Chapter 2:
Alternatives

CHAPTER 2: ALTERNATIVES

INTRODUCTION

This "Alternatives" chapter describes the various actions that could be implemented for current and future management of oil and gas operations in Big South Fork National River and Recreation Area (NRRA) and Obed Wild and Scenic River (WSR) (the park units). The National Environmental Policy Act (NEPA) requires federal agencies to explore a range of reasonable alternatives and to analyze what impacts the alternatives could have on the human environment, which the act defines as "the natural and physical environment and the relationship of people with that environment." The analysis of impacts is presented in "Chapter 4: Environmental Consequences," and is summarized in table 10 at the end of this chapter.

Operations (oil and gas)— *"All functions, work and activities within a unit in connection with exploration for and development of oil and gas resources." (36 CFR § 9.31(c)).*

The alternatives under consideration must include a "no-action" alternative, as prescribed by NEPA regulations at 40 Code of Federal Regulations (CFR) Section 1502.14. The no-action alternative in this document is the continuation of the current oil and gas management actions and policies in both park units – no major changes would be made to current management activities.

In addition, the interdisciplinary planning team developed two action alternatives, taking into consideration feedback obtained from the public and other agencies, during the planning process. These alternatives meet, to a large degree, the objectives developed for this plan, as well as the purpose of and need for action (see "Chapter 1: Purpose of and Need for Action"). Because these action alternatives would be technically and economically feasible, and demonstrate rational thought processes, they are considered "reasonable."

No-action Alternative—*An alternative that maintains current management practices and policies.*

As discussed in chapter 1, this is a largely programmatic management plan that establishes a general framework for taking a range of actions for managing oil and gas operations in the park units. However, the action alternatives also include a new management framework for facilitating the plugging and reclamation of wells. By itself, the Oil and Gas Management Plan / Environmental Impact Statement (plan/EIS) does not necessarily authorize any on-the-ground activities, especially those related to new oil and gas development. The National Park Service (NPS) would authorize specific projects for new oil and gas developments by reviewing and approving operator-submitted plans of operations or special use permit applications. Before any new oil and gas operation is approved, the NPS would conduct further analysis in accordance with NEPA, the National Historic Preservation Act of 1966, the Endangered Species Act of 1973, and other applicable federal laws. Activities proposed specifically as part of the new management framework for plugging and reclamation of wells (discussed later in this chapter), would also require further review prior to taking action to ensure that appropriate environmental compliance requirements are met.

The no-action and action alternatives selected for detailed analysis are briefly described below. This is followed by a discussion of background material that is necessary to understand the alternatives, such as the types of oil and gas operations that could occur in the park units, and a forecast of oil and gas activities, including the reasonably foreseeable development (RFD) scenario. The RFD scenario estimates the extent of the operations that could occur to find and produce the estimated undiscovered non-federal

oil and gas resources in the park units and is used, in part, to assess the impacts of each alternative presented in this plan/EIS. The remainder of this chapter provides a detailed description of the alternatives considered, addresses alternatives that were considered but eliminated from detailed analysis, and identifies the agency's preferred alternative, as well as the environmentally preferred alternative.

OVERVIEW OF THE ALTERNATIVES

ALTERNATIVE A: NO ACTION

The no-action alternative is the continuation of current oil and gas management practices and policies, including the current staffing levels that limit full implementation of the 9B regulations. The NPS would continue to work cooperatively with the state on regulations or enforcement, but would be somewhat limited in its ability to conduct inspections and monitoring of all operations on a regular basis and would defer to the state to notify operators about regulatory requirements and issues. Environmental compliance and permitting (NEPA, Endangered Species Act, National Historic Preservation Act) for plans of operations related to management of current operations and for new drilling and/or exploration would be conducted on a case-by-case basis in both park units with currently available staff and funding sources. Restrictions and protected areas identified in the current legal and policy requirements (CLPRs) for each park unit (including the NPS 9B regulations) would be applied to new operations. Plugging and reclamation activities would be guided by the 9B or state regulations, as appropriate, and compliance for these operations would be conducted on a case-by-case basis in both park units.

ALTERNATIVE B: COMPREHENSIVE IMPLEMENTATION OF 9B REGULATIONS AND A NEW MANAGEMENT FRAMEWORK FOR PLUGGING AND RECLAMATION

Under alternative B, the NPS would proactively pursue enforcement of the 9B regulations and plans of operations and provide clear communication with the public and operators about CLPRs, including the 9B regulations. For current operations, the NPS would continue to work cooperatively with the state on regulations or enforcement, but would conduct increased inspections and monitoring and identify sites that are found to be impacting, or threatening to impact, park resources beyond the operations area to bring these into compliance. New operations would be reviewed and permitted in accordance with the restrictions and protected areas described in the CLPRs, similar to alternative A. The park would use the oil and gas management planning process to proactively share information with the public about regulatory requirements, to seek out operators to ensure information is communicated clearly and effectively, and to focus staff resources on the implementation and compliance with the regulatory framework. Alternative B also includes a new management framework for efficiently completing compliance processes necessary for plugging and reclamation of wells, which would provide a method for evaluating the environmental compliance needs for future site-specific projects. Priority sites for plugging and reclamation would be identified using criteria developed for this plan/EIS.

ALTERNATIVE C: COMPREHENSIVE IMPLEMENTATION OF 9B REGULATIONS, NEW MANAGEMENT FRAMEWORK FOR PLUGGING AND RECLAMATION, AND ESTABLISHMENT OF SPECIAL MANAGEMENT AREAS (PREFERRED ALTERNATIVE)

Alternative C would implement proactive management described in alternative B, with additional inspections and monitoring of current and new operations. In addition, under alternative C, "Special Management Areas" or SMAs would be designated to identify and protect those areas where park resources and values are particularly susceptible to adverse impacts from oil and gas development. Specific protections afforded by these SMAs are presented in table 4 (later in this chapter), and these operating stipulations would be applied in the designated SMAs to protect the resources and values of the

park units unless other mitigation measures were specifically authorized in an approved plan of operations. Similar to alternative B, the park would use the oil and gas management planning process to proactively share information with the public about regulatory requirements, to seek out operators to ensure information is communicated clearly and effectively, and to focus staff resources on the implementation and compliance with the regulatory framework. Alternative C also includes the new management framework for plugging and reclamation of wells as described under alternative B; and the designated SMAs would be considered in setting priorities for plugging and reclamation.

TYPES OF OIL AND GAS OPERATIONS

There are four general phases of petroleum development: exploration, drilling, production, and abandonment/reclamation. Appendix F describes the activities associated with each of these phases, including information about hydraulic fracturing operations. However, in Big South Fork NRRA and Obed WSR, most oil and gas activities would likely be part of the production and abandonment/reclamation phases because there is a relatively small potential for new production in the area (see RFD scenario, below). Drilling is expected to occur on a less frequent basis. Although not necessarily expected, geophysical exploration activities are addressed in the event such operations are proposed during the life of this plan (15 to 20 years).

FORECAST OF OIL AND GAS ACTIVITY (INCLUDING UNDISCOVERED OIL AND GAS POTENTIAL AND REASONABLE FORESEEABLE DEVELOPMENT ACTIVITY)

The NPS developed this forecast for Big South Fork NRRA and Obed WSR as a reasonable basis for analyzing the potential impacts of oil and gas activities under the management alternatives presented in this plan/EIS. The projections in this forecast do not represent a benchmark or decision point for acceptable or desired levels of activity. 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, production, and reclamation operations expected during the plan/EIS timeframe.

SUMMARY

The forecast of oil and gas activities for Big South Fork NRRA includes:

- Plugging of up to 50 wells (these are in addition to those that have recently been or are currently being plugged and associated sites reclaimed under American Recovery and Reinvestment Act of 2009 (ARRA) and NPS funding administered through the Tennessee Department of Environment and Conservation (TDEC)), and surface reclamation of associated pads and access roads. However, if during the course of operations under this plan, additional wells were to be identified, they would also be incorporated into the scope of this plan.
- Workover or well servicing of up to 125 wells to restore or improve production.
- Very little, if any, geophysical (e.g., seismic) exploration.
- Drilling of between 0 and 20 new wells to produce both resources existing within discovered fields and undiscovered resources estimated to occur beneath nonfederal oil and gas estate acreage in the park.
- No federal surface disturbance associated with gas storage projects.

The forecast of oil and gas activities for Obed WSR includes:

- Plugging of up to 5 wells and surface reclamation of associated pads and access roads.
- Workover or well servicing of 2 wells to restore or improve production.
- Drilling of between 0 and 5 directional wells from surface locations outside the park to bottomhole locations inside or through the park to produce the volume of undiscovered resources estimated to occur beneath the park.

Important aspects of the forecast for both Big South Fork NRRA and Obed WSR are:

- Activities associated with existing operations are not expected to involve any new surface disturbance;
- Disturbance from new wells is expected to be offset by reclamation of existing wellpads and roads by at least a 2:1 ratio and perhaps by as much as a 10:1 ratio; and,
- The overall footprint of oil and gas activities and all the associated impacts is expected to be on a decreasing trend over the planning period.
- Workovers of existing wells will not use hydraulic fracturing, since these are older wells that were not completed to withstand the high pressures associated with that technique. Hydraulic fracturing could be used for new wells completed in the Chattanooga shale.

Table 3 (later in this chapter) includes an estimate of acreages inside the parks that may be either reclaimed or newly disturbed as a result of activities described under this forecast. For new drilling, pad sizes are based on the types of wells that may be drilled, with larger pad sizes required for horizontal wells that include hydraulic fracture stimulation.

RECLAMATION AND MAINTENANCE OF EXISTING OPERATIONS

Big South Fork NRRA

The majority of oil and gas activity in Big South Fork NRRA is expected to be associated with plugging oil and gas wells, surface reclamation, and production maintenance of existing producers, as opposed to new operations. Fifty-nine wells were recommended for plugging in a 2001 inventory of oil and gas wells at Big South Fork NRRA (TDEC 2001), and at present, funds have been allocated and compliance completed to plug 54 of these wells and reclaim pads and access roads. Fourteen of these wells will be completed using NPS funds through a cooperative agreement with TDEC. Additional funding was received under the American Recovery and Reinvestment Act of 2009 (ARRA) to plug and reclaim 39 others, for which an environmental assessment (EA) / Finding of No Significant Impact was completed in 2009. These wells are expected to be completed over the next few years. One other well was plugged and associated sites reclaimed using NPS funds in 2005. These wells are not included as part of the forecast of oil and gas activities in this plan since they are completed and/or are substantially underway, but they are included in the cumulative impact scenario addressed in chapter 4. However, based on the knowledge of the condition and number of other wells in the park gained from the 2001 inventory, the NPS estimates that about 50 additional wells that are inactive and/or have little foreseeable future activity could be plugged and associated sites reclaimed during the life of this plan under all alternatives, including additional wells that operators would identify as plugging candidates.

The forecast of activity includes workover or well servicing of up to 125 wells to restore or maintain production. The 125 wells consist of 108 wells that were in production at the time of the 2001 inventory

and another 17 that appeared capable of production, but were shut-in at the time. The NPS does not anticipate that one workover or well servicing would occur on each well. Rather, some wells would be worked on several times over the 10 to 15-year span of the plan/EIS, and other wells would see no well work activity. Some work would lead to well plugging, which is accounted for in the 50-well estimate.

Though this level of well work activity has not occurred in the past couple of decades, the NPS considered two factors in making the forecast. First, natural gas demand is expected to increase over the planning period with corresponding firmness or increasing pricing. Second, implementation of any of the alternatives under this plan would provide a level of regulatory certainty, which lack thereof may have contributed to operators choosing to avoid conducting work on wells in the park.

Obed Wild and Scenic River

The forecast of oil and gas activities for Obed WSR includes the potential for 5 wells to be plugged and their associated pads and roads to be reclaimed. The 5 wells represent all unplugged wells in the park. If the forecast played out, the footprint of oil and gas operations would be removed from the park.

The forecast does include the possibility for well work on the two producing wells to improve or prolong production.

GEOPHYSICAL EXPLORATION

The forecast of activity does not totally discount the possibility of geophysical exploration, which would most likely take the form of conventional surveys. However, geophysical exploration, especially in the form of 3-dimensional seismic surveys, would be of limited economic value for several reasons. First, there is existing subsurface geologic information available from over 300 existing wells, which provide coverage for the bulk of acreage available for future development. Second, the zones of interest occur at shallow depths generally above 2000 feet. The cost to drill a number of shallow wells would compete with the cost of 3D surveys. Finally, the rugged surface topography further detracts from the economical and logistical feasibility of 3D seismic.

The forecast does include the possibility for conventional seismic lines having limited utility in areas of existing roads where data could be acquired quickly and inexpensively.

Seismic would most likely be in the form of 1- to 3-day surveys using seismic vibrator trucks. Seismic vibrators, commonly known by their trademark name Vibroseis®, impart coded seismic energy into the ground. The seismic waves are recorded via geophones and subsequently subjected to processing applications to produce images of the subsurface rock layers. Today, there are a number of sophisticated vibrator systems – minivibes, truck mount vibes and buggy mount vibes – to provide the best possible solutions to meet specific seismic program needs. It is anticipated that seismic vibrator surveys at Big South Fork NRRA would most likely be in the form of 1- to 3-day surveys along existing roads and trails.

UNDISCOVERED OIL AND GAS POTENTIAL AND REASONABLY FORESEEABLE DEVELOPMENT SCENARIOS

The U.S. Geological Survey (USGS) estimated undiscovered potential hydrocarbon resources. Appendix G is the USGS Open-File Report 2006-1048, An Allocation of Undiscovered Oil and Gas Resources to Big South Fork NRRA and Obed WSR, Kentucky and Tennessee. The USGS estimates provide a basis for developing RFD scenarios. In addition to the USGS allocation of undiscovered oil and gas resources, the NPS considered existing well data, economics, historical trends, and continued development in existing fields in forming the RFD scenarios. The NPS also recognizes that mineral owners and industry

may possess confidential information not available to the USGS or NPS, and that this RFD scenario represents only one of many possible development scenarios.

Big South Fork National River and Recreation Area

The RFD scenario for Big South Fork NRRA includes drilling of up to 20 new wells to produce both resources existing within discovered fields and undiscovered resources estimated to occur beneath nonfederal oil and gas estate acreage in the park. It is estimated that pads for those wells that are developed in the Chattanooga shale would be about 4 acres in size, while other wells in the RFD scenario would require about 1.5 acres for each well pad. Larger pad sizes are needed for wells developed in the Chattanooga shale, which use horizontal drilling and hydraulic fracturing technology to obtain production. The larger well pads are needed due to use of larger equipment (such as frac fluid tanks, pumps, and mixing equipment) and require a larger work area. Wells developed using hydraulic fracturing require large tanker trucks to haul in water and remove wastewater, and have large storage tanks on site (see appendix F for more description of all oil and gas operations).

The Big South Fork NRRA is mostly situated in the southern portion of the USGS Appalachian Basin Province, but a small parcel lies within the USGS Cincinnati Arch Province. The USGS allocated undiscovered resources from 6 geologic assessment units to lands within the park using a simple acreage allotment. The USGS estimates do not include additional development and production from the existing fields. Appendix G provides additional information on the USGS methodology for allocating resources to the parks. For Big South Fork, the NPS used the same methodology to further allocate undiscovered hydrocarbon resources to acreage that is 1) outside of existing oil and gas fields, and 2) is available for oil and gas development by means of nonfederal oil and gas rights. That acreage is approximately 18,000 acres or 15% of the park.

For Big South Fork NRRA, the USGS/NPS estimates there is a 50% probability of 4,000 barrels of oil (BO), 3 billion cubic feet (BCF) of natural gas, and 60,000 barrels of natural gas liquids (BNGL) for nonfederal undiscovered hydrocarbon resources. Even at a lower 25% probability of discovering more resources, the estimates increase to 4,600 BO, 3.5 BCF, and 70,000 BNGL. Of these estimates, 70% of the gas and 95% of the NGLs are attributed to the Northwest Ohio Shale assessment unit known locally as the Chattanooga Shale.

The estimated resources per acre are very low by exploration standards and do not paint a compelling picture for exploration and production activity even under the best of economical conditions. In fact, historical data shows that the 10% of the 315 wells in the park drilled outside of defined oil and gas fields were largely unsuccessful. However, there are valid reasons for not discounting the possibility of future drilling in Big South Fork. These include testing of the Chattanooga Shale, potential for gas storage/secondary recovery projects in existing fields, and drilling in areas previously untested.

The RFD scenario includes the possibility for up to 10 Chattanooga Shale wells that could be placed either in or outside of existing fields. Past technology did not provide a means of obtaining commercial production from unconventional reservoirs like the Chattanooga Shale. Today, horizontal drilling and/or fracturing technology have enabled commercial shale gas production, and these technologies continue to improve. In fact, recent drilling activity in the New River drainage east of the park is partially attributable to the Chattanooga Shale. Even though the Chattanooga Shale in Big South Fork is thinner and shallower (less volume and pressure) than in the New River drainage, economics and technology may improve such that it could become a viable play. The ownership pattern of nonfederal oil and gas acreage in some areas could somewhat limit the options for long horizontal well completions. Also, horizontal well completions may be made from surface locations outside the park, and the RFD scenario assumes an even mix of

horizontal well surface locations inside and outside the park (i.e., half of the possible 10 Chattanooga shale wells would be made from surface locations outside the park).

The RFD scenario includes the possibility of up to 5 wells to facilitate gas storage/secondary recovery operations. Gas storage projects are being conducted around Big South Fork NRRA and on private lands within the park. Since gas storage is a right that belongs to the surface estate, no lands owned by the federal government would be available for development of gas storage fields. It must be noted, however, that some projects conducted in depleted oil reservoirs are characterized as both gas storage and secondary recovery, because the gas injection/production process can aid in continued production of oil. The 5 RFD scenario wells may be drilled either on private land inside the park or in conjunction with secondary recovery. The new wells may be necessary because existing wells do not meet mechanical integrity or zone isolation needs for gas injection and production.

The RFD scenario also includes the possibility of up to 5 wells to develop targets (e.g., Monteagle, Warsaw, Fort Payne, etc.) in areas previously not drilled.

Finally, the RFD scenario does not discount the possibility that no new wells would be drilled in Big South Fork NRRA during the planning time frame. The last well drilled in the park was in 1993, indicating industry has pursued other options throughout times of both low and historically high product prices and drilling activity. The NPS regulatory requirements cannot be the sole reason for a lack of industry interest, as 10 park units servicewide have had active drilling over the years under the NPS regulatory framework. The scenario that no wells would be drilled accounts for the lower range of zero in the RFD scenario.

Obed Wild and Scenic River

The RFD scenario for Obed WSR includes the possibility for drilling between 0 and 5 directional wells from surface locations outside the park to bottomhole locations inside or through the park (horizontal completions) to produce the volume of undiscovered resources estimated to occur beneath the park. As discussed later in this section, NPS regulations and the way in which land was acquired for Obed WSR preclude the probability that new wells would be drilled from surface locations inside the park.

The Obed WSR is entirely within the USGS Appalachian Basin Province. The USGS allocated undiscovered resources from 2 geologic assessment units to lands within the park using the same simple acreage allotment as was done for Big South Fork NRRA.

For Obed WSR, the USGS estimates there is a 50% probability of 600 BO, 0.5 BCF, and 10,000 BNGL of undiscovered hydrocarbon resources. Using a lower 25% probability of discovering more resources, the estimates increase to 700 BO, 0.55 BCF, and 11,500 BNGL. Like Big South Fork, these estimates do not include existing fields and are mostly attributed to the Chattanooga Shale.

All wells in what is now the Wild and Scenic River have been in defined oil and gas fields. The low volume of allocated resources would suggest no drilling outside existing fields, but exploration drilling around Obed WSR is occurring and with some success. Obed WSR consists of narrow river corridors, and acreage beneath the park would almost certainly be developed in conjunction with adjacent acreage outside the park.

Land acquisitions in Obed WSR have included a reservation of oil and gas rights and have also been subject to existing leases. Notwithstanding existing leases, the deeds include a surface use restriction that precludes future oil and gas exploration and production activities inside the park.

The RFD scenario assumes that where an existing lease is held by production of a well, no additional wells would be drilled inside the park to further develop that lease. This assumption is based on the fact that lease acreage in the park would be a small percentage of total lease acreage. Application of the NPS approval standard of "technologically feasible methods least damaging to [the park]" under the 9B regulations would result in wells being drilled "on lease," but outside the park. This would hold true even if the operator chose to use directional drilling to reach a bottomhole location inside the park. The RFD scenario also assumes that horizontal well completions to develop the estimated resources in the Chattanooga Shale would be accomplished from surface locations outside the park, regardless of lease status.

