

National Park Service
U.S. Department of the
Interior

Big Thicket National
Preserve



Environmental Assessment Famcor Oil, Inc. Roberts / Duke #1 Flowline



December 2004

In 1916, Congress created the National Park Service in the Department of the Interior to:

...promote and regulate the use of the Federal areas known as national parks, monuments, and reservations...by such means and measures as to 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 wild life 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. (NPS Organic Act, 16 U.S.C. § 1)

Cover Photo: Picture taken September 30, 2004 of Menard Creek Corridor Unit along the route of the proposed bore section. Dusty Pate, National Park Service.

Environmental Assessment
Famcor Oil, Inc.
Proposal to Directionally Drill a 2 Inch Flowline Crossing the Menard Creek
Corridor Unit of the Big Thicket National Preserve
Polk and Liberty Counties, Texas

Summary: In accordance with National Park Service (NPS) regulations for nonfederal oil and gas rights, Famcor Oil, Inc. (Famcor) has submitted a Plan of Operations (Plan) to the NPS to drill and install a 2 inch flowline from a surface location southeast of the Menard Creek Corridor Unit (Unit) of Big Thicket National Preserve (Preserve) in Liberty County, Texas, on lands owned by Famcor within the Six Lakes Subdivision, to a surface location northwest of the Unit in Polk County, Texas, on lands owned and managed by the Bar M Ranch. The entire project is anticipated to take ten days, with drilling operations expected to take one day of that total. The project would be initiated in the Winter / Spring of 2005.

This Environmental Assessment (EA) evaluates two alternatives. Alternative A, No Action, evaluates baseline conditions in which the flowline would not be drilled / installed; therefore, there would be no new impacts on the environment. Alternative B, Proposed Action, evaluates Famcor's proposal to directionally drill and install the flowline. Due to directional boring of the flowline beneath the Unit, and the application of other mitigation measures, impacts on Unit resources and values would be avoided or substantially reduced. Potential impacts on Unit resources and values, as summarized in Section 1, are expected to be of low intensity (no effect, or negligible to minor). Therefore, many topics have been dismissed from further analysis in this EA. The only Unit resource or value carried through for further analysis is natural soundscape. Increased noise levels would be localized in the vicinity of the surface locations (especially the location where the drill rig will be used) during directional drilling, trenching, and installation activities, as well as subsequent production, maintenance, and reclamation operations, resulting in short - to long - term, negligible to moderate, adverse impacts on natural soundscape within the Unit. There would be no potential for impairment to Unit resources and values from the proposed action. The topic, Adjacent Landowners, Resources and Uses was qualitatively analyzed. The proposed action would convert up to 0.62 acres of prime farmland soils to oil and gas use, and result in localized, short - to long - term, adverse impacts on air quality, natural soundscape, geology and soils, vegetation, and cultural resources.

Public Comment: A Notice of Availability was published in the *Federal Register* on December 28, 2004. If you wish to comment on the Plan of Operations or Environmental Assessment, please mail your comments to the address below. These documents will be available for public review for 30 days and comments must be received by the close of business on Friday, January 28, 2005. Please note that names and addresses of people who comment become part of the public record. If you wish us to withhold your name and / or address, you must state this prominently at the beginning of your comment letter. We will make all submissions from organizations, businesses, and from individuals identifying themselves as representatives or officials of organizations or businesses available for public inspection in their entirety.

Superintendent
Big Thicket National Preserve
3785 Milam
Beaumont, Texas 77701

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TABLE OF CONTENTS

1.0	PURPOSE OF AND NEED FOR ACTION	1
1.1	Objectives of Taking Action	4
1.2	Special Mandates and Direction	4
1.2.1	NPS Organic Act and General Authorities Act – Prevention of Impairment	4
1.2.2	Big Thicket National Preserve Enabling Act	5
1.2.3	NPS Nonfederal Oil and Gas Regulations, 36 CFR 9B	6
1.2.4	NPS Monitoring of Nonfederal Oil and Gas Operations	6
1.2.5	Approved Park Planning Documents	7
1.3	Issues and Impact Topics Evaluated	11
1.4	Issues and Impact Topics Eliminated from Further Analysis	13
1.4.1.	Socioeconomics in and outside of the Unit	14
1.4.2.	Environmental Justice	15
1.4.3.	Prime Farmlands in the Unit	15
1.4.4.	Air Quality in the Unit	16
1.4.5.	Lightscape Management in and outside of the Unit	18
1.4.6.	Geology and Soils in the Unit	18
1.4.7.	Water Resources, Floodplains, and Wetlands in and outside of the Unit	20
1.4.8.	Vegetation in the Unit	21
1.4.9.	Fish and Wildlife in and outside of the Unit	21
1.4.10.	Threatened and Endangered Species, and Other Species of Management Concern in and outside of the Unit	22
1.4.11.	Cultural Resources in the Unit	23
1.4.12.	Visitor Use and Experience in the Unit	24
2.0	ALTERNATIVES	25
2.1	Alternative A, No Action	25
2.2	Alternative B, Proposed Action, Application as Submitted	25
2.2.1	Location of the Well	26
2.2.2	Access	26
2.2.3	Surface Locations	26
2.2.4	Flowline	27
2.2.5	Directionally Drilled Portion	27
2.2.6	Trenched Portions	28
2.2.7	Reclamation Plan	28
2.3	Alternatives Considered but Dismissed from Further Analysis	29
2.3.1.	NPS Acquisition of the Mineral Rights	30
2.3.2.	Trench and Install Flowline	30
2.4	Environmentally Preferred Alternative	30
2.5	National Park Service Preferred Alternative	30
3.0	AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES	35
3.1	Impacts on Natural Soundscape in the Unit	36
3.2	Impacts on Adjacent Landowners, Resources and Uses	40
4.0	CONSULTATION AND COORDINATION	45
4.1	Individuals and Agencies Consulted	45
4.2	List of Document Recipients	45

4.3	List of Preparers	46
5.0	BIBLIOGRAPHY	47
6.0	APPENDIX A, State and Federally Listed Species	49

LIST OF FIGURES

Figure 1.	Project Location Map	2
Figure 2.	Map depicting the proposed flowline sections	3
Figure 3.	Proposed Operation Plat	25
Figure 4.	Sound Level Comparison Chart	38

LIST OF TABLES

Table 1.	Current Legal and Policy Requirements	8
Table 2.	Issue Statements	12
Table 3.	Mitigation Measures under Proposed Action (Alternative B)	28
Table 4.	Extent that Each Alternative Meets Objectives	31
Table 5.	Summary of Actions	32
Table 6.	Summary of Impacts	33

1. PURPOSE AND NEED

This Environmental Assessment evaluates two alternatives for the National Park Service to consider Famcor's proposal to directionally drill and install the Roberts / Duke #1 Flowline under the Menard Creek Corridor Unit of the Big Thicket National Preserve. The purpose of this analysis is to provide a decision - making framework for the NPS to approve the use of parklands for Famcor to develop its mineral rights, while protecting and preventing impairment to park resources and values, and allowing for a safe visitor experience; and to determine whether an Environmental Impact Statement (EIS) should be prepared.

This EA also serves the purpose of disclosing to the public the potential impacts on the human environment, both inside and outside the Unit. The impact analyses will take a "general look" at the impacts that could occur on adjacent lands.

When Congress authorized the establishment of Big Thicket National Preserve on October 11, 1974, the 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, yet the NPS is required by its laws, policies and regulations to protect the Preserve from any actions, including oil and gas operations, that may adversely impact or impair Preserve resources and values. The Preserve was created "to assure the preservation, conservation, and protection of the natural, scenic, and recreational values of a significant portion of the Big Thicket area in the State of Texas and to provide for the enhancement and public enjoyment thereof." The Preserve includes 15 units located in Jefferson, Hardin, Liberty, Polk, Tyler, Jasper, and Orange Counties, Texas. There are approximately 97,205 acres within the Preserve boundary. Of that total, the United States currently owns fee simple title to a surface estate of approximately 85,894 acres, as well as about 540 acres outside the boundary.

Figure 1 is a project location map depicting the 15 units of the Preserve, and the proposed project location.

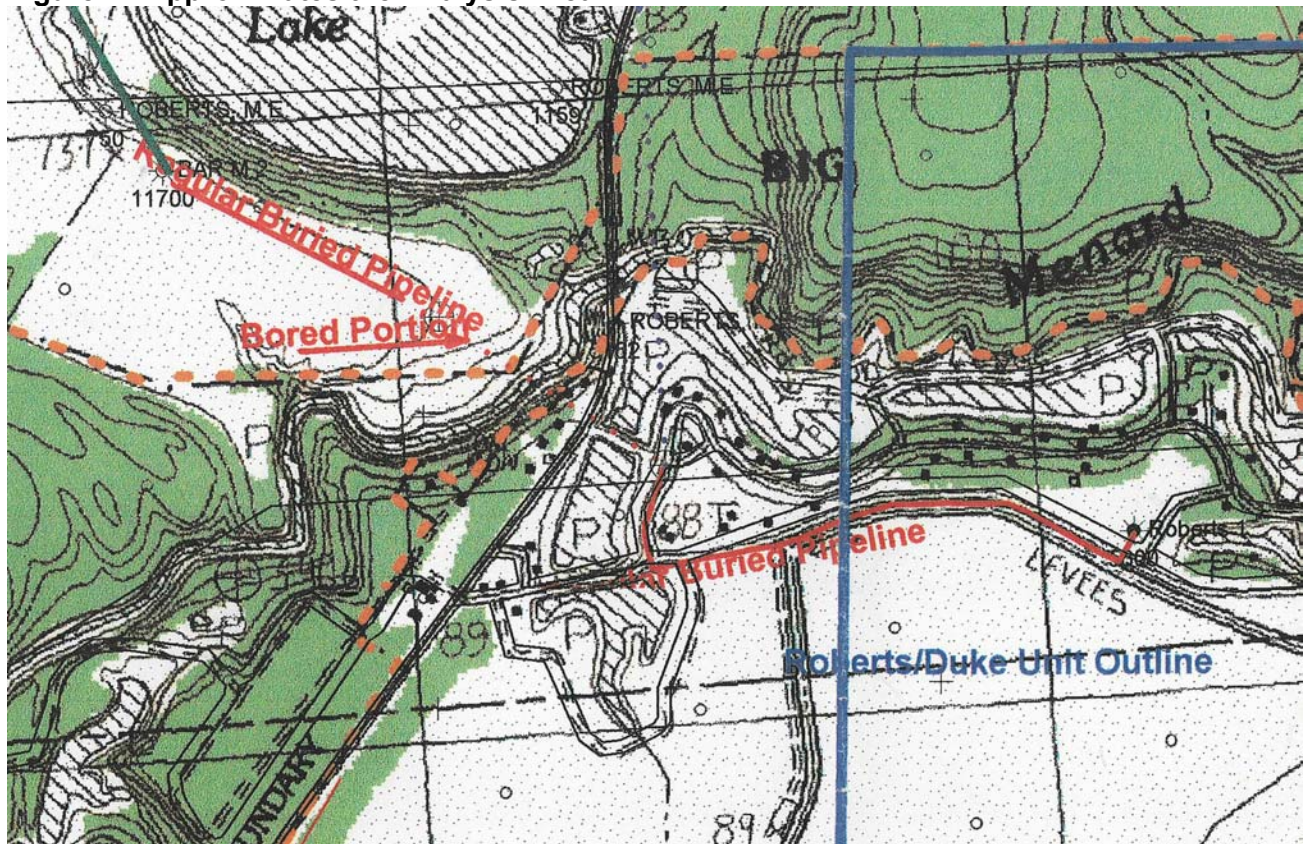
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On October 15, 2004 Famcor submitted a Plan of Operations to the NPS to drill and install the Roberts / Duke #1 Flowline. The NPS reviewed the Plan and identified needed changes in a letter dated November 22, 2004. The revised Plan incorporating the requested changes was received by the NPS on December 6, 2004. The NPS reviewed and determined the Plan of Operations to be substantially complete on December 17, 2004, and 'accepted' the Plan for formal processing. The NPS must decide whether to approve the plan and if so, if additional mitigation measures are needed.

The analysis area for evaluating impacts in this EA includes:

- The direct area of impact includes two surface locations for drilling and installing the bored section of flowline, one in the Six Lakes Subdivision, and one on the Bar M Ranch; three existing access roads; the bored section of flowline which is approximately 1,550 feet long and 6 inches in diameter, or 3,650 cubic feet; as well as two sections of trenched and buried flowline corridor, representing a combined total of 4,550 X 20 feet or 2.1 acres, that connect the drilled section to existing infrastructure.
- The indirect area of impact extends 1,500 feet beyond the surface locations, access roads, and the trenched sections of flowline. NPS selected the 1,500 foot offset because noise generated during drilling and installation activities may require up to 1,500 feet to attenuate to background levels.
- The analysis area of cumulative impacts includes the entire Menard Creek Corridor Unit and areas contiguous to the Unit.

Figure 2. Approximates the Analysis Area.



1. 1. Objectives of Taking Action

There are three objectives for this project that must be met if the project is to be considered successful:

- Provide Famcor Oil, Inc., as the lessee of nonfederal oil and gas mineral interests, reasonable access for development of their mineral estate.
- Avoid or minimize impacts on Unit resources and values, visitor use and experience, and human health and safety.
- Prevent impairment of Unit resources and values.

1. 2. Special Mandates and Direction

The NPS evaluates project-specific proposals for oil and gas production and transportation on a case-by-case basis by applying a variety of Current Legal and Policy Requirements prior to issuing a permit under the general regulatory framework of the NPS Nonfederal Oil and Gas Rights Regulations (36 CFR 9B). The following discussion is a summary of the basic management direction the NPS follows for permitting nonfederal oil and gas operations in units of the National Park System.

1. 2. 1. NPS Organic Act and General Authorities Act – Prevention of Impairment

The NPS Organic Act of 1916 (16 U.S.C. § 1, *et seq.*) provides the fundamental management direction 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.C. § 1a-1 *et seq.*) affirms that while all national park system 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 (2001 Management Policies, § 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 explain that an impact would be more likely to constitute an impairment to the extent 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) Identify as a goal in the park's general management plan or other relevant NPS planning documents.

An impact would be less likely to constitute impairment to the extent that it is an unavoidable result, which cannot be reasonably further mitigated, of an action necessary to preserve or restore of park resources or values.

NPS Management Policies 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. Park resources and values that are subject to the no impairment standard 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. Additional resources and values that are subject to the non-impairment standard include the park’s role in contributing to the national dignity, the high public value and integrity, and the superlative environment quality of the nation park system.

The Environmental Consequences section of this EA provides an analysis of the potential for impairment for each park resource or value carried forward for further evaluation.

1. 2. 2. Big Thicket National Preserve Enabling Act

The Preserve was established by 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 “to assure the preservation, conservation, and protection of the natural, scenic, and recreational values of a significant portion of the Big Thicket area in the State of Texas and to provide for the enhancement and public enjoyment thereof.” The Preserve includes 15 units located in Jefferson, Hardin, Liberty, Polk, Tyler, Jasper, and Orange Counties, Texas. There are approximately 97,205 acres within the Preserve boundary. Of that total, the United States currently owns fee simple title to a surface estate of approximately 85,894 acres, as well as about 540 acres outside the boundary.

The Preserve’s authorizing legislation provides that the United States shall not acquire the mineral estate within the Preserve unless the Secretary of the Interior “first determines that such property or estate is subject to, or threatened with, uses which are, or would be, detrimental to the purposes and objectives of sections 698 to 698e of this title.” 16 U.S.C. §§ 698a(a).

However, it also directs the Secretary “to 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: ... (2) exploration for, and extraction of, oil, gas, and other minerals.” Id at subsection 698c(b).

