- to long-term, moderate, adverse impacts from wells directionally drilled and produced from outside the.</p> <p><b>Plugging/Abandonment/Reclamation</b> – same as Alternatives A and B.</p>



Alternative A No Action/Current Management	Alternative B Preferred Alternative	Alternative C Maximum Resource Protection
<p><b>Cumulative Impacts</b> – negligible, beneficial impacts in the Preserve; and minor to moderate, adverse impacts in the Lower Neches River Watershed.</p> <p><b>Impairment Analysis</b> – no impairment.</p>	<p><b>Cumulative Impacts</b> – same as Alternative A, except that designation of SMAs with the NSU stipulation would provide consistent protection of floodplains in these areas of the Preserve.</p> <p><b>Impairment Analysis</b> – no impairment.</p>	<p><b>Cumulative Impacts</b> – same as Alternatives A and B, except that designation of SMAs over a larger area with the NSU stipulation would ensure widespread protection of floodplains in the Preserve.</p> <p><b>Impairment Analysis</b> – no impairment.</p>
<b>6. IMPACTS ON VEGETATION</b>		
<p><b>Geophysical Exploration</b> – localized, short-term, negligible to minor, adverse impacts.</p> <p><b>Drilling and Production</b> – localized, short- to long-term, minor to moderate, adverse impacts from operations in the Preserve; and ranging from no affect to indirect, localized to widespread, short- to long-term, moderate, adverse impacts from wells directionally drilled and produced from outside the Preserve.</p> <p><b>Plugging/Abandonment/Reclamation</b> – localized, short- to long-term, negligible to minor, adverse impacts from operations in the Preserve; and ranging from no affect to indirect, localized to widespread, short- to long-term, minor, adverse impacts from wells directionally drilled and produced from outside the Preserve.</p> <p><b>Cumulative Impacts</b> – negligible, beneficial impacts in the Preserve; and minor to moderate, adverse impacts in the Lower Neches River Watershed.</p> <p><b>Impairment Analysis</b> – no impairment.</p>	<p><b>Geophysical Exploration</b> – similar to Alternative A, except that vegetation in designated SMAs would be better protected.</p> <p><b>Drilling and Production</b> – similar to Alternative A, except that vegetation in designated SMAs would be better protected.</p> <p><b>Plugging/Abandonment/Reclamation</b> – similar to Alternative A, except that vegetation in designated SMAs would be better protected.</p> <p><b>Cumulative Impacts</b> – same as Alternative A, except that designation of SMAs with the NSU stipulation would provide consistent protection of vegetation in these areas of the Preserve.</p> <p><b>Impairment Analysis</b> – no impairment.</p>	<p><b>Geophysical Exploration</b> – localized, short-term, negligible to moderate, adverse impacts.</p> <p><b>Drilling and Production</b> – localized, short- to long-term, minor to moderate, adverse impacts from operations in the Preserve, and ranging from no impact to indirect, localized to widespread, short- to long-term, moderate, adverse impacts from wells drilled and produced from outside the Preserve.</p> <p><b>Plugging/Abandonment/Reclamation</b> – similar to Alternative B, except that vegetation in designated SMAs would be better protected.</p> <p><b>Cumulative Impacts</b> – same as Alternatives A and B, except that designation of SMAs over a larger area with the NSU stipulation would ensure widespread protection of vegetation in the Preserve.</p> <p><b>Impairment Analysis</b> – no impairment.</p>
<b>7. IMPACTS ON WETLANDS</b>		