Since no new drilling is expected to occur from surface locations in Obed WSR, the footprint of oil and gas operations would only diminish as existing wells are plugged and pads and roads are reclaimed.

The lower range estimate of 0 wells drilled within the planning period is based on the same premise as described for Big South Fork NRRA.

TABLE 3. SURFACE DISTURBANCE WITHIN BIG SOUTH FORK NRRA AND OBED WSR ASSOCIATED WITH OIL AND GAS ACTIVITY FORECAST

Park	Activity	Factors	Disturbance, Acres		
			Pads	Roads	Total
Big South Fork NRRA	Well Plugging and Surface Reclamation	• 50 wells • Average wellpad = .75 acres • Average road = ½ mile × 14 feet	-38	-42	-80
	Well Workover and Well Servicing	• No new surface disturbance	0	0	0
	Seismic	• Vehicles limited to existing roads • Surface disturbance limited to vegetation trimming	0	0	0
	RFD Scenario Wells	• 0-20 wells - 0-5 wells with surface location outside park = no surface disturbance in park - 0-5 wells in park (Chattanooga Shale or horizontal well surface locations inside the park) - wellpad = 4 acres - 0-10 wells in park - wellpad = 1.5 acres • Average road = ½ mile × 14 feet	0 to 35	0 to 13	0 to 48
		Big South Fork NRRA Totals	-38 to -3	- 42 to -29	-80 to -32
Obed WSR	Well Plugging and Surface Reclamation	• 5 wells • Average wellpad = 1 acre • Average road = ¼ mile × 14 feet	-5	-2	-7
	Well Workover and Well Servicing	• No new surface disturbance	0	0	0
	RFD Scenario Wells	• No surface disturbance	0	0	0
		Obed WSR Totals	-5	-2	-7

Note: Factors from RFD scenario (appendix G); the acreage of disturbance in the table assumes that all roads would be reclaimed; some may be kept for park purposes. Negative numbers indicate reclamation.

SPECIAL MANAGEMENT AREAS

During internal and public scoping and subsequent analyses, the interdisciplinary planning team identified certain resources and values that are particularly susceptible to adverse impacts from oil and gas operations or are essential to maintain the ecological integrity of Big South Fork NRRA and Obed WSR. These areas, called Special Management Areas (SMAs) in this plan/EIS, have been proposed as a part of alternative C. In some SMAs, oil and gas operations may be permitted with specific operating stipulations to protect park resources and values. In other areas, new operations would not be permitted to use or occupy the land surface, referred to as the "No Surface Use" stipulation, unless other mitigation that would protect the resources and values of the SMA is included in an approved plan of operations. There may be surface use allowed if mitigations are approved in a plan of operations. However, while an approved plan of operations could relax SMA restrictions, it would not supersede applicable statutes such as gorge restrictions and deed restrictions. In some cases where the No Surface Use 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 areas means that surface uses associated with non-federal oil and gas operations would not be permitted within 500 to 1,500 feet of the perimeter of the designated SMA. All setbacks described in this document are measured from the outermost boundary of any operations.

Although specific setback distances are described, they do not represent a strict prescription. The actual distances for setbacks may vary depending upon the specifics of individual projects and resources found at the sites and may be modified to be either increased or decreased from the figures presented here. These setbacks are variable, and are dependent upon the mitigation measures employed to protect resources, values, and human health and safety. For example, other mitigation measures that could be employed include installation of 10-foot sound walls for compressor sites during production, sound muffling and redirecting of unwanted sounds away from visitor use areas, regular maintenance to eliminate squeaks, and incorporation of newer, quieter pumpjacks that run on electricity. In addition, timing stipulations would be applied to minimize impacts during wet periods and high visitor use/visitation periods (generally April through October) in certain SMAs. Operations may be conducted when the timing stipulations are not in effect, unless an operator can demonstrate a compelling reason why it must conduct their activities when they are in effect. The SMAs, as well as the basis for establishing them, are described in table 4, and the stipulations are listed in table 7 under alternative C. Figures 8 through 10 in this chapter show the Big South Fork SMAs.

In recognition of the broad-scale information used in this document, and the surface and subsurface complexities of the park units, 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. SMAs would apply to all new operations unless an operator demonstrates this would entirely prevent reasonable access to a mineral estate. The NPS would require an operator to provide information to support such a conclusion, and would evaluate the application of the SMAs relative to the proposed operation on a case-by-case basis.

TABLE 4. BASIS FOR PROPOSED DESIGNATION OF SPECIAL MANAGEMENT AREAS IN BIG SOUTH FORK NATIONAL RIVER AND RECREATION AREA AND OBED WILD AND SCENIC RIVER UNDER ALTERNATIVE C

Proposed Special Management Areas (SMA)	Resources/Values Protected	Basis for SMA Designation
Big South Fork National River and Recreation Area		
Sensitive Geomorphic Feature SMA includes: • Rock Shelters • Arches • Chimneys • Natural Bridges • Falls • Windows	• Geology • State- and Federally Listed Species • Cultural Resources • Visitor Use and Experience	Sensitive geomorphic features, especially arches and chimneys, were identified as particularly sensitive to non-federal oil and gas operations. Some of these features are in their end stages of existence, are relatively fragile, and are susceptible to erosion. The General Management Plan (GMP) for the park unit includes these resources in a zone that would reflect natural conditions and that would be protected from unnatural degradation (NPS 2005a). In addition to the geology of the Sensitive Geomorphic Feature SMA, these areas are also important because they provide special habitat for certain plant and animal species, including some rare or unusual vegetation (NPS 2005a). The GMP for the park unit includes these resources in a zone that would reflect natural conditions and that would be protected from unnatural degradation (NPS 2005a). Features such as rock shelters in the Sensitive Geomorphic Feature SMA are also important because they provided shelter for humans from pre-Columbian times, and may include associated artifacts that require protection by regulation and/or NPS management policies.
Cliff Edge SMA includes: • Areas mapped by the NPS during development of the GMP for Big South Fork NRRA.	• State- and Federally Listed Species • Cultural Resources • Visitor Use and Experience	Cliff edges are defined in the GMP for the park unit as the exposed, rocky, sparsely vegetated, sandstone outcrops along the rim of the gorge. They can be found along the main gorge of the Big South Fork NRRA and up the valleys of many tributaries. They can run for a mile or more or occur in isolated short lengths. Cliff edges are a recognizable physiographic feature and are not necessarily the same as the "gorge" outline as defined in the legislation (NPS 2005a). These areas are home to threatened, endangered, and/or state-listed species and also provide roosting and nesting sites for birds (NPS 2005a). These resources must be protected based on regulatory requirements and/or NPS management policies from all impacts, including non-federal oil and gas operations. The GMP for the park unit includes these resources in a zone that would reflect natural conditions and that would be protected from unnatural degradation (NPS 2005a). Cliff edges are often associated with important archeological resources and sites eligible for listing on the National Register of Historic Places (NRHP) that contribute to the cultural characteristics of the park unit. Protection of the associated resources and values are required both by regulation and/or NPS management policies. Cliff edges provide a prime scenic resource at the park unit and some natural or developed overlooks would be open to visitor access (NPS 2005a). This opportunity is essential to the visitor experience of the gorge at Big South Fork NRRA and must be protected from all potential impacts, including non-federal oil and gas operations.

TABLE 4. BASIS FOR PROPOSED DESIGNATION OF SPECIAL MANAGEMENT AREAS IN BIG SOUTH FORK NATIONAL RIVER AND RECREATION AREA AND OBED WILD AND SCENIC RIVER UNDER ALTERNATIVE C

Proposed Special Management Areas (SMA)	Resources/Values Protected	Basis for SMA Designation
State Natural Area SMA includes: • Honey Creek and Twin Arches Natural Areas.	• State Natural Areas	The 109-acre Honey Creek Natural Area was set aside primarily because of its rich forest communities that have been undisturbed for many years, as well as its numerous geological formations. The area is extremely scenic, with lush vegetation, streams, a waterfall, rock shelters, and picturesque views of the gorge and river. The area contains a high diversity of forest species, rockhouse species, and sandstone barrens species, including federally threatened species. The 1,500-acre Twin Arches Natural Area was set aside primarily to protect the two geological formations that give the area its name. This area protects the largest natural bridge complex in Tennessee, and one of the largest such complexes in the world. A high diversity of forest species, rockhouse species, and sandstone barrens species exists within the area, including federally endangered and state-threatened plants. Scenic views of the surrounding forested upland and creek gorges are common.
Special Scenery SMA includes: • Areas within the park unit that are identified by conducting viewshed analysis as part of plans of operations. • Specific examples of special scenery that could be included in this SMA include Twin Arches, Honey Creek Overlook, Angel Falls Overlook, Maude's Crack, Sawtooth, and Yahoo Falls.	• Viewsheds • Visitor Use and Experience	The park unit GMP identifies areas of special scenery as sites and areas that are either especially scenic themselves or offer prime scenic views (NPS 2005a). Scenic enjoyment is the priority in these areas, and visitors are expected to experience the setting without being unduly disturbed by unrelated human activity. The potential for non-federal oil and gas operations, especially drilling operations and placement of large storage tanks, to affect the special scenery, or the views from these areas, is a concern in meeting the desired conditions. In addition to the views of or across the gorge, there is also some concern that views from the river up to the plateau could be affected by such operations. While some areas of special scenery have been identified as sensitive to drilling and potentially production, the analysis required by an operator would help identify additional areas where viewsheds could be affected.
Managed Fields SMA includes: • Managed fields identified in the Fields Management Plan/EA (NPS 2006d) that occur in the vicinity of private mineral interests.	• State-listed Plants • Wildlife • Cultural Resources • Visitor Use and Experience	As described in chapter 1, the Fields Management Plan/EA identifies long-term objectives to (1) restore disturbed lands to natural conditions, (2) enhance habitat for game and non-game wildlife, (3) preserve cultural landscapes, and (4) enhance recreational opportunities. Oil and gas operations in the vicinity of these fields could preclude the NPS from meeting these objectives.

TABLE 4. BASIS FOR PROPOSED DESIGNATION OF SPECIAL MANAGEMENT AREAS IN BIG SOUTH FORK NATIONAL RIVER AND RECREATION AREA AND OBED WILD AND SCENIC RIVER UNDER ALTERNATIVE C

Proposed Special Management Areas (SMA)	Resources/Values Protected	Basis for SMA Designation
Visitor Use/Administrative Area SMA includes: • Areas identified in the park unit GMP as First Order Development and Visitor Use Zone (readily accessible concentrations of visitor or administrative facilities) • Specific examples include the Bandy Creek, Blue Heron, and Headquarters areas.	• Visitor Use and Experience • Administrative and Other Use Areas	Visitor experiences and values (enjoyment of plant and animal biodiversity, visual quality, natural quiet, night sky, etc.) occurring in visitor use areas, must be protected from all potential impacts, including oil and gas operations. Facilities and private in-holdings within the park unit, as well as health and safety of park visitors and staff, must also be protected from all activities, including non-federal oil and gas operations.
Trails SMA includes: • All designated trails identified in the GMP.	• Visitor Use and Experience	Visitor experiences and values (enjoyment of plant and animal biodiversity, visual quality, natural quiet, night sky, etc.) occurring in visitor use areas, including along trails of the park unit, must be protected from all potential impacts, including oil and gas operations.
Cultural Landscapes and Cemeteries SMA includes: • 56 known cemeteries in the park unit • 19 cultural landscapes including four that are eligible for listing on the NRHP	• Visitor Use and Experience	Facilities and private in-holdings, including cemeteries, within the park unit, must also be protected from all activities, including non-federal oil and gas operations. Cemeteries are important to the local communities and families often visit the graves. Cultural landscapes, including those eligible for listing on the NRHP, must be protected from non-federal oil and gas operations.
Obed Wild and Scenic River		
Obed WSR SMA includes: • All federally owned land within the boundaries of the park unit.	• Wild and Scenic River Outstandingly Remarkable Values	Because the Obed WSR was established as a narrow corridor centered around surface waters, there is the potential for non-federal oil and gas operations to impact the outstandingly remarkable values identified when the park unit was included in the Wild and Scenic Rivers system. Currently, most deeds restrict non-federal oil and gas operations to areas outside the park unit. However, establishing all federally owned lands within Obed WSR as an SMA with No Surface Use stipulations provides upfront guidance to operators with mineral rights below these lands.

DEVELOPMENT OF NEW MANAGEMENT FRAMEWORK FOR PLUGGING AND RECLAMATION OF WELL SITES

When the NPS acquired lands for Big South Fork NRRA, it inherited a legacy of inactive non-federal oil and gas wells; many without responsible parties. The 2001 well inventory (TDEC 2001) identified 59 inactive wells at Big South Fork NRRA that were considered candidates for plugging, of which over half had no responsible parties. Of these, 54 wells have been or will be plugged within the next few years mainly using funding received through the ARRA and administered through TDEC. However, the NPS and operators are expected to identify additional inactive wells as plugging candidates in the future, and the forecast of oil and gas activity for this plan estimates that about 50 additional wells will need to be

plugged over the life of this plan. These wells pose environmental risks and public safety threats in park units with visitation by diverse user groups. Primary threats consist of resource damage from surface release of petroleum products as deteriorating pressure control equipment fails; subsurface contamination of groundwater absent proper well plugging; personal injury and property damage from spontaneous release of pressurized and highly flammable well fluids; and continued disruption of natural conditions from unreclaimed non-federal oil and gas development. These risks increase with time as does the cost to address them through proper plugging and reclamation. Resource managers at both park units have made it a high priority to remove these hazards by plugging wells and reclaiming the sites and to protect resources and provide for a safer visitor experience.

During internal scoping, the interdisciplinary team for the plan/EIS considered establishing a new management framework that would provide an efficient process to expedite the plugging and reclamation of abandoned or inactive wells, while providing for protection of resources and values and review of potential impacts. The intent was to describe and analyze the components of plugging/reclamation activities, analyze the impacts in this plan/EIS, and enable subsequent environmental compliance for these wells by using the analysis in the EIS in a streamlined process. This approach would avoid repetitive planning, analysis, and discussion of the same issues each time a well is to be plugged and the site reclaimed, and would expedite the removal of the threats described above. This became the basis of action to plug wells under ARRA, and an EA for the plugging and capping of several wells at Big South Fork NRRA was completed in 2010.

Those projects that would be conducted under the new management framework would be designed to meet the reclamation standards of 9B regulations. Project design would be driven by reclamation goals, and well plugging actions would be planned to minimize or avoid situations that would make surface reclamation more difficult or costly. Basically, equipment and methods for well plugging would be selected to meet job requirements, while minimizing the amount of re-disturbance necessary.

The goals for activities associated with access, plugging, and reclamation under the new management framework are described for both alternatives B and C. The description also provides detailed information on actions that would be required at Big South Fork NRRA and Obed WSR to meet these goals. The interdisciplinary team developed a process for evaluating the appropriate level of environmental compliance documentation that would be required for future well plugging and reclamation projects. This process is also described in detail for alternatives B and C.

CURRENT LEGAL AND POLICY REQUIREMENTS

In addition to the 9B regulations, all non-federal oil and gas operations in national park system units are subject to other CLPRs based on federal and state laws, regulations, federal executive orders, NPS policies, and applicable direction provided in NPS planning documents. Appendix B provides an overview of these other CLPRs.

PERFORMANCE STANDARDS

Performance standards are resource protection goals that have been identified for each resource topic described in this plan/EIS. These standards are based largely on the NPS *Management Policies 2006*, as well as resource-specific regulations, and are included in appendix H. The performance standards described would apply to all current and future non-federal oil and gas operations in the park units. Where a current operation does not comply with these standards, the operation would need to be modified or mitigation measures implemented.

STATUTORY AND REGULATORY REQUIREMENTS AND MITIGATION MEASURES FOR NON-FEDERAL OIL AND GAS OPERATIONS

To help provide guidance to non-federal oil and gas operators at Big South Fork NRRA and Obed WSR, the NPS has developed tables of statutory and regulatory requirements (referred to as operating stipulations), as well as recommended mitigation measures. These tables are presented in appendix B, and address all phases of non-federal oil and gas operations, including geophysical exploration, drilling and production operations (including measures that would apply to roads, drilling, production, or flowlines and pipelines), plugging, abandonment, and reclamation requirements. The tables also specify which resource(s) would be protected by the particular operating stipulation or mitigation measure. These measures would apply to any type of oil or gas operation; however, if hydraulic fracturing is used, the following mitigation measures would also be required:

- Specific chemicals and their quantities used in operations must be disclosed so that the appropriate containment and disposition requirements can be employed to minimize the risk of contaminants affecting park resources.
- Less toxic chemicals should be used if technically feasible (i.e., replacement of diesel with a less toxic carrying fluid).
- Well construction standards (i.e., surface casing and cementing) above those required by the state must be followed to enhance isolation and protection of usable quality water zones.
- Water must be obtained from sources outside the park. These sources would be identified and evaluated in future plans of operation.
- Wastewater must be stored in tanks (not pits) and disposed of outside the park. Disposal options would be identified and evaluated in future plans of operation.
- Comprehensive information on the geologic conditions and hydraulic stimulation design parameters would be required in the plan of operations proposal, so that the NPS can evaluate the risk of vertical fracture growth to groundwater.
- Measurement of naturally occurring radioactive material levels in drill cuttings could be included in the operator's monitoring program, and appropriate handling and disposal methods would be required.

The operating stipulations focus on the NPS's Non-federal Oil and Gas regulations at 36 CFR Part 9 Subpart B. Many, but not all of the operating stipulations required under other federal and state laws and regulations are also listed. To ensure compliance with all applicable legal and policy mandates, it is the operator's responsibility to consult with the appropriate federal, state, and local agencies prior to conducting operations in the park units. In addition, the operator should work with the NPS to review the suggested mitigation measures contained in the NPS Oil and Gas Operator's Handbook (NPS 2006a) that pertain to the proposed operations and to identify those that should be incorporated into the proposal to minimize adverse effects. Many of the mitigation measures for oil and gas operations are derived from environmental guidelines and publications developed by the oil and gas industry and environmental professionals. These measures may not address every environmental topic or risk that may be encountered during oil and gas operations, but provide potential options for consideration.

ALTERNATIVE A: NO ACTION (CURRENT MANAGEMENT CONTINUED)

The Council on Environmental Quality (CEQ) requires that alternatives analysis in an EIS "include the alternative of no action" (40 CFR 1502.14(d)). The no-action alternative "sets a baseline of existing impact continued into the future against which to compare impacts of action alternatives" (Director's Order 12 Handbook, section 2.7 (NPS 2001)). The no-action alternative is a continuation of existing oil and gas management practices and assumes no new management actions where environmental impacts would be implemented beyond those available when the oil and gas management planning process started.

CURRENT OPERATIONS

In the past, there has been no formalized, comprehensive management plan to guide non-federal oil and gas operations in either park unit. Oil and gas operations have been managed on a case-by-case basis based on availability of staff and funding sources. Under alternative A, current operations would continue to be managed in this manner, including site-by-site enforcement of the 9B regulations and other CLPRs, given current levels of staffing. The NPS would continue to work cooperatively with the state on regulations or enforcement, but would be somewhat limited in its ability to conduct inspections and monitoring of all operations on a regular basis and would defer to the state to notify operators about compliance issues. If any operations are found to pose a significant threat to federally owned or controlled lands or waters, the superintendent may suspend the operations until the threat is removed or remedied (see 36 CFR 9.33 and 9.51).

Based on the forecast of oil and gas activity, it is assumed that 125 wells at Big South Fork NRRA and two wells at Obed WSR could be worked over or serviced under this alternative, as staffing limitations and resources allow for review of the proposed projects.

NEW OPERATIONS

The RFD scenario presented in this plan/EIS would apply to alternative A, as new operations would be allowed under the no action alternative. Geophysical exploration (2-D seismic surveys) could be conducted as described above, and up to 25 wells (0 to 20 in Big South Fork NRRA; 5 with surface locations outside the park; and 0 to 5 directionally drilled beneath Obed WSR from locations outside the park unit) could be drilled in the park units over the next 15 to 20 years.

New operations would be subject to CLPRs, including 9B regulations, the requirements for a plan of operations, and appropriate mitigation, as needed. The few wells that may be developed using hydraulic fracturing would involve larger well pads with tanks for water and wastewater storage, additional truck transport to and from the operation, possible road upgrades or turnouts to accommodate the larger vehicles, and outside sources for water and wastewater disposal services. Fracturing operations would also require more time to develop, generally, 2 to 4 weeks more than a regular operation. Appendix F provides additional details on types of oil and gas development, including hydraulic fracturing. Proposals for all new operations would continue to be evaluated on a case-by-case basis, and appropriate mitigation required to eliminate or minimize impacts. New surface disturbances in Big South Fork NRRA and Obed WSR would be minimized by using directional drilling techniques and by conducting operations on previously disturbed areas if feasible.