One of the primary rights associated with the mineral interest is the right of reasonable access to explore for and develop the mineral interest. If the mineral interest holder chooses to exercise its right to explore for or develop its mineral interest, the NPS must consider granting some form of access in the Preserve. However, access to nonfederal oil and gas which requires access on, across, or through federally owned or controlled lands or waters within the Preserve is subject to the NPS’s Nonfederal Oil and Gas Rights Regulations.

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 United States 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 section 3 of the NPS Organic Act and individual park statutes, 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 Service’s jurisdiction under these regulations does not extend to any activities occurring outside park boundaries, even if such activities are associated with a nonfederal oil and gas operation occurring inside a park.

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. The application and implementation of these regulations on the ground must be assessed parkwide for each site-specific oil and gas activity to determine if these activities have the potential to impair park resources and values.

1. 2. 4. NPS Oversight and Monitoring of Nonfederal Oil and Gas Operations

Under 36 CFR § 9.37(f) “[a]pproval of each plan of operations is expressly conditioned upon the Superintendent having such reasonable access to the site as is necessary to properly monitor and insure compliance with the plan of operations.” The Preserve will have a qualified monitor onsite during drilling operations. Also, in the event of any release (from within the drilled section of flowline, or that would pose an imminent threat to Preserve resources) of oil or other contaminating substances, as defined at 36 CFR § 9.31(o), Famcor Oil, Inc. will promptly report the following information to the Superintendent of the Preserve: the time the release was discovered; the type of product released; the location; estimated spill volume; cause of the spill; area covered; estimated rate of release if the spill is ongoing; direction of spill movement; description of the contaminated area; proximity to surface waters, roads, or trails; weather conditions; what steps are being taken to remedy the situation; and initial response equipment required. In the event of a major release (characterized by a gas line break or rupture or

release in excess of five barrels of liquid), Famcor will provide a written report to the Superintendent within 10 working days of the incident. In addition to the information contained in the initial report, the written report will include steps that will be, or have been, taken to prevent recurrence of the incident. All approved plans of operations have a spill contingency plan that is reviewed and approved by the NPS.

Pursuant to 36 CFR § 9.51(a) an **“operator shall be held liable for any damages to federally-owned or controlled lands, waters, or resources, resulting from his failure to comply with...his plan of operations.”** Undertaking any operations within the boundaries of a park system unit in violation of the 9B regulations shall be deemed a trespass against the United States and shall be cause for revocation of approval of an operator's plan of operations. If an operator violates a term or condition of its approved plan of operation the Superintendent has the authority to temporarily suspend the operation and give the operator the chance to cure the violation. Section § 9.51(c) outlines the Superintendent's suspension authority and procedure. If an operator fails to correct any violation or damage to federally owned or controlled lands, waters, or resources the operator's approval will be revoked. 36 CFR § 9.51(c)(3).

In addition to the remedies available to the NPS under the 9B regulations, an operator is also subject to the remedial provisions found in all applicable federal, state, and local laws. For instance, under 16 U.S.C. § 19jj, commonly known as the “Park System Resource Protection Act,” any person who destroys, causes the loss of, or injures any park system resource is strictly liable to the United States for response costs and for damages resulting from such destruction, loss or injury.

1. 2. 5. Approved Park Planning Documents

Approved park planning documents also provide a framework for determining how nonfederal oil and gas operations are conducted within Big Thicket National 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 Big Thicket National Preserve in 1980. The Preserve's preparation of a new GMP is currently on hold.

A Draft Oil and Gas Management Plan / Environmental Impact Statement (Draft OGMP / EIS) for the Preserve has been prepared and released for public review and comment from December 10, 2004 to February 8, 2005. This Draft Plan / EIS analyzes three alternative approaches that could be implemented over the next 15 - 20 years for managing existing and anticipated oil and gas operations associated with the exercise of nonfederal oil and gas interests underlying the Preserve, and existing transpark oil and gas pipelines and activities in their associated rights-of-way within a unit.

During the scoping and development of the Plan of Operations for the Famcor Roberts / Duke #1 Flowline and the EA, the planning framework provided in the Preserve's GMP and Draft OGMP / EIS, have been followed.

Table 1, summarizes many, but not all, of the statutes, regulations, executive orders, and policies that govern the exercise of nonfederal oil and gas rights in National Park units.

Table 1. Current Legal and Policy Requirements.

AUTHORITIES	RESOURCES AND VALUES AFFORDED PROTECTION
National Park Service Laws and Applicable Regulations	
NPS Organic Act of 1916, as amended, 16 U.S.C. §§ 1 <i>et seq.</i>	All resources, including air resources, cultural and historic resources, natural resources, biological diversity, human health and safety, endangered and threatened species, visitor use and experience, and visual resources
National Park System General Authorities Act, 16 U.S.C. §§ 1a-1 <i>et seq.</i>	All resources, including air resources, cultural and historic resources, natural resources, biological diversity, human health and safety, endangered and threatened species, visitor use and experience, and visual resources
NPS Omnibus Management Act of 1998, 16 U.S.C. §§ 5901 <i>et seq.</i>	Any living or non-living resource
NPS Nonfederal Oil and Gas Regulations – 36 CFR Part 9, Subpart B	All resources, including air resources, cultural and historic resources, natural resources, biological diversity, human health and safety, endangered and threatened species, visitor use and experience, and visual resources
Park System Resource Protection Act, 16 U.S.C. § 19jj	Any living or non-living resource that is located within the boundaries of a unit of the National Park system, except for resources owned by a nonfederal entity
Other Applicable Federal Laws and Regulations	
American Indian Religious Freedom Act, as amended, 42 U.S.C. §§ 1996 – 1996a; 43 CFR Part 7	Cultural and historic resources
Antiquities Act of 1906, 16 U.S.C. §§ 431-433; 43 CFR Part 3	Cultural, historic, archeological, and paleontological resources
Archeological Resources Protection Act of 1979, 16 U.S.C. §§ 470aa – 470mm; 18 CFR Part 1312; 32 CFR Part 229; 36 CFR Part 296; 43 CFR Part 7	Archeological resources
Clean Air Act, as amended, 42 U.S.C. §§ 7401-7671q; 40 CFR Parts 23, 50, 51, 52, 58, 60, 61, 82, and 93; 48 CFR Part 23	Air resources
Coastal Zone Management Act of 1972, 16 U.S.C. § 1451 <i>et seq.</i> , 15 CFR Parts 923, 930, 933	Coastal waters and adjacent shoreline areas
Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended, 42 U.S.C. §§ 9601-9675; 40 CFR Parts 279, 300, 302, 355, and 373	Human health and welfare and the environment
Endangered Species Act of 1973, as amended, 16 U.S.C. §§ 1531-1544; 36 CFR Part 13; 50 CFR Parts 10, 17, 23, 81, 217, 222, 225, 402, and 450	Plant and animal species or subspecies, and their habitat, which have been listed as threatened or endangered by the U.S. Fish and Wildlife Service (USFWS) or the National Marine

AUTHORITIES	RESOURCES AND VALUES AFFORDED PROTECTION
	Fisheries Service (NOAA Fisheries)
Federal Insecticide, Fungicide, and Rodenticide Act, as amended (commonly referred to as Federal Environmental Pesticide Control Act of 1972), 7 U.S.C. §§ 136 <i>et seq.</i> ; 40 CFR Parts 152-180, except Part 157	Human health and safety and the environment
Federal Water Pollution Control Act of 1972 (commonly referred to as Clean Water Act), 33 U.S.C. §§ 1251 <i>et seq.</i> ; 33 CFR Parts 320-330; 40 CFR Parts 110, 112, 116, 117, 230-232, 323, and 328	Water resources, wetlands, and waters of the U.S.
Historic Sites, Buildings, and Antiquities Act (Historic Sites Act of 1935), 16 U.S.C. §§ 461-467; 18 CFR Part 6; 36 CFR Parts 1, 62, 63 and 65	Historic sites, buildings, and objects
Lacey Act, as amended, 16 U.S.C. §§ 3371 <i>et seq.</i> ; 15 CFR Parts 10, 11, 12, 14, 300, and 904	Fish, wildlife, and vegetation
Migratory Bird Treaty Act, as amended, 16 U.S.C. §§ 703-712; 50 CFR Parts 10, 12, 20, and 21	Migratory birds
National Environmental Policy Act (NEPA) of 1969, 42 U.S.C. §§ 4321 <i>et seq.</i> ; 40 CFR Parts 1500-1508	The human environment (e.g. cultural and historic resources, natural resources, biodiversity, human health and safety, socioeconomic environment, visitor use and experience)
National Historic Preservation Act of 1966, as amended, 16 U.S.C. §§ 470-470x-6; 36 CFR Parts 60, 63, 78, 79, 800, 801, and 810	Cultural and historic properties listed in or determined to be eligible for listing in the National Register of Historic Places
Native American Graves Protection and Repatriation Act, 25 U.S.C. §§ 3001-3013; 43 CFR Part 10	Native American human remains, funerary objects, sacred objects, and objects of cultural patrimony
Noise Control Act of 1972, 42 U.S.C. §§ 4901-4918; 40 CFR Part 211	Human health and welfare
Oil Pollution Act, 33 U.S.C. §§ 2701-2761; 15 CFR Part 990; 33 CFR Parts 135, 137, and 150; 40 CFR Part 112; 49 CFR Part 106	Water resources and natural resources
Pipeline Safety Act of 1992, 49 U.S.C. §§ 60101 <i>et seq.</i> ; 49 CFR Subtitle B, Ch 1, Parts 190-199	Human health, safety, and the environment
Resource Conservation and Recovery Act, 42 U.S.C. §§ 6901 <i>et seq.</i> ; 40 CFR Parts 240-280; 49 CFR Parts 171-179	Natural resources, human health, and safety
Rivers and Harbors Act of 1899, as amended, 33 U.S.C. §§ 401 <i>et seq.</i> ; 33 CFR Parts 114, 115, 116, 321, 322, and 333	Shorelines and navigable waterways, tidal waters, and wetlands
Safe Drinking Water Act of 1974, 42 U.S.C.	Human health and water resources

AUTHORITIES	RESOURCES AND VALUES AFFORDED PROTECTION
§§ 300f <i>et seq.</i> ; 40 CFR Parts 141-148	
Executive Orders	
Executive Order (E.O.) 11593 – Protection and Enhancement of the Cultural Environment, 36 Federal Register (Fed. Reg.) 8921 (1971)	Cultural resources
E.O. 11988 - Floodplain Management, 42 Fed. Reg. 26951 (1977)	Floodplains and human health, safety, and welfare
E.O. 11990 – Protection of Wetlands, 42 Fed. Reg. 26961 (1977)	Wetlands
E.O. 12088 – Federal Compliance with Pollution Control Standards, 43 Fed. Reg. 47707 (1978)	Natural resources and human health and safety
E.O. 12630 – Governmental Actions and Interference with Constitutionally Protected Property Rights, 53 Fed. Reg. 8859 (1988)	Private property rights and public funds
E.O. 12898 – Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, amended by Exec. Order No. 12948, 60 Fed. Reg. 6379 (1995)	Human health and safety
E.O. 13007–Indian Sacred Sites, 61 Fed. Reg. 26771 (1996)	Native Americans’ sacred sites
E.O. 13112 – Invasive Species, 64 Fed. Reg. 6183 (1999)	Vegetation and wildlife
E.O. 13186 – Responsibilities of Federal Agencies to Protect Migratory Birds, 66 Fed. Reg. 3853 (2001)	Migratory birds
E.O. 13212 - Actions To Expedite Energy-Related Projects (2001)	Production, transmission, and conservation of energy
Policies, Guidelines and Procedures	
NPS Management Policies (2001)	All resources, including air resources, cultural and historic resources, natural resources, biological diversity, human health and safety, endangered and threatened species, visitor use and experience, and visual resources
Department of the Interior (DOI), Departmental Manual (DM) 516 –NEPA policies (1980)	Archeological and prehistoric resources, historic resources, Native American human remains, and cultural objects
DOI, DM 517 - Pesticides (1981)	Human health and safety and the environment
DOI, DM 519 – Protection of the Cultural Environment (1994)	Archeological, prehistoric resources, historic resources, Native American human remains, and cultural objects
DOI, Onshore Oil and Gas Order Number 2, Section III, Drilling Abandonment Requirements, 53 Fed. Reg. 46,810-46,811 (1988)	Human health and safety

AUTHORITIES	RESOURCES AND VALUES AFFORDED PROTECTION
NPS Director's Order (D.O.) –12 and Handbook – Conservation Planning, Environmental Impact Analysis, and Decision Making (2001)	All resources, including air resources, cultural resources, human health and safety, socioeconomic environment, visitor use
NPS D.O. - 28 – Cultural Resource Management (1998)	Cultural, historic, and ethnographic resources
NPS D. O. 28A - Archeology	Clarifies roles & responsibilities for archeological resources management through out the NPS
NPS 66 – Minerals Management Guideline (1990)	Natural resources, human health and safety
NPS Reference Manual 77 – Natural Resources Management (1991)	Natural resources
NPS D.O. and Procedural Manual 77-1 – Wetland Protection (2002)	Wetlands
NPS D.O. and Procedural Manual 77-2 – Floodplain Management (2003)	Floodplains
Secretary of the Interior's "Standards and Guidelines for Archeology and Historic Preservation," 48 Fed. Reg. 44716 (1983), also published as Appendix C of NPS D.O. 28 – Cultural Resource Management	Cultural and historic resources
Government-to-Government Relations with Native American Tribal Governments, Presidential Memorandum signed April 29, 1994	Native American Tribal rights and interests

1. 3. Issues and Impact Topics Evaluated

Early in the planning and development of the Plan of Operations for the Roberts / Duke #1 Flowline by Famcor, the NPS scoped with Famcor and its consultant, Raven Environmental, to identify resources, values, and other concerns that could be potentially impacted by drilling, installing, and operating the flowline. In addition, early input from other federal, state, and local agencies was sought. Scoping was performed with the State Historic Preservation Office (SHPO), the Texas Commission on Environmental Quality (TCEQ), the Army Corps of Engineers (COE), and U.S. Fish and Wildlife Service (FWS), to define major issues, alternatives, potential impacts, and mitigation measures. The scoping process has been conducted through meetings, telephone conversations, written comments, and on - site observations and assessments.

A public scoping brochure was prepared to announce a 30 - day public scoping period. On August 23, 2004, the Preserve mailed the scoping brochure to affected state, federal and local agencies, including: the Texas Historical Commission, the Texas Committee on Natural Resources, the Alabama-Coushatta Tribe of Texas, Houston Sierra Club, and other interested persons and organizations. The Preserve also posted the public scoping brochure on the park's website. One scoping comment letter was received from the Houston Sierra Club. Substantive scoping comments focused on analyzing cumulative effects in the EA, as well as providing some suggestions for impact topics to be evaluated, suggesting alternatives for analysis, and

requesting that work on the EA cease until the programmatic oil and gas management plan / EIS is completed and approved.

Based on scoping, the NPS identified the following impact topics for evaluation in this EA:

- Natural Soundscape in the Unit;
- Adjacent Landowners, Resources, and Uses, focusing on an analysis of the following resources and values:
 - Air Quality
 - Natural Soundscape
 - Geology and Soils
 - Vegetation
 - Cultural Resources

Based on the above list of impact topics, issue statements were developed to define problems or benefits pertaining to the proposal to construct the flowline (see Table 2). The issue statements describe a cause and effect relationship between an activity and the impact topic. The issue statements were used in developing and evaluating alternatives.

