

**National Park Service  
U.S. Department of Interior**

**Big Thicket National Preserve  
Texas**



# **ENVIRONMENTAL ASSESSMENT**

**Endeavor Natural Gas, L.P.  
Proposal to Re-enter and Produce the Blackstone Minerals  
B-2 Well from Outside the Beaumont Unit**

**Big Thicket National Preserve  
Hardin County, Texas**

**September 2009**

## Executive Summary

The National Park Service (NPS) is conducting an environmental assessment (EA) to analyze Endeavor Natural Gas, L.P.'s (Endeavor's) proposed re-entry, directional drill, and production of the existing Blackstone Mineral B-2 well in Hardin County, Texas (Project). Proposed Project activities include directionally drilling from a distance of approximately 1,800 feet from an existing 1.89-acre surface location on private property outside of the Big Thicket National Preserve (Preserve), to reach a bottomhole located underneath the Beaumont Unit (Unit) of the Preserve. The well would be sited approximately 1,300 feet northwest of the Unit boundary.

This EA fully evaluates two alternatives for the proposed Project. Alternative A is the no-action alternative, which represents the baseline or benchmark from which to compare the impacts of the action alternatives. In this case, "no-action" means the well would not be re-entered. Alternative B is the proposed action and Endeavor would re-enter and directionally drill the well as proposed in their application. The operation would include an existing well pad location, flowlines to an existing pipeline accessible on site, and existing access road; all located outside of the Preserve.

This EA has been prepared in compliance with the National Environmental Policy Act (NEPA) to provide the decision-making framework that (1) analyzes a reasonable range of alternatives to meet Project objectives; (2) evaluates potential issues and impacts to the Preserve's resources and values; and (3) identifies mitigation measures to lessen the degree or extent of these impacts. Internal and external (public) scoping was conducted to assist with the development of this document. Two pieces of correspondence were received from the public in response to the NPS's request for public comment during external scoping which are discussed in the *Consultation and Coordination* sections of this EA.

By re-entering and directionally drilling the well from an existing wellpad site outside the Preserve, along with the application and other mitigation measures, Endeavor would substantially reduce impacts on Preserve resources and values. Therefore, NPS dismissed several topics from detailed analysis, and this EA provides the rationale that supports their dismissal. Issues with impacts that could potentially exceed minor levels were retained for more detailed analysis. These topics include impacts on natural soundscape, natural lightscape/night sky, adjacent landowners and visitor use and experience. Through the analysis, NPS concluded that the intensity of adverse impacts would range from negligible to moderate. No major adverse impacts were identified, and no impairment of NPS resources or values would occur as a result of the proposed actions. The duration of most impacts would be short-term, lasting from several days to weeks, and most effects would be localized to the project area. Through the analysis, Alternative B was found to be the NPS preferred alternative.

### Public Comment

If you wish to comment on this EA, you may do so online at the NPS website "Planning, Environment, and Public Comment" <http://parkplanning.nps.gov/bith/>, or you may mail comments to Todd Brindle, Superintendent; Big Thicket National Preserve; 6044 FM 420; Kountze, Texas 77625. This EA will be on public review for 30 days ending October 21, 2009. Before including your address, phone number, e-mail address, or other personal identifying information in your comment, you should be aware that your entire comment, including your

personal identifying information, may be made publicly available at any time. While you can ask us in your comment to withhold your personal identifying information from public review, we cannot guarantee that we will be able to do so.

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## *ACRONYM GLOSSARY*

bbls	Barrels
BCF	billion cubic feet
BMP	Best Management Practices
BOP	Blowout Prevention
CAA	Clean Air Act
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CO	Carbon Monoxide
dB	Decibels
dBA	A-weighted Decibels
dfs	depth below surface
EA	Environmental Assessment
EIS	Environmental Impact Statement
Endeavor	Endeavor Natural Gas, L.P.
EPA	Environmental Protection Agency
ERM	Environmental Resources Management
ESA	Endangered Species Act
GMP	General Management Plan
H <sub>2</sub> S	Hydrogen Sulfide
IPCC	Intergovernmental Panel on Climate Change
LNVA	Lower Neches Valley Authority
mL	Milliliter
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act
NO <sub>x</sub>	Nitrogen Oxides
NPS	National Park Service

NRCS	Natural Resource Conservation Service
NWI	National Wetland Inventory
PM	Particulate Matter
ppm	Parts per Million
Preserve	Big Thicket National Preserve
Project	Blackstone Minerals B-2 Re-Entry Project
PSD	Prevention of Signification Deterioration
RFD	Reasonably Foreseeable Development
RPW	Relatively Permanent Waterbody
RRC	Railroad Commission of Texas
SIP	State Implementation Plan
SO <sub>2</sub>	Sulfur Dioxide
SPCC	Spill Prevention Control and Countermeasures
SWPPP	Storm Water Pollution Prevention Plan
TCEQ	Texas Commission on Environmental Quality
THC	Texas Historical Commission
TPWD	Texas Parks and Wildlife Department
TPY	Tons per Year
TVD	True Vertical Depth
Unit	Beaumont Unit
US	United States
USACE	U.S. Army Corps of Engineers
USC	U.S. Code
USDA	U.S. Department of Agriculture
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Service
VOCs	Volatile Organic Compounds



## 1.0 PURPOSE AND NEED FOR ACTION

This Environmental Assessment (EA) has been prepared to comply with the National Environmental Policy Act (NEPA) to provide a decision-making framework, and to determine whether an Environmental Impact Statement (EIS) should be prepared. This EA evaluates the environmental impacts of two alternatives: the No Action Alternative or baseline alternative, and Endeavor Natural Gas, L.P.'s (Endeavor's) Proposed Action to re-complete an existing well and directionally drill from a surface location outside the Beaumont Unit (Unit) of the Big Thicket National Preserve (the Preserve) to reach a bottomhole target beneath the Unit.

One of the purposes of this analysis is to determine whether Endeavor's directional well (the Proposed Action) would qualify for an exemption from the National Park Service's (NPS's) nonfederal oil and gas rights regulations found in 36 Code of Federal Regulations (CFR) 9B. Specifically, § 9.32(e) governs operators that propose to develop nonfederal oil and gas rights underlying any unit of the National Park System by directionally drilling a well from a surface location outside unit boundaries to a location under federally-owned or controlled lands within park boundaries. Pursuant to § 9.32(e), an operator may obtain an exemption from the 9B regulations if the Regional Director is able to determine from available data that a proposed drilling operation under the park poses "no significant threat of damage to park resources, both surface and subsurface, resulting from surface subsidence, fracture of geological formations with resultant fresh water aquifer [sic] contamination or natural gas escape or the like." This EA also serves the purpose of disclosing to the public the potential impacts on the human environment, both inside and outside the Unit that may result from the Proposed Action.

When Congress authorized the establishment of the Preserve on October 11, 1974, the United States (U.S.) Government acquired surface ownership of the area. Private entities retained the subsurface mineral interests on most of these lands, while the State of Texas retained the subsurface mineral interests underlying the Neches River and navigable reaches of Pine Island Bayou. Thus, the federal government does not own any of the subsurface oil and gas rights in the Preserve. To protect the Preserve from oil and gas operations that may adversely impact or impair Preserve resources and values, the NPS regulates those operations in accordance with NPS laws, policies and regulations. The NPS recognizes that the applicants possess private property rights to nonfederal oil and gas in the Preserve. Such rights are accorded protection under the 5th Amendment of the U.S. Constitution, which states "... no person shall be deprived of property without due process of law; nor shall private property be taken for public use without just compensation."

Figure 1-1 presents a map depicting the locations associated with the Proposed Action and surrounding vicinity including five Units of the Preserve (Lance Rosier Unit, Pine Island – Little Pine Island Bayou Corridor Unit, Beaumont Unit, Village Creek Corridor Unit, and Lower Neches River Corridor Unit).

The "area of analysis" for evaluating potential impacts from the Proposed Actions in this EA will vary depending on the impact topic. These analysis areas are described for each topic in Section 3. The area of analysis for cumulative impacts includes the Beaumont Unit of the Preserve and area contiguous to the Unit (approximately one-half mile beyond Preserve boundaries).

Figure 1-1 Regional/Vicinity Map



## 1.1 PROPOSED FEDERAL ACTION

### 1.1.1 Objectives of Taking Action

The objectives of this project are to:

- Avoid or minimize impacts on the Preserve's resources and values, visitor use and experience, and human health and safety;
- Prevent impairment of the Preserve's resources and values;
- Provide Endeavor, as the lessee of nonfederal oil and gas mineral interests, access to explore for and develop oil and gas resources in a manner which will assure the natural and ecological integrity of the Preserve.

## 1.2 SPECIAL MANDATES AND DIRECTION

### 1.2.1 NPS Organic Act and General Authorities Act

The NPS Organic Act of 1916 (16 U.S.C. § 1, *et seq.*) provides the fundamental management directions for all units of the National Park System. Section 1 of the Organic Act states, in part, that the NPS shall:

*"... promote and regulate the use of the federal areas known as national parks, monuments, and reservations... by such means and measure as conform to the fundamental purpose of said parks, monuments, and reservations, which purpose is to conserve the scenery and the natural and historic objects and the wildlife therein and to provide for the enjoyment of the same in such manner and by such means as will leave them unimpaired for the enjoyment of future generations."* 16 U.S.C. § 1.

The National Park System General Authorities Act of 1970 (16 U.S. Code [U.S.C.] §1a-1 *et seq.*) affirms that while all National Park Units remain "distinct in character," they are "united through their interrelated purposes and resources into one National Park System as cumulative expressions of a single national heritage." The Act makes it clear that the NPS Organic Act and other protective mandates apply equally to all units of the system.

Subsequently, the 1978 Redwood Act Amendments to the General Authorities Act further clarified Congress' mandate to the NPS to protect park resources and values. The Amendments state, in part: "[t]he authorization of activities shall be construed and the protection, management, and administration of these areas shall be conducted in light of the high public value and integrity of the National Park System and shall not be exercised in derogation of the values and purposes for which these various areas have been established, except as may have been or shall be directly and specifically provided by Congress." (16 U.S.C. § 1a-1).

Current laws and policies require the analysis of potential effects to determine whether actions would impair park resources. While Congress has given the NPS the managerial discretion to allow certain impacts within parks, that discretion is limited by the statutory requirement (enforceable by the federal courts) that the NPS must leave park resources and values

unimpaired, unless a particular law directly and specifically provides otherwise (Management Policies 2006, § 1.4).

These authorities all prohibit an impairment of park resources and values. Not all impacts are impairments. An impairment is an impact that, in the professional judgment of the responsible NPS manager, would harm the integrity of park resources or values, including the opportunities that otherwise would be present for the enjoyment of those resources or values. Whether an impact meets this definition depends on the particular resources and values that would be affected; the severity, duration, and timing of the impact; the direct and indirect effects of the impact; and the cumulative effects of the impact in question and other impacts. The NPS Management Policies (NPS 2006a) explain that an impact would be more likely to constitute an impairment in the event that it affects a resource or value whose conservation is:

1. Necessary to fulfill a specific purpose identified in the establishing legislation or proclamation of the park;
2. Key to the natural or cultural integrity of the park or to opportunities for enjoyment of the park; or
3. Identified as a goal in the park's General Management Plan or other relevant NPS planning documents.

NPS *Management Policies* 2006 explain that “resources and values” mean the full spectrum of tangible and intangible attributes for which the parks are established and are being managed, including the Organic Act’s fundamental purposes (as supplemented), and any additional purposes as stated in a park’s establishing legislation. All park resources and values are subject to the no impairment standard. They include: the biological and physical processes which created the park and that continue to act upon it, scenic features, natural visibility, natural soundscapes and smells, water and air resources, soils, geological resources, paleontological resources, archeological resources, cultural landscapes, ethnographic resources, historic and prehistoric sites, structures and objects, museum collections, and native plants and animals. In addition, the non-impairment standard includes the park’s role in contributing to the national dignity, the high public value and integrity, and the superlative environmental quality of the national park system.

In analyzing impairments in conjunction with the NEPA analysis for this Project, the NPS takes into account the fact that, if an impairment were likely to occur, such impacts would be considered to be major or significant by operation of the Council on Environmental Quality’s (CEQ’s) regulations at 40 CFR 1500. This is because the context and intensity of the impact would be sufficient to render what would normally be a minor or moderate impact to be major or significant. Taking this into consideration, NPS guidance documents note that “Not all major or significant impacts under a NEPA analysis are impairments. However, all impairments to NPS resources and values would constitute a major or significant impact under NEPA. If an impact results in impairment, the action should be modified to lessen the impact level. If the impairment cannot be avoided by modifying the Proposed Action, that action cannot be selected for implementation.” (NPS 2003).

Section 3 of this EA, *Affected Environment and Environmental Consequences*, includes an impairment analysis for each park resource or value carried forward for detailed analysis.

NPS *Management Policies 2006* also require the NPS to consider whether a proposed use is suitable, proper, or fitting, and applies the stricter standard of “unacceptable impacts” which *Management Policies 2006*, describes as “impacts that fall short of impairment but are still not acceptable within a particular park’s environment.” As discussed in greater detail in Section 1.3, 1.4 and 1.5, this EA considers whether Endeavor’s proposal is an appropriate use in accordance with §§ 1.5 and 8.1.2, and if the proposal could result in unacceptable impacts in accordance with § 1.4.7.1 of *Management Policies 2006*.

### **1.2.2 Big Thicket National Preserve Enabling Act**

Congress established the Preserve with the Act of October 11, 1974, Pub. L. No. 93-439, 88 Stat. 1254, codified as amended at 16 U.S.C. §§ 698-698e (2000), as the nation’s first preserve, “[i]n order to assure the preservation, conservation, and protection of the natural, scenic, and recreational values of a significant portion of the Preserve area in the State of Texas and to provide for the enhancement and public enjoyment thereof.” The authorizing legislation directs the Secretary of the Interior to administer the lands within the Preserve “in a manner which will assure their natural and ecological integrity in perpetuity.” After the Preserve’s establishment, the U.S. began acquiring lands within the Preserve’s authorized boundaries. While the surface ownership was transferred to the U.S. Government, private entities retained ownership of the mineral estate underlying the properties, and the State of Texas retained ownership of the mineral estate underlying the Neches River and navigable reaches of Pine Island Bayou. Today, the Preserve encompasses approximately 105,000 acres comprised of nine land units and six water corridors located in Jefferson, Hardin, Liberty, Polk, Tyler, Jasper and Orange Counties in Texas.

Although the United States does not own any of the mineral estate underlying the Preserve, Congress charged the NPS with protecting the Preserve from oil and gas operations that may adversely impact the Preserve’s resources and values. The statute states:

*“In the interest of maintaining the ecological integrity of the preserve, the Secretary [of the Interior] shall . . . promulgate and publish such rules and regulations in the Federal Register as he deems necessary and appropriate to limit and control the use of, and activities on, federal lands and waters with respect to . . . exploration for, and extraction of, oil, gas, and other minerals . . .”* 16 U.S.C. § 698c(b)

The establishment of the Preserve as a national preserve created a new National Park System category, which meets different criteria than other parks and recreation areas within the National Park System. These criteria were set forth in the House of Representatives committee report (House Committee Report No. 93-676 pertaining to the establishment of the Preserve and Big Cypress National Preserve, approved on the same date), as follows:

*In the past, the Congress has authorized and established many areas for inclusion in the National Park System: national parks, national monuments, national recreation areas, national historic sites, and others. A systematic effort has been made to establish standards or criteria for each of these different categories in an effort to maintain the integrity of the values which each attempts to serve. The description of the [Preserve] area as a national preserve will establish a new category which can serve as a feasible and desirable vehicle for*

*the consideration of other nationally significant natural areas which differ from the qualities attributed to national parks and national recreation areas. The committee chose to call the area a preserve rather than a reserve, feeling that such distinction may be important. Reserve refers to stock – a commodity held for future use. Preserve refers more definitively to the keeping or safeguarding of something basically protected and perpetuated for an intended or stated purpose, as with the specific objectives for [Preserve] provided by this legislation. In general, national preserves will be areas of land and/or water which may vary in size, but which possess within their boundaries exceptional values or qualities illustrating the natural heritage of the Nation. Such areas would often be characterized by significant scientific values, including, but not limited to, ecological communities illustrating the process of succession, natural phenomena, or climax communities. In addition they could be characterized by a habitat supporting a vanishing, rare or restricted species; a relict flora or fauna persisting from an earlier period; or large concentrations of wildlife species. Other scientific, geologic, geomorphic or topographic values might also contribute to the purposes for which an area might be recognized.*

*The principal purpose of these areas should be the preservation of the natural values which they contain. They might differ, in some respects, from national parks and monuments insofar as administrative policies are concerned. Hunting, for example, subject to reasonable regulation by the Secretary, could be permitted to the extent compatible with the purposes for which the area is established. Other activities, including the extraction of minerals, oil, and gas could be permitted if such activities could be conducted without jeopardizing the natural values for which the area seeks to preserve. Management of the watershed resources might also be appropriate if that would enhance the value of the preserve as it serves other needs.*

*All management activities within these areas should be directed toward maintaining the natural and scientific values of the area, including the preservation of the flora and fauna and the reestablishment of the indigenous plant and animal life, if possible. Areas where scientific discoveries or historical events took place would contribute to the values of the preserve and should be managed in a manner which will maximize both the natural and historical values.*

*National preserves may accommodate significant recreational uses without impairing the natural values, but such public use and enjoyment would be limited to activities where, or periods when, such human visitation would not interfere with or disrupt the values which the area is created to preserve. Construction of physical facilities of any kind would be minimized and would be limited to those developments which are essential to the preservation and management of the area and the safety of the public. To the extent such facilities are deemed necessary and appropriate, they would be constructed in a manner which would minimize their impact on the environment and their intrusion on the natural setting.*

Given the park's enabling statute, oil and gas exploration and development activities at the Preserve are activities clearly contemplated by Congress and addressed in both statute and NPS regulations. Mineral exploration and development is addressed in the Preserve's *General Management Plan* (1980), and *Oil and Gas Management Plan* (2006).

### **1.2.3 NPS Nonfederal Oil and Gas Regulations, 36 CFR 9B**

The authority to manage and protect federal property arises from the Property Clause of the U.S. Constitution. The Property Clause provides that “Congress shall have Power to dispose of and make all needful Rules and Regulations respecting the Territory or other Property belonging to the United States . . .” (U.S. Const. Art. IV, § 3, cl. 2).

In 1916, Congress exercised its power under the Property Clause and passed the NPS Organic Act, 16 U.S.C. § 1 et seq. Section 3 of the Organic Act authorizes the Secretary of the Interior to “make and publish such rules and regulations as he may deem necessary or proper for the use of the parks...” (16 U.S.C. § 3).

Pursuant to § 3 of the NPS Organic Act and individual park statutes, including that of Preserve, the Secretary of the Interior promulgated regulations at 36 CFR Part 9, Subpart B (“9B regulations”) in 1979. The 9B regulations apply to operations that require access on or through federally-owned or controlled lands or waters in connection with non-federally owned oil and gas in all National Park System units (36 CFR § 9.30(a)).

The NPS Nonfederal Oil and Gas Rights Regulations (36 CFR 9B) and other regulatory requirements assist park managers in managing oil and gas activities so they may be conducted in a manner consistent with the NPS mandate to protect park resources and values. In implementing these regulations, the NPS must determine whether proposed operations meet the 36 CFR 9B approval standards and whether the operations have the potential to impair park resources and values.

Section 9.32(e) of the regulations governs operators that propose to develop nonfederal oil and gas rights in a park by directionally drilling a well from a surface location outside unit boundaries to a location under federally-owned or controlled lands or waters within park boundaries. It is limited in scope to those aspects of the directional drilling operation occurring within park boundaries.

Per § 9.32(e), an operator may obtain an exemption from the 9B regulations if a Regional Director is able to determine from available data that a proposed drilling operation under the park poses “no significant threat of damage to park resources, both surface and subsurface, resulting from surface subsidence, fracture of geological formations with resultant fresh water aquifer [sic] contamination or natural gas escape or the like.” The regulations define operations as “all functions, work and activities within a unit in connection with exploration for and development of oil and gas resources, the right to which is not owned by the U.S...” (36 CFR § 9.31(c), underlining added). The potential impacts considered in the §9.32(e) exemption process relate only to effects on park resources from downhole activities occurring within the boundary of the park, not threats to park resources associated with the operation outside park boundaries.

Under the regulations, the NPS may determine that:

1. An operator qualifies for an exemption from the regulations with no needed mitigation to protect park resources from activities occurring within park boundaries;

2. An operator qualifies for an exemption from the regulations with needed mitigation to protect subsurface park resources from activities occurring within park boundaries; or
3. An operator must submit a proposed plan of operations and a bond to the NPS for approval.

Each one of these legally permissible options is briefly described below.

1. Exemption with No Mitigation (*no approval or permit issued*): The NPS determines that the proposed operation inside the park qualifies for an exemption under § 9.32(e) without any mitigation or conditions required by the NPS on the downhole activities. This option will arise when there is no potential for surface or subsurface impacts in the park from the downhole activities (e.g., the wellbore does not intercept an aquifer with useable quality groundwater within the park). Under this option, the NPS is not granting an approval or issuing a permit.
2. Exemption with Mitigation (*no approval or permit issued*): The NPS determines that the proposed operation inside the park qualifies for an exemption under § 9.32(e) if there is no potential for surface impacts to park resources from downhole operations in the park and the operator adopts mitigation measures or conditions that reduce potential impacts on subsurface resources (e.g., an aquifer) to "no measurable effect." As in option #1 above, the NPS is not granting an approval or issuing a permit.
3. Plan of Operations (approval and "permit" issued): This regulatory option would apply if the NPS determines that it cannot make the requisite finding for a § 9.32(e) exemption because (1) impacts to surface resources from the downhole operations are involved, or (2) impacts to subsurface resources cannot be adequately mitigated to yield "no measurable effect." This option would also apply if an operator does not apply for an exemption and the NPS does not consider granting an exemption on its own initiative. In these cases, a prospective operator must submit and obtain NPS approval of a proposed plan of operations and file a bond before commencing directional drilling activities inside a park. The required plan and bond will be limited in scope to those aspects of the directional drilling operation that occur within park boundaries. As a result, many of the general plan information requirements set forth under § 9.36 would not apply. Mitigation measures and/or conditions of approval would be integral to this option. Such mitigation could encompass the protection of cultural resources, cave/karst resources, aquifers, floodplains, wetlands and other surface resources from operations occurring inside the park. Under this option, an operator must have the NPS's approval of a proposed plan before commencing any activity in the boundaries of the park. The approved plan constitutes the operator's "permit."

Based on the information presented in this EA and Endeavor's submitted application for proposed actions, the proposed directional well re-completion would qualify for an Exemption with No Mitigation (Option 1), because no surface access in the Preserve would be needed for any phase of drilling, production, transportation, or reclamation activities; and the wellbore would be drilled to cross into the Beaumont Unit at a substantial depth of 8,820 feet, so as to not cross usable quality groundwater at a depth of 1,850 feet. As detailed in the following Sections of this EA, the NPS identified no resource(s) on the surface of the Preserve, or immediately underlying the Preserve that would be negatively impacted by the wellbore since the drilling passes under the Preserve at substantial depths to extract hydrocarbons and other



associated fluids. Therefore, no significant threat to park resources or values exists based on methods and materials Endeavor proposes (in Section 2.2) to use to re-drill, case, cement, or plug and abandon the sections of the hole located inside the Beaumont Unit. Likewise, if the well is produced, methods of completion, stimulation, or injection, proposed by Endeavor in Section 2.2, that occur inside the Preserve within the borehole would not pose a substantial threat of damage to the Preserve's resources and values.

#### ***1.2.4 Protecting Park Resources from External Activities***

The NPS may seek compensation under 16 U.S.C. § 19jj and other appropriate statutes, if any activities outside park boundaries, including oil and gas operations, damage park resources.

#### ***1.2.5 NPS Monitoring of Nonfederal Oil and Gas Operations***

The NPS's ability to monitor and inspect directional drilling operations is limited to downhole operations within the park (e.g., setting and cementing surface casing and plugging operations, etc.). As a practical matter, monitoring of downhole activities inside the park can only be accomplished from the surface location outside the park. As a result, the NPS may need to access the surface location and should make such access a condition of an exemption under Option 2 or a condition of approval under Option 3. The NPS must coordinate the timing of such access with the operator. For directional drilling operations sited outside a park, the 9B regulations provide no authority to require an operator to grant the NPS access for the purpose of observing compliance with terms unrelated to the downhole activities inside the park. When the NPS has made an upfront determination that a directional drilling operation is exempt without conditions from the regulations because of the lack of impacts, there is no 9B regulatory reason to access the surface location outside the park (Option 1).

Where a state or federal agency, other than the NPS, has applied mitigation measures via their respective environmental compliance or permitting processes, that agency, not the NPS, has sole responsibility for monitoring and enforcing its mitigation measures. In the event the NPS becomes aware of a compliance concern related to another agency's jurisdiction, the NPS would alert that agency in a constructive manner.

#### ***1.2.6 National Environmental Policy Act of 1969 (NEPA)***

The NEPA applies to major federal actions. NEPA requires agencies to take a "hard look" at the environmental consequences of their Proposed Actions (Robertson v. Methow Valley Citizens Council, 490 U.S. 332, 350 (1989)). A legally adequate NEPA document (EA or EIS) must consider the direct, indirect, and cumulative impacts (effects) of the Proposed Action on the environment, along with connected, cumulative and similar actions (40 CFR § 1508.25; DO-12 Handbook, Chapter 2, § 2.4).

The requirements of NEPA are triggered by federal actions (projects, activities, or programs funded in whole or in part under the direct or indirect jurisdiction of a federal agency, including those carried out by or on behalf of a federal agency; those carried out with federal financial assistance; those requiring a federal permit, license, or approval; and those subject to state or local regulation administered pursuant to a delegation or approval by a federal agency). The NEPA process must be completed before a decision can be made to proceed with the proposal.