Operations associated with geophysical exploration, drilling, and production could be allowed in all areas of the park units where nonfederal oil and gas rights exist, with the exception of protected areas identified

by CLPRs, unless otherwise approved in a plan of operations. This would include provisions in the enabling legislation for Big South Fork NRRA that prohibit oil and gas operations in the designated gorge area, as well as deed restrictions at Obed WSR that require no surface occupancy and the use of technically feasible methods that are least damaging, such as directional drilling. As required in the 9B regulations (36 CFR 9.41), a 500-foot setback from visitor use and administrative areas, as well as perennial, intermittent, or ephemeral watercourses, would apply to all non-federal oil and gas operations, unless specifically authorized in an approved plan of operations. As a result, drilling, production, and geophysical operations would not be permitted on approximately 72,549 acres at Big South Fork NRRA at any time of the year (this number could be higher as it does not account for the land area that overlies mineral estates owned by the NPS). Approximately 52,600 acres of this are within the gorge, where oil and gas operations are prohibited by the enabling legislation for Big South Fork NRRA. There are approximately 17,477 private mineral acres present at Big South Fork NRRA, of which 8,413 acres are protected from development under the 9B regulations described above, unless mitigations were developed and approved in a plan of operations. At Obed WSR, the 9B regulations and deed restrictions would prohibit oil and gas operations on nearly all federal lands within the boundary of the park unit (approximately 3,712 acres) at any time of year.

In addition, provisions identified in GMPs for the park units would have to be considered. At Big South Fork NRRA, these include the road and trail standards (see discussion below and appendix E); as well as the desired conditions and setting identified for each GMP zone (see chapter 1). At the Obed WSR, consistency with the general provisions in the GMP related to non-federal oil and gas operations would be addressed, including stabilizing and revegetating inactive oil and gas sites to protect water quality; considering visual intrusions and noise from oil and gas development; and encouraging cooperation with surrounding landowners to implement measures to address impacts from activities on lands adjacent to the park unit.

Operators would also have to consider the location of federally listed species and their critical habitats, and include mitigation or setbacks to avoid adverse effects. Operators would also need to avoid long-term monitoring plots at Big South Fork NRRA during planning for new non-federal oil and gas operations. The purpose of these monitoring plots is to observe changes in natural resource conditions over time. The NPS would address the provisions needed to avoid impacts to listed species and long-term monitoring plots with operators during the development of plans of operations.

The acreage of protected areas under this alternative is approximate and does not include consideration of GMP provisions or long-term monitoring plots, both of which would be addressed on a case-by-case basis during the preparation of plans of operations. Operating stipulations could be modified, and protected areas could be larger or smaller, 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 park units.

PLUGGING AND RECLAMATION

Plugging and reclamation activities would be guided by the 9B or state regulations, as described later in this section, and environmental compliance for these operations would be conducted on a case-by-case basis in both park units. Priorities for plugging and reclamation would be determined based on certain criteria, such as environmental/health and safety issues, and access to the site.

When an operator or the NPS is responsible for plugging and reclamation activities, they would be carried out in accordance with NPS and state standards and 9B plan of operations, if applicable. In both of these cases, the NPS would provide on-site oversight to ensure plugging and reclamation standards are met.

Most operations exempted from 9B regulations under 36 CFR 9.33 (see appendix A) would likely encounter a circumstance (e.g., change in operator, new surface disturbance) that would cause loss of exempt status and would thus be plugged and associated sites reclaimed to NPS requirements. In the less likely case where grandfathered status is maintained through plugging and reclamation, the activities would be performed to state requirements only.

As described in the "Forecast of Oil and Gas Activities" it is assumed that approximately 50 wells at Big South Fork NRRA and 5 wells at Obed WSR would be plugged and associated sites reclaimed under this alternative.

ROAD STANDARDS

Under alternative A, road standards would be developed on a case-by-case basis depending on the activity. Appendix E outlines road and trail classifications and standards.

The GMP also identifies recreational/administrative routes used by oil and gas operators that are considered suitable for public use at Big South Fork. These roads (shown on figure 6 of chapter 1), the preferred recreational uses, and the associated classifications/standards are identified in appendix E. The standards applied to these roads also serve as examples of what may be required for new nonfederal oil and gas operations should the associated access routes be deemed appropriate for particular recreational or administrative uses. Use and maintenance of these roads would be addressed through discussions with the oil and gas operators during the development of plans of operations to ensure an equitable, cooperative management strategy. Warning signs could be posted to help minimize user conflicts and associated safety issues, including speeding. If an operator needs to improve any of the oil and gas access roads open for public use above the NPS road standards (e.g., to accommodate larger equipment), the operator would be responsible for all costs associated with these changes and their maintenance. All other oil and gas access roads would not be open for recreational uses and NPS would require that roads are constructed to meet the operational needs for oil and gas development or access, including appropriate erosion control and routine maintenance by the operator (NPS 2005a). While access roads may be subject to frequent use by operators when operations are active, the access roads would not be authorized for recreational trail use, unless access is on foot. The use of all-terrain vehicles in the park unit is an ongoing issue subject to management and enforcement actions.

Although the standards were developed for Big South Fork, they would also be applied at Obed WSR. However, considering deed restrictions that would likely require directional drilling from outside the park unit, new access routes are not expected within Obed WSR.

INSPECTIONS AND MONITORING

Site inspections and monitoring would continue to be limited to base duties, with priority given when problems or emergencies are reported or if there are information requests from operators. Where sites are found to be impacting, or threatening to impact, park resources beyond the operations area, the NPS would enforce the 9B regulations and/or contact the state to enforce applicable regulations. If any operations, within or outside a park unit, are found to pose a significant threat to federally owned or controlled lands or waters, the superintendent may suspend the operations until the threat is removed or remedied (see 36 CFR 9.33 and 9.51).

ACQUIRING MINERAL RIGHTS ON A CASE-BY-CASE BASIS

Per section 8.7 and 8.7.3 of the NPS *Management Policies 2006*, the NPS may seek to acquire non-federal mineral rights on a case-by-case basis. Under the no-action alternative, acquisition of mineral

rights at Big South Fork NRRA would continue to be based on the Land Protection Plan for the park unit (NPS 1998a). Of the 16 priority tracts or interests to be acquired per this plan, outstanding mineral rights are considered the lowest. The Land Protection Plan for Obed WSR (NPS 1986) recommends, as a minimum, NPS easements on lands that overlay oil and gas resources, which would also continue under this alternative.

PARK OPERATIONS AND MANAGEMENT

An equivalent of 3.6 full time employees (FTEs) would conduct activities associated with management of the nonfederal oil and gas operations in Big South Fork NRRA and Obed WSR under alternative A. This includes three positions (3 FTE) dedicated specifically to oil and gas management, including a geologist, oil and gas technician, and a physical science technician. In addition, part-time support is received from a biotech, wildlife biologist, archeologist, community planner, botanist, and resource management chief. These staff also assist with management of oil and gas operations at Obed WSR. The NPS Geologic Resources Division also provides support equivalent to that of approximately 0.4 FTEs. Staff activities include inspections/monitoring; response to emergency situations (see appendix I for details on emergency response procedures); review of plans of operations; preparation of environmental compliance documents for plans of operations, as well as plugging and reclamation activities; coordinating plugging and reclamation activities and providing oversight during such operations; and other miscellaneous activities (e.g., coordinating with the state and non-federal oil and gas operators).

IMPLEMENTATION COSTS

The costs associated with alternative A would primarily include staff time for oversight of the non-federal oil and gas operations in the park as described above. Based on input from park staff, the estimated cost of this staff time and other miscellaneous costs are shown in table 5.

TABLE 5. COST ESTIMATE ALTERNATIVE A

Action	Assumptions	Annual Cost	Cost for the 15-Year Planning Period
Big South Fork NRRA Staff Time	An equivalent of approximately 3.6 full-time employees.	$276,697	$4,150,455
Obed WSR Staff Time	Covered by Big South Fork NRRA staff.	$0	$0
Geologic Resources Division Staff Time	An equivalent of approximately 0.4 full-time employees, plus 35% for administrative and benefits overhead costs.	$48,000	$720,000
Miscellaneous Costs	Include equipment, vehicle, fuel, etc.	$10,000	$150,000
Total		**$334,697**	**$5,020,455**

ALTERNATIVE B: COMPREHENSIVE IMPLEMENTATION OF 9B REGULATIONS AND A NEW MANAGEMENT FRAMEWORK FOR PLUGGING AND RECLAMATION

Under alternative B, an oil and gas management plan that clearly articulates the CLPRs applicable to the exploration, production, and transportation of nonfederal oil and gas resources in Big South Fork NRRA and Obed WSR would be implemented to help ensure the long-term protection of the resources and values in these park units. Park staff would proactively pursue enforcement of the 9B regulations and plans of operations and provide clear communication with the public and operators about CLPRs, including the 9B regulations.

CURRENT OPERATIONS

Under alternative B, the NPS would proactively pursue 9B enforcement and plans of operations from current operators in both park units, and would plan to hire additional seasonal or term employees to accomplish this. Priorities for enforcement would be set considering (in no particular order):

- environmental/health and safety issues at well sites;
- the presence of abandoned wells;
- the extent of an operator's property interest in the park units;
- the location of a well relative to producing areas;
- road conditions; and
- status of compliance with state regulations

The NPS would continue to work cooperatively with the state on regulations or enforcement, but increased inspections and monitoring would proactively identify sites that are found to be impacting, or threatening to impact, park resources beyond the operations area (see section on "Inspections and Monitoring" for this alternative). The 9B regulations would be enforced at any such sites, and operations found to pose a significant threat to federally owned or controlled lands or waters shall be suspended by the superintendent until the threat is removed or remedied (see 36 CFR 9.33 and 9.51).

It is assumed that 125 wells at Big South Fork NRRA and two wells at Obed WSR could be worked over or serviced under this alternative, as staffing limitations and resources allow for review of the proposed projects.

NEW OPERATIONS

The RFD scenario presented in this plan/EIS would apply to alternative B. Geophysical exploration (seismic surveys) could be conducted as described above, and up to 25 wells (0 to 20 in Big South Fork NRRA, 5 with surface locations outside the park, and 0 to 5 directionally drilled beneath Obed WSR from locations outside the park unit) could be drilled in the park units over the next 15 to 20 years.

As with alternative A, new operations would be subject to CLPRs, including 9B regulations, the requirements for a plan of operations, and mitigation as needed. The park would use the oil and gas management planning process to proactively share information with operators about regulatory requirements and to focus staff resources on the implementation and compliance with the regulatory framework. The park would share information with the operators such as example plans of operation and

EAs, which should help facilitate the process. New surface disturbances in Big South Fork NRRA and Obed WSR would be minimized by using directional drilling techniques and by conducting operations on previously disturbed areas if possible.

Under alternative B, operations associated with geophysical exploration, drilling, and production could be allowed in all areas of the park units, with the exception of protected areas identified by CLPRs, as described for alternative A. This includes prohibitions on oil and gas operations in the designated gorge area (Big South Fork NRRA); deed restrictions that require no surface occupancy and the use of technically feasible methods that are least damaging, such as directional drilling (Obed WSR); and 500-foot setbacks from visitor use and administrative areas, as well as perennial, intermittent, or ephemeral watercourses, unless specifically authorized in an approved plan of operations (as required by 36 CFR 9.41). Operators would also have to consider provisions in the GMPs for the park units, as well as the location of long-term monitoring plots at Big South Fork NRRA, during planning for new nonfederal oil and gas operations, as described for alternative A.

In addition, because deed restrictions prevent new drilling on federal surface in Obed WSR, there would be No Surface Use (i.e., new operations would not be permitted to use or occupy the land surface) of the gorge at the Obed WSR. The Obed WSR contains an outstanding example of a deep, sandstone gorge that lines much of the river system and generally stretches from the river bed to the bluff tops. This gorge is identified in the GMP for the park unit as part of the natural resources interpretive theme for Obed WSR (NPS 1995a). This area possesses great ecological diversity with a variety of habitats for many species of flora and fauna, including a number of endangered and threatened species. Although the 9B regulations require a 500-foot setback from the banks of any watercourse (36 CFR 9.41(a)) that likely encompasses all of the gorge, the planning team applied the no surface use provision under this alternative to ensure the important values of this area are protected from occupancy and disturbance of surface resources. Directional drilling to reach mineral rights beneath the gorge would still be an available option.

Based on current legal and policy restrictions, drilling, production, and geophysical operations would not be permitted on approximately 72,549 acres at Big South Fork NRRA at any time of the year (approximately 52,600 acres of this are within the gorge), unless specifically authorized in an approved plan of operations. There are approximately 17,477 private mineral acres present at Big South Fork NRRA, of which 8,413 acres would be protected from development under the 9B regulations described above. At Obed WSR, oil and gas operations would be prohibited on all federal lands within the boundary (approximately 3,712 acres). None of the area where exploration, drilling, or production may be limited includes private lands found within the boundary of Big South Fork NRRA or Obed WSR. Also, the acreage of protected areas under this alternative is approximate and does not include consideration of GMP provisions or long-term monitoring plots, both of which would be addressed on a case-by-case basis during the preparation of plans of operations. Finally, operating stipulations could be modified, so protected areas could be larger or smaller, 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 park units and the appropriate mitigations are included in an approved plan of operations.

As with current operations, the NPS would continue to work cooperatively with the state on regulations or enforcement, but increased inspections and monitoring would proactively identify sites that are found to be impacting, or threatening to impact, park resources beyond the operations area (see section on “Inspections and Monitoring” for this alternative). The 9B regulations would be enforced at any such sites, and operations found to pose a significant threat to federally owned or controlled lands or waters shall be suspended by the superintendent until the threat is removed or remedied (see 36 CFR 9.33 and 9.51).

PLUGGING AND RECLAMATION

Generally, plugging and reclamation activities would be guided by the 9B or state regulations, as described later in this section, and environmental compliance for these operations would be conducted on a case-by-case basis in both park units. However, alternative B includes a new management framework to efficiently complete the compliance process for the plugging and reclamation of inactive wells that represent potential threats to park resources and values; this framework is described in detail below.

For existing operations exempted from the 9B regulations (see 36 CFR 9.33 in appendix A), plugging and reclamation would be conducted per state regulations, although many wells will have new surface disturbance associated with the action or some other action that will trigger the 9B regulations and the new management framework (see 36 CFR 9.33 in appendix A).

Existing operations that do not have the grandfathered exemption would be plugged and associated sites reclaimed in accordance with the 9B regulations, regardless of whether or not the operator or NPS plugs the well. These operations would also be subject to the provisions of an approved plan of operations or special use permit, as appropriate. In all circumstances, the NPS would provide on-site oversight to ensure plugging and reclamation standards are met.

It is assumed that about 50 wells at Big South Fork NRRA and five wells at Obed WSR would be plugged and associated sites reclaimed over the life of this plan under this alternative.

New Management Framework

As described previously in the section on “Development of New Management Framework for Plugging and Reclamation of Well Sites” the intent of the new management framework is to describe and analyze the components of plugging/reclamation activities, analyze the impacts in this plan/EIS, and enable subsequent environmental compliance for these wells by using the analysis in the EIS in a streamlined process. The following describes steps that would be taken to implement site-specific projects, as well as the activities that would be undertaken as part of plugging and reclamation, under the new management framework. This includes a discussion of criteria that would be used to prioritize sites identified as candidates for plugging, as well as the details of each component of the process, including gaining access, plugging, and reclaiming a site. Information is provided on equipment that would be needed for each component and standards for specific activities associated with each component. Detailed information and some examples that provide guidance for managers of proposed plugging and reclamation activities are provided in appendix J.

Implementation of Site-Specific Plugging and Reclamation Projects

A number of steps would be implemented under this alternative to determine the appropriate approach to the components of the plugging and reclamation activities under the new management framework. These steps are:

1. Identify wells for plugging and reclamation
2. Prioritize wells for plugging and reclamation
3. Site survey or assessment for sensitive resources

4. Determine appropriate access, well plugging, and reclamation activities
    a. Tailor desired condition and the reclamation requirements to the site
    b. Prepare site-specific monitoring program
    c. Determine subsequent compliance needs

A number of these steps have been completed or are supported by information developed as part of the new management framework and the EA completed in 2010 for oil and gas well plugging and restoration. The 2001 well inventory at Big South Fork NRRA was used to identify well sites that are candidates for plugging and reclamation (step 1). Preliminary assessments of resources at each site have been conducted using available data, and would be used in conjunction with guidance developed to prioritize wells for plugging and reclamation (see following section) (steps 2 and 3).

General guidelines for access, plugging and reclamation activities are also described in this plan/EIS, and include goals or desired conditions related to each of these (steps 4 and 4a). When a project is proposed, a survey of the site, including surveys for sensitive species and cultural resources, would be conducted to refine the resource information and the access, plugging, and reclamation activities that would be implemented. After a well site has been surveyed, park unit resource managers would collaborate to determine specific desired conditions that are to be achieved when plugging and reclaiming the particular site (e.g., specific goals related to access, plugging, and reclamation).

Once decisions have been made on the appropriate actions to be taken for gaining access, plugging, and reclaiming a site, park unit managers must then determine the appropriate compliance pathway. This alternative also provides guidance to help staff of Big South Fork NRRA and Obed WSR determine the compliance requirements for each plugging and reclamation project (step 4c).

Guidance for Prioritizing Well Sites for Plugging and Reclamation

Park staff would evaluate all wells that are candidates for plugging and reclamation to determine their potential for impacts on park unit resources and values. Sites would be prioritized for plugging and reclamation based on (in no particular order):

- environmental threats (including contamination);
- health and safety issues;
- access;
- mechanical conditions (deterioration and subsidence);
- proximity to the gorge;
- desired conditions and settings in GMP zones;
- cost;
- funding availability; and
- responsible party information.

The NPS does not expect to plug and reclaim all candidate wells during the 15- to 20-year period of this plan.

Access, Well Plugging, and Reclamation Activities

Access Roads—There are four goals for developing access roads during plugging and reclamation activities.

1. Provide access to well site for crews to disassemble and remove production equipment, debris, etc.
2. Provide access to well sites for plugging equipment, materials, and personnel.
3. Create no more re-disturbance (vegetative removal and road repair) than is necessary to achieve goals 1 and 2.
4. Secure access to authorized use by project personnel only.

Naturally reclaimed oil and gas access road.

The following actions would be required when developing access roads. Ultimately, the requirements for developing access roads would be driven by plugging equipment needs, primarily the plugging rig and cementing equipment.

Vegetation Trimming/Removal—Much of the network of oil and gas access roads is still in place, and the road base is serviceable for access needs associated with plugging and reclamation. Gas-powered chainsaws would be used for trimming vegetation along the road sides. A small vehicle with a chipper/shredder attachment or tractor with a brush hog may be used to clear low-growing plants, small woody shrubs, and /or small trees. Small bulldozers or the front bucket of a backhoe may be used to clear vegetation within the roadway or remove large downed woody debris. Some access has been blocked by mature trees that have fallen across established routes. These tree trunks would be cut into sections and removed. Cut vegetation would be dispersed into the woods in a manner that still provides reasonable ingress/egress for foot traffic and wildlife.

Earthwork—In most cases, it would be possible to limit road widths to 12 feet total disturbance (including road base and side ditches), which is consistent with original construction techniques. Therefore, little, if any, new disturbance would be required. Mudholes and road washouts would need to be repaired for rig access and larger equipment. The material for road repair (including improving the crown and filling in holes) would generally be obtained from clearing/establishing ditches. In some cases, temporary drainage would be established to empty mudholes. In a few cases, there may be sections of road that are excessively eroded. Park managers would evaluate whether altering the route or repairing the existing route is best in terms of 1) meeting access needs, and 2) minimizing impacts.

Erosion Control—Staked straw bales and sediment traps would be used at mudhole drainages and steep slopes in excess of 3%, as well as along areas of new disturbance. Water bars would be used to divert runoff to drainages on slopes greater than 3%.

Use of Gravel or Other Road Base Materials—Road base materials may be removed or left in place, depending on the future desired conditions of the site. Gravel or red dog (a local material that can be used in place of gravel to stabilize sections of road) would be used as road base material for access routes, where necessary. Gravel would be screened to minimize the amount of limestone sand present that could contribute to impacts on water-quality parameters such as pH. Larger (3 inches or more) material would often be necessary in filling in mudholes or at the base of jump up rocks. Smaller gravel would be used for traction on steeper slopes.

Currently operational oil and gas access road.

Equipment—Typical equipment used in opening up and repairing access roads includes a small dozer, small backhoe, hand tools (gas-powered chainsaw, hand saws, axes, shovels, etc.). Personal vehicles (typically four-wheel drive pickup trucks or sport utility vehicles) would be used to transport both people and supplies/equipment.