Table 2. Issue Statements

Impact Topic	Issue Statement
Natural Soundscape in the Unit	<ul style="list-style-type: none"> • Vehicles and equipment used for drilling, installing and operating the flowline could result in increased noise, adversely affecting wildlife and visitor uses and experience.
Adjacent Landowners, Resources, and Uses	<ul style="list-style-type: none"> • Constructing the proposed Famcor flowline could result in adverse impacts on air quality, natural soundscapes, geology and soils, and vegetation. • Air Quality. Exhaust from combustion of gasoline and diesel - powered vehicles and equipment used for construction and maintenance of the flowline would increase emissions of particulate matter which could affect air quality, including visibility in the vicinity of the operations. • Combustion of gasoline and diesel - powered vehicles and equipment would emit pollutants, including nitrogen oxides, volatile organic compounds, carbon monoxide, sulfur dioxide, particulate matter, and objectionable odors. These emissions could degrade air quality within the vicinity of operations and contribute toward regional air quality degradation. Nitrogen oxides and volatile organic compounds are primary precursors to ozone formation, which, depending on ambient concentrations, can have damaging effects on some vegetation and on the health of humans and wildlife. • Natural Soundscape. Vehicles and equipment used for drilling, installing, and operating the flowline could result in increased noise, adversely affecting wildlife and nearby residents.

Impact Topic	Issue Statement
	<ul style="list-style-type: none"> • Geology and Soils. Grading and leveling for the surface locations at the entrance and exit points for boring the flowline, trenching along other sections of the flowline, and eventual reclamation activities could result in soil compaction, increased erosion, and temporary conversion of up to 0.62 acres of prime farmland soils on the Bar M Ranch. • The release of hydrocarbons or other contaminating and hazardous substances from vehicles, equipment, or the flowline itself during construction and production operations, could alter the chemical and physical properties of the soil in the vicinity of the oil and gas activities. Changes in soil properties could result directly from contact with contaminants onsite, or indirectly, via runoff from contaminated areas. • Vegetation. Vegetation would be totally removed on up to 2.24 acres for the construction of the flowline. Vegetation removal could change the structure and composition of vegetative communities in the project area; alter wildlife habitat and species composition; increase storm runoff; and increase soil erosion. • The release of hydrocarbons and contaminating or hazardous substances could damage or kill vegetation directly, via contact with contaminants onsite, or indirectly, via pathways from contaminated areas. • Disturbances / removal of native vegetation could lead to the unintentional spread and establishment of nonnative plant species transported in or on drilling and maintenance equipment. • Reclamation of the oil and gas site could reestablish native vegetative communities and surface and subsurface drainage patterns necessary to support vegetative growth. • Cultural Resources. Ground - disturbance to trench or bore the flowline could uncover or damage undiscovered archeological materials.

1. 4. Issues and Impact Topics Eliminated from Further Analysis

Impact topics are dismissed from further evaluation in this EA if, for the action alternative(s):

- they do not exist in the analysis area,
- they would not be affected by the proposal, or
- when through the application of mitigation measures, the impacts (direct, indirect, and cumulative) would result in “minor or less effects,” and there is little controversy on the subject or reasons to otherwise include the topic. Minor impacts are generally those that would result in a change to the resource or value, but the change would be small and of little consequence and would be expected to be short - term and localized. Mitigation measures, if needed to offset adverse effects, would be simple and successful.

The following topics have been eliminated from further analysis for the reasons described.

- Socioeconomics in and outside of the Unit
- Environmental Justice
- Prime and Unique Farmlands in the Unit

- Air Quality in the Unit
- Lightscape Management in and outside of the Unit
- Geology and Soils in the Unit
- Water Resources, Floodplains, and Wetlands in and outside of the Unit
- Vegetation in the Unit
- Fish and Wildlife in and outside of the Unit
- Threatened and Endangered Species in and outside of the Unit
- Cultural Resources in the Unit
- Visitor Use and Experience in the Unit

1. 4. 1. Socioeconomics in and outside of the Unit

Socioeconomic issues include the effect of drilling, installing and operating the Famcor Roberts / Duke #1 flowline on the local and regional economies. The following description also provides supporting data to base the cumulative impact analysis for topics carried forward for further evaluation in Section 3.

Big Thicket National Preserve lies within the Railroad Commission of Texas' (RRC) District 3. During the period from January to November of 2004, 1,106 drilling permits were issued by the RRC in the 29 counties comprising District 3. For the 7 county area encompassing the Preserve, 310 drilling permits were issued, comprising 28 percent of the District - wide total. Production for the first nine months of 2004 for District 3 totaled 31,000,676 bbl oil and condensate, and 490,501,078 mcf natural gas from gas wells and casingheads. In the 7 county area encompassing the Preserve, production of oil from all sources totaled 8,995,092 bbl (29 percent of the District total), and 137,527,022 mcf natural gas from all sources (28 percent of the District total) (RRC 2004).

The NPS has prepared a reasonably foreseeable development (RFD) scenario to project future oil and gas development, based on an assessment by the U.S. Geological Survey of remaining hydrocarbons beneath Big Thicket National Preserve (DOI 2000). The RFD provides a reasonable assumption of future development of nonfederal oil and gas for park planning purposes and to provide a basis to measure potential environmental impacts. 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 29 additional wells would be drilled over the next 15 - 20 years to produce the estimated 1.21 million barrels of oil, 70.11 billion cubic feet of natural gas, and 1.02 million barrels of natural gas liquids from Tertiary and Upper Cretaceous age reservoirs underlying the Preserve. Based on an exploratory drilling success rate of approximately 50 percent, 29 additional wells are reasonably anticipated to be drilled, of which 19 could be commercially successful. The NPS acknowledges that the RFD is based solely on available production data and that more or less wells could be drilled. Under the RFD scenario, it would reasonably be anticipated that Preserve - wide, up to 267 acres could be disturbed for geophysical exploration operations; and up to 153 acres could be developed for drilling, production, and transportation operations for a total future development of 420 acres. Due to the narrow, linear nature of many of the Preserve's units, like the Menard Creek Corridor Unit, 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. For some units that are greater in size, some exploratory and development wells are expected to be sited within the unit boundary. The RFD scenario projects future oil and gas exploitation Preserve - wide, and the NPS does not expect the analysis area of cumulative effects that

includes the Menard Creek Corridor Unit and contiguous areas to be the site of an inordinate number of the projected wells.

Seismic exploration conducted in the Unit includes a 2-D survey in 1978 covering 1,500 feet, and a 3-D survey completed in 2004 over the northern half of the Unit.

The trend over the past 5 years 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 2004, there were no wells drilled within the Preserve. However, 19 directional wells were drilled from surface locations outside the Preserve to reach bottomholes inside the Preserve. There is currently one well developing hydrocarbons from a surface location outside the Menard Creek Corridor Unit. The Roberts / Duke #1 well, located approximately 1,125 feet to the south of the Unit boundary at its closest point, is draining natural gas from a 320 acre proration unit which includes the mineral estate underlying a portion of the Unit. The proposed pipeline would transport natural gas from this well. In the future the proposed Roberts / Duke #1 flowline could be used to transport fluids from additional wells whose production comes in part from mineral estate beneath the Preserve. Four transpark pipeline corridors cross the Unit and occupy a total area of approximately 31 acres.

Under Alternative B, Proposed Action, the drilling, installation, and operation of the Roberts / Duke #1 flowline would result in a negligible, beneficial impact on local and regional economies.

Cumulative Impacts

Under Alternative B, Proposed Action, the drilling, installation, and operation of the Roberts / Duke #1 flowline, including possible future use of the flowline to transport hydrocarbons from other wells drilled to complete the exploitation of the Six Lakes Field whose production would come in part from the mineral estate underneath the Preserve; and increased exploratory drilling activity and new field development from future 3-D seismic exploration in and adjacent to the Unit projected in the RFD scenario would result in an overall negligible, beneficial cumulative impact on the local and regional economies.

Because of the low intensity of impact, this topic is being dismissed from further analysis in the EA.

1. 4. 2. 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 minorities and low-income populations and communities. The proposed action would not have health or environmental effects on minorities or low - income populations or communities as defined in the Environmental Protection Agency's Environmental Justice Guidance (1998). The Six Lakes Subdivision is a community of both year - round residents and vacation property owners. Therefore, environmental justice was dismissed as an impact topic in this EA.

1. 4. 3. Prime Farmlands in the 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 or unique farmland soils classified by the U.S. Department of Agriculture's (USDA) Natural Resources Conservation Service (NRCS). Prime farmland is defined as soil that particularly produces general crops such as common foods, forage, fiber, timber, and oil seed;. Prime farmland soils are those that are used for food or fiber or are available for those uses. Urban or built - up land, public land, and water areas cannot be considered prime farmland.

Outside the Unit on the Bar M Ranch there are drained Kaman Clays that produce forage for cattle on the ranch. These soils are listed by the USDA Natural Resources Conservation Service as prime farmland soils. The proposed drilling and earthmoving activities would temporarily disturb approximately 0.62 acres of these soils at the exit location to the bore, the trenched section, and the connection to the Bar M #2 well gathering system.

There are no prime or unique farmlands located within the Unit that would be affected by the proposed operation; therefore, this topic was dismissed as an impact topic in this EA.

1. 4. 4. Air Quality in the Unit

The Preserve is located north of the Beaumont / Port Arthur / Orange airshed and northeast of the Houston / Galveston airshed. These are two of the most polluted airsheds in the State, and represent two of five Nonattainment Areas in Texas that exceed National Ambient Air Quality Standards (NAAQS) established by the Environmental Protection Agency (EPA). The Preserve may also be influenced by air pollutants transported from the Lake Charles, Louisiana, petrochemical complex. The primary pollutants transported from airsheds affecting the Preserve are volatile organic compounds (VOCs), and nitrogen oxides (No_x). Other air pollutants that could affect the Preserve and public health and welfare include carbon monoxide, sulfur dioxide (SO₂), and particulate matter (including heavy metals and lead).

During most of the year, prevailing air flow is from the southeast and Gulf of Mexico, shifting to flow from the northwest during passages of major continental air masses (cold fronts) that generally occur in late fall, winter, and early spring. The airshed of the southern portions of the Preserve is also affected by air currents (inshore / offshore flows) from the Gulf of Mexico with daily heating and cooling. These flow patterns are considered important because they transport various air pollutants from the nearby industrial and urban areas.

The Preserve is designated a Class II area under the Prevention of Significant Deterioration (PSD) provisions of the Clean Air Act (CAA). As such, the Preserve's air quality is protected by allowing limited increases (i.e., allowable increments) over baseline concentrations of pollution for the pollutants sulfur dioxide (SO₂), nitrogen dioxides (NO₂), and particulate matter (PM). The PSD permitting program is administered by the Texas Commission on Environmental Quality (TCEQ) and applies to defined categories of new or modified sources of air pollution with emissions greater than 100 tons per year and all other sources greater than 250 tons per year. Based on level of emissions, oil and gas operations may or may not be subject to the PSD permitting program. Emissions from these and other pollution sources affecting the Preserve will be considered on a project - by - project basis in the assessment of air quality impacts allowed under the PSD increment system. Emission limitations under CAA New Source Performance Standards and National Emission Standards for Hazardous Air Pollutants may apply to certain production facilities.

The Preserve lies within the Nonattainment Area for ozone in Hardin, Liberty, Orange, and Jefferson Counties. Ozone can be both phytotoxic (having damaging effects on some vegetation) and injurious to humans and wildlife. Existing ozone levels may be increased by additional emissions of No_x and VOCs, the primary precursors to ozone formation. Recognizing

that the current 1 - hour average ozone National Ambient Air Quality Standard (NAAQS) of 120 parts per million (ppm) is not protective of adverse effects on vegetation; the EPA has promulgated a new 8 - hour average standard that will provide a greater level of protection. Emission limits for ozone precursors must conform to the State Implementation Plan (SIP) to attain the ozone NAAQS in these counties, and more stringent emission controls may be imposed by TCEQ than those required under the PSD program.

In the fall of 1996, particulate matter (PM) was monitored in the Preserve as part of a special study by the TCEQ, NPS, and Mexico to increase understanding of the transport of pollution to the Big Bend area of Texas. The fine fraction of PM (i.e., particles less than 2.5 microns, or PM_{2.5}) was measured due to the interest in the dramatic effect this particle size has on visibility. Of the 18 sites monitored on both sides of the U. S. – Mexico border, the Preserve measured the highest levels of PM_{2.5} during a two month period. Preliminary study findings indicate that fine sulfate particles comprised a significant portion of the PM_{2.5} measured at the Preserve, and that air masses arriving at Big Bend National Park from the Big Thicket area contained some of the highest levels of PM_{2.5} and sulfur compounds. It is likely that additional industrial activity associated with oil and gas production will contribute to PM_{2.5} formation through emissions of SO₂, NO_x, and VOCs that are transformed in the atmosphere to fine particulate matter. Mean PM_{2.5} 24 - hour average levels (16.5 micrograms per cubic meter) measured in the Preserve during 1996 indicate ambient concentrations that exceed the recently promulgated annual average NAAQS for the pollutant (15 micrograms per cubic meter). If these levels are sustained, the Preserve would also be classified as a Nonattainment Area for fine particle NAAQS under EPA's proposed new standard.

The Preserve's fire management program and nonfederal oil and gas operations could locally affect air quality in the Preserve and surrounding area. Industrialization (primarily petrochemical and public utility industries) and urbanization contribute more appreciably to air quality in the vicinity of the Preserve. While Liberty County is listed as a Severe - 17 Nonattainment Area under the one hour standard for ozone as part of the Metro Houston - Galveston Intrastate Air Quality Control Region, Polk County is not listed by the EPA. In the analysis area for this proposal, it is likely that air quality is some of the best in Liberty County. The nearest fire management areas in the Preserve are approximately ten miles to the northeast in the Big Sandy Creek Unit, and other than timber management there is very little industrial activity in the area.

Under Alternative B, Proposed Action, the Famcor Roberts / Duke #1 flowline would be directionally drilled, installed, and operated from surface locations outside the Unit. Because the wellbore would cross into the Unit below the surface, there would be no impacts on the Unit's air quality from the subsurface oil and gas operations in the Unit.

Ground - disturbing activities associated with construction of the flowline; the use of vehicles, other machinery used to drill under the Unit, machinery used to trench the two sections of flowline connecting the bored section to the Roberts / Duke #1 and Bar M #2 wells; and routine maintenance activities during transport operations would result in increased particulates in the vicinity of the activities. Emissions of particulate matter, nitrogen oxides, carbon monoxide, carbon dioxide, and sulfur dioxide would be greatest during the short - term drilling and trenching operations due to increased use of vehicles and gasoline and diesel engines used to power the drill rig, trencher, pumps, and auxiliary equipment. Prevailing winds could carry some pollutants into the Unit. Impacts would be greatest during the 10 day drilling / trenching and installation phase, resulting in negligible, adverse effects on air quality in the Unit, localized near

the surface locations of those activities. Due to the very low level of emissions anticipated, there would be no permitting or attainment requirements imposed by TCEQ.

Cumulative Impacts

Future drilling of additional wells whose production comes in part from the mineral estate underneath the Unit, and tie-in to the 2-inch flowline to transport hydrocarbons to the Bar M Ranch facilities could also result in negligible, adverse impacts on the local and regional airsheds. Cumulative effects from industrial activity adjacent to the Unit, Preserve operations within the Unit, and oil and gas activities within and adjacent to the Unit, are expected to be less compared to Units of the Preserve located more easterly due to greater distance from point sources including refineries and because no prescribed fires are expected to be conducted by the Preserve within the Menard Creek Corridor Unit, resulting in negligible to minor, adverse impacts.

Because of the low intensity of impact, this topic is being dismissed from further analysis in the EA.

1. 4. 5. Lightscape Management in and outside of the Unit

The drilling / trenching and installation of the Roberts / Duke #1 flowline would be completed during daylight hours; therefore, artificial lighting at the surface locations of operations would only be necessary should be proposed operations unexpectedly extend into the evening. If this occurs, the additional artificial lighting would contribute to the existing lighting in the area from street lights in the Six Lakes Subdivision, a residence across Lakeshore Drive from the entrance to the bored section, other nearby residences, a convenience store across FM 2610, and vehicles traveling on the roadways.