<p><b>Geophysical Exploration</b> – localized, short-term, negligible to minor, adverse impacts.</p> <p><b>Drilling and Production</b> – localized, short- to long-term, negligible to moderate, adverse impacts from operations in the Preserve; and ranging from no affect to indirect, localized to widespread, short- to long-term, moderate, adverse impacts from wells directionally drilled and produced from outside the Preserve.</p> <p><b>Plugging/Abandonment/Reclamation</b> – localized, short- to long-term, negligible to minor, adverse impacts from operations in the Preserve; and ranging from no affect to indirect, localized to widespread, short- to long-term, minor, adverse impacts from wells directionally drilled and produced from outside the Preserve.</p> <p><b>Cumulative Impacts</b> – negligible beneficial impacts in the Preserve; and moderate, adverse impacts in the Lower Neches River Watershed.</p> <p><b>Impairment Analysis</b> – no impairment.</p>	<p><b>Geophysical Exploration</b> – similar to Alternative A, except that wetlands in designated SMAs would be better protected.</p> <p><b>Drilling and Production</b> – similar to Alternative A, except that wetlands in designated SMAs would be better protected.</p> <p><b>Plugging/Abandonment/Reclamation</b> – similar to Alternative A, except that wetlands in designated SMAs would be better protected.</p> <p><b>Cumulative Impacts</b> – same as Alternative A, except that designation of SMAs with the NSU stipulation would provide consistent protection of wetlands in these areas of the Preserve.</p> <p><b>Impairment Analysis</b> – no impairment.</p>	<p><b>Geophysical Exploration</b> – similar to Alternative B, except that wetlands in designated SMAs would be better protected.</p> <p><b>Drilling and Production</b> – same as Alternative B.</p> <p><b>Plugging/Abandonment/Reclamation</b> – similar to Alternative B, except that wetlands in designated SMAs would be better protected.</p> <p><b>Cumulative Impacts</b> – same as Alternatives A and B, except that designation of SMAs over a larger area with the NSU stipulation would ensure widespread protection of wetlands in the Preserve.</p> <p><b>Impairment Analysis</b> – no impairment.</p>

Alternative A No Action/Current Management	Alternative B Preferred Alternative	Alternative C Maximum Resource Protection
<b>8. IMPACTS ON FISH AND WILDLIFE</b>		
<p><b>Geophysical Exploration</b> – localized, short-term, negligible to minor, adverse impacts.</p> <p><b>Drilling and Production</b> – localized, short- to long-term, minor to moderate, adverse impacts from operations in the Preserve; and ranging from no affect to indirect, localized to widespread, short- to long-term, moderate, adverse impacts from wells directionally drilled and produced from outside the Preserve.</p> <p><b>Plugging/Abandonment/Reclamation</b> – localized, short- to long-term, negligible to minor, adverse impacts from operations in the Preserve; and ranging from no affect to indirect, localized to widespread, short-term, minor, adverse impacts from wells directionally drilled and produced from outside the Preserve.</p> <p><b>Cumulative Impacts</b> – negligible, beneficial impacts in the Preserve; and negligible to minor, adverse impacts in the Lower Neches River Watershed.</p> <p><b>Impairment Analysis</b> – no impairment.</p>	<p><b>Geophysical Exploration</b> – similar to Alternative A, except that fish and wildlife in designated SMAs would be better protected.</p> <p><b>Drilling and Production</b> – similar to Alternative A, except that fish and wildlife in designated SMAs would be better protected.</p> <p><b>Plugging/Abandonment/Reclamation</b> – similar to Alternative A, except that fish and wildlife in designated SMAs would be better protected.</p> <p><b>Cumulative Impacts</b> – same as Alternative A, except that designation of SMAs with the NSU stipulation would provide consistent protection of fish and wildlife in these areas of the Preserve.</p> <p><b>Impairment Analysis</b> – no impairment.</p>	<p><b>Geophysical Exploration</b> – similar to Alternative B, except that fish and wildlife in designated SMAs would be better protected.</p> <p><b>Drilling and Production</b> – same as Alternative B.</p> <p><b>Plugging/Abandonment/Reclamation</b> – similar to Alternative B, except that fish and wildlife in designated SMAs would be better protected.</p> <p><b>Cumulative Impacts</b> – same as Alternatives A and B, except that designation of SMAs over a larger area with the NSU stipulation would ensure widespread protection of fish and wildlife in the Preserve.</p> <p><b>Impairment Analysis</b> – no impairment.</p>