Well Plugging

The NPS goals and objectives in plugging a well, which have been refined for Big South Fork NRRA and Obed WSR, are:

1. To protect the zones of usable quality water and the surface by preventing the escape of oil, gas, or other fluids. To accomplish this
    a. Set cement plug(s) to isolate all formations bearing oil, gas, geothermal resources, and other prospectively valuable minerals from zones of usable-quality water.
    b. Set cement plug(s) to isolate all formations bearing usable-quality water.
2. To leave the surface in a clean and safe condition that sets the stage for surface reclamation. To accomplish this
    a. Set a cement plug to isolate the surface or intermediate casing from open hole below the casing shoe.
    b. Set a cement plug to seal the well at the surface.
    c. Remove surface casing below grade and cap the well.

Well with plug in place.

In accomplishing well plugging, standards including the use of methods that would not hamper or expand the subsequent site reclamation process would be required when conducting surface operations.

Design—Primarily, plugging activities would include re-disturbing only those areas along the access road and at the well site which are necessary to gain access for equipment and materials to complete the plugging. The NPS has adopted the minimum standards of the *Department of Interior's Onshore Oil and Gas Order Number 2, Section III.G, Drilling Abandonment* for plugging wells in parks (appendix K). The plugging requirements of Onshore Order No. 2 were written specifically for plugging newly drilled wells. However, the NPS has applied the same standards to the permanent abandonment of exhausted producers or service wells.

General Cementing Requirements—The plugging operation needs to include the general NPS requirements that are explained in appendix J for cement quality, cement volumes, cement placement, plugging fluids, static hole and testing plugs, and uncemented annular space. When NPS standards differ from state requirements, the stricter requirement to meet both state and federal standards would apply. The NPS may use or approve variations from these standards if the intent of a standard would be achieved to the degree that mechanical conditions of the well would allow. "A number of wells in the parks have missing or incomplete records and may require placement of continuous cement plugs over the upper portion of the well to ensure isolation and protection of usable quality water zones."

Public Health and Safety—Public health and safety concerns are limited to park visitors coming on location while plugging activities are ongoing. The NPS intends to close areas associated with the well site that are accessible to visitors while well plugging is ongoing. However, if people not associated with the well work should come on the location, workers/supervisors would direct them away.

Duration of Activities—A typical well plugging operation would last 2 to 5 days depending on equipment in the well, wellbore conditions, whether casing recovery is involved in the procedure, and number of plugs that need to be set. Most plugging jobs would be in the two to three day range from rig up to rig down.

Other Well Plugging Considerations—Precautions would be taken to prevent oil, brine, chemicals, cement, and other materials from contaminating the area and would include the effective use of plastic liners beneath the workover rig, pipe racks, fuel storage, and other equipment as necessary. All fluids and solids returned to the surface from the wellbore would be collected in tanks and disposed of back down the well (fluids only) or at an approved disposal site outside of the park. No water would be obtained from sources within the NPS property. Water needed during plugging would be transported to the site by a water truck.

Equipment— Equipment and materials to be used during the plugging operations consist of the following:

- Small pulling rig – typically one capable of only pulling single joints
- Cement mixing/pumping truck or trailer
- Bulk or sacked cement
- Water truck
- Tubing basket
- Winch truck

Heavy equipment used during oil and gas plugging operations.

- Personal vehicles
- Tanks for handling fluids/solids returned from the well

Reclamation

For surface reclamation, the 9B regulations state that the operator shall at a minimum return the area to natural conditions and processes, providing for safe use of the area by wildlife and park visitors, reestablishment of native vegetative communities, and normal surface and subsurface water flow (see 36 CFR 9.39(b)) The 9B regulations identify specific actions that need to be completed to satisfy the standard. These are:

1. Remove all above ground structures, equipment, and roads no longer needed for future operations.
2. Remove all other man-made debris that resulted from operations.
3. Remove or neutralize contaminating substances.
4. Restore the natural contour of the land.
5. Replace the natural soils needed for vegetation.
6. Reestablish native vegetative communities.

These actions provide an outline for a reclamation procedure. The reclamation procedure would further describe the methods and equipment that would be used to accomplish each of the required actions once a site-specific project is identified.

Contamination—If there is reason to suspect soils (or groundwater) have been contaminated, the NPS would require an operator to use site investigation methods to identify the area of contamination and associated concentrations of contaminants. Removal is usually a preferred method, but remediation on site can also be evaluated. Post cleanup work would typically involve obtaining and testing samples to verify that contaminating substances have been removed or neutralized (see appendix L, “Guidelines for Detection and Quantification of Contamination at Oil and Gas Operations”). Neutralization of contamination means that contaminant concentrations would be reduced in soils (or groundwater) to a condition that would not adversely affect, injure, or damage federally owned or controlled lands and waters; provides for the safe movement of native wildlife; and does not jeopardize visitor health and safety.

Restoring Natural Conditions—Pre-disturbance conditions would most often not be known with certainty; however, cut and fill areas of original road and pad construction would often be readily apparent. Surrounding plant communities are strong indicators of pre-disturbance vegetation conditions. Decisions on trying to return to original contours would take into consideration current conditions of plant communities and soils/slope stability and mineral ownership. If the access road may be needed for future private mineral access the road would be left in place, stabilized to prevent erosion, and re-seeded with native vegetation. Most well sites are in heavily forested areas where aesthetics would play a secondary role to functions and natural processes. If wetland areas have been directly or indirectly affected by operations, sites would be returned to their preexisting elevations. Soil, hydrology, and native vegetation communities would be restored as soon as practicable after completion of the plugging operation. Projects would implement Best Management Practices for wetlands as identified in NPS Procedures Manual 77-1, Appendix 2.

The reestablishment of native vegetative communities would generally be accomplished by seeding with native grasses and using straw mulch to help stabilize soils and retain moisture until grasses can become established. The grasses provide the early succession stage for native plant communities that surround the roads and pads. For smaller reclamation efforts, the NPS could blow leaf litter from the adjacent forest into disturbed areas to encourage the reintroduction of native plant seeds and supplement the mulch needed.

The reclamation procedure described previously would include provisions (methods and frequency) for monitoring, to determine success of revegetation efforts (e.g., species survival, native vegetation density and diversity, percent cover, etc.). Monitoring would identify problem areas which may require additional actions. Due to the likelihood of exotic plants becoming established in the reclamation areas, site monitoring would include monitoring for exotic species and in some cases follow-up treatment or control may be required.

Equipment—Typically, small earthmoving equipment (small dozer or backhoe) would be used to restore contours, remove pit contents if necessary, etc. Hand tools (shovels, rakes, etc.) would be used to finish the detail or work in areas where larger equipment would unnecessarily disrupt/damage existing vegetation. Seed and straw mulch would be distributed by hand within the pad and access routes. Personal vehicles (typically four-wheel drive pickup trucks or sport utility vehicles) would be used to transport both people and supplies/equipment. A small dump truck maybe be required if reclamation involves removal of contaminated soils. Access for monitoring would be by truck or off-road vehicle to the point where vehicles would negatively affect reclamation efforts (i.e., along roads and trails not being reclaimed), and then by foot.

Pulling rigs used during well reclamation activities.

Alternative Uses—Park managers may also identify alternative uses for the site that conform to parks' purposes and goals. For example, an access road and wellpad may be retained for administrative or recreational use. Different land uses would necessarily alter reclamation needs.

For Big South Fork NRRA, there are two instances where part or all of an access road may not be reclaimed following a specific plugging project. The road may be left in place as provided for in the GMP (see "Big South Fork National River and Recreation Area General Management Plan" section and figure 6 of chapter 1, as well as appendix E), or to provide access to additional wells that are either active or need to be plugged. In the latter case, these roads would eventually be reclaimed per the 9B regulations.

Determination of Subsequent Compliance Requirements

A decision tree (figure 7) would be used to confirm that future well plugging and reclamation projects comply with NEPA and other regulatory requirements (e.g., the *Endangered Species Act* and the *National Historic Preservation Act*). Park unit staff would confirm that a proposed plugging/reclamation project, and the associated effects have been considered by reviewing site-specific conditions and the impacts analyses in this plan/EIS. The park unit staff would also confirm whether environmental conditions have

or have not changed from what is presented in the plan/EIS. If a new method of plugging or reclamation (such as modified equipment needs or site preparation for reclamation) were developed and considered for use, the NPS must also determine whether these new methods are similar to ones already addressed in the plan/EIS and that the effects would also be similar. To assist project managers in determining the appropriate compliance needs a new environmental screening form would be filled out that is tailored to the site-specific well plugging and reclamation phase of these projects.

If a well plugging and reclamation project and its effects are determined to have been adequately addressed in this plan/EIS, the site-specific NEPA compliance document could be a memo to file. The memo would describe the site-specific impacts and explain why they are within the scope of impacts considered in this plan/EIS. If it is determined that a proposed well plugging and reclamation project and its effects are not addressed in this plan/EIS, preparation of an EA or EIS (depending on the extent of the impacts) would be required.

Other federal, state, and local laws may also have information requirements that overlap with NEPA. The compliance review would also confirm that the proposed project has addressed these other requirements. For example, when plugging and reclamation of a site is proposed in areas where sensitive species or their critical habitat is known to be present, criteria would be used to assist in selecting the appropriate actions and mitigation measures. The presence of state-listed species at well-plugging/reclamation sites would require consultation with the state, per NPS *Management Policies 2006*.

If plugging or reclamation activities could impact a federally listed species or its critical habitat, the NPS must comply with Section 7(a)(2) of the Endangered Species Act, which requires federal agencies to ensure their actions do not jeopardize the continued existence of federally listed species or adversely modify any critical habitat. Compliance with section 7(a)(2) requires consultation with the U.S. Fish and Wildlife Service (USFWS), during which the NPS must make an effects determination. This process involves an evaluation of the impacts to listed species and concludes with a determination of “no effect,” “not likely to adversely affect,” or “may affect.” The length and requirements of consultation may vary depending on the magnitude or complexity of the project (see “may affect” determinations below). Regardless of this fact, proposed activities cannot proceed until all consultation requirements have been met and the USFWS concurs, in writing, with the effects determination. A more detailed explanation of the Section 7 process can be found at the following website:
http://www.policyarchive.org/handle/10207/bitstreams/1560.pdf

For projects that meet the “no effect” or “not likely to adversely affect” determinations for federally listed species detailed in this document, the NPS could seek to establish a programmatic consultation agreement between the park units and the USFWS to address the requirements of Section 7 of the *Endangered Species Act*. Such an agreement would outline specific measures to protect listed species or their critical habitat (e.g., establishing buffers during sensitive times of the year to ensure protection of these species) and could act to expedite or streamline the Section 7 process. Ultimately, once the USFWS issues their concurrence on these determinations, these plugging and reclamation activities would not require further consultation, unless the review of site-specific projects identify changes that warrant further coordination (e.g., new species not detailed in this plan/EIS are present or the effects of the methods proposed are not covered). If a programmatic consultation agreement cannot be completed, the section 7 compliance requirements would be met on a case-by-case basis.

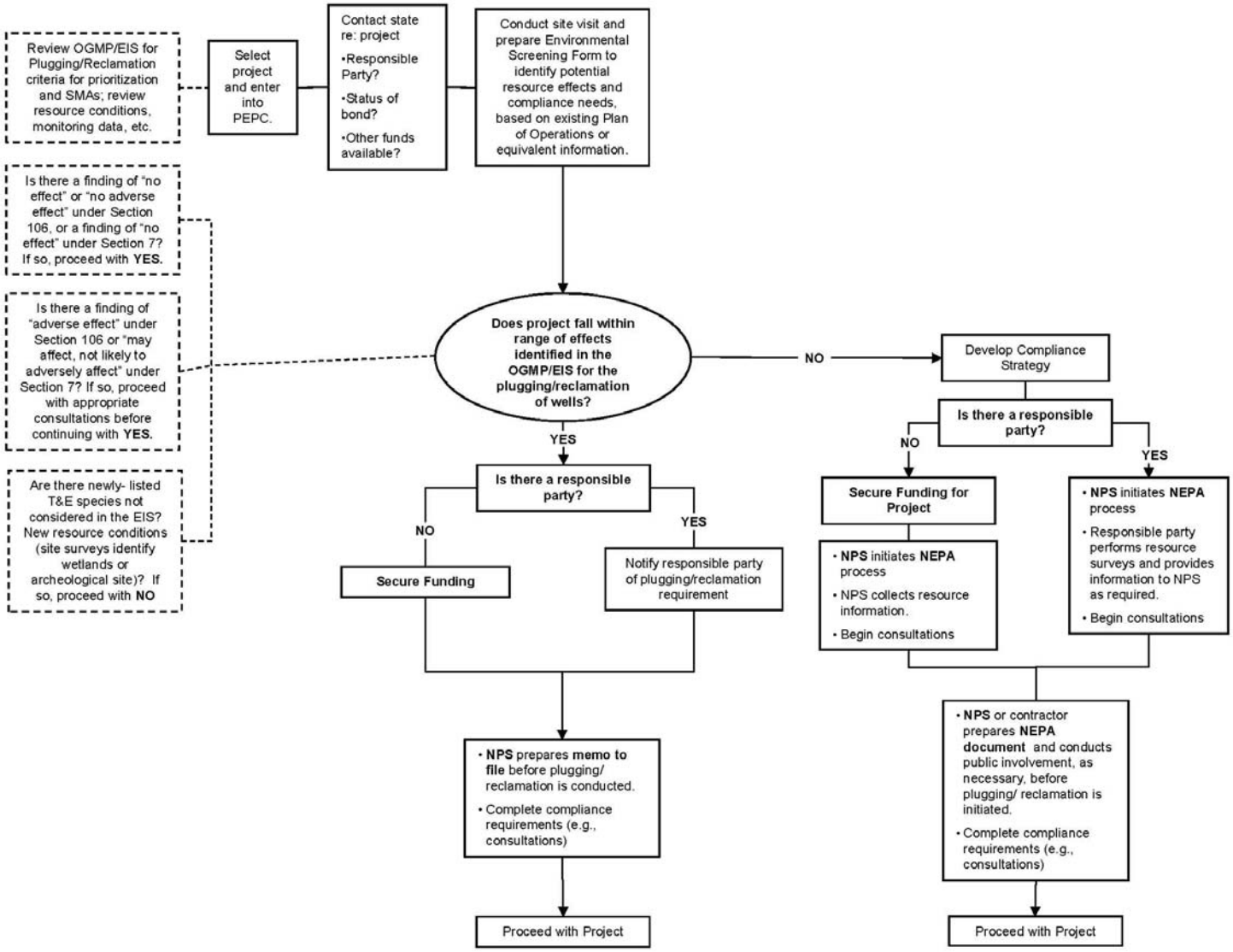


FIGURE 7. NEW MANAGEMENT FRAMEWORK DECISION TREE

Determinations of "may affect" for plugging and reclamation activities require formal consultation with the USFWS. Plugging and reclamation activities that require formal consultation would be addressed individually, and will require the preparation of a biological assessment if the NPS considers the proposed project a "major construction activity." The purpose of a biological assessment is to evaluate the effects of the proposed action on listed species or their critical habitat and this analysis will assist the NPS in making its effects determination. Should additional studies or research be required to complete the assessment, and that fieldwork have the potential to take a listed species, an Endangered Species Act, Section 10(a)(1)(A) recovery permit will be required.

If cultural resources are present, and could be affected by activities associated with plugging and reclamation, collaboration would occur between oil and gas program staff, cultural resource specialists, and other agencies (e.g., the State Historic Preservation Office), to determine the appropriate actions and mitigation measures to minimize, to the extent possible, any adverse impacts to those resources. As provided for in the implementing regulations (36 CFR 800) of the *National Historic Preservation Act,* a programmatic memorandum of agreement could also be developed among the park units, and other appropriate entities, such as Tribal Historic Preservation Officers, State Historic Preservation Offices, and the Advisory Council on Historic Preservation. This agreement would be consistent with the provisions of the 2008 Programmatic Agreement among the NPS, the Advisory Council on Historic Preservation, and the National Conference of State Historic Preservation Officers (NPS 2008e). It would define specific types of undertakings that the signatories of the agreement mutually concur would be excluded from further review beyond the park unit level. These stipulations would be based on information adequate to identify and evaluate affected cultural resources. Decisions regarding these undertakings would be made and carried out in conformity with applicable NPS policies, standards, and guidelines. This agreement would outline specific mitigation measures to ensure the identification, evaluation, and protection of National Register-eligible properties that would potentially be affected by future plugging and reclamation projects. The programmatic agreement would also identify special circumstances under which further compliance with section 106 would be necessary. If a programmatic memorandum of agreement cannot be completed, the section 106 compliance requirements would be met on a case-by-case basis.

ROAD STANDARDS

As noted for alternative A, road standards would be developed on a case-by-case basis with the operator. Minimum standards have been developed under alternative B and would be applied to existing and new roads, as well as roads developed for access to plug and reclaim a site. Depending on whether or not these roads are dedicated to oil and gas operations, or provide some sort of recreational or administrative access, the standards can differ substantially (see appendix E).

At a minimum, existing and future roads that only serve producing wells (i.e., no recreational or administrative access), or that would only provide access for future drilling operations, would be 8- to 18-foot wide "one-lane" roads with a 12- to 30-foot right-of-way. Surfaces would be dirt or gravel; shoulders would be no more than 1-foot (dirt or gravel); and the cleared height would be between 12 and 20 feet. Crowning, slopes, and ditches could be required on some roads as well. These roads would be equipped with locking gates to protect public health and safety. The NPS would be responsible for enforcing unauthorized use on these roads.

Road standards based on the Big South Fork GMP were also developed for the plugging and reclamation new management framework discussed under alternative B. In most cases, roads developed to provide access for plugging and reclamation (including road base and side ditches) would be limited to a width to accommodate the plugging equipment required, with adequate cleared height (based on the minimum standards) to allow equipment access. While access roads may be subject to frequent use by operators

when operations are active, the access roads would not be authorized for recreational trail use, unless access is on foot. The use of all-terrain vehicles in the park unit is an ongoing issue subject to management and enforcement actions.

If any of these routes are proposed for recreational uses, they would ultimately need to meet the standards described in the GMP for the proposed use (either during or after the operation) (see appendix E). Requirements for the use and maintenance of these roads would be the same as those identified under alternative A.

The minimum standards developed for Big South Fork NRRA would also be applied at Obed WSR. However, new access routes are not expected within Obed WSR under this alternative, taking into account current regulations, deed restrictions, and prohibitions within the gorge area.

INCREASED INSPECTIONS AND MONITORING

Site inspections and monitoring would be expanded beyond those activities conducted when problems and emergencies are reported, or when there are requests from operators. Current operations as well as new drilling, production, plugging, and reclamation activities would be more frequently monitored for compliance with the 9B regulations; consistency with the RFD scenario; compliance with the standards in the new management framework for plugging and reclamation activities; compliance with road standards; as well as other miscellaneous inspections (e.g., periodic stormwater testing and surveys for invasive plant species).

ACQUIRING MINERAL RIGHTS ON A CASE-BY-CASE BASIS

As mentioned under the no-action alternative, alternative A, per sections 8.7 and 8.7.3 of the NPS *Management Policies 2006*, the NPS may seek to acquire non-federal mineral rights on a case-by-case basis. Under the action alternatives, alternatives B and C, the NPS would amend the land protection plans for both park units to initiate a program to acquire funding for purchasing mineral rights from willing sellers in Big South Fork NRRA and Obed WSR.

PARK MANAGEMENT AND OPERATIONS

Administrative and Planning Responsibilities

It is expected that implementation of a comprehensive non-federal oil and gas management program under alternative B would enhance the ability of the Big South Fork NRRA and Obed WSR staff to respond to requests from operators, increasing their administrative and planning responsibilities. These responsibilities include providing guidance to operators developing plans of operations; reviewing plans of operations and preparing environmental compliance documents; reviewing proposed plugging and reclamation activities per the new management framework and subsequent environmental compliance; coordinating plugging and reclamation activities and providing oversight during such operations; and identifying responsible parties. To the extent possible, the NPS would use information presented in this plan/EIS, as well as the operators handbook for non-federal oil and gas development in units of the national park system (available on the web at http://www2.nature.nps.gov/geology/oil_and_gas/op_handbook.cfm), to minimize the administrative and planning responsibilities of both operators and the NPS. In addition, staff activities would include increased inspections/ monitoring and response to emergency situations.

Outreach and Education

Under alternative B, outreach and education related to non-federal oil and gas operations would be increased for operators at Big South Fork NRRA and Obed WSR. The NPS would offer training and workshops; provide information and helpful tools to operators by disseminating brochures and conducting presentations; as well as increase coordination and collaboration with the state, oil and gas associations, and operators, by working with them to integrate NPS-specific requirements into their training programs, and jointly participating in public and other meetings.