While it can be argued that NEPA is not triggered under Options #1 and #2 described above because the NPS does not grant an approval or issue a permit under these options, the prudent course of action the NPS has selected is to comply with this statute in making § 9.32(e) determinations. In addition, the NEPA document will contain the analysis and documentation required under § 9.32(e) and will disclose to the public the potential impacts that could occur both inside and outside of the Preserve. The types of impacts considered are direct, indirect, and cumulative.

Actions related to these types of impacts may be described as connected, cumulative, or similar.

1. Connected actions are closely related and, therefore, should be discussed in the EA. Actions are connected if they:
  - (i) automatically trigger other actions, which may require environmental analysis under NEPA;
  - (ii) cannot or will not proceed unless other actions are taken previously or simultaneously; or
  - (iii) are interdependent parts of a larger action and depend on the larger action for their justification.

Connected actions occurring outside of the park related to the Proposed Action (directional drilling operation outside the park) include the re-construction of the wellpad, gas flowline, and access road; re-drilling and completion; hydrocarbon production and transportation; and well plugging and surface reclamation. The impacts of these connected actions both inside and outside of the Preserve will be addressed in this EA.

2. Cumulative actions are actions that, when viewed with other proposed actions, may have cumulatively significant impacts and should, therefore, be discussed in the same environmental document.

Cumulative actions associated with the Proposed Action that should be analyzed in the NEPA document include surface re-drilling and production operations outside of the Preserve as well as any other activities that may have additive impacts to resources (e.g., logging, road building, construction projects, prescribed burns, etc.).

3. Similar actions are actions that, when viewed with other reasonably foreseeable or proposed agency actions, may have similarities that provide a basis for evaluating their environmental consequences together, such as common timing or geography. An agency may wish to analyze these actions in the same NEPA document. The agency should do so when the best way to assess the combined impacts of similar actions or reasonable alternatives to such actions is to treat them in a single impact assessment.

Similar actions associated with the Proposed Action could include activities such as the construction of private and public roads, drilling of water wells, and other types of construction activities. Similar actions were not identified for analysis in this EA.

### ***1.2.7 Approved Park Planning Documents***

Approved park planning documents also provide a framework for determining how nonfederal oil and gas operations are conducted within the Preserve.

The General Management Plan (GMP) is the major planning document for all National Park System units. The GMP sets forth the basic philosophy of the unit, and provides strategies for resolving issues and achieving identified management objectives required for resource management and visitor use. The GMP includes environmental analysis and other required compliance documentation. A GMP was completed for the Preserve in 1980. The Preserve anticipates preparing a new GMP in the coming years.

The NPS completed an *Oil and Gas Management Plan* for the Preserve on February 28, 2006 (NPS 2006b). The *Oil and Gas Management Plan*:

- identifies Preserve resources and values susceptible to adverse impacts from oil and gas operations;
- establishes performance standards and impact mitigation measures for oil and gas operations to protect and prevent impairment to Preserve resources and values from adverse impacts from oil and gas operations;
- establishes performance standards and impact mitigation measures for oil and gas operations to avoid or minimize impacts from oil and gas operations on visitor use and enjoyment, and human health and safety;
- provides holders of oil and gas rights reasonable access for exploration and development; and
- provides pertinent information to oil and gas operators to facilitate planning and compliance with NPS and other applicable regulations.

Endeavor's Proposed Action is in accordance with the goals and objectives articulated in the above mentioned planning documents.

### 1.3 IMPAIRMENT

NPS *Management Policies 2006*, require analysis of potential effects to determine whether or not actions would impair park resources (NPS 2006a). The fundamental purpose of the national park system, established by the Organic Act and reaffirmed by the General Authorities Act, as amended, begins with a mandate to conserve park resources and values. NPS managers must always seek ways to avoid, or to minimize to the greatest degree practicable, adversely impacting park resources and values. However, the laws do give NPS the management discretion to allow impacts to park resources and values when necessary and appropriate to fulfill the purposes of a park, as long as the impact does not constitute impairment of the affected resources and values. Although Congress has given NPS the management discretion to allow certain impacts within parks, that discretion is limited by the statutory requirement that NPS must leave park resources and values unimpaired, unless a particular law directly and specifically provides otherwise. The prohibited impairment is an impact that, in the

professional judgment of the responsible NPS manager, would harm the integrity of park resources or values. An impact to any park resource or value may constitute an impairment, but an impact would be more likely to constitute an impairment to the extent that it has a major or severe adverse effect upon a resource or value whose conservation is:

- Necessary to fulfill specific purposes identified in the establishing legislation or proclamation of the park;
- Key to the natural or cultural integrity of the park; or
- Identified as a goal in the park's General Management Plan (1980) or other relevant NPS planning documents.

Impairment may result from NPS activities in managing the park, visitor activities, or activities undertaken by concessionaires, contractors, and others operating in the park. A determination on impairment is made under each alternative for each resource topic carried forward in the *Environmental Consequences* section of this EA.

#### **1.4 UNACCEPTABLE IMPACTS**

The impact threshold at which impairment occurs is not always readily apparent. Therefore, NPS will apply a standard that offers greater assurance that impairment will not occur. NPS will do this by avoiding impacts that it determines to be unacceptable. These are impacts that fall short of impairment, but are still not acceptable within a particular park's environment. Preserve managers must not allow uses that would cause unacceptable impacts; they must evaluate existing or proposed uses and determine whether the associated impacts on park resources and values are acceptable.

Virtually every form of human activity that takes place within a park has some degree of effect on park resources or values, but that does not mean the impact is unacceptable or that a particular use must be disallowed. Therefore, for the purposes of these policies, unacceptable impacts are impacts that, individually or cumulatively, would:

- Be inconsistent with a park's purposes or values;
- Impede the attainment of a park's desired future conditions for natural and cultural resources as identified through the park's planning process;
- Create an unsafe or unhealthful environment for visitors or employees;
- Diminish opportunities for current or future generations to enjoy, learn about, or be inspired by park resources or values; and
- Unreasonably interfere with:
  - park programs or activities,
  - an appropriate use,

- the atmosphere of peace and tranquility, or the natural soundscape maintained in wilderness and natural, historic, or commemorative locations within the park, or
- NPS concessioner or contractor operations or services.

In accordance with NPS *Management Policies 2006*, Preserve managers must not allow uses that would cause unacceptable impacts to park resources. To determine if unacceptable impact could occur to the resources and values of Preserve, the impacts of proposed actions in this EA were evaluated based on the above criteria. A determination on unacceptable impacts is under each alternative for each resource topic carried forward in the *Environmental Consequences* section for this EA.

## 1.5 APPROPRIATE USE

Section 1.5 of NPS *Management Policies 2006* (NPS 2006a), *Appropriate Use of the Parks*, directs that NPS must ensure the park uses that are allowed would not cause impairment of, or unacceptable impacts on, park resources and values. A new form of park use may be allowed within a park only after a determination has been made in the professional judgment of the park manager that it will not result in unacceptable impacts.

Section 8.1.2 of NPS *Management Policies 2006* (NPS 2006a), *Process for Determining Appropriate Uses*, provides evaluation factors for determining appropriate uses. All proposals for park uses are evaluated for:

- Consistency with applicable laws, executive orders, regulations, and policies;
- Consistency with existing plans for public use and resource management;
- Actual and potential effects on park resources and values;
- Total costs to NPS; and
- Whether the public interest will be served.

Park managers must continually monitor all park uses to prevent unanticipated and unacceptable impacts. If unanticipated and unacceptable impacts emerge, the park manager must engage in a thoughtful, deliberate process to further manage or constrain the use, or discontinue it.

The proposal to re-enter, directionally drill, and produce an existing well from private lands outside of the Preserve is consistent with applicable laws, executive orders, regulations and policies (as discussed more fully under the *Relationship to Regulations, Policies, Plans, and Permits* section), because the proposed Project would be located outside of the Preserve and directionally drilled under the Beaumont Unit to avoid impacts to the Preserve. As discussed under the *Relationship to Regulations, Policies, Plans, and Permits* above, the proposal to re-enter, directionally drill, and produce an existing well from private lands outside of the Preserve is consistent with existing Preserve Plans.

The actual and potential effects to Preserve resources and values from Endeavor's Blackstone Minerals B-2 well Re-entry and Directional Drill Project would be insignificant and temporary in nature. All ground disturbing well re-entry activities would take place beyond the limits of the Preserve. Under Alternative B (proposed action), Endeavor would re-enter, directionally drill, and produce an existing well from private lands outside of the Preserve. The Project would not cause long-term impairment of, or unacceptable impacts on, Preserve resources and values.

Endeavor is a private company with sole financial responsibility for well maintenance and operations; therefore, no monetary costs, other than those associated with processing the company's application for a § 9.32(e) exemption, would be imposed on NPS.

For the reasons described in this section, NPS finds Endeavor's Blackstone Minerals B-2 well re-entry and directional drill below the Beaumont Unit an appropriate use of the Preserve.

## **1.6 ISSUES AND IMPACT TOPICS EVALUATED**

In accordance with NPS Director's Order 12, scoping, or requesting early input before the analysis formally begins, is required on all EAs prepared by NPS. Although public scoping is encouraged where an interested or affected public exists, issuing offices are only required to involve appropriate federal, state, and local agencies and any affected Indian tribe. The issuing office decides the method of scoping. Early in the planning and development of the directional drilling applications by Endeavor, the NPS conducted scoping with Endeavor and their consultant, Environmental Resources Management (ERM), to identify the resources, values, and other concerns that could be potentially impacted by drilling and producing the wells, to define major issues, alternatives, potential impacts, and mitigation measures. Scoping was conducted through meetings, telephone conversations, written comments, and on-site observations and assessments. The Preserve released a public scoping brochure on the Proposed Action to solicit public input prior to completing this EA.

For Endeavor's Proposed Action, the Preserve released a public scoping brochure on November 21, 2008, to announce a 30-day public scoping period. The public scoping brochure was mailed to affected state, federal and local agencies, and other interested persons and organizations, including: the Alabama-Coushatta Tribe of Texas, the Big Thicket Association, Endeavor Natural Gas, L.P., ERM, Davis Ross Oil Producers, the Lone Star Chapter and Houston Regional Group of the Sierra Club, the Lower Neches Valley Authority (LNVA), the Railroad Commission of Texas (RRC), the Texas Conservation Alliance, the Texas Historical Commission (THC), Texas Parks and Wildlife Department (TPWD), U.S. Army Corps of Engineers (USACE), U.S. Fish and Wildlife Service (USFWS) and the Texas U.S. Senators and local Congressman. The Preserve also posted the public scoping brochure on the park's website.

A scoping comment letter was received from the Alabama-Coushatta Tribe of Texas. The comment letter did not identify any new issues or alternatives for analysis that were not already listed in the public scoping brochure. Another scoping comment letter was received from the Lonestar Chapter and Houston Regional Group of the Sierra Club. This comment letter did not identify any alternatives for analysis that were not already listed in the public scoping brochure and requested that an EIS be prepared in lieu of this EA.

Based on Project scoping concerns, and the level and extent of potential impacts likely to occur, the NPS determined that the impact topics listed in Table 1-1, below, would likely have more than negligible impacts and, therefore, would be carried forward for detailed analysis in Section 3 of this EA. Other topics were addressed by conducting a screening-level assessment of potential impacts; however, these were dismissed from further analysis, because their impacts would not be expected to exceed negligible levels (see Section 1.4 and Table 1-3).

Table 1-1 Impact Topics Carried Forward for Detailed Analysis in Section 3

<b>Blackstone Minerals B-2 Well</b>
<ul style="list-style-type: none"> <li>• Natural Soundscape in and outside the Unit</li> <li>• Lightscapes/Night Sky in and outside the Unit</li> <li>• Adjacent Landowners, Resources and Uses outside the Unit:</li> <li>• Visitor Use and Experience in the Unit</li> </ul>

Based on the above list of impact topics, issue statements were developed to help define problems or benefits pertaining to the proposal to drill and produce the directional well (see Table 1-2). The issue statements describe a cause and effect relationship between an activity and the impact topic.

Table 1-2 Issue Statements for Impact Topics Retained for Detailed Analysis

<b>Impact Topic</b>	<b>Issue Statement</b>
Natural Soundscape in and outside the Unit	<ul style="list-style-type: none"> <li>• Existing natural soundscapes in the area of analysis are affected by human development not related to the proposed action such as nearby residential development, periodic logging operations and other land management activities on properties adjacent to the wellpad site, flowline, and access road. Natural sounds are intrinsic elements of the environment that are vital to the functioning of ecosystems and can be used to determine the diversity and interactions of species within communities. Natural soundscapes are often associated with parks and preserves and are considered important components of the visitor experience as well as the natural wildlife interactions.</li> <li>• Construction and associated noise related to the upgrade and/or maintenance of the existing access road spur, wellpad, and flowline could affect the quality of the natural soundscape in the general vicinity of the operation. This would occur primarily during the construction and drilling phases, but would extend on a smaller scale to the production phase.</li> <li>• Vehicles and equipment used for construction and/or maintenance of the access road spur, wellpad, and flowline; and well completion, production, plugging, and reclamation activities, could result in increased noise in the vicinity of the operation.</li> </ul>
Lightscapes/ Night Sky in and outside	<ul style="list-style-type: none"> <li>• The existing lightscape in the area of analysis is relatively natural, with only small residential lights in the vicinity of the wellpad, flowline, and access road</li> </ul>



the Unit	<p>spur. Typical impacts to natural lightscapes include the introduction of artificial light sources such as permanent lights used at residences and oil and gas production sites, and temporary lights on vehicles and equipment.</p> <ul style="list-style-type: none"> <li>• Re-completing the well would require the use of rig and location lighting. If the well proves to be productive, automated location lighting may be permanently installed over the producing life of the well. Artificial lighting could interfere with views of the night sky in the area of activity, and possibly affect wildlife.</li> </ul>
Adjacent Landowners, Resources and Uses	<ul style="list-style-type: none"> <li>• Well re-completion activities, production facilities, flowlines, and the upgrade to the existing access road spur outside the Preserve could result in adverse impacts on neighboring lands and landowners, including impacts on certain other resources (vegetation, wildlife, soils and geology and cultural resources) that could be affected outside the Preserve at more than negligible levels.</li> </ul>
Visitor Use and Experience in the Unit	<ul style="list-style-type: none"> <li>• Construction, re-completion and production of the proposed well re-entry site could result in adverse impacts to Visitor Use and Experience due to the possible impacts on soundscapes and lightscapes, as detailed above.</li> </ul>

### 1.7 ISSUES AND IMPACT TOPICS ELIMINATED FROM FURTHER ANALYSIS

In this section, and later in Section 3 of this EA, the NPS conducts a screening-level assessment of all potential impacts by considering the direct, indirect, and cumulative effects of the Proposed Action on the environment, along with connected and cumulative actions. In this section of the EA, NPS provides a limited evaluation and explanation as to why some impact topics are not evaluated in more detail. Impact topics are dismissed from further evaluation in this EA if:

- they do not exist in the area of analysis,
- they would not be affected by the proposal, or the likelihood of impacts are not reasonably expected, or
- effects (following any needed mitigation) would not exceed minor levels, and there is little controversy on the subject or reason to otherwise include the topic. Generally, a minor effect would result in a detectable change, but the change would be small and of little consequence.

Because there would be no effect or the effects would be minor or less, there would either be no or little contribution towards cumulative effects from these topics. For each issue or topic

presented below, if the resource is found in the area of analysis or the issue is applicable to the proposal, then a limited analysis of direct and indirect, and cumulative effects is presented. The basis for analyzing cumulative impacts in this section and Section 3 of the EA is provided in the descriptions under the headings “Socioeconomics” in this section of the EA, and under the heading “Cumulative Impacts” in the introduction of Section 3 of the EA.

There is no impairment analysis included in the limited evaluations for the dismissed topics because the NPS’s threshold for considering whether there could be an impairment is based on “major” effects. The impact threshold at which impairment occurs is not always readily apparent. Therefore, the NPS will apply a standard that offers greater assurance that impairment will not occur. The NPS will do this by avoiding impacts that it determines to be unacceptable. These are impacts that fall short of impairment, but are still not acceptable within a particular park’s environment.

Park managers must not allow uses that would cause unacceptable impacts; they must evaluate existing or proposed uses and determine whether the associated impacts on park resources and values are acceptable. Virtually every form of human activity that takes place within a park has some degree of effect on park resources or values, but that does not mean the impact is unacceptable or that a particular use must be disallowed. Therefore, for the purposes of these policies, unacceptable impacts are impacts that, individually or cumulatively, would:

- be inconsistent with a park’s purposes or values, or
- impede the attainment of a park’s desired future conditions for natural and cultural resources as identified through the park’s planning process, or
- create an unsafe or unhealthful environment for visitors or employees, or
- diminish opportunities for current or future generations to enjoy, learn about, or be inspired by park resources or values, or
- unreasonably interfere with
  - park programs or activities, or
  - an appropriate use, or
  - the atmosphere of peace and tranquility, or the natural soundscape maintained in wilderness and natural, historic, or commemorative locations within the park, or
  - NPS concessioner or contractor operations or services.

For all of the topics described below, impacts either did not meet the unacceptable impact criteria or effects were of such low intensity that they were deemed acceptable. These topics (Table 1-3) have thus been eliminated from further analysis for one or more of the reasons listed above.

Table 1-3 Impact Topics Eliminated from Further Analysis

<b>Blackstone Minerals B-2 Well</b>
<ul style="list-style-type: none"> <li>• Geology and Soils in the Unit</li> <li>• Water Resources, Floodplains, and Wetlands in and outside the Unit</li> <li>• Vegetation in the Unit</li> <li>• Fish and Aquatic Life in or outside the Unit</li> <li>• Threatened and Endangered Species in and outside the Unit and Other Species of Management Concern in the Unit</li> <li>• Cultural Resources in and outside the Unit</li> <li>• Air Quality in and outside the Unit</li> <li>• Catastrophic Incidents, such as Well Blowouts, Well Fires or Major Spills</li> <li>• Socioeconomics</li> <li>• Environmental Justice</li> <li>• Prime or Unique Farmland Soils in the Beaumont Unit</li> <li>• Climate Change</li> </ul>

The following sections explain why each of these topics was dismissed from further evaluation and provide limited analyses that support the dismissals. Where appropriate, the analyses describe the effects of “in-park operations” and “connected actions,” which are defined below:

- **In-Park Operations** would consist of the subsurface operations taking place under the Unit – i.e., the wellbore crossing into the Unit at substantial depths, so as to not cross usable quality ground water, to reach a bottomhole target beneath the Unit to extract hydrocarbons and other associated fluids from beneath the Unit.
- **Connected Actions** would consist of activities associated with access road maintenance; construction and maintenance of the well pad, production facilities and flowline, drilling and completion, hydrocarbon production and transportation and well plugging and surface reclamation outside the Unit.

The analysis of impacts from in-park operations contains the analysis and documentation required under § 9.32(e). The analysis of impacts from connected actions satisfies a broader NEPA requirement to assess impacts on the human and natural environment.

### ***1.7.1 Geology and Soils in the Beaumont Unit***

The geology and soils within the Preserve adjacent to the proposed well re-completion were examined to determine if more than negligible effects could occur from either in-park or connected actions. The soils and characteristics of the areas surrounding the existing well pad site are described below.

According to the U.S. Department of Agriculture (USDA) Natural Resource Conservation Service (NRCS) Soil Survey for Hardin County (2008), the general soil series within the site is

listed as Spurger very fine sandy loam. Spurger very fine sandy loam is typically found in association with terrace riser landforms with a zero to two % slope and is moderately well drained.

#### *1.7.1.1 Impacts from In-Park Operations*

Under the Proposed Action, the well would be re-entered and re-completed using directional drilling methods beneath the Preserve at a substantial depth under the land surface. The existing Blackstone Minerals B-2 well pad is located approximately 1,280 feet north of the closest portion the Preserve (the Beaumont Unit), and approximately 1,850 feet northeast of the Unit along the wellbore path. The wellbore would cross into the Unit at a measured depth of 9,800 feet true vertical depth of 8,820 feet and drill a six inch hole using fresh-water based drilling mud to a measured depth of 11,083 feet true vertical depth (TVD) of 9,969 feet, extracting hydrocarbons and other fluids from beneath the Unit.

Based on the depth below the surface of the Preserve, there would be negligible to no impacts on the geology and soils within the Preserve from the in-park subsurface oil and gas operations proposed for the well.

#### *1.7.1.2 Impacts from Connected Actions*

To evaluate whether the proposed activities outside the Preserve could impact geology and soils in the adjacent Unit, the NPS considered the potential for surface subsidence caused by the production of hydrocarbons and the potential for contamination of adjacent lands from operations outside the Preserve. For this, the NPS examined types and volumes of contaminants that would be present at the well/production site, the probability of release, and the potential for migration into the Unit.

The potential for subsidence is not a concern in the vicinity of the Preserve. The hydrocarbon producing zone is deep and has moderate porosity. There is a long history of oil and gas production in the area without evidence of subsidence occurring. The geologic strata located beneath the drilling site include the Vicksburg formation to 7,706 feet depth below surface (dbs), the Jackson formation to 8,298 feet dbs and the Yegua formation to 10,092 feet dbs (Endeavor, 2008). The target stratum for this operation is the Yegua formation at a depth below 9000 feet. This formation has produced a reported 59.6 billion cubic feet (BCF) of natural gas, 5.2 million barrels (bbls) of condensate and 233 thousand bbls of salt water from the Pine Island Bayou field (which includes the Blackstone Minerals Well B2 well) with no noticeable subsidence.

#### *1.7.1.3 Impacts from Contaminant Runoff*

The potential for runoff of contaminants onto Preserve soils resulting from the Proposed Action was evaluated at the site. Based on site observations, there is very little potential for impacts to geology and soils in the Preserve at the well location, as described below:

The potential for runoff of contamination to offsite soils was considered for all phases of oil and gas development: construction, drilling, production, and plugging/reclamation. The effects

from the connected actions to geology and soils would be primarily associated with surface impacts from vehicle use, construction, drilling, and fluid transport at the well pad and flowline corridor. Construction operations would require removal of vegetation, and disturbance of soils, especially at the well pad location. During rain events, runoff containing sediment or oils from construction equipment could reach adjacent lands. Drilling and production could result in releases of hydrocarbons, produced waters, water-based drilling mud, saltwater, condensate, or treatment chemicals, which could runoff to neighboring properties, along with soil from bare areas on the well pad site. No major spills would be likely, as described below (see “Catastrophic Incidents”).

Plugging and reclamation would provide for re-grading of soils and revegetation, but runoff and the potential for off-site contamination would persist until the site was totally reclaimed and any cleanup completed. However, the potential for runoff to reach lands inside the Preserve would be remote, based on site topography and the mitigation measures that Endeavor has committed to implement for all phases of the operation. The general topography across the existing well pad site is flat-lying and gradually slopes towards the southern end of the well pad site. Low gradient sheet flow drainage that may occur from the existing well pad site would initially be towards the Unit, but migration into the Unit is unlikely as it is over 1,200 feet away from the drilling location. Also, mitigation measures, described below, will further reduce the potential for runoff to reach the Preserve.

Mitigation would include scheduling construction to minimize construction during rain events, constructing a berm around the well pad, constructing a washout/emergency pit, using a closed-loop containerized mud system, storage of saltwater and condensate in steel tanks surrounded by a dyke, reducing the size of the well pad after drilling completion, constructing a 2-foot berm around the tank battery, and adherence to a Spill Prevention, Control, and Countermeasures (SPCC) Plan. Erosion control measures would include the use of mulching, seeding, silt fences, and hay bales (see Table 2-2 for a complete list of mitigation).

Reclamation would include restoring the site to original condition, removal of any contaminated soils, replacing topsoil, and revegetation. Based on these measures and site conditions, there would be a low potential for migration of contaminants into the Unit; and if it were to occur, there would be ample time and space to respond to even a major release before there would be impacts on geology and soils in the Unit. The potential for adverse impacts to soils and geology in the Unit would be negligible from the development of the Blackstone Minerals B-2 well over the short- or long-term.

#### *1.7.1.4 Cumulative Impacts*

Vehicle use, existing and future oil and gas operations in and outside the Preserve, maintenance of trans-park oil and gas pipelines, routine park operations, forestry operations adjacent to the Preserve, and continued land and residential development near the Preserve boundary would all contribute to cumulative impacts on geology and soils in the Preserve. The cumulative effect of drilling and producing the well projected in the Reasonably Foreseeable Development (RFD) scenario was considered in the Preserve’s *Oil and Gas Management Plan Environmental Impact Statement* (NPS 2005), and negligible to minor cumulative impacts were identified for this impact topic. Overall, the Proposed Actions would contribute negligible adverse effects to the cumulative impacts on geology and soils in the Preserve and adjacent lands.

#### 1.7.1.5 *Conclusion*

Because there would be negligible impacts to the Preserve's geology and soils from in-park oil and gas operations, and impacts from the connected actions would be negligible based on the flat site topography and mitigation, the topic of geology and soils in the adjacent Unit of the Preserve was dismissed from further analysis in this EA.

#### 1.7.2 *Water Resources and Quality: Ground water and Streamflow Characteristics, Floodplains and Wetlands in and outside the Beaumont Unit*

The water-related topics that are dismissed for the Endeavor Blackstone Minerals B-2 well include ground water, surface water quality, stream/drainage features and wetlands.