<b>9. IMPACTS ON SPECIES OF SPECIAL CONCERN</b>		
<p><b>Geophysical Exploration</b> – no adverse impacts.</p> <p><b>Drilling and Production</b> – no adverse impacts from operations in the Preserve; and ranging from no affect to indirect, localized to widespread, short- to long-term, moderate, adverse impacts from wells directionally drilled and produced from outside the Preserve.</p> <p><b>Plugging/Abandonment/Reclamation</b> – no adverse impacts from operations in the Preserve; and ranging from no affect to indirect, localized to widespread, short- to long-term, minor, adverse impacts from wells directionally drilled and produced from outside the Preserve.</p> <p><b>Cumulative Impacts</b> – negligible, beneficial impacts in the Preserve; and minor to moderate, adverse impacts in the Lower Neches River Watershed.</p> <p><b>Impairment Analysis</b> – no impairment.</p>	<p><b>Geophysical Exploration</b> – similar to Alternative A, except that species of special concern in designated SMAs would be better protected.</p> <p><b>Drilling and Production</b> – same as Alternative A.</p> <p><b>Plugging/Abandonment/Reclamation</b> – similar to Alternative A, except that species of special concern in designated SMAs would be better protected.</p> <p><b>Cumulative Impacts</b> – same as Alternative A, except that designation of SMAs with the NSU stipulation would provide consistent protection of species of special concern and perpetuate habitat for species in the Preserve.</p> <p><b>Impairment Analysis</b> – no impairment.</p>	<p><b>Geophysical Exploration</b> – similar to Alternative B, except that species of special concern in designated SMAs would be better protected.</p> <p><b>Drilling and Production</b> – same as Alternative B.</p> <p><b>Plugging/Abandonment/Reclamation</b> – similar to Alternative B, except that species of special concern in designated SMAs would be better protected.</p> <p><b>Cumulative Impacts</b> – same as Alternatives A and B, except that designation of SMAs over a larger area with the NSU stipulation would ensure widespread protection of species of special concern and perpetuate habitat for species in the Preserve.</p> <p><b>Impairment Analysis</b> – no impairment.</p>
<b>10. IMPACTS ON CULTURAL RESOURCES</b>		
<p><b>Geophysical Exploration</b> – no adverse impacts.</p>	<p><b>Geophysical Exploration</b> – similar to Alternative A, except that cultural resources in designated SMAs would be better protected.</p>	<p><b>Geophysical Exploration</b> – similar to Alternative B, except that cultural resources in designated SMAs would be better protected.</p>

Alternative A No Action/Current Management	Alternative B Preferred Alternative	Alternative C Maximum Resource Protection
<p><b>Drilling and Production</b> – no adverse impacts from operations in the Preserve; and ranging from no affect to indirect, localized to widespread, short- to long-term, moderate, adverse impacts from wells directionally drilled and produced from outside the Preserve.</p> <p><b>Plugging/Abandonment/Reclamation</b> – no adverse impacts from operations in the Preserve; and ranging from no affect to indirect, localized to widespread, short- to long-term, minor, adverse impacts from wells directionally drilled and produced from outside the Preserve.</p> <p><b>Cumulative Impacts</b> – negligible, beneficial impacts in the Preserve; and minor to moderate, adverse impacts in the Lower Neches River Watershed.</p> <p><b>Impairment Analysis</b> – no impairment.</p>	<p><b>Drilling and Production</b> – similar to Alternative A, except that cultural resources in designated SMAs would be better protected.</p> <p><b>Plugging/Abandonment/Reclamation</b> – similar to Alternative A, except that cultural resources in designated SMAs would be better protected.</p> <p><b>Cumulative Impacts</b> – same as Alternative A, except that designation of SMAs with the NSU stipulation would provide consistent protection of cultural resources in these areas of the Preserve.</p> <p><b>Impairment Analysis</b> – no impairment.</p>	<p><b>Drilling and Production</b> – same as Alternative B.</p> <p><b>Plugging/Abandonment/Reclamation</b> – same as Alternative B.</p> <p><b>Cumulative Impacts</b> – same as Alternatives A and B, except that designation of SMAs over a larger area with the NSU stipulation would ensure widespread protection of cultural resources in the Preserve.</p> <p><b>Impairment Analysis</b> – no impairment.</p>