Staffing

Additional seasonal or term employees may be added to the current 3.6 FTEs to conduct activities associated with management of the nonfederal oil and gas operations in Big South Fork NRRA and Obed WSR under alternative B. Current positions include three positions (3 FTE) dedicated specifically to oil and gas management, including a geologist, oil and gas technician, and a physical science technician. In addition, part-time support is received from a biotech, wildlife biologist, archeologist, community planner, botanist, and resource management chief. These staff also assist with management of oil and gas operations at Obed WSR. The NPS Geologic Resources Division also provides support equivalent to that of approximately 0.4 FTEs. The additional seasonal or term staff could be added as needed to expand the inspection and monitoring program beyond the base operations level and would consist, for estimation purposes, of 1 FTE.

IMPLEMENTATION COSTS

The costs associated with alternative B would primarily include staff time for oversight of the non-federal oil and gas operations in Big South Fork NRRA and Obed WSR as described above. Based on input from park staff, the estimated costs of this staff time as well as miscellaneous costs are shown in table 6.

TABLE 6. COST ESTIMATE ALTERNATIVE B

Action	Assumptions	Annual Cost	Cost for the 15-Year Planning Period
Big South Fork NRRA Staff Time	An equivalent of approximately 3.6 full-time employees (current staff) plus an equivalent 1 FTE seasonal or term employee.	$276,697 plus $72,500 for seasonal or term employee(s) = $349,197	$5,237,955
Obed WSR Staff Time	Covered by Big South Fork NRRA staff.	$0	$0
Geologic Resources Division Staff Time	An equivalent of approximately 0.4 full-time employees, plus 35% for administrative and benefits overhead costs.	$48,000	$720,000
Miscellaneous Costs	Include equipment, vehicle, fuel, etc.	$10,000	$150,000
Total		**$407,197**	**$6,107,955**

ALTERNATIVE C: COMPREHENSIVE IMPLEMENTATION OF THE 9B REGULATIONS, A NEW MANAGEMENT FRAMEWORK FOR PLUGGING AND RECLAMATION, AND ESTABLISHMENT OF SPECIAL MANAGEMENT AREAS (PREFERRED ALTERNATIVE)

Alternative C is similar to alternative B, but adds designated SMAs and associated restrictions to provide additional protection to sensitive areas. SMAs would be applied to non-federal oil and gas operations as described in the following sections.

SPECIAL MANAGEMENT AREAS

In addition to the protected areas described under alternatives A and B, SMAs would be formally designated under alternative C. These include areas of Big South Fork NRRA and Obed WSR where resources and values would be particularly susceptible to adverse impacts from oil and gas operations, or areas where certain resources are important to maintaining the ecological integrity of the park units. SMA boundaries are illustrated in figures 8, 9 and 10. Under this alternative, surface use and timing stipulations have been developed for the SMAs for different types of non-federal oil and gas operations, as follows. These stipulations would be followed unless mitigation that specifically addresses the resource or value identified in the SMA and that would protect and enhance the resource or value is authorized in an approved plan of operations. Although specific setback distances are described, these do not represent a strict prescription. The actual distances for setbacks may vary depending upon the specifics of individual projects and resources found at the sites and may be modified to be either increased or decreased from the figures presented here. Note that the setbacks described in this document are measured from the outermost boundary of any operations.

- **Sensitive Geomorphic Feature SMA**—With the exception of plugging and reclamation activities, there would be No Surface Use in this SMA, which includes features such as arches, chimneys, natural bridges, falls, and windows (unless mitigations are approved in a plan of operations). A 500-foot setback would be required for geophysical exploration, drilling and production operations based on the sensitivity of the resource and the potential impacts from vibrations associated with proposed operations.
- **Cliff Edge SMA**—As with sensitive geomorphic features, there would be No Surface Use in this SMA with the exception of plugging and reclamation activities (unless mitigations are approved in a plan of operations). Generally, a 100-foot setback would be required for all oil and gas operations (exploration, drilling, or production) unless an operator can demonstrate that these activities would not negatively impact the associated resources (federally threatened, endangered, candidate and/or state-listed species); archeological resources; sites eligible for listing on the NRHP; and/or visitor experience at the location. Timing restrictions may be applied to drilling operations to minimize impacts to species of special concern, and to avoid impacts to soils from rutting.
- **Managed Fields SMA**—With the exception of geophysical exploration and plugging and reclamation activities, there would be No Surface Use in this SMA, which includes managed fields in the vicinity of private mineral interests (unless mitigations are approved in a plan of operations). Generally, there would be no setback for geophysical exploration. There would be a 100-foot setback for drilling and production.
- **SMAs for Visitor Use Areas, Administrative Areas, and Trails**—Although these SMAs were established for differing reasons (refer to table 4 earlier in this chapter), the stipulation assigned would be the same. With the exception of plugging and reclamation activities, No Surface Use

would be allowed in these areas, and setbacks would be required from the outer boundary of the SMA for geophysical exploration (500 feet) as well as drilling and production (1,500 feet) for visitor use and administrative areas and 300 feet for trails (unless mitigations are approved in a plan of operations). Even if operations are allowed in these areas through plans of operation, all operations would be limited during high visitor use or visitation periods (generally April through October) to minimize impacts to visitors, and drilling would only be allowed during dry periods to minimize impacts to soils from rutting.

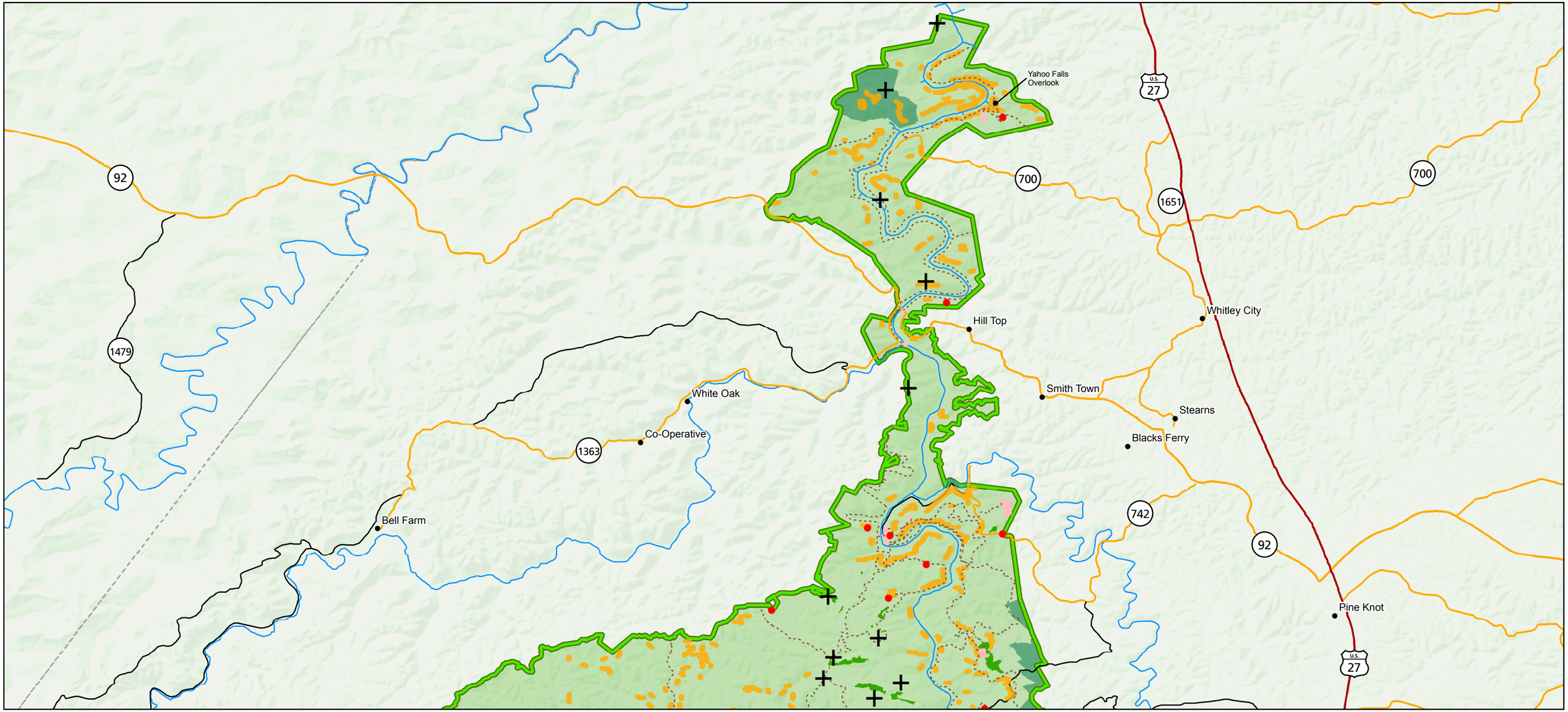
- **Cultural Landscape and Cemeteries SMA**—With the exception of plugging and reclamation activities, No Surface Use would be allowed in these areas, and setbacks would be required from the outer boundary of the SMA (unless mitigations are approved in a plan of operations). A 100-foot setback from cemeteries and a 1,500-foot setback from cultural landscapes would be required for all operations. All operations would be limited during high visitor use or visitation periods (generally April through October) to minimize impacts to visitors. Drilling would only be allowed during dry periods to minimize impacts to soils from rutting.
- **State Natural Area SMA**—No Surface Use would be allowed in the Honey Creek and Twin Arches state natural areas, with the exception of plugging and reclamation activities (unless mitigations are approved in a plan of operations). This would apply to exploration, drilling, and production operations.
- **Special Scenery SMA**—Park staff visited areas included in this SMA to evaluate the potential for impacts (specific examples of special scenery that could be included in this SMA include Twin Arches, Honey Creek Overlook, Angel Falls Overlook, Maude's Crack, Sawtooth, and Yahoo Falls). They determined that some of these areas could be affected by drilling and production operations, and that a viewshed analysis should be conducted during preparation of the plan of operations to evaluate the potential. The analysis would involve visiting and documenting a site proposed for oil and gas development with photographs, as well as recording the location using global positioning system (GPS) equipment. The location information would be entered into a geographic information system (GIS) database and evaluated electronically using a tool that would allow park managers to determine if the site lies within a viewshed that is visually sensitive to changes in the landscape. If so, the proposed location would become part of the Special Scenery SMA.

  Geophysical exploration would be allowed in this SMA at any time, while drilling activities in these areas would be limited during high visitor use periods (generally April through October). Production operations would be allowed in this SMA if the viewshed analysis indicates it would not impact the special scenery of an area.
- **Obed WSR SMA**—No Surface Use, with the exception of plugging and reclamation activities, would be allowed on any of the federal property within the boundaries of the Obed WSR.

These features are shown on figures 8 through 10 for Big South Fork NRRA. Federal lands within Obed WSR are shown on figure 5 in chapter 1.

Big South Fork National River and Recreation Area
Kentucky and Tennessee

National Park Service
U.S. Department of the Interior



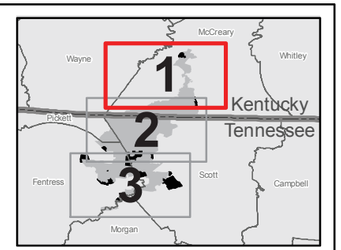
Legend

Figure 8. Special Management Areas in Big South Fork National River and Recreation Area (Map 1)

- U.S. Highway
- State Highways
- Roads
- Trails
- Sensitive Geomorphic Feature
- Park Boundary
- BISO Deferred Property
- Visitor Use / Administration Area
- Cemeteries
- County Boundary
- Managed Field
- Cliff Edge
- State Natural Area

N

0 2 4 Mi.



Big South Fork National River and Recreation Area
Kentucky and Tennessee

National Park Service
U.S. Department of the Interior

Great Meadow
Bear Creek Overlook
Foster Crossroads
Station Camp
154
Sharp Place
Bandy Creek Visitor Center
West Entrance
297
Black Oak
Park Headquarters
U.S. 27
Oneida

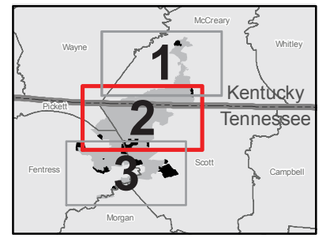
Legend

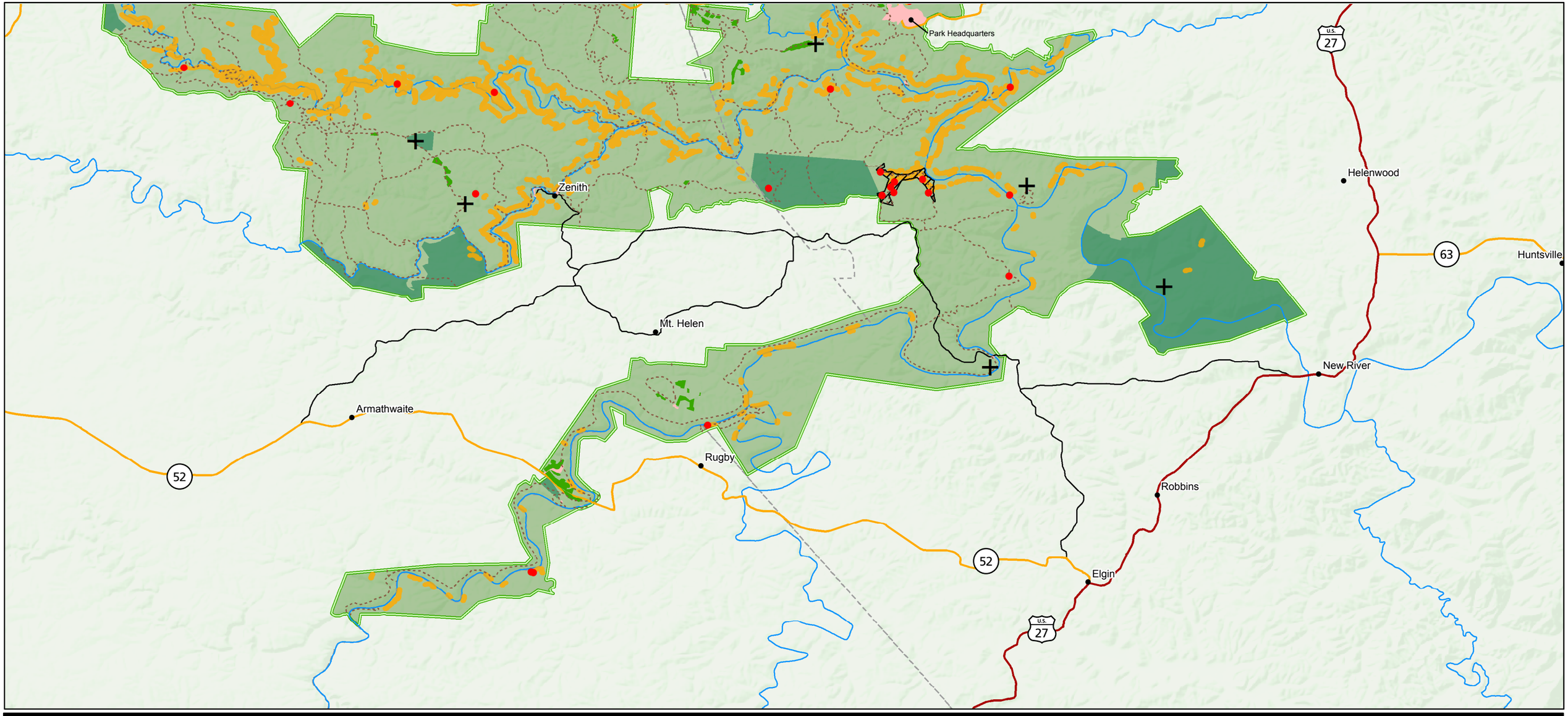
Figure 9. Special Management Areas in Big South Fork National River and Recreation Area (Map 2)

- U.S. Highway
- State Highways
- Roads
- Trails
- Sensitive Geomorphic Feature
- Park Boundary
- BISO Deferred Property
- Visitor Use / Administration Area
- Cemeteries
- County Boundary
- Managed Field
- Cliff Edge
- State Natural Area

N

0 2 4 Mi.





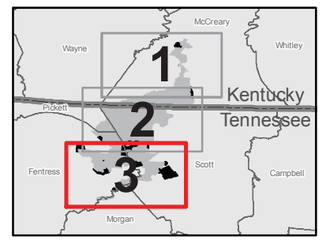
Legend

Figure 10. Special Management Areas in Big South Fork National River and Recreation Area (Map 3)

- U.S. Highway
- State Highways
- Roads
- Trails
- Sensitive Geomorphic Feature
- Park Boundary
- BISO Deferred Property
- Visitor Use / Administration Area
- Cemeteries
- County Boundary
- Managed Field
- Cliff Edge
- State Natural Area

N

0 2 4 Mi.



CURRENT OPERATIONS

Under alternative C, the NPS would proactively contact current operators and pursue 9B enforcement and plans of operations as described for alternative B. Priorities for enforcement would be set considering (in no particular order)

- environmental/health and safety issues at well sites;
- the presence of abandoned wells; the extent of an operator's property interest in the park units;
- the location of a well relative to producing areas;
- road conditions;
- proximity to an SMA; and
- status of compliance with state regulations.

The NPS would continue to work cooperatively with the state on regulations or enforcement, but increased inspections and monitoring would proactively identify sites that are found to be impacting, or threatening to impact, park resources beyond the operations area (see section on "Inspections and Monitoring" for this alternative). The 9B regulations would be enforced at any such sites, and operations found to pose a significant threat to federally owned or controlled lands or waters shall be suspended by the superintendent until the threat is removed or remedied (see 36 CFR 9.33 and 9.51).

It is assumed that 125 wells at Big South Fork NRRA and two wells at Obed WSR could be worked over or serviced under this alternative, as staffing limitations and resources allow for review of the proposed projects.

NEW OPERATIONS

As with alternative A, the RFD scenario presented in this plan/EIS would apply to alternative C. Geophysical exploration (2-D seismic surveys) could be conducted as described above, and up to 25 wells (0 to 20 in Big South Fork NRRA, 5 with surface locations outside the park, and 0 to 5 at Obed WSR directionally drilled from locations outside the park unit) could be drilled in the park units over the next 15 to 20 years. New operations would be subject to CLPRs, including 9B regulations and the requirements for a plan of operations. The park would use the oil and gas management planning process to proactively share information with operators about regulatory requirements and to focus staff resources on the implementation and compliance with the regulatory framework. The park would share information with the operators such as example plans of operation and EAs, which should help facilitate the process. New surface disturbances in Big South Fork NRRA and Obed WSR would be minimized by using directional drilling techniques and by conducting operations on previously disturbed areas if possible.

In addition to the protected areas identified by CLPRs for the Big South Fork NRRA and Obed WSR, as described for alternatives A and B, new operations would require consideration of the SMAs listed previously. SMAs could apply to all new operations unless an operator demonstrates this would prevent reasonable access to a mineral estate. The NPS would require an operator to provide information to support such a conclusion, and would evaluate the application of the SMAs relative to the proposed operation on a case-by-case basis. Operating stipulations described below could be modified, and protected areas could be larger or smaller, 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. Mitigation that would specifically address and protect the resource and/or value of the SMA would be included and authorized

in an approved plan of operations. Also, the acreage of private mineral rights affected by protected areas, including SMAs, under this alternative is approximate. The totals do not include any areas deemed eligible for the Special Scenery SMA or potential modifications to other SMAs, both of which would be addressed on a case-by-case basis during the preparation of plans of operations.

Geophysical exploration would not be allowed in any of the SMAs, or the associated setbacks, at Big South Fork NRRA, with the exception of the Special Scenery SMA, unless authorized in an approved plan of operations. However, while an approved plan of operations could relax SMA restrictions, it would not supersede applicable statutes such as gorge restrictions and deed restrictions.

Timing stipulations for geophysical operations would apply in the SMAs for visitor use/administrative areas, trails, and cemeteries. At Obed WSR, all federal property within the boundaries of the park unit would be subject to No Surface Use at all times of the year. As a result, SMAs could prohibit exploration operations on up to approximately 10,943 acres of minerals at Big South Fork NRRA and 3,712 acres at Obed WSR. This total does not include any areas deemed eligible for the Special Scenery SMA which would be addressed on a case-by-case basis during the preparation of plans of operation.