The existing well pad site and its associated access and flowlines are located on an upland area with no floodplains, wetlands, or special aquatic sites. One swale, or a shallow trough-like depression that carries water mainly during rainstorms, was identified within the eastern portion of the well pad site. The swale is fed from the north by runoff from agricultural land that flows over the existing well pad site and drains south of the existing well pad site into an adjacent mixed bottomland hardwood-cypress forest. The mixed bottomland hardwood-cypress forest, a National Wetland Inventory (NWI) mapped feature, abuts the LNVA Canal, approximately 1,250 feet south of the Site. An existing road would be used to gain entrance to the existing well site proposed for re-completion. According to the Texas Commission on Environmental Quality (TCEQ), usable quality groundwater occurs from the land surface to a depth of 1,850 feet; and the interval from land surface to a depth of 100 feet contains water of superior quality. Appendix A includes a Wetland Delineation Report prepared by ERM for the well pad site.

The only impact likely to affect water resources adjacent to the well pad would be the (unplanned) release of hydrocarbons, produced water (brine), sediment, or other chemicals that could runoff into any adjacent drainages (refer to Section 1.4.1 for a description of potential runoff during all phases of operation). No new bridges or culverts are planned for this site, so no sediment loading from road construction would occur. The chances of catastrophic releases are very low (see "Catastrophic Incidents"), and Endeavor has committed to several mitigation measures to reduce the chances of release of contaminating substances or sediment. Mitigation measures to protect water resources include: a ditch and ring levee around the well pad, a lined washout/emergency pit, a closed-loop containerized mud system, safety drip device, and placement of stormwater best management practices (BMPs) (e.g., hay bales and silt fence) on the southeast side of the drill site where runoff is toward the wetland (see Table 2-2 for a complete list of mitigation measures). Therefore, given the lack of water resources in the area and implementation of mitigation measures, potential for adverse impacts on the Unit's water resources, floodplains and wetlands in or outside the Unit would be negligible from the development of the Blackstone Minerals B-2 well over the short or long-term.

#### 1.7.2.1 *Impacts from In-Park Operations*

Under the Proposed Action, the existing well would be re-entered and directionally drilled from outside the Preserve and cross into the Unit at a substantial depth, as described under in

Section 1.4.1 above. TCEQ Form-0051, Depth of Usable-Quality Ground Water to be Protected, states that usable quality water occurs from the land surface to a depth of 1,850 feet. The interval from the land surface to a depth of 100 feet contains water of superior quality which must be isolated from water in underlying beds. The proposed re-entry wellbore would cross into the Unit at a measured depth of 9,800 feet with 13 3/8" surface casing set at 1,900 feet and 9 5/8" intermediate casing set at 9,168 feet and a 7 inch liner set to 11,867 feet. The original well was completed using surface casing to protect the water table. The continued use of proper well casing and cementing, and plugging and abandonment procedures, as required by the Statewide Oil and Gas Rules administered by the RRC (and included as mitigation), would effectively isolate usable quality ground water zones. Therefore, the proposed in-park operations are expected to have no effect on surface water flows or usable quality ground water zones either in or outside the Unit as any usable quality ground water zones would be crossed outside of the Unit.

#### *1.7.2.2 Impacts from Connected Actions*

Similar to the in-park part of the operations, the continued use of existing well casing and cementing, and plugging and abandonment procedures, as required by the Statewide Oil and Gas Rules administered by the RRC and included as mitigation, would result in ensuring the isolation of usable quality groundwater zones. The chances of catastrophic releases are very low (see "Catastrophic Incidents"), and Endeavor has committed to several mitigation measures (e.g., SPCC Plan, secondary containment) to reduce the chances of releasing contaminating substances that could reach groundwater if released in sufficient quantities (see Table 2-2 for a complete list of mitigation measures). Therefore, the actions that involve subsurface drilling of the well would have no effect on usable quality groundwater either in or outside the Unit.

Surface water features that could be directly impacted by the connected actions would be limited to a depression swale located on the privately-owned well pad area. Due to mitigation measures that are part of Endeavor's proposal, no impacts to the hydrology or streamflow characteristics of any stream/drainage feature would be expected to occur.

#### *1.7.2.3 Cumulative Impacts*

Residential development, agricultural development, vehicle uses, existing and future oil and gas development, maintenance of trans-park oil and gas pipelines, routine park operations, forestry operations adjacent to the Unit, and land development near the Unit boundary could all affect water resources, floodplains or wetlands in the cumulative impacts analysis area. An analysis of the cumulative effect of drilling and producing the well projected in the RFD scenario was performed in the Preserve's *Oil and Gas Management Plan Environmental Impact Statement* (NPS 2005), and up to moderate impacts were identified from all actions that could affect water resources, floodplains and wetland in the cumulative impacts analysis area. The effects of the Proposed Action would not contribute more than negligible adverse impacts to the overall cumulative impact of all these actions in the region.

#### *1.7.2.4 Conclusion*

There would be no impacts on ground water or water resources from in-park oil and gas operations, and the impacts from the connected actions would be negligible, due to the low

potential for catastrophic releases, mitigation to prevent releases and the spread of any contamination, and the use of storm water BMPs on the well pad site. Therefore, these aspects of the water resources topic were dismissed from further analysis in this EA for the Endeavor Blackstone Minerals B-2 well.

### **1.7.3 Vegetation in the Beaumont Unit**

Impacts on vegetation would occur from the Proposed Action both outside the Preserve Unit (on adjacent lands where the well pad and flowlines are constructed), as well as on land located within the Unit if contaminated runoff occurs from the existing well pad site (similar to impacts to soils and geology in the Preserve, as discussed above). Impacts to vegetation within the Unit are not expected to exceed negligible levels, as discussed below. The following is a general description of vegetation found within the Unit adjacent to the proposed well re-entry pad site.

The vegetation in the area adjacent to the proposed well re-entry pad consists of various shrub/scrub species such as: rough dropseed (*Sporobolus asper*), eastern baccharis (*Baccharis halimifolia*), bushy bluestem (*Andropogon glomeratus*), annual marsh elder (*Iva annua* L.), giant goldenrod (*Solidago gigantea*), and a small stand of young loblolly pines (*Pinus taeda*) less than five years old.

#### **1.7.3.1 Impacts from In-Park Operations**

Under the Proposed Action, the well would be re-entered and directionally drilled into the Preserve at a substantial depth under the land surface, as described in Section 1.4.1. Therefore, there would be no impacts on vegetation either within or outside the Unit from the in-park subsurface oil and gas operations proposed for the well.

#### **1.7.3.2 Impacts from Connected Actions**

The possible impacts to the vegetation inside the Unit from all phases of development would be similar to those described above for the proposed well re-entry pad site (Section 1.4.1), with the primary concern being off-site migration of contaminants and sediment that could adversely affect adjacent vegetation. Hydrocarbons, chemicals, and produced water can damage or kill vegetation, and soils and sediment can smother plants or coat leaves. Herbicides used to control site vegetation could migrate off-site, although this is unlikely if they are applied according to label instructions.

As previously described, general topography within the site is flat land which gradually slopes towards the southern end of the site. The low gradient sheet flow drainage from the site is initially towards the Unit, but migration into the Unit is unlikely as it is over 1,280 feet away from the drilling location.

Mitigation that would reduce impacts to offsite vegetation would be similar to those measures listed in Section 1.4.1 and includes SPCC Plan implementation, berms, erosion control measures, and self-contained systems (see Table 2-2). There would be a low potential for migration of contaminants into the Unit; and if this were to occur, there would be ample time and space to respond to even a major release before there would be impacts on vegetation in the



Unit. For these reasons, and with the application of mitigation measures, potential adverse impacts to vegetation in the Unit from development of the well over the short- and long-term are expected to be negligible.

#### *1.7.3.3 Cumulative Impacts*

Existing and future oil and gas operations outside the Unit, residential development, maintenance of oil and gas pipelines transecting the park, and forestry operations adjacent to the Unit contribute to the cumulative impacts on vegetation. An analysis of the cumulative effects of drilling and producing the well projected in the RFD scenario was performed in the Preserve's *Oil and Gas Management Plan Environmental Impact Statement* (NPS 2005), and up to moderate adverse impacts were identified from all actions that could affect vegetation in the cumulative impacts analysis area. Considering that the type of vegetation that could be affected is primarily shrub scrub and pine plantation and the impacts would be indirect only, with no removal of vegetation, the effects of the Proposed Actions would not contribute more than negligible adverse impacts to the overall cumulative impact of all these actions in the region.

#### *1.7.3.4 Conclusion*

There would be no impacts on vegetation from in-park oil and gas operations, and impacts from the action would be negligible based on the low chance of a catastrophic release, mitigation to prevent releases and off-site contamination, and the relatively flat site topography and low runoff potential. Therefore, the topic of vegetation in the Unit was dismissed from further analysis in this EA.

#### *1.7.4 Fish, Wildlife and Species of Management Concern in and outside the Beaumont Unit*

The existing well pad site, located outside the Unit, would be situated in shrub-scrub vegetation that has been previously disturbed for oil and gas production. There are no water bodies in or within 1,200 feet of the existing well pad site that support fish populations or other aquatic life. A depressional swale identified near the existing well pad site holds water only immediately after large rain events. With the implementation of Endeavor's mitigation measures, potential for adverse impacts on the fish and wildlife would be negligible from the development of the well. Therefore, the topic of fish and wildlife was dismissed from further analysis.

Under the Endangered Species Act of 1973 (ESA), the NPS has responsibility to address impacts to federally-listed, candidate, and proposed species. Also, NPS policy requires that state-listed species, and others identified as species of management concern by the park, are to be managed in parks in a manner similar to those that are federally-listed. The Preserve does not have any species of management concern identified in addition to federal and state listed species. Therefore, federal and state listed species will be addressed in this EA following federal law and NPS policy.

Under NPS policy, the proposed operations would qualify for an exemption with no mitigation. Under this scenario, actions by the NPS with respect to the ESA (1973) are non-discretionary. The well would originate on lands located outside of the Unit, and the wellbore would cross through the Unit at a sufficient depth to preclude any effect on surface resources (species or habitat). Therefore, the NPS has no ESA § 7 responsibility or authority associated with the

proposed well re-entry , other than assessing potential impacts to threatened and endangered species from connected actions outside the Unit.

Appendix B provides USFWS lists of threatened or endangered species that may occur in Hardin County (where the Endeavor Blackstone Minerals B-2 well is located). Two species (red-cockaded woodpecker [*Picoides borealis*] and the Texas trailing phlox [*Phlox nivalis* ssp *texensis*]) are listed as endangered by the USFWS and potentially occurring in Hardin County. Appendix C contains a current listing by the TPWD of threatened, endangered, and state-identified species of concern that may occur in Hardin County, as well as a brief description of the habitats they require. The list includes twenty-one federally-listed threatened and endangered species: red-cockaded woodpecker (*Picoides borealis*); piping plover (*Charadrius melodus*); white-faced ibis (*Plegadis chihi*); wood stork (*Mycteria americana*); blue sucker (*Cycleptus elongates*); creek chubsucker (*Erimyzon oblongus*); paddlefish (*Polyodon spathula*); American black bear (*Ursus americanus*); Louisiana black bear (*Ursus americanus luteolus*); red wolf (*Canis rufus*) which was extirpated from eastern Texas; alligator snapping turtle (*Macrochelys temminckii*); American peregrine falcon (*Falco peregrinus anatum*); arctic peregrine falcon (*Falco peregrinus tundrius*); Bachman's sparrow (*Aimophila aestivalis*); bald eagle (*Haliaeetus leucocephalus*) which was delisted as of June 2007; swallow-tailed kite (*Elanoides forficatus*); Rafinesque's big-eared bat (*Corynorhinus rafinesquii*); timber/canebrake rattlesnake (*Crotalus horridus*); Louisiana pine snake (*Pituophis ruthveni*); northern scarlet snake (*Cemophora coccinea copei*); and Texas trailing phlox (*Phlox nivalis* ssp *texensis*). There is no federally designated critical habitat in or near the Unit of the Preserve.

#### 1.7.4.1 *Impacts from In-Park Operations*

As previously noted, under NPS policy, the proposed operation would qualify for an exemption with no mitigation. The well proposed for re-completion originates on land located outside of the Unit, and the wellbore will cross through the Unit at a sufficient depth to preclude any effect on surface resources. Therefore, the NPS has no § 7 responsibility or authority associated with the proposed well re-completion; however, it is anticipated that in-park operations will have no impact on threatened or endangered species in the Unit from the subsurface oil and gas operations.

#### 1.7.4.2 *Impacts from Connected Actions*

The Preserve has not documented any federally- or state-listed threatened and endangered species in the area of the existing Endeavor Blackstone Minerals B-2 well proposed for re-entry. The Blackstone Minerals B-2 well is located on abandoned, privately-owned, industrial lands and, to a large extent, the site is still covered by caliche rock, gravel and other stabilizing materials, including several concreted areas left over from previous oil and gas exploration activities.

A field investigation was conducted in November 2008 at the Blackstone Minerals B-2 site. There were no indications of any state- or federally-listed threatened or endangered species found on or in the vicinity of the proposed site, well pad, or flowline corridor. The design of Endeavor's proposal would avoid any surface disturbance of habitat in the Unit. Thus, no federally-listed, candidate or proposed species, nor state-listed species on the NPS acreage would be directly impacted by the proposal through removal or disturbance of soils or

vegetation. Less direct, yet potential impacts to species occupying the Unit could occur through noise disturbance, lightscape alterations, loss and fragmentation of habitat on adjacent private lands, and potential for spills of oil and other produced fluids. Appendix D includes a Threatened and Endangered Species Report prepared by ERM for the well pad site.

As previously described, the potential for more than short-term disturbances from noise or release of oil or hazardous substances is unlikely, based on site conditions and mitigation employed to reduce risk of runoff. Mitigation for potential oil spills which could affect habitat in the Unit is included in Section 2 of this EA. NPS determined that the re-entry, directional drilling and production of the Blackstone Minerals B-2 well would not affect federally-listed threatened or endangered species or their habitat in or outside the Unit, nor would there be impacts to the state-listed species which may possibly occur in the Unit. This determination is based upon a combination of factors. First, the habitat in the project area is not suitable for any of the species identified by USFWS. Second, there is an absence of observations of any species documented in Appendix A, Appendix B or Preserve records based on site-specific surveys completed by the proponent. Third, the depth with which the well would enter the Unit eliminates the possibility of surface habitat disturbance in the Unit.

#### *1.7.4.3 Cumulative Impacts*

Vehicle uses, existing and future oil and gas operations in and outside the Unit, maintenance of oil and gas pipelines transecting the park, routine park operations, recreational activities including hunting in and outside the Unit, and forestry operations adjacent to the Unit could impact threatened or endangered species, and other species of management concern. An analysis of the cumulative effect of drilling and producing the up to 40 wells projected in the RFD scenario was performed in the Preserve's *Oil and Gas Management Plan Environmental Impact Statement* (NPS 2005), and up to moderate adverse impacts were identified from all actions that could affect threatened and endangered species in the cumulative impacts analysis area. Considering the lack of habitat for state- and federally-listed species and the fact that the survey conducted for this EA found no listed species at the existing well location, the effects of the Proposed Action would not contribute more than negligible adverse impacts to the overall cumulative impact to species of management concern.

#### *1.7.4.4 Conclusion*

There would be no impacts on species of management concern from in-park oil and gas operations, and the connected actions would have no effect on federally-listed threatened and endangered species or their habitat in or outside the Unit; there would be no anticipated effect on any state-listed listed species within the Unit from the connected actions, based on the lack of habitat for these species at the well pad site, field survey results that indicate these species are not present, and mitigation (e.g., use of an existing industrial site) that would minimize impacts to wildlife in general. Therefore, the topic of species of management concern in and outside the Unit was dismissed from further analysis in this EA.

### *1.7.5 Cultural Resources in and outside of the Beaumont Unit*

Under § 106 of the National Historic Preservation Act of 1966, as amended, the NPS has a responsibility to consider the impacts that undertakings may have on cultural resources listed

on or eligible for listing on the National Register of Historic Places. The law also requires that agencies discuss their actions, before taking them, with the State Historic Preservation Office or Tribal Historic Preservation Officer, and (if necessary) the Advisory Council on Historic Preservation, as well as other consulting parties, such as certified local governments.

Under the Proposed Action, the well would be re-entered and directionally drilled from a surface location outside of the Unit. The wellbore would cross into the Unit at a depth below usable quality ground water to extract hydrocarbons and other fluids from beneath the Unit. The well would qualify for an exemption with no mitigation because the well would originate on land located outside of the Unit, and the wellbore would cross through the Unit at a sufficient depth so as to have no impact on the surface of the Unit. Under this scenario, actions by the NPS with respect to the National Historic Preservation Act are non-discretionary.

Because the in-park operations would have no effect on cultural resources inside the Unit, the NPS has no § 106 responsibility, nor authority, associated with the well for the proposed in-park operation for which a 9.32(e) exemption is being evaluated. As part of the NEPA analysis, however, the NPS is providing the following analysis of the effects of the actions on cultural resources. Impacts from in-park operations for the well are discussed below and dismissed from further analysis. Impacts outside the Unit at the Endeavor Blackstone Minerals B-2 existing well pad site were also dismissed because desktop research revealed no documented cultural resources near the previously disturbed industrial well pad site.

#### *1.7.5.1 Impacts from In-Park Operations*

Under the Proposed Action, the well would be re-entered and directionally drilled into the Preserve at a substantial depth under the land surface, as described in Section 1.4.1. Therefore, there would be no impacts on cultural resources either within or outside the Unit from the in-park subsurface oil and gas operations proposed for the well.

#### *1.7.5.2 Impacts from Connected Actions*

As part of the NEPA analysis, the NPS also considered the impacts of the actions on cultural resources in and outside the Unit. The NPS has no authority under 36 CFR § 9.32(e) to require Endeavor to contract an archeological survey in the project area on lands adjacent to the Unit. However, ERM performed a review of the Texas Archeological Sites Atlas maintained by the THC for all recorded and listed sites, and surveys within one mile of the re-entry site.

No cultural resources within one mile of the existing well pad site on both public and private lands were identified during research of THC records. Research has also been conducted within the Unit within the one mile search area, with no findings reported. Furthermore, Endeavor has chosen a previously disturbed industrial well pad site for Project development. If however, unanticipated cultural resources are discovered at the well pad site, Endeavor will cease activities and contact the appropriate authorities.

It is possible that undiscovered cultural resource sites exist in the Unit and outside the Unit, but the mitigation measures discussed above are expected to confine potentially adverse impacts to the well pad site. Therefore, adverse impacts to cultural resources in and outside the Unit are not expected from the Proposed Action.

#### 1.7.5.3 *Cumulative Impacts*

Vehicle uses, existing and future oil and gas operations in and outside the Unit, maintenance of oil and gas pipelines transecting the park, routine park operations, recreational activities including hunting in and outside the Unit, and forestry operations adjacent to the Unit could impact cultural resources in the analysis area; however, compliance with the National Historic Preservation Act is anticipated to result in projects undertaken within the Unit having no adverse effect. Over time, cultural resources outside the Unit could be incrementally lost, with cumulative adverse impacts on cultural resources and traditional cultural practices in the region.

An analysis of the cumulative effect of drilling and producing the up to 40 wells projected in the RFD scenario was performed in the Preserve's *Oil and Gas Management Plan Environmental Impact Statement* (NPS 2005), and up to moderate adverse impacts were identified from all actions that could affect cultural resources in the cumulative impacts analysis area. However, since no adverse impacts to cultural resources are expected in or outside of the Unit, the effects of this part of Proposed Action represent an overall negligible impact.

#### 1.7.5.4 *Conclusion*

Because there would be no known cultural resources affected in or outside of the Unit from in-park operations or connected actions from the proposed Blackstone Minerals B-2 well, the topic of cultural resources in and outside the Unit was dismissed from further analysis in this EA.

### 1.7.6 *Air Quality in and outside of the Beaumont Unit*

NPS air resource management policy has been developed in conjunction with requirements in the Clean Air Act (CAA) and the Environmental Protection Agency's regulations. The level of protection afforded to some park resources and values by the CAA may be the determining factor when deciding whether air quality impacts are acceptable. Air pollution sources within the park boundaries, must, by law, comply with all federal, state and local regulations depending upon the land ownership and type and size of pollution source. Preserve impairment determinations are not linked to exceeding the national ambient air quality standards (NAAQS), but mitigation measures would likely be required under the CAA if emissions from an activity caused or contributed to a NAAQS violation.

The CAA established NAAQSs to protect the public health and welfare from air pollution. The act also established the prevention of significant deterioration (PSD) of air quality program for protection of the air quality in relatively clean areas (i.e., those areas that are in attainment with the NAAQS). One purpose of the PSD program is to protect public health and welfare, including natural resources, from adverse effects that might occur even though NAAQS are not violated. Another purpose is to preserve, protect, and enhance the air quality in national parks, national wilderness areas, national monuments, national seashores, and other areas of special national or regional natural, recreational, scenic or historic value (42 U.S.C. 7401 *et seq.*). The PSD program includes a classification approach for controlling air pollution.

The Preserve is a Class II area and the CAA allows only moderate air quality deterioration in these areas. In no case may pollution concentrations violate any of the NAAQS.

Areas that do not meet the NAAQS for any pollutant are designated as “non-attainment areas.” Areas that were once designated non-attainment, but are now achieving the NAAQS are termed “maintenance areas.” In non-attainment areas, states must develop plans to reduce emissions and bring the area back into attainment of the NAAQS, and Proposed Actions must “conform to the State Implementation Plan (SIP), which establishes *de minimis* values for certain pollutants which cannot be exceeded, so as to limit pollution and reach attainment.

Under the CAA, the NPS is prohibited from permitting any activity that does not conform to the State of Texas’ implementation plan. The general conformity *de minimis* levels established by the SIP within Hardin County are 100 tons per year (TPY) of volatile organic compounds (VOCs), and 100 TPY of nitrogen oxides (NO<sub>x</sub>), which are both precursors to ozone formation. In addition, the TCEQ administers a permitting program for new or modified facilities or sources of air pollution with greater than 100 TPY (i.e., the PSD program).

Under its *Management Policies 2006* the NPS will seek to perpetuate the best possible air quality in parks to (1) preserve natural resources and systems; (2) preserve cultural resources; and (3) sustain visitor enjoyment, human health, and scenic vistas (sec.4.7.1).

The *Management Policies 2006* further states that the NPS will assume an aggressive role in promoting and pursuing measures to protect air quality related values from the adverse impacts of air pollution. In cases of doubt as to the impacts of existing or potential air pollution on park resources, the NPS “will err on the side of protecting air quality and related values for future generations.

The Unit is located north of the Beaumont/Port Arthur/Orange airshed and northeast of the Houston/Galveston airshed. “The primary pollutants transported from airsheds affecting the Preserve are VOCs, and NO<sub>x</sub>. Other air pollutants that could affect the Preserve include carbon monoxide (CO), sulfur dioxide (SO<sub>2</sub>), and particulate matter (PM; including heavy metals and lead; NPS Air Resources Division (ARD), 2007). Industrial activities and urbanization account for the majority of impacts to air quality in the Preserve when compared to nonfederal oil and gas operations or Preserve Management activity.

Ground-level ozone (sometimes referred to as smog) is formed by the reaction of VOCs and NO<sub>x</sub> in the atmosphere in the presence of sunlight. These two pollutants, often referred to as ozone precursors, are emitted by many types of pollution sources, including on-road and off-road motor vehicles, power plants and industrial facilities, and smaller sources, collectively referred to as area sources. The ozone season in the Beaumont/Port Arthur/Orange non-attainment area is typically eight months long, lasting from March through October with peak high ozone events occurring generally late August and September. Regulatory standards inside non-attainment areas for ozone precursors are 100 TPY of VOCs, and 100 TPY of NO<sub>x</sub> (TCEQ, 2007b).

Other values may be affected by air quality. These are referred to as “air quality-related values” and include such things as vegetation that may be sensitive to variety of air pollutants, especially ozone; visibility; and fish and wildlife resources that can be affected by air quality and effects of

pollutant deposition in water. The analysis in this document focused on the emissions of ozone precursors that can affect Preserve vegetation, as well as emissions of sulfur compounds that may affect plant growth, species composition and water quality by acidifying surface waters. Since it is difficult to relate these effects to a single oil and gas operation, and because the actual impacts to air quality related values depends on their chronic exposure to air affected by many industrial activities and urbanization in the area, a specific analysis of these values is not included, but the potential effects can be indirectly assessed by an analysis of emissions and impact levels.

Air quality in the region is influenced by activities occurring in the Beaumont/Port Arthur/Orange and Houston/Galveston airsheds. Industrialization and urbanization of these airsheds are the major sources of emissions. The primary pollutants transported by the Beaumont/Port Arthur/Orange airshed are VOCs and NO<sub>x</sub>. Other air pollutants that could affect the Unit and public health include CO, SO<sub>2</sub>, hydrogen sulfide (H<sub>2</sub>S), and PM.

#### *1.7.6.1 Impacts from In-Park Operations*

Under the Proposed Action, the well would be drilled from an existing well pad located outside the Unit's boundaries. In-park operations consist of the re- entering and directionally drilling wellbore into the plane of the Unit several thousand feet below the surface and extracting hydrocarbons and other fluids from beneath the Unit. These subsurface actions would have no impact on the surface air quality regardless of what the methods and materials are used to drill, case, cement, or plug and abandon the section of the holes inside the Unit. Therefore, there would be no impacts to the air quality in or outside the Unit from in-park operations.

#### *1.7.6.2 Impacts from Connected Actions*

Ground-disturbing activities associated with maintenance of the well pad and flowline would result in increased emissions of particulates in the vicinity of the activities. Greater use of motor vehicles during re-construction of the well pad, drilling, and production would increase particulate matter from vehicle exhaust and dust from paved and unpaved surfaces. Exhaust from machinery and equipment used intermittently during construction, drilling, and production would also contribute to an increase in PM, as well as emissions of hydrocarbons, NO<sub>x</sub>, and CO.