Under Alternative B, Proposed Action, the Famcor Roberts / Duke #1 flowline would be directionally drilled and installed from surface locations outside the Unit. Because the wellbore would cross into the Unit below the surface, there would be no impacts on the Unit's lightscape from the subsurface oil and gas operations in the Unit.

If operations located outside the Unit extend into the evening and artificial lighting is necessary, Unit visitors at the closest visitor use development in the Unit, located approximately ½ mile away at the Birdwatchers Trail parking area are not expected to be affected.

Cumulative Impacts

Under Alternative B, Proposed Action, the Famcor Roberts / Duke #1 flowline project would not produce artificial light. The lightscape in the analysis area of the proposed operation is impacted by artificial light from many sources, especially along the roadways. Artificial lighting in the area as a result of past, present, and future oil and gas activities, residential / commercial construction and uses, and roadway construction and uses is expected to result in cumulative, minor, adverse impacts.

Because of the low intensity of impact, this topic is being dismissed from further analysis in the EA.

1. 4. 6. Geology and Soils in the Unit

The soils in the area of the proposed project are mapped as Vamont Clay, Owentown Fine Sandy Loam, and Kaman Clay. Kaman Clay is listed by the USDA Natural Resources Conservation Service as a prime farmland soil when rarely flooded. It exists in this rarely

flooded condition outside the boundary of the Unit on the Bar M Ranch and produces forage for the cattle on the ranch. Thus, the Kaman clay in the analysis area can be considered prime farmland soil. Impacts to this soil are described in the section on Prime Farmlands above.

The stratigraphy of the area is characterized by three geologic formations: the lower Lissie Formation, the Beaumont Formation, and the Deweyville Formation. The lower Lissie Formation is present in the subsurface of the analysis area. It is unconformably overlain by the late Pleistocene Beaumont Formation. Inset into and overlaying the Beaumont Formation is the late Pleistocene or early Holocene Deweyville Formation. This formation outcrops in the analysis area.

Under Alternative B, Proposed Action, the Famcor Roberts / Duke #1 flowline would be directionally drilled and installed from surface locations outside the Unit. The bore would cross into the Unit, at a depth below that listed for any soils in the area, transporting hydrocarbons and other fluids from beneath the Unit. The NPS believes mud losses from the borehole have a low probability of causing an impact to Preserve resources. At shallow depths, mud losses from the borehole would be expected to migrate along horizontal pathways. Therefore, the most likely pathway of migration from the borehole to Menard Creek is not necessarily the 20 feet of vertical separation, but the 300 foot or greater horizontal separation from the proposed bore section and the creek channel. The proposed mud system, casing program, flowline design, and mitigation measures Famcor would implement during construction and transport activities are anticipated to confine impacts to the bore. In the event of mud losses from the bore, or any fluid loss during hydrocarbon transport activity, there could be short - term, negligible, adverse impacts on the Unit's geology and soils.

The potential for impacts to geology and soils in the Unit due to low gradient sheet flow drainage from the surface locations associated with the proposed project is slight. The surface locations in the Six Lakes Subdivision are separated from the Unit by roads and their attendant ditch systems. The surface locations on the Bar M Ranch are located at least 550 feet from the Unit boundary. All areas of surface disturbance would be screened by silt fencing and hay bales. To evaluate whether the proposed activities outside the Unit could impact geology and soils in the Unit, the NPS considered types and volumes of contaminants that would be present at the sites, the probability of release, and the potential for migration into the Unit. 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, resulting in short - and long - term, negligible, adverse impacts.

The direct areas of impact to soils outside the Unit would be confined to the sections of trenched flowline and the entrance and exit locations of the bored section. These areas would be regraded and reseeded after the construction of the flowline. The impacts to these soils are expected to be short - to long - term, minor, and adverse.

Cumulative Impacts

Future drilling of additional wells whose production comes in part from the mineral estate underneath the Unit, and tie-in to the 2-inch flowline to transport hydrocarbons to the Bar M Ranch facilities is expected to have no effect on the Unit's geology and soils. Cumulative effects from commercial timber, ranching, road and residential construction adjacent to the Unit, Preserve operations within the Unit, recreational activities within and adjacent to the Unit, and oil and gas activities within and adjacent to the Unit, could result in negligible to minor, adverse impacts on geology and soils within the Unit.

Because of the low intensity of impact, this topic is being dismissed from further analysis in the EA.

1. 4. 7. Water Resources, Floodplains, and Wetlands in and outside of the Unit

The proposed project involves drilling under Menard Creek, and has multiple surface locations located within approximately 650 to 800 feet of the center of the channel. The U. S. Army Corps of Engineers has reviewed the project proposal and concluded that it is not subject to their jurisdiction under Section 10 of the Rivers and Harbors Act of 1899 or Section 404 of the Clean Water Act. As such, a Department of the Army permit is not required. Surface water drains from the exit location of the bored section of flowline into unnamed drainages which flow into Menard Creek. The surface location at the entrance to the bored section of flowline would shed water into a pond located to its west. Famcor plans to install silt fencing and hay bales at all the sites of surface disturbance proposed in their plan of operations.

Per Texas Commission on Environmental Quality Form TCEQ-0051 (Depth of Usable - Quality Ground Water to be Protected) for the Roberts / Duke #1 well, which is located approximately 2,500 feet to the ESE from the entrance to the bore, usable - quality water occurs from the land surface to a depth of 1,700 feet. The interval from the land surface to a depth of 650 feet contains water of superior quality which must be isolated from water in underlying beds. A water well was drilled at the site of the Roberts / Duke #1 well to a depth of approximately 160 feet. Cuttings from this water well showed a near surface geology consisting of clay containing iron gravels from the surface to a depth of 70 feet and a water bearing sand from 75 feet to 160 feet. According to the Plan of Operations provided by Famcor, at the location of the directionally drilled section of flowline, "Sands containing usable quality ground water occur from approximately 75' below the surface to a depth of 1700'." per Bob Traylor of the Texas Commission on Environmental Quality."

Under Alternative B, Proposed Action, the Famcor Roberts / Duke #1 flowline would be directionally drilled and installed from a surface location outside the Unit. As discussed in the section on soils above, the proposed mud system, casing program, flowline design, and mitigation measures Famcor would implement during construction and transport activities are anticipated to confine impacts to the bore. In the event of mud losses from the bore, or any fluid loss during hydrocarbon transport activity, affecting the Unit, impacts to the water resources, floodplains, or wetlands of the Unit would be short - term, negligible, and adverse.

Outside the Unit boundary the proposed casing program, flowline design, and mitigation measures Famcor would implement during construction and transport activities are anticipated to confine impacts to the bore, trenched corridors, and drilling and installation surface locations, resulting in the impact on water resources, floodplains or wetlands in the analysis area being short - term, negligible, and adverse. Mitigation measures include placement of hay bales and silt fence at the locations of surface disturbance proposed and a closed - loop containerized mud system.

Cumulative Impacts

Over time, protection provided to water resources, floodplains, and wetlands in the Preserve under Current Legal and Policy Requirements is expected to result in the Preserve maintaining and improving water resources, floodplains, and wetlands within the Unit, with cumulative, beneficial impacts to those resources; while adjacent lands within the analysis area could continue to be developed with water resources, floodplains, and wetlands adversely affected. However, as Menard Creek is buffered by Preserve lands through almost its entire length within the analysis area the beneficial cumulative impacts to water resources, floodplains, and

wetlands are expected to balance the adverse effects of development outside the Preserve boundary resulting in cumulative, negligible to minor, adverse impacts on those water resources, floodplains, and wetlands in the analysis area both inside and adjacent to the Unit.

Because of the low intensity of impact, this topic is being dismissed from further analysis in the EA.

1. 4. 8. Vegetation in the Unit

The potential vegetation in the Unit in the proposed project area is mapped as the Lower Slope Hardwood Pine type by Harcombe and Marks. The dominant species of this vegetation type are loblolly pine (*Pinus taeda*), American beech (*Fagus grandifolia*), southern magnolia (*Magnolia grandifolia*), and white oak (*Quercus alba*). Also present in the proposed project area is the Floodplain Hardwood type. Dominant species include sweetgum (*Liquidambar styraciflua*) and water oak (*Q. nigra*) in the overstory and a subcanopy layer of ironwood (*Carpinus caroliniana*). Outside the Unit at the surface locations of the proposed project the vegetation is characterized by disturbance and consists of mown or grazed grasses and forbs. Also, there are a number of pine saplings at the proposed surface location of the entrance to the bored section. These surface areas will be regraded and reseeded after the installation of the flowline.

Under Alternative B, Proposed Action, the Roberts / Duke #1 flowline would be directionally drilled and installed under Menard Creek. The directional bit would be guided by cables laid across the surface. The placement of the cables may require vegetative trimming. The impact to the vegetation of the Unit is expected to be localized, short - term, negligible, and adverse.

Outside the Unit boundary, some vegetation may be completely removed, but most would only be impacted by the movement of vehicles / equipment. The potential for sheet flow drainage carrying contaminants beyond the direct area of disturbance would be mitigated by the placement of silt fencing and hay bales. The area of direct impact would be reclaimed. The impacts to the surface vegetation outside the Unit boundary are expected to be short - to long - term, negligible to minor, and adverse.

Cumulative Impacts

Under Alternative B, Proposed Action, cumulative impacts on vegetation in the analysis area would be similar to those impacts to geology and soils; and water resources, floodplains, and wetlands; with localized, short - to long - term, negligible to minor, adverse impacts localized near developments from commercial timber, ranching, road and residential construction, recreational, and oil and gas activities.

Because the impacts on vegetation in and outside the Unit boundary, and the effect from cumulative impacts on vegetation inside the analysis area, would be at low intensity levels this impact topic was dismissed from further analysis in this EA.

1. 4. 9. Fish and Wildlife in and outside of the Unit

The abundant and diverse vegetation of the Preserve supports aquatic and terrestrial habitats for a variety of fish and wildlife. Sixty species of mammals are either documented or believed to inhabit the Preserve. Birds are the most visible and diverse group of vertebrate fauna found in the Preserve. Currently, 176 species have been documented. Approximately 85 species of reptiles and amphibians are believed to inhabit the Preserve (Harcombe et al., 1986). Ninety-two species of fish are believed to inhabit Preserve waters. A recent comprehensive inventory of invertebrates documented over 1800 species (Bordelon and Knudson, 1999).

Under Alternative B, Proposed Action, the Roberts / Duke #1 flowline would be directionally drilled and installed under Menard Creek. The directional bit would be guided by cables laid across the surface. The placement of the cables may require vegetative trimming. Foot access across the Unit would create a low level of noise impacts affecting wildlife. The noise created by construction equipment may have a short - term, minor, adverse effect on wildlife in the area. The potential impacts to the fish and wildlife of the Unit from construction or transport activities in the event of mud losses from the bore, or any fluid loss during hydrocarbon transport activity would be similar to those for water resources i.e. short - term, negligible, and adverse.

The project areas located outside the Unit would be situated in a residential neighborhood and on the Bar M Ranch. The vegetation is characterized by disturbance and consists of mown or grazed grasses and forbs. Also, there are a number of pine saplings at the proposed surface location of the entrance to the bored section. These surface areas will be regraded and reseeded after the installation of the flowline. Due to the low diversity of vegetation, it is anticipated that the project areas adjacent to the Unit would support a low diversity of wildlife. If artificial lighting is needed, the lighting could attract bats and owls opportunistically feeding on insects drawn to the light. This would result in a short - term, beneficial, impact on wildlife, localized near the light source. However, nighttime operations are not expected for the proposed project.

Cumulative Impacts

Under Alternative B, Proposed Action, cumulative impacts on fish and wildlife in the analysis area located within and adjacent to the Unit would include localized, short - to long - term, negligible to minor, beneficial and adverse impacts on fish and wildlife near sources and developments from commercial timber, ranching, road and residential construction, recreational, and oil and gas activities.

Because of the low intensity of impact, this topic is being dismissed from further analysis in the EA.

1. 4. 10. Threatened and Endangered Species, and Other Species of Management Concern in and outside of the Unit

Under the Endangered Species Act of 1973 (ESA), the NPS has responsibility to address impacts to federally - listed threatened, endangered, candidate, and species proposed for listing. 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. Thus, federal and state - listed species will be addressed in this EA following federal law and NPS policy.

The terms “threatened” and “endangered” describe the official federal status of certain species in the Preserve as defined by the ESA. The term “candidate” is used officially by the U.S. Fish and Wildlife Service (FWS) when describing those species for which the FWS has on file sufficient information on biological vulnerability and threats to support issuance of a “proposed rule to list,” but issuance of the proposed rule is precluded. No candidate species are currently believed to inhabit the Preserve. The term “proposed” describes species for which a “proposed rule to list” has been published in the *Federal Register*, however, a finalized rule has not yet been issued. Texas has enacted regulations similar to the ESA that confer threatened and endangered status to certain species that inhabit areas in the state. NPS policies dictate that federal candidate species, proposed species and state - listed threatened and endangered

species are to be managed to the greatest extent possible as federally - listed threatened and endangered species (NPS, 1991). Therefore, these species are included in this discussion.

Texas Parks and Wildlife Department (TPWD) lists of threatened, endangered, and state - identified rare species that may occur in Polk and Liberty Counties are provided in Appendix A. Also in the Appendix is a brief description of the habitats required by these species. For Polk County, the list includes 3 federally - listed threatened and endangered species (as well as one candidate for federal - listing), and 14 state - listed species out of a total of 18 species. For Liberty County, the list includes 5 federally - listed threatened and endangered species (as well as one candidate for federal - listing), and 20 state - listed species out of a total of 24 species. (Please note that the July list for Liberty County is a Draft.) There is no federally - designated critical habitat in or near Big Thicket National Preserve.

The Preserve documented an Alligator snapping turtle in Menard Creek (May, 1999). This species is listed by the TPWD as threatened. Famcor contacted the U. S. Fish and Wildlife Service in June of 2004 and obtained a finding that after a review of FWS files and project information "... no federally listed or proposed threatened or endangered species are likely to occur at the project site. The project is not located within officially designated critical habitat."

The design of Famcor's proposal would avoid major 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.

Cumulative Impacts

Over time, protection provided to species of management concern under Current Legal and Policy Requirements would result in maintaining and improving habitat in the Unit, with cumulative, beneficial impacts. The expectation that adjacent lands within the analysis area would continue to be developed with incremental loss of wildlife habitat over the long - term, could result in cumulative, negligible to minor, adverse impacts adjacent to the Unit.

NPS determines the directional drilling and production of the Roberts / Duke #1 flowline would have no effect on federally - listed threatened and endangered species or their habitat in the Unit. Nor would there be an effect on any state - listed species. This determination is based upon a combination of factors. First, the habitat in the project area is not suitable for several of the species identified by U.S. Fish and Wildlife Service (e.g. Bald eagle, Red - cockaded woodpecker, Texas trailing phlox). Second, the directionally drilled construction of the flowline section crossing the Unit reduces the possibility of disturbance to resources. And third, mitigation measures have been designed into the project (Table 3 of this EA). This no effect determination negates the need to prepare a Biological Assessment. Therefore, threatened and endangered species and other species of management concern were dismissed from further analysis in this EA.

1. 4. 11. Cultural Resources in the Unit

Under Section 106 of the National Historic Preservation Act (NHPA), the NPS has responsibility to consider the effects their 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 (SHPO) or Tribal Historic Preservation Officer (THPO), the Advisory Council on Historic Preservation (ACHP), if necessary, as well as other consulting parties, such as certified local governments.

The NPS has Section 106 responsibility to seek concurrence from the SHPO for a finding of no historic properties affected in the Unit from the in - park operations. Under Alternative B, Proposed Action, the Roberts / Duke #1 flowline would be constructed using directional drilling techniques. The bore would cross under the Preserve below any known Holocene deposits according to the American Archaeology Group's Michael R. Bradle. In August of 2004, Mr. Bradle on behalf of his client, Famcor Oil, Inc., wrote the Texas SHPO, and received a determination of "No Historic Properties Affected Project May Proceed."