Drilling and production would not be allowed in any of the SMAs or the associated setbacks at Big South Fork NRRA, unless authorized in an approved plan of operations. However, while an approved plan of operations could relax SMA restrictions, it would not supersede applicable statutes such as gorge restrictions and deed restrictions. As with geophysical exploration, timing stipulations for drilling and production would apply in the SMAs for visitor use/administrative areas, trails, and cemeteries at this park unit. Timing stipulations would also apply in the Special Scenery SMA for drilling operations. Production activities would be allowed in the Special Scenery SMA based on the outcome of the viewshed analysis required under this alternative. At Obed WSR, all federal property within the boundaries of the park unit would be subject to No Surface Use at all times of the year. As a result, SMAs could protect approximately 11,587 acres of private mineral lands present at Big South Fork NRRA and 3,712 acres at Obed WSR. It should be noted, however, that this acreage number does not include the contribution from Special Scenery SMAs, as these would need to be evaluated on a case-by-case basis for each proposed operation. None of the area where exploration, drilling, or production may be limited occurs on private lands found within the boundary of Big South Fork NRRA or Obed WSR.

As with alternative B, the NPS would continue to work cooperatively with the state on regulations or enforcement, but increased inspections and monitoring would proactively identify sites that are found to be impacting, or threatening to impact, park resources beyond the operations area (see section on “Inspections and Monitoring” for this alternative). The 9B regulations would be enforced at any such sites, and operations found to pose a significant threat to federally owned or controlled lands or waters shall be suspended by the superintendent until the threat is removed or remedied (see 36 CFR 9.33 and 9.51).

PLUGGING AND RECLAMATION

Plugging and reclamation activities under alternative C would be the same as those described for alternative B, using the new management framework as a tool to streamline the process (see discussion of framework, decision tree, and compliance under alternative B). It is assumed that about 50 wells at Big South Fork NRRA and 5 wells at Obed WSR would be plugged and associated sites reclaimed under this alternative. The activities that would be undertaken as part of plugging and reclamation under the new management framework would be the same as those described for alternative B. This includes the criteria that would be used to prioritize sites identified as candidates for plugging, as well as the details of each component of the process, including gaining access, plugging, and reclaiming a site. However, under alternative C, the NPS would also consider the proximity of a well site to an SMA when prioritizing those

for plugging and reclamation. Equipment needs and standards for specific activities associated with each component would be the same. Please see the discussion in alternative B, as well as the detailed information and examples provided in appendix J for more specific information.

ROAD STANDARDS

Minimum standards under alternative C would be the same as those described for alternative B. The minimum standards developed for Big South Ford NRRA would also be applied at Obed WSR. However, new access routes are not expected within Obed WSR under this alternative, taking into account current regulations, deed restrictions, prohibitions within the gorge area, as well as establishment of the unit as a SMA with no surface use allowed under alternative C. While access roads may be subject to frequent use by operators when operations are active, the access roads would not be authorized for recreational trail use, unless access is on foot. The use of all-terrain vehicles in the park unit is an ongoing issue subject to management and enforcement actions.

INCREASED INSPECTIONS AND MONITORING

The monitoring approach described under alternative B would also guide increased inspections and monitoring activities under alternative C.

ACQUIRING MINERAL RIGHTS ON A CASE-BY-CASE BASIS

The acquisition of mineral rights under alternative C would include initiation of a program to acquire funding for purchasing mineral rights, as described for alternative B. In addition, the NPS would create a priority order of which rights to acquire based on:

- willing sellers
- sensitivity of resources
- size of the area
- economic feasibility
- available funding.

PARK MANAGEMENT AND OPERATIONS

Administrative and Planning Responsibilities

Administrative and planning responsibilities under alternative C would be the same as those described for alternative B.

Outreach and Education

Outreach and education programs under alternative C would be the same as those described for alternative B.

Staffing

Staffing under alternative C would be the same as described for alternative B, and would include approximately 3.6 FTEs at Big South Fork NRRA and the equivalent of approximately 0.4 FTEs at the NPS Geologic Resources Division to manage oil and gas operations at both park units, plus additional

seasonal or term staff could be added as needed to expand the inspection and monitoring program beyond the base operations level. The additional staff would consist, for estimation purposes, of 1 FTE.

IMPLEMENTATION COSTS

The costs associated with alternative C would primarily include staff time for oversight of the non-federal oil and gas operations in the park as described above. The estimated cost of this staff time and other miscellaneous costs would be the same as described for alternative B and are shown in table 7.

TABLE 7. COST ESTIMATE ALTERNATIVE C

Action	Assumptions	Annual Cost	Cost for the 15-Year Planning Period
Big South Fork NRRA Staff Time	An equivalent of approximately 3.6 full-time employees (current staff) plus an equivalent 1 FTE seasonal or term employee.	$276,697 plus $72,500 for seasonal or term employee(s) = $349,197	$5,237,955
Obed WSR Staff Time	Covered by Big South Fork NRRA staff.	$0	$0
Geologic Resources Division Staff Time	An equivalent of approximately 0.4 full-time employees, plus 35% for administrative and benefits overhead costs.	$48,000	$720,000
Miscellaneous Costs	Include equipment, vehicle, fuel, etc.	$10,000	$150,000
Total		**$407,197**	**$6,107,955**

HOW ALTERNATIVES MEET OBJECTIVES

As stated in the “Purpose of and Need for Action,” all action alternatives selected for analysis must meet all objectives to a large degree. The action alternatives must also address the stated purpose of taking action and resolve the need for action; therefore, the alternatives were individually assessed in light of how well they would meet the objectives for this plan and EIS (refer to “Chapter 1: Purpose of and Need for Action”). Alternatives that did not meet the objectives were not analyzed further (see the “Alternatives Eliminated from Further Consideration” section in this chapter).

Table 8 compares the alternatives by summarizing the elements being considered, and table 9 compares how each of the alternatives described in this chapter would meet the plan objectives. Table 10 presents a brief summary of the impacts of each alternative by impact topic. These impacts are more thoroughly described in “Chapter 4: Environmental Consequences.”

TABLE 8. COMPARISON OF ALTERNATIVES

	Alternative A: No Action	Alternative B: Comprehensive Implementation of 9B Regulations and a New Management Framework for Plugging and Reclamation	Alternative C: Comprehensive Implementation of 9B Regulations, a New Management Framework for Plugging and Reclamation, and Establishment of Special Management Areas (Preferred Alternative)
General			
Current Legal and Policy Requirements	All non-federal oil and gas operations in national park system units are subject to CLPRs that are based on federal and state laws, regulations, federal executive orders, NPS policies, and applicable direction provided in NPS planning documents.	Same as alternative A, but with proactive management including increased/enhanced enforcement and inspections /monitoring.	Same as alternative B.
Forecast of Oil and Gas Activities			
Geophysical Exploration	Small-scale, occasional geophysical surveys.	Same as alternative A.	Same as alternative A.
Drilling and Production	Big South Fork NRRA: 0–20 wells (5 with surface locations outside the park). Obed WSR: 0–5 wells directionally drilled from outside the park unit.	Same as alternative A.	Same as alternative A.
Well Workover/ Servicing	About 125 wells	Same as alternative A.	Same as alternative A.
Plugging and Reclamation	Big South Fork NRRA: approximately 50 additional wells Obed WSR: 5 wells	Same as alternative A.	Same as alternative A.
Approximate Area of Disturbance	Geophysical Exploration: none Drilling and Production: • Big South Fork NRRA: 0–48 acres inside the park • Obed WSR: 0 acres inside the park	Same as alternative A.	Same as alternative A.
Approximate Area Reclaimed	Big South Fork NRRA: 80 acres Obed WSR: 7 acres	Same as alternative A.	Same as alternative A.

TABLE 8. COMPARISON OF ALTERNATIVES

	Alternative A: No Action	Alternative B: Comprehensive Implementation of 9B Regulations and a New Management Framework for Plugging and Reclamation	Alternative C: Comprehensive Implementation of 9B Regulations, a New Management Framework for Plugging and Reclamation, and Establishment of Special Management Areas (Preferred Alternative)
Totals	Big South Fork NRRA: disturbances reduced by 32 to 80 acres Obed WSR: disturbances reduced by 7 acres	Same as alternative A	Same as alternative A.
Designated Areas / Operating Stipulations[1]			
Protected Areas Per CLPRs	**Big South Fork NRRA Designated Gorge:** • Exploration, drilling, and production prohibited **Big South Fork NRRA Long-term monitoring plots[2]:** • Avoid impacts; address in plans of operations **Obed WSR Deed Restrictions:** • Some deed restrictions require No Surface Use prohibiting exploration, drilling, and production on federal lands[2] **Visitor Use, Administrative, and Other Use Areas with 500-foot Setback Per 9B regulations:** • No Surface Use (exploration, drilling, and production) **Federally Listed Species and their Critical Habitats** • Avoid impacts; address in plans of operations **Waterways with 500-foot Setback Per 9B regulations:** • No Surface Use (exploration, drilling, and production)	Same as alternative A.	Same as alternative A.

TABLE 8. COMPARISON OF ALTERNATIVES

	Alternative A: No Action	Alternative B: Comprehensive Implementation of 9B Regulations and a New Management Framework for Plugging and Reclamation	Alternative C: Comprehensive Implementation of 9B Regulations, a New Management Framework for Plugging and Reclamation, and Establishment of Special Management Areas (Preferred Alternative)
Special Management Areas[3]	Not applicable	Not applicable	**Big South Fork NRRA—the following would be protected as noted unless other mitigation that protects SMA resources and values is included and authorized in an approved plan of operations.** **Sensitive Geomorphic Feature SMA with 500-foot setback:** • No Surface Use (exploration, drilling, and production) **Cliff Edge SMA with 100-foot setback):** • No Surface Use (exploration, drilling, and production) • Drilling would only be allowed during dry periods **Managed Field SMA with 100-foot setback:** • No Surface Use (exploration, drilling, and production) • Setback only applies to drilling and production **SMAs with Setbacks for Visitor Use/ Administrative Areas, and Trails** • **Visitor Use and Administrative Areas:** - 500-foot setback for geophysical exploration - 1,500-foot setback for drilling and production • **Trails:** - 300 foot setback for all operations • **All:** - No Surface Use (exploration, drilling, and production) in SMA or setbacks - All operations would be limited during high visitor use or visitation periods (generally April through October) - Drilling would only be allowed during dry periods

TABLE 8. COMPARISON OF ALTERNATIVES

	Alternative A: No Action	Alternative B: Comprehensive Implementation of 9B Regulations and a New Management Framework for Plugging and Reclamation	Alternative C: Comprehensive Implementation of 9B Regulations, a New Management Framework for Plugging and Reclamation, and Establishment of Special Management Areas (Preferred Alternative)
Special Management Areas (continued)			**Cultural Landscapes and Cemetery SMA:** • 100-foot setback from cemeteries for all operations • 1,500-foot setback from cultural landscapes for all operations • No Surface Use (exploration, drilling, and production) in SMA or setbacks • All operations would be limited during high visitor use or visitation periods (generally April through October) • Drilling would only be allowed during dry periods **State Natural Area SMA:** • No Surface Use (exploration, drilling, and production) would be allowed in state natural areas **Special Scenery SMA[2]:** • Geophysical exploration would be allowed at any time • Drilling activities limited during high visitor use periods (generally April through October) • Requires viewshed analysis for production activities. This would be a GIS analysis that would allow park managers to determine if the site lies within a viewshed that is visually sensitive to changes in the landscape. If so, the proposed location would become part of the Special Scenery SMA. **Obed WSR** **Obed WSR SMA:** • No Surface Use (exploration, drilling, and production) would be allowed on any of the federal property within the boundaries of the Obed WSR (per existing deed restriction)

TABLE 8. COMPARISON OF ALTERNATIVES

	Alternative A: No Action	Alternative B: Comprehensive Implementation of 9B Regulations and a New Management Framework for Plugging and Reclamation	Alternative C: Comprehensive Implementation of 9B Regulations, a New Management Framework for Plugging and Reclamation, and Establishment of Special Management Areas (Preferred Alternative)
Total Acreage of Private Mineral Rights with Operating Stipulations[4]	Big South Fork NRRA: 8,413 acres (all operations) Obed WSR: 3,712 acres	Big South Fork NRRA: 8,413 acres (all operations) Obed WSR: 3,712 acres	Big South Fork NRRA: • Geophysical – 10,943 acres • Drilling and production – 11,587 acres • Obed WSR: 3,712 acres
Current Operations			
Management	As staffing allows, current non-federal oil and gas operations managed on a case-by-case basis per 9B regulations and other CLPRs.	Proactively pursue 9B enforcement and plans of operations from current operators; seek out operators and proactively provide information and clearly communicate regulatory requirements.	Same as alternative B.
Inspections/ Monitoring	Limited to base workload and focused on when problems are identified or emergencies are reported.	Site inspections and monitoring would be increased to more proactively assess problem areas.	Same as alternative B.
Enforcement	NPS enforces 9B regulations, or requests state enforcement of the State's regulations, where sites are found to be impacting, or threatening to impact, park resources beyond the operations areas.	The NPS would continue to work cooperatively with the state on regulations or enforcement, but increased inspections and monitoring would proactively identify sites that are found to be impacting, or threatening to impact, park resources beyond the operations area during inspections and monitoring. Priorities for enforcement would be set considering environmental/health and safety issues at well sites; the presence of abandoned wells; the extent of an operator's property interest in the park units; wells located in producing areas; road conditions; and status of compliance with state regulations.	Same as alternative B.

TABLE 8. COMPARISON OF ALTERNATIVES

	Alternative A: No Action	Alternative B: Comprehensive Implementation of 9B Regulations and a New Management Framework for Plugging and Reclamation	Alternative C: Comprehensive Implementation of 9B Regulations, a New Management Framework for Plugging and Reclamation, and Establishment of Special Management Areas (Preferred Alternative)
New Operations			
Management	New non-federal oil and gas operations managed on a case-by-case basis per 9B regulations and other CLPRs, including requirements for a plan of operations.	The park would use the oil and gas management planning process to proactively share information with operators about regulatory requirements and to focus staff resources on the implementation and compliance with the regulatory framework. The park would share information with the operators such as example plans of operation and EAs, which should help facilitate the process.	Same as alternative B.
Inspections/Monitoring	Limited to base workload and focused on when problems are identified or emergencies are reported.	Site inspections and monitoring would be increased to more proactively assess problem areas.	Same as alternative B.
Enforcement	NPS would enforce 9B regulations, or request state enforcement of their regulations, where sites are found to be impacting, or threatening to impact, park resources beyond the operations areas.	The NPS would continue to work cooperatively with the state on regulations or enforcement, but increased inspections and monitoring would proactively identify sites that are found to be impacting, or threatening to impact, park resources beyond the operations area during inspections and monitoring.	Same as alternative B.
Plugging and Reclamation			
Standards	Guided by the 9B or state regulations, as appropriate, as well as an approved plan of operations, if available.	Same as alternative A, plus substantial numbers of wells could be plugged and associated sites reclaimed based on the standards associated with the new management framework.	Same as alternative B.

TABLE 8. COMPARISON OF ALTERNATIVES

	Alternative A: No Action	Alternative B: Comprehensive Implementation of 9B Regulations and a New Management Framework for Plugging and Reclamation	Alternative C: Comprehensive Implementation of 9B Regulations, a New Management Framework for Plugging and Reclamation, and Establishment of Special Management Areas (Preferred Alternative)
Management	Priorities for plugging and reclamation would be determined based on certain criteria, such as environmental/health and safety issues, and access to the site. NPS would provide onsite oversight to ensure standards are met. Administrative processes applied on case-by-case basis.	• Sites would be prioritized for plugging and reclamation based on environmental threats (including contamination); health and safety issues; access; mechanical conditions (deterioration and subsidence); proximity to the gorge; desired conditions and settings in GMP zones; cost; funding availability; and responsible party information. • NPS provides on-site oversight to ensure standards are met. • Administrative burden reduced by new management framework.	Same as alternative B, plus SMAs would be considered when prioritizing wells for plugging and reclamation.
Compliance	Environmental compliance for these site-specific operations would be conducted on a case-by-case basis in both park units.	As part of new management framework: • Complete a new environmental screening form for the site-specific well plugging and reclamation phase of these projects, and confirm if they are considered, along with potential impacts, in the OGMP/EIS. • Review site-specific conditions and confirm if they are considered, along with potential impacts, in the OGMP/EIS. • Confirm whether environmental conditions have or have not changed from what is presented in the OGMP/EIS. • Assess whether or not new methods and their effects are similar to ones already addressed in the OGMP/EIS and determine appropriate NEPA pathway.	Same as alternative B.

TABLE 8. COMPARISON OF ALTERNATIVES

	Alternative A: No Action	Alternative B: Comprehensive Implementation of 9B Regulations and a New Management Framework for Plugging and Reclamation	Alternative C: Comprehensive Implementation of 9B Regulations, a New Management Framework for Plugging and Reclamation, and Establishment of Special Management Areas (Preferred Alternative)
Park Operations and Management			
Staffing	Approximately 3.6 FTEs at Big South Fork NRRA would cover oil and gas management at both park units. NPS Geologic Resources Division support equivalent to that of approximately 0.4 FTEs.	Same as alternative A, plus additional seasonal or term staff equivalent to 1 FTE.	Same as alternative B.
Program Activities	Inspections/monitoring; response to emergency situations; review of plans of operations; preparation of environmental compliance documents for plans of operations, as well as plugging and reclamation activities; coordinating plugging and reclamation activities and providing oversight during such operations; and other miscellaneous activities (e.g., coordinating with the state and non-federal oil and gas operators).	Same as alternative A, plus increased monitoring.	Same as alternative B.

[1]Operating stipulations may be modified 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 protected areas or SMAs. Setbacks for visitor use, administrative, and other use areas and waterways would be applied, unless other measures are specifically authorized by an approved plan of operations, as per 36 CFR 9.41(a). There may be surface use allowed if mitigations are approved in a plan of operations. However, while an approved plan of operations could relax or extend SMA restrictions, it would not supersede applicable statutes such as gorge restrictions and deed restrictions.

[2]The area covered by this protected area/SMA has not been mapped and would be determined on a case-by-case basis during scoping and preparation of a plan of operations for specific projects.

[3]Acreages are based on designated setbacks, which could vary depending upon how individual projects are implemented and may be modified to increased or decreased distances.

[4]The total area with operating stipulations excludes overlap between protected areas and/or SMAs.

TABLE 9. SUMMARY OF HOW ALTERNATIVES MEET PROJECT OBJECTIVES

Objective	Alternative A: No Action	Alternative B: Comprehensive Implementation of 9B Regulations and a New Management Framework for Plugging and Reclamation	Alternative C: Comprehensive Implementation of 9B Regulations, a New Management Framework for Plugging and Reclamation, and Establishment of Special Management Areas (Preferred Alternative)
General			
Identify and protect resources from adverse impacts from oil and gas operations.	Partially meets objective. Resources are not specifically identified until a plan of operations is submitted, and protection is dependent on reporting by the state and resolution of problems as they arise, not regular monitoring and enforcement.	Meets objective to a large degree. Proactive management would identify resources and clearly communicate resource conditions and protection requirements to the operators.	Fully meets objective. Same as alternative B plus early identification of and specified protection for sensitive areas identified as SMAs.
Provide owners and operators of private oil and gas rights reasonable access for exploration, production, maintenance, and surface reclamation.	Fully meets objective. Oil and gas operators may conduct operations in accordance with CLPR.	Fully meets objective. Oil and gas operators may conduct operations in accordance with CLPR.	Meets objective to a large degree. Oil and gas operators may conduct operations in accordance with CLPR and also SMA restrictions, although directional drilling or additional mitigation may be required.
Water Resources			
Protect and enhance water resources.	Partially meets objective. Water resources are protected in accordance with CLPRs, but no proactive monitoring or improved plugging approval process; would not enhance current conditions.	Meets objective to a large degree. Same as alternative A, plus proactive management would identify problems and possible releases before substantial damage occurs; well plugging would remove potential source of contamination.	Fully meets objective. Same as alternative B, with potential added protection for sensitive water resources that may fall in SMAs such as State Natural Areas SMA and protection of cliff edges that prevents runoff into streams below.