H<sub>2</sub>S could be encountered and released during operations. Past operations in the Preserve have not encountered H<sub>2</sub>S bearing zones. Texas RRC Statewide Rule 36 applies to operations in H<sub>2</sub>S areas. The rule does not apply where concentrations in the system are less than 100 parts per million (ppm), and the amount typically associated with past operations near the Preserve were much less than this limit. If zones containing H<sub>2</sub>S under pressure are encountered, the drilling mud would be adjusted to prevent the release of H<sub>2</sub>S and drilling would be discontinued until the pressure is stabilized and there is not gas entering the hole. The small amount of gas that could reach the surface would be vented and flared.

Prevailing winds could carry some pollutants associated with the Project into the Unit and the surrounding adjacent lands. Construction, drilling, and production would result in short-term, negligible to minor adverse effects on air quality in and outside the Unit, localized near the well pad site.

#### 1.7.6.3 *Cumulative Impacts*

Cumulative impacts to air quality in the area of analysis would result primarily from contaminants from the Beaumont/Port Arthur/Orange airshed, as well as from the Houston/Galveston airsheds. Industrialization and urbanization in these airsheds are the major sources of emissions. Vehicle use, recreational activities, development (including the Proposed Action and other oil and gas activity), and commercial timber activities would also contribute to air quality impacts in the analysis area. All these existing and reasonably foreseeable activities/pollution sources, in combination with the emissions expected from well development under the Proposed Action, would result in long-term, widespread, minor to moderate, adverse cumulative impacts on air quality.

#### 1.7.6.4 *Conclusion*

Under the Proposed Action, the well would be re-drilled and possibly completed to produce hydrocarbons. Maintenance of the flowline, wellpad, re-drilling and producing the well; eventual plugging and reclamation activities would result in negligible adverse impacts. There would be no impacts on air quality from in-park operations. Cumulative impacts would result in long-term, widespread, minor to moderate, adverse impacts.

#### 1.7.7 *Catastrophic Incidents, such as Well Blowouts, Well Fires or Major Spills*

One issue related to the Proposed Action is the potential for catastrophic incidents, including well blowouts, well fires, or major spills. The RRC oversees the state's oil and gas industry, gas utilities, pipelines, safety in the liquefied petroleum gas industry and surface mining and reclamation of coal and uranium. The RRC divides the state up into 12 districts for purposes of administering and regulating oil and gas operations under its jurisdiction, and maintains statistics on blowout and well control problems, and spills. In this section, data are provided for calendar years 2006 through 2008 for incidents reported in RRC District 3, which includes Preserve and would be representative of blowout events/well control problems, fires and spills that occur in or adjacent to the Preserve. RRC District 3 includes 29 counties in southeast Texas. Data are also presented for Hardin County within District 3 in which the well site and the Preserve are located.

As of September 2008, there were approximately 7,393 regular producing oil wells and 3,989 regular producing gas wells in RRC District 3, totaling 11,382 wells. Of these wells, a total of 898 wells or approximately eight percent of the RRC District 3 total are located within Hardin County where the Project is located. These include 818 oil wells (11 % of the District total) and 80 gas wells (two percent of the RRC District 3 total) (RRC 2009a).

Tables 1-4 and 1-5, below, show the number of reported well control problems, well fires, and major spills in RRC District 3 during calendar years 2006, 2007 and 2008 (RRC 2009b). Incidents of well fires were derived from two website sources that describe "Blowouts and Well Control Problems," and "H-8 Reported Spills."



**TABLE 1-4 Well Control Problems, Well Fires, and Major Spills – RRC District 3**

<b>Type of Incident</b>	<b>2006 No. of Incidents / Rate of Occurrence</b>	<b>2007 No. of Incidents / Rate of Occurrence</b>	<b>2008 No. of Incidents / Rate of Occurrence</b>
Blowouts or Well Control Problems During Drilling Operations	8 / 1:1,755 wells per year	3 / 1:6,756 wells per year	3 / 1:3,794 wells per year
Well Fires	0 / 0:14,042 wells per year	0 / 0:20,269 wells per year	0 / 0:11,382 wells per year
Major Oil Spills (defined as exceeding 5 bbls)	26 / 1:540 wells per year	34 / 1:596 wells per year	62 / 1:184 wells per year

**TABLE 1-5 Well Control Problems, Well Fires, and Major Spills – Hardin County**

<b>Type of Incident</b>	<b>2006 No. of Incidents / Rate of Occurrence</b>	<b>2007 No. of Incidents / Rate of Occurrence</b>	<b>2008 No. of Incidents / Rate of Occurrence</b>
Blowouts or Well Control Problems During Drilling Operations	1 / 1:1,536 wells per year	0 / 0:1,514 wells per year	0 / 0:818 wells per year
Well Fires	0 / 0:1,536 wells per year	0 / 0:1,514 wells per year	0 / 0:818 wells per year
Major Oil Spills (defined as exceeding 5 bbls)	2 / 1:768 wells per year	1 / 1:1,514 wells per year	3 / 1:273 wells per year

### *Well Blowouts*

The term “blowout” means the uncontrolled escape of formation fluids (water/brine, gas, and/or oil) from a well. Given present day technology, a well blowout is extremely rare. According to RRC data, the vast majority of reports deal with well control problems that never manifested in full, sustained blowouts. During 2006, 8 blowouts/well control problems were reported in RRC District 3, equating to approximately one blowout/well control problem for

every 1,755 wells per year (RRC 2009b). Of the three incidents reported in RRC District 3 during calendar years 2007 and 2008, none occurred within Hardin County.

Of the 38 directional wells drilled at the Preserve since 1986 for which NPS issued § 9.32(e) exemption determinations, there is only one well that reported well control problems. The well control problem reported by Comstock for the Blackstone B1 well did not result in a well blowout or well fire. During wireline operations to retrieve the measured well depth, the internal float on the drill string failed and the packoff on the wireline lubricator failed, resulting in oil-based drilling mud flowing up the drill pipe. The wireline was pulled out of the hole, the safety valve was shut in and the well was secured. No injuries or fatalities occurred during the incident. The well control problems did not result in impacts off the well pad; and there were no impacts on the resources or values of the Preserve.

### *Well Fires*

According to RRC data, over the last 66 years, there have been 50 fires associated with oil and gas wells in RRC District 3 (RRC 2009b). This equates to approximately 0.75 fires per year. During 2006 and 2007, there were no fires that resulted from well control problems encountered during well drilling or lightening strikes.

### *Major Spills*

The RRC defines “major spills” as those exceeding five bbls of oil, and requires reporting of releases of that amount (Tex. Admin. Code Tit. 16, § 3.20 (2005)). During 2006, in RRC District 3, there were 26 spills reported greater than five bbls of oil, equating to approximately one spill for every 540 wells per year (RRC 2009c).

Two of the 26 spills in 2006 were located in Hardin County in which the Project is located. It should be noted that any loss of product is reported, and some do not pertain to spills or releases that actually reach the ground. For example, during 2005, two reported incidents involved water haulers removing crude oil and gas well liquid in error from the wrong storage tanks instead of produced water.

Of the 26 reported spills in 2006, 13 spills (50%) occurred within tank batteries from a variety of causes including corrosion, equipment failure, human-error, and lightning strike. Most of the releases within tank batteries were contained within the diked areas. Five (19%) of the reported spills involved pipelines or flowlines. These spills were predominantly caused by corrosion.

Of the 26 reported spills in 2006, 11 spills (42%) consisted of quantities less than 20 bbls; four spills (12%) were between 21 and 50 bbls; seven spills (31%) were between 51 and 100 bbls; and four spills (12%) were between 101 and 1,159 bbls. Of the 26 spills reported, there was 100 % recovery of the spilled product in five spills (19%), 80 to 99 % recovery in eight spills (31%), 50 to 70 % recovery in six spills (23%), and zero to 49 % recovery in the remaining seven spills (30%).

During 2007, in RRC District 3, there were 34 spills reported greater than five bbls of oil, equating to approximately one spill for every 596 wells per year. One of the 34 spills was located in the Hardin County in which the Project is located.

During 2008, in RRC District 3, there were 62 spills reported greater than five bbls of oil, equating to approximately one spill for every 184 wells per year. Three of the 62 spills were located in the Hardin County in which the Project is located. It should be noted that 29 of the 62 spills report in RRC District 3 were related to damage from Hurricane Ike in September 2008.

Any oil and gas operator that could reasonably be expected to discharge oil in harmful quantities, as defined in 40 CFR 110.3, into navigable waters, as defined in 40 CFR 110.1, is required to have a SPCC Plan in accordance with 40 CFR Part 112. Under 40 CFR 112.14, some of the specific SPCC Plan requirements for onshore oil drilling and workover facilities include:

- Meet the general requirements listed under Sec. 112.7, and also meet the specific discharge prevention and containment procedures listed under this section.
- Position or locate mobile drilling or workover equipment so as to prevent a discharge as described in Sec. 112.1(b).
- Provide catchment basins or diversion structures to intercept and contain discharges of fuel, crude oil, or oily drilling fluids.
- Install a blowout prevention (BOP) assembly and well control system before drilling below any casing string or during workover operations. The BOP assembly and well control system must be capable of controlling any well-head pressure that may be encountered while that BOP assembly and well control system are on the well.

Due to these requirements, in the rare event of a major spill consisting of five or more barrels of oil, the spill would be rapidly contained and removed, so that impacts are short-lived and limited to the immediate area of operations. In the less likely event that a spill did occur and did spread into the Preserve, the impacts could be remedied and mitigated over time.

In the event that spilled substances from a well blowout, or other release, impacts the Preserve, or a well fire spreads into the Preserve, the NPS would seek damages and restoration costs under the Park System Resources Protection Act, 16 U.S.C. § 19jj. While applicability of the Park System Resources Protection Act would be applied only after damages to the Preserve's resources or values have occurred, this tool is also an effective means to assure that operators apply the necessary preventative measures to prevent an incident from affecting the Preserve.

#### *1.7.7.1 Impacts from In-Park Operations*

Under the Proposed Action, the well would be re-drilled from an existing well pad located outside the Unit's boundaries. The proposed in-park operations consist of directionally drilled wellbore crossing into the vertical plane of the Unit at depths below the usable quality groundwater zone and extracting hydrocarbons and other fluids from beneath the Unit. Therefore, the proposed in-park operations would have no impact on the surface. Likewise, if the well is produced, methods of completion, stimulation, or injection proposed by Endeavor in Section 2.2 that occur inside the Unit will not pose a substantial threat of damage to park resources. Surface subsidence caused by fluid withdrawals is not a reasonable expectation because of the properties (depth, porosity, compaction, hydropressure, etc.) of the target reservoirs and adjacent overlying sediments (Endeavor 2008). Fracture of geologic formations

with reluctant usable quality water zone contamination is not an issue in the § 9.32(e) determination because activities inside the Preserve would occur below the deepest usable quality water zone. Further, in-park operations would not occur at the surface, and therefore, have no potential for well-blowouts, well fires, or spills.

#### *1.7.7.2 Impacts from Connected Actions*

The NPS recognizes that unplanned incidents associated with oil and gas operations such as well blowouts, fires, and spills near the boundaries of the Preserve present a risk of damage to park resources and values. However, the rates of incidence for such impacts are low and are not a reasonable expectation of Project implementation. If such an incident did occur, required mitigation measures listed in Section 2.2 of this EA would reduce the potential for spilled substances or a well fire to spread into the Preserve, and would provide for timely response and cleanup. Therefore, there is a reasonable expectation that such potential spills would be confined to the well pad. If a spill does reach the Preserve, the natural environment would be reclaimed per NPS standards. As noted above, the Comstock Blackstone B1 well did encounter well control problems, but no impacts occurred beyond the well pad. In the event that Preserve resources or values would be damaged, the NPS could seek remedy both on the ground and in the form of monetary compensation. Any further analysis on this topic would be highly speculative.

#### *1.7.7.3 Cumulative Impacts*

Cumulative impacts related to this topic can be assessed by examining relevant data for wells located within Hardin County that contain the Project. As noted on Table 1-4, there are very low rates of occurrence for all three types of incidents, ranging from zero well fires to eight major spills reported in 2006, out of a total of 2,528 wells in service (corresponding to 1 spill per 316 wells). Cumulatively, the re-entry of the well in the Proposed Action would not add more than negligible effects to these regional incident statistics.

#### *1.7.7.4 Conclusion*

Because there would not be potential for a catastrophic incident, such as well blowout, well fire or major spill occurring as a result of the in-park operations, and because the likelihood of such incidents from the connected actions is very low, it is not expected that catastrophic incidents, such as well blowouts, well fires and major spills in and outside the Units, would result in more than negligible impacts, and this topic was dismissed from further analysis in this EA.

### *1.7.8 Socioeconomics*

Socioeconomic issues include the effect of the proposed drilling and possible production of the well on the local and regional economies, and the effects of the Proposed Action on visitation in the Preserve, which in turn affects those economies. The description presented below of past, present, and reasonably foreseeable oil and gas development in and adjacent to the Preserve provides supporting data on which to base the cumulative impact analyses in this section and for analyses presented in Section 3. The description below is in addition to the description of “Cumulative Impacts” provided under the heading “Methodology” in Section 3.

The Proposed Action would generate an unknown amount of revenue for the local economy through rent or other payments to adjacent, private surface owners. Mineral owners would receive bonus payments for leases, and could subsequently receive rentals or royalties. Local businesses would receive revenue from purchases of food, fuel, lodging, and other incidental purchases by drilling and production crews and managers.

However, revenue from oil and gas production would likely affect only a small number of people. The individuals or groups affected would not necessarily be from the socioeconomic area in the vicinity of the Project. Also, increased oil and gas activity in the area could potentially have restrictive effects on the local economy. For example, housing markets and/or property values may fluctuate with the development of oil and gas operations near residences or from the demand for housing from workers; however, this is not anticipated since the Project will utilize an existing well pad site.

The Preserve contributes to the local and regional economies by adding sales, taxes, and employment related to the acquisition of services, supplies and materials needed to administer the Preserve. In addition, tourism-related expenditures contribute to the economy, and also create jobs to support tourism. The NPS has estimated that there were approximately 95,285 visitors to the Preserve in 2007, and 29,600 visitors to the Unit in 2007 (NPS, Public Use Statistics Office 2008). Hunting is permitted within portions of the Unit from the opening date of the Texas fall hunting season through the second Sunday in January. An extended hunting season for feral hogs runs until the end of February.

Other visitor uses in the Unit include hiking, bird watching, and canoeing. There are four picnic areas, one public boat ramp, and one area of river access located within the Unit.

It is estimated that in the 2007 fiscal year, visitors to the Preserve spent a total of \$7,257,000, creating or supporting 139 area jobs (Stynes 2008). In the event of a serious oil spill and/or accident involving serious personal injury or death, the public could perceive that the Preserve is not a desirable place to visit. Tourism could fall, resulting in reduced revenues to the local and regional economies. However, the likelihood of this happening is relatively low, because the applicant is required to take precautions to prevent accidents under federal statute and numerous Statewide Rules administered by RRC as discussed above in Section 1.4.8.

The NPS has prepared a revised RFD scenario to project future oil and gas development, based on an assessment by the United States Geological Survey (USGS) of remaining hydrocarbons beneath Preserve (Schenk 1999). The revised RFD was produced in response to public comments received on the *Draft Oil and Gas Management Plan Environmental Impact Statement* (NPS, 2004), for which the original RFD had been produced, and the increase in drilling activity experienced in RRC District 3 in 2005 and throughout the United States and Texas from 2002 to the present (Baker Hughes Incorporated 2007).

The RFD provides a reasonable assumption of future development of nonfederal oil and gas for park planning purposes, and provides a basis for measuring potential environmental impacts. It does not represent a benchmark or decision point for acceptable levels of activity that could occur to develop the oil and gas underlying the Preserve. During the revision effort, the USGS's assessment of the remaining hydrocarbon potential beneath the Preserve was reviewed, and the

NPS contacted operators who have recently drilled wells in and adjacent to the Preserve to verify the assumptions made.

The RFD projects that, initially, 3-D seismic surveys would be conducted throughout the entire Preserve, and the data obtained would be used to delineate oil and gas drilling prospects. It was assumed that approximately 40 additional wells would be drilled over the next 15 to 20 years to produce the four million barrels of oil and natural gas liquids (condensate) and 94 BCF of natural gas from Tertiary and Upper Cretaceous-age reservoirs believed to underlie the Preserve. Based on an exploratory drilling success rate of approximately 50 % and a developmental drilling success rate of 75 %, of the 40 wells anticipated to be drilled, 27 could be commercially successful (the remaining 13 would be plugged as dry holes). The NPS acknowledges that the RFD is based on available production data, and that more or fewer wells could be drilled or produced. Under the RFD scenario, it would reasonably be anticipated that Preserve-wide, up to 465 acres could be disturbed for geophysical exploration operations; and up to 241 acres could be developed for drilling, production and transportation operations for a total future development of 706 acres.

Due to the narrow, linear nature of many of the Preserve's units many of the drilling and production operations are anticipated to follow the existing trend for siting from surface locations outside the Preserve to access hydrocarbons beneath the Units using directional drilling technology. However, exploratory and development wells are expected to be sited within some Units that are greater in size, like the Big Sandy Creek and Neches Bottom and Jack Gore Baygall Units. Therefore, it is possible that the actual acreage disturbed by drilling, production and transportation operations would approximate that projected by the RFD. However, the NPS expects the actual figure to fall somewhere between the RFD projection and zero (0) acres if, for example, all oil and gas wells under the Preserve were drilled directionally without the disturbance of federal surface lands (which is the case for the Proposed Action to re-complete the existing Blackstone Minerals B2 well).

A survey of NPS records indicates that twenty-eight (28) two-dimensional (2-D) seismic surveys were conducted in the Beaumont since 1977. These surveys were conducted as combination of cable-only, or walk-across, operations, and use of drilling equipment (typically referred to as highland rigs or Ardco buggies) to place energy sources (explosives) within the Unit. Two (2) three-dimensional (3-D) seismic surveys utilizing a combination of tractor drills, all-terrain vehicle mounted drills, rickshaw drills, man-portable drills, and jon boat mounted drills to drill shotholes which most of this Unit.

The trend over the past decade for drilling wells to produce oil and gas underlying the Preserve is towards directionally drilling from surface locations outside the Preserve to bottomhole targets beneath the Preserve. From 1998 through the present, there have been no wells drilled from surface locations within the Preserve. However, oil and gas exploration and development has continued during that time. Since the last well drilled from inside the Preserve was completed in 1997, 38 directional wells were drilled from surface locations outside the Preserve to reach bottomhole targets beneath the Preserve. During the same period, applicants received § 9.32(e) exemption determinations for 15 additional directional wells that have not yet been drilled.

Only five wells have been drilled from surface locations within the Beaumont Unit, all prior to the Preserve and all wells have subsequently been plugged and abandoned. The Beaumont Unit also has two natural gas transpark pipelines that cross it.

#### *1.7.8.1 Impacts from In-Park Operations and Connected Actions*

For socioeconomics, the analysis is not separated into in-park operations and connected actions, since both the in-park borehole and connected action together are needed to produce impacts. The Proposed Action (if the directional well was re-drilled and hydrocarbons are discovered and produced) would result in only a negligible effect on the local or regional economy, since it represents such a small amount the total production in RRC District 3. The amount of revenue generated from leases, royalties, and rents would be very limited, and revenue related to production would not necessarily be retained locally. Revenue from sales of goods to crews would be beneficial, but limited and sporadic.

#### *1.7.8.2 Cumulative Impacts*

Cumulative impacts on socioeconomics within the project area would continue to occur because of Preserve operations, visitor use, hunting, development including oil and gas operations, and commercial timber harvest creating demand for goods and services, and other sources of economic development. An example of the latter would be residential or commercial development adding to the tax base of the area. The divestiture of timberlands surrounding the Preserve by traditional, integrated forest products companies could also affect socioeconomics of the area.

All three of the major landholding neighbors to the Preserve, International Paper, Louisiana Pacific, and, most recently, Temple-Inland have sold their timberlands. The sale of these lands has been primarily to institutional investors. This represents a subtle shift in land management strategy towards maximizing returns on timberland assets for shareholders. It is unclear what the cumulative effect to socioeconomics of institutional investment in timberlands adjacent to the Preserve would be. As impacts from the proposed directional well are not expected to create more than a negligible impact on the local or regional economy, the implementation of the Proposed Action is not expected to add cumulative impacts to socioeconomic values in the project area.

#### *1.7.8.3 Conclusion*

Because revenue from oil and gas production of the well would likely affect only a small number of people, and the development would have such a small effect on the local and regional economies, socioeconomics was dismissed from further analysis in this EA.

#### *1.7.9 Environmental Justice*

Executive Order 12898, “General Actions to Address Environmental Justice in Minority Populations and Low-Income Populations,” requires all federal agencies to incorporate environmental justice into their missions by identifying and addressing disproportionately high and adverse human health or environmental effects of their programs and policies on communities as defined in the Council on Environmental Quality’s Environmental Justice

Guidance (1997). The Proposed Action would not have disproportionate health or environmental effects on minority or low-income populations or communities as defined in the Council on Environmental Quality's Environmental Justice Guidance (1997). Therefore, environmental justice was dismissed from further assessment as an impact topic in this EA.

#### *1.7.10 Prime or Unique Farmland Soils in the Beaumont Unit*

As a result of a substantial decrease in the amount of open farmland, Congress enacted the Farmland Protection Policy Act (Public Law 97-98). In August 1980, the Council on Environmental Quality directed that federal agencies must assess the effects of their actions on prime and unique farmland soils classified by the U.S. Department of Agriculture's Natural Resources Conservation Service (NRCS). Prime or unique farmland is defined as soil that particularly produces general crops such as common foods, forage, fiber, timber, and oil seed; unique farmland is defined as soils that produce specialty crops such as fruits, vegetables, and nuts. Prime and unique farmland soils are those that are actively being developed and could be converted from existing agriculture uses to nonagricultural purposes, as described above. Urban or built-up land, public land, and water areas cannot be considered prime farmland.

Soils inside the Unit cannot be considered prime farmland soils because they are public lands unavailable for food and fiber production. The Farmland Protection Policy Act only applies to direct federal actions and does not apply to the connected actions identified in this EA (that is, the surface disturbances outside the Unit).

Because there are no prime and unique farmland soils in the Unit, and the Farm Protection Policy Act does not apply to private projects on private properties, this impact topic was dismissed from further analysis in this EA.

#### *1.7.11 Climate Change*

On-going scientific research has identified the potential impacts of climate changing pollutants on global climate. These pollutants are commonly called "greenhouse gases" and include carbon dioxide, CO<sub>2</sub>; methane; nitrous oxide; water vapor; and several trace gas emissions. Through complex interactions on a regional and global scale, these emissions cause a net warming effect of the atmosphere, primarily by decreasing the amount of heat energy radiated by the Earth back into space.

Although climate changing pollutant levels have varied for millennia (along with corresponding variations in climatic conditions), recent industrialization and burning of fossil carbon sources have caused CO<sub>2</sub> concentrations to increase dramatically, and are likely to contribute to overall climatic changes, typically referred to as global warming. Increasing CO<sub>2</sub> concentrations also lead to preferential fertilization and growth of specific plant species.

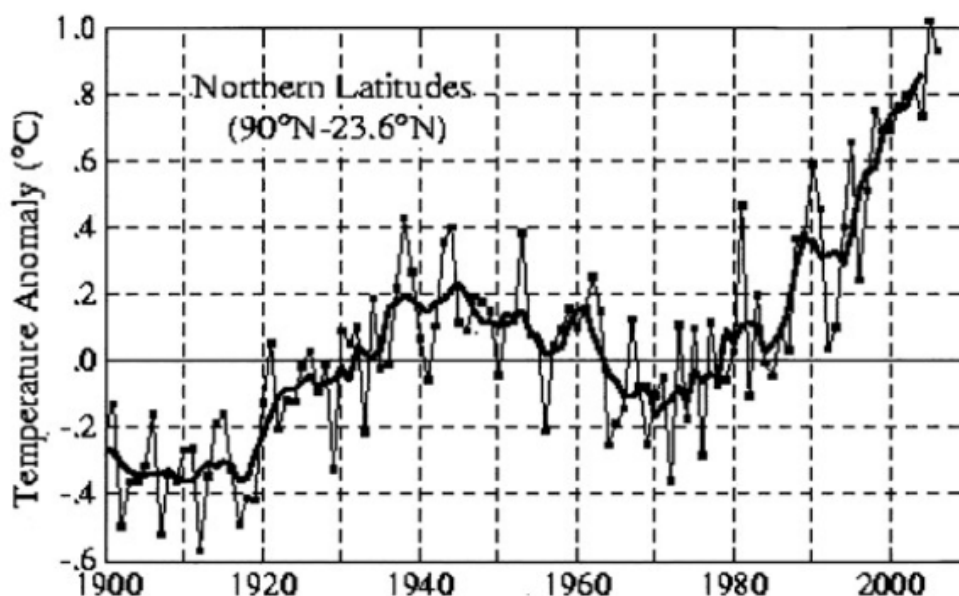
Global mean surface temperatures have increased nearly 1.0°C (1.8°F) from 1890 to 2006 (GISS 2007). However, observations and predictive models indicate that average temperature changes are likely to be greater in the Northern hemisphere. Figure 1-2 demonstrates that northern latitudes (above 24°N) have exhibited temperature increases of nearly 1.2°C (2.1°F) since 1900, with nearly a 1.0°C (1.8°F) increase since 1970. Without additional meteorological monitoring systems, it is difficult to determine the spatial and temporal variability and change of



climatic conditions, but increasing concentrations of these “greenhouse gases” are likely to accelerate the rate of climate change.