There are no known cultural resources listed in or eligible for listing in the National Register of Historic Places within the Unit. There is a low potential for surface or subsurface impacts within the Preserve from the proposed operations. Because of the lack of surface effects, the result of consultation under § 106 of the NHPA is "no historic properties affected." This is documented by sending a letter to the SHPO/THPO and Indian tribes. If the SHPO/THPO does not object within 30 days, § 106 compliance is complete.

As part of the NEPA analysis, the NPS also considered the impacts of the connected actions on Unit cultural resources. The proposed construction techniques, site location, site design, and mitigation measures Famcor would implement during the drilling and production activities are anticipated to confine impacts to the surface locations and bore. The potential for release and transport of contaminating or hazardous substances would be unlikely. There would be no historic properties affected in the Unit from the connected actions.

The NPS has no authority to require Famcor to contract an archaeological survey in the project area on lands adjacent to the Unit.

Cumulative Impacts

Over time, protection provided to cultural resources in the Unit under Current Legal and Policy Requirements would result in the preservation of those resources, resulting in cumulative, , beneficial impacts.

Because of the low intensity of impact, this topic is being dismissed from further analysis in the EA.

1. 4. 12. Visitor Use and Experience in the Unit

The primary visitor uses that occur in the Unit are picnicking, hiking, and bird-watching. The Birdwatchers Trail parking area is located approximately 0.5 mile from the closest of the surface locations associated with the proposed operation and moves away to its terminus near the confluence of Menard Creek and the Trinity River. The end of the trail is designated as a Birding Hotspot. This location is approximately one mile from the proposed operation, so it is not expected that visitors would be affected by the proposed operation.

Cumulative Impacts

Under Alternative B, Proposed Action, cumulative impacts on visitor use and experience in the Unit, from commercial timber, ranching, road and residential construction, recreational, and oil and gas activities, are expected to be localized near sources and developments, resulting in short - to long - term, negligible, adverse impacts.

Because of the low intensity of impact, this topic is being dismissed from further analysis in the EA.

2.0. ALTERNATIVES

Two alternatives are described and evaluated in this EA; Alternative A, No Action; and Alternative B, Proposed Action, Plan of Operations as Submitted. Alternative locations and strategies that were considered but dismissed from further analysis are then described. 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.

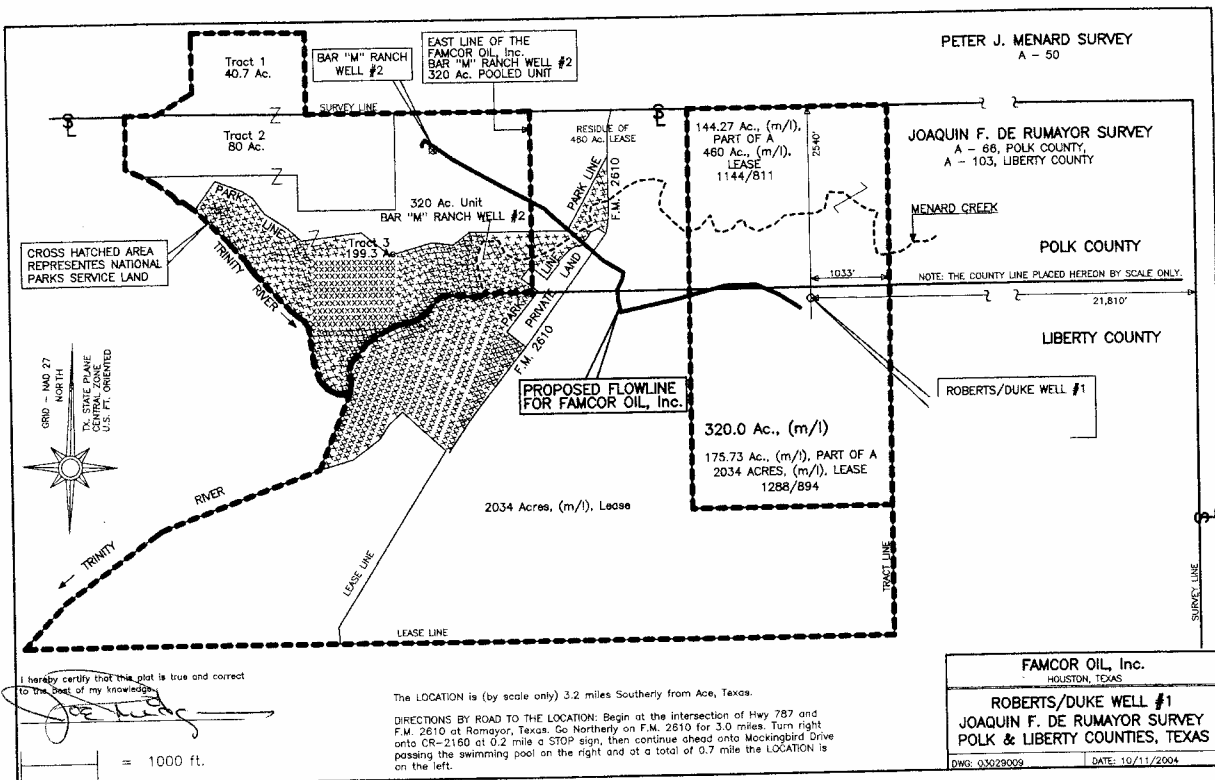
2. 1. Alternative A, No Action

The no action alternative is required under the National Environmental Policy Act (NEPA), and establishes a baseline, or benchmark, from which to compare the present management direction and environmental consequences of the action alternative. Under No Action, the Famcor flowline would not be drilled and installed.

2.2. Alternative B, Proposed Action, Plan of Operations as Submitted

Under Alternative B, Famcor would drill and install the flowline as proposed in its Plan of Operations. Figure 3 shows the proposed bored section of flowline and the trenched flowline segments to tie into existing infrastructure in relation to the Menard Creek Corridor Unit.

Figure 3. Proposed Operation Plat (note: Unit extends to east following creek)



2. 2. 1. Location of the Flowline

The proposed flowline consists of three distinct sections; two that are trenched, and one bored section. The bored section is the section that would facilitate crossing the Unit and would be located perpendicular to FM 2610 traveling from a surface location outside the Unit boundary on Lot #1 of the Six Lakes Subdivision approximately 675 feet to the southeast of the Unit boundary to another surface location on the Bar M Ranch approximately 575 feet to the northwest of the Unit boundary. The point where the bore would travel under Menard Creek is located approximately 690 feet to the southwest of the FM 2610 bridge crossing the creek. Please see the following sections for more detail and descriptions of other parts of the proposed operations.

The flowline should be completed in 10 days. The boring operation is expected to take one day of this time. Operations would commence immediately after approval from the NPS is obtained.

2. 2. 2. Access

Access to the surface location at the entrance to the directionally drilled section of flowline would be provided by existing paved roads in the Six Lakes Subdivision. Mockingbird Lane runs east / west from FM 2610 to the access for the Roberts / Duke #1 gas well on its north side and is blacktopped. Lake Shore Drive is a macadam road running north / south connecting Mockingbird Lane with Lot #1 of the Six Lakes Subdivision on the west side of the road (the site of the entrance surface location). The surface location at the exit of the bored section would be accessed from existing gravel roads leading from the western side of FM 2610 and crossing the Bar M Ranch as well as a section of pasture. No improvements to any of the access roads would be needed.

The directional rig would require two cables placed approximately 10 to 15 feet apart on the surface of the Preserve to guide the bit underground. Access across the Unit would be by foot only. Cutting of vegetation would be limited to the minimum necessary to accommodate placement of the guide cables. Other than Chinese tallow (*Sapium sebiferum*), the cutting of woody vegetation (dead or alive) would be limited by size to three (3) inches in diameter, measured one (1) foot above ground. All cuts would be flush with the ground and the remaining stump would be no higher than one inch above the ground. No limb larger than three (3) inches in diameter, measured at the branch collar or branch bark ridges, would be cut. The remaining limb would not extend more than one (1) inch beyond the main trunk. Use of motorized cutting equipment would be permitted. However, it is expected that only minimal cutting of vegetation, if any, would be required to place the cables.

2. 2. 3. Surface locations

Famcor owns Lot #1 of the Six Lakes Subdivision, and would operate the directional drilling rig from that location. The lot is 60 X 100 feet, or 0.14 acres, of which a 25 X 40 foot, or 0.023 acre, surface pad for the rig would be needed. Equipment at this site would include: the directional drilling rig; a mud mixing tank; a water truck; a cable truck for directional control; a drill pipe truck; an open top steel tank for the collection of cuttings; and a vacuum truck for the removal and disposal of mud and cuttings. Silt fencing and hay bales would be placed at the site to reduce the potential for migration of contaminants from the site.

The exit of the directionally drilled section of flowline as proposed is located in a pasture on the Bar M Ranch. The direct area of disturbance at this site is very small, approximately 5 X 5 feet. The equipment at this site would include welding trucks and pipe trailers. Silt fencing and hay

bales would also be placed at this site to reduce the potential for migration of contaminants to the surrounding area.

2. 2. 4. Flowline

The Roberts / Duke #1 Flowline consists of three distinct sections. Following the direction of proposed gas transport; first would be the trenched section from the Roberts / Duke #1 well in the Six Lakes Subdivision to the surface location at Lot #1 also in the Six Lakes Subdivision. The second section would be the directionally drilled section that would run from the entrance surface location at Lot #1 to the exit surface location on the Bar M Ranch. The third proposed section would be trenched from the exit of the bored section on the Bar M Ranch to connect with the gathering system of the Bar M #2 well also located on the Bar M Ranch.

The three sections of the Roberts / Duke #1 flowline would have some common features. The flowline would carry wet gas only. All other products would be separated at the Roberts / Duke #1 well location and transported by truck from the site. The pipe used to construct the three sections of flowline would be of 2 inch inside diameter threaded steel and would be screwed together. The anticipated line pressure would be 550 to 560 psi. Before production would begin the flowline would be pressure tested to approximately 1,500 psi. Famcor does not expect any abnormal pressures or temperatures in the flowline. There would be automatic shutoff valves installed on the flowline to close the line off if abnormal product pressures are detected. Also, check valves would be installed on the flowline to prevent backflow of any hydrocarbons. Famcor has an approved Spill Prevention Control and Countermeasure Plan in effect. The flowline route would be marked with signage showing the operator name, emergency phone numbers, and RRC identification number.

2. 2. 5. Directionally Drilled Portion of Flowline

The directional drilling portion of the proposed operation is expected to take one day to complete, and would be accomplished by drilling from the proposed surface location in the Six Lakes Subdivision to the proposed surface location on the Bar M Ranch. The total horizontal distance would be approximately 1,550 feet. Inside the Unit Famcor's proposed operations would consist of directionally drilling a 6 inch diameter hole from one side of the Unit to the other. The horizontal length would be approximately 275 feet. The hole would be at its deepest point while crossing the Unit, some 45 to 60 feet below the surface locations, and a minimum of 20 feet below the deepest point of Menard Creek. Outside the Unit boundary, the bore would travel at least 10 feet below the bottom of the small lake within the Six Lakes Subdivision that is located approximately 100 feet to the west of the entrance to the directionally drilled section. The drilling fluid would be made up of fresh water and bentonite. Cuttings would be stored at the entrance location in an open top steel tank. All drilling fluid and cuttings would be removed by vacuum truck, and disposed of at a Railroad Commission of Texas approved site. If the NPS monitor onsite during drilling operations sees evidence of mud losses from the hole impacting Preserve resources, operations will cease until such time as the mud loss can be mitigated. The directional bit would be guided by two cables placed approximately 10 to 15 feet apart on the surface.

The directionally drilled section would be cased with a 4 inch coated and wrapped steel pipe, rated X52, with an outside diameter of 4.50 inches and an inside diameter of 4.00 inches. This casing pipe would be welded at the exit location then pulled through the hole to the entrance surface location. This pipe would contain the 2 inch flowline which would be screwed together at the exit location, and pulled through the casing to the entrance location.

2. 2. 6. Trenched Portions of Flowline

One trenched section of the Roberts / Duke #1 flowline would run from the Roberts / Duke #1 well, cross under Mockingbird Lane, continue west down the south side of Mockingbird to its intersection with Lakeshore Drive, cross under Mockingbird once more, and continue on the west side of Lakeshore to the entrance of the bored section at Lot #1 of the Six Lakes Subdivision. This section is approximately 3,200 feet long. The second trenched section would run from the exit of the bored section approximately 1,350 feet to the Bar M Ranch #2 location, and connect with a metering station then through to the gathering system at that site.

The trenched sections of the flowline would be buried 36 to 48 inches below ground, and would require the disturbance of a 20 foot wide corridor to run the welding and ditching machinery. The proposed area of disturbance for both of the trenched sections together is approximately 4550 X 20 feet or 2.1 acres.

2. 2. 7. Reclamation Plan

All of the proposed surface locations including the entrance and exit of the directionally drilled section as well as the surface of the trenched sections of the Roberts / Duke #1 flowline would be graded to a condition as near as possible to original and reseeded after operations are completed. All survey stakes, flagging, trash, or other waste would be removed from the surface of Big Thicket National Preserve.

Upon abandonment of production and gas transport operations under the Preserve Famcor would remove hydrocarbons from the Roberts / Duke #1 flowline. An attempt would be made to pull the 2 inch pipe in the bored section of the flowline. If this attempt is unsuccessful the pipe would be filled with fresh water and capped at both ends. No impacts to the surface of the Preserve are expected. If however, there are surface impacts inside the Preserve, Famcor has included a statement in their Plan of Operations that indicates they, "... will clean up and restore affected areas within the Preserve in a manner acceptable to the Superintendent ..."

The approval of the Plan of Operations will be conditioned on Famcor tendering a performance bond in the amount of \$53,000.00.

In order to reduce impacts on the human environment, Famcor has incorporated the following mitigation measures listed in Table 3 in its Plan of Operations.

Table 3. Mitigation Measures under Proposed Action (Alternative B)

No.	Mitigation Measures - Proposed Action (Alternative B)	Resource(s) Protected
Project Planning and Site Construction		
1	Construction operations anticipated to last 10 days total	all natural resources and values in Big Thicket National Preserve
2	Prepare and comply with a Spill Prevention Control and Countermeasure (SPCC) Plan	all natural resources, and human health and safety
3	Site drilling / installation surface locations, access roads, and the majority of the pipeline outside of the Menard Creek Unit	all natural resources and values in Big Thicket National Preserve
4	Surface locations of drilling / trenching and installation operations need minimal vegetative clearing / surface disturbance	soils, water resources, floodplains, wetlands, vegetation

No.	Mitigation Measures - Proposed Action (Alternative B)	Resource(s) Protected
5	Schedule construction to avoid nighttime operations	lightscape
6	Place silt fencing and hay bales around sites of surface disturbance	water resources, vegetation, soils
	Minimize length of flowline impacting Preserve	all natural resources and values in Big Thicket National Preserve
7	Pressure test flowline	all natural resources and values in Big Thicket National Preserve
Flowline Drilling		
8	Directionally drill flowline from outside boundary	all natural resources and values in Big Thicket National Preserve
9	Use a closed-loop containerized mud system	water resources, soils, vegetation
10	Case flowline with 4" pipe	groundwater
11	Use mud system with a minimal environmental hazard	water resources, soils, vegetation
12	Follow Big Thicket National Preserve rules for vegetative trimming for line of sight operations	vegetation
13	Dispose of drilling mud and well cuttings off-site	all natural resources located on and adjacent to wellpad
Transportation		
14	Reclaim sites of surface disturbance by regrading / reseeded	Soils, vegetation, water resources
15	Install check and shut off valves on wells and flowline	all natural resources and values in Big Thicket National Preserve
16	Wet gas transport only	Soils, vegetation, water resources
17	Pressure of gas in line is far less than rated pressure	all natural resources and values in Big Thicket National Preserve
18	Notify regulatory authorities and Big Thicket Superintendent within 24 hours in the event of a release or spill of hydrocarbon condensate, crude oil, or other contaminating substance	all natural resources
Abandonment / Reclamation		
19	Attempt to pull bored flowline section from casing. Failing this fill flowline with fresh water and cap both ends.	all natural resources
20	Agree to reclaim / restore affected areas in Preserve to a condition acceptable to the Superintendent	all natural resources and values in Big Thicket National Preserve

2. 3. Alternatives Considered but Dismissed from Further Analysis

During the scoping process for the project, alternative locations and methods were considered for the installation of the Roberts / Duke #1 flowline. The Preserve along with Famcor, the NPS Minerals / Oil and Gas Program Leader for the Intermountain Region, and the Geologic Resources Division discussed these alternative locations and methods. For the reasons described below, these alternatives were not subjected to further analysis.