TABLE 9. SUMMARY OF HOW ALTERNATIVES MEET PROJECT OBJECTIVES

Objective	Alternative A: No Action	Alternative B: Comprehensive Implementation of 9B Regulations and a New Management Framework for Plugging and Reclamation	Alternative C: Comprehensive Implementation of 9B Regulations, a New Management Framework for Plugging and Reclamation, and Establishment of Special Management Areas (Preferred Alternative)
Vegetation/Wildlife/Species of Special Concern			
Protect species of management concern and critical habitat from adverse effects of oil and gas operations.	Partially meets objective. These resources would be protected by compliance with CLPR on a case-by-case basis, but the lack of inspections and enforcement and existing abandoned wells and roads present risks to wildlife and have adversely affected site vegetation.	Meets objective to a large degree. Same as alternative A, plus proactive management would identify problems and possible impacts before substantial damage occurs; well plugging would remove potential source of contamination.	Fully meets objective. Same as alternative B, with potential added protection for sensitive species in SMAs such as Cliff Edge SMA (harbors sensitive species), Sensitive Geomorphic Feature SMA (rare vegetation locales), Managed Field SMA.
Visitor Experience, Conflicts, and Safety			
Prevent, minimize, or mitigate conflicts between oil and gas operations and visitor use.	Partially meets objective. Mitigation would be provided on a case-by-case basis based on CLPRs.	Meets objective to a large degree. Proactive management would identify and mitigate conflicts and clearly communicate requirements to the operators.	Fully meets objective. Same as alternative B, with potential added mitigation to protect SMAs and buffers (e.g., Visitor Use and Trails SMAs) and to identify these up front.
Protect human health and safety from oil and gas operations.	Partially meets objective. Health and safety would be protected by compliance with CLPR on a case-by-case basis, but the lack of inspections and enforcement and existing abandoned wells and roads present risks to visitors.	Fully meets objective. Same as alternative A, plus proactive management would identify problems and possible leaks or unsafe conditions; well plugging would remove potential source of contamination and gases, and hazardous wellhead equipment.	Fully meets objective. Essentially same as alternative B, with slightly more protection due to segregation of operations from visitors in certain areas (buffers).
Cultural Resources			
Protect cultural resources, including those on/or eligible for listing on the NRHP.	Partially meets objective. Mitigation would be provided on a case-by-case basis based on CLPRs and all operations would go through Section 106 compliance, but some damage could result from existing operations.	Partially meets objective. Proactive management would identify and mitigate potential impacts and clearly communicate requirements to the operators; well plugging would remove potential source of contamination and visual blight.	Meets objective to a large degree. Same as alternative B, with potential added mitigation to protect SMAs and buffers associated with cultural landscapes.

TABLE 9. SUMMARY OF HOW ALTERNATIVES MEET PROJECT OBJECTIVES

Objective	Alternative A: No Action	Alternative B: Comprehensive Implementation of 9B Regulations and a New Management Framework for Plugging and Reclamation	Alternative C: Comprehensive Implementation of 9B Regulations, a New Management Framework for Plugging and Reclamation, and Establishment of Special Management Areas (Preferred Alternative)
Park Management and Operations			
Provide pertinent guidance to operators to facilitate planning and compliance with NPS regulations.	Partially meets objective. Guidance and information is provided to operators on a case-by-case basis when plans of operations are submitted or problem is reported; there is no comprehensive management plan to facilitate dissemination of information and, and protection is dependent on reporting by the state and resolution of problems as they arise, not regular monitoring and enforcement.	Fully meets objective. Proactive management would identify resources and clearly communicate resource conditions and protection requirements to the operators. Management plan would provide operators with up front and consistent guidance prior to project planning.	Fully meets objective. Same as alternative B.
Establish an efficient process under NEPA for plugging wells and reclaiming well sites and access roads	Does not meet objective. There is no new management framework for well plugging under the no action alternative.	Fully meets objective. Includes a new management framework for well plugging and reclamation that is designed to streamline the process and make plugging more efficient for NPS staff and operators.	Fully meets objective. Same as alternative B.

TABLE 10. SUMMARY OF ENVIRONMENTAL CONSEQUENCES

Impact Topic	Alternative A: No Action	Alternative B: Comprehensive Implementation of 9B Regulations and a New Management Framework for Plugging and Reclamation	Alternative C: Comprehensive Implementation of 9B Regulations, a New Management Framework for Plugging and Reclamation, and Establishment of Special Management Areas (Preferred Alternative)
Geology and Soils Direct/indirect effects	**Geophysical** – localized, short-term negligible adverse impacts from soil compaction and vibration. **Drilling and production** (in park and directionally drilled wells) – localized short- and long-term minor to moderate adverse impacts from possible release of hydrocarbons, produced waters, or treatment chemicals and pad construction; possible major adverse impacts in the unlikely event of a well blowout, fire, or major release. **Plugging and reclamation** (all wells) – short-term negligible to minor adverse impacts from ground disturbance with long-term beneficial impacts from site reclamation, removal of contamination, and erosion control.	**Geophysical** – same as alternative A. **Drilling and production** – localized short- and long-term minor adverse impacts; reduced chance of major adverse impacts due to increased monitoring and inspections. **Plugging and reclamation** – same as alternative A with greater chance of completion sooner due to new well plugging management framework.	**Geophysical** – same as alternative A; more upfront protection in certain SMAs. **Drilling and production** – localized short- and long-term negligible to minor adverse impacts; similar to alternative B but with SMA recognition and protection. Plugging and reclamation – same as alternative B.
Cumulative effects	**Cumulative impacts** – short- and long-term minor to moderate adverse impacts from various sources; alternative A would contribute minimally to overall adverse cumulative impacts.	**Cumulative impacts** – similar to alternative A but with long-term cumulative benefits due to proactive management and expedited well plugging.	**Cumulative impacts** – same as alternative B but with additional SMA recognition and protection.

TABLE 10. SUMMARY OF ENVIRONMENTAL CONSEQUENCES

Impact Topic	Alternative A: No Action	Alternative B: Comprehensive Implementation of 9B Regulations and a New Management Framework for Plugging and Reclamation	Alternative C: Comprehensive Implementation of 9B Regulations, a New Management Framework for Plugging and Reclamation, and Establishment of Special Management Areas (Preferred Alternative)
Water Resources Direct/indirect effects	**Geophysical exploration** – localized short-term negligible adverse impacts from erosion and runoff. **Drilling and production** (in park and directionally drilled wells) – short- and long-term minor to moderate adverse impacts from the construction of well pads, access roads, flow lines and pipelines, well stimulation operations, and possible release of hydrocarbons, produced waters or treatment chemicals; possible major adverse impacts in the unlikely event of a well blowout, fire, or major release. **Plugging and reclamation** (all wells) – localized, short term, negligible to minor, adverse impacts with long-term beneficial impacts from reclamation.	**Geophysical** – same as alternative A. **Drilling and production** (in park and directionally drilled wells) short-term to long-term negligible to moderate adverse impacts related to site and access road clearing and construction and the associated ground disturbance, compaction, and/or erosion, well stimulation operations, leaks and spills; but with a reduced chance of major adverse impacts due to increased monitoring and inspections. **Plugging and reclamation** (all wells) same as alternative A, with greater chance of completion sooner due to new well plugging management framework.	**Geophysical** – same as alternative A. **Drilling and production** (in park and directionally drilled wells) – localized short-term to long-term negligible to mostly minor adverse impacts; similar to alternative B but with SMA recognition and protection. **Plugging and reclamation** (all wells) same as alternative B.
Cumulative effects	**Cumulative impacts** – short- and long-term minor to moderate adverse cumulative impacts. The actions under alternative A would contribute minimally to overall cumulative impacts.	**Cumulative impacts** – same as alternative A but with long-term cumulative benefits due to proactive management and expedited well plugging.	**Cumulative impacts** – same as alternative B, but with additional SMA recognition and protection.

TABLE 10. SUMMARY OF ENVIRONMENTAL CONSEQUENCES

Impact Topic	Alternative A: No Action	Alternative B: Comprehensive Implementation of 9B Regulations and a New Management Framework for Plugging and Reclamation	Alternative C: Comprehensive Implementation of 9B Regulations, a New Management Framework for Plugging and Reclamation, and Establishment of Special Management Areas (Preferred Alternative)
Floodplains Direct/indirect effects	**Geophysical –** localized, short-term negligible adverse impacts from increased road runoff and crossing of small areas of floodplains along tributary streams. **Drilling and production** (in park and directionally drilled wells) – short- to long-term negligible to minor adverse impacts, since new oil and gas operations would not be permitted in floodplains unless there was no practicable alternative, floodplains could likely be avoided, and mitigation for flood proofing would be required. **Plugging and reclamation** (all wells) - localized, short-term, negligible to minor and adverse, with long-term beneficial impacts from site reclamation.	**Geophysical** – same as alternative A. **Drilling and production** (in park and directionally drilled wells) – short- to long-term negligible adverse impacts; inspections preventing floodplain impacts. **Plugging and reclamation** (all wells) – same as alternative A, but with a greater chance of completion sooner due to the new well plugging management framework.	**Geophysical** – same as alternative A. **Drilling and production** (in park and directionally drilled wells) – localized, short- to long-term, negligible and adverse similar to alternative B but with SMA recognition and protection. **Plugging and reclamation** (all wells) – same as alternative B.
Cumulative effects	**Cumulative impacts** – short- and long-term minor adverse cumulative impacts from various sources; alternative A would contribute minimally to overall adverse cumulative impacts.	**Cumulative impacts** – similar to alternative A, but with long-term cumulative benefits due to its proactive management and expedited well plugging.	**Cumulative impacts** – similar to alternative B but with additional SMA recognition and protection.

TABLE 10. SUMMARY OF ENVIRONMENTAL CONSEQUENCES

Impact Topic	Alternative A: No Action	Alternative B: Comprehensive Implementation of 9B Regulations and a New Management Framework for Plugging and Reclamation	Alternative C: Comprehensive Implementation of 9B Regulations, a New Management Framework for Plugging and Reclamation, and Establishment of Special Management Areas (Preferred Alternative)
Wetlands Direct/indirect effects	**Geophysical** – localized short-term negligible adverse impacts from disturbance of existing unpaved surfaces and resultant road runoff or from the crossing of small areas of wetlands along tributary streams. **Drilling and production** (in park and directionally drilled wells) – short- to long-term negligible to moderate adverse impacts from vegetation clearing, ground disturbance or rutting, erosion, runoff, and possible spills and leaks going undetected; however, new oil and gas operations would not be permitted in wetlands unless there was no practicable alternative, and wetlands could likely be avoided; possible major adverse impacts in the unlikely event of a well blowout, fire, or major release. **Plugging and reclamation** (all wells) – localized, short term, negligible to minor, adverse impacts with long-term beneficial impacts from site reclamation.	**Geophysical** – same as alternative A. **Drilling and production** (in park and directionally drilled wells) – short-term to long-term negligible to minor adverse impacts; reduced chance of major adverse impacts due to increased monitoring and inspections. **Plugging and reclamation** (all wells) – same as alternative A, with greater chance of completion sooner due to the new well plugging management framework.	**Geophysical** – same as alternative A. **Drilling and production** (in park and directionally drilled wells) – localized short- to long-term negligible to negligible to minor adverse impacts; similar to alternative B, but with SMA recognition and protection. **Plugging and reclamation** (all wells) – same as alternative B.
Cumulative effects	**Cumulative impacts** – short- and long-term minor to moderate adverse cumulative impacts from various sources; alternative A would contribute minimally to overall cumulative impacts.	**Cumulative impacts –** similar to alternative A, but with long-term cumulative benefits due to its proactive management and enforcement and expedited well plugging.	**Cumulative impacts** – similar to alternative B, but with additional SMA recognition and protection.

TABLE 10. SUMMARY OF ENVIRONMENTAL CONSEQUENCES

Impact Topic	Alternative A: No Action	Alternative B: Comprehensive Implementation of 9B Regulations and a New Management Framework for Plugging and Reclamation	Alternative C: Comprehensive Implementation of 9B Regulations, a New Management Framework for Plugging and Reclamation, and Establishment of Special Management Areas (Preferred Alternative)
Vegetation Direct/indirect effects	**Geophysical** – localized, short-term negligible adverse impacts due to vegetation clearing and effects on soils. **Drilling and production** (in park and directionally drilled wells) – localized short-term to long-term minor adverse impacts from the loss of vegetation and ground disturbance/soil erosion and compaction, but with a risk of more severe adverse impacts from leaks and spills that could go undetected or migrate off site, possible major adverse impacts in the unlikely event of a well blowout, fire, or major release. **Plugging and reclamation** (all wells) – localized, short term, negligible to minor, adverse impacts with long-term beneficial effects from site reclamation.	**Geophysical** – same as alternative A. **Drilling and production** (in park and directionally drilled wells) – same as alternative A, reduced chance of spills and leaks and major adverse impacts due to increased monitoring and inspections. **Plugging and reclamation** (all wells) – negligible to minor impacts; similar to alternative A; with a greater chance of completion sooner due to the new well plugging management framework.	**Geophysical** – same as alternative A. **Drilling and production** (in park and directionally drilled wells) – short- to long-term, negligible to minor adverse impacts; similar to alternative B; but with SMA recognition and protection. **Plugging and reclamation** (all wells) – same as alternative B.
Cumulative effects	**Cumulative impacts** – short- and long-term minor to moderate adverse cumulative impacts from various sources. The actions under alternative A would contribute minimally to overall cumulative impacts.	**Cumulative impacts** – same as alternative A, but with long-term cumulative benefits due to proactive management and expedited well plugging.	**Cumulative impacts** – same as alternative B, but with additional SMA recognition and protection.

TABLE 10. SUMMARY OF ENVIRONMENTAL CONSEQUENCES

Impact Topic	Alternative A: No Action	Alternative B: Comprehensive Implementation of 9B Regulations and a New Management Framework for Plugging and Reclamation	Alternative C: Comprehensive Implementation of 9B Regulations, a New Management Framework for Plugging and Reclamation, and Establishment of Special Management Areas (Preferred Alternative)
Wildlife and Aquatic Species Direct/indirect effects	**Geophysical –** localized, short-term negligible to minor adverse impacts from habitat removal and disturbance, particularly short-term noise seismic vibrator use. **Drilling and production** (in park and directionally drilled wells) – localized, short- to long-term minor to moderate adverse impacts from loss, fragmentation, or disruption of habitat due to vegetation and site clearing, possible injury to or mortality of less mobile species, noise and associated species displacement or stress, and possible spills or releases of harmful substances; possible major adverse impacts in the unlikely event of a well blowout, fire, or major release. **Plugging and reclamation** (all wells) – localized, short-term negligible to minor adverse impacts with long-term beneficial impacts as a result of site reclamation.	**Geophysical** – same as alternative A. **Drilling and production** (in park and directionally drilled wells) **–** localized short- to long-term minor adverse impacts; reduced chance of injury and major adverse impacts due to increased monitoring and inspection. **Plugging and reclamation** (all wells) – same as alternative A; with a greater chance of completion sooner due to the new well plugging management framework.	**Geophysical** – same as alternative A. **Drilling and production** (in park and directionally drilled wells) **–** short- to long-term negligible to minor; similar to alternative B; but with SMA recognition and protection. **Plugging and reclamation** (all wells) – same as alternative B.
Cumulative effects	**Cumulative impacts** – short- and long-term minor to moderate adverse cumulative impacts from various sources. The actions under alternative A would contribute minimally to overall cumulative impacts.	**Cumulative impacts –** similar to alternative A, but with long-term cumulative benefits due to its proactive management and expedited well plugging.	**Cumulative impacts –** similar to alternative B, but with additional SMA recognition and protection.

TABLE 10. SUMMARY OF ENVIRONMENTAL CONSEQUENCES

Impact Topic	Alternative A: No Action	Alternative B: Comprehensive Implementation of 9B Regulations and a New Management Framework for Plugging and Reclamation	Alternative C: Comprehensive Implementation of 9B Regulations, a New Management Framework for Plugging and Reclamation, and Establishment of Special Management Areas (Preferred Alternative)
Federally Listed Threatened and Endangered Species Direct/indirect effects	**Geophysical** – localized short-term negligible adverse impacts from vegetation trimming, disturbance and noise/seismic vibrator use. **Drilling and production** (in park and directionally drilled wells) – short-term negligible to minor adverse impacts, primarily from the noise and disturbance related to construction of new well pads, access roads, flowlines, and pipelines and possible major adverse impacts from leaks and spills that could go undetected and could reach listed species; possible major adverse impacts in the unlikely event of a well blowout, fire, or major release. **Plugging and reclamation** (all wells) – localized, short term to long term, negligible to minor, adverse impacts with long-term beneficial impacts on listed species from site reclamation.	**Geophysical** – same as alternative A. **Drilling and production** (in park and directionally drilled wells) – short- to long-term, negligible to minor, adverse impacts; reduced chance of major adverse impacts due to increased monitoring and inspections. **Plugging and reclamation** (all wells) – localized, short-term negligible to minor adverse impacts, with a greater chance of completion sooner due to the new well plugging management framework.	**Geophysical** – same as alternative A. **Drilling and production** (in park and directionally drilled wells) – localized short- to long-term negligible and adverse; similar to alternative B, but with SMA recognition and protection. **Plugging and reclamation** (all wells) – same as alternative B.
Cumulative impacts	**Cumulative impacts** – short- and long-term minor to moderate adverse cumulative impacts from various sources. The actions under alternative A would contribute minimally to overall cumulative impacts.	**Cumulative impacts** – similar to alternative A, but with long-term cumulative benefits due to proactive management and expedited well plugging.	**Cumulative impacts** – same as alternative B, with additional SMA identification and protection.

TABLE 10. SUMMARY OF ENVIRONMENTAL CONSEQUENCES

Impact Topic	Alternative A: No Action	Alternative B: Comprehensive Implementation of 9B Regulations and a New Management Framework for Plugging and Reclamation	Alternative C: Comprehensive Implementation of 9B Regulations, a New Management Framework for Plugging and Reclamation, and Establishment of Special Management Areas (Preferred Alternative)
Species of Special Concern Direct/indirect effects	**Geophysical** – localized, short-term negligible adverse impacts from vegetation trimming, disturbance and noise/seismic vibrator use. **Drilling and production** (in park and directionally drilled wells) – short- to long-term negligible to minor adverse impacts, primarily from the noise and disturbance related to construction of new well pads, access roads, flowlines, and pipelines, habitat loss or fragmentation, and possible moderate or major adverse impacts from leaks and spills that could go undetected or migrate off site; Possible major adverse impacts in the unlikely event of a well blowout, fire or major release. **Plugging and reclamation** (all wells) – localized, short-term, negligible to minor, adverse; impacts with long-term beneficial impacts from site reclamation.	**Geophysical** – same as alternative A. **Drilling and production** (in park and directionally drilled wells) – same as alternative A, but with reduced chance of major adverse impacts due to increased monitoring and inspections. **Plugging and reclamation** (all wells) – same as alternative A, but with greater chance of completion sooner due to new well plugging management framework.	**Geophysical** – same as alternative A. **Drilling and production** (in park and directionally drilled wells) – long-term negligible to minor adverse impacts; similar to alternative B but with adequate setback and SMA recognition and protection. **Plugging and reclamation** (all wells) – localized short- to long-term minor adverse impacts, similar to alternative B.
Cumulative effects	**Cumulative impacts** – short- and long-term minor to moderate adverse cumulative impacts from various sources; alternative A would contribute minimally to overall cumulative impacts.	**Cumulative impacts** – same as alternative A, but with long-term cumulative benefits due to proactive management and expedited well plugging.	**Cumulative impacts** – same as alternative B, but with additional SMA recognition and protection.

TABLE 10. SUMMARY OF ENVIRONMENTAL CONSEQUENCES

Impact Topic	Alternative A: No Action	Alternative B: Comprehensive Implementation of 9B Regulations and a New Management Framework for Plugging and Reclamation	Alternative C: Comprehensive Implementation of 9B Regulations, a New Management Framework for Plugging and Reclamation, and Establishment of Special Management Areas (Preferred Alternative)
Soundscapes Direct/indirect effects	**Geophysical –** localized short-term negligible to minor adverse impacts from noise related to work crews and the use of seismic vibration technology. **Drilling and production** (in park and directionally drilled wells) – short-term to long-term minor to moderate adverse impacts from equipment and vehicles and associated traffic. Long-term adverse impacts would arise from continuous production at existing wells until the wells are depleted; noise would be sporadic over the course of production, occurring during workovers and servicing operations, as well as continuous from existing motors and pumpjacks. **Plugging and reclamation** (all wells) – short term, minor to moderate, adverse impacts, with long term beneficial impacts from re-vegetation of site reclamation.	**Geophysical** – same as alternative A. **Drilling and production** (in park and directionally drilled wells) – same as alternative A, but with increased certainty that mitigation measures would be implemented to ensure protection of park resources, including the natural soundscape, due to increased inspections and management. **Plugging and reclamation** (all wells) – same as alternative A, with a greater chance of completion sooner as well as simultaneous plugging operations due to new well plugging management framework.	**Geophysical** – same as alternative A. **Drilling and production** (in park and directionally drilled wells) – same as alternative B, but with a greater chance of directional drilling with SMA recognition and protection. **Plugging and reclamation** (all wells) – same as alternative B.
Cumulative effects	**Cumulative impacts** – short- and long-term minor to moderate adverse cumulative impacts from various sources; alternative A would contribute minimally to the overall cumulative impacts.	**Cumulative impacts** – short-term and long-term negligible to moderate adverse cumulative impacts; similar to alternative A, but with long-term cumulative benefits due to proactive management and expedited well plugging.	**Cumulative impacts** – same as alternative B, but with additional SMA recognition and protection.