The Intergovernmental Panel on Climate Change (IPCC) has recently completed a comprehensive report assessing the current state of knowledge on climate change, its potential impacts, and options for adaptation and mitigation. In lieu of printing of this report, it is available on the IPCC web site (<http://www.ipcc.ch>). According to this report, global climate change may ultimately contribute to a rise in sea level, destruction of estuaries and coastal

**Figure 1-2 Annual Mean Temperature Change for Northern Latitudes (24-90° N)**



Source: GISS (2007)

wetlands, and changes in regional temperature and rainfall patterns, with major implications to agricultural and coastal communities.

The IPCC has suggested that the average global surface temperature could rise 1 to 4.5 degrees Fahrenheit (°F) in the next 50 years, with significant regional variation. The National Academy of Sciences (2006) has confirmed these findings, but also indicated that there are uncertainties regarding how climate change may affect different regions. Computer models indicate that such increases in temperature will not be equally distributed globally, but are likely to be accentuated at higher latitudes, such as in the Arctic, where the temperature increase may be more than double the global average. Also, warming during the winter months is expected to be greater than during the summer, and increases in daily minimum temperatures is more likely than increases in daily maximum temperatures. Vulnerabilities to climate change depend considerably on specific geographic and social contexts.

NPS recognizes the importance of climate change and the potential effects it may have on the natural environment. Several activities occur within the planning area that may generate emissions of climate changing pollutants. The continuation of nonfederal oil and gas operations contemplated in this assessment would involve the use of vehicles to access operations locations; the use of combustion engines in earth-moving equipment to clear areas to construct oil and gas access roads, and wellpad; and the use of combustion engines to drill well. The revised RFD scenario projects that 3D seismic surveys could be conducted over the southern one-third of the park, and that up to 50 wells could be drilled, with up to 30 possibly being placed in production. As some wells are drilled, others would be plugged and areas reclaimed; therefore, the 50 wells would be distributed over time. Park operations and recreational activities that involve the use of combustion engines would also generate CO<sub>2</sub> and methane.

Wind erosion from disturbed areas and fugitive dust from roads along with entrained atmospheric dust has the potential to darken glacial surfaces and snow packs resulting in faster snowmelt. Other activities may help sequester carbon, such as managing vegetation to favor perennial grasses and increase vegetative cover, which may help build organic carbon in soils and function as “carbon sinks”. Anticipated emissions from oil and gas operations as described above Section 1.4.6 are anticipated to be low.

The assessment of climate changing pollutant emissions and climate change is in its formative phase; therefore, it is not yet possible to know with confidence the net impact to climate. However, the Intergovernmental Panel on Climate Change (IPCC 2007) recently concluded that “warming of the climate system is unequivocal” and “most of the observed increase in globally average temperatures since the mid-20th century is very likely due to the observed increase in anthropogenic [man-made] greenhouse gas concentrations.”

The lack of scientific tools designed to predict climate change on regional or local scales limits the ability to quantify potential future impacts. Currently NPS does not have an established mechanism to accurately predict the effect of development activities in this assessment on global climate change (CCSP 2006). However, potential impacts to air quality due to climate change are likely to be varied. For example, if global climate change results in a warmer and drier climate, increased particulate matter impacts could occur due to increased wind blown dust from drier and less stable soils. Cool season plant species’ spatial ranges are predicted to move north and to higher elevations, and extinction of endemic threatened/endangered plants may be accelerated. Due to loss of habitat, or due to competition from other species whose ranges may shift northward, the population of some animal species may be reduced. Less snow at lower elevations would be likely to impact the timing and quantity of snowmelt, which, in turn, could impact aquatic species.

Because of the low emissions anticipated from drilling up to one well, it is reasonably expected that the effect on climate change would not have more than a negligible effect, therefore, this topic was dismissed from further analysis in this assessment.

## 2.0 ALTERNATIVES

Two alternatives are described and evaluated in this EA, Alternative A (No Action), and Alternative B (Proposed Action, Application as Submitted). Alternatives considered but dismissed from further analysis are described and the reasons for dismissing them are given. Analyses for selecting the environmentally preferred alternative and the NPS preferred alternative are also provided. This section concludes with three (3) summary tables comparing the two alternatives.

### 2.1 ALTERNATIVE A: NO ACTION

The No Action Alternative is required to be considered under NEPA and establishes a baseline for comparing the present management direction and environmental consequences of the action alternative. Under the No Action Alternative, the well would not be re-entered.

### 2.2 ALTERNATIVE B: PROPOSED ACTION – SUBMITTED APPLICATION

Under Alternative B, Endeavor would re-enter and directionally drill the well as proposed in their application. Figure 2-1 shows the well's existing surface and proposed bottomhole location, existing well pad location, flowlines to an existing pipeline accessible on site, existing access road, and the area of analysis in relation to the boundary of the Unit.

#### 2.2.1 Project Siting

The surface and bottomhole location for the well is provided in Table 2-1, below (U.S. State Plan Coordinate System, North American Datum 83, Texas, South Central Zone, Meters). The surface location for the well is an existing well pad location that was plugged and closed approximately five years ago.

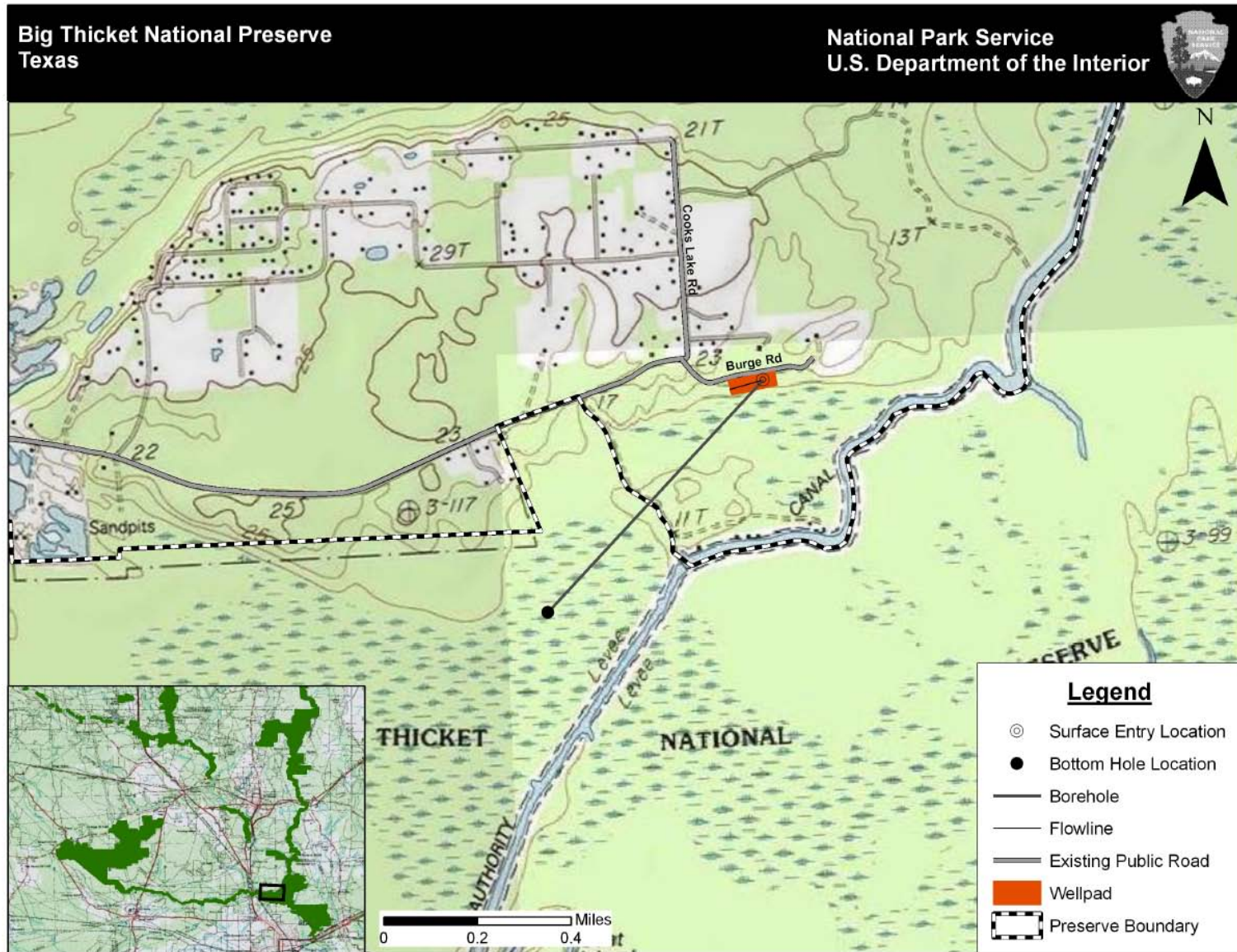
*Table 2-1 Surface and Bottomhole Locations for the Well*

Well Name	Surface Location	Bottomhole Location
Blackstone B-2 Re-entry	x = 4251284.55 y = 10086987.74	x = 4248826.70 y = 10084415.14

#### *Access*

No surface access in the Unit would be needed for any phase of drilling, production, transportation, or reclamation activities. Access to the Blackstone B-2 well would be along the existing Burge Road. No improvements to the existing public road would be needed. An existing approximately 20 foot spur would be improved with aggregate material from the edge of the public road to the well pad (not within the Preserve).

Figure 2-1 Regional/Vicinity Map



### *Well pad*

The well pad would measure approximately 150 feet x 550 feet (82,500 sq. ft. or 1.89 acres). The well pad area would be upgraded using heavy machinery (bulldozer and maintainer). Gravel would be placed on the entire 1.89 acre existing well pad site to provide workspace necessary to drill the well.

The well would be sited approximately 1,300 feet northwest of the Unit boundary. The well pad would extend to within approximately 1,150 feet of the Unit boundary. A 15-foot x 60-foot washout/emergency pit, lined with 12-mil plastic, would be constructed south of the existing well pad site to be used as a retention basin for washing the steel rig tanks and to contain any excess runoff from the area of the rig equipment. The 12-mil plastic liner would be removed upon completion of the drilling operation and disposed of in an approved landfill. Ring levees would be constructed around the remaining sides of the drill site to contain runoff. A 35-foot x 25-foot unlined fresh-water pit and water well would be placed in the southeast corner of the pad. Construction of the well pad is not anticipated to require fill into waters of the U.S. and, therefore, would not require a § 404 permit from the U.S. Army Corps of Engineers.

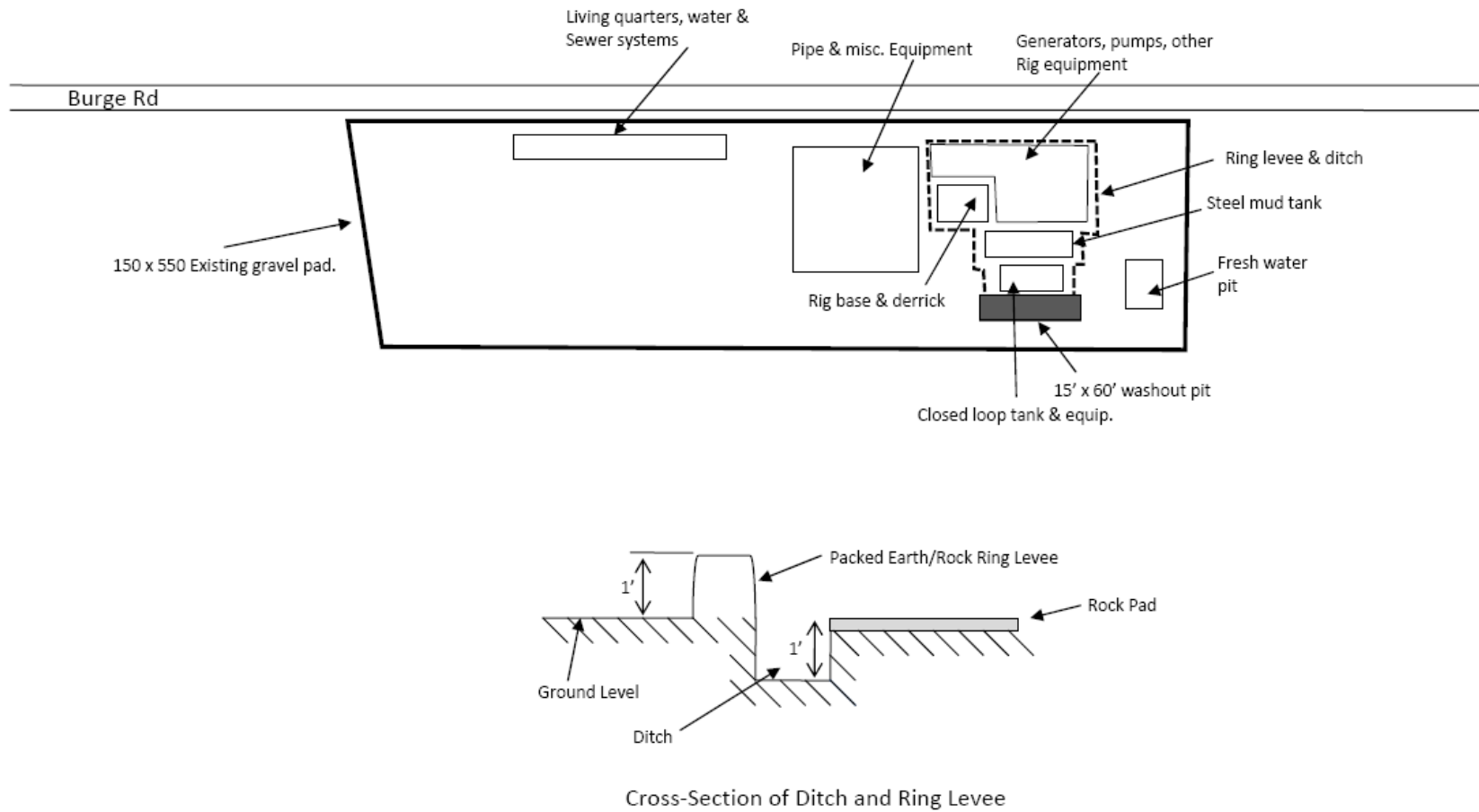
#### **2.2.2      *Drilling Operations***

Endeavor's proposed operations inside of the Preserve would consist of re-drilling to remove existing plugs in an existing 12.25-inch hole with a seven-inch production liner from some point below approximately 8,921 feet TVD to a milling point of 9,214 feet, then drilling a six-inch hole to target depths of about 9,969 feet TVD into the Yegua Formation. The well would then be completed with a 4.5-inch production liner, or plugged and abandoned as a dry hole.

As per TCEQ Form TCEQ-0051 (Depth of Usable Quality Ground Water to be Protected) usable-quality water occurs from the land surface to a depth of 1,850 feet. The interval from the land surface to a depth of 100 feet contains water of superior quality which must be isolated from water in underlying beds. Endeavor would comply with all provisions of the RRC's statewide oil and gas rules to drill and eventually plug the well to ensure the protection of usable quality water zones.

The proposed re-completion drilling is expected to take approximately four to six weeks. Water-based drilling mud would be used for the entire depth of the well. All mud and cuttings would be contained in a closed system of above-ground metal storage tanks to recirculate drilling mud and above-ground steel tanks used to contain the drill cuttings prior to removal from the site. Figure 2-2 shows the proposed drilling facility layout.

Figure 2-2 Blackstone Minerals B-2 Drilling Operations Layout



### **2.2.3            *Production Facilities***

If oil and/or gas are discovered and the proposed well re-entry is completed as a producer, production facilities would be constructed within the areas utilized to drill the wells. The production facility would be developed on the existing rock pad. Features could include the wellhead, line heaters and separation devices, a glycol dehydration unit, a tank battery consisting of a water tank and two condensate tanks, a series of flowlines connecting the components, and a product sales line and meter. The facility would be developed and maintained according to Endeavor's SPCC Plan and 40 CFR 112.7. The layout of the proposed production facility is provided in Figure 2-3.

The tank battery would have an earthen fire wall (covered with rock to reduce erosion) surrounding the feature that provides secondary containment with a capacity of 1.5 times the capacity of the single largest tank. The approximate height of the firewall would be two feet. The off-load connection would have a safety drip device below it to catch any dripping fluid lost during hook-up and disconnection.

All oil and water (storage) lines from the production facility to the tanks located at the existing well pad site would be buried at a depth of one foot below the surface.

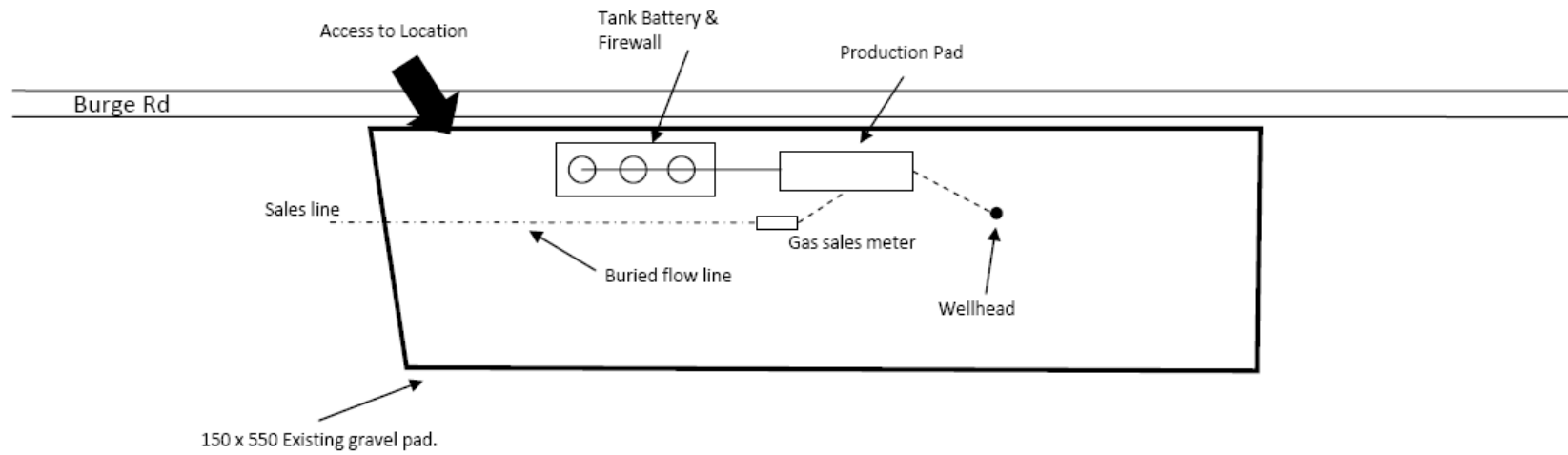
#### *Flowline*

No flowlines would need to be constructed or buried outside of the existing well pad site, should the well be successfully re-completed as a producing well. Existing buried pipelines, accessible from within the well pad site, would be used to transport gas.

### **2.2.4            *Reclamation Plans***

Once re-drilling and completion operations are finished, or if the well is not productive, the portion of the drill site no longer needed would be reclaimed, and the washout/emergency and water pits would be filled with native soil in accordance with RRC Statewide Rule 8. Upon final abandonment, the equipment and all related materials would be removed, and the well plugged according to RRC Statewide Rules 13 and 14. The site would be reclaimed in conformance with the surface use agreement between Endeavor and Blackstone Minerals, LP. The disposal of excess drill fluids and water would occur off-site or downhole depending on Endeavor obtaining the necessary permits and approvals.

Figure 2-3 Blackstone Minerals B-2 Production Operations Layout





## 2.2.5 Mitigation Measures

In order to reduce impacts on the human environment, Endeavor has incorporated the following mitigation measures listed in Table 2-2 as part of their application for the proposed operations. While many of the mitigation measures are required by other state and federal requirements, the NPS does not have the regulatory authority under § 9.32(e) to require mitigation under option #1, Exemption with No Mitigation.

**Table 2-2 Mitigation Measures for the Blackstone Minerals B-2 well under Proposed Action (Alternative B)**

No.	Mitigation Measures – Proposed Action (Alternative B)	Resource(s) Protected	Reference in § 9.32(e) Application	Required or Voluntary
<b>Project Planning and Site Construction</b>				
1	Conduct an archeological desktop survey of the proposed Project site	Archaeological resources	Section 6.5	Voluntary
2	Conduct a wetland delineation of the proposed Project site	Wetlands and Water resources	Section 6.2 and Section 6.6	Voluntary
3	Conduct a threatened and endangered species survey of the proposed Project site	Threatened, endangered or otherwise protected resources	Section 6.3 and Section 6.7	Voluntary
4	Site well, access road, pipeline and production facilities outside of the Unit	All natural resources and values in the Preserve	Section 4.1 and Section 7.1	Required to qualify for NPS exemption under 36 CFR § 9.32(e)
5	Use an existing industrial upland site for the well pad, an existing public road for the access road, and existing flowline accessible from within the site	soils, water resources, floodplains, wetlands, vegetation	Section 4.1	Voluntary
6	Prepare and comply with a SPCC Plan	All natural resources, and human health safety	Section 7.3 and Section 7.6	EPA requirement as per 40 CFR, Chapter 1, Subchapter D, Part 112 – Oil Pollution Prevention
7	Prepare and comply with a Storm Water Pollution Prevention Plan (SWPPP)	Water resources, soils, vegetation	Section 7.2 and Section 7.5	Voluntary
8	Schedule construction to limit activities during rain events	Water resources, soils, vegetation	Section 7.2 and Section 7.5	Voluntary
9	Construct ditch and one-foot high ring levee around the well pad that can contain approximately 560 bbls or 1.5 times capacity of the largest storage tank	Water resources, soils, vegetation	Section 7.3 and Section 7.6	Voluntary
10	Construct a 15-foot by 60-foot washout/emergency pit and line with 12 mil plastic	Water resources, soils, vegetation	Section 4.1, Section 7.2 and Section 7.5	Construction, design and maintenance of pit in conformance with RRC Statewide Rule 8, liner would be voluntary
<b>Well Drilling</b>				
11	Directionally drill well so that wellbore intercepts useable quality	Groundwater in Preserve	Section 6.2	Required to qualify for NPS exemption with no mitigation measures

No.	Mitigation Measures – Proposed Action (Alternative B)	Resource(s) Protected	Reference in § 9.32(e) Application	Required or Voluntary
	groundwater outside of Preserve			
12	Use a closed-loop containerized mud System	Water resources, soils, vegetation	Section 7.3 and Section 7.6	Voluntary
13	Set surface casing according to State of Texas RRC requirements	Groundwater	Section 4.1	RRC requirement as per Statewide Rule 13(b)(2)
14	Adjust drilling mud to release and flare any pressurized H <sub>2</sub> S encountered during drilling. Drilling would be discontinued until the pressure is stabilized.	Air Quality	Section 7.3 and Section 7.6	Voluntary
15	Dispose of drilling mud and well cuttings off-site or downhole	All natural resources located on and adjacent to well pad	Section 7.3 and Section 7.6	Disposal in accordance with RRC Statewide Rule 8
<b>Well Production</b>				
16	Reduce size of well pad to after drilling completion and fill in washout/emergency and water pits with native soil in accordance with Statewide Rule 8	Water resources, soils, vegetation	Section 4.1, Section 7.3 and Section 7.6	Reduction in well pad size voluntary, fill in washout/emergency and water pits required by RRC statewide Rule 8(d)(4)(G)
17	Construct a 2-foot earthen, rock covered or metal firewall around the tank battery with a capacity 1.5 times (approximately 560 bbls) the largest tank	Water resources, soils, vegetation	Section 4.1, Section 7.3 and Section 7.6	EPA requirement as per 40 CFR, Chapter 1, Subchapter D, Part 112.9(c)(2) to construct secondary containment capable of holding the volume of largest tank plus sufficient freeboard to contain precipitation, voluntary to build capacity for holding 1.5 times volume of largest tank
18	Install a safety drip device on the off-load connection	Soils	Section 7.3 and Section 7.6	Voluntary
19	Use stormwater BMPs (e.g., mulching, seeding, silt fences, and hay bales)	Water resources, soils	Section 7.2 and Section 7.5	Voluntary
20	Wind-erosion preventive measures will include watering if dust conditions are determined to be detrimental during construction	Air quality, vegetation,, water resources	Section 7.2 and Section 7.5	Voluntary
21	Notify regulatory authorities and Preserve Superintendent within 24 hours in the event of a release or spill of hydrocarbon condensate, crude oil, or other contaminating substance exceeding five	All natural resources	Section 7.3 and Section 7.6	RRC requirement to report well blowout/well control problems or spills exceeding 5 bbls as per Statewide Rules 20 and 91(e), in the event of any condensate spill,

No.	Mitigation Measures – Proposed Action (Alternative B)	Resource(s) Protected	Reference in § 9.32(e) Application	Required or Voluntary
	bbls			operator must consult with RRC as per Statewide Rule 91(b) and any spills of crude oil into water must be reported to the RRC as per Statewide Rule 91(e)(3), spills of other contaminating substances may require reporting to the TCEQ or EPA under a variety of laws and regulations depending on the substance released, the amount, whether or not the release was into soil, water or air, whether the release was ongoing, etc., notification to NPS voluntary
<b>Well Plugging</b>				
22	Comply with all applicable state and federal regulations regarding plugging	All natural resources	Section 4.2	RRC requirement as per Statewide Rule 14,
<b>Reclamation</b>				
23	If well re-completion does not produce adequate hydrocarbons to justify operating, equipment and related materials would be removed and the area restored.	All natural resources	Section 4.2	RRC requirements as per Statewide Rule 14(d)(12), this section of the Statewide Rules requires an operator to "contour the location to discourage pooling of surface water at or ground the facility site,"

## 2.3 ALTERNATIVES CONSIDERED BUT ELIMINATED FROM FURTHER ANALYSIS

During the scoping process, alternative locations were considered for siting the well. These alternative locations were discussed in consultation with Endeavor, ERM (Endeavor's contracted consultant), and NPS staff at the Preserve, Regional and Washington Offices. NPS acquisition of the mineral rights that are part of Endeavor's proposals was also considered. For the reasons described below, these alternatives were dismissed from further analysis.