2. 3. 1. NPS Acquisition of the Mineral Rights that are Part of Famcor'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 Famcor's flowline proposal, mitigation measures were identified and applied, most notably directional drilling from a surface locations outside the Unit. These mitigation measures substantially reduced the potential for adverse impacts to Unit resources and values. As a result, the acquisition of mineral rights was dismissed from further consideration in this EA.

2. 3. 2. Trench and Install Flowline Alternatives

The following optional approaches for trenching the flowline were considered:

- 1) Trenching pipeline along an existing pipeline corridor running north through the Unit. (When Famcor explored this option they had difficulty reaching an agreement with the existing pipeline owners for a shared use of the right of way.)
- 2) Trenching to the east - northeast approximately three miles to connect with existing gas transmission infrastructure (Kinder Morgan Production Co. pipeline) was considered. This alternative would involve crossing a roadway as well as the Unit.
- 3) Trenching to the west across the Unit to connect to existing infrastructure at the Bar M #2 well was considered. This alternative would follow much the same path that the proposed flowline would.

All of the options available to trench and install the Roberts / Duke #1 flowline across the Unit would cause surface impacts to Preserve resources. These alternatives do not meet the project objectives of allowing reasonable access for the lessee, minimizing or mitigating impacts on resources and values, and preventing impairment to Preserve resources as well as the proposed action. As a result, the options to trench and install the flowline were 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 installing the Roberts / Duke #1 flowline is based on these national environmental policy goals. Under Alternative A, No Action, the flowline would not be installed. Because there would be no new impacts, Alternative A would provide the greatest protection of area and Unit resources and values. Alternative A meets five of the six criteria (1 thru 4, and 6) and is therefore the environmentally preferred alternative.

Famcor's Proposal, Alternative B, would have greater effects on the environment because of the drilling and transportation activities. Alternative B meets four of the six criteria (1, 2, 4, and 5). Although mitigating measures would reduce effects to Unit resources and values, there would still be effects, and therefore this alternative would not meet the Park Service's environmental policy goals as well as the No Action Alternative.

2. 5. National Park Service Preferred Alternative

The environmentally preferable 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, Plan of Operations as submitted, because Famcor holds a valid oil and gas lease right which if developed, would not result in an impairment of park resources and values. The NPS believes this alternative would fulfill its park protection mandates while allowing Famcor to exercise its property right interest.

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 4, Table 5, and Table 6 respectively).

Table 4. Extent that Each Alternative Meets Objectives

Objectives	Does Alternative A, No-Action, Meet Objective?	Does Alternative B, Proposed Action, Meet Objective?
Provide Famcor, 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.	No (-) The flowline would not be directionally drilled and installed, precluding Famcor access to develop its nonfederal oil and gas mineral interests.	Yes (+) The flowline would be directionally drilled, installed, and operated, providing Famcor reasonable access to develop its nonfederal oil and gas mineral interests.
Avoid or minimize impacts on Unit resources and values, visitor use and experience, and human health and safety.	Yes (++) Without directionally drilling, installing, and operating the flowline, there would be no impacts.	Yes (+) Mitigation measures would avoid and minimize impacts.
Prevent impairment of Unit resources and values.	Yes (++) Without installing the flowline, there would be no potential for Unit resources and values to be impaired.	Yes (+) Directional drilling, installing, and operating the flowline beneath the Unit would result in no impairment of Unit resources and values.

¹No 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 5. Summary of Actions

Actions	Alternative A No-Action	Alternative B Proposed Action
Access	Access would not be required because the flowline would not be constructed.	Famcor would utilize existing roads to access their drilling / installation surface locations. Access across the Unit to lay the guidance cables would be on foot with limited vegetative cutting allowed.
Surface Locations	The surface locations for drilling / installation on Lot #1 and on the Bar M Ranch would not be impacted because the flowline would not be constructed.	The potential impact to vegetation / soils at the two drilling / installation surface locations would be a total of 0.14 acres (Lot #1 60 X 100 feet or 0.14 acres) as the acreage at the exit of the bore would not be any wider than that of the trenched section in that area and was considered in that calculation.
Directionally Drilled Flowline Section	The directionally drilled section of flowline would not be installed.	The directionally drilled section would be completed as planned with a total horizontal length of approximately 1,550 feet. Of this total approximately 275 feet are located within the Unit boundary.
Trenched Flowline Sections	Trenched flowlines would not be required because the bored section would not be drilled.	Two trenched sections of flowline would be installed to connect the two well sites and the bored section of flowline. The total surface disturbance associated with the installation of these sections would be approximately 4,550 X 20 feet or 2.1 acres.
Reclamation Plan	No reclamation plan would be needed because the flowline would not be installed.	Famcor would regrade and reseed all sites of surface disturbance associated with their operation, and remove all waste from the surface of the Unit associated with survey / guidance cable operations. Hydrocarbons would be

Actions	Alternative A No-Action	Alternative B Proposed Action
		removed from the flowline after the abandonment of operations under the Big Thicket National Preserve. The bored section of the flowline would be flushed and capped if the effort to remove it from the casing fails.

Table 6. Summary of Impacts

Impact Topic	Alternative A No-Action	Alternative B Proposed Action
Natural Soundscape in the Unit	Under Alternative A, No Action, the Roberts / Duke #1 flowline would not be constructed; therefore, there would be no new impacts on natural soundscape in the Unit. However, existing impacts on the natural soundscape (from bird calls, wind, and rustling leaves) from recreational uses in and outside the Unit, park management functions inside the Unit, oil and gas activities in and outside the Unit, traffic noise, cattle production, road and residential construction, and timber management adjacent to the Unit would result in intermittent, short - term, negligible to moderate, adverse impacts. Cumulative impacts on 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, traffic noise, cattle production, road and residential construction, and timber management activities adjacent to the Unit boundaries, would result in intermittent, short - term, negligible to moderate, adverse impacts, localized near sources. No impairment to natural soundscape in the Unit would result from implementation of this alternative.	Under Alternative B, Proposed Action, the Roberts / Duke #1 flowline would be constructed. Construction of the flowline, and eventual plugging and reclamation activities would result in short - to long - term, negligible to moderate, adverse impacts on natural soundscape, localized around sources. Cumulative impacts in and contiguous to the Unit would be similar to those described under No Action, with intermittent, short - term, negligible to moderate, adverse impacts on natural soundscape throughout the Unit, localized near sources. No impairment to natural soundscape in the Unit would result from implementation of this alternative.

Impact Topic	Alternative A No-Action	Alternative B Proposed Action
Adjacent Landowners, Resources and Uses	<p>Under Alternative A, No Action, the Roberts / Duke #1 flowline would not be constructed; therefore, there would be no new impacts on adjacent landowners, resources and uses. However, existing impacts from cattle production, commercial timber, oil and gas activities, road and residential construction, and recreational uses would continue, resulting in localized, short - to long - term adverse impacts on air quality, natural soundscape, geology and soils, vegetation, and cultural resources. Cumulative impacts from cattle production, commercial timber, recreational uses, road and residential construction, and oil and gas activities, would result in short - to long - term, beneficial and adverse impacts on air quality, natural soundscape, geology and soils, vegetation, and cultural resources on lands adjacent to the Unit.</p>	<p>Under Alternative B, Proposed Action, the Roberts / Duke #1 flowline would be constructed. The proposed operation would disturb approximately 0.62 acres of these soils at the exit location to the bore, the trenched section, and the connection to the Bar M #2 well gathering system. Construction activities and eventual plugging and reclamation activities would result in short - to long - term, adverse impacts on air quality, natural soundscape, geology and soils, vegetation, and cultural resources localized around the project area. Cumulative impacts from cattle production, road and residential construction, commercial timber, recreational uses, and oil and gas activities would result in short - to long - term, adverse impacts on air quality, natural soundscape, geology and soils, vegetation, and cultural resources on lands adjacent to the Unit.</p>

3. 0. AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

Methodology

During project scoping, it was determined that the following topics will be carried forward for analysis:

- Natural Soundscape in the Unit
- Adjacent Landowners, Resources and Uses, focusing on an analysis of the following resources and values:
 - Air Quality
 - Natural Soundscape
 - Geology and Soils
 - Vegetation
 - Cultural Resources

This chapter is organized by impact topic. Under each impact topic, the affected environment is described, the methodology for assessing impacts is presented, the impacts under each alternative is given, a cumulative impact analysis is provided, and a conclusion is stated. The conclusion section summarizes all major findings and includes an impairment analysis. Impairment analyses are only performed 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 (pages 4 and 5).

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** (affecting the project area) 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 gathering lines. The intensity of impacts is provided only in assessing impacts on park resources and values. The intensity and type of impact is described as negligible, minor, moderate, or major, and as beneficial or adverse. For park resources and values being assessed, impact intensity threshold definitions are provided for negligible, minor, moderate, and major. Where the intensity of an impact can be described quantitatively, the numerical data are presented. However, most impact analyses are qualitative.

Cumulative Impacts

The Council on Environmental Quality (CEQ) regulations, which implement the National Environmental Policy Act of 1969 (42 U. S. C. 4321 *et seq.*), require assessment of cumulative impacts in the decision - making process for federal projects. 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 section. These descriptions should be used in conjunction with the discussion in the section titled Socioeconomics under the Heading Issues and Impact Topics Eliminated from Further Analysis on pages 14 and 15 of this EA that

describes past, present, and reasonably foreseeable oil and gas development in the analysis area.

NPS Development and Operations

Park developments that support visitor uses in the Menard Creek Unit include a two day - use areas, one birding hot spot area, and a hiking trail. These developments are located in two disjunct areas. One of these includes one of the day - use areas, and is approximately 7.5 miles to the east of the nearest oil and gas development associated with this Plan. The other group of visitor use improvements is much closer to the proposed operations. The parking lot of the Birdwatchers Trail is located approximately 0.5 miles from the nearest development associated with the proposed flowline to the southwest. However, the day - use area and birding hot spot are located at the end of the trail, which is approximately one mile from the nearest part of the proposed operation to the southwest. Visitor use is generally light in the winter months and relatively heavy in the spring.

Adjacent Land Uses

Of the land uses immediately adjacent to the Preserve, commercial and private forestry account for approximately 95 percent of the land area. (Harcombe and Callaway, 1997) Additional uses 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)

The Railroad Commission of Texas production data available for Liberty and Polk Counties during the period between January to November 2004 shows a total of 140 drilling permits issued. During the period between January to September 2004 there was a reported production of 3,775,173 bbl oil and condensate, and 70,134,377 mcf of natural gas from gas wells and casingheads in the two counties. There are three units of the Big Thicket National Preserve in the two counties; the Big Sandy Creek Unit, the Loblolly Unit, and the Menard Creek Corridor Unit. Please see the section on Socioeconomics under the heading Issues and Impact topics Eliminated from Further Analysis for a discussion of production over a wider geographic area.

3. 1. Impacts on Natural Soundscape in the Unit

Affected Environment

In 1998, the NPS measured ambient sound levels at 11 locations in the Preserve (Foch, 1999). Sound levels ranged from 35 to 43 decibels in the Preserve. According to Foch (1999), background sound levels in most of the Preserve are due to rustling of leaves. The measurements of sound level were not taken in any area of the Preserve analogous to the area in the Menard Creek Corridor Unit that would be impacted by the proposal. There is a state highway that runs through the Unit to the north of the surface location of the drill rig. The area has residential development on both sides of the highway, a cattle ranching operation on the northwest boundary of the Unit in the area, and the Unit is also crossed by a pipeline corridor that parallels the highway. Also, the Unit narrows to approximately 275 feet at the location of the bored section of pipeline. Therefore, natural quiet is not a significant feature of this part of the Preserve, but the NPS believes that it is still instructive to examine the data generated by the 1999 study to examine the attenuation of drilling sounds over distance. Figure 4 compares sound levels recorded at locations in the Preserve with other sounds, including that from a drilling rig at various distances. The rig Famcor proposes to use at the drilling site is much smaller than those used to drill oil and gas wells the table in Figure 4 is based upon, but the impact on the natural soundscape in the area is expected to be comparable.

Methodology

The report titled “Ambient Sound Levels at Big Thicket National Preserve during March-June 1998” by James D. Foch was used to predict the impacts of each alternative on the natural soundscape in the Unit. Ambient sounds were monitored and recorded at 11 locations within the Preserve to provide a basis for protecting natural soundscapes.

The thresholds of change for the intensity of an impact are defined as follows:

Negligible:	the impact is barely detectable.
Minor:	the impact is slight but detectable.
Moderate:	the impact is readily apparent.
Major:	the impact is severely adverse.

Figure 4. Sound Level Comparison Chart¹

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 Garbage disposal	90	
	Near drilling rig Automatic dishwasher Muffled jet ski @ 50 ft. Vacuum cleaner	80	
	Drilling rig @ 200 ft. Window air conditioner outside @ 2 ft.	70	
Quiet	Window air conditioner in room Drilling rig @ 800 ft. Normal conversation	60	
Sleep interference	Quiet home in evening	50	
	Bird calls Drilling rig @ 1500 ft. Library	40	Big Sandy Creek along Big Sandy Horse Trail 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	

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

Impacts on Natural Soundscape in the Unit under Alternative A, No Action

Under Alternative A, No Action, the Roberts / Duke #1 flowline would not be drilled; resulting in no new impacts on the natural soundscape in this area of Unit. However, existing impacts on the natural soundscape (from bird calls, wind, and rustling leaves) from recreational uses in and outside the Unit, park management functions inside the Unit, oil and gas activities in and outside the Unit, traffic noise, cattle production, road and residential construction, and timber management adjacent to the Unit would result in intermittent, short - term, negligible to moderate, adverse impacts.

Other sources of noise adjacent to the Unit may be from all - terrain vehicles, boats on the Trinity River, aircraft, and firearms.

These activities in and adjacent to the Unit would occasionally result in sounds that exceed the ambient sound levels in the Unit, resulting in localized, intermittent and short - term, negligible to moderate, adverse impacts on the natural soundscape in the Unit.

Cumulative Impacts

Under Alternative A, No Action, cumulative impacts on 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, traffic noise, cattle production, road and residential construction, and timber management activities adjacent to the Unit boundaries, would result in intermittent, short - term, negligible to moderate, adverse impacts, localized near sources. No impairment to natural soundscape in the Unit would result from implementation of this alternative.

Conclusion

Under Alternative A, No Action, the flowline would not be directionally drilled and installed; therefore, there would be no new impacts on natural soundscape in the Unit. However, existing impacts on the natural soundscape (from bird calls, wind, and rustling leaves) from recreational uses in and outside the Unit, park management functions inside the Unit, oil and gas activities in and outside the Unit, traffic noise, cattle production, road and residential construction, and timber management adjacent to the Unit would result in intermittent, short-term, negligible to moderate, adverse impacts. Cumulative impacts on natural soundscape inside 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, traffic noise, cattle production, road and residential construction, and timber management activities adjacent to the Unit boundaries, would result in intermittent, short - term, negligible to moderate, adverse impacts, localized near sources. No impairment to natural soundscape in the Unit would result from implementation of this alternative.