TABLE 10. SUMMARY OF ENVIRONMENTAL CONSEQUENCES

Impact Topic	Alternative A: No Action	Alternative B: Comprehensive Implementation of 9B Regulations and a New Management Framework for Plugging and Reclamation	Alternative C: Comprehensive Implementation of 9B Regulations, a New Management Framework for Plugging and Reclamation, and Establishment of Special Management Areas (Preferred Alternative)
Cultural Resources Direct/indirect effects	**Geophysical** – localized, short- and long-term negligible to minor adverse impacts as a result of soil disturbance and vibration, with offsets and mitigation as needed to reduce impacts. **Drilling and production** (in park and directionally drilled wells) – short-term and long-term negligible to minor adverse impacts as a result of impacts on soils, historic artifacts, and cultural landscapes; possible major adverse impacts in the unlikely event of a well blowout, fire, or major release. **Plugging and reclamation** (all wells) – localized short-term and long-term negligible to minor adverse impacts and long-term minor beneficial impacts on cultural resources.	**Geophysical** – localized, long-term negligible to minor adverse impacts, similar to alternative A. **Drilling and production** (in park and directionally drilled wells) – same as alternative A; reduced chance of major adverse impacts due to increased monitoring and inspections. **Plugging and reclamation** (all wells) – same as alternative A; with a greater chance of completion sooner due to the new well plugging management framework.	**Geophysical** – same as alternative A; more upfront protection in certain SMAs. **Drilling and production** (in park and directionally drilled wells) – similar to alternative B; but with reduced chance of impacts due to SMA recognition and protection and possible directional drilling. **Plugging and reclamation** (all wells) – same as alternative B.
Cumulative effects	**Cumulative impacts** – long-term minor adverse cumulative impacts from various sources. The actions under alternative A could contribute moderately to both adverse and beneficial cumulative impacts.	**Cumulative impacts** – same as alternative A.	**Cumulative impacts** – same as alternative A, but with additional SMA recognition and a No Surface Use stipulation.

TABLE 10. SUMMARY OF ENVIRONMENTAL CONSEQUENCES

Impact Topic	Alternative A: No Action	Alternative B: Comprehensive Implementation of 9B Regulations and a New Management Framework for Plugging and Reclamation	Alternative C: Comprehensive Implementation of 9B Regulations, a New Management Framework for Plugging and Reclamation, and Establishment of Special Management Areas (Preferred Alternative)
Visitor Use and Experience Direct/indirect effects	**Geophysical –** localized, short-term negligible to minor adverse from temporary access restrictions and effects on visual quality, noise, odors, and human health and safety. **Drilling and production** (in park and directionally drilled wells) – short- and long-term minor to moderate adverse impacts on access, visual quality, noise, and health and safety. Possible major adverse impacts in the unlikely event of a well blowout, fire, or major release. **Plugging and reclamation** (all wells) – localized long-term beneficial impact on visitor use and experience. Temporary effects on access, visual quality, noise, odors, and human health and safety would be short term, minor to moderate, and adverse.	**Geophysical** – same as alternative A **Drilling and production** (in park and directionally drilled wells) – short- and long term mostly minor adverse impacts, similar to alternative A; reduced chance of major adverse impacts due to increased monitoring and inspections. **Plugging and reclamation** (all wells) – Temporary effects on access, visual quality, noise, odors, and human health and safety would be short term, negligible to moderate, and adverse, similar to alternative A, with greater chance of completion sooner due to new well plugging management framework.	**Geophysical** – localized, short-term negligible adverse, similar to alternative A. **Drilling and production (**in park and directionally drilled wells) – localized short-term negligible to mostly minor adverse impacts; similar to alternative B, but with SMA recognition and protection. **Plugging and reclamation** (all wells) – Temporary effects on access, visual quality, noise, odors, and human health and safety would be short term, negligible to minor, and adverse, similar to alternative B.
Cumulative effects	**Cumulative impacts** – short- and long-term minor adverse cumulative impacts from various sources. The actions under alternative A would contribute moderately to both adverse and beneficial cumulative impacts.	Cumulative impacts – same as alternative A.	**Cumulative impacts –** short-and long-term negligible to minor, similar to alternative A.

TABLE 10. SUMMARY OF ENVIRONMENTAL CONSEQUENCES

Impact Topic	Alternative A: No Action	Alternative B: Comprehensive Implementation of 9B Regulations and a New Management Framework for Plugging and Reclamation	Alternative C: Comprehensive Implementation of 9B Regulations, a New Management Framework for Plugging and Reclamation, and Establishment of Special Management Areas (Preferred Alternative)
Park Management and Operations Direct/indirect effects	**Geophysical** – short-term negligible to minor adverse impacts from a slight increase in costs and staff time needed to oversee operations. **Drilling and production** (in park and directionally drilled wells) – localized short-term minor to moderate adverse impacts, from site inspections; possible major adverse impacts in the unlikely event of a well blowout, fire, or major release. **Plugging and reclamation** (all wells) – short-term minor to moderate adverse impacts that would be spread out over time from increasing the work load of NPS staff; with long-term beneficial impacts from site reclamation.	**Geophysical** – same as alternative A. **Drilling and production** (in park and directionally drilled wells) – similar to alternative A, but with a reduced chance of major adverse impacts due to increased monitoring and inspections; will require additional staff resources and effort. **Plugging and reclamation** (all wells) – short term minor adverse, with a greater chance of reducing staff through the proposed management framework.	**Geophysical** – same as alternative A. **Drilling and production** (in park and directionally drilled wells) – similar to alternative B, but with additional staff time needed to identify and delineate SMAs to be avoided or mitigated. **Plugging and reclamation** (all wells) – same as alternative B.
Cumulative effects	**Cumulative impacts** – short- and long-term minor to moderate adverse cumulative impacts from various sources. The actions under alternative A would contribute moderately to both adverse and beneficial cumulative impacts.	**Cumulative impacts** short and long-term minor adverse cumulative impacts, similar to alternative A.	**Cumulative impacts** – same as alternative B.

ALTERNATIVES ELIMINATED FROM FURTHER CONSIDERATION

In developing alternatives for this plan/EIS, several alternatives or elements of alternatives, were initially considered by the planning team as a result of internal and external scoping. Several of these were eliminated from further detailed evaluation as standalone alternatives, but were incorporated as elements common to the alternatives as described previously in this chapter (such as acquiring mineral rights on a case-by-case basis). Others 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.

NO SURFACE OCCUPANCY AT BIG SOUTH FORK NATIONAL RIVER AND RECREATION AREA

This alternative would allow for continued development of private mineral rights within Big South Fork NRRA, but would require all associated activities be conducted from outside the park boundary using directional drilling. This was considered but dismissed because the enabling legislation for the park unit allows for oil and gas operations at the park, and the 9B regulations provide adequate protection to park resources when implemented comprehensively.

ACQUIRING ALL MINERAL RIGHTS WITHIN THE PARK UNITS

Although this alternative would protect park resources and values, and avoid conflicts with visitor use, enjoyment, and human health and safety, it would create substantial conflicts with private property rights. In the event that there were unwilling sellers, this alternative would possibly require condemnation of mineral rights. This would contradict provisions in the legislation for both Big South Fork NRRA and Obed WSR. As described in the “Background” section of chapter 1, the enabling legislation for Big South Fork NRRA permits prospecting and drilling for petroleum products and natural gas in the adjacent area (16 USC 460ee(e)(3)). Although there are no provisions related to oil and gas operations in the 1976 amendment to the Wild and Scenic Rivers Act that established the Obed WSR (16 USC 1274), the original act (PL 90-542, passed October 2, 1968) does discuss mining and mineral leasing laws and allows for access to valid existing mineral rights (section 9(a)(i) and 9(a)(ii)). This alternative would also be inconsistent with the objective of providing owners and operators of private oil and gas rights reasonable access for exploration, production, maintenance, and surface reclamation, as identified in chapter 1. NPS regulations at 36 CFR Part 9B, governing non-federal oil and gas operations in park units, provide for reasonable controls on non-federal oil and gas exploration, production, and transportation to assure park resource and visitor protection, and acquisition of all rights would be unnecessary to achieve these goals. The NPS also has the authority to purchase the non-federal mineral rights on a case-case basis, and it would likely be cost prohibitive to purchase all of the mineral rights throughout Big South Fork NRRA and Obed WSR. Therefore, this alternative was eliminated from further detailed analysis.

SUBSIDIZING PLUGGING OPERATIONS

During development of the alternatives for this plan/EIS, the interdisciplinary planning team considered the idea of the NPS paying for operations associated with plugging and reclaiming wells. In essence, the NPS would pay for the plugging and reclamation to ensure that it is conducted in a timely manner. This alternative was dismissed from further consideration because it provides little benefit to taxpayers, given that high priority wells are already targeted for plugging and reclamation, and could create a financial burden for the NPS. Increased inspections, monitoring, and enforcement of the 9B regulations, as well as implementation of the new management framework, described for the action alternatives, would result in more timely plugging and reclamation of well sites.

CLOSING WELLS IN VIOLATION OF 9B REGULATIONS OR WITHIN 500 FEET OF WATERCOURSES OR RECREATION RESOURCES AT BIG SOUTH FORK NATIONAL RIVER AND RECREATION AREA

During public scoping, commenters suggested the NPS enact regulations to close all wells in violation of the 9B regulations or within 500 feet of watercourses and recreational resources (trails) at Big South Fork NRRA. As described previously, new regulations are not needed as protection afforded by existing legal mandates is adequate when enforced properly. The 9B regulations provide the superintendent of a park unit the authority for suspending operations found to be impacting, or threatening to impact, park resources beyond the operations area (see 36 CFR 9.33 and 9.51). As a result, even if wells within 500 feet of a watercourse or trails are allowed in an approved plan operations, the superintendent can suspend such operations if there is the potential for a serious impact to land or water resources. If circumstances occur that cause the superintendent to suspend the operation, an operator would have the chance to remedy the situation. Because the superintendent has this suspension authority, this idea was dismissed from further consideration as a stand-alone alternative.

LIMIT NUMBER OF WELLS AND ASSOCIATED AREA OF DISTURBANCE AT BIG SOUTH FORK NATIONAL RIVER AND RECREATION AREA

During public scoping, it was suggested that the NPS enact regulations to limit the number of wells allowed in Big South Fork NRRA to 350 or less, and limit the disturbance associated with wells to one acre or less. However, density of wells is currently limited by state spacing requirements for oil and gas operations. As described previously, new regulations are not needed as protection afforded by existing legal mandates is adequate when enforced properly. Chapter 1040-2-4 of the Rules of the Tennessee State Oil and Gas Board Statewide Order No. 2 requires 10- to 160-acre spacing and 330- to 1,320-foot setbacks from property lines, while Title 805, Chapter 1, Sections 100 and 130 of the Kentucky Administrative Regulations require approximately 3- to 574-acre spacing, as well as 400 to 1,000 feet between wells, and 200 to 500 feet from mineral boundaries. In addition, the 9B regulations require an operator take steps to insure that surface disturbance is minimized during nonfederal oil and gas operations (see 36 CFR 9.36(a)(16)(iii)). Big South Fork NRRA also seeks to limit new surface disturbance during an operator's development of plans of operations. There was also concern that limiting the number of wells could result in a taking of private property rights, which would contradict provisions in the legislation for the park units that allows for nonfederal oil and gas operations to exercise private mineral rights. Therefore, this alternative was dismissed from further consideration.

ENACT NEW REGULATIONS FOR PERMITTING, OPERATING, AND PROHIBITING OIL AND GAS IN BIG SOUTH FORK NATIONAL RIVER AND RECREATION AREA

Comments received during scoping recommended that the NPS enact specific regulations for nonfederal oil and gas operations in Big South Fork NRRA in accordance with the enabling legislation for the park unit. Upon further review of the enabling legislation, Congress provides that "prospecting and drilling for petroleum products and natural gas may be permitted in the adjacent area under such regulations as the Secretary or the Secretary of the Interior…may prescribe to minimize detrimental environmental impacts…" (16 USC 460ee(e)(3)). Although this provides the NPS the opportunity to pass such park-specific regulations, they are not required. In addition, after reviewing the regulations proposed (including those related to protection of water quality/quantity, geologic formations/topography, rare or endangered plants/animals, recreational opportunities, health or safety, and air quality, establishing public notice, comment, and hearing requirements, and requiring development of an EIS for plans of operations) the planning team felt that existing provisions of 36 CFR Part 9B, NEPA, the Clean Water Act, the Clean Air Act, etc., provided appropriate regulatory protection. In addition, the provisions provided in the action

alternatives of this plan/EIS include protected areas and SMAs that were identified or developed to further protect these resources and values. Finally, the servicewide 36 CFR 9B regulations are currently being evaluated by the NPS for revision. Therefore, this was dismissed from further consideration as a stand-alone alternative.

PHASE NON-FEDERAL OIL AND GAS OPERATIONS IN ZONES AT BIG SOUTH FORK NATIONAL RIVER AND RECREATION AREA

Public comment received during scoping suggested the NPS consider dividing the park unit into sections, and staggering development of private mineral rights over time in each zone. This alternative was dismissed from further consideration because the NPS cannot preclude an operator from accessing their mineral rights except under circumstances described in the 9B regulations, enabling legislation for Big South Fork NRRA, or other pertinent laws or regulations. Establishing these zones and only allowing development in some sections could therefore be considered a taking of private property rights.

CONSISTENCY WITH THE PURPOSES OF THE NATIONAL ENVIRONMENTAL POLICY ACT

NEPA requires an analysis of how each alternative meets or achieves the purposes of the act, as stated in Section 101(b). Each alternative analyzed in a NEPA document must be assessed as to how it meets the following purposes:

1. fulfill the responsibilities of each generation as trustee of the environment for succeeding generations;
2. assure 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 national 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 would permit high standards of living and a wide sharing of life's amenities; and
6. enhance the quality of renewable resources and approach the maximum attainable recycling of depletable resources.

The CEQ has promulgated regulations for federal agencies' implementation of NEPA (40 CFR Parts 1500–1508). Section 1500.2 states that federal agencies shall, to the fullest extent possible, interpret and administer the policies, regulations, and public laws of the United States in accordance with the policies set forth in the act (sections 101(b) and 102(1)); therefore, other acts and NPS policies are referenced as applicable in the following discussion.

ALTERNATIVE A: NO ACTION

Alternative A would meet the purpose of NEPA to a small degree because the NPS would continue to manage non-federal oil and gas operations at less than an optimum level. By requiring plans of operations for new activities, this alternative would help preserve important historic, cultural, and natural aspects of our national heritage, and would maintain an environment that supports diversity and variety of individual choice by allowing access to non-federal mineral rights (purpose 4). However, undesirable consequences

associated with current non-federal oil and gas operations (e.g., spills) could cause degradation of the environment (purpose 3) that goes unnoticed in the absence of a more enhanced inspection and monitoring program. This alternative would do little to attain a wide range of beneficial uses of the environment (purpose 3) or help achieve a balance between population and resource use (purpose 5) as non-federal oil and gas operations could occur in areas particularly susceptible to adverse impacts from these operations. Possible lack of inspections, monitoring, and enforcement of regulations under this alternative would not ensure healthful, productive, or esthetically pleasing surroundings (purpose 2). As a result, this alternative would only partially fulfill the responsibilities of each generation as the trustee of the environment for succeeding generations, and in preserving important aspects of our national heritage (purpose 1).

ALTERNATIVE B: COMPREHENSIVE IMPLEMENTATION OF THE 9B REGULATIONS AND A NEW MANAGEMENT FRAMEWORK FOR PLUGGING AND RECLAMATION

This alternative would fulfill most of the purposes of NEPA to a moderate or large degree. Once the plan was implemented, inspections and monitoring would be increased, and the NPS would pursue plans of operations for current activities. The NPS would continue to work cooperatively with the state on regulations or enforcement, but increased inspections and monitoring would proactively identify sites that are found to be impacting, or threatening to impact, park resources beyond the operations area during inspections and monitoring. Enforcement of NPS regulations at current operations would be prioritized by site conditions, which would minimize the potential for impacts from both current and new oil and gas operations. The new management framework for plugging and reclamation would establish standards and a process for compliance that would facilitate this phase of oil and gas operations and expedite the plugging and reclamation of potentially hazardous well sites. As result, alternative B would do a better job of preserving important historic, cultural, and natural aspects of our national heritage in the long term (purpose 4) and helping to ensure safe, healthful, productive, and esthetically pleasing surroundings (purposes 2 and 3). Continued access to non-federal oil and gas rights under this comprehensive plan would provide for a wide range of uses of the environment while minimizing the potential for environmental degradation or other undesirable or unintended consequences (purpose 3). Providing this access under a comprehensive plan would also help achieve a balance between population and resource use (purpose 5). However, there is some risk to health and safety associated with non-federal oil and gas operations that cannot be eliminated (purposes 2 and 3). Overall, this alternative would go further than alternative A towards fulfilling the responsibilities of each generation, as a trustee of the environment, for succeeding generations (purpose 1).

ALTERNATIVE C: COMPREHENSIVE IMPLEMENTATION OF THE 9B REGULATIONS, A NEW MANAGEMENT FRAMEWORK FOR PLUGGING AND RECLAMATION, AND ESTABLISHMENT OF SPECIAL MANAGEMENT AREAS (PREFERRED ALTERNATIVE)

Much like alternative B, this alternative would fulfill most of the purposes of NEPA to a moderate or large degree. The comprehensive management plan, including the inspections, monitoring, and enforcement of regulations for both current and new operations, as well as the new management framework for plugging and reclamation, would minimize the potential for impacts from non-federal oil and gas operations to historic, cultural, and natural aspects of our national heritage in the long term (purpose 4). Establishing SMAs under this alternative would provide the greatest opportunity to preserve important natural aspects in the long term. The presence of SMAs would also go the farthest towards minimizing the potential for environmental degradation or other undesirable or unintended consequences, while still achieving a wide range of uses of the environment, by providing access to private mineral rights (purpose 3). Providing this access under a comprehensive plan would also help achieve a balance between population and resource use (purpose 5). As a result, alternative C would also do a better job of

helping to ensure safe, healthful, productive, and esthetically pleasing surroundings (purposes 2 and 3). However, there is some risk to health and safety associated with non-federal oil and gas operations that cannot be eliminated. Overall, this alternative would give the NPS the best chance for fulfilling the responsibilities of each generation, as a trustee of the environment, for succeeding generations (purpose 1).

ENVIRONMENTALLY PREFERRED ALTERNATIVE

The NPS is required to identify the environmentally preferred alternative in its NEPA documents for public review and comment. Guidance from the CEQ states that the environmentally preferred alternative means it is "the alternative that causes the least damage to the biological and physical environment; it also means the alternative which best protects, preserves, and enhances historic, cultural, and natural resources" (CEQ 1981).

Alternative C has been selected as the NPS environmentally preferred alternative. Compared to alternatives A or B, alternative C provides additional protection to park resources through identification of SMAs and protection of these resources through either avoidance of SMAs or additional mitigation in approved plans of operations. As described above, establishing SMAs under this alternative would provide the greatest opportunity to preserve important natural aspects in the long term. Although the types of impacts expected under alternative C are similar to those expected under alternative B, they would likely occur at a reduced intensity because of SMA recognition and protection. Like alternative B, alternative C also includes the new management framework for plugging of abandoned wells, resulting in an expedited process for well site cleanup and reclamation. Alternative A (no action) was not considered environmentally preferred because of its lack of proactive enforcement, and lack of a comprehensive plan and plugging protocol. Overall, alternative C would result in the least damage to the biological and physical environment and protect the parks' valuable cultural resources.

NATIONAL PARK SERVICE PREFERRED ALTERNATIVE

To identify the preferred alternative, the planning team evaluated each alternative based on its ability to meet the plan objectives (see table 9), considering potential impacts on the environment and on existing and future operations. Alternative C was selected as the NPS preferred alternative.

Alternative C fully meets seven of the nine planning objectives (table 9) and meets the other two to a large degree. Alternative B fully meets three of the nine objectives and meets the others to a large degree, while the no-action alternative fully meets only one objective (hence the need for the plan). With the addition of SMAs, alternative C best identifies and protects resources from adverse effects of oil and gas operations, including protection of water resources, species of management concern, and cultural resources. It also best minimizes or mitigates conflicts between oil and gas operations and visitor use by buffering some visitor use areas from operations and identifying regulatory and other requirements up front with SMA designations. It is equivalent to alternative B in protecting human health and safety, providing guidance to operators, and establishing an efficient well plugging process, as it includes the new management framework for well plugging and reclamation. Although alternative B ranks higher in providing owners and operators with reasonable access, alternative C also provides reasonable access since it has provisions for addressing resource concerns as additional mitigation in approved plans of operation (or using directional drilling) in lieu of limiting surface use entirely in SMAs, where appropriate.