<b>11. IMPACTS ON VISITOR USE AND EXPERIENCE AND ADMINISTRATIVE AREAS</b>		
<p><b>Visitor Use and Experience</b> – exploration, drilling and production operations in the Preserve would result in localized, short- to long-term, negligible to moderate, adverse impacts, and reclamation operations would result in localized, long-term, moderate, beneficial impacts. Wells directionally drilled from outside the Preserve would result in impacts ranging from no affect to indirect, localized, short- to long-term, moderate, adverse impacts; and reclamation would result in indirect, localized moderate, adverse and beneficial impacts.</p> <p><b>Human Health and Safety</b> – negligible, adverse impacts.</p> <p><b>Cumulative Impacts</b> – negligible, adverse impacts.</p>	<p><b>Visitor Use and Experience</b> – similar to Alternative A, except that visitor use and experience and administrative areas in designated SMAs would be better protected.</p> <p><b>Human Health and Safety</b> – similar to Alternative A, except that visitor use and experience and administrative areas in designated SMAs would be better protected.</p> <p><b>Cumulative Impacts</b> – same as Alternative A, except that designation of SMAs with the NSU stipulation would provide consistent protection of visitor use and experience and human health and safety in these areas of the Preserve.</p>	<p><b>Visitor Use and Experience</b> – exploration, drilling and production operations in the Preserve would result in localized, negligible to minor, adverse impacts, and reclamation operations would result in localized, moderate, beneficial impacts. Drilling and production of wells directionally drilled from outside the Preserve would result in impacts ranging from no affect to short- to long-term, moderate, adverse impacts; and reclamation would result in localized moderate, adverse and beneficial impacts.</p> <p><b>Human Health and Safety</b> – similar to Alternative B, except that visitor use and experience and administrative areas in designated SMAs would be better protected.</p> <p><b>Cumulative Impacts</b> – same as Alternatives A and B, except that designation of SMAs with the NSU stipulation would ensure more widespread protection of visitor use and experience and human health and safety in these areas of the Preserve.</p>
<b>12. IMPACTS ON SOCIOECONOMICS – ADJACENT LAND USES AND RESOURCES</b>		
<p><b>Geophysical Exploration</b> – localized, short-term, negligible to moderate, adverse impacts.</p> <p><b>Drilling and Production</b> – short- to long-term, minor to major, adverse impacts, depending on the resource protection measures employed.</p> <p><b>Plugging/Abandonment/Reclamation</b> – localized, negligible to major, adverse impacts, depending on the amount of reclamation performed.</p> <p><b>Cumulative Impacts</b> – minor to major, adverse impacts.</p>	<p><b>Geophysical Exploration</b> – localized, short-term, minor to major, adverse impacts.</p> <p><b>Drilling and Production</b> – similar to Alternative A.</p> <p><b>Plugging/Abandonment/Reclamation</b> – localized, negligible to major, adverse impacts, depending on the amount of reclamation performed.</p> <p><b>Cumulative Impacts</b> – similar to Alternative A.</p>	<p><b>Geophysical Exploration</b> – similar to Alternative B.</p> <p><b>Drilling and Production</b> – similar to Alternative B.</p> <p><b>Plugging/Abandonment/Reclamation</b> – similar to Alternative B.</p> <p><b>Cumulative Impacts</b> – similar to Alternative B.</p>

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