Impacts on Natural Soundscape in the Unit under Alternative B, Proposed Action

Under Alternative B, Proposed Action, the flowline would be directionally drilled, installed, and operated. Existing impacts on the natural soundscape within the Unit would be similar to Alternative A, No Action, with localized, intermittent and short - term, negligible to moderate, adverse impacts on the natural soundscape in the Unit.

Directional drilling of a segment of flowline, and construction of the remainder of the flowline by trenching two more segments, routine maintenance activities, and eventual reclamation activity would result in localized and short - term increases in noise associated with drilling equipment, vehicle traffic, and ground - disturbing activities. Elevated noise would be greatest during the

short - term (approximately 1 day) drilling of the bored section of flowline. Sound levels could reach up to 90 decibels at the drilling location. At 1,500 feet from the drill rig, sound levels would approach background levels ranging around 40 decibels (USDI, 1994). Noise levels would attenuate with increasing distance from the source(s). 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. Tree cover in the area is limited to the Unit for the most part other than shade trees in the yards of houses. Elevated noise during the drilling phase would result in localized, short - term, minor to moderate, adverse impacts on natural soundscapes within 1,500 feet of the drilling equipment. The Unit is only 275 feet wide at the site of the bored section of the flowline. The Unit boundary is approximately 500 feet from the location of the drill rig. This means that elevated noise could extend up to 1,200 feet into the Unit and onto the Bar M Ranch during the drilling phase. It is possible that on a calm day, the drilling could be heard farther than 1,500 feet from the drilling equipment. During the operation of the flowline to transport fluids to market, occasional maintenance operations could occur. Maintenance would increase noise levels, but at much lower intensity and duration than drilling the flowline. Maintenance operations would result in localized, long - term, negligible to minor, adverse impacts on the natural soundscape in the Unit.

Cumulative Impacts

Under Alternative B, Proposed Action, cumulative impacts 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, traffic noise, cattle production, road and residential construction, and timber management activities adjacent to the Unit boundaries would be similar to those described under No Action, with intermittent, short - term, negligible to moderate, adverse impacts on natural soundscape throughout the Unit, localized near sources.

Conclusion

Under Alternative B, Proposed Action, the Famcor Roberts / Duke #1 flowline would be directionally drilled, installed, and operated. Directional drilling of one segment of the flowline, trenching of the other two segments, maintenance, and eventual reclamation activities would result in short - to long - term, negligible to moderate, adverse impacts on natural soundscape, localized around sources. Cumulative impacts inside and contiguous to the Unit would be similar to those described under No Action, with intermittent, short - to long - term, negligible to moderate, adverse impacts on natural soundscape throughout the Unit localized near sources. No impairment to natural soundscape in the Unit would result from implementation of this alternative.

3. 2. Impacts on Adjacent Landowners, Resources and Uses

Affected Environment

The surface locations of the proposed Famcor Roberts / Duke #1 flowline would occupy lands owned by Famcor in the Six Lakes Subdivision and lands owned and managed by the Bar M Ranch. The main land uses in the project area are residential development, timber production, oil and gas activity, conservation, and pasture.

Methodology

The assessment of potential impacts on adjacent land uses and resources is based on best professional judgment and has been developed through discussions with staff from the National Park Service and through review of relevant literature.

Thresholds of change of the intensity of an impact are defined as follows:

- Negligible:** Adjacent land uses and resources would not be impacted, or changes in land use would be either non - detectable or if detected, would have effects that would be considered slight, local, and would likely be short - term as a result of nonfederal oil and gas operations occurring outside the Preserve.
- Minor:** Adjacent land uses and resources would have measurable impacts, although the changes would be small, would likely be short - term, and the effects would be localized. Mitigation measures, if needed to offset adverse effects of nonfederal oil and gas operations occurring outside the Preserve, would be simple and successful.
- Moderate:** Adjacent land uses and resources would have measurable impacts that would be long - term, and of consequence, but would be relatively local. Mitigation measures, to offset adverse effects of nonfederal oil and gas operations occurring outside the Preserve, would likely succeed.
- Major:** Adjacent land uses and resources would have readily measurable impacts, with substantial consequences, and be noticed on a regional scale. Mitigation measures would be necessary to offset the adverse effects of nonfederal oil and gas operations occurring outside the Preserve, and their success would not be guaranteed.

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

Under Alternative A, No Action, the Famcor Roberts / Duke #1 flowline would not be drilled; resulting in no new impacts on adjacent landowners, resources and uses; however, existing impacts would continue. Impacts on air quality, natural soundscapes, geology and soils, vegetation, and cultural resources are described below.

Air Quality. Existing impacts on air quality would continue as the result of vehicle use on lands in and outside of the Unit, recreational activities in and outside of the Unit (including use of all-terrain vehicles, and burning of campfires), park facility management, cattle production outside the Unit, residential and road construction, and commercial timber activities occurring adjacent to the Unit. The use of vehicles and other combustion engines, and fires would emit particulate matter, nitrogen oxides, carbon monoxide, carbon dioxide, and sulfur dioxide, resulting in intermittent, short - term, adverse impacts localized around point sources.

Natural Soundscape. Existing impacts on the natural soundscape would continue as a result of recreational uses in and outside the Unit, park management functions inside the Unit, oil and gas activities in and outside the Unit, traffic noise, cattle production, road and residential construction, and timber management adjacent to the Unit would result in intermittent, short - term, negligible to moderate, adverse impacts.

Geology and Soils. Existing impacts on geology and soils would continue as the result of recreational uses in and outside the Unit, park management functions inside the Unit, oil and gas activities in and outside the Unit, cattle production, road and residential construction, and timber management adjacent to the Unit. These activities would contribute towards compaction, rutting, and erosion of soil; and potential for contamination of soils from leaks and spills of oil and gas, and other contaminating substances, with short-term, adverse impacts localized near point sources. Timber and ranching activities could also have short - to long - term, beneficial impacts by producing timber, cattle, and maintaining prime farmland soils.

Vegetation. Existing impacts on vegetation would continue as the result of recreational uses in and outside the Unit, park management functions inside the Unit, oil and gas activities in and outside the Unit, cattle production, road and residential construction, and timber management adjacent to the Unit. These activities would contribute towards compaction, crushing and loss of vegetation. Vehicles could import non - native seed. These activities would result in localized, short - to long - term, adverse impacts. Commercial forestry activities could result in short - to long - term, beneficial impacts by producing timber.

Cultural Resources. Existing impacts on cultural resources would continue as the result of recreational uses in and outside the Unit, park management functions inside the Unit, oil and gas activities in and outside the Unit, cattle production, road and residential construction, and timber management adjacent to the Unit. If archeological surveys are not conducted and National Register of Historic Places - eligible sites are not avoided, ground - disturbing activities could uncover and damage undiscovered archeological materials, resulting in short - to long - term, adverse impacts to archeological resources localized at ground-disturbances.

Cumulative Impacts

Under Alternative A, No Action, cumulative impacts on adjacent landowners, resources and uses on lands adjacent to the Unit are expected to be characterized by localized, short - to long - term, adverse impacts on air quality and natural soundscape, geology and soils, vegetation, and cultural resources near sources and developments from commercial timber, ranching, road and residential construction, recreational, and oil and gas activities.

Air Quality. Cumulative impacts on air quality would result primarily from oil and gas operations in and adjacent to the Unit, timber management adjacent to the Unit, Preserve management practices, and road use within and adjacent to the Unit. Future oil and gas development to exploit the resources of the Six Lakes Field would be distributed over time. Other sources of air quality impacts would be from use of vehicles and other combustion engines, leaks and spills from oil and gas operations in and adjacent to the Unit, fires other than prescribed burns, recreational activities in and adjacent to the Unit including burning of campfires, and routine maintenance activities in the Unit including road maintenance and mowing. Cumulative, adverse impacts are expected to be localized near point sources, short-term, and not exceed National Ambient Air Quality Standards (NAAQS) established under the Clean Air Act.

Natural Soundscapes. Cumulative impacts on natural soundscape would result primarily from oil and gas operations in and adjacent to the Unit, timber management adjacent to the Unit, recreational activities in and adjacent to the Unit, aircraft passing overhead, and firearms during hunting season. Sound levels from these sources would range from 41 dBA (approximate ambient sound level in the Unit) to 140 dBA (for gunfire). Cumulative, adverse impacts are expected to be localized near point sources, intermittent and short - term.

Geology and Soils. Cumulative impacts on geology and soils would result primarily from oil and gas operations in and adjacent to the Unit, leaks and spills from oil and gas operations and transpark pipelines, timber management adjacent to the Unit, park developments, and use of all - terrain vehicles off roadways. Cumulative impacts on geology and soils are expected to be localized near developments, with short - to long - term, adverse impacts. In the event of a major spill from a pipeline, impacts could be widespread.

Vegetation. Cumulative impacts on vegetation would result from the same sources as described for geology and soils, resulting in short - to long - term, adverse impacts localized near developments. Similar to the description of cumulative impacts on geology and soils, in the event of a major spill from a pipeline, impacts on vegetation could be widespread.

Cultural Resources. Cumulative impacts on archeological resources could result from ground-disturbing activities where surveys are not performed so that sites are avoided or impacts are mitigated by excavation / data recovery, resulting in short - to long - term, adverse impacts localized near ground - disturbances.

Conclusion

Under Alternative A, No Action, the Roberts / Duke #1 flowline would not be drilled; therefore, there would be no new impacts on adjacent landowners, resources and uses. However, existing impacts from commercial timber, ranching, vehicles, oil and gas, and recreational uses would continue, resulting in localized, short - to long - term adverse impacts on air quality, natural soundscape, geology and soils, and vegetation. Cumulative impacts from commercial timber, recreational uses, ranching, road and residential construction, park management, and oil and gas activities, would result in short - to long - term, beneficial and adverse impacts on air quality, natural soundscape, geology and soils, vegetation, and cultural resources on lands adjacent to the Unit.

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

Under Alternative B, Proposed Action, the Roberts / Duke #1 flowline would be directionally drilled, installed, and operated to transport hydrocarbons. Existing impacts would be similar to Alternative A, No Action, with localized, short - to long - term, adverse impacts associated with vehicle use, oil and gas activity, ranching, recreational uses, park management activities, and commercial timber practices.

Impacts from drilling, installing, and operation of the flowline; and eventual abandonment / reclamation of the Roberts / Duke #1 flowline on air quality, natural soundscapes, geology and soils, vegetation, and cultural resources adjacent to the Unit are described below.

Air Quality. Drilling and installing the flowline would result in localized and short - term increases in particulate matter during ground - disturbing activities, and use of vehicles and other machinery. Emissions of particulate matter, nitrogen oxides, carbon monoxide, carbon dioxide, and sulfur dioxide would be greatest during the short - term (1 day) drilling of the bored section of flowline due to increased use of vehicles and large gasoline and diesel engines used to power the drill rig, pumps, and auxiliary equipment, resulting in short-term, adverse impacts on air quality, localized near the drilling site. Based on calculations by the NPS total organic compounds (TOC) emitted during the proposed drilling operation for 24 hours for an engine similar to the one used to power the directional rig used to bore the hole for the flowline would be approximately 768 grams. This figure is a tiny fraction of the emission threshold of 100 tons of total emissions per year. Neither the proposed trenching nor maintenance / reclamation activities have the potential to exceed this threshold. Prevailing winds are expected to dissipate emissions out of the area.

Natural Soundscapes. Impacts on the natural soundscape on lands adjacent to the Unit would be similar to those described above under Impacts on Natural Soundscapes in the Unit, and

result in short - to long - term, negligible to moderate, adverse impacts on natural soundscape, localized around sources.

Geology and Soils. Development of the Roberts / Duke #1 flowline outside the Unit would result in the short - term disturbance to geology and soils on up to 2.24 acres at the surface locations of drilling and trenching operations outside the boundary. Of this total 0.62 acres are considered prime farmland soils by the USDA NRCS.

Mitigation measures to protect soils during the drilling and transportation activities include complying with a SPCC Plan, constructing silt fencing and placing hay bales around the sites of surface disturbance, using a closed-loop containerized mud system, and disposing of drilling mud and well cuttings off-site. These measures are intended to minimize and contain any spilled substances. After the end of production activity, the area would be reclaimed. The proposed activities would result in localized, short - to long - term, adverse impacts on geology and soils on adjacent lands.

Vegetation. Impacts on vegetation outside the Unit would be similar to those described above for geology and soils. Construction of the flowline would result in clearing of vegetation on up to 2.24 acres. After the flowline is constructed the sites of surface disturbance will be reclaimed. The proposed activities would result in localized, short - to long - term, adverse impacts on vegetation on adjacent lands.

Cultural Resources. The NPS has no authority to require that Famcor survey proposed project areas outside the Unit boundary. The finding of No Historic Properties Affected by the SHPO was reached with a focus on the bored section of flowline alone. There would be ground - disturbing activities under the proposed Plan that affect areas outside the Unit boundary where no archaeological survey has been completed. Impacts on archeological resources outside the Unit would be similar to those described under Alternative A, No Action. Ground - disturbing activities could uncover archeological materials, and unless avoided or mitigated, could result in localized, short - to long - term, adverse impacts.

Cumulative Impacts

Under Alternative B, Proposed Action, cumulative impacts on adjacent landowners, resources and uses on lands adjacent to the Unit would be similar to those described under No Action, with localized, short - to long - term, adverse impacts on air quality and natural soundscape, geology and soils, vegetation, and cultural resources near sources and developments from commercial timber, ranching, road and residential construction, recreational, and oil and gas activities.

Conclusion

Under Alternative B, Proposed Action, the Roberts / Duke #1 flowline would be drilled and may be completed to produce hydrocarbons. The construction of the flowline on 2.24 acres would result in the conversion of up to 0.62 acres of prime farmland soils to oil and gas use. Construction activities; maintenance; and eventual abandonment and reclamation activities would result in short - to long - term, adverse impacts on air quality and natural soundscape, and short - to long - term, beneficial and adverse impacts to geology and soils and vegetation, localized around the project area. Cumulative impacts from commercial timber ranching, road and residential construction, recreational uses, and oil and gas activities would result in short - to long - term, adverse impacts on air quality, natural soundscape, geology and soils, vegetation, and cultural resources on lands adjacent to the Unit.

4. 0. CONSULTATION AND COORDINATION

Following public review and comment period for the Plan of Operations and Environmental Assessment, the NPS will consider written comments received. Copies of the decision document will be sent to those who provide substantive comment on the environmental assessment during the public review period, or to those who request a copy of the decision document.

4. 1. Individuals and Agencies Consulted

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

Raven Environmental Services

Famcor Oil, Inc.

Richard Hughart, Senior Geologist

National Park Service

Big Thicket National Preserve, Beaumont, TX

Art Hutchinson, Superintendent

Curtis Hoagland, Chief, Resources Management Division

Geologic Resources Division, Lakewood, CO

Carol McCoy, Chief, Branch of Planning, Evaluation and Permits

Pat O'Dell, Petroleum Engineer, Branch of Planning, Evaluation and Permits

Lisa Norby, Geologist, Branch of Planning, Evaluation and Permits

Intermountain Regional Office, Lakewood, CO

Cheryl Eckhardt, NEPA / Section 106 Specialist, Office of Planning and Environmental Quality

Railroad Commission of Texas, Oil and Gas Division, District 3

State Historic Preservation Office

U.S. Fish and Wildlife Service

U. S. Army Corps of Engineers

Texas Natural Resource Conservation Commission

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:

Chuck Rhinesmith, Alabama - Coushatta Tribe of Texas

Ellen Buchanan, Big Thicket Association

Richard Hughart, Famcor Oil and Gas, Inc.