### 2.3.1 Relocate the Surface Location of the Well to within the Beaumont Unit

Drilling a vertical well from a surface location inside the Preserve directly over the bottomhole target was considered. Also considered was another directional well from a surface location within the Preserve. These alternatives would have required access into the Preserve and approved plans of operation.

There are no existing roads inside the Unit near the locations considered; therefore, new access roads would have been needed. Access through the Unit would have required crossing sustainably inundated wetlands and floodplains. Although drilling the well from inside the Unit is technically feasible, this alternative was judged to be unreasonable in terms of economics, logistics, degree of environmental impact, and time required to implement the proposal. Alternative siting locations for the well within the Unit was dismissed from further analysis because, these locations would not meet the objectives of Endeavor and the Preserve as well as those other alternatives evaluated in detail.

### **2.3.2      *NPS Acquisition of the Mineral Rights that are Part of Endeavor's Proposal***

In the event that a proposed operation cannot be sufficiently modified to prevent the impairment of park resources and values, the NPS may seek to extinguish the associated mineral right through acquisition, subject to the appropriation of funds from Congress. With respect to Endeavor's directional drilling proposal, mitigation measures were identified and applied, most notably directional drilling from an existing surface location outside the Preserve. These mitigation measures substantially reduced the potential for adverse impacts to the Unit's resources and values, visitor use and experience, and public health and safety. As a result, the acquisition of mineral rights was dismissed from further consideration in this EA.

## **2.4      *ENVIRONMENTALLY PREFERRED ALTERNATIVE***

Section 101 of NEPA states that "...it is the continuing responsibility of the federal government to...(1) fulfill the responsibilities of each generation as trustee of the environment for succeeding generations; (2) assure for all Americans safe, healthful, productive, and aesthetically and culturally pleasing surroundings; (3) attain the widest range of beneficial uses of the environment without degradation, risk to 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 which supports diversity, and variety of individual choice; (5) achieve a balance between population and resource use which 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" [42 U.S.C. § 4321*et seq.* § 101 (b)].

The environmentally preferred alternative for drilling and producing the directional well is based on these national environmental policy goals. Under Alternative A, No Action, the well would not be drilled. Because there would be no new impacts, Alternative A would provide the greatest protection of the Unit's resources and values. Alternative A meets five of the six criteria (1 thru 4, and 6) and is, therefore, the environmentally preferred alternative.

Endeavor's proposal, Alternative B, would have greater effects on the environment because of the drilling and production activities. Alternative B meets four of the six criteria (1, 2, 4, and 5). Although mitigating measures would avoid or reduce effects to the Unit's resources and values, there could still be effects, and therefore, this alternative would not meet the NPS's environmental policy goals as effectively as the No Action Alternative.

## **2.5      *NATIONAL PARK SERVICE PREFERRED ALTERNATIVE***

The environmentally preferred alternative is Alternative A because it surpasses Alternative B in realizing the full range of national environmental policy goals as stated in §101 of NEPA. However, the NPS preferred alternative is Alternative B, Proposed Action, because Endeavor holds valid oil and gas lease rights which, if developed, would not result in major impacts or an impairment of park resources and values. The NPS believes this alternative would fulfill its park protection mandates while allowing Endeavor to exercise their property right interests.

## 2.6 SUMMARY OF ALTERNATIVES

The following tables assess the extent to which each alternative meets objectives in taking action, summarize actions of each alternative, and summarize impacts of each alternative (see Table 2-3, Table 2-4, and Table 2-5, respectively).

**Table 2-3 Extent that Each Alternative Meets Objectives**

<b>Objectives</b>	<b>Alternative A, No-Action</b>	<b>Alternative B, Proposed Action</b>
Avoid or minimize impacts on the Unit's resources and values, visitor use and experience, and human health and safety.	<b>Yes</b> Without drilling the well, there would be no impacts.	<b>Yes</b> Mitigation measures would avoid or minimize impacts.
Prevent impairment of the Unit's resources and values.	<b>Yes</b> Without drilling the well, there would be no potential for the Unit's resources and values to be impaired.	<b>Yes</b> Directional drilling at depth within the Unit would result in no impairment of the Units' resources and values.
Provide Endeavor, as the lessee of nonfederal oil and gas mineral interests, access to explore for and develop oil and gas resources in a manner which will assure the natural and ecological integrity of the Preserve.	<b>No<sup>1</sup></b> The well would not be drilled, precluding Endeavor access to develop their nonfederal oil and gas mineral interests.	<b>Yes</b> Endeavor would be issued a § 9.32(e) exemption, enabling them to drill and produce the well.

<sup>1</sup>No Action Alternative is required under NEPA to describe baseline conditions. It is acceptable for the no action alternative to not meet all of the planning objectives.

Table 2-4 Summary of Actions

<b>Actions</b>	<b>Alternative A, No-Action</b>	<b>Alternative B, Proposed Action</b>
Access	Access would not be required because the well would not be drilled.	Endeavor would utilize and existing public road (Burge Road) and improve an existing approximately 20 feet spur from the road to the existing well pad site.
Well pad	The well pad would not be constructed because the well would not be drilled.	Vegetation would be cleared on an existing 150 feet by 550 feet (1.89 acres) well pad on which a rock pad would be constructed. The well pad would extend within 1,150 feet of the Unit boundary.
Flowline	A flowline would not be required because the well would not be drilled.	An existing and buried flowline would be accessed from within the well pad. No new flowlines would be constructed outside of the well pad site.
Reclamation	Reclamation would not be needed because the well would not be drilled.	Endeavor would plug and abandon the well in accordance with Railroad Commission of Texas requirements. Surface reclamation would be performed in accordance with leases and agreements.

Table 2-5 Summary of Impacts

<b>Impact Topic</b>	<b>Alternative A, No-Action</b>	<b>Alternative B, Proposed Action</b>
Natural Soundscapes in and outside the Units	<p>Under Alternative A, No-Action, the well would not be drilled; therefore, there would be no new impacts on the natural soundscape in the Unit. Cumulative impacts on the natural soundscape in and contiguous to the Unit from recreational activities in and outside the Unit, park management functions within the Unit, oil and gas activities in and outside the Unit, and timber management activities adjacent to the Unit's boundaries, would result in long-term but intermittent, negligible to moderate, adverse impacts, localized near sources.</p> <p>No impairment to natural</p>	<p>Under Alternative B, Proposed Action, cumulative impacts on the natural soundscape in the Unit would be similar to those described under No Action, with vehicle uses, existing and future oil and gas operations in and outside the Unit, maintenance of oil and gas pipelines transecting the park, routine park operations, recreational activities including hunting in and outside the Unit, and forestry operations adjacent to the Unit. The impacts from these sources, added to the intermittent, short-term, negligible to moderate, adverse impacts from the operations, would result in localized, short to long-term, negligible to moderate, adverse cumulative impacts to natural soundscapes in the analysis</p>

Impact Topic	Alternative A, No-Action	Alternative B, Proposed Action
	<p>soundscape in the Unit would result from implementation of this alternative. Implementation of this alternative would not result in any unacceptable impacts and is consistent with §1.4.7.1 of the <i>NPS Management Policies</i> 2006.</p>	<p>area.</p> <p>No impairment to natural soundscape in the Unit would result from implementation of this alternative. Implementation of this alternative would not result in any unacceptable impacts and is consistent with §1.4.7.1 of the <i>NPS Management Policies</i> 2006.</p>
<p>Lightscapes and Night Sky in and outside the Units</p>	<p>Under Alternative A, No Action, the well would not be drilled, resulting in no new impacts to lightscapes or night sky. Cumulative impacts to lightscapes could occur as a result of development of adjacent properties, oil and gas activities in and outside the Unit, and timber management activities adjacent to the Unit, and are expected to result in long-term, localized to widespread, negligible to moderate, adverse impacts.</p> <p>No impairment to lightscape and night sky in the Unit would result from implementation of this alternative. Implementation of this alternative would not result in any unacceptable impacts and is consistent with §1.4.7.1 of the <i>NPS Management Policies</i> 2006.</p>	<p>Under Alternative B, Proposed Action, the well would be re-drilled and possibly completed to produce hydrocarbons. Construction of the access roads, flowlines, and well pad would not result in new impacts to lightscapes or night sky, as construction activities would only be conducted during daylight hours.</p> <p>Drilling and producing the wells; and eventual plugging and reclamation activities would result in adverse impacts ranging from short- to long-term, and negligible to moderate. Elevated light levels would be greatest during the estimated four to six week drilling/completion phase of the well and localized from the lighting of the drill rig for 24-hour operations, resulting in moderate short-term adverse impacts. Construction and maintenance of the existing access roads, well pad, and flowlines; and plugging and reclamation could result in localized, short-term, negligible impacts from increases in artificial light associated with vehicle traffic, rig lighting, and heavy equipment. Production impacts could be long-term but negligible to minor from lighting used for on-going operations and during workovers. There would be no effect from in-park operations.</p>

Impact Topic	Alternative A, No-Action	Alternative B, Proposed Action
		<p>Cumulative effects to Lightscares/Night Sky are expected to be long-term, localized to widespread, negligible to moderate, and adverse.</p> <p>No impairment to lightscape and night sky in the Units would result from implementation of this alternative. Implementation of this alternative would not result in any unacceptable impacts and is consistent with §1.4.7.1 of the NPS <i>Management Policies</i> 2006.</p>
Adjacent Landowners , Resources and Uses	<p>Under Alternative A, No-Action, the well would not be drilled; therefore, there would be no new impacts on adjacent land uses and resources outside the subject Unit. It is expected that existing and reasonably foreseeable uses in the analysis area would continue with short- to long-term, negligible to moderate, adverse cumulative impacts on geology, soils and vegetation at the site, localized near these uses.</p>	<p>Under Alternative B, Proposed Action, the well would be re-drilled and may be produced. Construction of the access roads, flowlines, well pad; drilling and producing the well; and eventual plugging and reclamation activities would result in adverse impacts ranging from short- to long-term, and negligible to moderate on adjacent landowners, resources, and uses outside the Unit. The expected effects on geology and soils and vegetation on adjacent lands are expected to be confined to the direct area of impact by the application of mitigation measures at each site. Therefore, the adverse impacts on these adjacent resources are expected to be localized and minor, with long-term impacts during production and lasting until site reclamation restores soils and vegetation cover. There would be no impacts on soils or vegetation from in-park oil and gas operations. Cumulative impacts to these adjacent resources and uses would continue, with long-term, localized, negligible to moderate, adverse cumulative impacts to soils and vegetation outside the Unit.</p>
Visitor Use	Under Alternative A, No-	Under Alternative B, Proposed



Impact Topic	Alternative A, No-Action	Alternative B, Proposed Action
and Experience in the Unit	Action, the well would not be drilled; therefore, there would be no new impacts on visitor use or experience within the subject unit. It is expected that existing and reasonably foreseeable uses in the analysis area would continue with short- to long-term, negligible to minor, adverse cumulative adverse impacts on visitor use and experience	Action, the well would be re-drilled and may be produced. Construction of the access road spur improvements, flowline and well pad; drilling and producing the well; and eventual plugging and reclamation activities would result in adverse impacts ranging from short- to long-term, and negligible impacts on visitor use and experience inside the Unit. There would be no impacts to visitor use or experience from in-park operations. Cumulative impacts in and contiguous to the Unit would be similar to those described under No Action, with long-term but intermittent, negligible, adverse impacts on visitor use or experience inside the Unit.

### 3.0 AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

#### 3.1 METHODOLOGY

Based on Project scoping and expected impacts, it was determined that the following topics in Table 3-1 would be carried forward for analysis:

Table 3-1. Impact Topics Carried Forward for Detailed Analysis in Section 3

<b>Blackstone B2 Well</b>
<ul style="list-style-type: none"><li>• Impacts on Natural Soundscape in and outside Unit</li><li>• Impacts on Lightscape/Night Sky in and outside Unit</li><li>• Impacts on Adjacent Landowners, Resource and Uses, focusing on an analysis of the following resources and values located outside the unit:<ul style="list-style-type: none"><li>○ Geology and Soils</li><li>○ Vegetation</li></ul></li><li>• Impacts on Visitor Use and Experience in the Unit:</li></ul>

This section is organized by impact topic. Under each impact topic, the affected environment is described, the methodology for assessing impacts is provided, and a conclusion is stated. The conclusion section summarizes all major findings and includes an impairment analysis and a statement regarding unacceptable impacts. Impairment analyses are performed only for park resources and values. A description of the NPS mandate to prevent impairment to park resources and values is provided in Section 1.2.1 of this EA.

This section describes direct, indirect, and cumulative impacts under the two alternatives. Impacts are described in terms of context and duration. The context or extent of the impact may be **localized** (generally, the footprint of the existing access road spur, existing well pad site, and flowline, including immediately adjacent lands) or **widespread** (affecting other areas of the Preserve and/or the project area). The duration of impacts could be **short-term**, ranging from days to three years in duration, or **long-term**, extending up to 20 years or longer. Generally, short-term impacts would apply to construction activities and long-term impacts would apply to roads, production operations, and the flowline. The intensity and type of impact is described as negligible, minor, moderate, or major, and as beneficial or adverse. Impact intensity threshold definitions are provided for negligible, minor, moderate, and major. Where the intensity of an impact can be described quantitatively, numerical data are presented. However, most impact analyses are qualitative.

The impact analysis under the action alternative (Alternative B, Proposed Action) for each Preserve resource or value describes “in-park operations” and “connected actions.” The analysis of impacts from in-park operations contains the analysis and documentation required under § 9.32(e). The analysis of impacts from connected actions satisfies a broader NEPA requirement to assess impacts on the human environment.

- **In-park Operations** would consist of the wellbore crossing into the Unit at substantial depths so as to not cross usable quality groundwater to reach bottomhole target beneath the Unit to extract hydrocarbons and other associated fluids from beneath the Unit.
- **Connected Actions** would consist of activities associated with re-construction and maintenance of the well pad, production facilities and flowline, drilling and completion, hydrocarbon production and transportation and well plugging and surface reclamation outside the Unit.

To clearly describe the potential impacts under the action alternative (Alternative B, Proposed Action), the impact analysis for **connected actions** is organized under the following headings:

- **Construction** and upgrading involves the initial upgrade of an existing access road spur to the well pad from an existing public road, and of the well pad itself.
- **Drilling** involves re-drilling the well.
- **Production** involves the development of production facilities and producing the re-completed well in addition to construction and operation of the flowline to transport products to market. The flowline construction will be limited to within the well pad site as a functional pipeline from the site that already exists.
- **Plugging/Reclamation** involves plugging the well and reclaiming the areas that were developed as per agreements with the landowners.

## 3.2 CUMULATIVE IMPACTS

This section also assesses cumulative impacts. Cumulative impacts are defined as "the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or nonfederal) or person undertakes such other actions" (40 CFR 1508.7).

The following descriptions of park development and operations, and adjacent land uses provide the basis for analyzing cumulative impacts in this EA. These descriptions should be used in conjunction with the discussion under the "Socioeconomics" discussion in Section 1 of this EA that describes past, present, and reasonably foreseeable oil and gas development in the analysis area.

### 3.2.1 Park Development and Operations

Park developments that support visitor uses in the Unit include seven day use areas, these areas include four picnic and parking areas, private and public boat launch areas, and a river access area for fishing. These developments are located along the perimeter of the Unit. The nearest development, a picnic area, is approximately 1.75 miles from the Blackstone B-2 well pad site. Public access to Unit developments is not gained through or by the existing well pad site.

The Preserve's developments that support visitor uses in the Unit include a private boat ramp and picnic and parking area within the northern and southern parts of the Unit, a picnic and parking area located along Broad Oak Drive in the western portion, and a river access area on the eastern side of the Unit. The nearest visitor use area developed within the Unit is the picnic and parking area located along Broad Oak Drive, approximately 1.75 mi from the Blackstone B-2 well pad site. It is the nearest federally-maintained area to the existing well pad site where the

Proposed Action would occur. There are currently no active fire management plans or fire monitoring plots within this Unit of the Preserve.

### ***3.2.2 Adjacent Land Uses***

Of the land uses immediately adjacent to the Preserve, commercial and private forestry account for approximately 95 % of the land area. Additional concerns related to timberlands include encroachment onto Preserve lands, public safety concerns regarding hunting clubs on adjacent timberlands, and public use of timber company roads to access the Preserve (Harcombe and Callaway 1997).

Residential development on lands adjacent to the Unit is generally rural. For Units of the Preserve along the Neches River (like the Beaumont Unit), commercial timber and commercial timber with oil account for approximately 90 % of land uses within a one mile buffer from the center of the Neches River.

### ***3.2.3 Visitor Uses and Developments***

An average of almost 100,000 visitors come to the Preserve each year (NPS Public Use Statistics Office 2007). Spring and fall are the primary visitor use seasons. High temperatures limit visitor use during the summer. In creating the Preserve, Congress limited the construction of roads, vehicular campgrounds, employee housing, and other public and administrative facilities in the interest of maintaining the ecological integrity of the Preserve. Therefore, development is limited.

There are 26 day-use areas located in nine units, nine hiking trails in five units, four canoe routes, and eight birding hot spots. Hunting is allowed during specific seasons in a total of approximately 47,400 acres in the Beaumont, Beech Creek, Big Sandy Creek, Lance Rosier, and Neches Bottom and Jack Gore Baygall Units. Trapping is permitted in a total of approximately 35,000 acres in the Beaumont, Lance Rosier, and Neches Bottom and Jack Gore Baygall Units. Backcountry camping is light (approximately 1,315 overnight stays per year over the last seven years), and must be conducted in designated areas. In addition to visitor uses and developments, there are three cemeteries and two inholding homesites located in the Preserve.

## ***3.3 IMPACTS ON NATURAL SOUNDSCAPE IN AND OUTSIDE OF THE BEAUMONT UNIT***

### ***3.3.1 Background***

The natural soundscape is defined as the aggregate of all the natural sounds that occur in parks, absent human-caused sound, together with the physical capacity for transmitting the natural sounds (NPS *Management Policies* 2006). It includes all of the sounds of nature, including such “non-quiet” sounds as birds calling, waterfalls, thunder, and waves breaking against the shore. Some natural sounds are also part of the biological or other physical resource components of parks (e.g., animal communication, sounds produced by physical processes such as wind in trees, thunder, running water). It is important to distinguish between the intrinsic value of the soundscape as a natural resource, the soundscape as something to be experienced by people, the soundscape as part of wildlife habitat, and as part of a cultural (i.e., historic, ethnographic) resource.

In accordance with policy derived from NPS mandates, the NPS will preserve, to the greatest extent possible, the natural soundscapes of parks. Natural sounds occur within and beyond the range of sounds that humans can perceive, and can be transmitted through air, water, or solid materials. The NPS will restore degraded soundscapes to the natural condition wherever possible, and will protect natural soundscapes from degradation due to noise or inappropriate sound.

Inappropriate sound can adversely impact wildlife resources by interfering with sounds important for animal communication, including territory establishment, courtship, nurturing, predation, avoiding predators, migration, and foraging functions. Certain types and levels of sound can, especially in non-habituated populations, cause animals to use avoidance mechanisms. Avoidance, initiated as it may be by annoyance or stress, can cause individual animals to alter normal behavior, move to less preferred habitats, and to unduly use energy during critical times of the year. In some cases, animals may become habituated to some level of human-caused sound without negative impacts, unless habituation in and of itself may be counted as such. However, in cases where animals do not habituate or where sound levels are such that normal behavior is altered, a whole suite of negative consequences may result.

Inappropriate sound can adversely impact park visitor experiences. Managing parks for “visitor experience” provides the opportunity for visitors to enjoy a park's resources and values in a manner appropriate to the park's purpose and significance, and supports the Park's resource protection goals. Visitors usually have expectations about the experience being offered in National Park System units. The impacts of inappropriate sound on visitor experience can be especially evident when visitor expectations include solitude, serenity, tranquility, contemplation, or a completely natural or historic environment. Many visitors have great expectations for national parks in this regard, since daily life for many people consists of high and constant levels of noise in urban/suburban settings.

Another value that can be adversely impacted by noise is any resource, location, or structure having cultural, historic, or religious significance. In the same way that visitor experience or natural resources can be affected, cultural, historic or religious sites are impacted by noise out of character for the resource. Maintaining the context also benefits the visitor who wishes to engage in and appreciate these resources.

### **3.3.2 Guiding Laws, Regulations and Policies**

A variety of laws, regulations and policies direct and guide the management of natural soundscapes as an inherent value of national parks to be conserved, and as a resource to be enjoyed. Some of the laws are explicit to sound, or noise, as an impact on national parks or to specific sources of noise. Similarly, some regulations are specific to sources and levels of noise, and they provide a regulatory standard. Two statements of policy are directed at noise and the natural soundscape: *NPS Management Policies* 2006, § 4.9, and NPS Director's Order #47.

Director's Order #47, *Soundscape Preservation and Noise Management*, emphasizes policy and requires “to the fullest extent practicable, the protection, maintenance, or restoration of the natural soundscape resource in a condition unimpaired by inappropriate or excessive noise sources . . . The fundamental principle underlying the establishment of soundscape preservation

objectives is the obligation to protect or restore the natural soundscape to the level consistent with park purposes, taking into account other applicable laws.”

### 3.3.3 *Affected Environment*

The Preserve is crossed by, or adjacent to, many roads, pipelines and power lines of varying size. The lands adjacent to the Preserve are mostly commercial timberlands, but residences and some commercial development are also located near the Preserve boundary. There are also a few residences inside the boundary or surrounded by NPS lands. Improvements inside the Preserve related to visitor experience are limited, for the most part, to trails, parking and picnic areas, information kiosks and boat ramps. There are two cemeteries located within the Preserve boundary or surrounded by Preserve lands. Hunting and trapping are allowed within some Units of the Preserve.

Improvements related to administration activities for the Preserve consist of seasonal employee housing and several radio tower installations. The main visitor contact and administrative facilities are located adjacent to the Big Sandy Creek Corridor Unit and are outside of the Preserve proper. Preserve management involves the use of on and off-road vehicles, boats, aircraft, heavy equipment and prescribed fire, and potentially involves firearms. Several oil and gas production facilities exist within the Preserve, and many more are located just outside the boundary.

The noise expected to be produced by the Proposed Action is considered to be appropriate to the operations area, as the exercise of nonfederal mineral rights is provided for in the enabling legislation of the Preserve. Areas within the Unit boundaries that could be affected by elevated noise generated by the proposed drilling and production of the directional wells would be part of the exploration/mining subzone described under the Preserve’s *General Management Plan* (1980) for the duration of operations. The primary reason for the discussion of noise impacts is the potential effects of noise on visitor use and experience and wildlife. A study of the desired experiences of Preserve visitors determined that the desire to “escape the crowd/noise” was very important (Gulley 1999).

Sources of noise within the Preserve and surrounding areas include trucks and automobiles, aircraft, boat motors, motorcycles, all-terrain vehicles, various types of equipment (e.g., tractors, log skidders and feller bunchers, chainsaws, lawn mowers, oil and gas separation and treatment vessels, compressors, etc.), power lines/transformers and firearms. Sources of noise within the Preserve are generally localized and/or seasonal in duration.

The natural soundscape of the Preserve was studied in the spring of 1998 to determine ambient sound levels (Foch 1999). Sound levels were measured at 11 locations Preserve-wide during this study, and both short- and long-term data were collected. Most natural sound within the Preserve was found to be produced by winds moving through the trees. Foch reported that “diurnal and monthly changes were conspicuous” in the long-term data. The short-term data indicated spatial variability between different units of the Preserve. As indicated above, most sounds occurring in the Preserve were found to be from wind in trees, but a variety of sounds were captured in the data and noted. These sounds included other natural sounds like the dawn chorus of birds and insects at night, as well as human-caused sounds such as aircraft,

powerboats, personal watercraft, and a natural gas powered generator at an oil and gas production facility.

Sound levels are usually measured in decibels (dB), and most noise levels are rated using the A-weighted decibels (dBA). L90 is a percentile representing the sound level where sounds exceed the value 90 % of the time. This number is usually considered to be analogous to the “background” sound level.

Long-term sound level data (taken in one location for 75 days) were collected only in the Turkey Creek Unit of the Preserve, in an area that would be representative of the less developed areas surrounding the proposed well re-entry location. Of the long-term data (collected between March 25, 1998 - June 8, 1998), 80 % of the range of sound levels varied between 27.1 and 44.1 dBA (Foch 1999). Short-term monitoring was conducted in both the Big Sandy Creek and the Neches Bottom and Jack Gore Baygall Units. Ambient L90 values recorded were 41 dBA in the Neches Bottom and Jack Gore Baygall Unit within upper slope pine oak forest, and 41 dBA in the Unit along the Big Sandy Horse Trail within upper slope hardwood pine forest (NPS 2006b).

The short-term data collected as part of the Foch study were generally collected during two-hour time periods, at varying times of day (but never late at night), and in varying parts of the Preserve. When compared with the long-term data collected, all short-term L90 values were higher than the L50, or median, cumulative long-term value of 35 dBA. The short-term L90 values recorded in the Big Sandy Creek and Neches Bottom and Jack Gore Baygall Units exceeded 40 dBA, and approached the L10 cumulative long-term value of 44.1 dBA.

It is not apparent why the short-term data do not match the long-term, but this serves as an indication of the variability of the sound levels recorded during the study. On a month to month basis, the measured long-term L90 values ranged from a low of about 22 dBA in the early morning hours of April, to a high of about 50 dBA at around 9 p.m. in June. Recorded anthropogenic sounds (deemed appropriate within the Preserve [powerboats, and aircraft overflights]) produced sound levels that approached or exceeded 70 to 80 dBA. Figure 3-1 compares sound levels recorded in various Units in the Preserve with other sounds.

Surrounding ambient noise levels have not been recorded for these specific areas, but it can be assumed that the noise levels around the existing well pad site would be variable, ranging from very quiet in wooded areas to quite noisy when logging or other oil and gas operations are underway.