National Park Service

Linda Dansby, Regional Minerals Coordinator, Intermountain Region, Santa Fe, NM

Cheryl Eckhardt, NEPA / Section 106 Specialist, Office of Planning and Environmental Quality, Intermountain Region, Lakewood, CO

Carol McCoy, Chief, Branch of Planning, Evaluation and Permits, Geologic Resources Division, Lakewood, CO

Debra Beene, Archeologist, State Historic Preservation Office, Austin, TX

Phyllis Dunham, Regional Director, Sierra Club, Austin, TX

Chris Wilhite, Associate Regional Representative, Sierra Club, Austin, TX

Brandt Mannchen, Chair, Big Thicket Committee, Lone Star Chapter, Sierra Club, Houston, TX
Janice Bezanson, Texas Committee on Natural Resources, Austin, TX
Edith Erfling, U. S. Fish and Wildlife Service, Clear Lake Field Office, Houston, TX
Bruce Bennett, U. S. Army Corps of Engineers, Galveston, TX
Guy Grossman, Railroad Commission of Texas, District 3, Houston, TX

4. 3. List of Preparers

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5. 0. BIBLIOGRAPHY

Cook, D.I. and D.R. Haverbeke. 1974. Tree-covered Land Forms for Noise Control. Research Bulletin 263. United States Department of Agriculture, Washington, D.C.

Dixie Environmental Services Company and National Park Service. 2003. Environmental Assessment of a Proposed 3-D Seismic Survey within the Big Sandy Creek, Menard Creek Corridor, and Hickory Creek Savannah Units of the Big Thicket National Preserve.

Environmental Protection Agency (EPA). 2004.
<http://www.epa.gov/oar/oaqps/greenbk/oncs.html#TEXAS>

Foch, James D. 1999. Ambient Sound Levels at Big Thicket National Preserve during March-June 1998. Prepared for the National Park Service, Big Thicket National Preserve.

Griffith, Kirby L. 1996. Soil Survey of Liberty County, Texas. United States Department of Agriculture, Natural Resources Conservation Service, in cooperation with the Texas Agricultural Research Station and Texas State Soil and Water Board.

Hall, Rosine W. and Paul A. Harcombe. 1997. Description of Land Cover/Land Use Map. Prepared for the National Park Service under Cooperative Agreement with Rice University, Houston, Texas.

Harcombe, P. A. and Glenda Callaway. 1997. Management Assessment of the Water Corridor Units of the Big Thicket National Preserve. Prepared for the National Park Service, Big Thicket National Preserve, under Cooperative Agreement with Rice University, Houston, Texas.

Harcombe, P. A. 1996. Characterization of the Biological Resources of the Water Corridor Units, Big Thicket National Preserve, Department of Ecology and Evolutionary Biology Rice University, Under Cooperative Agreement with the National Park Service, Big Thicket National Preserve.

Hughart, Richard D. 2004. Plan of Operations for the Roberts / Duke #1 Flowline, Liberty and Polk Counties, Texas. Famcor Oil, Inc.

Komarek, E. V. 1970. Controlled Burning and Air Pollution: An Ecological Review. Proc. Tall Timbers Fire Ecol. Conf. 10: 141-173.

Lower Neches Valley Authority (LNVA). 1999. Lower Neches River Basin, Draft 1999 Basin Summary Report. Texas Clean Rivers Program.

McEwen, Harry, Kirby Griffith, and Jesse D. Deshotels. n.d. Soil Survey of Polk and San Jacinto Counties, Texas. United States Department of Agriculture, Soil Conservation Service, in cooperation with the Forest Service and the Texas Agricultural Experiment Station.

PBS&J. 2003. Pre-operational Assessment of Vegetation in the Big Sandy Creek Unit of Big Thicket National Preserve, Polk County, Texas.

Radian Corporation. 1984. Location and Characterization of Active and Abandoned Oil and Gas Activity in Big Thicket National Preserve. NPS Contract No. CX-0001-4-0068. Prepared for the National Park Service, Energy, Mining, and Minerals Division.

Railroad Commission of Texas (RRC). 2004.
<http://www.rrc.state.tx.us/divisions/og/information-data/wkly-qtry-monthly-reports/produc-drill/>

U.S. Department of the Interior, Bureau of Land Management. 1994. Final Environmental Impact Statement: Miccosukee 3-1 Exploratory Well, Broward County, Florida. Prepared with the assistance of Dames and Moore and in cooperation with the Bureau of Land Management and Bureau of Indian Affairs.

U.S. Department of the Interior, U. S. Geological Survey. 2000 Remaining Oil and Gas Resources Beneath Big Thicket National Preserve. Prepared for the National Park Service, Big Thicket National Preserve.

U.S. Department of the Interior, National Park Service. 2004. Draft Environmental Impact Statement / Oil and Gas Management Plan.

U.S. Department of the Interior, National Park Service. 2001. Management Policies.

U.S. Department of the Interior, National Park Service. 2001. Director's Order #12 Handbook.

U.S. Department of the Interior, National Park Service. 1996. Resources Management Plan, Big Thicket National Preserve.

U.S. Department of the Interior, National Park Service. 1980. General Management Plan, Big Thicket National Preserve.

6.0 APPENDIX ONE
State - and Federally - Listed Threatened and Endangered Species

POLK COUNTY

*** BIRDS ***

Arctic Peregrine Falcon (<i>Falco peregrinus tundrius</i>) - potential migrant	DL	T
Bachman's Sparrow (<i>Aimophila aestivalis</i>) - open pine woods with scattered bushes or understory, brushy or overgrown hillsides, overgrown fields with thickets and brambles, grassy orchards; nests on ground against grass tuft or under low shrub		T
Bald Eagle (<i>Haliaeetus leucocephalus</i>) – found primarily near seacoasts, rivers, and large lakes; nests in tall trees or on cliffs near water; communally roosts, especially in winter; hunts live prey, scavenges, and pirates food from other birds	LT-PDL	T
Henslow's Sparrow (<i>Ammodramus henslowii</i>) - wintering individuals (not flocks) found in weedy fields or cut-over areas where lots of bunch grasses occur along with vines and brambles; a key component is bare ground for running/walking		
Red-cockaded Woodpecker (<i>Picoides borealis</i>) - cavity nests in older pine (60+ years); forages in younger pine (30+ years); prefers longleaf, shortleaf, & loblolly	LE	E
Swallow-tailed Kite (<i>Elanoides forficatus</i>) – lowland forested regions, especially swampy areas, ranging into open woodland; marshes, along rivers, lakes, and ponds; nests high in tall tree in clearing or on forest woodland edge, usually in pine, cypress, or various deciduous trees		T
Wood Stork (<i>Mycteria americana</i>) - forages in prairie ponds, flooded pastures or fields, ditches, and other shallow standing water, including salt-water; usually roosts communally in tall snags, sometimes in association with other wading birds (i.e. active heronries); breeds in Mexico and birds move into Gulf States in search of mud flats and other wetlands, even those associated with forested areas; formerly nested in Texas, but no breeding records since 1960		T

FISHES

Creek Chubsucker (<i>Erimyzon oblongus</i>) – small rivers and creeks of various types; seldom in impoundments; prefers headwaters, but seldom occurs in springs; young typically in headwater rivulets or marshes; spawns in river mouths or Planls, riffles, lake outlets, upstream creeks		T
Paddlefish (<i>Polyodon spathula</i>) - prefers large, free-flowing rivers, but will frequent impoundments with access to spawning sites; spawns in fast, shallow water over gravel bars; larvae may drift from reservoir to reservoir		T

POLK COUNTY cont.

Federal Status	State Status
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***** MAMMALS *****

Plains Spotted Skunk (*Spilogale putorius interrupta*) – catholic in habitat; open fields, prairies, croplands, fence rows, farmyards, forest edges, and woodlands; prefers wooded, brushy areas and tallgrass prairie

Rafinesque's Big-eared Bat (*Corynorhinus rafinesquii*) - roosts in cavity trees of bottomland hardwoods, concrete culverts, and abandoned man-made structures

T

Southeastern Myotis Bat (*Myotis austroriparius*) - roosts in cavity trees of bottomland hardwoods, concrete culverts, and abandoned man-made structures

***** REPTILES *****

Alligator Snapping Turtle (*Macrochelys temminckii*) - deep water of rivers, canals, lakes, and oxbows; also swamps, bayous, and ponds near deep running water; sometimes enters brackish coastal waters; usually in water with mud bottom and abundant aquatic vegetation; may migrate several miles along rivers; active March-October; breeds April-October

T

Louisiana Pine Snake (*Pituophis ruthveni*) - mixed deciduous-longleaf pine woodlands; breeds April-September

C1

T

Texas Horned Lizard (*Phrynosoma cornutum*) - most likely introduced; open, arid and semi-arid regions with sparse vegetation, including grass, cactus, scattered brush or scrubby trees; soil may vary in texture from sandy to rocky; burrows into soil, enters rodent burrows, or hides under rock when inactive; breeds March-September

T

Timber/Canebrake Rattlesnake (*Crotalus horridus*) - swamps, floodplains, upland pine and deciduous woodlands, riparian zones, abandoned farmland; limestone bluffs, sandy soil or black clay; prefers dense ground cover, i.e. grapevines or palmetto

T

***** VASCULAR PlanTS *****

Texas screwstem (*Bartonia texana*) – sandy soils in dry mesic pine or mixed pine-oak forests and forest borders; usually in fire-maintained longleaf pine savannas, but also in more mesic habitats; flowering (June-?)

Texas trailing phlox (*Phlox nivalis* ssp. *texensis*) - endemic; deep sandy soils in fire-maintained openings in upland longleaf pine savannas or bluejack oak woodlands; flowering March-early April

LE

E

Status Key:

LE,LT - Federally Listed Endangered/Threatened

PE,PT - Federally Proposed Endangered/Threatened

E/SA,T/SA - Federally Endangered/Threatened by Similarity of Appearance

C1 - Federal Candidate, Category 1; information supports proposing to list as endangered/threatened

DL,PDL - Federally Delisted/Proposed for Delisting
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Species appearing on these lists do not all share the same probability of occurrence. Some species are migrants or wintering residents only, or may be historic or considered extirpated.

LIBERTY COUNTY

Federal State
Status Status

***** DRAFT ***** DRAFT ***** DRAFT***** DRAFT ***** DRAFT ***** DRAFT*****
UNDER CONSTRUCTION ***** SPECIES MAY BE ADDED/DELETED WITH
QUALITY CONTROL

*** AMPHIBIANS ***

Houston Toad (<i>Bufo houstonensis</i>) - endemic; species sandy substrate, water in pools, ephemeral pools, stock tanks; breeds in spring especially after rains; burrows in soil when inactive; breeds February-June; associated with soils of the Sparta, Carrizo, Goliad, Queen City, Recklaw, Weches, and Willis geologic formations	LE	E
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*** BIRDS ***

American Peregrine Falcon (<i>Falco peregrinus anatum</i>) - potential migrant; nests in west Texas	DL	E
Arctic Peregrine Falcon (<i>Falco peregrinus tundrius</i>) - potential migrant	DL	T
Bachman's Sparrow (<i>Aimophila aestivalis</i>) - inhabits mature open pine forests with grassy understory, regenerating pine clear-cuts (1-7 years post re-planting), or open habitats with a dense ground cover of grasses and forbs, or palmetto scrub; in Texas, known to occur only in the far eastern portion of the state; most abundant in forests south of Angelina National Forest		T
Bald Eagle (<i>Haliaeetus leucocephalus</i>) - found primarily near seacoasts, rivers, and large lakes; nests in tall trees or on cliffs near water; communally roosts, especially in winter; hunts live prey, scavenges, and pirates food from other birds	LT- PDL	T
Henslow's Sparrow (<i>Ammodramus henslowii</i>) - wintering individuals (not flocks) found in weedy fields or cut-over areas where lots of bunch grasses occur along with vines and brambles; a key component is bare ground for running/walking		
Red-cockaded Woodpecker (<i>Picooides borealis</i>) - cavity nests in older pine (60+ years); forages in younger pine (30+ years); prefers longleaf, shortleaf, & loblolly	LE	E
Swallow-tailed Kite (<i>Elanoides forficatus</i>) - lowland forested regions, especially swampy areas, ranging into open woodland; marshes, along rivers, lakes, and ponds; nests high in tall tree in clearing or on forest woodland edge, usually in pine, cypress, or various deciduous trees		T
White-faced Ibis (<i>Plegadis chihi</i>) - prefers freshwater marshes, sloughs, and irrigated rice fields, but will attend brackish and saltwater habitats; nests in marshes, in low trees, on the ground in bulrushes or reeds, or on floating mats		T
Wood Stork (<i>Mycteria americana</i>) - forages in prairie ponds, flooded pastures or fields, ditches, and other shallow standing water, including salt-water; usually roosts communally in tall snags, sometimes in association with other wading birds (i.e. active heronries); breeds in Mexico and birds move into Gulf States in search of mud flats and other wetlands, even those associated with		T

forested areas; formerly nested in Texas, but no breeding records since 1960

Texas Parks & Wildlife
Annotated County Lists of Rare Species
61

Last Revision: 25 Sep 2004
Page 2 of

LIBERTY COUNTY

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*** BIRDS-RELATED ***

Colonial waterbird nesting areas - many rookeries active annually

*** FISHES ***

American Eel (*Anguilla rostrata*) - most aquatic habitats with access to ocean; spawns January-February in ocean, larva move to coastal waters, metamorphose, then females move into freshwater; muddy bottoms, still waters, large streams, lakes; can travel overland in wet areas; males in brackish estuaries

Creek Chubsucker (<i>Erimyzon oblongus</i>) - small rivers and creeks of various types; seldom in impoundments; prefers headwaters, but seldom occurs in springs; young typically in headwater rivulets or marshes; spawns in river mouths or pools, riffles, lake outlets, upstream creeks	T
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Paddlefish (<i>Polyodon spathula</i>) - prefers large, free-flowing rivers, but will frequent impoundments with access to spawning sites; spawns in fast, shallow water over gravel bars; larvae may drift from reservoir to reservoir	T
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*** MAMMALS ***

Black Bear (<i>Ursus americanus</i>) - within historical range of Louisiana Black Bear in eastern Texas, Black Bear is federally listed threatened and inhabits bottomland hardwoods and large tracts of undeveloped forested areas; in remainder of Texas, Black Bear is not federally listed and inhabits desert lowlands and high elevation forests and woodlands; dens in tree hollows, rock piles, cliff overhangs, caves, or under brush piles	T/S A; NL	T
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Louisiana Black Bear (<i>Ursus americanus luteolus</i>) - possible as transient; bottomland hardwoods and large tracts of inaccessible forested areas	LT	T
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Rafinesque's Big-eared Bat (<i>Corynorhinus rafinesquii</i>) - roosts in cavity trees of bottomland hardwoods, concrete culverts, and abandoned man-made structures		T
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Red Wolf (<i>Canis rufus</i>) (extirpated) - formerly known throughout eastern half of Texas in brushy and forested areas, as well as coastal prairies	LE	E
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Southeastern Myotis Bat (<i>Myotis austroriparius</i>) - roosts in cavity trees of bottomland hardwoods, concrete culverts, and abandoned man-made structures		
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Louisiana Pine Snake (<i>Pituophis ruthveni</i>) - mixed deciduous-longleaf pine woodlands; breeds April-September	C1		T
Northern Scarlet Snake (<i>Cemophora coccinea copei</i>) - mixed hardwood scrub on sandy soils; feeds on reptile eggs; semi-fossorial; active April-September			T
Texas Diamondback Terrapin (<i>Malaclemys terrapin littoralis</i>) - coastal marshes, tidal flats, coves, estuaries, and lagoons behind barrier beaches; brackish and salt water; burrows into mud when inactive; may venture into lowlands at high tide			
Texas Horned Lizard (<i>Phrynosoma cornutum</i>) - open, arid and semi-arid regions with sparse vegetation, which could include grass, cactus, scattered brush or scrubby trees; soil may vary in texture from sandy to rocky; burrows into soil, enters rodent burrows, or hides under rock when inactive; breeds March-September			T
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