However, it is noted these noise levels may not be representative of the ambient noise levels of the Unit due to this Unit's close proximity to the Cities of Beaumont and Lumberton, and the relatively constant traffic noise associated with Interstate Highway 10 (six miles south) and US 96 (2.5 miles east).

The Blackstone B-2 well would be located 1,280 feet from the Unit boundary (at its closest proximity) and there are private residences within 500 feet of the site. The nearest visitor area is located 1.75 miles from the Blackstone B-2 well.

### ***3.3.4 Environmental Consequences***

#### ***3.3.4.1 Area of Analysis***

The area of analysis for soundscapes is defined as the well operations area plus the area within 1,500 of the existing well pad, since drilling noise is expected to attenuate to about the background level recorded for quiet areas in the Preserve units at that distance.



**Figure 3-1 Sound Level Comparison Chart<sup>1</sup>**

How it Feels	Equivalent Sounds	Decibels	Sound Levels at Various Locations in Big Thicket National Preserve
Near permanent damage level from short exposure	Large caliber rifles (e.g., .243, 30-06)	140-160	
Pain to ears	.22 caliber weapon	130-140	
Very loud	Air compressor @ 20 ft. Garbage trucks and city buses	100	
Conversation Stops	Power Lawnmower Diesel truck @ 25 ft.		
Intolerable for phone use	Steady flow of freeway traffic 10 HP outboard motor Bulldozer or grader at 50'	90	
	Near drilling rig Automatic dishwasher Muffled jet ski @ 50 ft. Vacuum cleaner	80	
	Window air conditioner outside @ 2 ft.	70	
Quiet	Window air conditioner in room Normal conversation	60	
Sleep interference	Quiet home in evening	50	
	Bird calls		Big Sandy Creek along Big Sandy Horse Trail
	Library	40	Neches Bottom and Jack Gore Baygall Unit Lance Rosier Unit—end of Church House Rd. Turkey Creek Unit on Turkey Creek Trail and at NPS Ranch House Beech Creek Unit along Beech Woods Trail
	Soft whisper	30	
	In a quiet house at midnight Leaves rustling	20	

<sup>1</sup>Modified from Final Environmental Impact Statement, Miccosukee 3-1 Exploratory Well, Broward County, Florida (U.S. Department of the Interior).

### 3.3.4.2 *Methodology and Assumption*

After reviewing work conducted by Foch in 1999 on the ambient noise levels within the Preserve and considering adjacent land uses surrounding the Preserve, Preserve visitor use and management activity, as well as the existing legislative, regulatory and policy framework for the Preserve, the NPS developed the following impact intensity thresholds for soundscapes:

- Negligible:** Natural sounds would prevail; noise would be very infrequent or absent.
- Minor:** Natural sounds would predominate in areas where management objectives call for natural processes to predominate, with infrequent noise. In areas where noise is consistent with park purpose and objectives, noise could be heard frequently throughout the day and natural sounds could be heard occasionally. Mitigation measures, if needed to offset adverse effects, would be simple and successful.
- Moderate:** In areas where management objectives call for natural processes to predominate, natural sounds would predominate, but noise could occasionally be present. In areas where noise is consistent with park purpose and objectives, noise would predominate and natural sounds could still be heard occasionally. Mitigation measures could be extensive, and would likely be successful.
- Major:** In areas where noise is inconsistent with park purpose and objectives, noise would persistently dominate the soundscape. Extensive mitigation measures would be needed to offset any adverse effects, and their success would not be guaranteed.

### 3.3.4.3 *Impacts on Natural Soundscape in and outside the Beaumont Unit under Alternative A, No Action*

Under Alternative A, No Action, the well would not be drilled, resulting in no new impacts on the natural soundscape either in or outside the subject Units.

**Cumulative Impacts.** Under Alternative A, No Action, cumulative impacts on natural soundscapes throughout the subject Unit and contiguous areas could result from vehicle use, existing and future oil and gas operations both inside and outside the Unit, the routine maintenance of oil and gas flowlines and pipelines, park operations including maintenance of park developments, recreational activities in and outside the Unit such as group picnics and playing radios at a high volume, and particularly forestry operations adjacent to the Unit.

Forestry operations would introduce elevated noise from the use of all-terrain vehicles, tractors, chainsaws, and log skidders, reaching up to 140 dB (Figure 3-1). Aircraft flying over the Unit would also introduce elevated noise, although very sporadically. Hunting is also seasonally permitted and popular. Currently, an unlimited number of permits are issued each year to hunt in the Unit. Approximately 200 permits were issued for the Unit in the 2007-2008 hunting season. Although seasonal and intermittent, gun fire produces considerable noise in the range of 130 to 160 dBA, depending on the caliber of the weapon (see Figure 3-2). An analysis of the cumulative effect of drilling and producing the up to 40 wells projected in the RFD scenario was

performed in the Preserve's *Oil and Gas Management Plan Environmental Impact Statement* (NPS, 2005). No "major" adverse impacts were identified for this impact topic, which was analyzed under the heading "Visitor Use and Experience."

Sound levels from all the sources of noise mentioned above would range from 41 dBA (ambient sound level in quiet areas of the Units) up to 160 dBA (for gunfire). As a result of these various existing and future activities, cumulative impacts on natural soundscape within and contiguous to the Units are anticipated to result in long-term but intermittent, negligible to moderate, adverse impacts on the natural soundscape in and outside the Units, localized near sources.

**Conclusion.** Under Alternative A, No-Action, the Blackstone B-2 well would not be re-drilled; therefore, there would be no new impacts on the natural soundscape in the Unit. Cumulative impacts on the natural soundscape in and contiguous to the Units from recreational activities in and outside the Unit, park management functions within the Unit, oil and gas activities in and outside the Units, and timber management activities adjacent to the Unit's boundaries, would result in long-term but intermittent, negligible to moderate, adverse impacts, localized near sources.

Although the conservation of soundscapes is (1) necessary to fulfill specific purposes identified in the establishing legislation of Preserve; (2) key to the natural or cultural integrity of the Preserve; or (3) identified as a goal in the Preserve's *General Management Plan* (1980) and other relevant NPS planning documents, selection of Alternative B would not result in a major impact, thus, the proposal will not result in its impairment and is consistent with §1.4.7.1 of the NPS *Management Policies 2006*.

#### 3.3.4.4 *Impacts on Natural Soundscape in and outside the Beaumont Unit under Alternative B, Proposed Action*

**Impacts from In-Park Operations.** Under the Proposed Action, the Blackstone B-2 well would be re-drilled from an existing well pad located outside the Unit's boundaries. In-park operations consist of directionally drilling the wellbore into the Unit at several thousand feet below the surface and extracting hydrocarbons and other fluids from beneath the Unit. These actions in the subsurface of the Unit would have no impact on the surface soundscapes, regardless of what methods and materials Endeavor use to drill, case, cement, or plug and abandon the section of the holes inside the Unit. Therefore, there would be no impact to the natural soundscape in or outside the Unit from in-park operations.

**Impacts from Connected Actions.** Impacts are described by phase of activity, below.

**Construction.** Construction at the existing well pad site would consist of the improvement of an existing 20-foot spur from the public access road to the existing 550-foot x 150-foot (1.89 acres) well pad at the Blackstone B-2 well site. Site preparation would include clearing, grading, and leveling of the pad using heavy construction equipment, which would be the predominant source of noise during this phase. Bulldozers and graders have noise levels reported at 85 dBA at 50 feet from the source (FHWA 2007; Figure 3-1). Construction activities would only occur during the daytime hours.

Noise decreases by six dBA with the doubling of distance from the source under “hard” surface conditions (no intervening ground attenuation) (Caltrans 1998), so the 85 dBA at the wells (within 50 feet of the equipment) would decrease to 43 dBA (just above the estimated 41 dBA background level in quiet areas of these Units) at a distance of 6,400 feet from the well pad site, without considering any attenuation from intervening vegetation or topography (see Table 3-2).

However, according to Cook and Haverbeke (1974), significant tree cover is known to attenuate noise levels by magnitudes of 18-25 dBA at 300 feet from the source, so background levels would likely occur within shorter distances given the dense vegetation surrounding the well pad site. Caltrans (1998) reports that “soft” sites with soft dirt, grass, or scattered shrubs or trees would experience a decrease in noise levels of 7.5 dBA with doubling of distance from a point source, and that thicker vegetation strips can reduce noise by up to 10 dBA over what would be predicted without the vegetation present. Considering a 7.5 dBA reduction with doubling of distance to be a conservative estimate at the well pad site, noise from construction equipment at 85 db at the source would decline to 40 dBA at 3,200 feet. However, considering a 10 dBA reduction with doubling of distance to be a more realistic estimate at the existing well pad site due to the dense foliage between the Preserve and the well pad site, noise from construction equipment at 85 dBA at the source would decline to 35 dBA at 1,600 feet. Other factors such as continuity of operations, wind, air temperature, humidity, and turbulence can also affect noise levels as the distance from a source increases. In any case, the noise from construction operations would be intermittent and only occur during daytime hours during the time it takes to construct the well pad and roads, which is generally several weeks to a month. Given the reduction in noise expected and the intermittent nature of the noise, heavy equipment and ground-disturbing activities at the existing well pad site would result in short-term and intermittent, localized and minor adverse impacts to the natural soundscape in and outside the Units.

Table 3-2 Noise Dissipation with Distance from Source

<b>Equipment:</b>	<b>Construction-grader or bulldozer (85 dBA at 50 feet)</b>			<b>Drill Rig (82 dBA at 50 feet)</b>		<b>Diesel truck (88 dBA at 50 feet)</b>	
<b>Surface:</b>	<b>Hard</b>	<b>Soft</b>	<b>Soft</b>	<b>Soft</b>	<b>Soft</b>	<b>Soft</b>	<b>Soft</b>
<b>Attenuation<sup>1</sup> :</b>	<b>6 dB</b>	<b>7.5 dB</b>	<b>10 dB</b>	<b>7.5 dB</b>	<b>10 dB</b>	<b>7.5 dB</b>	<b>10 dB</b>
<b>Distance from Source (feet)</b>							
50	85	85	85	82	82	88	88
100	79	77.5	75	74.5	72	80.5	78
200	73	70	65	67	62	73	68
400	67	62.5	55	59.5	52	65.5	58
800	61	55	45	52	42	58	48
1,600	55	47.5	35	44.5	32	50.5	38
3,200	49	40	--	37	--	43	--
6,400	43	--	--	--	--	35.5	--

<sup>1</sup> Attenuation with doubling distance

Source: Noise Levels from FHWA (2007)

**Drilling.** Elevated noise would be greatest during the short-term re-drilling of the well. The proposed re-drilling period is expected to be 4 to 6 weeks for the Blackstone B-2 well. Drilling is a 24-hour, 7-day a week operation, so noise would be continuous during the drilling periods. In addition, mobilizing the rig to the location requires moving 10-25 large truckloads of equipment to the site. Sound levels at a typical oil drill rig have been reported at 82 dBA (NPS 2006b), while some diesel trucks have been reported at 88 dBA at 50 feet from the source (FHWA 2007). Noise levels would attenuate with increasing distance from the source(s), as described under “Construction” above.

Assuming a “soft surface” 10 dBA decrease with a doubling of distance is appropriate for the dense vegetated areas between the preserve and the well pad site, noise levels from drilling would reach 42 dBA at 800 feet and be as low as 32 dBA at 1,600 feet and noise from large trucks (or a noisier rig) could extend slightly further until the 41 dBA background level is reached (Table 3-2). Because noise produced during drilling is relatively loud, and this elevated noise would be continuous during the drilling period, drilling would result in short-term, minor adverse impacts on natural soundscapes both in and outside the Unit, with impacts of greater intensity localized near the well locations outside the Unit.

**Production.** If the well is successfully re-completed, and moves into the production phase, a flowline would be constructed within the well site area to connect to existing service lines, with short-term, minor, localized adverse impacts to soundscapes from the use of heavy construction equipment used to lay the pipelines. Noise from production equipment, especially gas compression or other pumping equipment powered by internal combustion engines, could result in negligible to minor adverse impacts localized around the well pad site. These impacts

could be continuous and long-term. However, it is unlikely that impacts of greater intensity would occur during all, or even most, phases of the economic life of the wells.

Transportation of fluids from the sites would likely involve large vehicles which would be intermittent sources of noise localized around the access roads and well pad site. During the long-term production life of the well, occasional workover operations could occur at 5- to 10-year intervals and take 1 to 2 weeks to complete. Workover rigs are essentially a scaled-down version of drill rigs and would increase noise levels, but at much lower intensity and duration than drilling a well. Workovers are not a 24-hour, continuous operation and may involve intermittent use of noise-producing equipment. Well production operations would result in localized, long-term, negligible to minor, adverse impacts on the natural soundscape in and outside the Units.

**Plugging/Reclamation.** Plugging and reclamation involve the use of heavy equipment and trucks to remove production equipment, plug wells, and re-contour the well pad in preparation for reseeding. Noise from earthmoving equipment and trucks would occur only for the period of plugging and reclamation preparation, usually a period of only a few days, and only during daylight hours. Similar to the initial construction phase, these activities would cause periodic increases in noise, resulting in short-term and intermittent, localized, and minor adverse impacts to the natural soundscape in and outside the Units.

**Cumulative Impacts.** Under Alternative B, Proposed Action, cumulative impacts on the natural soundscape in the Unit would be similar to those described under No Action, with vehicle uses, existing and future oil and gas operations in and outside the Unit, maintenance of trans-park oil and gas pipelines, routine park operations, recreational activities including hunting in and outside the Unit, and forestry operations adjacent to the Unit. The impacts from these sources, added to the intermittent, short-term, negligible to moderate, adverse impacts from the operations, would result in localized, short- to long-term, negligible to moderate, adverse cumulative impacts to natural soundscapes in the analysis area.

**Conclusion.** Under Alternative B, Proposed Action, the well would be re-drilled and may be produced. Construction of the access road spur improvements, flowline and well pad; drilling and producing the well; and eventual plugging and reclamation activities would result in adverse impacts ranging from short- to long-term, and negligible to moderate on natural soundscape in and outside the Unit, with more intense impacts localized around source.

The greatest impacts (moderate effects) would occur during the short-term (but continuous) drilling period, which is expected to last from four to six weeks. Therefore, inside the Unit drilling activities would result in minor impact to soundscape. Construction, plugging and reclamation would result in short-term, minor adverse impacts due mainly to the use of heavy equipment and vehicles, while production impacts would be negligible to minor and long-term due to the ongoing operations at the site and occasional workovers.

There would be no impacts to natural soundscapes from in-park operations. Cumulative impacts in and contiguous to the Unit would be similar to those described under No Action, with long-term but intermittent, negligible to moderate, adverse impacts on natural soundscape in and outside the Unit, localized near sources.

Although the conservation of soundscapes is (1) necessary to fulfill specific purposes identified in the establishing legislation of Preserve; (2) key to the natural or cultural integrity of the Preserve; or (3) identified as a goal in the Preserve's *General Management Plan* (1980) and other relevant NPS planning documents, selection of Alternative B would not result in a major impact, thus, the proposal will not result in its impairment and is consistent with §1.4.7.1 of the NPS *Management Policies* 2006.

### **3.4 IMPACTS ON LIGHTSCAPE/NIGHT SKY IN AND OUTSIDE OF THE BEAUMONT UNIT**

#### **3.4.1 Background**

Light has a tremendous amount of natural variation. From the brightest day to the darkest night, light levels span over eight orders of magnitude (NPS, National Resources Program Center (NRPC) 2003). Disruption of this cycle can have significant ecological effects. Darkness is an important habitat component, providing cover, security, navigation, or predatory advantage to both nocturnal and diurnal species. Light pollution, defined as stray unwanted light outside the range and timing of natural variation, is not only an ecological disrupter, but also adversely affects the natural scenery of the night. The NPS mission to “conserve scenery” extends to night and the sky above. The ability to view a pristine night sky where thousands of stars are visible has diminished with increasing development. The loss of this resource represents a direct reduction in enjoyment for park visitors who regularly stargaze. It will also reduce the integrity of other resources by a loss in context.

Light pollution has been documented over 200 miles from the light source (Ibid.). The cumulative effect of multiple artificial light sources at varying distance brightens the sky background, drowning out stars and astronomical objects by contrast reduction, and increasing the illuminance of the ground surface. Particularly dark skies are most prone to a degradation of their scenic potential, showing a large reduction in the number of visible stars with a small amount of light pollution. Night skies already brightened by artificial light show a lessening degradation with each incremental increase in light pollution. Within this response function may be embedded thresholds whereupon certain species, ecological processes, or key scenic resources will be affected.

Individual point sources of light can impact Preserve resources, even if they contribute relatively little to overall skyglow. Artificial lights punctuating the landscape can detract from the natural and historic character of the scenery. They can interfere with human dark adaptation and are documented as affecting certain wildlife.

The degree of impact of artificial light is highly dependent on the distance and the type and brightness of the light fixture. Atmospheric characteristics such as humidity and particulates further influence the apparent effect of artificial light. Distance is the most influential, because the brightness of sky glow from a given light sources decreases six times for every doubling of distance (point light sources decrease four times for every doubling of distance)(Inverse Square Law). Whether the light fixture is fully shielded is also important; fully shielded fixtures can greatly decrease the creation of both point and diffuse source light pollution. The perception of light pollution will vary from one location to another caused by differences in vegetation cover, sight lines and horizon visibility, and even the color of the ground. Atmosphere of greater clarity tends to amplify distant light sources and attenuate nearby light sources, while more

humid and polluted air tends to amplify close light sources, especially those within 6.2 miles (10 kilometers) of an observer (Ibid.)

Both the generally flat topography of the Preserve area and the prevalence of canopy layer vegetation in most of the Preserve naturally limit the experience of vistas in which a substantial portion of the night sky could be observed. This is especially true at the horizon, the part of the sky in which lightscape impacts are first noted. Air quality considerations can also play a role in the context of lightscape impacts, because the presence of air pollution can increase light scattering. However, visibility as an air quality related value of concern was dismissed from consideration in this EA because of the lack of opportunities to view landscape or other features over long distances at the Preserve.

### ***3.4.2 Guiding Laws Regulations and Policies***

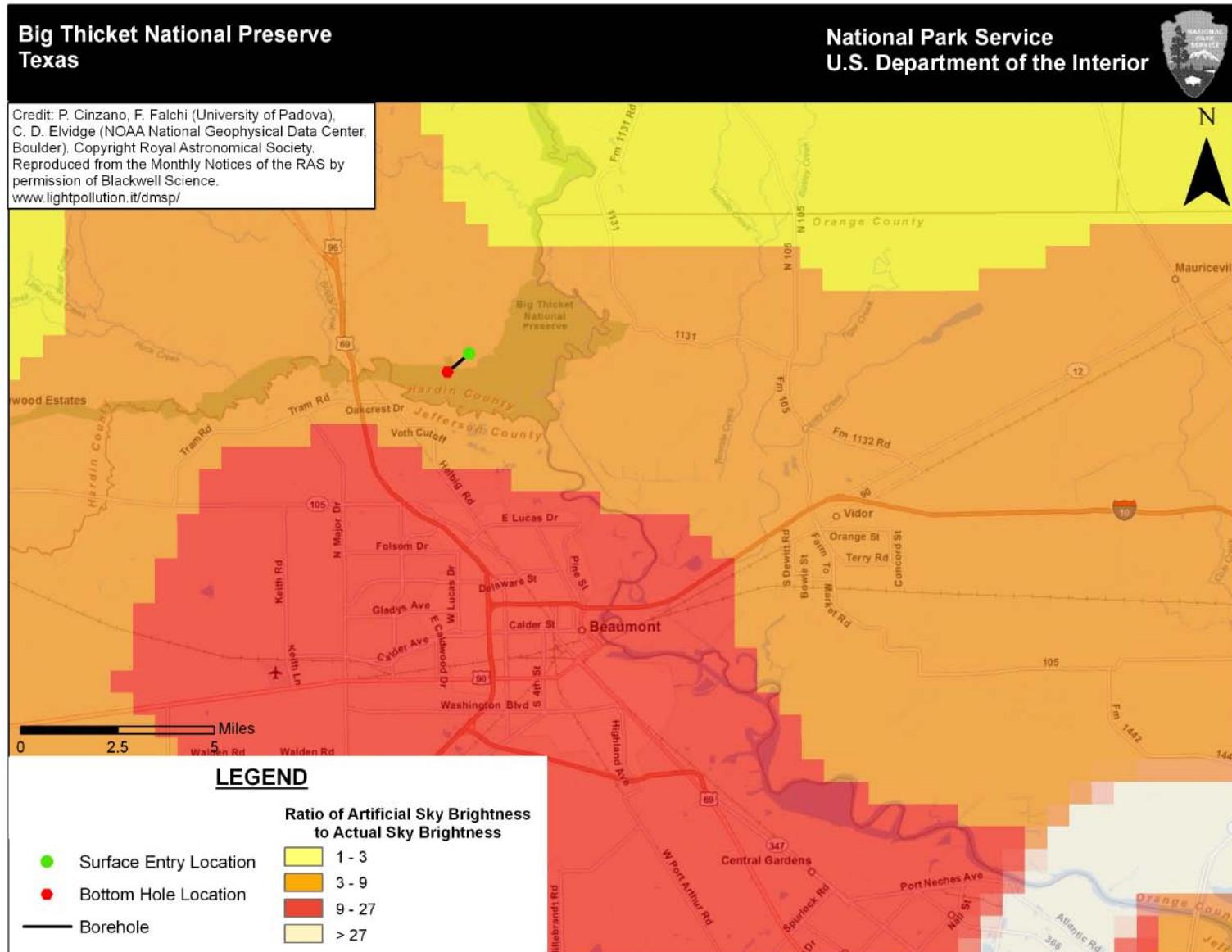
NPS *Management Policies 2006* (§ 4.10) emphasize the protection of natural lightscapes not only for the enjoyment and experience of visitors, but also for protection of ecological integrity. Mitigation strategies are identified, including restricting the use of artificial lighting only where necessary and shielding lights to prevent unwanted light scatter.

### ***3.4.3 Affected Environment***

The existing lightscape surrounding the proposed project area, as shown in Figure 3-2, represents an increase in artificial light of 900-26,999% from natural conditions between zenith and 45° which is converted to a ratio of artificial sky brightness to actual sky brightness ranging from three to nine (Cinzano, et al. 2001).



Figure 3-2 Lightscape Map



### 3.4.4 *Environmental Consequences*

#### 3.4.4.1 *Area of Analysis*

The area of analysis for lightscapes/night sky includes the immediate location of the proposed well pad re-entry site and about 1,500 feet into the surrounding area (both inside and outside the Units) where impacts from lighting would be more noticeable.

#### 3.4.4.2 *Methodology and Assumptions.*

NPS has developed the following impact thresholds for lightscapes, based on effects on visitor experience, ecological disruption, and general park context (relation to cultural or historic setting, etc).

- Negligible:** Light conditions cycle as they would within the range of existing variability. The night sky is unchanged by artificial light, leaving the current amount of stars, astronomical objects, and atmospheric phenomena visible. No visible change in light pollution, either bright stationary point source lights, or sky glow from cities would be noticeable (although change may be detectable by a trained observer or instrument).
- Minor:** The cycle of light and dark is largely similar to existing conditions. Changes in the lightscape are visible along the horizon, but are unnoticed at higher angular altitudes. Mitigation measures, if needed to offset adverse effects, would be simple and successful.
- Moderate:** The cycle of light and dark is modified over existing conditions. Changes in lightscape are obvious, and extend perceptibly overhead. Mitigation measures would be extensive and likely successful.
- Major:** The cycle of light and dark is clearly altered from existing conditions. Changes in lightscape are conspicuous overhead. The sky background is noticeably brighter and more colored in appearance. Extensive mitigation measures would be needed to offset any adverse effects, and their success would not be guaranteed.

#### 3.4.4.3 *Impacts on Lightscapes/Night Sky in and outside the Beaumont Unit under Alternative A, No Action*

Under Alternative A, the Blackstone B-2 well would not be drilled, resulting in no new impacts on lightscapes or night sky in or outside the Unit.

**Cumulative Impacts.** Under Alternative A, cumulative impacts to lightscape would result from a variety of light sources in the area of analysis for cumulative impacts, including new development, commercial timber activities, roadway vehicle traffic outside the Unit, and existing oil and gas operations and industrial facilities both inside and outside the Unit. Light from these sources would vary considerably in intensity, wavelength, duration, and hours of operation, but the numerous light sources have increased the background skyglow levels to various extents in the vicinity of the preserve (Figure 3-2).

An analysis of the cumulative effect of drilling and producing the up to 40 wells projected in the RFD scenario was performed in the Preserve's *Oil and Gas Management Plan Environmental Impact Statement* (NPS, 2005). No "major" adverse impacts were identified for this impact topic which was analyzed under the heading "Visitor Use and Experience." As a result of all the potential light sources mentioned, cumulative impacts to the lightscape within the analysis area are anticipated to be long-term, localized to widespread, negligible to moderate, and adverse.

**Conclusion.** Under Alternative A, No Action, the Blackstone B-2 well would not be drilled, resulting in no new impacts to lightscapes or night sky. Cumulative impacts to lightscapes could occur as a result of development of adjacent properties, oil and gas activities in and outside the Unit, and timber management activities adjacent to the Unit, and are expected to result in long-term, localized to widespread, negligible to moderate, adverse impacts.

Although the conservation of lightscapes is (1) necessary to fulfill specific purposes identified in the establishing legislation of Preserve; (2) key to the natural or cultural integrity of the Preserve; or (3) identified as a goal in the Preserve's *General Management Plan* (1980) and other relevant NPS planning documents, selection of Alternative B would not result in a major impact, thus, the proposal will not result in its impairment and is consistent with §1.4.7.1 of the NPS *Management Policies* 2006.

#### 3.4.4.4 *Impacts on Lightscapes/Night Sky in and outside the Beaumont Unit under Alternative B, Proposed Action*

**Impacts from In-park Operations.** Under Alternative B, Proposed Action, the Blackstone B-2 well would be re-entered and directionally drilled and the wellbore would cross into the Unit at substantial depths and extract hydrocarbons and other fluids from beneath the Unit. There would be no impacts on the Units' lightscapes from the subsurface oil and gas operations in the Unit.

**Impacts from Connected Actions.** Impacts are described by phase of activity, below.

**Construction.** Construction of the access road spur upgrade and well pad, flowline, and production activities would not result in changes in artificial light associated with vehicle traffic and heavy equipment as the construction will occur during daylight hours. Therefore, construction activities would be expected to cause no new impacts on lightscapes or night sky in or outside the analysis area.

**Drilling.** Elevated light levels would be greatest during the short-term drilling/completion periods estimated for the well (four to six weeks) from the lighting of the drill rig to allow for 24-hour operations. During the re-drilling of the well, lighting on the derrick, rig floor, and drill site would be necessary for drilling at night to provide for worker safety. The area of the proposed well re-entry location has minor artificial lighting from residential and agricultural development located north of the site and across Burge Rd.

There are no overnight camping facilities or other visitor use developments in any area of the Unit near the well pad site, so it is not expected that visitors would be affected by the

introduction of additional artificial lighting. It is possible that the light from drilling activities would normally travel the distance between the proposed drilling/production location to the Unit boundaries and into the Unit. However, a dense buffer of forested vegetation is located over the distance (1,280 feet) between the pad site and the Unit boundary. This dense vegetation, combined with the lack of elevation change, would have the effect of blocking the majority of the light from the site before it reaches the Unit. The introduction of artificial light on the dark night sky in the Unit during the short-term drilling phase would result in localized, short-term, but moderate adverse impacts since the lighting would be continuous.

**Production.** During the long-term production life of the well there could be smaller artificial lighting installed at the drilling/production sites. Construction of the flowline and production activities, as well as maintenance of the existing access road, well pad, flowline, and production activities, could result in localized and short-term increases in artificial light associated with vehicle traffic and heavy equipment. Also, occasional workovers on the wells could occur at 5 to 10-year intervals and take one to two weeks to complete. Workover rigs could introduce artificial lighting as well, but are expected to be at lower levels relative to the initial drilling operations and would not operate at night. Lighting from these various sources during the production phase would be expected to cause short- and long-term, localized, negligible to minor adverse impacts to the lightscape and night sky in the analysis area.

**Plugging and Reclamation.** Plugging and reclamation would involve the use of heavy equipment and trucks to remove production equipment, plug the well, and re-contour the well pad in preparation for reseeding. Light sources would include lights on earthmoving equipment and trucks and lighting would be needed only intermittently for the period of plugging and reclamation preparation, usually a period of only a few days, with no nighttime lighting required. Similar to the initial construction phase, these activities would cause no new impacts on lightscapes or night sky in or outside the analysis area.

**Cumulative Impacts.** Under Alternative B, cumulative impacts to Lightscapes/Night Sky in the Unit would be similar to those described for Alternative A. Potential impacts to lightscapes in the area of analysis would result from development of adjacent private properties, vehicle traffic, existing oil and gas operations both inside and outside the Unit, the routine maintenance of trans-park oil and gas pipelines, and recreational activities in and outside the Unit. As a result of these activities and the light contributed by the well, cumulative impacts to the lightscape within the analysis area are anticipated to be long-term, negligible to moderate, localized to widespread, and adverse.

**Conclusion.** Under Alternative B, Proposed Action, the Blackstone B-2 well would be re-drilled and possibly completed to produce hydrocarbons. Construction of the access road spur improvements, flowline, well pad; drilling and producing the well; and eventual plugging and reclamation activities would result in adverse impacts ranging from short- to long-term, and negligible to moderate. Elevated light levels would be greatest during the estimated four to six week drilling/completion phase of the well and localized from the lighting of the drill rig for 24-hour operations, resulting in moderate short-term adverse impacts.

Construction and maintenance of the existing access road, well pad, and flowline; and plugging and reclamation could result in localized, short-term, negligible impacts from increases in artificial light associated with vehicle traffic and heavy equipment. Production impacts could

be long-term but negligible to minor from lighting used for on-going operations and during workovers. There would be no effect from in-park operations. Cumulative effects to Lightscares/Night Sky are expected to be long-term, localized to widespread, negligible to moderate, and adverse.

Although the conservation of lightscares is (1) necessary to fulfill specific purposes identified in the establishing legislation of Preserve; (2) key to the natural or cultural integrity of the Preserve; or (3) identified as a goal in the Preserve's *General Management Plan* (1980) and other relevant NPS planning documents, selection of Alternative B would not result in a major impact, thus, the proposal will not result in its impairment and is consistent with §1.4.7.1 of the NPS *Management Policies* 2006.

### **3.5 IMPACTS ON ADJACENT LANDOWNERS, RESOURCES AND USES**

#### **3.5.1 Background**

This section addresses impacts on adjacent landowners and resources, with emphasis on certain resources on the property outside the Units that could be affected by the proposed operations at noticeable levels. Those resources include soils and geology and vegetation, and cultural resources at the well, all previously discussed in Section 1 of this EA.

#### **3.5.2 Affected Environment**

##### **3.5.2.1 Surface Owners and Land Uses**

The surface location of the proposed Blackstone B-2 well re-entry would occupy lands currently owned by Blackstone Minerals, L.P. The primary land use on lands adjacent to the Unit is timber (predominately pulpwood) production. There is some clearing for small-scale agriculture (pasture) on adjacent lands, and there are two towns, Rose Hill Acres and Voth, located immediately adjacent to the Unit.

#### **3.5.3 Environmental Consequences**

##### **3.5.3.1 Area of Analysis**

The area of analysis for this topic is limited to the private adjacent lands outside the Unit in the immediate vicinity of the well pad site.

##### **3.5.3.2 Methodology and Assumptions**

The assessment of potential impacts on adjacent land uses and resources was based on professional judgment and was developed through discussions with staff from the NPS, review of relevant literature, and field observations. Thresholds of change of the intensity of impacts to adjacent landowners, resources, and uses are defined as follows:

**Negligible:** Impacts would result in a change to land uses or resources, but the change would be so slight that it would not be of any measurable or perceptible consequence.

- Minor:** Operations would cause limited localized change to land uses or resources. Mitigation measures, if needed to offset adverse effects, would be simple and successful.
- Moderate:** Impacts would have measurable impacts to adjacent land uses or resources that would be consequential, but would be relatively local. Mitigation measures, if needed, to offset adverse effects occurring outside the Preserve, would likely succeed.
- Major:** Operations would cause substantial alteration to land uses or resources on a regional scale. Extensive mitigation measures would be needed to offset any adverse effects, and their success would not be guaranteed.

#### 3.5.3.3 *Impacts on Adjacent Landowners, Resources and Uses under Alternative A, No Action*

Under Alternative A, No Action, the Blackstone B-2 well would not be drilled, resulting in no new impacts on adjacent land uses and resources outside the subject Unit.

**Cumulative Impacts.** Cumulative impacts on geology and soils, vegetation and cultural resources outside the Unit would result primarily from land development, including oil and gas operations, as well as from leaks and spills from oil and gas operations and trans-park pipelines, timber management, prescribed burns, and use of vehicles off of roadways. These activities could increase surface runoff; increase soil erosion, rutting and compaction; affect the permeability of soils (and other soil characteristics); and could directly and indirectly affect the growth and regeneration of vegetation. It is expected that existing and reasonably foreseeable uses in the analysis area would continue with long-term, negligible to moderate, adverse cumulative impacts on geology and soils and vegetation, localized near these uses.

Cumulative impacts on cultural resources in the analysis area are expected to continue primarily as the result of ground disturbing activities, where surveys are not performed so sites can be avoided, or impacts mitigated by data recovery programs, associated with vehicle use on and off developed roads, recreational activities, development (including oil and gas activity), and commercial timber activities adjacent to the Unit. Overall, it is expected that existing uses in the analysis area would continue, with long-term, localized, negligible to moderate, adverse cumulative impacts to landowners.

**Conclusion.** Under Alternative A, No-Action, the well would not be drilled; therefore, there would be no new impacts on adjacent land uses and resources outside the Unit. It is expected that existing and reasonably foreseeable uses in the analysis area would continue with short- to long-term, negligible to moderate, adverse cumulative impacts on geology and soils and vegetation, and landowners at the site, localized near these uses.

#### 3.5.3.4 *Impacts on Adjacent Landowners, Resources and Uses under Alternative B, Proposed Action*

**Impacts from In-Park Operations.** Under the Proposed Action, the Blackstone B-2 well would be re-entered and directionally drilled into the Preserve at substantial depths under the

land surface, as described under in Section 1.4.1 above. Therefore, there would be no impacts on adjacent landowners, resources, or uses outside the Preserve Unit from the in-park subsurface oil and gas operations proposed for the well.

**Impacts from Connected Actions.** Impacts are described by phase of activity, below.

**Construction.** Well pad construction and access road spur improvement would result in the minimal direct disturbance to site geology and soils and vegetation on the Blackstone B-2 well. Though the site and roads currently exist, improvement and maintenance of the access road spur and well pad would require the area be mechanically cleared and leveled. Rock would be imported to cover the pad. The proposed oil and gas activities would locally affect soil characteristics by decreasing permeability and increasing erosion and surface runoff. Soils compacted by foot or vehicle use could reduce soil permeability, change surface drainage patterns, and hinder the penetration of plant roots. Disturbance of the site could lead to the unintentional spread of non-native plant species transported to the site on equipment used to drill and develop the well.

The Blackstone B-2 existing well pad site is a previously-used oil well location with little re-growth of vegetation and that vegetation that would be removed is primarily shrub scrub vegetation. Impacts to soils and vegetation at the well would be short-term, (except for the long-term clearing effects over the life of the well), minor, localized, and adverse. No impacts to cultural resources are anticipated at the well pad as discussed in Section 1.4.5. However if discovered ground disturbing activities associated with the construction of the proposed drilling/production pad and flowlines could result in long-term, localized, negligible to moderate, adverse impacts to cultural resources on adjacent lands. To mitigate for unanticipated discoveries, Endeavor will cease operation if cultural resources are discovered and notify the proper authorities.

**Drilling.** The unplanned release of hydrocarbons or other hazardous substances from vehicles, equipment, or flowlines during drilling operations could alter the chemical and physical properties of the soil in the vicinity of oil and gas activities. Changes in soil properties could result directly from contact with contaminants on site, or indirectly, via runoff from contaminated areas.

Mitigation measures to protect soils and vegetation during the drilling (and production) activities include complying with a SPCC Plan, constructing a ditch and levee around the well pad, constructing a washout/emergency pit lined with 12-mil plastic, using a closed-loop containerized mud system, disposing of drilling mud and well cuttings off-site, constructing a two-foot firewall around the tank battery with a capacity 1.5 times the largest tank, installing a safety drip device on the off-load connection, and following RRC Statewide Rules for surface casing and well plugging. After re-drilling the well, the washout/emergency and water pits would be filled. These measures are intended to minimize and contain any spilled substances. If the well does not go into production, the area would be reclaimed, resulting in localized, short-term, minor adverse impacts on geology and soils on adjacent lands.

**Production.** If the well is produced, no additional acreage would be needed for the construction of the flowline needed to carry the product. The approximately 200 foot flowline

constructed to connect to existing service lines would be entirely within the previously disturbed well pad site.

**Plugging and Reclamation.** Plugging and reclamation operations and site preparation during reclamation would involve the use of heavy equipment and have similar impacts as construction, but over a much shorter period of time (a few days), with very short-term, minor, localized effects. The long-term effect of the reclamation phase is to return the areas to natural conditions, which would restore soils and vegetation on the sites. The potential for leaks and spills exists for all phases of oil and gas activities; however, the mitigation measures (plastic liners, berms, etc.) that would be implemented would confine impacts to the well pad, and reclamation would include cleanup of any remaining site contamination.

**Cumulative Impacts.** Cumulative impacts would be similar to those described for Alternative A. Land development, including existing and future oil and gas operations, maintenance of oil and gas pipelines, and forestry operations adjacent to the Unit could contribute to cumulative impacts on soils and vegetation. Considering the limited amount of acreage that would be directly impacted (a total of about two acres for the well pad), the type of vegetation loss (mainly shrub scrub), and the reclamation that would occur after the site is no longer used, the effects of the Proposed Actions would not contribute more than minor adverse impacts to the overall cumulative impact of all these actions in the region.

**Conclusion.** Under Alternative B, Proposed Action, the well would be drilled and may be produced. Construction of the access road spur improvements, flowline, well pad; drilling and producing the well; and eventual plugging and reclamation activities would result in adverse impacts ranging from short- to long-term, and negligible to moderate on adjacent landowners, resources, and uses outside the Unit. The expected effects on geology and soils and vegetation on adjacent lands are expected to be confined to the direct area of impact by the application of mitigation measures at the site. Therefore, the adverse impacts on these adjacent resources are expected to be localized and minor, with long-term impacts during production and lasting until site reclamation restores soils and vegetation cover.

Ground disturbing activities associated with the construction of the proposed drilling/production pad and flowlines, unless avoided or mitigated, could result in long-term, localized, negligible to moderate, adverse impacts to cultural resources on adjacent lands. There would be no impacts on soils, vegetation, or cultural resources from in-park oil and gas operations. Cumulative impacts to these adjacent resources and uses would continue, with long-term, localized, negligible to moderate, adverse cumulative impacts to soils, vegetation, and cultural resources outside the Unit.

### **3.6 VISITOR USE AND EXPERIENCE IN THE BEAUMONT UNIT**

#### **3.6.1 Background**

This section addresses impacts on visitor use and experience within the Preserve, with emphasis on certain resources on the property outside the Units that could be affected by the proposed operations at noticeable levels. Those resources include soundscapes and lightscapes, all previously discussed in Section 3.1 and 3.2, respectively, of this EA.



### 3.6.2 *Affected Environment*

Very few visitors would be expected within the Unit near the vicinity of the proposed well re-entry, since there are few visitor-use developments or amenities within the areas of the Preserve in the vicinity of the existing well pad location. Furthermore, access to the Preserve is not available through or immediately adjacent to the existing well pad site. The primary visitor uses that may occur in the Unit in the vicinity of the proposed Blackstone B-2 well are picnicking, located approximately 1.75 miles to the southwest, and hunting activities. The frequency of active hunting in the vicinity of the Project is greatly limited as the majority of the Unit would only be accessible by boat from within the Preserve. Other primary visitor uses would be canoeing and other boating activities which are popular on the Neches River, located about two miles east of the site. There have been no recent written or verbal complaints from visitors relating to oil and gas development in the Preserve. However, it is recognized that noise from oil and gas operations could indirectly affect visitors, especially those hiking/boating in more remote areas of the Preserve, and this is addressed in the “Soundscapes” analysis in Section 3.

Oil and gas development would alter the physical setting by introducing unwanted visual intrusion to the landscape, noises, smells, or lighting that would be noticeable to the casual viewer and would interfere with the visitor experience.

### 3.6.3 *Environmental Consequences*

#### 3.6.3.1 *Area of Analysis*

The area of analysis for this topic is limited to the private adjacent lands outside the Unit in the immediate vicinity of the well locations.

#### 3.6.3.2 *Methodology and Assumptions*

NPS has developed the following impact thresholds for visitor use and experience, based on effects on visitor experience, ecological disruption, and general park context (relation to cultural or historic setting, etc).

**Negligible:** Visitors would not be affected or changes in visitor use and/or experience would be below or at the level of detection. There is no expectation for endangering visitor health and safety from oil and gas operations.

**Minor:** Changes in visitor use and/or experience would be detectable, although the changes would be slight. Few visitors would be affected. There is little expectation for endangering visitor health and safety from oil and gas operations with the application of mitigating measures.

**Moderate:** Changes in visitor use and/or experience would be readily apparent. Many visitors would be affected and would likely express an opinion about the effects. Extensive mitigation is necessary to reduce risk of endangering visitor health and safety from oil and gas operations.

**Major:** Changes in visitor use and/or experience would be readily apparent and have important consequences. Most visitors would be affected and would likely express a strong opinion about the effects. Extensive mitigating measures could not reduce risk of endangering visitor health and safety from oil and gas operations.

3.6.3.3 *Impacts on Adjacent Landowners, Resources and Uses under Alternative A, No Action*

Under Alternative A, No Action, the Blackstone B-2 well would not be drilled, resulting in no new impacts on visitor use and experience within the subject Unit.

**Cumulative Impacts.** Vehicle uses, existing and future oil and gas operations in and outside the Unit, maintenance of oil and gas pipelines, routine park operations, recreational activities including hunting in and outside the Unit, and forestry operations adjacent to the Unit are anticipated to result in localized, short- to long-term, negligible to minor, adverse impacts on visitor use and experience.

An analysis of the cumulative effect of drilling and producing the up to 40 wells projected in the RFD scenario was performed in the Preserve's *Oil and Gas Management Plan Environmental Impact Statement* (NPS 2005), and negligible cumulative adverse impacts were identified for this impact topic. The effects of the Proposed Action would contribute negligible adverse impacts to overall cumulative impact of all actions in the region.

**Conclusion.** Under Alternative A, No-Action, the well would not be drilled; therefore, there would be no new impacts on visitor use or experience within the subject unit. It is expected that existing and reasonably foreseeable uses in the analysis area would continue with short- to long-term, negligible to minor, adverse cumulative adverse impacts on visitor use and experience.

3.6.3.4 *Impacts on Adjacent Landowners, Resources and Uses under Alternative B, Proposed Action*

**Impacts from In-Park Operations.** Under the Proposed Actions, the well would be re-entered and directionally drilled from a surface location approximately 1,500 feet from the boundary of the Preserve. The wellbores would cross into the Unit at considerable depths (see Section 1.4.1). Therefore, there would be no impacts on visitor use and experience within the Unit from the subsurface oil and gas operations in the Unit.

**Impacts from Connected Actions.** It is unlikely that many visitors would be in the vicinity of the proposed re-drilling and production activities associated with the existing Blackstone B-2 well pad site. The areas adjacent to the site are not located in high visitor use areas of the Preserve. The closest picnicking and parking area is located approximately 1.75 miles to the southwest, there are no hiking trails or bird watching hotspots in the vicinity of the well pad site. Furthermore, due to the distance from the Preserve and the dense forested vegetation between the Preserve and the Connected Actions, it is not anticipated that visitors will see the activities. Impacts to Preserve visitors from connected actions could include the effects of releases of

contaminants from the sites, or noise and light from construction and operations. The potential for contamination of off-site areas is very low, as described under in Section 1.4.1.

The possibility of catastrophic release was dismissed, based on the frequency of recent occurrences in the area. Also, the Blackstone B-2 existing well pad site has included several mitigation measures to lessen potential off-site impacts to Preserve visitors, primarily spill prevention and control measures. Regarding noise impacts to nearby visitors, the effects of connected actions on the natural soundscape, which can indirectly affect visitor experience, are addressed in detail above. Therefore, based on the lack of visitation in this area, the lack of complaints relating to oil and gas operations, and the low potential for health and safety issues, impacts on visitor use and experience in the Units from the connected actions are expected to be negligible.

**Cumulative Impacts.** Vehicle use, existing and future oil and gas operations in and outside the Unit, maintenance of oil and gas pipelines, routine park operations, recreational activities including hunting in and outside the Unit, and forestry operations adjacent to the Unit are anticipated to result in localized, short- to long-term, negligible to minor adverse impacts on visitor use and experience.

An analysis of the cumulative effect of drilling and producing the up to 40 wells projected in the RFD scenario was performed in the Preserve's Oil and Gas Management Plan Environmental Impact Statement (NPS 2005), and negligible cumulative adverse impacts were identified for this impact topic. The effects of the Proposed Action would contribute negligible adverse impacts to the overall cumulative impact of all actions in the region.

**Conclusion.** Under Alternative B, Proposed Action, the well would be re-drilled and may be produced. Construction of the access road spur improvements, flowline and well pad; drilling and producing the well; and eventual plugging and reclamation activities would result in adverse impacts ranging from short- to long-term outside the Unit, and negligible impacts on visitor use and experience inside the Unit. There would be no impacts to visitor use or experience from in-park operations. Cumulative impacts in and contiguous to the Unit would be similar to those described under No Action, with intermittent, negligible, long-term adverse impacts on visitor use or experience inside the Unit.

Although the conservation of visitor use (1) necessary to fulfill specific purposes identified in the establishing legislation of Preserve; (2) key to the natural or cultural integrity of the Preserve; or (3) identified as a goal in the Preserve's *General Management Plan* (1980) and other relevant NPS planning documents, selection of Alternative B would not result in a major impact, thus, the proposal will not result in its impairment and is consistent with §1.4.7.1 of the NPS *Management Policies* 2006.

#### **4.0 CONSULTATION AND COORDINATION**

Following the 30-day external public scoping and comment period, NPS received and considered the written comments from the following:

- Alabama-Coushatta Tribe of Texas – requesting that if any unanticipated cultural resources are found that they be notified. No comments were made for alternatives or impacts not discussed in this EA.
- Lonestar Chapter and Houston Regional Group of the Sierra Club – requesting that an EIS be prepared in lieu of this EA and commenting on NPS policies. No comments were made for alternative or impacts not discussed in this EA.

Following the 30-day public review and comment period, NPS will consider the written comments received.

#### **4.1 INDIVIDUALS AND AGENCIES CONSULTED**

The following were consulted or contributed information during the preparation of this environmental assessment:

Alabama-Coushatta Tribe of Texas  
Endeavor Natural Gas, L.P.  
    William Russ, Principal  
Environmental Resources Management  
    Alicia Smith, Project Manager  
    Erin Johnson, Project Scientist  
National Park Service  
    Big Thicket National Preserve, Beaumont, TX  
        Dave Roemer, Chief of Resources Management  
        Todd Brindle, Superintendent  
        Haigler “Dusty” Pate, Biologist, Natural Resource Program Manager  
        Stephanie Burgess, Oil and Gas Program Manager  
    Office of Minerals/Oil/Gas  
        Linda Dansby, Regional Minerals Coordinator  
    Office of Planning and Environmental Quality, Intermountain Region, Lakewood, CO  
        Chris Turk, Regional Environmental Quality Officer  
        Cay Ogden, Wildlife Ecologist and T&E Coordinator  
        Jim Bradford, Supervisory Archeologist  
    Planning, Evaluation and Permits Branch, Geologic Resources Division, Lakewood, CO  
        Carol McCoy, Chief  
Natural Resource Conservation Service  
Railroad Commission of Texas, Oil and Gas Division, District 3  
Texas Historical Commission  
Texas Commission on Environmental Quality  
Texas Parks and Wildlife Department  
U.S. Fish and Wildlife Service

## 4.2 LIST OF DOCUMENT RECIPIENTS

During the public review and comment period, a copy of this environmental assessment will be sent to each of the following agencies, organizations and businesses:

### Tribal Government

Oil and Gas Department, Alabama-Coushatta Tribe of Texas  
Tribal Administrator, Alabama-Coushatta Tribe of Texas  
Historical Preservation, Alabama-Coushatta Tribe of Texas

### Federal Government

#### National Park Service

Linda Dansby, Regional Minerals Coordinator, Intermountain Region, Santa Fe, NM  
Chris Turk, Regional Environmental Quality Coordinator, Intermountain Region, Denver, CO  
Carol McCoy, Chief, Branch of Planning, Evaluation and Permits, Geologic Resources Division, Lakewood, CO  
Cay Ogden, Wildlife Ecologist and T&E Coordinator, Office of Planning and Environmental Quality, Intermountain Region, Lakewood, CO  
Jim Bradford, Supervisory Archeologist, Office of Planning and Environmental Quality, Intermountain Region, Lakewood, CO  
Bruce Bennett, North Evaluation Unit Leader, U.S. Army Corps of Engineers, Galveston District, Galveston, TX  
Edith Erfling, Fish and Wildlife Biologist, U. S. Fish and Wildlife Service, Clear Lake Field Office, Houston, TX  
U.S. Senator John Cornyn, Houston, TX  
U.S. Senator Kay Bailey Hutchison, Houston, TX  
U.S. Congressman Kevin Brady, District 8 Orange, TX

### State Government

Guy Grossman, Director, Railroad Commission of Texas, District 3, Houston, TX  
Debra Beene, Archeologist, State Historic Preservation Office, Austin, TX  
Amy Hanna, Texas Parks and Wildlife Department

### Oil and Gas Industry and Consultants

William Russ, Endeavor Natural Gas, L.P., Houston, TX  
Alicia Smith, Environmental Resources Management, Houston, TX  
Ross Davis, Davis Ross Oil Producers, Houston, TX

### Organizations and Businesses

Bruce Drury, President, Big Thicket Association  
Brandt Mannchen, Chair, Big Thicket Committee, Sierra Club, Lone Star Chapter and Houston Regional Group, Houston, TX  
Janice Benzanson, Executive Director, Texas Conservation Alliance  
Kevin Cronin, Beaumont, TX  
Robert Stroder, Lower Neches Valley Authority, Beaumont, TX

## 4.3 LIST OF PREPARERS

Alicia Smith, Environmental Resources Management, Houston, TX  
Erin Johnson, Environmental Resources Management, Houston, TX  
Stephanie Burgess, Oil and Gas Program Manager, Big Thicket National Preserve, Kountze, TX

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**Wetlands Delineation Report**  
*Appendix A*

*05, 28, 2009*

**Federally-listed Threatened and Endangered Species**  
*Appendix B*

**State-listed Threatened and Endangered Species**  
*Appendix C*

**Threatened and Endangered Species Report**  
*Appendix D*

*05, 28, 2009*